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COUNTY OF SANTA BARBARA
AGREEMENT FOR:
General Services Project No. 20041
County of Santa Barbara
IRC Expansion and ADA Upgrades
4436 Calle Real, Santa Barbara, CA 93110
BC: _____-_____

THIS AGREEMENT ("Agreement") is made by and between the County of Santa Barbara, a political subdivision of the State of California ("**COUNTY**"), and **ProWest PCM, Inc. dba ProWest Constructors** ("**CONTRACTOR**" and together with COUNTY, collectively, the "Parties" and each individually a "Party"), for the completion of the Work (defined below), on the following terms, conditions, and provisions. All references in the General Terms to the "Agreement" shall have the meaning ascribed to the term "Agreement" in the immediately preceding sentence.

1. CONTRACT: This Agreement incorporates by reference all of the General Conditions and Special Conditions, Specifications and Drawings provided by the COUNTY for the **IRC Expansion and ADA Upgrades**, Project No. **20041**, the Invitation for Bids as amended by Addenda Number **1 and 2**, the Bid Bond, the Performance Bond, the Payment Bond, and the bid documents executed and submitted by the CONTRACTOR for the Project ("Bid"), to the extent the Bid is consistent with the provisions of this Agreement other than the Bid (all of the foregoing documents, together with this Agreement, collectively, the "Contract" or "Contract Documents"). A copy of each of the General and Special Conditions, Specifications and Drawings provided by the COUNTY for the **IRC Expansion and ADA Upgrades, Project Number 20041**, the Notice to Bidders, the Bid Bond, the Performance Bond, and the Payment Bond are attached hereto as EXHIBIT A, and a copy of the Bid is attached hereto as EXHIBIT B. All capitalized terms used but not defined herein shall have the respective meanings ascribed to such terms in the Notice to Bidders. Copies of all Contract Documents are on file in the Department of General Services Office of the COUNTY, and have been and will be made available to the CONTRACTOR during the term of this Agreement. CONTRACTOR acknowledges receipt of all Contract Documents.

2. WORK: CONTRACTOR, at CONTRACTOR's own cost and expense, shall perform all the work described in the Contract Documents ("Work"), and shall furnish all equipment and materials necessary to perform and complete the Work, in a good and workmanlike manner and to the satisfaction of the Director of the COUNTY's General Services Department ("Director"), or the Director's designee, all in strict accordance with the Contract Documents.

3. EXCAVATIONS: Before any pavement resurfacing, displacement, or excavation of the ground that may be required in connection with the Work under this Contract, the CONTRACTOR shall obtain an inquiry identification number by calling Underground Service Alert (USA) 1 (800) 422-4133 or by such other means as may be required; shall conform to all requirements of Sections 4215 through 4217 of the Government Code regarding any such pavement resurfacing, displacement or excavation, including the payment of any fees required; and shall facilitate performance by the COUNTY of any obligation required of the COUNTY under the Government Code. There shall be no performance under this Contract by either party hereto unless and until CONTRACTOR complies with all of the foregoing provisions of this Sections 3, and notifies the County Representative (defined below) in writing regarding such compliance.

4. COUNTY REPRESENTATIVE: The "County Representative" referred to in the Contract Documents is **Fernando Orta**.

5. PAYMENT: As full compensation for furnishing all labor, supervision, overhead, materials, and equipment and for completing all of the Work contemplated by this Contract, and subject to adjustments and liquidated damages, if any, as provided in the Contract Documents, the base amount to be paid to the CONTRACTOR for satisfactory completion of all requirements of the CONTRACTOR under this Contract is and shall be **SIX MILLION, TWENTY FOUR THOUSAND, TWO HUNDRED AND FORTY SIX DOLLARS AND ZERO CENTS ($6,024,246.00)** ("Base Contract Amount"), to be paid as provided in the Contract Documents. CONTRACTOR assumes and will provide against any loss or damage arising out of the nature of the Work undertaken, or the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered in the performance of the Work until its acceptance by the COUNTY, and assumes any and all expenses incurred by or in consequence of suspension or discontinuance of the Work, for well and faithfully completing the Work and the whole thereof, in the manner and

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to the requirements of the Contract and directions of the County Representative to the extent not inconsistent with any provisions of the Contract Documents.

6. **RIGHT TO AUDIT**: CONTRACTOR shall maintain and make available all books, papers, records, detail costs, estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractors, and financial records related to or which arise in connection with the Contract (collectively, the "Records"). The form of record keeping with respect to the Records shall be subject to approval by COUNTY. The Records shall be made available during normal business hours for examination by COUNTY or the County Representative and shall be retained at CONTRACTOR'S principal place of business in California for audit during normal business hours at such place for four (4) years after the recording of the Notice of Completion for the Project. CONTRACTOR shall provide an office in which COUNTY and the County Representative may conduct such audit(s).

The COUNTY will have the right to audit CONTRACTOR'S Project records. Records must be made available in a form satisfactory to the Santa Barbara County Auditor-Controller.

7. EXTRA WORK: Extra work and materials, may only be authorized via written Change Order(s) duly executed by the Director or his designee in accordance with Section 30, below, including Change Order(s) providing for compensation in addition to the Base Contract Amount; *provided*, *however*, that the aggregate amount of such compensation in addition to the Base Contract Amount that may be authorized by the Director or his designee pursuant to duly executed Change Orders shall not exceed **$313,712.30** ("Contingency Amount"). Compensation in such other equitable amount as is appropriate for the requirements of the COUNTY may be authorized by resolution or minute order of the Santa Barbara County Board of Supervisors.

8. COMPLIANCE WITH LAW: CONTRACTOR shall keep fully informed of, and shall at all times during the Term (defined below) ensure the performance of the Work is in compliance with, all laws, statutes, ordinances, decrees, orders, and regulations which do or may affect the Project, performance of the Work, the materials used therein, or persons engaged in connection therewith, and all such orders of bodies and tribunals having any jurisdiction over same (collectively, "Applicable Laws"). If CONTRACTOR has reason to believe that any provision of the Contract Documents conflict with any Applicable Law(s), the CONTRACTOR shall immediately report same to the County Representative in writing. CONTRACTOR shall at all times observe and comply with, and shall cause all agents, employees, and subcontractors to observe and comply with, all Applicable Laws. CONTRACTOR acknowledges and shall comply with the provisions of Sections 9364 and Sections 9550 and 9566, inclusive, of the Civil Code of California.

9. PAYMENTS NOT ACCEPTANCE: No certificate given or payments made under this Contract, except the final payment hereunder, shall be evidence of the performance of this Contract, either wholly or in part, against any claim upon CONTRACTOR. Final payment for the Work performed under this Contract shall not be made until the lapse of thirty (30) days after the Notice of Completion of the Work has been filed for record and no payment shall be construed to be acceptance of any defective Work or improper materials. CONTRACTOR agrees that the payment for final quantities due under this Contract and the payment of amounts due for any Work in accordance with this Contract shall release the COUNTY from any claims or liabilities on account of Work performed under this Contract, as the same may be amended from time to time during the Term. In addition to guarantees required elsewhere, CONTRACTOR shall and does hereby guarantee all workmanship and material to be free of defects and fit for the purposes intended for a period of one year from and after both the date of acceptance of the work and the recordation of the Notice of Completion by the COUNTY and CONTRACTOR shall repair or replace all Work and materials, together with any other portions of the Work which may be displaced in so doing, that, in the opinion of the County Representative, is or becomes defective during the period of said guarantee, without expense whatsoever to the COUNTY.

10. PREVAILING WAGE RATES: Rates of wages, including overtime, holiday, and Sunday rates provided for the Work shall comply with and are subject to the California Labor Code, Sections 1770 et. seq., Executive Orders of the President of the United States No. 9240, dated September 9, 1942, and No. 9250, dated October 3, 1942, and to any modifications thereof, and to and any orders of the President or any authorized Federal Officer or agency, insofar as the same may apply to this Contract.

No contractor or subcontractor may be listed on a bid for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. This Project is subject to compliance monitoring and enforcement by the Department of

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Industrial Relations.

11. CONTRACT DOCUMENTS ACKNOWLEDGED: CONTRACTOR hereby declares that CONTRACTOR has read the Contract Documents, has carefully examined the plans and detailed drawings of the Work to be performed, and fully understands the intent and meaning of the same.

12. TIME FOR COMMENCEMENT, COMPLETION: The term of this Contract shall commence effective as of the first date that this Agreement is duly executed by all of the parties hereto ("Effective Date") and shall terminate on the date that is **676** calendar days after the Effective Date unless earlier terminated in accordance with the provisions of this Agreement ("Term"). As soon as practicable after the Contract has been executed by both the CONTRACTOR and the COUNTY, a Notice to Proceed will be issued by the County Representative stating the starting date of work performance under the Contract ("Work Start Date"). CONTRACTOR shall complete all Work specified in the Contract Documents within **456** calendar days after the Work Start Date ("Contract Time" as that term is used in the General Conditions). The provisions of this Agreement pertaining to Liquidated Damages shall apply in the event of the CONTRACTOR's failure to complete the Work within the Contract Time. In the event that CONTRACTOR does not complete the Work during the Term, CONTRACTOR shall only be paid for the Work actually performed during the Term and accepted by COUNTY in accordance with the provisions of this Agreement.

13. WORKERS' COMPENSATION INSURANCE: CONTRACTOR certifies that CONTRACTOR has knowledge of, is in compliance with, and warrants that CONTRACTOR at all times during the Term shall remain in compliance with, the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for Workers' Compensation or to undertake self-insurance by the provisions of that Code. CONTRACTOR shall comply with such provisions before commencing the performance of the Work.

14. PROGRESS PAYMENT; NO WAIVER FOR DELAY: Any progress payment made after the scheduled completion date for the Work shall not constitute a waiver of any liquidated damages under this Contract.

15. GUARANTEE BONDS: Before any performance under this Contract, the CONTRACTOR shall provide the security required by statute for the payment of all workers and suppliers, and security for the faithful performance of all terms and conditions of this Contract, in an amount and form approved by the COUNTY. Both securities shall contain provisions that automatically increase amounts thereof and/or time of completion or both for all change orders, extensions, and additions to the Work provided under this Contract.

16. DISPUTES: Should any dispute(s) arise respecting the construction or meaning of any of the plans or specifications affecting the Work or respecting the true value of any extra work or work omitted, such dispute(s) shall be resolved by the Director of the COUNTY's General Services Department or his Assistant Director of General Services designee ("Director"), whose decision shall be final and binding upon the parties hereto. If, after the decision of the Director as provided herein, claims (as defined in Public Contracts Code Section 20104) under this Contract are filed by CONTRACTOR against COUNTY, and those claims are in the aggregate amount of $375,000 or less, such claims shall be resolved under Public Contracts Code Sections 20104 through 20104.8, inclusive.

17. SURVIVAL: All provisions of this Contract which by their nature are intended to survive the termination or expiration of this Agreement shall survive such termination or expiration.

18. INDEMNIFICATION AND INSURANCE: CONTRACTOR shall at all times comply with the indemnification and insurance provisions set forth in EXHIBIT C, attached hereto and incorporated herein by reference.

19. TAXES: CONTRACTOR shall pay all taxes, levies, duties, and assessments of every nature due in connection with any Work under this Contract, and shall make any and all payroll deductions required by law. CONTRACTOR is responsible for all CONTRACTOR personnel and for the payment of their compensation, including, if applicable, withholding of income taxes, and the payment and withholding of social security and other payroll taxes, unemployment insurance, workers' compensation insurance payments, and disability benefits. In no event shall COUNTY pay or be responsible for any taxes imposed on, or with respect to, CONTRACTOR's income, revenues, gross receipts, personnel, real or personal property, or other assets. COUNTY shall not be responsible for paying any taxes on CONTRACTOR's behalf, and should COUNTY be required to do so by state, federal, or local taxing agencies, CONTRACTOR agrees to promptly reimburse COUNTY for the full value of such paid taxes plus interest and penalty, if any. These taxes shall include, but not be limited to, the following: FICA (Social Security), unemployment insurance contributions, income tax, disability insurance, and workers' compensation insurance.

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20. **CONFLICT OF INTEREST**: CONTRACTOR covenants that CONTRACTOR presently has no employment or interest and shall not acquire any employment or interest, direct or indirect, including any interest in any business, property, or source of income, which would conflict in any manner or degree with the performance of Word required to be performed under this Contract. CONTRACTOR further covenants that in the performance of this Contract, no person having any such interest shall be employed by CONTRACTOR. CONTRACTOR must promptly disclose to COUNTY, in writing, any potential conflict of interest. COUNTY retains the right to waive a conflict of interest disclosed by CONTRACTOR if COUNTY determines it to be immaterial, and such waiver is only effective if provided by COUNTY to CONTRACTOR in writing.

21. **NONDISCRIMINATION**: COUNTY hereby notifies CONTRACTOR that COUNTY's Unlawful Discrimination Ordinance (Article XIII of Chapter 2 of the Santa Barbara County Code) applies to this Contract and is incorporated herein by this reference with the same force and effect as if the ordinance were specifically set out herein and CONTRACTOR agrees to comply with said ordinance.

22. **NON-ASSIGNMENT**: CONTRACTOR shall not assign, subcontract, delegate, or otherwise transfer, directly or indirectly, whether by operation of law or otherwise ("Transfer") this Contract, in whole or in part,, or any of CONTRACTOR's rights or obligations under this Contract, without the prior written consent of COUNTY in each instance. Any attempted or purported Transfer in violation of this Section 24, or in violation of Section 2.08 of the General Conditions, attached hereto as part of Exhibit A, shall be null and void and without legal effect and shall constitute grounds for termination by COUNTY. No Transfer shall relieve CONTRACTOR of any of its obligations hereunder.

23. **SEVERABILITY**: If any one or more of the provisions contained in the Contract shall for any reason be held to be invalid, illegal or unenforceable in any respect by a court of competent jurisdiction, then such provision or provisions shall be deemed severable from the remaining provisions hereof, and such invalidity, illegality or unenforceability shall not affect any other provision hereof, and this Contract shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

24. **TIME IS OF THE ESSENCE**: Time is of the essence in this Contract, and each covenant and term is a condition herein.

25. **ENTIRE AGREEMENT AND AMENDMENT**: The Contract Documents, as may be modified from time to time during the Term by duly authorized and executed Change Orders in accordance with the provisions of this Agreement and the General Terms, contain the entire understanding and agreement of the Parties with respect to the subject matter hereof and thereof, and there have been no promises, representations, agreements, warranties or undertakings by any of the Parties, either oral or written, of any character or nature hereafter binding except as set forth herein and therein. This Contract may be altered, amended or modified only by an instrument in writing, duly executed by each of the Parties, and by no other means, except as otherwise set forth in Section 30, below, to the extent such delegated authority is expressly authorized by the COUNTY Board of Supervisors in approving this Contract. Each Party waives its future right to claim, contest or assert that this Agreement was modified, canceled, superseded, or changed by any oral agreements, course of conduct, waiver or estoppel.

26. **EXECUTION OF COUNTERPARTS**: This Contract may be executed electronically and in any number of counterparts, and each of such counterparts shall for all purposes be deemed to be an original; and all such counterparts, or as many of them as the Parties shall preserve undestroyed, shall together constitute one and the same instrument.

27. **SUBCONTRACTORS**: CONTRACTOR is authorized to subcontract with only the subcontractor(s) identified in the Bid as attached hereto and as set forth in Exhibit B ("Subcontractors"). Contractor shall be fully responsible for all services and Work performed by its Subcontractors. Contractor shall secure from each of its Subcontractors legally binding written agreements to comply with the provisions of this Agreement pertaining to CONTRACTOR's obligations as if such obligations pertained to such Subcontractor, including, but not limited to, audit obligations.

28. **CHANGE ORDERS**: No Change Order shall be valid or enforceable against the COUNTY unless in the form of the Form of Change Order attached here as Exhibit **D** and duly executed by both CONTRACTOR and the Director. in accordance with this Section 30 and Article 13 of the General Conditions ("Change Order").

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29. **FLEET REQUIREMENTS**: Vehicles with a Gross vehicle weight rating ("GVWR") greater than 8,500 lbs. and light-duty package delivery vehicles operated in California may be subject to the California Air Resources Board ("CARB") Advanced Clean Fleets regulations. Such vehicles may therefore be subject to requirements to reduce emissions of air pollutants. For more information, please visit the CARB Advanced Clean Fleets webpage at https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets. Contractor shall at all times have a valid Certificate of Reported Compliance, as described in section 2449(n) of Title 13 of the California Code of Regulations ("CARB Certificate of Compliance"), and shall confirm that each subcontractor listed in Contractor's Bid has a valid CARB Certificate of Compliance, for each fleet of vehicles subject to 13 CCR section 2449 that may be used in performance of this Contract. No such vehicle is permitted on the project site unless and until Contractor provides County with a valid Certificate of Reported Compliance applicable to such vehicle.

30. **ORDER OF PRECEDENCE**: In the event of conflict between the provisions contained in the numbered sections 1 through 34 of this Agreement ("Numbered Section") and the provisions contained in the Exhibits, the provisions contained in the Numbered Sections of this Agreement shall prevail over those in the Exhibits other than Exhibit C, which Exhibit C shall control and prevail over all other provisions of this Contract. CONTRACTOR agrees that in the event of any discrepancy, inconsistency, gap, ambiguity, or conflicting language between the Bid attached hereto as Exhibit B, on the one hand, and any other provision(s) of this Contract on the other, the provisions of this Contract (including the Numbered Sections of this Agreement, Exhibit A, and Exhibit C) other than Exhibit B shall take precedence and control and prevail over the provisions of the Bid attached hereto as Exhibit B.

31. **TERMINATION.**

A. COUNTY may, by written notice to CONTRACTOR, terminate this Contract in whole or in part at any time, whether for COUNTY's convenience, for nonappropriation of funds, or because of the failure of CONTRACTOR to fulfill its obligations hereunder.

1. **For Convenience.** COUNTY may terminate this Contract in whole or in part upon thirty (30) days' written notice. During such thirty (30) day period, CONTRACTOR shall, as directed by COUNTY, wind down and cease Work as quickly and efficiently as reasonably possible, without performing unnecessary services or activities and by minimizing negative effects on COUNTY from such winding down and cessation of Work.

2. **For Nonappropriation of Funds.** Notwithstanding any other provision of this Contract, in the event that no funds or insufficient funds are appropriated or budgeted by federal, State or COUNTY governments, or sufficient funds are not otherwise available for payments hereunder in the fiscal year(s) covered by the Term of this Agreement, then COUNTY will notify CONTRACTOR of such occurrence, and COUNTY may terminate or suspend this Contract in whole or in part, with or without a prior notice period. Subsequent to termination of this Contract under this provision, COUNTY shall have no obligation to make payments with regard to the remainder of the Term.

3. **For Cause.** Should CONTRACTOR default in the performance of this Contract or materially breach any of the provisions hereof, COUNTY may, at COUNTY's sole option, terminate or suspend this Contract in whole or in part upon written notice ("Termination Notice"). Upon receipt of such Termination Notice, CONTRACTOR shall immediately discontinue all Work (unless otherwise directed in such Termination Notice) and notify COUNTY in writing of the status of CONTRACTOR's performance of Work hereunder. The date of termination shall be the date the Termination Notice is received by CONTRACTOR, unless the Termination Notice directs otherwise.

B. Upon termination, CONTRACTOR shall deliver to COUNTY all data, estimates, graphs, summaries, reports, and all other property, records, documents or papers as may have been accumulated or produced by CONTRACTOR in performing this Contract, whether completed or in process, except such items as COUNTY may, by written permission, permit CONTRACTOR to retain. Notwithstanding any other payment provision of this Contract, COUNTY shall pay CONTRACTOR for satisfactory Work performed as of the date of termination to include a prorated amount of compensation due hereunder less payments, if any, previously made. In no event shall CONTRACTOR be paid an amount in excess of the Maximum Contract Amount, or for unperformed portions of Work. CONTRACTOR shall furnish to COUNTY such financial information as in the judgment of COUNTY is necessary to determine the reasonable value of the

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Work rendered by CONTRACTOR. The foregoing is cumulative and shall not affect any right or remedy which COUNTY may have in law or equity.

32. JURISDICTION; VENUE. This Contract shall be governed by the laws of the State of California. Any litigation arising out of this Contract shall be filed in the County of Santa Barbara, if in state court, or in the federal district court nearest to the County of Santa Barbara, if in federal court.

33. NO WAIVER. COUNTY's delay or failure to act with respect to a breach of this Contract by CONTRACTOR shall not constitute or be construed as a waiver of COUNTY's rights with respect to subsequent or similar breaches. Any delay or failure of COUNTY to exercise or enforce any right or provision of this Contract shall not constitute a waiver of such right or provision, and every power and remedy given by this Contract to COUNTY shall be exercised from time to time and as often as may be deemed expedient in the sole discretion of COUNTY. No remedy herein conferred upon or reserved to COUNTY is intended to be exclusive of any other remedy or remedies, and each and every such remedy, to the extent permitted by law, shall be cumulative and in addition to any other remedy given hereunder or now or hereafter existing at law or in equity or otherwise.

34. SIGNATORY AUTHORITY. Each of the Parties hereby represents and warrants to the other Party that:

(a) Such Party has the full right, power, and authority to enter into this Contract and to perform its obligations hereunder.

(b) The execution of this Contract by the individual whose signature is set forth at the end of this Agreement on behalf of such Party, and the delivery of this Contract by such Party, have been duly authorized by all necessary corporate or other action on the part of such Party.

(c) This Contract has been executed and delivered by such Party and (assuming due authorization, execution, and delivery by the other Party) constitutes the legal, valid, and binding obligation of such Party, enforceable against such Party in accordance with its provisions.

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IN WITNESS WHEREOF, the parties hereto have executed this Agreement to be effective as of the first date fully executed by all of the parties hereto.

COUNTY
County of Santa Barbara

By: Signed by: _____
BOB NELSON, CHAIR
BOARD OF SUPERVISORS

Dated: 1/14/2026 | 1:50 PM PST

ATTEST:
MONA MIYASATO,

_____
COUNTY EXECUTIVE OFFICER

CLERK OF THE BOARD

By: Signed by: _____
Deputy Clerk of the Board

CONTRACTOR

ProWest PCM, Inc. dba ProWest Constructors, a California corporation

By: Michael DeMarie Digitally signed by Michael DeMarie DN: C=US, E=miked@goprowest.com, O="ProWest PCM, Inc. DBA ProWest Constructors", OU=President, CN=Michael DeMarie Date: 2025.12.12 13:08:47-08'00' _____
AUTHORIZED REPRESENTATIVE
Name: Mike DeMarie

Title: PRESIDENT

APPROVED AS TO FORM:
RACHEL VAN MULLEM,
COUNTY COUNSEL

By: Signed by: _____
Deputy County Counsel

APPROVED AS TO ACCOUNTING FORM:
BETSY SCHAFFER, CPA, CPFO
AUDITOR-CONTROLLER

By: Signed by: _____
Deputy Auditor-Controller

APPROVED AS TO FORM:
GREG MILLIGAN, ARM
RISK MANAGER

By: Signed by: _____
Risk Management

RECOMMENDED FOR APPROVAL
KIRK LAGERQUIST, DIRECTOR
GENERAL SERVICES DEPARTMENT

By: DocuSigned by: _____
Department Head

Dept 063 Fund 0030 Program 1930 Account {ACCT} Project 20041

COUNTY OF SANTA BARBARA
GENERAL SERVICES DEPARTMENT
CAPITAL PROJECTS DIVISION

one COUNTY | one FUTURE

INVITATION FOR BIDS
IRC EXPANSION & ADA UPGRADES
4436 CALLE REAL
SANTA BARBARA, CA 93110

COUNTY PROJECT NO. 20041

MANDATORY JOB WALK:
FRIDAY, OCTOBER 31, 2025
1:00 P.M.

BID DUE DATE:
TUESDAY, NOVEMBER 25, 2025
3:00 P.M.

VIRTUAL BID OPENING:
TUESDAY, NOVEMBER 25, 2025
3:30 P.M.

TABLE OF CONTENTS

BIDDING DOCUMENTS

Notice to Bidders
Bid Form – correction of walk pad
Designation of Subcontractors
Noncollusion Affidavit
Certificate of Compliance
Bidder's Statements
Anti-fraud Certification
Bidder's Bond

CONTRACT FORMS

Payment Bond
Performance Bond
Certificate of Insurance Transmittal
Unlawful Discrimination Ordinance
County of Santa Barbara Agreement Form

TERMS & CONDITIONS

Special Conditions – Division 00 70 00
General Conditions – Division 00 71 00
Exhibit "C" Indemnification and Insurance Requirements (For Construction Contracts)

DRAWINGS AND SPECIFICATIONS

Drawings:
SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENTS,
Dated February 25, 2025 by Nacht & Lewis Architects, Inc.
Specifications:
SANTA BARBARA COUNTY SOUTH COUNTY MAIN JAIL IRC ADA AND INTAKE RENOVATION,
Dated September 8, 2025 by Nacht & Lewis Architects, Inc.

ATTACHMENTS

1. Earth Systems Pacific, Inc. Geotechnical Engineering Report Dated June 5, 2025
2. Insight Environmental, Inc. Limited Asbestos Survey, Dated May 2, 2025
3. CEQA Notice of Exemption, Dated March 6, 2024

BIDDING DOCUMENTS

NOTICE TO BIDDERS

Notice is hereby given that the General Services Department, County of Santa Barbara will receive bids for:

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041

MANDATORY JOB WALK:
FRIDAY, OCTOBER 31, at 1:00 P.M.
BID DUE DATE:
TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.
VIRTUAL BID OPENING:
TUESDAY, NOVEMBER 25, 2025, at 3:30 P.M.

CONSTRUCTION COST ESTIMATE: Estimated cost of construction is $7,100,000.00

PROJECT LOCATION: 4436 Calle Real, Santa Barbara, CA 93110

MANDATORY JOB WALK: The job walk is MANDATORY on FRIDAY, OCTOBER 31, at 1:00 P.M. at the project location address above. Only those prime contractors attending a job walk shall be qualified to bid the work.

PROJECT DESCRIPTION: The project includes renovations of the existing Intake and Reception Center (IRC) building at the Santa Barbara County Main Jail, as well as an addition to the IRC building underneath the existing canopy. The project includes access compliance improvements throughout the existing IRC building, a new fire wall and fire door separation between the IRC and the remaining facility. Also included are clinician spaces, interview spaces, pre-booking areas, officer and inmate toilets and revised paving and parking. An add alternate for no climb fencing at the existing IRC tier level and stairs is requested as part of the bid.

CONTRACTOR'S LICENSE: The CONTRACTOR shall possess either a Class A or Class B license.

QUESTIONS: All questions MUST be submitted electronically through the Public Purchase Portal (www.publicpurchase.com) on or before 4:00 P.M., WEDNESDAY, NOVEMBER 12, 2025. Any changes or additional information needed for bidding will be provided in an Addendum posted on the Public Purchase site. Contractors shall be responsible for addendums.

BID SUBMITTAL INSTRUCTIONS: Each bid shall be in accordance with the plans and specifications approved by the General Services Department. The bid MUST be submitted electronically through the Public Purchase website (www.publicpurchase.com) on or before TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

SUBSTITUTION OF SECURITIES: Pursuant to Section 22300 of the Public Contract Code and the project specifications, the CONTRACTOR may substitute securities or request that the County make payment of retentions to an escrow agent for any money held by the COUNTY to ensure contract performance.

REGISTRATION: No contractor or subcontractor may be listed on a Bid for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code § 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code § 1771.1(a)]; no contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code § 1725.5; and this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

QUALIFYING CONTRACTOR OR SUBCONTRACTOR: Pursuant to the provisions of Section 4104 of the California Public Contracting Code a contractor or subcontractor shall not be qualified to bid on, be listed in a bid, or engage in the performance of any contract for public work, as defined in Section 4104, unless currently registered with the Department of Industrial Relations and qualified to perform public work pursuant to Section 1725.5 California Labor Code.

WITHDRAWAL OF BIDS: The COUNTY reserves the right to reject any and or all bids or waive any informality in a bid. No bidder may withdraw his bid for a period of sixty (60) days after the date set for the opening thereof.

BID SELECTION: The COUNTY reserves the right to select any one or any combination of bids, whichever is in the best interest of the COUNTY.

BID PROTEST: The County of Santa Barbara Bid Protest Procedures are described in Item 11 of the BID FORM, which is included in the bid documents.

CONSTRUCTION TIME: The successful CONTRACTOR (after receiving the Notice to Proceed) shall have 456 calendar days to complete all work called for under the Contract Documents.

LIQUIDATED DAMAGES: The liquidated damages will be $1,500.00 (One Thousand, Five Hundred Dollars) per day for project delays that are determined to be attributable to the CONTRACTOR.

VIRTUAL BID OPENING: Bids will be opened and read aloud in a public virtual meeting. Meeting can be attended by using the following Teams link: (copy and paste into browser)
https://teams.microsoft.com/dl/launcher/launcher.html?url=%2F_%23%2Fl%2Fmeetup-join%2F19%3Ameeting_MzZjMjE3OWItMDY5Mi00Y2M1LWI1NDUtNzA3MGJiN2Y1YmZi%40thread.v2%2F0%3Fcontext%3D%257b%2522Tid%2522%253a%2522e64b3773-9890-4a2f-87cd-23725df35ace%2522%252c%2522Oid%2522%253a%2522d2b1e431-1ba1-4f27-a276-e13eb745e08e%2522%257d%26anon%3Dtrue&type=meetup-join&deeplinkId=6e0e171f-ddf8-45bf-8e5c-6686e7c97445&directDl=true&msLaunch=true&enableMobilePage=true&suppressPrompt=true
or
call in (audio only) 805-724-0311 and use Phone Conference ID:795001994#

BID FORM

1. Pursuant to and in compliance with your Notice to Bidders and the Contract Documents relating to the construction of:

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
Bid Due Date: TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

including Addendum No(s). ___, ___, ___, ___,___, ___, ___, the undersigned bidder, having become thoroughly familiar with the terms and conditions of the Contract Documents and with local conditions affecting the performance and the costs of the Work at the place where the Work is to be done, hereby proposes and agrees to fully perform the Work within the time stated in and in strict accordance with the Contract Documents (including the furnishing of any and all labor, materials, tools, expendable equipment and utility and transportation services necessary to fully perform the work and complete it in a workmanlike manner) for the total sum of:

2. BASE BID:

$ | | | , | | | | , | | | | . | | |

(Place figures in appropriate boxes.)

Number of calendar days: 456

Additive Alternate No. 1: Detention Enclosures. Construction of detention enclosures at the tier levels and stairwells to tier levels inside the existing IRC building as indicated on Sheets A112, A420, A512, A542, A551, A642 and as specified in Division 01 Section 05 5 963.

$ | | | , | | | | , | | | | . | | |

(Place figures in appropriate boxes.)

3. If the project has additive bid items or additive groups, the lowest responsible bidder will be determined in accordance with Public Contract Code Division II, Part 3, Chapter 1, Section 20103.8, Subdivision (a) and as follows:
   a. The lowest bid shall be determined based on the lowest Base Bid amount only, without consideration of the prices on any additive or deductive items. The County will notify the lowest responsible bidder within 1 week of the Virtual Bid Opening if the additive alternate will be awarded and included in the final contract amount.

4. It is understood that Owner reserves the right to reject this Bid and that it shall remain open and not be withdrawn for a period of sixty (60) calendar days from the date prescribed for its opening.

5. Attached hereto and incorporated herein is the complete and entire list of subcontractors to be employed by the undersigned and in the performance of the Work.

6. It is understood and agreed that if written notice of the acceptance of this Bid is mailed or delivered personally to the undersigned bidder within thirty (30) calendar days after the opening of the Bid, or at any time thereafter before it is withdrawn, the undersigned bidder will execute and deliver the Contract Documents to Owner in accordance with the Bid as accepted, and will also furnish and deliver to Owner any Payment Bond required under the provisions of California Civil Code Section 3247 through 3252 and Performance Bond as required under the provisions of the California Government Code and/or California Public Contract Code all within fourteen (14) calendar days after personal delivery or deposit in the mails, as the case may be, of the notifications of award. The work under the contract shall be commenced by the undersigned bidder on the date stated in COUNTY'S written Notice to Proceed and shall be completed within 456 calendar days thereafter.

7. Notice of acceptance or request for additional information may be addressed to the undersigned bidder at the business address set forth below.

8. The bid, contract or other submittal of the CONTRACTOR identified below in connection with the foregoing project is not made in the interest of or on behalf or any undisclosed person, partnership, company, association, organization, or corporation; and that the bid is genuine, and not collusive or sham; that the undersigned bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid and has not directly or indirectly colluded, conspired, connived or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding; that the undersigned bidder has not directly or indirectly sought by agreement, communication or conference with anyone to fix his bid price or the bid price of any other bidder or to fix any overhead, profit or cost element of such bid price or of that of any other bidder or to secure any advantage against the COUNTY of Santa Barbara of anyone interested in the proposed contract; or all statements contained in this Bid are true; and that the undersigned bidder has not directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay any fee to any corporation, partnership, company association, organization, Bid Depository or to any member or agent thereof to effectuate a collusive or sham bid. I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct.

9. Wherever in this Bid an amount is stated in both words and figures, in case of discrepancy between words and figures the words shall prevail; if all or any portion of the Bid is required to be given in unit prices and totals and a discrepancy existing between any such unit prices and totals so given, the unit prices shall prevail.

10. In accordance with the provisions of Sections 1860 and 1861 of the California Labor Code, every CONTRACTOR will be required to secure the payment of compensation of his or her employees. Each CONTRACTOR to whom a public works contract is awarded shall sign the following certification prior to performing the work of the contract: "I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract."

11. Protests shall follow the procedures outlined at the County of Santa Barbara Bid Opportunities website: http://www.countyofsb.org/1580/Bid-Opportunities

CONTRACTOR

_____	IRS No.: _____
Company	
_____	License Classification(s): _____
Street Address	
_____	Phone Number: _____
City	
BY: _____	_____
Signature	Printed Name, Title

DESIGNATION OF SUBCONTRACTORS

The bidder agrees if this Bid is accepted, that he will contract with the County of Santa Barbara to do all work and furnish all labor, materials, machinery, tools and apparatus necessary to completely perform said Contracts in the manner and time prescribed by said Contract.

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
Bid Due Date: TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

In compliance with the provisions of Section 4100-4107 of the Public Contract Code of the State of California, and any amendments, thereof, the undersigned bidder has set forth below the name and location of the place of business of each subcontractor who will perform work or labor or render service to the undersigned in or about the construction of the work to be performed. That portion of the work which will be done by each subcontractor for each subcontract in excess of one-half of one percent of the undersigned's total aggregate bid shall be listed.

DIVISION OF WORK	SUBCONTRACTOR	LIC NO.	LOCATION

COMPANY: _____ BY: _____
Bidder's Signature

NOTE: This form may be reproduced and attached behind this page to list more Subcontractors.

NONCOLLUSION AFFIDAVIT

In accordance with Public Contract Code § 7106. _____
(Bidder's full name)

being first duly sworn, deposes and says that he or she is _____
(Bidder's title)

of _____
(Company's name)

the party making the foregoing Bid, that the Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the Bid is genuine and not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham Bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham Bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the Bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the Bid price, or of that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed Contract; that all statements contained in the Bid are true; and further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham Bid and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

SIGNATURE BLOCK (*Signature Block must be completed in ink& changes must be initialed.*)
Bidder's Signature:_____Date:_____ Bidder's Name & Title (Print):_____ At CITY: _____ STATE: _____

CERTIFICATE OF COMPLIANCE

This is to certify that all requirements for insurance of subcontractors as specified for this project will be met.

Dated

Signature of Principal

Printed Name, Title of Principal

Company

Address

City, State & Zip

BIDDER'S STATEMENTS

REGARDING INSURANCE COVERAGE:
Bidder hereby certifies that he has reviewed the insurance coverage requirements specified in the Contract Forms. Should he be awarded the contract for the work, Bidder further certifies that he can meet all the Contract Specification requirements for insurance including insurance coverage of his subcontractors.

REGARDING TITLE 13 OF THE CA CODE OF REGULATIONS, BIDDER'S FLEET:
Bidder must provide to the County, prior to executing the Contract, a true and correct copy of each valid Certificate of Reported Compliance, as described in section 2449(n) of Title 13 of the California Code of Regulations, for Bidder's fleet, and for each fleet of each subcontractor listed in Bidder's Bid, of vehicles subject to 13 CCR section 2449 that may be used in performance of the Contract.

REGARDING PUBLIC CONTRACT CODE SECTION 10232:
In accordance with Public Contract Code Section 10232, the Contractor hereby states, under penalty of perjury, that no more than one final unappealable finding of contempt of court by a Federal Court has been issued against the Contractor within the immediately preceding two year period because of the Contractor's failure to comply with an order of a Federal Court which orders the Contractor to comply with an order of the National Labor Relations Board.

REGARDING PUBLIC CONTRACT CODE SECTION 10162:
In accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

> Has the bidder, any officer of the bidder, or any employee of the bidder who has proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing, a federal, state, or local government project because of a violation of law or safety regulation?
>
> Yes ____ No ____
>
> (If the answer is yes, explain the circumstances on a separate sheet of paper and attach to Bid)

_____ Date

_____ Signature of Principal

_____ Printed Name, Title of Principal

_____ Company

_____ Address

_____ City, State & Zip

ANTI-FRAUD CERTIFICATION

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
Bid Due Date: TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

In accordance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury that the bidder has __, has not __, been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or federal antitrust law in connection with the bidding upon award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or Trustees of the California State University.

The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

NOTE: The bidder must place a check mark after "has" or "has not" in one of the blank spaces provided.

Date

Signature of Principal

Printed Name, Title of Principal

Company

Address

City, State & Zip

BIDDER'S BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____ as Principal, and _____ as Surety (hereinafter referred to as Surety), are held firmly bound unto the County of Santa Barbara, State of California (hereinafter called "Owner") in the penal sum of Ten Percent (10%) of the total aggregate amount of the bid of the Principal above named, submitted by said Principal to Owner for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents. Surety shall be and hereby warrants that it is listed in the Insurance Organizations Authorized by the Insurance Commissioner to Transact Business of Insurance in the State of California, published by the Department of Insurance, State of California or successor publications. In no case shall the liability of the Surety hereunder exceed the sum of _____ DOLLARS ($_____).

The condition of this obligation is such that a bid to Owner for certain construction specifically described as follows:

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041

for which bids are due on TUESDAY, NOVEMBER 25, 2025 has been submitted by Principal to Owner.

NOW, THEREFORE, if the aforesaid Principal shall not withdraw said bid within the period therein after the opening of the same, or, if no period be specified within sixty (60) days after said opening and shall within the period specified therefore, or, if no period be specified, within eight (8) days after the prescribed forms are presented to him for signature, enter into a written Contract with Owner, in the prescribed form, in accordance with the bid as accepted, and file the two Bonds with Owner, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by law, then this obligation shall be null and void; otherwise, it shall remain in full force, virtue and affect.

Said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any manner affects its obligations on this bond, and it does hereby waive notice of any change, extension, alteration, or addition.

It is hereby agreed that any progress payment made after the scheduled completion date will not constitute a waiver of any liquidated damages heretofore agreed upon.

In the event suit is brought upon said Bond by Owner and judgment is recovered, the Surety shall pay all costs incurred by Owner in such suit, including a reasonable attorney's fee to be fixed by the Court.

Death, Bankruptcy, Receivership, Going Out of Business for any reason, or incompetence of the Principal shall not relieve the Surety of its obligations hereunder.

_____
Name of Principal

Dated _____ _____ (Seal)
Signature of Principal

_____
Name of Surety

_____
Address

_____
City, State & Zip

Dated _____ _____ (Seal)
Signature of Surety's Attorney-in-fact

Surety's Agent for Service of Process (located within the State of California):

_____
Name of Agent

_____
Address

_____
City, State & Zip

_____
Telephone Number

_____
FAX Number

NOTE: Signatures of those executing for Surety MUST be properly acknowledged. This form may be reproduced for transmittal to the Surety for execution and attached to the front of the original Bid Bond Form.

CONTRACT FORMS

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That the County of Santa Barbara of the State of California (hereinafter referred to as the County) and _____ (hereinafter referred to as Principal) have by written agreement dated _____, entered into a contract identified as:

Project Title: County of Santa Barbara
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041

(Hereinafter referred to as the Contract) and

That, pursuant to law and to said Contract, and before entering upon the performance of said Contract, the principal is required to file with the County a good and sufficient bond to secure the payment of labor and materials claims.

NOW, THEREFORE, said Principal and _____

_____

as corporate surety (hereinafter referred to as Surety), are held firmly bound unto the County in the amount of $_____, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns both jointly and severally. Surety shall be and hereby warrants that it is listed in the Insurance Organizations Authorized by the Insurance Commissioner to Transact Business of Insurance in the State of California, published by the Department of Insurance, State of California or successor publications.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said principal, his or its subcontractors, heirs, executors, administrators, successors, or assigns, shall fail to pay any of the persons named or referred to in Section 9100 of the California Civil Code, or amounts due under Unemployment Insurance Code with respect to work or labor performed by any such claimant, or for any amounts required to be deducted, withheld and paid over to the Employment Development Department from the wages of employees of the Contractor and his subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor as required by the California Civil Code, or this bond, then said Surety will pay for the same, in an amount not to exceed the amount hereinafter set forth.

This bond shall insure to the benefit of any and all persons, entities, companies and corporations named or referred to in Section 9100 of the California Civil Code, so as to give a right of action to them or their assign in any suit brought upon this bond.

And the said Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, or the Specifications accompanying the same, shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Specifications.

In the event suit is brought upon this Bond by County and judgment is recovered, Surety shall pay all costs incurred by the County in such suit, including a reasonable attorney's fee to be fixed by the court.

Death, illness, disability or disqualification of the Principal shall not relieve Surety of its obligations hereunder.

_____	_____
Principal	Surety
By: _____	_____
	Signature of Attorney-in-fact
DATED: _____	_____
	_____
	Address
	_____
	City, State & Zip Code

Surety's Agent for Service of Process (located within the State of California):

_____
Name of Agent
_____
Address
_____
City, State & Zip Code
_____
Telephone Number
_____
FAX Number

NOTE: Signature of those executing for Surety must be properly acknowledged.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That the County of Santa Barbara of the State of California (hereinafter referred to as the County) and _____ (hereinafter referred to as Principal) have by written agreement dated _____, entered into a contract identified as:

Project Title: County of Santa Barbara
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
(Hereinafter referred to as the Contract) and

That, pursuant to law and to said Contract, and before entering upon the performance of said Contract, the Principal is required under the terms and conditions of said Contract to furnish a bond for the faithful performance of Contract.

NOW, THEREFORE, said Principal and _____

_____

as corporate surety (hereinafter referred to as Surety), are held firmly bound unto the County in the amount of $_____, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns both jointly and severally. Surety shall be and hereby warrants that it is listed in the Insurance Organizations Authorized by the Insurance Commissioner to Transact Business of Insurance in the State of California, published by the Department of Insurance, State of California or successor publications.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal, his heirs, executors, administrators, successors, or assigns, shall perform all of the covenants, conditions and agreements in said Contract and any alteration thereof made as herein provided, in his or their part, to be kept and performed at the time, and in the manner therein specified, and shall indemnify and save harmless County, its officers, agents, and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force, virtue and effect.

And the said Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or additions to the terms of the Contract or to the work or to the specifications.

In the event suit is brought upon this Bond by County and judgment is recovered, Surety shall pay all costs incurred by the County in such suit, including a reasonable attorney's fee to be fixed by the court.

Death, illness, disability or disqualification of the Principal shall not relieve Surety of its obligations hereunder.

_____	_____
Principal	Surety
By: _____	_____
	Signature of Attorney-in-fact
DATED: _____	_____
	_____
	Address
	_____
	City, State & Zip Code

Surety's Agent for Service of Process (located within the State of California):

_____
Name of Agent

_____
Address

_____
City, State & Zip Code

_____
Telephone Number

_____
FAX Number

NOTE: Signature of those executing for Surety must be properly acknowledged.

CERTIFICATE OF INSURANCE
TRANSMITTAL FORM

FOR THE FOLLOWING DESCRIBED PROJECT:

County of Santa Barbara
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041

CONTRACTOR:

_____
Name

_____
Address

_____
City, State & Zip Code

The successful bidder shall furnish satisfactory proof of the maintenance of adequate Worker's Compensation Insurance, and the maintenance of Comprehensive General and Automobile Liability Insurance in the amount of not less than $1,000,000 per occurrence and $2,000,000 in the aggregate. The County of Santa Barbara (COUNTY), its officers, employees, and agents shall be named as additional insured on all certificates. A copy of the endorsement evidencing that the County has been added to the policy must be attached to the certificate of insurance. Said policy or policies shall provide that the COUNTY shall be given thirty (30) days written notice prior to cancellation or expiration of the policy or reduction in coverage. Refer to section 5.18 of the General Conditions.

In addition to the above, the following information must appear on the certificates:

County of Santa Barbara
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041

This form must be attached to all insurance forms sent to the County of Santa Barbara, General Services Department:

_____
Authorized Insurance Company Representative's Signature

This form may be reproduced as required.

COUNTY OF SANTA BARBARA UNLAWFUL DISCRIMINATION ORDINANCE

Section 2-95. Prohibition of unlawful discrimination in employment practices. The COUNTY reserves the right to terminate forthwith each and every written contract and agreement (except purchase orders) respecting real property for goods and/or services entered into by the COUNTY or by its joint powers, agencies, or agents with the consent of the other parties (hereinafter called "CONTRACTOR") including but not limited to concessions, franchises, construction agreements, leases, whether now in effect or hereinafter made if the COUNTY finds that the CONTRACTOR is discriminating or has discriminated against any employee or applicant for employment in violation of any applicable state or federal laws, rules, or regulations which may now or hereafter specifically prohibit such discrimination on such grounds as race, religion, sex, color, national origin, physical or mental handicap when otherwise qualified, Vietnam war veteran/disabled, age, medical condition, marital status, ancestry, sexual orientation, or other legally protected status.

Such finding may only be made after CONTRACTOR has had a full and fair hearing on notice of thirty (30) days before an impartial hearing officer at which hearing CONTRACTOR may introduce evidence, produce witness, and have the opportunity to cross-examine witnesses produced by the COUNTY. Further, any finding of discrimination must be fully supported by the facts developed at such hearing and set forth in a written opinion; and in addition, CONTRACTOR may move in the appropriate court of law for damages and/or to compel specific performance of a CONTRACTOR or agreement if any of the above procedures are not afforded to the CONTRACTOR. If CONTRACTOR is not found to have engaged in unlawful discriminatory practices, COUNTY shall pay all costs and expense of such hearing, including reasonable attorney's fees to CONTRACTOR in accordance with current Santa Barbara County Superior Court schedule of attorney's fees for civil trials. If CONTRACTOR is found to have engaged in such unlawful discriminatory employment practices, CONTRACTOR shall pay all such costs, expenses, and attorney's fees.

Whether or not a contract or agreement is still in existence at the time of final determination of such unlawful discrimination, the CONTRACTOR shall forthwith reimburse COUNTY for all damages directly stemming from such discrimination; however, those damages shall not exceed and are not reimbursable in an amount which exceeds amounts paid CONTRACTOR under the terms of the contract or agreement.

Nothing in this Section 2-95 shall directly or by interpretation give a private cause of action to any third party (not a signatory to the contract or agreement) including employees past or present, or applicants for employment to CONTRACTOR, it being the sole purpose of this clause to administratively assure compliance with the nondiscrimination clauses contained herein.

Employment practices shall include, but are not limited to employment, promotion, demotion, transfer, recruitment and advertising for recruitment, layoff or other termination, rate of pay, employee benefits, and all other forms of compensation selection for training and apprenticeship and probationary periods.

CONTRACTOR shall permit access at all reasonable time and places to all of its records of employment, advertising, application forms, tests, and all other pertinent employment data and records, to the COUNTY, its officers, employees, and agents for the purpose of investigation to ascertain if any unlawful discrimination as described herein has occurred or is being practiced, provided that such records are relevant to a complaint of an unlawful discriminatory practice which has been forwarded to CONTRACTOR reasonably prior to the time CONTRACTOR is asked to make such records available. In addition, all such records shall be deemed "Confidential" by the officers, employees, and agents of the COUNTY. No records or copies of such records may be removed from the premises of CONTRACTOR and no disclosure, oral, or written of such record, may be made to third parties except as provided within the agreement.

Provided, however, that in the event of a hearing to determine whether or not CONTRACTOR is engaging in unlawful discrimination in employment practices as defined herein, the Board of Supervisor of Santa Barbara County may issue subpoenas to require that certified copies of such records be made available to the hearing.

Failure to fully comply with any of the foregoing provisions relating to unlawful discrimination in employment practices shall be deemed to be a material breach of any contract or agreement with the COUNTY. All persons contracting with or who have contracts for goods or services with the COUNTY shall be notified that this chapter applied to their contract or agreement with the COUNTY (Ordinance No. 2946, SS1; Ordinance No. 2993, SS1; and Ordinance No. 3018, SS1).

Section 2-95.5. Exceptions. Notwithstanding any other provisions in this article, any party contracting with the COUNTY having an affirmative action program which has been approved within twelve (12) months from the date of the contract by an agency of the federal government shall be deemed to be in compliance with the provisions of this article upon furnishing documentary evidence of such approval satisfactory to the COUNTY affirmative action officer. Loss of such approval shall be immediately reported by such party to the COUNTY affirmative action officer.

Section 2-96. Purchase orders. Purchase orders shall contain the following clause as grounds for termination of such purchase orders:

"If complaint is made that seller is engaging in discriminatory employment practices made unlawful by applicable state and federal laws, rules, or regulations, and the State Fair Employment Practice Commission or the Federal Equal Employment Opportunities Commission determines that such unlawful discrimination exists, then the COUNTY may forthwith terminate this order." (Ordinance No. 2946, SS 1)

Section 2-97. Affirmative action officer. At the discretion of the COUNTY affirmative action officer, he or she shall promptly and thoroughly investigate, or cause to be investigated reports and complaints from whatever source, that any party contracting with the COUNTY is engaging, or during the term of a contract or agreement with the COUNTY has engaged, in any unlawful discriminatory employment practices as described in Section 2-95 of this Code. If the investigation discloses reason to believe such unlawful discrimination does exist or has existed and the conditions giving rise thereto have not been changed so as to prevent further such unlawful discrimination, and the said party shall forthwith terminate such unlawful discrimination, take all appropriate steps to prevent a recurrence of such or other unlawful practices, and compensate the person or persons unlawfully discriminated against for any and all loss incurred by reason of such unlawful discrimination, all to the satisfaction of the affirmative action officer, then the affirmative action officer shall cause the matter to be presented for action to the State Fair Employment Practices Commission or the Federal Equal Employment Opportunities Commission, or both, and to any other concerned state or federal agencies or officers.

If and when it has been finally determined by the affirmative action officer, COUNTY counsel, or state or federal regulatory agencies that such unlawful discriminatory employment practice has in fact so occurred or are being carried on, then the affirmative action officer shall forthwith present the entire matter to the Board of Supervisors of the COUNTY, together with all damages, costs, and expense related thereto and incurred by COUNTY, for appropriate action by the Board of Supervisors in accord with the intent and purposes of this article and of the affirmative action program of the COUNTY (Ordinance No. 2946, SS 1)

COUNTY OF SANTA BARBARA
AGREEMENT FOR:
General Services Project No. 20041
County of Santa Barbara
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
BC: _____-_____

THIS AGREEMENT ("Agreement") is made by and between the County of Santa Barbara, a political subdivision of the State of California ("**COUNTY**"), and {FULL LEGAL NAME OF CONTRACTOR} ("**CONTRACTOR**" and together with COUNTY, collectively, the "Parties" and each individually a "Party"), for the completion of the Work (defined below), on the following terms, conditions, and provisions. All references in the General Terms to the "Agreement" shall have the meaning ascribed to the term "Agreement" in the immediately preceding sentence.

1. CONTRACT: This Agreement incorporates by reference all of the General Conditions and Special Conditions, Specifications and Drawings provided by the COUNTY for the IRC EXPANSION & ADA UPGRADES, Project No. 20041, the Invitation for Bids as amended by Addenda Number {xx-xx}, the Bid Bond, the Performance Bond, the Payment Bond, and the bid documents executed and submitted by the CONTRACTOR for the Project ("Bid"), to the extent the Bid is consistent with the provisions of this Agreement other than the Bid (all of the foregoing documents, together with this Agreement, collectively, the "Contract" or "Contract Documents"). A copy of each of the General and Special Conditions, Specifications and Drawings provided by the COUNTY for the IRC EXPANSION & ADA UPGRADES, PROJECT NUMBER 20041, the Notice to Bidders, the Bid Bond, the Performance Bond, and the Payment Bond are attached hereto as EXHIBIT A, and a copy of the Bid is attached hereto as EXHIBIT B. All capitalized terms used but not defined herein shall have the respective meanings ascribed to such terms in the Notice to Bidders. Copies of all Contract Documents are on file in the Department of General Services Office of the COUNTY, and have been and will be made available to the CONTRACTOR during the term of this Agreement. CONTRACTOR acknowledges receipt of all Contract Documents.

2. WORK: CONTRACTOR, at CONTRACTOR's own cost and expense, shall perform all the work described in the Contract Documents ("Work"), and shall furnish all equipment and materials necessary to perform and complete the Work, in a good and workmanlike manner and to the satisfaction of the Director of the COUNTY's General Services Department ("Director"), or the Director's designee, all in strict accordance with the Contract Documents.

3. EXCAVATIONS: Before any pavement resurfacing, displacement, or excavation of the ground that may be required in connection with the Work under this Contract, the CONTRACTOR shall obtain an inquiry identification number by calling Underground Service Alert (USA) 1 (800) 422-4133 or by such other means as may be required; shall conform to all requirements of Sections 4215 through 4217 of the Government Code regarding any such pavement resurfacing, displacement or excavation, including the payment of any fees required; and shall facilitate performance by the COUNTY of any obligation required of the COUNTY under the Government Code. There shall be no performance under this Contract by either party hereto unless and until CONTRACTOR complies with all of the foregoing provisions of this Sections 3, and notifies the County Representative (defined below) in writing regarding such compliance.

4. COUNTY REPRESENTATIVE: The "County Representative" referred to in the Contract Documents is {COUNTY REPRESENATIVE NAME}.

5. PAYMENT: As full compensation for furnishing all labor, supervision, overhead, materials, and equipment and for completing all of the Work contemplated by this Contract, and subject to adjustments and liquidated damages, if any, as provided in the Contract Documents, the base amount to be paid to the CONTRACTOR for satisfactory completion of all requirements of the CONTRACTOR under this Contract is and shall be {WRITTEN AMOUNT IN DOLLARS AND CENTS} ($NUMERICAL) ("Base Contract Amount"), to be paid as provided in the Contract Documents. CONTRACTOR assumes and will provide against any loss or damage arising out of the nature of the Work undertaken, or the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered in the performance of the Work until its acceptance by the COUNTY, and assumes any and all expenses incurred by or in consequence of suspension or discontinuance of the Work, for well and faithfully completing the Work and the whole thereof, in the manner and to the requirements of the Contract and directions of the County Representative to the extent not inconsistent with any provisions of the Contract Documents.

6. **RIGHT TO AUDIT**: CONTRACTOR shall maintain and make available all books, papers, records, detail costs, estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractors, and financial records related to or which arise in connection with the Contract (collectively, the "Records"). The form of record keeping with respect to the Records shall be subject to approval by COUNTY. The Records shall be made available during normal business hours for examination by COUNTY or the County Representative and shall be retained at CONTRACTOR'S principal place of business in California for audit during normal business hours at such place for four (4) years after the recording of the Notice of Completion for the Project. CONTRACTOR shall provide an office in which COUNTY and the County Representative may conduct such audit(s).

The COUNTY will have the right to audit CONTRACTOR'S Project records. Records must be made available in a form satisfactory to the Santa Barbara County Auditor-Controller.

7. EXTRA WORK: Extra work and materials, may only be authorized via written Change Order(s) duly executed by the Director or his designee in accordance with Section 30, below, including Change Order(s) providing for compensation in addition to the Base Contract Amount; *provided, however*, that the aggregate amount of such compensation in addition to the Base Contract Amount that may be authorized by the Director or his designee pursuant to duly executed Change Orders shall not exceed $[__] ("Contingency Amount"). Compensation in such other equitable amount as is appropriate for the requirements of the COUNTY may be authorized by resolution or minute order of the Santa Barbara County Board of Supervisors.

8. COMPLIANCE WITH LAW: CONTRACTOR shall keep fully informed of, and shall at all times during the Term (defined below) ensure the performance of the Work is in compliance with, all laws, statutes, ordinances, decrees, orders, and regulations which do or may affect the Project, performance of the Work, the materials used therein, or persons engaged in connection therewith, and all such orders of bodies and tribunals having any jurisdiction over same (collectively, "Applicable Laws"). If CONTRACTOR has reason to believe that any provision of the Contract Documents conflict with any Applicable Law(s), the CONTRACTOR shall immediately report same to the County Representative in writing. CONTRACTOR shall at all times observe and comply with, and shall cause all agents, employees, and subcontractors to observe and comply with, all Applicable Laws. CONTRACTOR acknowledges and shall comply with the provisions of Sections 9364 and Sections 9550 and 9566, inclusive, of the Civil Code of California.

9. PAYMENTS NOT ACCEPTANCE: No certificate given or payments made under this Contract, except the final payment hereunder, shall be evidence of the performance of this Contract, either wholly or in part, against any claim upon CONTRACTOR. Final payment for the Work performed under this Contract shall not be made until the lapse of thirty (30) days after the Notice of Completion of the Work has been filed for record and no payment shall be construed to be acceptance of any defective Work or improper materials. CONTRACTOR agrees that the payment for final quantities due under this Contract and the payment of amounts due for any Work in accordance with this Contract shall release the COUNTY from any claims or liabilities on account of Work performed under this Contract, as the same may be amended from time to time during the Term. In addition to guarantees required elsewhere, CONTRACTOR shall and does hereby guarantee all workmanship and material to be free of defects and fit for the purposes intended for a period of one year from and after both the date of acceptance of the work and the recordation of the Notice of Completion by the COUNTY and CONTRACTOR shall repair or replace all Work and materials, together with any other portions of the Work which may be displaced in so doing, that, in the opinion of the County Representative, is or becomes defective during the period of said guarantee, without expense whatsoever to the COUNTY.

10. PREVAILING WAGE RATES: Rates of wages, including overtime, holiday, and Sunday rates provided for the Work shall comply with and are subject to the California Labor Code, Sections 1770 et. seq., Executive Orders of the President of the United States No. 9240, dated September 9, 1942, and No. 9250, dated October 3, 1942, and to any modifications thereof, and to and any orders of the President or any authorized Federal Officer or agency, insofar as the same may apply to this Contract.

No contractor or subcontractor may be listed on a bid for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

SAMPLE

11. CONTRACT DOCUMENTS ACKNOWLEDGED: CONTRACTOR hereby declares that CONTRACTOR has read the Contract Documents, has carefully examined the plans and detailed drawings of the Work to be performed, and fully understands the intent and meaning of the same.

12. TIME FOR COMMENCEMENT, COMPLETION: The term of this Contract shall commence effective as of the first date that this Agreement is duly executed by all of the parties hereto ("Effective Date") and shall terminate on the date that is 456 calendar days after the Effective Date unless earlier terminated in accordance with the provisions of this Agreement ("Term"). As soon as practicable after the Contract has been executed by both the CONTRACTOR and the COUNTY, a Notice to Proceed will be issued by the County Representative stating the starting date of work performance under the Contract ("Work Start Date"). CONTRACTOR shall complete all Work specified in the Contract Documents within 456 calendar days after the Work Start Date ("Contract Time" as that term is used in the General Conditions). The provisions of this Agreement pertaining to Liquidated Damages shall apply in the event of the CONTRACTOR's failure to complete the Work within the Contract Time. In the event that CONTRACTOR does not complete the Work during the Term, CONTRACTOR shall only be paid for the Work actually performed during the Term and accepted by COUNTY in accordance with the provisions of this Agreement.

13. WORKERS' COMPENSATION INSURANCE: CONTRACTOR certifies that CONTRACTOR has knowledge of, is in compliance with, and warrants that CONTRACTOR at all times during the Term shall remain in compliance with, the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for Workers' Compensation or to undertake self-insurance by the provisions of that Code. CONTRACTOR shall comply with such provisions before commencing the performance of the Work.

14. PROGRESS PAYMENT; NO WAIVER FOR DELAY: Any progress payment made after the scheduled completion date for the Work shall not constitute a waiver of any liquidated damages under this Contract.

15. GUARANTEE BONDS: Before any performance under this Contract, the CONTRACTOR shall provide the security required by statute for the payment of all workers and suppliers, and security for the faithful performance of all terms and conditions of this Contract, in an amount and form approved by the COUNTY. Both securities shall contain provisions that automatically increase amounts thereof and/or time of completion or both for all change orders, extensions, and additions to the Work provided under this Contract.

16. DISPUTES: Should any dispute(s) arise respecting the construction or meaning of any of the plans or specifications affecting the Work or respecting the true value of any extra work or work omitted, such dispute(s) shall be resolved by the Director of the COUNTY's General Services Department or his Assistant Director of General Services designee ("Director"), whose decision shall be final and binding upon the parties hereto. If, after the decision of the Director as provided herein, claims (as defined in Public Contracts Code Section 20104) under this Contract are filed by CONTRACTOR against COUNTY, and those claims are in the aggregate amount of $375,000 or less, such claims shall be resolved under Public Contracts Code Sections 20104 through 20104.8, inclusive.

17. SURVIVAL: All provisions of this Contract which by their nature are intended to survive the termination or expiration of this Agreement shall survive such termination or expiration.

18. INDEMNIFICATION AND INSURANCE: CONTRACTOR shall at all times comply with the indemnification and insurance provisions set forth in EXHIBIT C, attached hereto and incorporated herein by reference.

19. TAXES: CONTRACTOR shall pay all taxes, levies, duties, and assessments of every nature due in connection with any Work under this Contract, and shall make any and all payroll deductions required by law. CONTRACTOR is responsible for all CONTRACTOR personnel and for the payment of their compensation, including, if applicable, withholding of income taxes, and the payment and withholding of social security and other payroll taxes, unemployment insurance, workers' compensation insurance payments, and disability benefits. In no event shall COUNTY pay or be responsible for any taxes imposed on, or with respect to, CONTRACTOR's income, revenues, gross receipts, personnel, real or personal property, or other assets. COUNTY shall not be responsible for paying any taxes on CONTRACTOR's behalf, and should COUNTY be required to do so by state, federal, or local taxing agencies, CONTRACTOR agrees to promptly reimburse COUNTY for the full value of such paid taxes plus interest and penalty, if any. These taxes shall

SAMPLE

include, but not be limited to, the following: FICA (Social Security), unemployment insurance contributions, income tax, disability insurance, and workers' compensation insurance.

20. **CONFLICT OF INTEREST**: CONTRACTOR covenants that CONTRACTOR presently has no employment or interest and shall not acquire any employment or interest, direct or indirect, including any interest in any business, property, or source of income, which would conflict in any manner or degree with the performance of Word required to be performed under this Contract. CONTRACTOR further covenants that in the performance of this Contract, no person having any such interest shall be employed by CONTRACTOR. CONTRACTOR must promptly disclose to COUNTY, in writing, any potential conflict of interest. COUNTY retains the right to waive a conflict of interest disclosed by CONTRACTOR if COUNTY determines it to be immaterial, and such waiver is only effective if provided by COUNTY to CONTRACTOR in writing.

21. **NONDISCRIMINATION**: COUNTY hereby notifies CONTRACTOR that COUNTY's Unlawful Discrimination Ordinance (Article XIII of Chapter 2 of the Santa Barbara County Code) applies to this Contract and is incorporated herein by this reference with the same force and effect as if the ordinance were specifically set out herein and CONTRACTOR agrees to comply with said ordinance.

22. **NON-ASSIGNMENT**: CONTRACTOR shall not assign, subcontract, delegate, or otherwise transfer, directly or indirectly, whether by operation of law or otherwise ("Transfer") this Contract, in whole or in part,, or any of CONTRACTOR's rights or obligations under this Contract, without the prior written consent of COUNTY in each instance. Any attempted or purported Transfer in violation of this Section 24, or in violation of Section 2.08 of the General Conditions, attached hereto as part of Exhibit A, shall be null and void and without legal effect and shall constitute grounds for termination by COUNTY. No Transfer shall relieve CONTRACTOR of any of its obligations hereunder.

23. **SEVERABILITY**: If any one or more of the provisions contained in the Contract shall for any reason be held to be invalid, illegal or unenforceable in any respect by a court of competent jurisdiction, then such provision or provisions shall be deemed severable from the remaining provisions hereof, and such invalidity, illegality or unenforceability shall not affect any other provision hereof, and this Contract shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

24. **TIME IS OF THE ESSENCE**: Time is of the essence in this Contract, and each covenant and term is a condition herein.

25. **ENTIRE AGREEMENT AND AMENDMENT**: The Contract Documents, as may be modified from time to time during the Term by duly authorized and executed Change Orders in accordance with the provisions of this Agreement and the General Terms, contain the entire understanding and agreement of the Parties with respect to the subject matter hereof and thereof, and there have been no promises, representations, agreements, warranties or undertakings by any of the Parties, either oral or written, of any character or nature hereafter binding except as set forth herein and therein. This Contract may be altered, amended or modified only by an instrument in writing, duly executed by each of the Parties, and by no other means, except as otherwise set forth in Section 30, below, to the extent such delegated authority is expressly authorized by the COUNTY Board of Supervisors in approving this Contract. Each Party waives its future right to claim, contest or assert that this Agreement was modified, canceled, superseded, or changed by any oral agreements, course of conduct, waiver or estoppel.

26. **EXECUTION OF COUNTERPARTS**: This Contract may be executed electronically and in any number of counterparts, and each of such counterparts shall for all purposes be deemed to be an original; and all such counterparts, or as many of them as the Parties shall preserve undestroyed, shall together constitute one and the same instrument.

27. **SUBCONTRACTORS**: CONTRACTOR is authorized to subcontract with only the subcontractor(s) identified in the Bid as attached hereto and as set forth in Exhibit B ("Subcontractors"). Contractor shall be fully responsible for all services and Work performed by its Subcontractors. Contractor shall secure from each of its Subcontractors legally binding written agreements to comply with the provisions of this Agreement pertaining to CONTRACTOR's obligations as if such obligations pertained to such Subcontractor, including, but not limited to, audit obligations.

28. **CHANGE ORDERS**: No Change Order shall be valid or enforceable against the COUNTY unless in the form of

SAMPLE

the Form of Change Order attached here as Exhibit X_ and duly executed by both CONTRACTOR and the Director. in accordance with this Section 30 and Article 13 of the General Conditions ("Change Order").

29. **FLEET REQUIREMENTS**: Vehicles with a Gross vehicle weight rating ("GVWR") greater than 8,500 lbs. and light-duty package delivery vehicles operated in California may be subject to the California Air Resources Board ("CARB") Advanced Clean Fleets regulations. Such vehicles may therefore be subject to requirements to reduce emissions of air pollutants. For more information, please visit the CARB Advanced Clean Fleets webpage at https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets. Contractor shall at all times have a valid Certificate of Reported Compliance, as described in section 2449(n) of Title 13 of the California Code of Regulations ("CARB Certificate of Compliance"), and shall confirm that each subcontractor listed in Contractor's Bid has a valid CARB Certificate of Compliance, for each fleet of vehicles subject to 13 CCR section 2449 that may be used in performance of this Contract. No such vehicle is permitted on the project site unless and until Contractor provides County with a valid Certificate of Reported Compliance applicable to such vehicle.

30. **ORDER OF PRECEDENCE**: In the event of conflict between the provisions contained in the numbered sections 1 through 34 of this Agreement ("Numbered Section") and the provisions contained in the Exhibits, the provisions contained in the Numbered Sections of this Agreement shall prevail over those in the Exhibits other than Exhibit C, which Exhibit C shall control and prevail over all other provisions of this Contract. CONTRACTOR agrees that in the event of any discrepancy, inconsistency, gap, ambiguity, or conflicting language between the Bid attached hereto as Exhibit B, on the one hand, and any other provision(s) of this Contract on the other, the provisions of this Contract (including the Numbered Sections of this Agreement, Exhibit A, and Exhibit C) other than Exhibit B shall take precedence and control and prevail over the provisions of the Bid attached hereto as Exhibit B.

31. **TERMINATION.**

A. COUNTY may, by written notice to CONTRACTOR, terminate this Contract in whole or in part at any time, whether for COUNTY's convenience, for nonappropriation of funds, or because of the failure of CONTRACTOR to fulfill its obligations hereunder.

1. **For Convenience.** COUNTY may terminate this Contract in whole or in part upon thirty (30) days' written notice. During such thirty (30) day period, CONTRACTOR shall, as directed by COUNTY, wind down and cease Work as quickly and efficiently as reasonably possible, without performing unnecessary services or activities and by minimizing negative effects on COUNTY from such winding down and cessation of Work.

2. **For Nonappropriation of Funds.** Notwithstanding any other provision of this Contract, in the event that no funds or insufficient funds are appropriated or budgeted by federal, State or COUNTY governments, or sufficient funds are not otherwise available for payments hereunder in the fiscal year(s) covered by the Term of this Agreement, then COUNTY will notify CONTRACTOR of such occurrence, and COUNTY may terminate or suspend this Contract in whole or in part, with or without a prior notice period. Subsequent to termination of this Contract under this provision, COUNTY shall have no obligation to make payments with regard to the remainder of the Term.

3. **For Cause.** Should CONTRACTOR default in the performance of this Contract or materially breach any of the provisions hereof, COUNTY may, at COUNTY's sole option, terminate or suspend this Contract in whole or in part upon written notice ("Termination Notice"). Upon receipt of such Termination Notice, CONTRACTOR shall immediately discontinue all Work (unless otherwise directed in such Termination Notice) and notify COUNTY in writing of the status of CONTRACTOR's performance of Work hereunder. The date of termination shall be the date the Termination Notice is received by CONTRACTOR, unless the Termination Notice directs otherwise.

B. Upon termination, CONTRACTOR shall deliver to COUNTY all data, estimates, graphs, summaries, reports, and all other property, records, documents or papers as may have been accumulated or produced by CONTRACTOR in performing this Contract, whether completed or in process, except such items as COUNTY may, by written permission, permit CONTRACTOR to retain. Notwithstanding any other payment provision of this Contract, COUNTY shall pay CONTRACTOR for satisfactory Work performed as of the date of termination to include a prorated amount of compensation due hereunder less payments, if

SAMPLE

any, previously made. In no event shall CONTRACTOR be paid an amount in excess of the Maximum Contract Amount, or for unperformed portions of Work. CONTRACTOR shall furnish to COUNTY such financial information as in the judgment of COUNTY is necessary to determine the reasonable value of the Work rendered by CONTRACTOR. The foregoing is cumulative and shall not affect any right or remedy which COUNTY may have in law or equity.

32. **JURISDICTION; VENUE.** This Contract shall be governed by the laws of the State of California. Any litigation arising out of this Contract shall be filed in the County of Santa Barbara, if in state court, or in the federal district court nearest to the County of Santa Barbara, if in federal court.

33. **NO WAIVER.** COUNTY's delay or failure to act with respect to a breach of this Contract by CONTRACTOR shall not constitute or be construed as a waiver of COUNTY's rights with respect to subsequent or similar breaches. Any delay or failure of COUNTY to exercise or enforce any right or provision of this Contract shall not constitute a waiver of such right or provision, and every power and remedy given by this Contract to COUNTY shall be exercised from time to time and as often as may be deemed expedient in the sole discretion of COUNTY. No remedy herein conferred upon or reserved to COUNTY is intended to be exclusive of any other remedy or remedies, and each and every such remedy, to the extent permitted by law, shall be cumulative and in addition to any other remedy given hereunder or now or hereafter existing at law or in equity or otherwise.

34. **SIGNATORY AUTHORITY.** Each of the Parties hereby represents and warrants to the other Party that:

(a) Such Party has the full right, power, and authority to enter into this Contract and to perform its obligations hereunder.
(b) The execution of this Contract by the individual whose signature is set forth at the end of this Agreement on behalf of such Party, and the delivery of this Contract by such Party, have been duly authorized by all necessary corporate or other action on the part of such Party.
(c) This Contract has been executed and delivered by such Party and (assuming due authorization, execution, and delivery by the other Party) constitutes the legal, valid, and binding obligation of such Party, enforceable against such Party in accordance with its provisions.

SAMPLE

IN WITNESS WHEREOF, the parties hereto have executed this Agreement to be effective as of the first date fully executed by all of the parties hereto.

COUNTY
County of Santa Barbara

By: _____
LAURA CAPPS, CHAIR
BOARD OF SUPERVISORS

Dated: _____

ATTEST:
MONA MIYASATO,

_____
COUNTY EXECUTIVE OFFICER

CLERK OF THE BOARD

By: _____
Deputy Clerk of the Board

CONTRACTOR

{LEGAL NAME OF CONTRACTOR}, a California corporation

By: _____
AUTHORIZED REPRESENTATIVE
Name: {NAME}

Title: {TITLE OF AUTHORIZED REPRESENTATIVE}

APPROVED AS TO FORM:
RACHEL VAN MULLEM,
COUNTY COUNSEL

By: _____
Deputy County Counsel

APPROVED AS TO ACCOUNTING FORM:
BETSY SCHAFFER, CPA, CPFO
AUDITOR-CONTROLLER

By: _____
Deputy Auditor-Controller

APPROVED AS TO FORM:
GREG MILLIGAN, ARM
RISK MANAGER

By: _____
Risk Management

RECOMMENDED FOR APPROVAL
KIRK LAGERQUIST, DIRECTOR
GENERAL SERVICES DEPARTMENT

By: _____
Department Head

Dept 063 Fund 0030 Program 1930 Account {ACCT} Project 20041

SAMPLE

TERMS & CONDITIONS

00 70 00

Special Conditions

County of Santa Barbara
Project #20041
October 2025

GENERAL

The following Special Conditions are in addition to the General Conditions of the Contract. **These Special Conditions represent items specific to County Project #20041 IRC Expansion and ADA Improvements**. Where a portion of the General Conditions is modified and or deleted by these Special Conditions, the unaltered portions of the General Conditions shall remain in effect. If a conflict exists between these Special Conditions and the General Conditions, these Special Conditions supersede.

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SPECIAL CONDITIONS ATTACHMENTS

1. CONTRACTOR CLEARANCE FORM
2. SITE LOGISTICS PLAN
3. AMENDED LANGUAGE FOR 00 71 00 13.1.5.1(a.)

ITEM 1 – WORKER SECURITY CLEARANCES

The IRC Expansion and ADA Improvements Project is located within and around the secure and operational Santa Barbara Main Jail facility. **All on-site workers** (inclusive of the General Contractor ("Contractor") , all subcontractors, all levels of sub-tiers and vendors, manufacturer's representatives, and/or any other personnel performing work or inspection on-site) are required to be cleared by the Santa Barbara County Sheriff's Office **prior to entry to the site**. Required clearance form is provided within these Special Conditions as Attachment 1. Delivery drivers do not require pre-clearance.

Clearance forms take approximately one (1) calendar week to process and return. Contractor shall plan accordingly to ensure all required personnel submit clearance forms timely so as not to impact the project schedule.

Sheriff's office will not "re-run" clearance requests/forms for any persons who are not initially cleared. Explanations/reasoning for non-clearance will not be provided by the Santa Barbara County Sheriff's office.

Clearance forms shall be filled out completely, signed, and submitted in a sealed envelope to Sheriff staff at the main lobby of the Santa Barbara County Main Jail. Multiple clearance forms may be submitted in the same sealed envelope. Sealed envelopes shall be identified with the following information:

ATTN: LT. TOM LISTON
PROJECT 20041 – IRC EXPANSION
CONTRACTOR CLEARANCE FORM(S)

All on-site workers are required to sign-in and sign-out daily at the main project entrance or the Contractor's jobsite trailer (if on site). The Contractor shall maintain an accurate list of clearances and verify that all workers on the jobsite have been cleared by the Santa Barbara County Sheriff's office to work on the project.

All costs for providing a workforce that can obtain the necessary security clearance, and for completion and submission of worker security clearance forms, are part of the Base Bid for the Contract. No additional costs related to any aspect of security clearance requirements or providing personnel capable of obtaining such clearances will be considered or allowed.

ITEM 2 – WORKING HOURS

The Santa Barbara County Main Jail is an active detention facility that operates 24 hours a day, seven days a week.

Normal Working Hours for this project are 7am – 5pm Monday thru Friday.

Contractor must request in writing, and no less than 72 hours prior, approval for work outside of Normal Working Hours - including weekend and/or Holiday work. The County is under no obligation to approve off-hours work but will attempt to accommodate such requests if possible. Contractor will

be financially responsible for any additional costs to the County to accommodate off-hours work requests (including but not limited to: inspection/special inspection, testing, overtime, Sheriff or General Services escorts, etc.).

ITEM 3 – SITE LOGISTICS

A site logistics plan (Special Conditions Attachment 2) has been included in these Special Conditions to inform the Contractor of entry/egress points from the site, expectations for temporary fencing, staging and material storage areas, and contractor/subcontractor parking. Contractor will not be provided area(s) by the County outside of those identified on the included site logistics plan.

All contractor gates shall be dual-locked with the Santa Barbara County Sheriff's Office.

Contractor will be responsible to remedy any damage done to existing facilities, infrastructure, or other existing condition during the work of this Contract.

Deliveries shall be coordinated so as not to impede the flow of visitors and staff withing the IRC parking lot.

All equipment and tools shall be locked at the end of the working day. No loose tools shall be left on the jobsite. Locked toolboxes are permitted to remain on site. Personnel leaving loose tools shall be subject to permanent removal from the project by the OWNER. **Any such determination is FINAL and non-negotiable**.

The Santa Barbara County Main Jail is an operational detention facility. Interaction between site workers and inmates is strictly prohibited and may result in permanent removal from the project by the OWNER. **Any such determination is FINAL and non-negotiable**.

ITEM 4 – CONTRACT DURATION & NOTICES TO PROCEED (NTPs)

The total Contract time is **456** calendar days.
There will be two (2) separate NTPs for this project as follows:

NTP-1 – All Exterior Work, Interior Measurement/Layout and Planning for NTP-2, Firewall (including doors and hardware) in the buss hallway separating the IRC from the remainder of the main jail (refer to SPECIAL CONDITIONS ITEM 6 below).
Duration for completion: **456** Calendar Days.

Upon approval of the Contract by the Santa Barbara County Board of Supervisors, Contractor shall be issued NTP-1 with an anticipated date of January 5, 2026. NTP-1 will cover all exterior work for the project. NTP-1 will also include any measurement, layout, and planning necessary for work scope to be performed within NTP-2. The firewall separation in the buss hallway is also covered by NTP-1.

NTP-2 – Interior Work at Existing IRC Building
Duration for Completion: **110** Calendar Days **concurrent** with the projects overall 456 calendar day duration.

The County will issue NTP-2 for all interior work at the existing IRC Building once the Contractor has secured delivery at the project site of all materials and/or equipment required for this portion of the scope.

Contractor shall include within the overall project schedule an independent sub-schedule detailing the work associated with NTP-2 and tied to the appropriate activities of NTP-1. The sub-schedule shall include activities for submittals, approvals, procurement and deliveries as well as the activities for performing the work. In addition to Contractor's activities, the schedule shall include a prerequisite Milestone activity of 30 calendar days for "Notice to the County Project Manager" prior to the NTP-2 issuance. This activity is for County coordination with the Sheriff's office to relocate inmates, furniture, fixtures, and/or equipment prior to the Contractor's anticipated NTP-2 date.

Due to the inmate and staff relocation necessary for NTP-2, it is imperative the Contractor coordinate and plan the work to alleviate impacts to Sheriff operations beyond the NTP-2 duration. The Sheriff's office plans to re-occupy the Existing IRC building as soon as possible after acceptance of the NTP-2 work. The contractor will be expected to prioritize any re-work, punch list, or other corrective work for NTP-2 to facilitate the re-opening of the facility. Contractor shall include a Milestone activity in the project schedule for "Acceptance of NTP-2 Work" with a Finish to Start relationship to NTP-2 punch list completion.

Project Completion is achieved only after the work of both NTP's is completed.

ITEM 5 – WORK PERFORMED INSIDE THE EXISTING IRC DURING NTP-1

The existing IRC will be fully operational until the date of NTP-2. Therefore, any activities to occur inside the IRC that is part of NTP-1 (measurement, layout, planning) shall be coordinated with the County Project Manager.

Requests for access shall be submitted 72hrs in advance so the County can arrange for the appropriate escort (General Services, Sheriff, or both). Access to inmate occupied portions of the IRC will require a Sheriff escort. Contractor and subcontractors performing activities in the existing IRC are required to stay with their escort at all times. Tool logging (in and out) will be required, and all persons must have passed the security clearance per SPECIAL CONDITIONS ITEM 1 above. Special ID badges (issued daily) and sign-in/sign out procedures will be required for access into the IRC during NTP-1.

Contractor is expected to coordinate all planning work during NTP-1 so materials and equipment for NTP-2 scope can be submitted, approved, ordered and delivered timely so as not to affect the project schedule.

ITEM 6 – TEMPORARY BARRIER FOR NTP-2 WORK

Contractor will be responsible for providing a temporary barrier within the buss hallway to separate the IRC from the remainder of the Main Jail in order to proceed with NTP-2 work. The new fire wall currently shown in the bus hallway is NOT SUFFICIENT for this purpose (nor is it located appropriately). The temporary barrier will need to be located between the IRC and the door leading to the bus yard. Contractor to coordinate the precise location with the County Project Manager. See notations related to this item on the site logistics plan for approximate location.

The temporary barrier shall be robust enough to block sound and dust from exiting the IRC during construction activities under NTP-2. A keyed door shall be provided in the temporary barrier for Sheriff access only (no Contractor access). This temporary barrier shall be demolished by the Contractor upon completion of the NTP-2 scope of work. Any existing conditions affected by the temporary barrier shall be returned to their prior condition.

The new fire wall in the buss hallway that is part of the project scope shall be constructed after the demolition of the temporary barrier. Therefore, NTP-2 completion is required prior to construction of the new fire wall (including door and hardware). The bus hallway is an active thoroughfare, and the Sheriff will be utilizing this area for additional activities during the NTP-2 work. The Contractor shall include an activity in the project schedule as follows: "Sheriff relocation of temporary activities from buss hallway" (14 calendar days, Finish to Start relationship with "NTP-2 Acceptance").

ITEM 7 – SPECIAL ITEMS FOR TURNOVER TO FACILITIES

Contractor shall coordinate a meeting within 14 days of the NTP-1 with the County Project Manager and Facilities Maintenance to review all items that are slated for demolition. The meeting is to coordinate items that the County will want turned over in lieu of demo. Known items include: doors (specifically slider doors), detention hardware, isolation and/or shutoff valves.

ITEM 8 – ALLOWANCE FOR POWER/COOLING TO THE IRC SERVER ROOM

Contractor shall provide an allowance of **$50,000.00** specifically to maintain power and cooling to the IRC Server Room. This allowance shall be itemized on the Contractors' Schedule of Values. County Project Manager will coordinate with the Contractor, Facilities Maintenance, and Sheriff to facilitate the requirements for temporary power and/or cooling. Any unused portion of the allowance shall be returned to the County by Change Order at the conclusion of the project.

ITEM 9 – MODIFICATION TO 00 71 00 GENERAL CONDITIONS ARTICLE 13.1.5.1

00 71 00 General Conditions, Article 13.1.5.1(a.) is revised as follows:

Case B and C to include additional Commission for Insurance at 0.8% and Bond at 0.7%. In addition, Case B has been clarified to allow 5.0% Profit for first tier subcontractor(s) only. Refer to Special Conditions Attachment 3 for revised section 13.1.5.1(a.).

END OF SPECIAL CONDITIONS

SPECIAL CONDITIONS ATTACHMENTS FOLLOW

Special Conditions
ATTACHMENTS

00 70 00
Special Conditions
ATTACHMENT 1

CONTRACTOR CLEARANCE FORM

Santa Barbara County Sheriff's Department
Custody Operations

Request for Security Access

Authority: Title 15 California Code of Regulations Section 3172 requires the visiting approval application process to include an inquiry of personal, identifying, and the arrest history of the prospective visitor sufficient to complete a criminal records clearance.

COMPANY NAME: _____

Telephone _____

Full Name _____ _____ _____
Last First Middle

Address_____City, State, Zip Code_____

Place of Birth_____Date of Birth_____

Height _____Weight_____ Hair_____ Eyes_____

Occupation _____Business Address_____

Driver's License Number/State _____ Social Security Number_____

Spouse or Relative _____ Relationship _____Telephone_____

Address_____ City, State, Zip Code_____

A request for security access to the Santa Barbara County Jail can include, but not limited to the following:

- Department of Motor Vehicles/Identification check;
- Warrants (Wanda) check;
- NCIC, RMS and SAM Systems check;
- CLETS Criminal History check;
- Fingerprint and or Photograph Identification check.

This information is used for security purposes. The Custody Administration Lieutenant will make final authorization for security access.

Upon issuance of security clearance, it will be the responsibility of the individual to notify the Custody Administration Lieutenant of any changes. Upon termination/separation from employment, you will return the issued identification badge immediately to the Custody Administration Lieutenant.

I authorize the Santa Barbara County Sheriffs Department to conduct a criminal history check for the purposes of security. I have read and understand the above information and agree to submit personal information to obtain security clearance for the purpose listed:

(__) Medical Services Employee
(__) Inmate Services Volunteer
(__) Other:
Explain: _____

_____ Date:_____
Applicant's Signature

_____

Access: Approved: (circle one) YES / NO_____
Administrative Lieutenant

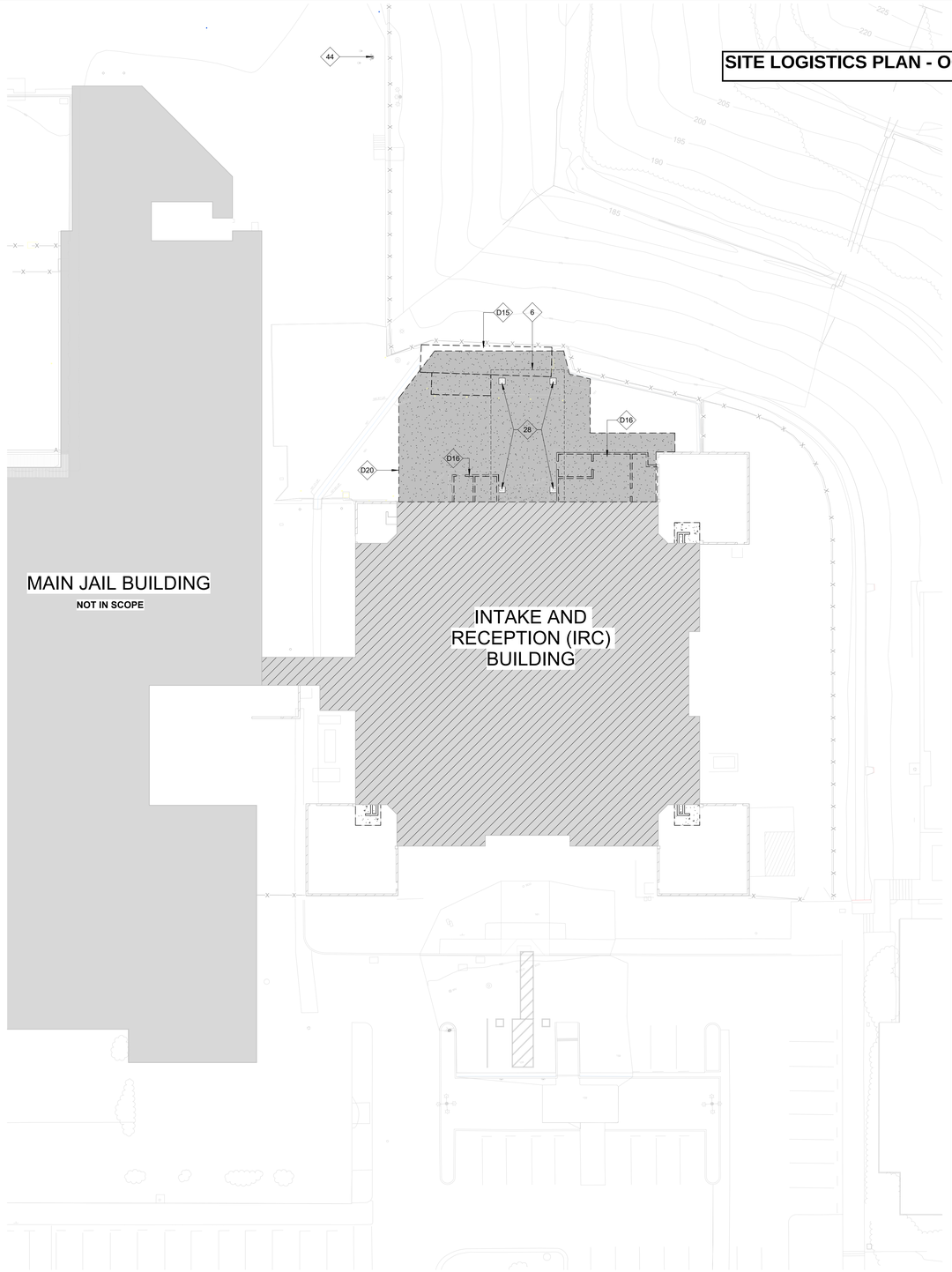
Security Access to:

(__) Main Jail Facilities
(__) Branch Jail Facilities

00 70 00
Special Conditions
ATTACHMENT 2

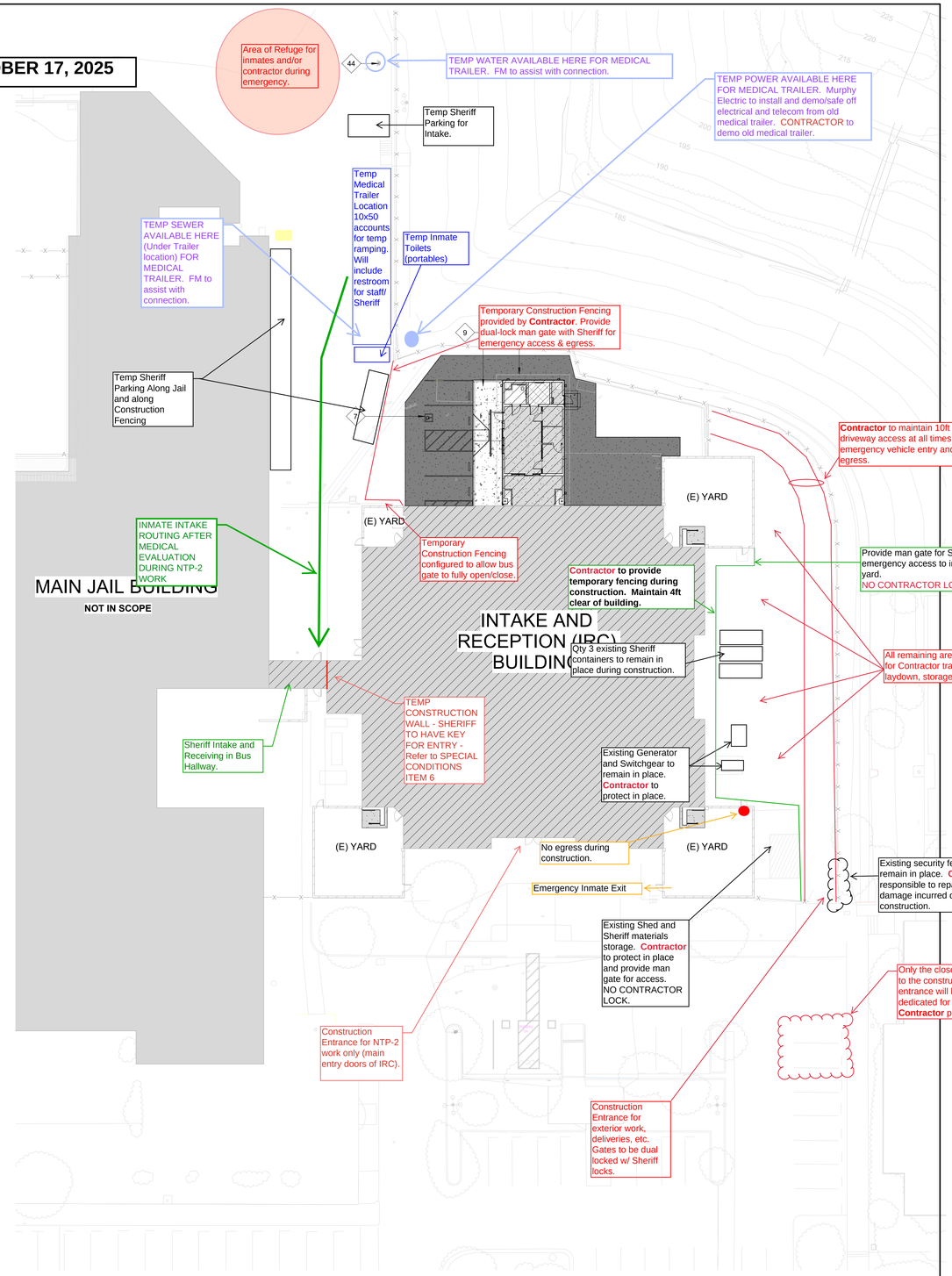
SITE LOGISTICS PLAN

SITE LOGISTICS PLAN - OCTOBER 17, 2025



1 DEMOLITION SITE PLAN

1" = 20'-0"



2 PROPOSED SITE PLAN

1" = 20'-0"

KEYNOTES:

◇ # THESE KEYNOTES APPLY TO THIS SHEET ONLY

DEMOLITION KEYNOTES

D15 DEMOLISH (E) TRAILER AND COVERED RAMP

D16 DEMOLISH (E) BUILDING - SEE DEMO PLAN F.A.I.

D20 DEMOLISH (E) ASPHALT PAVING, CONCRETE SLABS, CURBS AND FOOTINGS (WHERE OCCURS) - SEE CIVIL SHEETS F.A.I.

NEW CONSTRUCTION KEYNOTES

6 (E) ROOF ABOVE

7 NEW ACCESSIBLE PARKING AND ACCESS AISLE STRIPING - SEE CIVIL SHEETS F.A.I.

9 NEW CONCRETE FLATWORK WITH CURBCUT - SEE CIVIL SHEETS F.A.I.

28 (E) CONCRETE PEDESTAL TO REMAIN - PROTECT IN PLACE

44 (E) FIRE HYDRANT

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR BUILDING EXPANSION AND WORK WITHIN EXISTING IRC SEE FLOOR PLANS A111D AND A111.
2. SEE CIVIL DRAWINGS FOR SCOPE OF PAVING, T.O. CONCRETE ELEVATIONS, AND NEW PAVING ELEVATIONS.

LEGEND:

(N) BUILDING ADDITION UNDER (E) CANOPY

(E) BUILDING

(E) ASPHALT PAVING TO BE REMOVED - SEE CIVIL DWGS FOR FULL SCOPE OF PAVING DEMOLITION

(N) ASPHALT PAVING - SEE CIVIL DWGS FOR FULL SCOPE OF PAVING REPLACEMENT

(N) CONCRETE WALKWAY - SEE CIVIL DWGS FOR FULL SCOPE

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

nacht&lewis
600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

ENLARGED SITE PLAN - DEMO AND PROPOSED

SHEET NO.

A101

00 70 00
Special Conditions
ATTACHMENT 3

MODIFICATION TO
00 71 00 GENERAL CONDITIONS
ARTICLE 13.1.5.1(a.)

Docusign Envelope ID: 202B89B3-8596-4BA3-BC36-3C03B91587A7

13.1.5.1 The net cost of Changes in the Work may include all items of labor or material, power tools and equipment actually used, prorate charges for foreman and payroll charges such as Public Liability and Workmen Compensation Insurance. No percentage for overhead, profit and commission shall be allowed on items of premium costs for overtime, social security, old age and unemployment insurance, fringe benefits, and payroll taxes. If deductions are ordered, the credit shall be the net cost. Items considered as overhead shall include insurance, other than that mentioned above, bond or bonds, superintendent, timekeeper, clerks, watchmen, use of small tools, incidental job burdens, transportation, and general offices expense. The percentages for overhead and profit shall be negotiated and may vary according to the nature, extent and complexity of the changed Work (other than those covered by unit prices set forth on the Contract Documents), but in no case shall exceed the following:

(a.) Allowable Mark-ups on Change Order Definitions:

Prime Contractor = General Contractor

First Tier Contractor to the Subcontractor = Prime Contractor.

Second Tier Contractor to the Subcontractor = First Tier Subcontractor.

Case A: For work within the scope of the Change Order performed by forces of the Prime Contractor:
Overhead:10% to Prime Contractor only.
Profit: 5% to Prime Contractor only.
Commission: No commission to any party.

Case B: For work within the scope of the Change Order performed by forces of the First Tier Subcontractor(s):
Overhead: 10% to First Tier Subcontractor(s)only.
Profit: 5% to First Tier Subcontractor(s) only.
Commission: 5% to Prime Contractor, plus 0.8% insurance and 0.7% bond.

Case C: For work within the scope of the Change Order performed by forces of the Second Tier Subcontractor(s):
Overhead:10% to the Second Tier Subcontractor(s) only.
Profit: 5% to the Second Tier Subcontractor(s)only.
Commission: 5% to the Prime Contractor, plus 0.8% insurance and 0.7% bond, and 5% to the First Tier Subcontractor(s).
No commission to Second Tier Subcontractor(s).

(b.) Not more than four (4) mark-ups (Case C), not to exceed the maximum percentages shown above, shall be allowed.

(c.) All Cost Proposals for work shall be submitted to the Designated Representative on the attached document: "County of Santa Barbara General Services/Capital Projects Division Cost Proposal".

00 71 00

General Conditions

County of Santa Barbara
Project #20041
October 2025

GENERAL CONDITIONS

GENERAL CONDITIONS

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ARTICLE 1: CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 The Contract Documents: The Contract Documents consist of the Agreement between the Owner and the Contractor, the Conditions of the Contract (General Conditions, General Requirements, Special Provisions and other Conditions), the Drawings, the Specifications, all Addenda, Supplements, Invitations to Bid and Proposal Forms issued prior to execution of the Contract and all Modifications issued after the execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties (2) a Change Order, (3) a written interpretation issued by the Architect/Engineer pursuant to Subparagraph 3.2.2 or (4) a written order for a minor change in the Work issued on the Owner's behalf pursuant to Paragraph 13.4.1.

1.1.2 The Contract: The Contract Documents form the Contract with the Contractor. This Contract represents the entire and integrated agreement and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Architect/Engineer and the Contractor or between the Architect/Engineer and the Designated Representative but the Architect/Engineer and the Designated Representative shall be entitled to performance of the obligations of the Contractor intended for their benefit and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner, the Designated Representative or the Architect/Engineer and any Subcontractor or Sub-subcontractor.

1.1.3 The Work: The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or part of the project.

The Project: The "Project" is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

1.1.5 The Owner: As defined in Article 2 of the General Conditions, the Owner for this project is:
Santa Barbara County, through its
Board of Supervisors

1.1.6 Architect/Engineer: As defined in Article 3 of the General Conditions.

1.1.7 Designated Representative: As defined in Article 4 of the General Conditions, the Designated Representative is also the Labor Compliance Coordinator for the Work.

1.1.8 Contractor: As defined in Article 5 of the General Conditions.

1.1.9 Product: The term "product" shall include materials, equipment and systems.

1.1.10 The Drawings: The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

1.1.11 The Specifications: The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work and performance of related services.

1.1.12 The Bid Package: The Bid Package is the volume usually assembled for the Work which may include the bidding requirements, sample forms, conditions of the Contracts and Specifications.

1.1.13 As Approved: Where used in conjunction with the Designated Representative or the Architect/Engineer's response to submittal's, requests, applications, inquiries, reports and claims by the Contractor, the meaning of the term "approved" shall not exceed the limitations of the Designated Representative or the Architect/Engineer's responsibilities and duties as established in these General Conditions.

1.1.13.1 In no case shall "approval" by the Designated Representative or the Architect/Engineer be interpreted as a release of the Contractor from the responsibilities to fulfill the requirements of the Contract Documents.

1.1.13.2 Approval, where required for an item, shall be obtained from the Architect/Engineer through the Designated Representative in writing.

1.1.14 Indicated: The term "indicated" is a cross reference to details, notes or schedules on the drawings, other paragraphs

or schedules in the Specifications and similar means of recording requirements in the Contract Documents.

1.1.14.1 Where terms such as "shown", "noted", "scheduled", and "specified" are used instead of "indicated", it is for the purpose of helping the reader accomplish the cross reference and no limitation of locations is intended except as specifically noted.

1.1.14.2 Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected:, "approved", "required", "accepted", and "permitted" mean "directed by the Architect/Engineer, Designated Representative or Owner's Representative", "requested by the Architect/Engineer, Designated Representative or the Owner's Representative", etc. However, no such implied meaning will be interpreted to extend to the Architect/Engineer's or Designated Representative's responsibility in the Contractor's area of construction supervision.

1.1.15 Installer: The person or entity engaged by the Contractor or its Subcontractor or Sub-subcontractor for the performance of a particular unit of Work at the project site, including installation, erection, application and similar required operations. It is a General Requirement that installers be recognized as experienced and competent in the Work that they are engaged toperform.

1.1.16 Suitable, Reasonable, Proper, Correct, and Necessary: Such terms shall mean as suitable, reasonable, proper, correct or necessary for the purpose intended as required by the Contract Documents, subject to the judgment of the Architect/Engineer or the Designated Representative.

1.1.17 Including, Such As: The Terms "including" and "such as" shall always be taken in the most inclusive sense, namely, "including, but not limited to", and "such as, but not limited to."

1.1.18 Option: The term "option" shall mean a choice from the specified products which shall be made by the Contractor. The choice is not "whether" the Work is to be performed, but "which" product or "which" procedure is to be used. The product or procedure chosen by the Contractor shall be provided at no increase in the cost to the Owner or the Designated Representative and with no lessening of the Contractor's responsibility for its performance. All or any options selected or proposed are still subject to all requirements for submittals and for approval of same.

1.1.19 Exposed: The term "exposed" shall mean any item or surface, exterior or interior, which can be seen by a person outside the building, or seen by a person inside any usable space within thebuilding during normal activity.

1.1.20 At No Additional Cost: The term "at no additional cost" shall mean at no additional cost to the Owner and at no cost to the Architect/Engineer or the Designated Representative.

1.1.21 Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the Work, either at the project site or elsewhere; and to report and interpret the results of those inspections or tests.

1.1.22 Record Documents: Construction Documents revised to show changes made during the construction process, usually based on marked-up prints, drawings and other data furnished by the Contractor to the Designated Representative.

1.1.23 Compliance Group Representative: The person or entity representing a third-party observer whose sole purpose on the PROJECT is to interview contractor employees, including any subcontractor for prevailing wage compliance consistent with federal and state prevailing wage requirements as set forth in the David-Bacon Act and other related codes, laws or regulations.

1.2 ABBREVIATIONS

1.2.1 The language of the specifications and elsewhere in the Contract Documents is of the abbreviated type in certain instances and implies words and meanings which will be appropriately interpreted.

1.2.2 Actual word abbreviations of a self-explanatory nature have been included in the Specifications and Drawings. These are generally defined in the Specifications Section at the first instance of use of each term so abbreviated. They are generally summarized in a list on the Drawings.

1.2.3 Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and the full context of the requirements so indicates.

1.3 EXECUTION, CORRELATION AND INTENT

1.3.1 By executing this Agreement, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed and correlated its observations with the requirements of the Contract Documents. Claims, as a result of failure to do so, will not be considered.

1.3.2 The contract agreement shall be signed in triplicate by the Owner and Contractor. Original copies are to be provided to Owner, Contractor, and Designated Representative. Digital signatures are acceptable by the County of Santa Barbara

1.3.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of

the Work. The Contract Documents are complementary and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations in the Contract Documents which have well-known technical or trade meanings are used in accordance with such recognized meanings.

1.3.4 The organization of the Specification into divisions, sections and articles and the arrangements of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any Trade.

1.3.5 All indications or notations which apply to one or a number of similar situations, materials or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the Work, unless otherwise indicated in the Contract Documents.

1.3.5.1 Where the word "similar" appears on the drawings, it shall be interpreted in its general sense and not as meaning identical and all details shall be worked out in relations to their location and connection with other parts of the Work.

1.3.5.2 Where, on any drawings, a portion of the Work is drawn out and the remainder is indicated in outline, the parts drawn out shall also apply to parts outlined.

1.3.6 All manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

1.3.7 The Contract Documents should be read as one package and are dependent on one another for interpretation. If there is an ambiguity or conflict between documents, the Contractor or its Subcontractor has the duty of inquiring with the Designated Representative and the Architect/Engineer before he bids on the job. Conflicts and discrepancies discovered during the process of the Work shall be referred to the Architect/Engineer and Owner via the Designated Representative for resolution.

1.3.8 Any noted discrepancies between the Contract Documents shall be promptly called to the attention of the Designated Representative and the Architect/Engineer and no Work so affected shall be undertaken in advance of the Designated Representative's and the Architect/Engineer's decision, except at the Contractor's own risk.

1.4 OWNERSHIP AND USE OF DOCUMENTS

1.4.1 All Drawings, Specifications, and copies thereof of this project shall remain the Owner’s property. They are to be used only with respect to this project and are not to be used on any other project..

1.4.2 Project approved Working Drawings, Specifications, Exhibits, and Reports will be posted on the Owner’s website specified in the Invitation to Bid. Owner will not furnish paper copies of approved Working Drawings, Specifications, Exhibits, and Reports to Contractor. Contractor is responsible to download Working Drawings, Specifications, Reports, and Exhibits via the Owner’s website specified in Invitation to Bid.

ARTICLE 2: OWNER

2.1 DEFINITION

2.1.1 The Owner is the person or entity identified as such in the Agreement between the Owner and the Contractor and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner or its authorized representative.

2.2 INFORMATION AND SERVICES FURNISHED BY THE OWNER

2.2.1 The Owner will furnish all surveys describing the physical characteristics and approximate known utility locations for the site of the Project.

2.2.2 Except as provided in Subparagraph 5.7.1, the Owner will secure and pay for necessary approvals, easements, assessments and charges required for the construction, use, or occupancy of permanent structures or for permanent changes in existing facilities unless otherwise noted.

2.2.3 Information or services under the Owner's control will be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

2.2.4 The Owner shall forward all instructions to the Contractor through the Designated Representative.

2.2.5 The Owner shall at all times have access to the Work for inspection, wherever it is in preparation or in progress. When directed by the Designated Representative, the Contractor shall provide facilities for such access and inspection at the Contractor's cost.

2.3 DELEGATION

2.3.1 The Board of Supervisors delegates to the County Director of General Services the authority to act on its behalf in the administration of this contract.

2.3.2 The Director of General Services has the authority to change the Designated Representative when the Designated Representative is an employee of the County.

2.3.3 If the Designated Representative is a person or entity other than an employee of the County, the Director of General Services shall recommend to the Board of Supervisors a replacement for the Designated Representative whenever such replacement is in the best interest of the County. An affirmative majority vote by the Board of Supervisors is required to complete the replacement of the Designated Representative.

2.3.4 The Director of General Services may execute Change Orders in accordance with Article 13 in a cumulative amount not to exceed 10% of the first $250,000 of the base contract amount plus 5% of the base contract amount over $250,000, and for time extensions as the director may deem equitable. Any Change Orders in excess of 10% of the first $250,000 of the base contract amount plus 5% of the base contract amount over $250,000 shall be approved by a majority vote of the Board of Supervisors.

2.4 AUTHORITY OF BOARD AND INSPECTION

2.4.1 The Board of Supervisors has the final authority in all matters affecting the work covered by the plans and specifications. Within the scope of the contract, the Designated Representative has the authority to enforce compliance with the plans and specifications. The Contractor shall promptly comply with instructions from the Designated Representative.

2.4.2 On all questions relating to quantities, the acceptability of material, equipment, or work, the execution, progress or sequence of work, and the interpretation of specifications or drawings, the decision of the Designated Representative is final and binding, and shall be precedent to any payment under the contract, unless otherwise ordered by the Board.

2.4.3 Labor Compliance Monitoring: To ensure compliance with prevailing wage requirements in the WORK, the Board of Supervisors has adopted a *Joint Labor Compliance Monitoring Program.* This program monitors labor compliance by conducting interviews with Contractor employees and subcontractors at the project site. A copy of the *Joint Labor Compliance Monitoring Program* is available at the Capital Projects Division Office. A copy of the *Joint Labor Compliance Monitoring Program* will be provided upon request. The Contractor, and all subcontractors, shall cooperate by allowing approved Compliance Group Representatives access to its employees on the project site for the purpose of conducting prevailing wage compliance interviews. The Compliance Group Representative shall restrict their on-site activities to prevailing wage compliance interviews only. Promotion, advertising or other related activities of the Compliance Group Representative is strictly prohibited. Any additional effort required by the Contractor in compliance with this Article shall be incorporated into the Bid Scope of Work and no additional compensation will be considered.

2.4.4 The Designated Representative (or its designee) may accompany any Compliance Group Representative when conducting prevailing wage compliance interviews. The Compliance Group Representative will display in plain view a county-issued identification card when conducting prevailing wage compliance interviews at the project site.

ARTICLE 3: ARCHITECT/ENGINEER

3.1 DEFINITIONS

3.1.1 The Architect/Engineer is the person lawfully licensed to practice architecture or engineering or an entity lawfully practicing architecture or engineering who has entered into an Agreement with the Owner to serve as Architect/Engineer and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Architect/Engineer means the Architect/Engineer or its authorized representative.

3.1.2 Architect/Engineer shall be entitled to performance by the Contractor of any obligations expressly set forth which are intended for the Architect/Engineer's benefit and to enforcement thereof.

3.1.3 In the case of the termination of the employment of the Architect/Engineer, the Owner shall appoint a capable and reputable Architect/Engineer. The status under the Contract of the Architect/Engineer so appointed shall be that of the former Architect/Engineer. The Owner shall notify the Contractor whenever the Architect/Engineer is replaced.

3.1.4 The Architect/Engineer may be an employee of the County or other governmental entity.

3.2 ARCHITECT/ENGINEER'S DUTIES DURING CONSTRUCTION

3.2.1 The Architect/Engineer shall at all times have access to the Work wherever it is in preparation and progress. When directed by the Designated Representative, the Contractor shall provide facilities for such access at the Contractor's cost so the Architect/Engineer may perform its functions under the Contract Documents.

3.2.2 The Architect/Engineer will be the interpreter of the requirements of the Drawings and Specifications. Written

interpretations necessary for the proper execution or progress of the Work, in the form of drawings or otherwise, will be issued with reasonable promptness by the Architect/Engineer through the Designated Representative and in accordance with any schedule agreed upon. The Contractor or Owner shall make written dated request through the Designated Representative to the Architect/Engineer for such interpretations. Such interpretations shall be consistent with and reasonably inferable from the Contract Documents. The Contractor or Owner shall execute and complete the Work in accordance with such interpretations. The Architect/Engineer shall not be liable to the Contractor for the result of any interpretation or decisions rendered in good faith in such capacity.

3.2.2.1 The Architect/Engineer shall interpret the requirements of Change Orders and he shall decide all other questions of design intent in connection with the Work.

3.2.2.2 It shall be the responsibility of the Architect/Engineer to make interpretations and render opinions in regard to all claims to the Owner or Designated Representative involving questions of interpretation of the intent of the drawings and specifications. Such opinions and interpretations, together with the reasons therefore, shall be furnished in writing by the Architect/Engineer to the Owner, Designated Representative and Contractor within ten (10) days after a request is made thereof.

3.2.2.3 Neither the Contractor, the Designated Representative nor the Owner shall be bound by any determination, interpretation or opinion of the Architect/Engineer if it is determined that such is not in accord with the true intent of the Contract Documents. The party taking issue with the determination, interpretation, or decision of the Architect/Engineer shall give the other party or parties, as the case may be, written notice of such fact within ten (10) days after the determination, interpretation, or opinion is rendered by the Architect/Engineer. However, it is the intent of this Paragraph 3.2 that in the actual performance of the Work, the Contractor and the Designated Representative shall, in the first instance, proceed in accordance with the instruction given by the Architect/Engineer unless the Owner and the Designated Representative mutually agree that the Contractor and the Designated Representative shall proceed otherwise.

3.2.3 The Architect/Engineer's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

3.2.4 The Architect/Engineer will have the authority to reject Work which does not conform to the Contract Documents. Whenever, in its opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the Work in accordance with Subparagraph 8.7.2 whether or not such Work be then fabricated, installed or completed. However, neither the Architect/Engineer's authority to act under this Subparagraph 3.2.4, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Architect/Engineer to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

3.2.4.1 The Architect/Engineer will be the judge of the performance of the Work and will use its powers under the Contract to enforce its faithful performance. The Architect/Engineer will determine the amount, quality, acceptability and fitness of all parts of the Work.

3.2.4.2 The Architect/Engineer will recommend suspension of the Work whenever suspension may be necessary to ensure the proper execution of the Work.

3.2.5 The Architect/Engineer will review and approve or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Architect/Engineer approval of a specific item shall not indicate approval of an assembly of which item is a component.

3.2.6 The Architect/Engineer along with the Designated Representative will conduct inspections to determine the dates of Substantial Completion and Final Completion and will receive and review written warranties and related documents required by the Contract and assembled by the Contractor.

3.2.7 Architect/Engineer shall prepare and deliver to the Owner in an electronic format record construction drawings and record construction specifications showing significant changes in the Work during the construction process based upon as-built construction drawings and other data provided by the Contractor through the Designated Representative.

3.2.8 The Architect/Engineer will communicate with the Contractor through the Designated Representative.

3.2.9 The Architect/Engineer will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. However, the Architect/Engineer will not be required to make exhaustive or continuous on-site inspections to check quality or quantity of the Work. On the basis of on-site observations as an Architect/Engineer, the Architect/Engineer will keep the Owner informed of progress of the Work and will endeavor to guard the Owner against defects and deficiencies in the Work.

3.2.10 The Architect/Engineer will not have control over or charge of and will not be responsible for construction means,

methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 5.3. The Architect/Engineer will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect/Engineer will not have control or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractor, or their agents or employees, or of any other persons performing portions of the Work.

3.2.11 The Architect/Engineer has no authority to prepare and issue change orders. All change order proposals shall be prepared by the Contractor, shall be approved by the Owner or Director of General Services, and shall be issued to the Contractor through the Designated Representative.

ARTICLE 4: DESIGNATED REPRESENTATIVE

4.1 DEFINITION

4.1.1 The Designated Representative is the person or entity who has been identified in writing by the Owner to serve as Designated Representative and is referred to throughout the Contract Documents. When the Designated Representative is an entity, the term Designated Representative includes the Designated Representative acting through its authorized representatives as indicated to the Contractor in writing at the preconstruction meeting or whenever changes in personnel assignments occur.

4.2 ADMINISTRATION OF THE CONTRACT

4.2.1 The Designated Representative will provide, as the Owner's authorized representative, the general administration of the Project as herein described.

4.2.2 The Designated Representative will be the Owner's construction representative during the construction until final payment and shall have the responsibility to monitor the Work of the Contractor.

4.2.3 The Designated Representative shall monitor the Work to be performed through final completion and project close-out. The Designated Representative's activities shall in no way supersede or dilute the Contractor's obligation to perform the Work in conformance with all contract requirements, but s/he is empowered, by the Owner, to act on its behalf with respect to the proper execution of the Work and shall give instructions to require such corrective measures as may be necessary, in its opinion, to ensure the proper execution of the contract or to protect the Owner's interest. The Designated Representative shall have the authority to require prompt execution of Work whenever such action may be necessary, in its opinion, to ensure the proper execution of the Work or to protect the interests of the Owner. Except as otherwise provided herein, the Designated Representative shall determine the amount, quality, acceptability, fitness and progress of the Work covered by the Contract without, however, assuming any of the Architect/Engineer's statutory or customary obligations.

4.2.4 The Designated Representative shall be deemed to be the Owner's Representative to the extent set forth below and elsewhere in this Contract. The Designated Representative shall have no authority to obligate or otherwise bind the Owner.

4.2.5 The Designated Representative shall review and monitor the Contractor's Work and construction schedule and establish specific measures and actions which the Contractor shall take to maintain the current approved schedule.

4.2.6 The Designated Representative shall examine the Contractor's Work to determine if the construction conforms to the requirements of this Contract (provided, however, that such action by the Designated Representative shall not supersede or diminish the Contractor's obligation to furnish materials and perform the Work in conformity with all requirements of this Contract).

4.2.7 The Designated Representative shall determine any corrective measures which may be necessary to bring the Contractor's performance into conformity with Contract requirements.

4.2.8 The Designated Representative shall monitor the Contractor's performance in coordinating the Contractor's Work under this Contract with the Work being performed or to be performed by other separate contractors.

4.2.9 The Designated Representative shall assist the Owner and the Architect/Engineer in the resolution of questions of Contract interpretation. If the Contractor either disagrees with the Designated Representative's interpretation or considers that such interpretation constitutes a constructive change in Contract requirements, the question shall be referred to the Owner for contract interpretation.

4.2.10 The Designated Representative shall establish and recommend administrative procedures for coordinating the activities of the Contractor, the Designated Representative, the Architect/Engineer and the Owner.

4.2.11 The Designated Representative shall monitor the Contractor's submittal schedule.

4.2.12 The Designated Representative shall coordinate the activities of the Testing Agencies with the activities of the Contractor.

4.2.13 The Designated Representative shall review all requests or recommendations for changes affecting this Contract, review proposals, assist in negotiating and submit recommendations thereon to the Owner.

4.2.14 The Designated Representative shall make recommendations, together with the Architect/Engineer where appropriate, to the Owner as to the qualifications of Subcontractors or Suppliers wherever submittals of Subcontractors and Suppliers are required to be furnished under this contract.

4.2.15 The Designated Representative shall transmit to the Owner all written guarantees and warranties which the Contractor is required to furnish under this contract.

4.2.16 The Designated Representative may call meetings which shall be attended by the Contractor, Subcontractors and Material Suppliers, as the Designated Representative may deem necessary.

4.2.17 The Designated Representative shall have the authority to reject Work which does not conform to the Contract Documents and to require any Special Inspection and Testing in accordance with Subparagraph 8.7.2.

4.2.18 The Designated Representative shall review all applications by the Contractor for progress payments and final payment and make recommendations to the Architect/Engineer and Owner for approval thereof in accordance with the Owner's procedures.

4.2.19 The Designated Representative along with the Architect/Engineer will conduct inspections to determine the dates of Substantial Completion and Final Completion and will receive and review written warranties and related documents required by the Contract and assembled by the Contractor.

4.2.20 In the event any claim is made or any action brought in any way relating to the design or construction of the Project, the Designated Representative will render to the Owner any and all assistance required of it.

4.2.21 The Owner may, at his option, designate the Designated Representative as its representative to perform additional functions, including functions for which other authorized representatives may be designated by the provisions of this contract.

4.2.22 It shall be the duty of the Contractor to comply with all procedures established and implemented by the Designated Representative and approved by the Owner as stated above. In the event any such procedures are at a variance with other provisions of the Contract Documents, such procedures shall prevail.

4.2.23 The Designated Representative shall, at all times, have access to the Work wherever it is in preparation and progress. When directed by the Designated Representative, the Contractor shall provide facilities for such access so the Designated Representative may perform its functions under the Contract Documents.

4.2.24 In no event shall any act or omission on the part of the Designated Representative relieve the Contractor from its obligation to perform its Work in full compliance with the Contract.

4.3 OWNER'S AND DESIGNATED REPRESENTATIVE'S RIGHT TO STOP WORK

4.3.1 If the Contractor fails to correct defective Work as required by Paragraph 14.2 or persistently fails to carry out the Work in accordance with the Contract Documents, the Designated Representative or the Owner through the Designated Representative may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

4.3.1.1 The Contractor shall bear all costs of such Work stoppage unless it is determined that no fault existed in the Contractor's Work. Any Work stoppage for the correction of defective Work or removal and replacement of unacceptable materials and equipment will not be considered as the basis for any time extension.

4.3.2 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Document and fails within 48 hours after receipt of written notice from the Designated Representative to commence and continue correction of such default or neglect with diligence and promptness, the Designated Representative may, by written notice and without prejudice to any other remedy he or the Owner may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect/Engineer's and the Designated Representative's additional services made necessary by such default, neglect or failure.

4.3.3 The relationship of the Designated Representative to the Owner may be that of an independent contractor and the Designated Representative shall have no authority to bind the Owner in any way with the Contractor, its subcontractors, materials suppliers or any third parties.

ARTICLE 5: Contractor

5.1 DEFINITION

5.1.1 A Contractor is the person or entity identified as such in the Agreement between the Owner and a Contractor and is referred to throughout the Contract Document as if singular in number and masculine in gender. The term Contractor means the Contractor or its authorized representative.

5.1.2 It is the duty of the Contractor to comply with all procedures established and implemented by the Designated Representative and approved by the Owner as stated herein.

5.2 REVIEW OF CONTRACT DOCUMENTS

5.2.1 The Contractor shall carefully study and compare the Contract Documents, shall investigate existing site conditions, and shall at once report to the Designated Representative any error, inconsistency or omission he may or reasonably should discover.

5.2.2 All soil,test borehole and exploratory borings data, water table elevations, and soil analyses shown on the drawings or included in the Geotechnical Report and specifications apply only at the locations of the exploratory borings and to the depths indicated. Geotechnical Report is included in and made part of the bid documents. . Any additional subsurface exploration shall be done by bidders or the Contractor at their own expense.

5.2.3 The indicated elevation of the water table is that existing at the date the test hole was determined. It is the Contractor's responsibility to determine and allow for the elevation of groundwater at the date of project construction. A difference in elevations between groundwater shown in exploratory soil boring logs, Geotechnical Report, and groundwater actually encountered during construction will not be considered as a basis for extra work.

5.3 SUPERVISION AND CONSTRUCTION PROCEDURES

5.3.1 The Contractor shall supervise and direct the Work, using the best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

5.3.1.1 The Designated Representative may reject any means, methods, techniques, sequences or procedures proposed by the Contractor, which might constitute or create a hazard to the Work or to persons or property, or which will not provide Work in accordance with the Contract Documents. However, neither the Designated Representative's acceptance of nor its failure to reject any means, methods, techniques, sequences and procedures shall relieve the Contractor of its responsibilities to safely and properly complete the Work.

5.3.2 The Contractor shall be responsible to the Owner and the Designated Representative for the acts and omissions of its employees and all its Subcontractors and their agents and employees and other persons performing any of the Work under a contract with the Contractor.

5.3.3 Neither observations, inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from its obligations to perform the Work in accordance with the Contract Documents.

5.3.4 The Contractor shall perform and be responsible for the correct horizontal and vertical layout out and completion of the Work as per the drawings and written instruction of the Designated Representative including all necessary leveling and checking. The Contractor shall protect and preserve all permanent survey monuments or bench marks and shall bear the expense of replacing any that may be disturbed without permission of the Designated Representative. Replacement of damaged permanent survey monuments or benchmarks shall be performed by a licensed land surveyor hired by the Owner.

5.3.5 The Contractor shall keep the Designated Representative informed of the plan and progress of its Work. No Work shall be closed or covered until it has been duly inspected and approved. Should uninspected Work be covered, the Contractor shall, at its own expense, uncover all such Work so that it can be properly inspected; and after such inspection, he shall properly repair and replace all such Work.

5.4 LABOR AND MATERIALS

5.4.1 The Contractor shall provide and pay for all labor, equipment, tools, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

5.4.1.1 The Contractor shall accept delivery and store, protect and provide security for any Owner-purchased materials, systems and equipment which are a part of the Work until such items are incorporated into the Work. The Contractor shall document receipt of such materials, systems and equipment on forms acceptable to the Designated Representative.

5.4.1.2 The Contractor shall furnish, install, connect, make operable, and commission all heating, ventilating and air conditioning equipment, plumbing fixtures, lighting fixtures, kitchen equipment, and any other mechanical or electrical equipment shown on the plans or called for in the specifications or change orders. In connection therewith, the Contractor shall also furnish and install all necessary devices, hardware, and systems required to make said equipment properly and safely operable including, but not limited to, mounting hardware and framing, insulation, vibration control devices, duct systems, gas piping systems, hot and cold water systems, venting ducts, control systems, and electrical circuits.

5.4.1.3 The Contractor shall furnish and install complete utility systems ready for use and shall pay any special fees, permits or assessments required by the serving utility.

5.4.2 The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

5.4.2.1 Any person employed, who is found to be incompetent, intemperate, troublesome, disorderly or otherwise objectionable, or who fails or refuses to perform its work properly and acceptably, shall be immediately removed from the work by the Contractor and not be re-employed on the jobsite.

5.4.2.2 The Owner may remove and may order the Contractor to remove any person who is incompetent or otherwise objectionable from the site of the Work.

5.4.3 Approval of the Architect/Engineer under any substitution clause shall be obtained in writing before any substitution is made. In the event of the Contractor failing to obtain such approval, no consideration will be given to any appeal from the decision of the Architect/Engineer condemning any materials furnished.

5.4.4 Pursuant to the Public Contract Code, any reference in the specifications and plans to any brand name, article, device, product, materials, fixture, form or type of construction by brand name, make, or catalog number, such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at its option use any article, device, product, materials fixture, form or type of construction which in the judgment of the Architect/Engineer expressed in writing is equal to that specified. The Contractor must within forty (40) days after award of the Contract submit data substantiating a request for substitution.

5.4.5 Requests for substitutions prior to award of the Contract shall be submitted within the time indicated in the Instructions to Bidders.

5.4.6 Requests for substitutions after award of the Contract shall be submitted within **THIRTY-FIVE** (**35**) days of the date of the Notice of Award. This time period may be extended by the COUNTY OF SANTA BARBARA only, in its sole discretion.

5.4.7

5.4.8 If the Contractor proposed to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents he shall inform the Architect/Engineer through the Designated Representative in writing of the nature of such deviations at the time that the materials are submitted for approval and shall request a written approval of the deviation from the requirements of the Contract Documents.

5.4.9 In requesting approval of deviations or substitutions, the Contractor shall provide evidence leading to a reasonable certainty that the proposed substitutions or deviation will provide a quality of result at least equal to that otherwise attainable. If, in the opinion of the Architect/Engineer, the evidence presented by the Contractor does not provide a sufficient basis for such reasonable certainty, the Architect/Engineer may reject such substitution or deviation without further investigation.

5.4.10 The Architect/Engineer will judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the project, as well as for their intrinsic merits. The Architect/Engineer will not approve proposed substitutes as equal to items specified which, in its opinion, would be unharmonious, or otherwise inconsistent with the character or quality of design of the project.

5.4.11 Any additional cost, or any loss or damage, arising from the substitution of any material or method for those originally specified or drawn shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Owner or Architect/Engineer, unless such substitution was made at the written request or direction of the Owner or Architect/Engineer.

5.4.12 The investigation, review and approval of substitute materials requires a minimum of 15 calendar days additional time more than for specified items. The Contractor is required to assure the time impact will not delay its or other Contractor's Work when submitting (proposing) a substitution. Submittal of a substitution will be promptly rejected if the Contractor does not accept the delay responsibility in making its submittal.

5.4.13 The Contractor provides the same warranties and guarantees for the substitute that would be provided for that specified.

5.4.14 The Contractor, its agents and employees shall be bound by and comply with all applicable provisions of the California Labor Code, and with Federal, State, and local laws related to labor.

5.4.15 The Contractor shall strictly adhere to the provisions of the California Labor Code regarding minimum wages, the eight-hour day and the forty-hour week, overtime, Saturday, Sunday, and holiday work and non-discrimination because of race, color, national origin, religion, sex, age, or physically handicapped when otherwise qualified. The Contractor shall forfeit to the Owner the penalties prescribed in the California Labor Code for violations.

5.4.16 The Contractor, as required by the California Labor Code, Sections 1770 et seq., the Contractor shall pay not less than the prevailing rate of per diem wages for each classification of worker employed as determined by the Director

of the California Department of Industrial Relations. A copy of the general prevailing rate of per diem wages is available at the General Services Department to be viewed upon request. The Contractor shall post a copy of such wage determination at each job site.

5.4.17 As provided in Section 1775 of the California Labor Code, as a penalty, the Contractor shall forfeit twenty-five dollars ($25.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates for such work or craft in which such worker is employed for any public work done under the Contract by the Contractor or any Subcontractor under him.

5.4.18 The Contractor shall submit completed Payroll Reporting Forms for all Tradesmen employed on the Work with the monthly Progress Payment Application.

5.4.19 Payroll Reporting Forms shall be the forms prescribed by the Owner or computer-generated payroll reporting forms

which have been approved in writing by the Owner or the Designated Representative.

5.4.20 The Contractor's attention is directed to Sections 1777.5, 1777.6, and 1777.7 of the California Labor Code and Title 8, California Administrative Code Section 200 et seq.

5.4.21 To ensure compliance and complete understanding of the law regarding apprentices, and specifically the required ratio thereunder, the Contractor and Subcontractors should, where some question exists, contact the Division of Apprenticeship Standards prior to commencement of the Work. Responsibility for compliance with the law lies with the Contractor.

5.4.22 The Owner's policy is to encourage the employment and training of apprentices in its construction contracts as may be permitted under local apprenticeship standards.

5.4.23 As required by Section 1773.8 of the California Labor Code, the Contractor shall pay travel and subsistence payments to each worker needed to execute the Work, as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with this section.

5.4.24 To establish such travel and subsistence payments, the representative of any craft, classification, or type of workman needed to execute the Work shall file with the Department of Industrial Relations fully executed copies of collective bargaining agreements for the particular craft classification or type of work involved. Such agreements shall be filed within ten (10) days after their execution and thereafter shall establish such travel and subsistence payments whenever filed thirty (30) days prior to the call for bids.

5.4.25 The Contractor shall comply with all applicable provisions of Sections 1810 to 1815, inclusive of the California Labor Code relating to working hours. As a penalty, the Contractor shall forfeit twenty-five dollars ($25.00) for each worker employed in the execution of the Work by the Contractor or by any Subcontractor for each calendar day during which such work is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week, unless such worker receives compensation for all hours worked in excess of these limits at not less than one and one half (1.5) times the basic rate of pay.

5.5 WARRANTIES AND GUARANTEES

5.5.1 Contractor shall obtain and preserve for the benefit of the COUNTY OF SANTA BARBARA, manufacturer's warranties on materials, fixtures, and equipment incorporated into the Work.

5.5.2 The Contractor, prior to or at the time of Substantial Completion for the Work and during administrative closeout of the project, shall submit one (1) digital copy of all final warranties and guarantees to the Designated Representative for subsequent transmittal to the Architect/Engineer and Owner. All final guarantees and warranties shall be in writing on guarantors'/warrantors' stationery or official forms and signed by a responsible company official, and shall be submitted in full force and effect by the Contractor.

5.5.2.1 The Contractor warrants to the Owner and the Designated Representative that all installed materials and equipment will be new unless otherwise specified and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these requirements, including substitutions not properly approved or authorized, shall be considered defective unless specifically accepted by the Owner. If required by the Designated Representative, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Paragraph 14.2.

5.5.2.2 The warranty of materials, equipment and workmanship defined in 5.5.1 is separate from, independent of and in addition to any other guarantees in this contract or any other warranties required by the Contract Documents.

5.5.2.3 Except as otherwise specified, all Work shall be guaranteed by the Contractor against defects resulting from the use of inferior materials, equipment or workmanship for one year from the date of Substantial Completion of the Project and acceptance/occupancy by the Owner in writing, provided that if prior to the acceptance of the entire project, the Owner occupies or uses any separate unit of Work, the guarantee period shall, as to the unit so occupied or used, commence on the date of such occupancy or use, with the further provision that the Owner shall have first agreed in writing that the separate unit shall be occupied or used by the Owner until such certificate has been given. Equipment and facilities, which have seasonal limitations on their operations, shall be guaranteed for one full year from the date of test and acceptance in writing by the Owner.

5.5.2.4 If within any guarantee period, repairs or changes are required in connection the guaranteed Work, as the result of the use of materials, equipment or workmanship which are defective or inferior or not in accordance with the terms of the Contract, the Contractor shall, promptly, within ten (10) days after receipt of notice from the Designated Representative or Owner and without expense to the Owner or the Designated Representative, commence and continue to effect such repairs or changes.

(a.) The Contractor shall place in satisfactory condition, in every particular, all of such guaranteed Work and correct all defects therein.

(b.) The Contractor shall make good all changes to the structure or site or equipment or contents thereof, which, in the opinion of the Architect/Engineer and the Designated Representative is the result of the use of materials, equipment

or workmanship which are inferior, defective or not in accordance with the terms of the Contract. The Contractor shall make good any Work or materials, or the equipment and contents of structures or site disturbed in fulfilling such guarantee.

(c.) Notifications by Owner of defects shall stop the warranty time period. The guarantee or warranty period for that replaced or restored Work shall be reinstated for the remaining time period, starting on the date of acceptance of the replaced or restored Work.

5.5.2.5 In any case, where in fulfilling the requirement of the Contract or of any guarantee embraced in or required thereby, the Contractor disturbs any Work guaranteed under another contract, he shall restore such Work to a condition satisfactory to the Architect/Engineer and the Designated Representative and guarantee such restored Work to the same extent as it was guaranteed under such other contract.

5.5.2.6 If the Contractor, after notice, fails to proceed within 48 hours to commence and continue to comply with the terms of the guarantee, the Owner or Designated Representative may have the defect corrected in which case the Contractor and its surety shall be liable for all expenses incurred.

5.5.2.7 All special guarantees or warranties applicable to definite parts of the Work that may be stipulated in the Specifications or other papers forming a part of the Contract shall be subject to the terms of the Subparagraph 5.5.1.2 during the first year of the life of such special guarantee.

5.5.2.8 Nothing contained in Subparagraph 5.5.1 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including liability for defective Work under Subparagraph 5.5.1. Subparagraph 5.5.1 relates to the specific obligation of the Contractor to correct the Work and does not limit the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor of the time within which proceedings may be commenced to establish the Contractor's Liability with respect to its other obligations under this contract.

5.5.2.9 In the event the Work of the Contractor is to be modified by another Contractor, either before or after the Inspection provided for in Subparagraph 10.7.1, the first Contractor shall remain responsible in all respects under the warranty given in Paragraph 5.5 and under any other warranties provided in the General Conditions or by law. However, the first Contractor shall not be responsible for any defects in materials or workmanship introduced by the Contractor modifying its Work. Both the first Contractor and the Contractor making the modifications shall be responsible solely for the Work done by each. The Contractor modifying the earlier Work shall be responsible for any damage to or defect introduced into the Work which it is modifying.

5.5.2.10 Warranties and guarantees shall clearly define what is to be guaranteed; the extent, terms, conditions, time and effective dates.

5.5.2.11 Copies of the same warranties and guarantees shall be included in the "Owner's Maintenance Manual" as specified herein.

5.5.3 The Owner shall schedule an end of warranty review meeting with the Designated Representative, Architect/Engineer, and Contractor prior to the end of one year warranty to determine any work requiring correction.

5.5.4 Nothing herein shall limit any other rights or remedies available to County of Santa Barbara.

5.6 CONTROL OF OPERATIONS AND EMPLOYEES

5.6.1 The Contractor shall not use any of the existing Owner's facilities, such as, but not limited to, toilets, cafeteria, parking areas, power hookup, except with the Owner's written approval.

5.6.2 The Contractor shall confine and perform its operations in those areas where construction is required. Contractor shall protect the contiguous non-construction property. The Contractor shall protect from damage all existing trees, utilities, or other improvements at the site. Should damage result from the Contractor's failure to exercise reasonable care in the performance of its Work, the Contractor shall repair or restore any such damage at its own expense.

5.6.3 Obnoxious behavior or possession or consumption of alcoholic beverages or drugs on the premises is strictly prohibited. Violators shall be promptly discharged from the site and may be subject to prosecution.

5.6.4 All vehicular aisles and walking paths at the site where Work under the Contract is being performed are for the general use and the Contractor's operations must conform to the Owners regulations and requirements to keep areas free of obstructions. If the Work of a Contractor requires that such aisles and paths be temporarily discontinued, after obtaining Designated Representative's approval, the Work shall be done expeditiously and alternate vehicular routes and paths of travel shall be identified by such Contractor and maintained as directed.

5.6.4.1 To minimize public inconvenience and possible hazards and to restore work areas to their original condition and former state of usefulness as soon as practicable, the Contractor shall diligently prosecute the work to completion. If, in the Designated Representative's opinion the Contractor fails to prosecute the work to the extent that the above purposes are not being accomplished, the Contractor shall, upon orders from the Designated Representative, immediately take the steps necessary to fully accomplish said purposes. All costs of prosecuting the work as described herein shall be borne by the Contractor. Should the Contractor fail to take the necessary steps to fully accomplish said purposes, after orders of the Designated Representative to do so, the Owner may suspend the work in whole or in part, until the Contractor takes said steps.

5.6.4.2 If work is suspended through no fault of the Owner, all expenses and losses incurred by the Contractor during such

suspensions shall be borne by Contractor . If the Contractor fails to properly provide for public safety, traffic, and protection

of the work during periods of suspension, the Owner may elect to do so, and deduct the cost thereof from monies due the Contractor. Such action will not relieve the Contractor from liability.

5.6.5 The Contractor shall not disturb any existing structure, piping, apparatus or other Work unless expressly required by the contract. Where cutting, drilling or removals are required in existing walls, floor or roof construction, the Work shall be done in such a manner to safeguard and not endanger the structure and shall in all cases be as approved by the Owner and Designated Representative. Prior to any cutting, drilling or removals, the Contractor shall investigate both sides of the surface involved, shall determine the exact location of adjacent structural members by visual examination and shall avoid interference with such members. No structural members, such as joists, beams or columns supporting Work that are to remain shall be cut, drilled or removed unless such conditions are shown in detail on the Drawings and reinforcing of members affected or new members to compensate for such cutting, drilling and removals are shown. If unforeseen obstructions are encountered, the Contractor shall take all precautions necessary to prevent damage and shall apply for and obtain full instructions from the Designated Representative, in writing, before proceeding with the Work.

5.6.6 Rights of way or easements for the improvement as shown on the plans will be provided by the Owner. Unless otherwise provided, the Contractor shall make its own arrangements, pay for, and assume all responsibility for acquiring, using, and disposing of additional work areas and facilities temporarily required by him. The Contractor shall indemnify and hold the Owner, Designated Representative, and Architect/Engineer harmless from all claims for damages occasioned by such actions.

5.6.7 The Contractor shall remove and dispose at no cost to the Owner and with the Owner's approval, existing improvements for which no specific disposition is made on the plans but which could interfere with the work.

5.7 PERMITS, FEES AND NOTICES

5.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for all permits including encroachment permits, governmental fees, licenses and inspections necessary for the proper execution and completion of this Work, which are customarily secured after execution of the contract and which are legally required at the time bids or proposals are received excluding permits cited in 5.7.1.1 and 5.7.1.2.

5.7.1.1 The Project pays County Building Permit Fees.

5.7.1.2 The Owner will pay for building permits required by other governmental entities.

5.7.1.3 The Contractor shall sign for all building permits and shall be responsible for all inspections required.

5.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the Work.

5.7.3 Unless otherwise provided in the Contract Documents, it is the responsibility of the Contractor to make certain that the Contract Documents are in accordance with the applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Designated Representative in writing and any necessary changes shall be by appropriate Modification.

5.7.4 If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations and without such notices to the Designated Representative he shall assume full responsibility therefore and shall bear all costs attributable thereto.

5.8 ALLOWANCES

5.8.1 The Contractor shall include in the Contract Sum as defined in Subparagraph 10.1.1, all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the Designated Representative may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

5.8.2 Unless otherwise provided in the Contract Documents, all allowances shall cover the cost to the Contractor, less applicable trade discount, of the materials and equipment required by the allowances delivered at the site and all applicable taxes.

5.8.3 Unless otherwise provided in the Contract Documents, the Contractor's costs for unloading and handling (including hoisting) on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance.

5.8.4 Unless otherwise provided in the Contract Documents, whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which recognizes changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

5.9 SUPERINTENDENT

5.9.1 The Contractor shall employ an experienced, competent superintendent and necessary assistants who shall be in attendance at the Project site full time during the progress of the Work until the date of Substantial Completion and

for such additional time thereafter as the Designated Representative may deem necessary for the expeditious completion of the Work. The superintendent shall be satisfactory to the Designated Representative and shall not be changed without the consent of the Designated Representative, unless the superintendent proves to be unsatisfactory to the Contractor or ceases to be in its employ. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed on written request in each case.

5.9.2 The Contractor shall submit a job organization chart and resumes which identify the key personnel he intends to assign to the project, to the Designated Representative within 48 hours after receipt of the Notice to Proceed. The Owner, acting through the Designated Representative, reserves the right to approve the Contractor's proposed personnel and anyone not so approved shall be immediately replaced by someone acceptable. If in the course of construction, the Owner, on advice of the Designated Representative, determines that it would be in its best interest to request a change in the Contractor's personnel, he may do so; and the Contractor shall immediately assign a suitable replacement who is acceptable to the Owner and the Designated Representative at no additional cost.

5.9.2.1 A duly authorized representative of the Contractor shall be available for emergency telephone communication from the Owner or Designated Representative on a 24-hour basis, seven days a week during the performance of the Work.

5.10 CONSTRUCTION SCHEDULE

5.10.1 Contractor shall provide to COUNTY OF SANTA BARBARA, Designated Representative, and Architect a schedule in conformance with the Contract Documents and as required in the Notice to Proceed and the Contractor's Submittals and Schedules section of these General Conditions.

5.10.2 Submission of Schedule and Format.

5.10.2.1 Within Thirty **(30) calendar days** of the Notice to Proceed, the Contractor shall submit to the Designated Representative a construction Schedule covering the entire project.

5.10.2.2 The Schedule shall be prepared utilizing the critical path method of scheduling. CONTRACTOR shall utilize Primavera Scheduling Software (P6) to employ the Critical Path Method (CPM) in the development and maintenance of the construction schedule. If the version of Primavera Scheduling Software (P6) used is greater than Version 15.1, the CONTRACTOR shall save & export schedules in Version 15.1 before submitting to COUNTY OF SANTA BARBARA for review. The scheduling software shall be capable of being resource loaded with manpower, costs, and materials. It shall also be capable of generating time-scaled logic diagrams, resource histograms and profiles, bar charts, layouts, and reports with any and/or all activity detail. The Schedule will show the Contractor's plan for construction in sufficient detail to indicate the sequence of construction and planned dates for achieving major milestones.

5.10.2.3 The maximum duration for any single activity will be fifteen (15) working days unless approved by the County of Santa Barbara, with the exception of "Fabrication and Delivery" activities. Although portions of the Work may take longer than 15 working days, all work shall be presented in the schedule to allow for monitoring of progress through completion of incremental activities with a duration not exceeding 5 days.

5.10.2.4 A sufficient number of activities will be carried in the schedule so that each subcontract subdivision is represented and the planned start and completion of each Subcontractor's Work can be determined.

5.10.2.5 All submittals required by the specifications will be scheduled along with the approval period (fifteen calendar days minimum) and fabrication and delivery periods.

5.10.2.6 The Contractor shall submit to the Designated Representative for approval a computer-generated critical path schedule and bar charts. The schedule shall contain the following information and shall be presented in a legible format acceptable to the Designated Representative.

(a.) The critical path schedule shall indicate for each activity:

Description
Original Duration
Remaining Duration
Percentage Complete
Total Float (critical path highlighted)
Responsibility Code (who will perform the work)
Early Start/Finish Dates (current update)
Late Start/Finish Dates (current update)
Predecessor and Successor Activities to the activity (arrow connections)

(b.) The Contractor shall submit a bar chart schedule listing all activities in the schedule as organized by responsibility, area or date as approved by the Designated Representative. The bar chart shall include all the information listed in paragraph (a.) above for each activity except the listing of predecessor and successor activities.

5.10.2.7 If construction must commence during Schedule preparation and approval period, the Contractor shall prepare a **ninety (90) calendar day preliminary construction schedule** to cover the initial field construction and submittals within 10 days after the Notice to Proceed. Activities on this Schedule should have maximum durations of five (5) days to allow for monitoring of progress through completion of the incremental activities.

5.10.2.8 A copy of the Schedule shall be submitted via email to the Designated Representative for review. At the time of submittal, The Contractor's lead on-site manager or superintendent will make a presentation to the Designated Representative on the planned construction sequence/schedule. Within **Fifteen (15) calendar days** of receipt, the Designated Representative will notify the Contractor, in writing, as to any objections to the Schedule submitted. If the Schedule is deemed objectionable, the Contractor will have **five (5) calendar days** from receipt to revise the

schedule and resubmit it as above. The Contractor's presentation will include, but not be limited to:

(a.) Describing the sequence and phasing of work.
(b.) Delineating any area subdivision used to plan the work sequence/schedule.
(c.) Identifying the critical path.
(d.) Identifying when the milestone events specified herein are planned to be achieved (earliest and latest times).
(e.) Any plans for shift work, weekend work, or extended work weeks and non-work days (i.e. holidays observed).
(f.) Any planned interruptions of building power, water, communications, or other utilities.
(g.) Any assumptions used in planning and sequencing the work.
(h.) Long lead fabrication items.
(i.) Manpower projections for the project.
(j.) Noise/dust control measures.
(k.) Safety plan.
(l.) Plans for moving materials into the building and removing refuse and debris.
(m.) Any other planning information requested by the Owner or its Designated Representative prior to the presentation.

5.10.3 Updating of the Schedule

5.10.3.1 The Schedule documents will be updated monthly at a minimum to reflect progress through the "Data Date". All contract changes as they are agreed to shall be specifically incorporated into the appropriate Schedule update. The Data Date may be the last working day of the month or it may be the "closure" date of the requisition for payment, as the Contractor may choose and as approved by the Designated Representative. However, when one of the above Data Dates is selected, it will be used throughout the project. The update will be submitted concurrently with the monthly payment application no later than the fifth day of the succeeding month .

5.10.2.1 The Contractor shall submit marked up copies of the approved critical path schedule and the bar chart indicating progress through the data date. If the Contractor has elected to submit a computer-generated schedule, monthly update reports and schedule plots shall be submitted as directed by the Designated Representative.

5.10.4 Revision of the Schedule

5.10.4.1 Every effort shall be made by all parties to Work in accordance with the accepted Project Schedule. The Schedule will be revised only if the actual status of Work cannot be brought into conformance with the existing Schedule. If the Schedule is revised, the revised Schedule will be submitted as if any initial Schedule.

5.10.5 Minor Changes of the Schedule

5.10.5.1 The Schedule is not considered to be "revised" if the Contractor must make minor changes, such as:

(a.) Adding additional details to a sub-network to facilitate coordination of subcontract Work.
(b.) Additions/deletions/modifications of Schedule activities to reflect Work added or deleted by change order.

5.10.6 Extensions of Contract Time

5.10.6.1 All claims for extensions to contract time shall be supported by a detailed comprehensive analysis of the accepted Schedule. This analysis shall provide sufficient supporting evidence to justify a time extension. No time claims will be considered without the supporting analysis. If a time extension is granted, it shall be included in the next update of the Schedule.

5.10.7 During Construction

5.10.7.1 Construction milestone event dates will be incorporated into the detailed Construction Schedule as "target dates". These dates will be clearly noted and fixed on the Schedule graphics and corresponding computer file. It is the intent that the Work will be undertaken so as to achieve each target date and thereby achieve overall project completion as specified in the Contract.

5.10.7.2 The milestone event target dates will not be revised unless delays beyond the control of the Contractor occur.

5.10.7.3 If, when the Schedule is updated, the planned dates for achieving any milestone(s) falls more than ten (10) working days behind the target date(s), and if this has occurred through no fault of the Owner, the Architect/Engineer or their consultants, the Contractor may be directed by the Owner or the Designated Representative, to take any and all actions required to bring the actual construction back into accordance with the target dates.

5.10.7.4 When the Contractor falls behind its schedule and is not entitled to any time extension other than extensions already reflected in the current approved schedule, he shall submit its plan for bringing the Work back up to schedule and shall implement the plan. If other measures will not be sufficient to make up the lag, the Contractor's plan and implementation thereof shall include, but not be limited to increasing the number of shifts and days of Work, additional Work, additional equipment, increasing manpower and expediting deliveries, all at the Contractor's sole expense.

5.10.7.5 If the Contractor works overtime, more than forty (40) hours per week, Saturdays, Sundays or holidays; whether by choice or by necessity, the Contractor shall be responsible for the reimbursement of the Owner for additional costs

incurred for the Owner's, Designated Representative's and Architect/Engineer's overtime services.

5.10.7.6 In the event the Contractor fails or refuses to implement such measures as will bring its Work back up to conformity with the approved schedule, its right to proceed with any or all portions of the Contract requirements may be canceled or suspended; but permitting the Contractor to proceed shall in no way operate as a waiver of any rights of the Owner or deprive the Owner of its rights under any provisions of this contract.

5.10.7.7 The Contractor shall include milestone activities in the Schedule as applicable to the Work. Milestone events shall at a minimum include the following as applicable:

(a.) Demolition and Excavation complete
(b.) Start foundation concrete
(c.) Complete footings and piers
(d.) Complete all subgrade concrete construction
(e.) Each level's structural slab complete
(f.) Roof level structural slab complete
(g.) Penthouse Level structural slab complete
(h.) Begin structural steel
(i.) Complete structural steel
(j.) Complete decks/structure
(k.) Permanent power available
(l.) Temporary heating/cooling available
(m.) Begin roofing
(n.) Complete roofing
(o.) Begin exterior facades
(p.) Complete exterior facades
(q.) Begin exterior glazing
(r.) Complete exterior glazing
(s.) Building dry-in
(t.) Elevators operational
(u.) Begin mechanical/electrical/plumbing rough-in
(v.) Begin building controls
(w.) Complete building controls
(x.) System start-up
(y.) Begin partition rough-in
(z.) Complete partition rogh-in
(aa) Begin drywall
(bb) Begin finishes and millwork
(cc) Complete finishes and millwork
(dd) Begin site work and landscaping
(ee) Complete grading
(ff) Begin underground utilities
(gg) Complete underground utilities
(hh) Complete site paving
(ii) Complete landscaping
(jj) Substantial completion
(kk) Start installation of Owner furnished equipment
(ll) Project complete/beneficial occupancy

5.10.8 Owner Directed Schedule

5.10.8.1 On projects involving extensive coordination between the Contractor and the Owner's ongoing operations, the Owner may issue with the Contract Documents an Owner Directed Schedule which shall be used by the Contractor in preparing its plan of operations. The Contractor shall not deviate from the Owner Directed Schedule without the written prior approval of the Owner or Designated Representative. As indicated in Paragraph 5.10.6, the Contractor may be directed by the Owner or Designated Representative to take any and all actions required to perform the actual construction in accordance with the Owner Directed Schedule and its "target dates".

5.11 SUBMITTAL SCHEDULE

5.11.1 The Contractor shall prepare a schedule of required submittals not later than **ten (10) days** after the receipt of the Notice to Proceed. The schedule shall include a complete list of items requiring shop drawings, design mixes, material certification, product data, brochures, catalog cuts, etc., to be approved by the Architect/Engineer. The Contractor shall coordinate all submittals requiring approvals by code enforcement agencies and shall include these special approvals in the submittal schedule. The schedule is to be submitted on a form approved by the Designated Representative. The schedule shall be updated monthly or as required by the Designated Representative. All shop drawings and other submittals shall be accompanied by a transmittal letter and reference should be indicated to the item numbers of the above mentioned schedule. The Contractor is to indicate the following in its submittal schedule.

(a.) Description of item
(b.) Specification division, page numbers, article and paragraph
(c.) Type of submittal (shop drawings, sample, product data)

(d.) Date that submittal shall be delivered to the Designated Representative's office.
(e.) Date that Contractor must have approval.
(f.) Date that material, equipment must be on site in order to maintain the Contractor's progress schedule.

5.11.2 The Contractor's submittal schedule shall allow reasonable time (15 calendar days minimum) for review by the Designated Representative and the Architect/Engineer, and revision or correction, resubmittal and approval, sufficiently in advance of the time that the item is scheduled for incorporation into the Work.

5.11.3 The Designated Representative and the Architect/Engineer shall review the Contractor's submittal schedule for completeness, fulfillment of Specification requirements and compatibility with the anticipated construction schedule. The sequence and duration of Contractor, Architect/Engineer, Designated Representative activities on the submittal schedule may be adjusted by the Designated Representative.

5.12 DRAWINGS AND SPECIFICATIONS AT THE SITE

5.12.1 The Contractor shall maintain at the site for the Designated Representative and the Architect/Engineer, two (2) copies of all drawings, specifications, addenda, change orders, responses to requests for information, proposals and other modifications, in good order and marked currently to record all changes made during the construction, including any changes in locations, size and arrangement of the various components of the Work or any other variations from the drawings or shop drawings. The Contractor shall mark each drawing as the Work shown thereon is completed in the field, revising any or adding lines, dimensions, elevations, depths, notes or any other information required to accurately record conditions. These drawings, marked to record all changes during the construction and approved shop drawings, product data, samples, addenda, change orders, responses to requests for information, proposals and other records of modifications shall be delivered to the Designated Representative, for the Owner, upon completion of the Work.

5.12.1.1 In addition to maintaining and delivering to the Designated Representative those record drawings required by Subparagraph 5.12.1, the Contractor shall also prepare and submit to the Designated Representative, upon completion of the Work, record reproducible drawings if the technical specifications so require.

5.13 USE OF SITE

5.13.1 The Contractor shall confine operations at the site to areas approved by the Designated Representative, permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment.

5.13.2 The Contractor shall not disturb existing monuments and markers at the site. Should monuments or markers or both be disturbed at any time by the Contractor, he shall bear the cost of a licensed surveyor engaged by the Owner for the purpose of relocating such monuments or markers.

5.13.3 The Contractor shall lay out its Work and shall be responsible for the accuracy of all lines, elevations and measurements, grading, utilities and other Work executed by Contractor under its Contract. Contractor must exercise proper precaution to verify figures shown on drawing before laying out Work and will be held responsible for any error resulting from its failure to exercise such precaution.

5.13.4 All discrepancies shall be brought to the attention of the Designated Representative in writing for review and direction before proceeding with the Work. Should the Contractor proceed without direction, he shall be responsible to make whatever changes are necessary and pay call costs incurred by that Contractor, the Designated Representative, the Owner or other Contractors.

5.13.5 Any enclosure including safety barricades, perimeter rails, opening covers and devices required to protect the Work, workmen, materials or equipment shall be provided by the Contractor.

5.13.6 Weather protection shall be supplied by the Contractor and shall include all enclosure, supplemental heating and furnishing all other features (insulation, etc.), or meeting conditions required by the Designated Representative or by the specifications relative to the Contractor's Work, to protect the Work and any materials stored on site.

5.13.7 Protection of finished Work until acceptance shall be furnished by the Contractor.

5.13.8 Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy of the Site, the Premises, or of the Project. The COUNTY OF SANTA BARBARA shall have complete access to the Project Site for any reasonable purpose at all times.

5.14 CUTTING AND PATCHING WORK

5.14.1 The Contractor shall be responsible for all cutting or patching that may be required to complete the Work or to make its several parts fit together properly. He shall provide protection of existing Work as required.

5.14.2 The Contractor shall not damage or endanger any portion of the Work or the Work of any separate contractors by cutting, patching or otherwise altering any Work or by excavation. The Contractor shall not cut or otherwise alter the Work of any separate contractor except with the written consent of the Designated Representative and of such separate contractor. The Contractor shall not unreasonably withhold from any separate contractor its consent to

cutting or otherwise altering the Work.

5.14.3 Contractor shall do all cutting, fitting, patching, and preparation of Work as required to make its several parts come together properly, to fit it to receive or be received by work of other contractors, and to coordinate tolerances to various pieces of work, showing upon, or reasonably implied by, the Drawings and Specifications for the completed structure, and shall conform them as COUNTY OF SANTA BARBARA and/or Architect may direct.

5.14.4 All cost caused by defective or ill-timed Work shall be borne by Contractor, inclusive of repair work.

5.14.5 Contractor shall not endanger any work performed by it or anyone else by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor except with written consent of COUNTY OF SANTA BARBARA.

5.14.6 The Contractor shall not cut, weld to or otherwise alter any structural member without the written consent of the Architect/Engineer obtained through the Designated Representative.

5.15 DAILY AND FINAL CLEAN UP

5.15.1 The Contractor shall be responsible for daily and final clean up and continuous removal of all rubbish and debris from the building and site.

5.15.1.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by its operations. At the completion of the Work Contractor shall remove all its waste materials and rubbish from and about the Project, as well as all its tools, construction equipment, machinery and surplus materials.

5.15.2 The job site shall be maintained in a neat and orderly condition and kept free from accumulations of waste materials and rubbish during the entire construction period. Remove all crates, cartons and other flammable waste materials or trash from the Work areas at the end of each working day to appropriate waste hauling receptacles.

5.15.3 Elevator shafts, electrical closets, pipe and duct shafts, chases, furred spaces and similar spaces which are generally unfinished, shall be cleaned and left free from rubbish, loose plaster, mortar drippings, extraneous construction materials, dirt and dust before Substantial Completion inspection.

5.15.4 The Contractor shall be responsible for the cleaning of all surfaces as necessary to make them free of spatters or other deposits of paint, plaster, mortar, concrete, adhesives, roofing, dirt, soil, oil, and all other materials foreign to the surface involved.

5.15.5 The Contractor shall provide all services, labor, materials, and equipment necessary for protecting the Work, , furnishings, equipment, and building structure from damage until its Completion and final acceptance by COUNTY OF SANTA BARBARA. At Completion of the Work and portions thereof, Contractor shall clean to the original state any areas beyond the Work area that become dust laden because of the Work. The Contractor always must maintain good housekeeping practices to reduce the risk of fire damage and must make a fire extinguisher, fire blanket, and/or fire watch, as applicable, available at each location where cutting, braising, soldering, and/or welding is being performed or where there is an increased risk of fire.

5.15.6 If the Designated Representative, Architect, or COUNTY OF SANTA BARBARA observe the accumulation of trash and debris, the COUNTY OF SANTA BARBARA will give the Contractor a 24-hour written notice to mitigate the condition.

5.16 COMMUNICATIONS

5.16.1 The Contractor shall forward all communications to the Owner and Architect/Engineer through the Designated Representative.

5.16.1.1 The Contractor shall promptly return telephone calls or respond to any other form of communication initiated by the Designated Representative. Failure to promptly do so shall be considered lack of performance on the part of the Contractor.

5.16.1.2 All written correspondence to the Designated Representative shall be dated and signed by the Contractor or its authorized representative.

5.16.2 Weekly project progress review meetings will be conducted with Designated Representative, Architect/Engineer, their consultants as necessary, and Contractor in attendance. The Designated Representative may call for special meetings of the Contractor, Subcontractors and material suppliers as he deems necessary for the proper coordination of the Work. Such meetings shall be held at the job site on regular working days during regular working hours. Unless otherwise directed by the Designated Representative, attendance shall be mandatory for all parties notified to attend the meeting.

5.17 ROYALTIES AND PATENTS

5.17.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner and Designated Representative harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Designated Representative.

5.18 INDEMNIFICATION AND INSURANCE

5.18.1 Contractor agrees to indemnify, defend (with counsel reasonably approved by County) and hold harmless County and its officers, officials, employees, agents and volunteers from and against any and all claims, actions, losses, damages, judgments and/or liabilities arising out of this Agreement from any cause whatsoever, including the acts, errors or omissions of any person or entity and for any costs or expenses (including but not limited to attorneys' fees) incurred by County on account of any claim except where such indemnification is caused by the active negligence, sole negligence, or willful misconduct of the County.

5.18.2 **NOTIFICATION OF ACCIDENTS AND SURVIVAL OF INDEMNIFICATION PROVISIONS**

5.18.2.1 Contractor shall notify the County immediately in the event of any accident or injury arising out of or in connection with this Agreement. The indemnification provisions in this Agreement shall survive any expiration or termination of this Agreement.

5.18.3 **INSURANCE**

5.18.3.1 Without limiting the Contractor's indemnification of the County, Contractor shall procure the following required insurance coverages at its sole cost and expense. All insurance coverages are to be placed with insurers which (1) have a Best's rating of no less than A: VII, and (2) are admitted insurance companies in the State of California. All other insurers require the prior approval of the County. Such insurance coverage shall be maintained during the term of this Agreement. Failure to comply with the insurance requirements shall place Contractor in default. Upon request by the County, Contractor shall provide a certified copy of any insurance policy to the County within ten (10) working days. Contractor shall procure and maintain for the duration of this Agreement insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Contractor, its agents, representatives, employees or subcontractors.

5.18.3.2 Minimum Scope and Limit of Insurance Coverage shall be at least as broad as:

1. **Commercial General Liability (CGL):** Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis, including products-completed operations, personal & advertising injury, with limits no less than $2,000,000 per occurrence and $4,000,000 in the aggregate.
2. **Automobile Liability:** ISO Form Number CA 00 01 covering any auto (Code 1), with limit no less than $2,000,000 per accident for bodily injury and property damage.
3. **Workers' Compensation:** as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease.
4. **Contractors' Pollution Legal Liability and/or Asbestos Legal Liability:** (if project involves environmental hazards) with limits no less than $1,000,000 per occurrence or claim, and $2,000,000 policy aggregate.
5. **Builder's Risk (Course of Construction):** (if project involves property under construction) insurance utilizing an "all Risk" (aka "Special" policy form) coverage form, with limits equal to the completed value of the project an no coinsurance penalty provisions. The policy must include the perils of earthquake and flood and "certified acts of terrorism". Coverage must also include soft costs, building ordinance or law, off site materials storage, property in transit, loss of materials and equipment at the job site and boiler and machinery if applicable.

   Contractor shall procure and maintain, during the life of this Contract, Builder's Risk (Course of Construction), or similar first party property coverage acceptable to the COUNTY OF SANTA BARBARA, issued on a replacement cost value basis. The cost shall be consistent with the total replacement cost of all insurable Work included within the Contract Documents. Coverage is to insure against all risks of accidental physical loss and shall include without limitation the perils of vandalism and/or malicious mischief (both without any limitation regarding vacancy or occupancy), sprinkler leakage, water damage, mold, civil authority, theft, sonic disturbance, earthquake, flood, collapse, wind, fire, war, terrorism, lightning, smoke, and rioting. Coverage shall include debris removal, demolition, increased costs due to enforcement of all applicable ordinances and/or laws in the repair and replacement of damaged and undamaged portions of the property, and reasonable costs for the Architect's and engineering services and expenses required because of any insured loss upon the Work and Project, including completed Work and Work in progress, to the full insurable value thereof. Contractor must review the Special Conditions to confirm the scope of this requirement and if the COUNTY OF SANTA BARBARA has modified this provision.

Contractor shall not commence Work, nor shall it allow any Subcontractor to commence Work under the Contract, until Contractor and its Subcontractor(s) have procured all required insurance and Contractor has delivered in duplicate to the COUNTY OF SANTA BARBARA complete endorsements (or entire insurance policies) and certificates indicating the required coverages have been obtained, and the COUNTY OF SANTA BARBARA has approved these documents.

All endorsements, certificates and insurance policies shall state that COUNTY OF SANTA BARBARA, its trustees, employees and agents, the State of California, Designated Representative(s), Inspector(s) and Architect(s) are named additional insureds under all policies except Workers' Compensation Insurance and Employers' Liability Insurance.

Insurance Policy Limits:

Commercial General Liability	Includes: Personal & Advertising Injury, Product Liability and Completed Operations	$2,000,000 each occurrence; $4,000,000 general aggregate
Automobile Liability – <u>Any</u> Auto	Combined Single Limit	$2,000,000 per occurrence
Excess Liability (Umbrella)		$4,000,000 per occurrence; $4,000,000 aggregate

Workers Compensation		Statutory limits pursuant to State law
Employers' Liability		$2,000,000 each accident, each disease; $2,000,000 policy limit
Builder's Risk (Course of Construction)		Issued for the value and scope of Work indicated herein.
Property of Others	Combined Single Limit General Aggregate	Issued for the value and scope of Work stored off-site.

5.18.3.3 **Other Insurance Provisions**

The insurance policies must contain, or be endorsed to contain, the following provisions:

1. **Additional Insured** – County, its officers, officials, employees, agents and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations. General liability coverage can be provided in the form of an endorsement to the Contractor'S insurance at least as broad as ISO Form CG 20 10 11 85 or both CG 20 10, CG 20 26, CG 20 33, or CG 20 38; and CG 20 37 forms if later revisions used).
2. **Primary Coverage** – For any claims related to this Agreement, the Contractor'S insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the County, its officers, officials, employees, agents and volunteers. Any insurance or self- insurance maintained by the County, its officers, officials, employees, agents or volunteers shall be excess of the Contractor'S insurance and shall not contribute with it.
3. **Notice of Cancellation** – Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the County.
4. **Waiver of Subrogation Rights** –**You agree to waive rights of subrogation which any of your insurer may acquire** from you by virtue of the payment of any loss. You agree to obtain any endorsement that may be necessary to effect this waiver of subrogation. **The Workers' Compensation policy shall be endorsed with a waiver of subrogation** in favor of the County for all work performed by you, your employees, agents and subcontractors. This provision applies regardless of whether or not the County has received a waiver of subrogation endorsement from the insurer.
5. **Deductibles and Self-Insured Retention** – Any deductibles or self-insured retentions must be declared to and approved by the County. At County's option, either: cause the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the County, its officers, officials, employees, agents and volunteers; or provide a financial guarantee satisfactory to the County guaranteeing payment of losses and related investigations, claim administration, and defense expenses.
6. **Acceptability of Insurers** – Unless otherwise approved by Risk Management, insurance shall be written by insurers authorized to do business in the State of California and with a minimum A.M. Best's Insurance Guide rating of "A- VII".
7. **Verification of Coverage** –You must furnish proof of insurance, original certificates and amendatory endorsements as required by this Agreement. The proof of insurance, certificates and endorsements must be received and approved by the County before work commences. However, failure to obtain the required documents prior to the work beginning shall not waive your obligation to provide them. You must furnish evidence of renewal of coverage throughout the term of the Agreement. The County reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.
8. **Failure to Procure Coverage** – In the event that any policy of insurance required under this Agreement does not comply with the requirements, is not procured, or is canceled and not replaced, County has the right but not the obligation or duty to terminate the Agreement. Maintenance of required insurance coverage is a material element of the Agreement and failure to maintain or renew such coverage or to provide evidence of renewal may be treated by County as a material breach of contract.
9. **Subcontractors** –You must require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and you must ensure that County is an additional insured on insurance required from subcontractors. For CGL coverage subcontractors shall provide coverage with a format least as broad as CG 20 38 04 13.

10. **Claims Made Policies** – If any of the required policies provide coverage on a claims-made basis:
    i. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work.
    ii. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work.
    iii. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a

Retroactive Date prior to the contract effective date, you must purchase "extended reporting" coverage for a minimum of five (5) years after completion of contract work.

11. **Special Risks or Circumstances** – County reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

The above insurance requirements are subject to periodic review by the County. The County's Risk Manager is authorized to change the above insurance requirements, with the concurrence of County Counsel, to include additional types of insurance coverage or higher coverage limits, provided that such change is reasonably based on changed risk of loss or in light of past claims against the County or inflation. This option may be exercised during any amendment of this Agreement that results in an increase in the nature of County's risk and such change of provisions will be in effect for the term of the amended Agreement. Such change pertaining to types of insurance coverage or higher coverage limits must be made by written amendment to this Agreement. Contractor agrees to execute any such amendment within thirty (30) days of acceptance of the amendment or modification.

Any failure, actual or alleged, on the part of County to monitor or enforce compliance with any of the insurance and indemnification requirements will not be deemed as a waiver of any rights on the part of County.

5.18.3.4 **Enforcement**

The General Services Department may assure your compliance with your insurance obligations. Ten days before an insurance policy lapses or is canceled during the Contract period you must submit to the General Services Department evidence of renewal or replacement of the policy.

If you fail to maintain any required insurance coverage, the General Services Department may maintain this coverage and withhold or charge the expense to you or terminate your control of the work.

You are not relieved of your duties and responsibilities to indemnify, defend, and hold harmless the County, its officers, agents, and employees by the General Services Department's acceptance of insurance policies and certificates.

The minimum insurance coverage amounts do not relieve you for liability in excess of such coverage, nor do they preclude the County from taking other actions available to it, including the withholding of funds under this Contract.

5.18.3.5 **Self-Insurance**

Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the County. If you use a self-insurance program or self-insured retention, you must provide the County with the same protection from liability and defense of suits as would be afforded by first-dollar insurance. Execution of the Contract is your acknowledgment that you will be bound by all laws as if you were an insurer as defined under Ins Code § 23 and that the self-insurance program or self-insured retention shall operate as insurance as defined under Ins Code § 22.

5.19 Contractor QUALITY CONTROL SYSTEM

5.19.1 The Contractor shall provide and maintain an effective quality control program of Contractor inspection system, which assure that all supplies and services required under the Contract conform to the Contract Documents whether constructed or processed by the Contractor or procured from subcontractors or vendors. The Contractor shall substantiate that all supplies and services conform to the Contract Documents and shall also perform or have performed all inspections and tests otherwise required by the Contract Documents unless the required inspection and test is specifically designated to be performed by the Owner or the Owner's designated representative. Mechanical and electrical personnel, either engineers or highly qualified technicians shall be provided during the testing, balancing, adjusting and regulating mechanical and electrical devices and systems. The Contractor's inspection system shall be documented, as specified herein, and shall be available for review by the Designated Representative prior to the start of construction and throughout the life of the Contract. The Contractor shall notify the Designated Representative in writing of any proposed change to its inspection system and change shall be subject to disapproval if they would, in the opinion of the Designated Representative, result in non-conformance

with the Contract requirements. The Contractor's inspection system shall include the minimum requirements stated below. The Contractor's full time job site superintendent may function as the Contractor's Contractor Quality Control representative.

5.19.1.1 Preparatory Inspection: The Contractor's Quality Control organization shall perform prior to the beginning any Work on any definable segment of Work; a review of contract requirements; a check to assure that all materials and equipment have been tested, submitted and approved; a check to assure that provisions have been made to provide required control testing; examination of the Work area to ascertain that all preliminary Work has been completed; and a physical examination of materials and equipment to assure that they conform to approved shop drawings or submittal data and that all material and equipment are on hand. As a part of this preparatory Work, the Contractor's Quality Control organization will review and certify all shop drawings, certificates and other submittal data prior to submission to the Designated Representative. Each submittal offered to the Designated Representative will bear the date and the signature of a member of the Contractor's Quality Control organization indicating that he has reviewed the submittal and certified it to be in compliance with the Contract Documents (or showing the required change). The Designated Representative shall be notified a minimum of seventy two (72) hours prior to the beginning of a Preparatory Inspection. If inspection, testing, or observation is by authority other than the COUNTY OF SANTA BARBARA, the Contractor shall inform the Project Inspector and the Designated Representative not less than seventy-two (72) hours prior to the date fixed for such inspection, test, or observation.

5.19.1.2 The Contractor shall notify the COUNTY OF SANTA BARBARA's representative a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents, that must by terms of the Contract Documents be tested, in order that the COUNTY OF SANTA BARBARA may arrange for the testing of same at the source of supply. This notice shall be, at a minimum, seventy-two (72) hours prior to the manufacture of the material that must be tested.

5.19.1.3 Initial Inspection: The Contractor's Quality Control organization shall perform, as soon as a representative segment of the particular item of Work has been accomplished, an examination of the quality of workmanship and a review of control testing for compliance with Contract Requirements, use of defective or damaged materials, omissions, and dimensions requirements.

5.19.1.4 Follow-Up Inspection: The Contractor's Quality Control organization shall perform daily, or as frequently as necessary, follow up inspections to assure continuing compliance with Contract Requirements, including control testing, until completion of the particular segment of the Work.

5.19.1.5 Unless Work outside the Inspector's regular working hours is required for recovery of construction schedule as deemed necessary by the County, If the Contractor performs Work outside the Inspector's regular working hours, over a period of more than eight (8) hours per day by any single person, on weekends/holidays or requests the Inspector to perform inspections off Site, then the costs of any inspections required outside regular working hours, over a period of more than eight (8) hours per day by any single person, on weekends/holidays or off Site, shall be borne by the Contractor and may be invoiced to the Contractor by the COUNTY OF SANTA BARBARA or the COUNTY OF SANTA BARBARA may deduct those expenses from the next Progress Payment.

5.19.1.6 The Contractor shall maintain current records on an appropriate approved format of all inspections and tests performed. These records should provide factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, causes for rejection, etc.; proposed remedial action and corrective actions taken. The Contractor shall not build upon or conceal any feature of the Work containing uncorrected defects, and payment on deficient items will be withheld until satisfactorily corrected or other actions taken as authorized. These records must cover both conforming and defective items and shall include a statement that all supplies and materials, incorporated in the Work, are in full compliance with the terms of the contract. Legible copies shall be furnished to the Designated Representative. The report will cover all Work placement subsequent to the previous report and will be verified by the prime Contractor's Quality Control representative. The Contractor shall include in all subcontracts, purchase orders or other agreements, either written or oral, with a commercial testing laboratory for quality control testing under the subject Contract, a requirement that copies of any test reports, data or other information relating to tests conducted by said laboratory under this Contract, be mailed simultaneously to the Designated Representative when said report, data or other information are mailed or delivered to the Contractor.

5.19.1.7 The Contractor shall establish controls necessary to assure scheduled completion dates established by the Contract are not impacted by the delinquent submittal data and operational tests. **Twenty (20)** days in advance of the Substantial Completion and prior to scheduling a pre-final inspection of the Work, or any phase of Work, under the Contract, the Contractor's Quality Control organization shall submit to the Designated Representative a complete and factual report of all remaining submittals, inspections and tests required prior to acceptance of the Work. The report shall include the following:

(a.) A list of outstanding shop drawing submittals or re-submittals requiring approval by the Contractor.

(b.) A list of manuals, test reports, spare parts, keys, etc., to be furnished to the Designated Representative and scheduled submittal dates.

(c.) Schedule of required operations tests and instruction periods.

(d.) Scheduled delivery dates for materials or equipment impacting contract completion dates.

(e.) Plan of action by the Contractor for correcting all known contract deficiencies including delay in scheduled progress.

5.19.1.8 The Contractor shall maintain marked-up documents depicting Record Document conditions. These drawings will be maintained in a current condition at all times until completion of the Work and will be available for review by the Designated Representative at all times. All variations from the Contract Documents, for whatever reason, including those occasioned by the required coordination between trades, will be indicated. These variations will be shown in the same general detail utilized in the Contract Documents. Upon Substantial Completion, the marked-up documents shall be furnished to the Designated Representative for delivery to the Owner or the Owner's designated representative. The Contractor shall also furnish Record Documents as provided in the Technical Provisions of the specifications.

5.19.1.9 After the Contract is awarded and before construction operations are started, the Contractor shall meet with the Designated Representative and discuss the inspection system requirements. The meeting shall develop mutual understanding relative to details of the Contractor's Quality Control system including the form to be used for

recording the inspection, administration of the system and the interrelationship of the Contractor and the Designated Representative. The Contractor shall furnish to the Designated Representative within five (5) days after receipt of the Notice to Proceed, an inspection system plan which shall include the procedures, instructions and reports to be used. No progress payments will be processed under this Contract until the inspection plan is acceptable to the Owner and the Designated Representative. The Contractor's Quality Control plan documentation will include the following minimum elements:

(a.) The inspection organization.
(b.) Number and qualifications of inspection personnel to be used.
(c.) Authority and responsibilities of inspection personnel.
(d.) Schedule of use of inspection personnel by types and phase of Work.
(e.) Methods of inspection, including Subcontractor's work.
(f.) Test methods including as specified, name of qualified testing laboratory to be used, if applicable.
(g.) Method of documenting inspection and testing.
(h.) A copy of a letter of direction to the Contractor's Quality Control representative responsible for the quality control inspection, outlining its duties and responsibilities and signed by a responsible officer of the firm.

5.19.1.10 The Contractor's Quality Control inspection system shall provide for procedures which will assure that the latest applicable drawings, including shop drawings, specifications and instruction required by the contract, as well as authorized changes thereto, are used for fabrication, inspection and testing.

5.19.1.11 The Designated Representative and the Architect/Engineer reserves the right to inspect at source supplies or services not manufactured or performed within the Contractor's facility. The Designated Representative's and the Architect/Engineer's inspection shall not constitute acceptance, nor shall it in any way replace Contractor inspection or otherwise relieve the Contractor of its responsibility to furnish an acceptable end item. When inspection at Subcontractor's plant is performed by the Designated Representative, such inspection shall not be used by Contractor as evidence of effective inspection by such Subcontractor.

5.19.1.12 The Designated Representative may notify the Contractor or its Quality Control representative at the site of noncompliance with the foregoing provisions. This notice may be in writing by a form titled "Deficiency Correction Report" or "Notice of Noncompliance". The Contractor shall immediately, upon receipt of said notice, indicate the corrective action which will be taken and the date by which it will be complete, and submit this data for the Designated Representative's approval. If the Contractor refuses to comply promptly with these requirements, the Designated Representative may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost or cost of damages due to such stop orders shall be compensable and payment representing the noncompliance item and corrective action will be withheld until the Designated Representative has approved the corrective action.

5.19.1.13 Each of the Contractor's Quality Control Inspectors shall be responsible for inspecting the Work under its surveillance for compliance with OSHA Standards for the Construction Industry Section and approved safety program and shall immediately bring to the attention of the Contractor's supervisory personnel any unsafe Work conditions and instance of noncompliance noted.

5.19.2 Certificates of Compliance: The Designated Representative may require certificates of compliance with the specifications for materials or manufactured items produced outside of the job site. Such certificates will not relieve the Contractor from the requirements of providing material and manufactured items complying with the specifications even though they have been incorporated into the job.

5.19.3 Weighing Equipment: All scales used for proportioning materials shall be inspected for accuracy and certified within the past twelve (12) months by the State of California Bureau of Weights and Measures, by the County Director or Sealer of Weights and Measures, or by a Scale Mechanic registered with or licensed by the County.

5.19.3.1 The accuracy of the work of a scale service agency, except as stated herein, shall meet the standards of the California Business and Professions Code and the California Administrative Code pertaining to weighing devices. A certificate of compliance shall be presented prior to operation to the Designated Representative for approval and shall be renewed whenever required by the Designated Representative at no cost to the Owner.

5.19.3.2 All scales shall be so arranged that they may be read easily from the operator's platform or area. They shall indicate the true net weight without the application of any factor. The figures of the scales shall be clearly legible. Scales shall be accurate to within 1% when tested with the plant shut down. Weight equipment shall be so insulated against vibration or moving of other operating equipment in the plant area that the error in weighing with the entire plant running will not exceed 2% for any setting nor 1-1/2% for any batch.

5.20 COMPLETION INSPECTIONS

5.20.1 Contractor's Quality Control Completion Inspection: Based upon the Designated Representative's concurrence that the Work is nearing Substantial Completion, at least 15 days prior to pre-final inspection, the Contractor's Quality Control Inspection personnel shall conduct a detailed inspection. The Designated Representative shall be notified of the inspection date in order that he may participate, if s/he so elects. The Work shall be inspected for conformance to plans, specifications, quality, workmanship and completeness. The Contractor shall prepare an itemized list of Work not properly completed, inferior workmanship or not conforming to Contract Documents. The list shall also include outstanding administrative items such as Record Documents, operations and maintenance

manuals, spare parts, installed property list, etc. The list shall be included in the Quality Control documentation and submitted to the Designated Representative with an estimated date for correction of each deficiency within five (5) working days after conducting this inspection.

5.20.2 Pre-Final Inspection: The Contractor's Quality Control Inspection personnel, its superintendent, or other primary management person and the Designated Representative will attend this inspection. Additional Owner personnel, including but not limited to those from the Owner's General Services Department user groups, Board of Supervisors and the Architect/Engineer may be in attendance. The pre-final inspection will be formally scheduled by the Owner or the Designated Representative based upon notice from the Contractor. This notice will be given to the Owner or the Designated Representative at least **ten (10)** days prior to the pre-final inspection and must include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with the remaining Contract Work will be complete and acceptable by the date scheduled for the pre-final inspection. Failure of the Contractor to have all Contract Work acceptably complete for this inspection will be the cause of the Owner or the Designated Representative to be reimbursed by the Contractor for the additional inspection costs of the Owner or the Designated Representative. At this inspection, the Owner or the Designated Representative will develop a specific list of incomplete and unacceptable Work performed under the Contract and will subsequently furnish this list to the Contractor. Failure of the Owner or the Designated Representative to detect or list all incomplete and unacceptable Work during this inspection will not relieve the Contractor from acceptably performing all Work required by the Contract Documents. The Owner or the Designated Representative, at their option, may accept this inspection as the final acceptance inspection, if in its opinion the completion status of the inspected facilities and other Work performed under the Contract warrant this consideration.

5.20.3 Final Acceptance Inspection: The Contractor's Quality Control Inspection personnel, its superintendent or other primary management persons and the Owner or the Designated Representative will attend this inspection. Additional Owner personnel including, but not limited to, those from the Owner's General Services Department, user groups, Board of Supervisors and the Architect/Engineer may also be in attendance. The final acceptance inspection will be formally scheduled by the Owner based upon the Contractor's written assertion to the Owner that the Work is complete. This notice will be given to the Owner or the Designated Representative at least **five (5) days** prior to the final acceptance inspection and must include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining Work performed under the Contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all Work acceptably complete for this inspection will be cause for the Owner and the Designated Representative to bill the Contractor for any additional inspection costs.

5.20.4 If, in the Designated Representative's judgment, the work has been completed in accordance with the plans and specifications and is ready for acceptance he will so certify to the Owner, which may accept the completed work. The Designated Representative will, in its certification to the Owner, give the date when the work was completed. This will be the date when the Contractor is relieved from responsibility to protect the work. This will also be the date to which liquidated damages will be computed.

5.21 WARRANTY OF CONSTRUCTION

5.21.1 Contractor shall obtain and preserve for the benefit of the COUNTY OF SANTA BARBARA, manufacturer's warranties on materials, fixtures, and equipment incorporated into the Work.

5.21.2 Performance Bond: The Performance Bond shall remain in effect for a 12-month warranty period after the date of substantial completion, as determined by the County. In addition to guarantees required elsewhere, Contractor shall, and hereby does guarantee and warrant all Work against all defects for a period of **ONE (1)** year after the date of completion as defined in Public Contract Code Section 7107 subdivision (c) or commissioning of the project whichever is later. Extended warranty periods shall be provided under manufacturer warranties, as required by project specifications.

5.21.3 In the event that the Contractor or its designated representative fails to commence and diligently pursue all Work required under Paragraph 5.5 within a reasonable time after receipt of written notification pursuant to the requirements thereof, the Owner or the Designated Representative shall have the right to demand that said Work be performed under the Performance Bond by making written notice on the surety. If the surety fails or refuses to perform the obligation it assumed under the Performance Bond, the Owner or the Designated Representative shall have the Work performed by others, and after completion of the Work, shall make demand for reimbursement of any or all expenses incurred by the Owner while performing the Work, including, but not limited to, administrative personnel.

5.21.4 Warranty repair work which arises to threaten the health or safety of personnel or the safety of property or equipment will be handled by the Contractor on an immediate basis as directed verbally by the Owner or the Designated Representative. Written verification will follow the Owner's or the Designated Representative's verbal instructions. Failure of the Contractor to respond as verbally directed will be cause for the Owner or the Designated Representative to have the warranty repair work performed by others and to proceed against the Contractor as outlined in Paragraph 5.21.2 above.

5.21.5 The above provisions do not in any way limit the guarantees on any items for which a longer guarantee is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish to COUNTY OF SANTA BARBARA all appropriate guarantee or warranty certificates as indicated in the Specifications or upon request by COUNTY OF SANTA BARBARA.

5.21.6 Pre-Warranty Conference: Prior to Substantial Completion and at a time designated by the Owner or the Designated Representative, the Contractor shall meet with the Owner or the Designated Representative to develop a mutual understanding with respect to the requirements of Paragraph 5.5 of this specification. The Owner or the Designated Representative shall establish communication procedures for the Contractor notification of warranty defects, priorities with respect to the type of defect and reasonable time required for the Contractor response and other details deemed necessary by the Owner or the Designated Representative for the execution of the construction warranty. In connection with these requirements, the Contractor will furnish the name, telephone number and e-mail address of a licensed and bonded company which is authorized to initiate and maintain warranty Work action on behalf of the Contractor. This single point of contact will be located within the local service area of the warranted construction and will be responsive to the Owner's inquiry on warranty Work action and status. This

requirement does not relieve the Contractor of any of its responsibilities in connection with Paragraph 5.5.

5.22 SUBCONTRACTS

5.22.1 Each bidder shall file with its bid the name, license number, and the location of the place of business of each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the Contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent of the Contractor's total bid. Each bidder shall state the portion of the work which will be done by each subcontractor under this act. The Contractor shall list only one subcontractor for each such portion as is defined by the Contractor in its bid.

5.22.2 In each instance, the nature and extent of the work to be sublet shall be described. The failure of the Contractor to specify a subcontractor, or the listing of more than one subcontractor for the same portion of the work, constitutes an agreement by the Contractor that he is fully qualified to perform that portion himself, and that he shall perform that portion himself.

5.22.3 The Contractor must have the written consent of the Owner to substitute a subcontractor other than that designated in the original bid, to permit any subcontract to be assigned or transferred, or to allow a subcontract to be performed by other than the original subcontractor. The Contractor shall submit an acknowledgement signed by the original subcontractor that there is no objection to its replacement by another subcontractor. Any substitution of subcontractors must comply with California Public Contract Code.

5.22.4 Subcontracting of work for which no subcontractor was designated in the original bid, and which is more than one-half of one percent of the work, will be allowed only in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the Owner, setting forth the facts constituting the emergency or necessity.

5.22.5 Violation of any of the above provisions will be considered a violation of the Contract, and the Owner may cancel the Contract or assess the Contractor a penalty of not more than 10% of the subcontract involved.

5.22.6 All persons engaged in the work, including subcontractors and their employees, will be considered as employees of the Contractor. He will be held responsible for their work. The Owner will deal directly with, and make all payments to the Contractor.

5.22.7 When subcontracted work is not being prosecuted in a satisfactory manner, the Contractor will be notified to take corrective action. If the Owner so orders, and on receipt by the Contractor of written instructions from the Owner, the subcontractor shall be removed immediately from the work. He shall not again be employed on the work.

5.23 LAWS TO BE OBSERVED

5.23.1 The Contractor shall keep himself fully informed of State and National laws and County and municipal ordinances and regulations which in any manner affect those employed in the work or the materials used in the work or in any way affect the conduct of the work. He shall at all times observe and comply with all such laws, ordinances and regulations.

5.23.2 Santa Barbara County Ordinance 2946 Unlawful Discrimination in Employment Practices: Contractor agrees with the County of Santa Barbara that it will not discriminate against any employee or applicant for employment in violation of any applicable State or Federal laws, rules or regulations which may now or hereafter specifically prohibit such discrimination on such grounds as race, religion, sex, color, national origin, physical handicap when otherwise qualified, Vietnam era veteran/disabled or age. If it is determined by the Board of Supervisors upon recommendation of the Affirmative Action Officer and the County Counsel that during the life of this contract any such unlawful discriminations have occurred, the County Board of Supervisors may forthwith terminate this contract. Contractor further agrees that whether or not the term of this contract is still in existence at the time of final determination of such unlawful discrimination, that it will forthwith reimburse the County for any and all damages, costs and expenses incurred in connection with such unlawful discrimination, including but not limited to damages from loss of Federal or State grants, subventions or loans; costs of processing, investigating and reporting complaints of unlawful discrimination; additional costs or expenses incurred in completion of this agreement by another party if this agreement is terminated before completion; all costs of suit including reasonable attorney's fees incurred in collecting any such damages, costs and expenses; and interest at 7% on all such damages, costs and expenses from the date they are incurred to date of payment.

5.23.2.1 Employment practices shall include, but are not limited to employment, promotion, demotion, transfer, recruitment and advertising for recruitment, layoff or other termination, rates of pay, employee benefits and all other forms of compensation, selection for training and apprenticeship and probationary periods.

5.23.2.2 Contractor further agrees to permit access at all reasonable times and places to all of its records of employment advertising, application forms, tests and all other pertinent employment data and records, to the County of Santa Barbara, its officers, employees and agents for the purpose of investigation to ascertain if any unlawful discrimination as described herein has occurred or is being practiced.

5.23.2.3 Failure to fully comply with any of the foregoing provisions relating to unlawful discrimination in employment

practices shall be deemed to be a material breach of this contract.

ARTICLE 6: SUBCONTRACTORS

6.1 DEFINITION

6.1.1 A Subcontractor is a person or entity who has a direct contract with a Contractor to perform any of the Work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or its authorized representative.

6.1.2 Nothing in the Contract Documents shall create any contractual relationship between the Owner, the Architect/Engineer or the Designated Representative and any Contractor, any Subcontractor, or any Sub-subcontractor or its authorized representative.

6.2 SUB-CONTRACTUAL RELATIONS

6.2.1 By an appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor, by the terms of the Contract Documents and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these documents, assumes toward the Owner, the Designated Representative or the Architect/Engineer. Said agreement shall preserve and protect the rights of the Owner, the Designated Representative and the Architect/Engineer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents has against the Owner or Designated Representative. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with its Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 6.3 and shall identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents to its Subcontractors.

ARTICLE 7: SEPARATE CONTRACTS

7.1 OTHER CONTRACTORS

7.1.1 The Owner reserves the right to let other separate contracts in connection with the Work of the Project. The Contractor shall cooperate with other separate contractors and he shall afford the Designated Representative and other Contractors reasonable opportunity for the introduction and storage of their materials and equipment and execution of their Work and shall properly connect and coordinate its Work with others under the general direction of the Designated Representative. Temporary structures, equipment or materials shall be located where directed by the Designated Representative and if not so located, they shall be moved by the Contractor when directed at no additional cost.

7.2 CONTRACTOR TO INSPECT OTHER WORK

7.2.1 If any part of the Contractor's Work depends, for proper execution or results, upon the Work of the Designated Representative or any separate contractor, the Contractor shall, prior to proceeding with the Work, inspect and measure Work already in place and promptly report to the Designated Representative any discrepancies from the drawings and specifications or defects in such Work that render it unsuitable for such proper execution and results. The Contractor shall submit the report of discrepancies or defects in the form of a written request for information. Failure of the Contractor to so report shall constitute an acceptance of the other contractor's Work as fit and proper to receive its Work, except as to defect which may develop after the execution of its Work.

7.2.2 Copies of Drawings and specifications relating to these separate contracts will be available to the Contractor, upon request, for its information in carrying out the above provisions. The Contractor shall be held responsible for any damage or misfit resulting from its neglect to comply with the foregoing.

7.3 COORDINATION AND COOPERATION

7.3.1 The Contractor shall coordinate Work to be done hereunder with the Work of such other contractors in such manner as the Designated Representative may direct. The Work shall be scheduled and executed at such time and in such a way as to cause the least inconvenience to the Owner and with proper consideration for the rights of other contractors and public. The Contractor shall keep fully informed with the entire operation and install its Work promptly.

7.3.2 If the Designated Representative determines that the Contractor is failing to coordinate its Work with the Work of other contractors as directed, he may, upon written notice to the Contractor recommend the following actions by the Owner:

7.3.2.1 The Owner may withhold any payment otherwise due hereunder until the Designated Representative's directions are complied with by the Contractor.

7.3.2.2 The Owner, through the Designated Representative, may direct other contractors to perform portions of the contract and charge the cost of such Work to the contract amount.

7.3.2.3 The Owner may terminate any and all portions of the contract for the Contractor's failure to perform in accordance with the contract.

7.3.3 If the Contractor notifies the Designated Representative, in writing, that another contractor on this project is failing to coordinate its Work with the Work of this contract, as directed, the Designated Representative will promptly investigate the charge. If he finds it to be true, he will promptly issue such directions to the other contractor with respect thereto as the situation may require. The Designated Representative shall not, however, be liable for any damages suffered by this contractor by reason of the other contractor's failure to promptly comply with the directions so issued by the Designated Representative or by reason of another contractor's default in performance; it being understood that the Designated Representative does not guarantee the responsibility or continued efficiency of any contractor.

7.3.4 In the event of any labor dispute, affecting the Contractor or its employees, the Contractor shall utilize all possible means to resolve the dispute in order that the project not be delayed to any extent.

7.3.5 The Contractor shall cooperate with the Owner, the Architect/Engineer and the Designated Representative and other Contractors working on this project in order to avoid interference, inconvenience or damage. To aid in avoiding conflicts, the Contractor, without additional charge, shall make all reasonable modification in the Work as may be directed by the Designated Representative. In the event of the Contractor's operations causes any damage, interference, or inconvenience to Work being carried out under any other contract, the Contractor shall restore, replace, rectify, or otherwise make good any damage to the satisfaction of the Designated Representative or to the other contractors. Should the responsible Contractor fail to comply with this provision, the Work will be done by others at the expense of the responsible Contractor.

7.3.6 The Contractor shall ensure that all labor employed by him, its agents, or those he assigns for Work on the project shall be in harmony with and be compatible with all other labor being used by the Designated Representative or other Contractors. The Contractor shall observe hours and conditions of labor as directed by Designated Representative and in any event, in compliance with all applicable laws, ordinances and regulations. The Contractor shall coordinate its work with the work of other Contractors, the Owner and the Designated Representative and shall provide adequate information and planning of its work to allow for effective coordination by others with its operations. Whenever the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of the Work of this contract, the Contractor shall immediately give notice thereof to the Designated Representative. The Contractor shall then confirm the notice, in writing within 24 hours of the giving thereof, and shall include all relevant information with respect thereto. No claims will be accepted for costs incurred as a result of jurisdictional or labor practice disputes.

7.4 OWNER'S RIGHT TO CLEAN UP

7.4.1 If a dispute arises between the separate contractors as to their responsibility for cleaning up as required by Paragraph 5.15, the Owner may clean up and charge the cost thereof to the Contractor responsible therefore as the Owner shall determine to be just.

7.5 DAMAGES TO WORK

7.5.1 Should the Contractor wrongfully cause damage to the Work or property of the Owner or to other Work on the site, the Contractor shall promptly remedy such damage at no cost to Owner.

7.5.2 Should the Contractor wrongfully cause damage to the Work or property of any other Contractor, the Contractor shall, upon due notice, promptly attempt to settle with the other Contractor by agreement, or otherwise resolve the dispute. If such other Contractor sues the Owner or the Designated Representative or initiates any legal proceeding against the Owner or the Designated Representative on account of any damage alleged to have been caused by the Contractor, the Owner or Designated Representative shall notify the Contractor who shall defend such proceedings at the Contractor's expense and if any judgment or award against the Owner or Designated Representative arises from, the Contractor shall pay or satisfy it and shall reimburse the Owner or Designated Representative for all attorney's fees and court costs which the Owner or Designated Representative has incurred.

7.5.3 Should the Contractor sustain any damage through any act or omission of any other contractor having a contract for the performance of Work upon the site or of Work which may be necessary to be performed for the proper execution of the Work to be performed hereunder, the Contractor shall have no claim against the Owner, Architect/Engineer, Designated Representative or the Owner's consultants for such damage, but shall have a right to recover such damage from the other contractor as provided herein.

7.5.4 The Contractor shall indemnify and hold the Owner, Architect/Engineer and Designated Representative harmless from any and all claims or judgments for damages and from costs and expenses to which the Owner and Designated Representative may be subjected or which either may suffer or incur by reason of the Contractor's failure to comply with the Designated Representative's directions promptly.

ARTICLE 8: MISCELLANEOUS PROVISIONS

8.1 GOVERNING LAW

8.1.1 This contract shall be governed by the laws of the State of California.

8.2 SUCCESSORS AND ASSIGNS

8.2.1 The Owner and the Contractor each binds himself, its partners, successors, assignees and legal representatives to the other part hereto and to the partners, successors, assignees and legal representatives of such other parties in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract nor sublet it as a whole without written consent of the other.

8.2.1.1 The Contractor shall not assign any monies due, or to become due, under this Contract without prior written consent of the Owner obtained through the Designated Representative.

8.3 WRITTEN NOTICE

8.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by the registered or certified mail to the last business address known to him who gives the notice.

8.4 CLAIMS FOR DAMAGES

8.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of its employees, agents or others for whose acts he is legally liable, claims shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

8.5 PERFORMANCE BOND AND LABOR MATERIAL PAYMENT BOND

8.5.1 The Contractor shall deliver to the Designated Representative, on forms approved by the Designated Representative and Owner, all executed and Standard Performance Bond and Standard Labor Material Payment Bond and a one (1) year Maintenance (Warranty) Bond, both with an approved surety acceptable to the Owner or Designated Representative and each payable in the amount at least equal to one hundred (100%) percent of the accepted bid as guarantee for the faithful performance of the Contractor and the payment of all persons who have, and fulfill, contracts which are directly with the successful bidder. The sureties of all bonds shall be of such security company or companies as are approved by the Designated Representative and the Owner. No Contract shall be deemed to be in effect until all bonds have been approved.

8.5.2 The insurance and bonding companies providing or underwriting such bonding shall be duly authorized and registered to do business in the State of California and shall be acceptable to the Owner and the Designated Representative.

8.5.3 The performance bond required by the Contract Documents shall remain in full force and effect during the warranty periods required by the Contract so as to give the Designated Representative and Owner recourse on the bond if the Contractor fails to remedy defects during the warranty period.

8.5.4 The Contractor's Payment and Performance Bond shall name the Owner as obligee.

8.6 RIGHTS AND REMEDIES

8.6.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available there under shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

8.6.2 No action or failure to act by the Designated Representative, Architect/Engineer or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract Documents nor shall any such action or failure to act constitute an approval or acquiescence in any breach there under, except as may be specifically agreed in writing.

8.7 TESTS

8.7.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Designated Representative timely notice of its readiness so the Architect/Engineer and Designated Representative may observe such inspection, testing, or approval. The Owner shall bear all costs of such inspections, tests or approvals unless otherwise noted. The Contractor shall bear all costs of retesting any work failing to pass initial testing.

8.7.2 If the Architect/Engineer or Designated Representative determine that any Work requires special inspection, testing, or approval which Subparagraph 8.7.1 does not include, he will, through the Designated Representative, instruct the Contractor to prepare for such special inspection, testing or approval and the Contractor shall give notice as in Subparagraph 8.7.1 If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, Contractor shall bear all costs thereof, including compensation for the

Architect/Engineer's and the Designated Representative's additional services made necessary by such failure. If the Work complies, the Owner shall bear such costs and an appropriate Change Order shall be issued.

8.7.3 Where operating tests are specified, the Contractor shall test its Work as it progresses, on its own account and shall make satisfactory preliminary tests in all cases before applying to the Designated Representative for official tests.

8.7.4 Official tests shall be made as directed by the Designated Representative, in the manner specified, for the different branches of the Work or portions thereof. The Contractor shall furnish all materials and apparatus, make connections and conduct the official test under the observation of the Owner's independent testing agency where appropriate. The official test will be conducted in the presence of a representative of the Designated Representative. Should defects appear, they shall be corrected by the Contractor and the official test repeated until the installation is acceptable to the Designated Representative.

8.7.5 Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by him through the Designated Representative to the Architect/Engineer.

8.7.6 If the Architect/Engineer or Designated Representative is to observe the inspections, tests or approval required by the Contract Documents, he will do so promptly and, where practicable, at the source of supply.

8.7.7 The Contractor shall deliver test samples of any of the materials specified in any of the Sections of the Specifications to the Owner's testing agency. This may apply to materials proposed for use, materials already delivered to the job, or materials already incorporated into the construction.

8.7.8 Neither the observations of the Architect/Engineer or the Designated Representative in their Administration of the Construction Contract, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from its obligation to perform the Work in accordance with the Contract Documents.

8.7.9 Any materials which fail to meet the requirements of these specifications shall not be used whether or not previously approved by the Architect/Engineer. If they have been delivered to the job, they shall be removed. If they have already been incorporated into the construction, the Designated Representative or Architect/Engineer may order them removed, or, at the discretion of the Owner through the Designated Representative, they may be permitted to remain in place, providing the Contractor agrees to a proper deduction from the contract sum.

8.7.10 The services of a testing and inspection engineer, selected by the Owner, Designated Representative and Architect/Engineer, shall be provided and paid for by the Owner for the tests required in the various sections, unless specifically stated otherwise or due to deficient Work.

8.7.11 No Work of any kind shall be covered or enclosed before it has been tested and approved.

8.8 ORDER OF PRECEDENCE

8.8.1 In the event of any conflict or discrepancy in the provisions of the Contract Documents, the documents shall be interpreted on the basis of the following order or priority:

(a.) Agreement between the Owner and the Contractor
(b.) Addenda, with later date having greater priority
(c.) Special Conditions
(d.) General Requirements and Other Conditions
(e.) Drawings and Specifications

8.8.2 In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum the better quality or greater quantity of Work shall be provided in accordance with the Architect/Engineer's and Designated Representative's interpretation.

ARTICLE 9: TIME

9.1 DEFINITIONS

9.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for the Substantial Completion of the Work as defined in Subparagraph 9.1.3 including authorized adjustments thereto.

9.1.2 The date of commencement of the Work is the date established in a Notice to Proceed (NOP) from the Owner.

9.1.3 The Date of Substantial Completion of the Work or designated portion thereof is the date certified by the Architect/Engineer when construction is sufficiently complete in accordance with the Contract Documents, so that the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended.

9.1.4 The term Day, as used in the Contract Documents, shall mean calendar day unless otherwise specifically designated.

9.2 PROGRESS AND COMPLETION

9.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

9.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 9.1.2. He shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The actual date on which the Contractor starts work will not affect the required time for completion of the work.

9.2.3 The Contractor shall furnish sufficient forces, plant and equipment and shall Work such hours, including night shifts and lawful overtime operations as may be necessary to ensure the execution of the Work in accordance with the Construction Schedule. If, in the opinion of the Designated Representative, the Contractor falls behind the progress schedule, the Contractor shall take such steps as may be necessary to improve its progress and shall submit its plans demonstrating the manner in which the desired rate of progress may be regained. It shall be the responsibility of the Contractor to maintain its schedule so as not to delay the progress of the project. If the Contractor delays the progress of the project, he shall, in order to maintain the overall schedule, take all necessary actions, not limited to an increase in the number of shifts, days of Work and to the extent permitted by law, to institute or increase overtime operations, all without additional cost.

9.2.4 If the Designated Representative determines that the Contractor, without just cause, fails or refuses to employ an adequate working force, or to employ them for a maximum number of hours per day as permitted by law or by shifts of its working forces as would be sufficient, in the opinion of the Designated Representative to complete the Work in accordance with the approved project schedule or within the time to which such completion may be extended, then after formal notice to the Contractor, the Owner shall have the right to complete or to have the Work completed by such means and in such manner, by contract or otherwise, as permitted by law, as the Owner may deem advisable, utilizing for such purpose such of the Contractor's plant, materials, equipment, tools and supplies remaining on the site. Formal notice in this article shall be e-mail, or registered letter to the last known business address of the Contractor.

9.2.5 The expense of such completion shall be charged against and deducted out of such money as would have been payable to the Contractor if he had completed the Work; the balance of such moneys, if any, subject to the other provisions of this contract, to be paid to the Contractor without interest after completion. Should the expense of such completion, so certified by the Designated Representative, exceed the total sum which would have been payable under this contract, if the same had been completed by the Contractor or its surety, the surety shall remit such balance due to the Owner upon its demand.

9.2.6 Whether or not the Contractor's right to proceed is terminated, he and its surety will be liable for any damage to the Owner, other Contractors and the Designated Representative from the Contractor's refusal to complete the Work in accordance with the approved progress schedule or within the time for which such completion may be extended. Formal notice in this article shall be by telegram, or registered letter to last known business address of the Contractor.

9.2.7 The permitting of the Contractor or the surety on the performance bond to proceed to complete all Work or any part of it after the date of Substantial Completion or after the date to which the time for Substantial Completion may have been extended, shall in no way operate as a waiver on the part of the Owner of any of its rights hereunder.

9.2.8 In order to expedite the completion of the Contractor's Work, the Designated Representative may direct the Contractor to Work on the basis of two (2) shifts instead of one (1) or to take such other measures as he deems necessary to expedite construction. If the need for such direction is not attributable to delays or other fault on the part of the Contractor, the Owner shall pay the Contractor any additional net cost. If, however, the Contractor is behind schedule due to its own delays or other fault on its part and the Designated Representative directs him to Work additional shifts, expedite deliveries or purchase additional materials or equipment in order to bring its Work up to schedule, all additional costs shall be borne by the Contractor.

9.2.9 With the Designated Representative's approval, the Contractor shall suspend any Work that may be subject to damage by climatic conditions. Under such conditions, the Contractor shall take measures to protect the Work and to minimize the impact on the progress of the Work.

9.3 DELAYS AND EXTENSIONS OF TIME

9.3.1 If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the Owner, Designated Representative or the Architect/Engineer or by any employee of either, or by any separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, adverse weather conditions not reasonably anticipated, unavoidable casualties or any causes beyond the Contractor's control, or by delay authorized by the Owner or Designated Representative pending litigation, or by any other cause which the Designated Representative determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Director of General Services may determine. No adjustment of the Contract Time shall be made on account of any Excusable Delays or Compensable Delays unless those delay(s) actually and directly impact Work or Work activities on the critical path of the then current and updated approved Construction Schedule as of the date on which a delay first occurs.

9.3.2 Any claim for extension of time shall be made in writing to the Designated Representative not more than ten (10) days after commencement of the delay; otherwise, it shall be waived. Any claim for extension of time shall state the cause of the delay and the number of days of extension requested. If the cause of the delay is continuing, only one claim is necessary, but the Contractor shall report the termination of the cause for the delay within ten (10) days after such termination and shall simultaneously make final claim for said delay, otherwise any claim for extension of time based upon that cause shall be waived.

9.3.3 In the event of a delay attributable in part to the Contractor and in part to causes for which the Contractor is not responsible, then provided the Contractor has given proper and timely notice hereunder, the delay shall be equitably apportioned among the parties causing it and the Contractor shall remain liable for the portion not so excused.

9.3.4 If no agreement is made stating the dates upon which interpretations as set forth in Subparagraph 3.2.2 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after written request is made for them and not then, unless such claim is reasonable.

9.3.5 If the Project is delayed as a result of the Contractor's refusal or failure to begin the Work on the date of commencement, as defined in Subparagraph 9.1.2, or its refusal or failure to carry the Work forward expeditiously with adequate forces, equipment, material or other resources, the Contractor shall be liable to the Owner for damages for every day Contractor's scheduled completion is exceeded, provided, however, that such refusal or failure is not the result of a justifiable delay as defined in Subparagraph 9.3.1.

9.3.6 Neither the Owner, Architect/Engineer, nor Designated Representative shall have liability to the Contractor nor to any other Contractor or subcontractor for delay, hindrance or interference in the performance of the Work, however caused, except for delay or hindrance resulting from active interference of the Owner or its representatives in such Contractor's execution of the Work.

9.3.7 In addition to damages, as defined in Subparagraph 9.3.5, the Contractor shall be liable to the Owner for any damages sustained as the result of the Contractor's refusal or failure to perform the Work, provided however that such refusal or failure is not the result of a justifiable delay as defined in Subparagraph 9.3.1

9.3.8 Contractor shall not request additional time to complete the project because of delays occurring on Sundays or holidays. Neither shall he request additional time for Saturday delays except and unless he can show proof of normally working on Saturdays in order to complete the Work on time.

9.3.9 Anticipated Normal Weather Days: The time estimated by the Contractor for completion of the entire Work ready for use shall include the number of calendar days, for anticipated delays due to normal weather conditions. No time extensions for delays due to weather will be allowed until and unless such delays exceed the time included for normal weather delays. In case of claims for extension of time because of abnormal inclement weather, such extension of time shall be granted only because such abnormal inclement weather prevented the execution of major items of Work on normal working days. The weather table below will be used to determine any contract time extension due to abnormally inclement weather. For the purpose of this contract, "abnormal inclement weather" will be interpreted as the number of days in excess of the normal on which rainfall exceeds 0.01 inch or snow/ice pellets

exceed 1.0 inch. Extension of time to complete the project will be based on actual working days, i.e., Saturdays, Sundays and holidays will be considered in granting extension of time.

Weather Table:

January	6	July	0
February	5	August	0
March	5	September	1
April	4	October	1
May	1	November	3
June	0	December	5

9.3.10 Liquidated Damages: The Owner will suffer financial loss if the project is not substantially complete on the date set forth in the Contract Documents. The Contractor and its surety shall be liable for and pay to the Owner, hereinafter stipulated as fixed, agreed, and liquidated damages for each consecutive calendar day of delay until the Work is substantially complete, the sum of Five Hundred Dollars ($5,000). The Owner reserves the right to withhold the liquidated damages, incurred because of failure to complete the project on time, from the final payment to the Contractor. The Owner reserves the right to withhold liquidated damages from any progress payments occurring after the contract completion date.

9.3.11 If a suspension of work is ordered by the Designated Representative, due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the contract, the days on which the suspension order is in effect shall be considered working days if such days are working days as defined.

ARTICLE 10: PAYMENTS AND COMPLETION

10.1 CONTRACT SUM

10.1.1 The Contract Sum is stated in the Agreement between the Owner and the Contractor including adjustments thereto and is the total amount payable to the Contractor for the performance of the Work under the Contract Documents.

10.1.2 Payment for work performed or materials furnished under an assessment proceedings contract will be made as provided in the particular proceedings or legislative act under which such contract was awarded.

10.1.3 Whenever any portion of the work is performed by the Owner at the Contractor's request, the cost thereof shall be charged against the Contractor, and may be deducted from any amount due or becoming due from the Owner.

10.2 SCHEDULE OF VALUES

10.2.1 Within **ten (10) calendar days** after the effective notice to proceed, the Contractor shall submit to the Designated Representative a schedule of values allocated to the various portions of the Work prepared in such a form and supported by such data to substantiate its accuracy as the Designated Representative may require. This schedule, unless objected to by the Designated Representative, shall be used only as a basis for the Contractor's Application for Payment.

10.2.2 The schedule of values shall equal in total the Contract Sum and shall correctly represent a reasonable apportionment of the Contract Sum.

10.2.3 When a bid item is included in the proposal form and subject to the limitation and conditions in the contract documents, the Contractor shall itemize in the schedule of values the costs of mobilization work in advance of construction operations and not directly attributed to any specific bid item. When no such bid item is provided, payment for mobilization costs will be considered in the other items of work.

10.2.4 With said Schedule of Values contractor shall provide to Owner's Designated Representative copies of hourly wage rates for all workers in all trades associated with the job. If, during the course of construction, wage rates change, the contractor shall provide to Owner's Designated Representative copies of revised hourly wage rates the same day as said change is adopted or agreed-upon.

10.3 APPLICATION FOR PAYMENT

10.3.1 The Designated Representative will, after award of the contract, establish a closure date for the purpose of making monthly progress payments. The Contractor may request in writing that such monthly closure date be changed. The Designated Representative may approve such request when it is compatible with the Owner's payment procedures.

10.3.1.1 Each month, the Contractor will make an approximate measurement of the work performed to the closure date and as a basis for making monthly payments, estimate its value based on the contract unit prices or as provided for in the approved schedule of values.

10.3.1.2 At a fixed date each month as established by the Designated Representative during the progress of the Work, the Contractor shall render to the Designated Representative a notarized Application for Payment for a portion of the Contract Price, broken down into the categories itemized in the Contractor's Schedule of Values. The amounts invoiced shall be directly proportional to the percentage of completion of Work in each of the categories at the end of the closure date for the invoice period less any amounts previously invoiced. The Application for Payment shall be made on A.I.A. Document G702 with continuation sheets A.I.A. Document G703, or on other forms approved by the Designated Representative.

10.3.2 The Contractor shall certify monthly that he has made payment due to its Subcontractors and suppliers from the proceeds of prior payments and that he will make timely payments from the proceeds of the progress payment now due to its Subcontractor and suppliers in accordance with the contractual arrangements with them. The Contractor shall submit written certification that all amounts for equipment, materials, labor, union benefits and other services and all other items provided by the month covered by Contractor's invoice have been paid; and proof that Contractor has acquired title to the equipment and materials invoiced the previous month. Partial Waivers of Lien will be

required with the second and succeeding monthly invoices. The Designated Representative may request Record Documents, schedule updates, payrolls for all labor and other data supporting payment to Subcontractors and material suppliers before processing the requisition.

10.3.3 With respect to material purchased during the preceding month by the Contractor as Owner's special purchasing subagent, the Contractor shall provide the Designated Representative with a statement showing the costs of such materials and any state or local sales and use taxes paid by the Contractor in connection with the purchase or use thereof during the preceding month, which statement shall be supported by copies of invoices, receipts, etc., clearly and separately showing the costs of such materials and taxes. This statement shall be filed with the Designated Representative within one month after the purchase of such items.

10.3.4 Unless otherwise provided in the Contract Documents, payment will be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site. Payments made for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Designated Representative to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest. Materials invoiced in pay applications, if not stored on site, must be kept stored in a bonded warehouse approved by the Designated Representative.

10.3.5 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the Owner by incorporation in the construction and upon the receipt of final payment by the Contractor free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 10 as "liens" and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor by any other person performing its Work at the site or furnishing materials and equipment for its Work, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person. All Subcontractors and Sub-subcontractors agree that title will so pass upon their receipt of payment from the Contractor.

10.4 PROGRESS PAYMENTS

10.4.1 If the Contractor has made Application for Payment in accordance with the General Requirements, the Designated Representative will, with reasonable promptness, review and process such Application for Payment in accordance with the Contract. From each progress estimate, five (5%) percent will be deducted and retained by the Owner, and the remainder less the amount of all previous payments will be paid to the Contractor.

10.4.2 No approval of an application for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents. Nor shall the same relieve the Contractor or its surety from any obligation under the Contract or the Standard Performance Bond and the Standard Labor and Material Payment Bond.

10.4.3 Except in case of bona fide disputes, or where the Contractor has some other justifiable reason for delay, the Contractor shall pay for all transportation and utility services not later than the end of the calendar month following that in which services are rendered and for all materials, tools and other expendable equipment to the extent of ninety percent (90%) of the cost thereof not later than the end of the calendar month following that in which such materials, tools and equipment are delivered at the site of the Project. The Contractor shall pay to each of its Subcontractors, not later than the end of the calendar month in which each payment is made to the Contractor, the representative amount allowed the Contractor on account of the Work performed by its Subcontractors, to the extent of each Subcontractor's interest herein. The Contractor shall, by an appropriate agreement with each Subcontractor, also require each Subcontractor to make payments to its suppliers and sub-subcontractors in a similar manner.

10.4.4 Payment shall not relieve the Contractor from its obligations under the contract; nor shall such payment be construed to be acceptance of any of the work. Payment shall not be construed as the transfer of ownership of any equipment or materials to the Owner. Responsibility of ownership shall remain with the Contractor who shall be obligated to store, protect, repair, replace, rebuild or otherwise restore any fully or partially completed work or structure for which payment has been made; or replace any materials of equipment required to be provided under the contract which may be damaged, lost, stolen or otherwise degraded in any way prior to acceptance of the work under the contract, except as provided in Paragraph 10.7.2.

10.4.4.1 Guarantee periods shall not be affected by any payment but shall commence on the date equipment or material is placed into service at the direction of the Owner. In the event such items are not placed into service prior to partial or final acceptance of the project, the guarantee period will commence on the date of such acceptance.

10.4.4.2 If, within the time fixed by law, a properly executed notice to stop payment is filed with the Owner, due to the Contractor's failure to pay for labor or materials used in the work, all money due for such labor or materials will be withheld from payment to the Contractor in accordance with applicable laws.

10.4.5 Per the California Public Contract Code, upon the Contractor's request, the County will make payment of funds withheld to ensure performance of the Contract if the Contractor deposits in escrow with the Santa Barbara County Treasurer, or with a bank acceptable to the County/DISTRICT, securities eligible for investment under Government Code Section 16430 or bank or savings and loan certificates of deposit, upon the following conditions:

(a.) The Contractor shall bear the expense of the County/DISTRICT and the escrow agent, either the County

Treasurer or the bank, in connection with escrow deposit made.

(b.) Securities or certificates of deposit to be placed in escrow shall be of a value at least equivalent to the amount of retention to be paid to the Contractor pursuant to this section.

(c.) The Contractor shall enter into an escrow agreement satisfactory to the County/DISTRICT which agreement shall include provisions governing inter alia:

(1) the amount of securities to be deposited.
(2) the providing of power of attorney or other documents necessary for the transfer of the securities to be deposited.
(3) conversion to cash to provide funds to meet defaults by the Contractor including, but not limited to, termination of the Contractor's control over the work, stop notices filed pursuant to law, assessment of liquidated damages or other amounts to be kept or retained under the provisions of thecontract.
(4) decrease in value of securities on deposit.
(5) the termination of the escrow upon completion of theContract.

(d.) The Contractor shall obtain the written consent of the surety of such agreement.

10.5 PAYMENTS WITHHELD

10.5.1 The Designated Representative, Architect/Engineer or the Owner may decline approval of an Application for Payment if, in its opinion, the Application is not adequately supported. If the Contractor and the Designated Representative or Owner cannot agree on a revised amount, the Designated Representative shall process the application for the amount he deems appropriate. An amount equaling one hundred fifty (150%) percent of the value of the Work related to any Stop Notice shall be withheld from payments applied for by the Contractor until the Stop Notice is expunged. The Designated Representative may also decline to approve any Applications for Payment or, because of subsequently discovered evidence or subsequent inspections, he may nullify in whole or in part any approval previously made to such extent as may be necessary in its opinion because of:

(a.) Defective Work not remedied.
(b.) Third party claims filed or reasonable evidence indicating probably filing of such claims.
(c.) Failure of the Contractor to make payments properly to Subcontractor or for labor, materials or equipment.
(d.) Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum.
(e.) Damage to the Designated Representative, the Owner or another contractor working at the Project.
(f.) Reasonable evidence that the Work will not be completed within the Contract Time.
(g.) Persistent failure to carry out the Work in accordance with the Contract Documents.
(h.) The filing of a lien against the Project when lien is caused by the act or inaction of the Contractor or its subcontractor.
(i.) Refusal to follow the Project Safety Program issued as a Contract Document.
(j.) Failure to maintain records as specified.
(k.) Failure to maintain record drawings as specified.
(l.) Failure to secure required building inspections.

10.5.2 When the above grounds in Subparagraph 10.5.1 are removed, payment shall be made for the amounts withheld because of them, but in no case shall interest be paid on amounts withheld by the Owner to the Contractor.

10.6 FAILURE OF PAYMENT

10.6.1 If the Contractor is not paid within sixty (60) days after the Application for Payment is approved for payment by the Designated Representative and has become due and payable, then the Contractor may, upon thirty (30) additional days written notice to the Owner and the Designated Representative, stop the Work until payment of the amount owing has been received. The Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start up, which shall be effected by the appropriate Change Order in accordance with Paragraph 13.3., but in no case shall interest be paid by the Owner to the Contractor.

10.7 SUBSTANTIAL COMPLETION

10.7.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 9.1.3, the Contractor shall prepare for submission to the Designated Representative a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Designated Representative and Architect/Engineer, on the basis of inspection, determine that the Work or designated portion thereof is substantially complete, the Architect/Engineer will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner, the Designated Representative and the Contractor for security, maintenance, heat, utilities, damage to the Work, insurance and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall commence on the Date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner, the Designated Representative and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate. The Owner may retain a sum equal to an amount not to exceed one hundred fifty percent (150%) of the estimated cost of completing any unfinished items, separately listed and estimated at the time of substantial

completion. Thereafter, the Owner shall pay to the Contractor monthly, the amount retained for incomplete items as each of said items are completed.

10.7.2 The Owner shall have the right to take possession of and use for any purpose any partially completed portion of the Work. The Designated Representative will give notice to the Contractor of the Owner's intention to take said possession and use. Such taking possession or use shall not be deemed to be the Designated Representative's acknowledgement of completion and acceptance of said portion of Work.

10.7.2.1 The Owner's taking over and utilizing all or part of any completed facility or appurtenance will relieve the Contractor of responsibility for injury or damage to said completed portions of the improvement resulting from use by the public or from the action of the elements or from any other cause, except injury or damage resulting from the Contractor's operations or negligence. The Contractor will not be required to reclean such portions of the improvements before final acceptance, except for cleanup made necessary by its operations. Nothing in this section shall be construed as relieving the Contractor from full responsibility for correcting defective work or materials.

10.7.2.2 In the event the Owner exercises its right to place into service and utilize all or part of any completed facility or appurtenance, the Owner shall assume the responsibility and liability for injury to persons or property arising out of or resulting from the utilization of the facility or appurtenance so placed into service, except for any such injury to persons or property caused by any willful or negligent act or omission of the Contractor, subcontractor, their officers, employees or agents.

10.8 FINAL COMPLETION AND FINAL PAYMENT

10.8.1 Following the Architect/Engineer's issuance of the Certificate of Substantial Completion of the Work or designated portion thereof and the Contractor's completion of the Work, the Contractor shall notify the Designated Representative in writing that the Work will be ready for final inspection and test on a definite date. Notice shall be given at least **five (5)** days in advance of said date. Designated Representative shall forward the notice to the Architect/Engineer who will attach its endorsement as to whether or not he concurs with the Contractor's statement that the Work will be ready for final inspection or test on the date given, but such endorsement shall not relieve the Contractor of its responsibility in the matter. If the Architect/Engineer concurs that the Work will be ready for final inspection or test on the date given, the Architect/Engineer and the Designated Representative will make such inspection. The Contractor is required to furnish access for the final inspection as provided in Subparagraph 3.2.1. If the Work is found acceptable under the Contract Documents and the Contract fully performed the Designated Representative, upon receipt of a correct final Application for Payment, shall recommend to the Owner that such payment be made.

10.8.2 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Designated Representative all (1) inspection sign-offs, (2) final certificate of occupancy, (3) an affidavit that all payrolls, bills for materials and equipment and other indebtedness connected with the Work for which the Owner or its property might in any way be responsible, have been paid or otherwise, (4) consent of surety, if any, to final payment and executed "General Release and Lien Waiver and General Guarantee:, on forms to be provided by the Designated Representative, (5) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the contract, to the extent and in such form as may be designated by the Owner or Designated Representative. If any Subcontractor refuses to furnish a release or waiver required by the Owner or Designated Representative, the Contractor may furnish a bond satisfactory to the Owner and Designated Representative to indemnify them against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner or Designated Representative all monies that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees. Contractor is required to submit all "Record Documents" and operating manuals as required by the Contract Documents prior to the processing of the final payment.

10.8.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting the final completion, and the Designated Representative so confirms, the Owner shall upon certification by the Designated Representative and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance of Work not fully completed or corrected is less than the retention stipulated in the Contract Documents and if the bonds have been furnished as provided in Paragraph 8.5, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Designated Representative prior to such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

10.8.4 Upon successful completion of the final inspection and Work required by the Contract, acceptance of the same by the Owner and the filing of all affidavits, consents of surety and other data required in Subparagraph 10.8.2 and the submission of all bonds, written warranties and guarantees and of all data documents required for project closeout by the Contract Documents, the Architect/Engineer shall file a written certification of completion with the Owner and with the Designated Representative as to the entire amount of Work performed and compensation earned, including extra Work and compensation therefore. At the expiration of thirty-five (35) days after the Owner's confirmation of such Certificate of Completion or as prescribed by law, the Owner shall pay the Contractor the amount stated therein, less all prior payments and advances, whatsoever, to or for the account of the Contractor except such amounts as are required to be withheld by properly executed and filed notices to stop payment or as may be authorized by the contract to be further retained. All prior estimates and payments including those relating to extra Work shall be subject to correction by this payment, which is throughout the Contract called "Final Payment."

10.8.5 The making of Final Payment shall constitute a waiver of all claims by the Owner or Designated Representative except those arising from:

(a.) Unsettled liens.
(b.) Faulty or defective Work appearing after Substantial Completion.
(c.) Failure of the Work to comply with the requirements of the Contract Documents
(d.) Terms of any special warranties required by the Contract Documents.

10.8.5.1 The acceptance by the Contractor of the Final Payment shall be and operate as a release to the Owner and to the Designated Representative of all claims and of all liability to the Contractor for all things done or furnished in connection with this Contract.

10.8.6 In accordance with Section 4551 of the Government Code, the Contractor and subcontractors shall conform to the following requirements. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the awarding body all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act, Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code, arising from purchases of goods, services, or materials pursuant to the public works contract of the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties.

10.8.7 In accordance with Section 4552 of the Government Code, the bidder shall conform to the following requirements. In submitting a bid to a public purchasing body, the bidder offers and agrees that if the bid is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code, arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

10.9 MEASUREMENT OF QUANTITIES FOR UNIT PRICE WORK

10.9.1 General: Unless otherwise specified, quantities of work shall be determined from measurements or dimensions in horizontal planes. However, linear quantities of pipe, piling, fencing, and timber shall be considered as being the true length measured along the longitudinal axis. Unless otherwise provided in the Contract Documents, volumetric quantities shall be the product of the mean area of vertical or horizontal sections and the intervening horizontal or vertical dimension. The planimeter shall be considered an instrument of precision adapted to the measurement of all areas.

10.9.2 Methods of Measurement: Materials and items of work which are to be paid for on the basis of measurement shall be measured in accordance with the methods stipulated in the particular section involved.

10.9.3 Certified Weights: When payment is to be made on the basis of weight, the weighing shall be done on certified platform scales or, when approved by the Designated Representative, on a completely automated weighing and recording system. The Contractor shall furnish the Designated Representative with duplicate licensed weighmaster's certificates showing the actual net weights. The Designated Representative will accept the certificate as evidence of the weights delivered.

10.9.4 Units of Measurement: Measurements shall be in accordance with U. S. Standard Measures. A pound is an avoirdupois pound. A ton is 2,000 pounds avoirdupois. The unit of liquid measure is the U. S. gallon.

10.9.5 Lump Sum Items: Items for which quantities are indicated as "Lump Sum", "L.S.", "Job", or words of like import shall be paid for at the price named. Such payment shall be full compensation for the work named and all work appurtenant thereto required by the contract which is not specifically provided for by other pay items.

10.9.6 Actual Quantities: The quantities listed in the bid schedule will not govern final payment. Payment to the Contractor will be made only for the actual quantities of contract items constructed in accordance with the plans and specifications. Upon completion of the construction, if the actual quantities show either an increase or decrease from the quantities given in the bid schedule, the contract unit prices will prevail subject to the provisions of Article 13.

10.9.7 Waste: Payment will not be made for materials wasted or disposed of in a manner not called for under the Contract. This includes rejected materials not unloaded from vehicles, material rejected after it has been placed and material placed outside of the plan lines. No compensation will be allowed for disposing of rejected or excess material.

ARTICLE 11: PROTECTION OF PERSONS AND PROPERTY

11.1 SAFETY PRECAUTIONS AND PROGRAMS

11.1.1 Contractor will be solely and completely responsible for conditions of the Work Site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and not be limited to normal working hours.

11.1.2

11.1.3 The Contractor expressly undertakes, both directly and through its Subcontractor, to take every precaution at all times for the protection of persons, including employees and property. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

11.1.4 The Contractor shall comply with the provisions of the "Construction Safety Act" and the "Occupational Safety and Health Act of 1970" and the Designated Representative's safety program, as well as all other applicable, Federal, State and local requirements. The Contractor shall submit its safety program to the Designated Representative prior to mobilizing the job and shall be responsible for the safety, efficiency and adequacy of its plant, appliances and methods and for any damage which might result from failure or improper construction, maintenance or operation. The Contractor shall provide a safety report to the Designated Representative on a weekly basis. During the conduct of the Work, the Contractor shall take immediate corrective action, as required upon notification of any deficiencies in safety provisions by the Designated Representative or identification of any deficiencies by Subcontractor personnel.

11.1.5 If the Contractor fails to maintain the safety precautions required by law or directed by the Designated Representative, the Designated Representative may take such steps as necessary and charge the Contractor therefore.

11.1.6 The failure of the Owner to take any such action shall not relieve the Contractor of its obligations in Subparagraph 11.1.1.

11.1.7 The Contractor shall immediately notify the Designated Representative of all accidents and submit a written report describing in detail the circumstances of all accidents within twenty-four (24) hours.

11.1.8 The Contractor alone shall be responsible for the safety, efficiency and adequacy of its plant, appliances and methods and for any damage which may result from their failure or their improper construction, maintenance or operation.

11.1.9 The wearing of hard hats will be mandatory at all times for all personnel on Site. Contractor shall supply sufficient hard hats to properly equip all employees and visitors.

11.1.10 Any construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the Work Site.

11.1.11 Implementation and maintenance of safety programs shall be the sole responsibility of the Contractor.

11.1.12 Contractor shall furnish to the COUNTY OF SANTA BARBARA a copy of the Contractor's safety plan within the time frame indicated in the Contract Documents and specifically adapted for the Project.

11.1.13

11.2 SAFETY OF PERSONS AND PROPERTY

11.2.1 The Contractor shall take all reasonable precautions for the safety of and shall provide all reasonable protection to prevent damage, injury or loss to:

(a.) All employees on the Project and all other persons who may be affected thereby;

(b.) All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of its Subcontractors or Sub-subcontractors; and

(c.) Other property at the site or adjacent thereto, including trees, shrubs, lawns walks, pavements, roadways, structures and utilities not designed for removal, relocation or replacement in the course of construction.

11.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

11.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards promulgating safety regulations and notifying the Owners and users of adjacent utilities. He shall protect the Owner's property from injury or loss arising in connection with this Contract. He shall adequately protect adjacent property as provided by law and the Contract Documents. He shall provide and maintain all passageways, guard fences, light and other facilities for protection required by public authority, local conditions or any of the Contract Documents. If the Contractor fails to so comply, he shall, at the direction of the Designated Representative, remove all forces from the Project without cost or loss to the Owner or Designated Representative, until he is in compliance.

11.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

11.2.5 The Contractor shall notify the Designated Representative of any flammable, combustible and toxic materials intended for use on the project and shall furnish the Designated Representative literature pertinent to the use and control of such materials.

11.2.6 Every employee will be dressed for the Work he performs. Minimum dress will consist of long pants, tee shirt and work shoes. Shorts, cut-offs, "tank-top" shirts or soft-soled shoes will not be permitted.

11.2.7 The Contractor shall promptly remedy all damage or loss (other than damage or loss insured under Paragraph 12.2) to any property, referred to under Articles 11.2.1.2 and 11.2.1.3, caused in whole or in part by the Contractor, its Subcontractors or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under the Articles 11.2.1.2 and 11.2.1.3, except damage or loss attributable to the acts or omissions of the Owner or Architect/Engineer or anyone directly or indirectly employed by either of them or by anyone for whose acts either of them may be liable and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to its obligations under Paragraph 5.18. The Contractor shall be responsible to the Owner and the Designated Representative for the acts and omissions of all its employees and all Subcontractors, their agents and employees and all other persons performing any of the Work under a contract with the Contractor.

11.2.8 The Contractor and each Subcontractor shall designate a responsible member of its organization at the site to act as its Safety Representative whose duty shall be the prevention of accidents and who shall be responsible to maintain all Safety requirements of the Contractor and shall attend all Project Safety Meetings scheduled by the Contractor. This person shall be the Contractor's or Subcontractor's Superintendent unless otherwise designed by the Contractor in writing to the Designated Representative.

11.2.9 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger safety.

11.2.10 When necessary for the proper protection of the Work, temporary heating of a type approved by the Designated Representative and Architect/Engineer shall be provided by the Contractor unless otherwise specified.

11.3 EMERGENCIES

11.3.1 In an emergency affecting the safety or life of individuals, of the Work, or of adjoining property, the Contractor without special instruction or authorization from the Owner or Designated Representative or Architect/Engineer shall act, at its discretion, to prevent such threatened loss or injury. Also, should he, to prevent threatened loss or injury, be instructed or authorized to act by the Owner or Designated Representative or Architect/Engineer, he shall so act, without appeal. Any additional compensation or extension of time claimed by the Contractor on account of any emergency Work shall be determined as provided by Article 13 - Changes in the Work.

11.3.2 Whenever immediate action is required to prevent impending injury, death, or property damage, and precautions which are the Contractor's responsibility have not been taken and are not reasonably expected to be taken, the Owner or Designated Representative may, after reasonable attempt to notify the Contractor, cause such precaution to be taken and shall charge the cost thereof against the Contractor, or may deduct such cost from any amount due or becoming due from the Owner. The Owner's or Designated Representative's action or inaction under such circumstances shall not be construed as relieving the Contractor or its surety from liability.

ARTICLE 12: UTILITIES

12.1 LOCATION

12.1.1 The Owner will search known substructure records and furnish the Contractor, when requested by the Contractor, with copies of documents which describe the location of utility substructures, or will indicate on the plans for the project those substructures, except for service connections, which may affect the work. Information regarding removal, relocation, abandonment, or installation of new utilities will be furnished to prospective bidders.

12.1.2 Where underground main distribution conduits such as water, gas, sewer, electric power, telephone or cable television are shown on the plans, the Contractor, for the purpose of preparing its bid, shall assume that every property parcel will be served by a service connection for each type of utility.

12.1.3 At least two (2) working days before entering on the work, the Contractor shall request the utility owners whose utilities will be affected by the Contractor's work to mark or otherwise indicate the approximate location of their subsurface facilities including, but not limited to, structures, main conduits and service connections. This requirement will not apply to sewer and storm drain installations where their location and depth are shown on the plans for the project.

12.1.4 It shall be the Contractor's responsibility to determine the location and depth of all utilities, including service connections, which he believes may affect or be affected by its operations. If no pay item is provided in the contract for this work, full compensation for such work shall be considered as included in the prices bid for other items of work.

12.2 PROTECTION

12.2.1 The Contractor shall not interrupt the service function or disturb the supporting base of any utility without authority from the utility owner or order from the Designated Representative.

12.2.2 Where protection is required to insure support of utilities located as shown on the plans or in accordance with Paragraph 12.1, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at its expense.

12.2.3 Upon learning of the existence and location of any utility omitted from or shown incorrectly on the plans, or not properly marked, the Contractor shall immediately notify the Designated Representative in the form of a written request for information. When authorized by the Owner, support or protection of the utility will be paid for as provided in Article 13.

12.2.4 The Contractor shall immediately notify the Designated Representative and the utility owner if any utility is disturbed. The Contractor shall bear the costs of repair or replacement of any utility damaged.

12.2.5 Contractor shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property, and structures (including, without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations.

12.2.6

12.2.7 When placing concrete around or contiguous to any non-metallic utility installation, the Contractor at its own expense, shall (1) furnish and install a two-inch cushion of expansion joint material or other similar resilient material; or (2) provide a sleeve or other opening which will result in a two-inch minimum clear annular space between the

concrete and the utility; or (3) provide other acceptable means to prevent embedment in or bonding to the concrete. Where concrete is used for backfill or for structures which would result in embedment, or partial embedment, of a metallic utility installation; or where the coating, bedding or other cathodic protection system is exposed or damaged by the Contractor's operations or as may be required by the work, the Contractor shall notify the Designated Representative and arrange to secure the advice of the affected utility owner regarding the procedures required to maintain or restore the integrity of thesystem.

12.3 EXCAVATIONS

12.3.1 For any displacement or excavation of the ground that may be required by any performance under this Contract, the Contractor shall obtain an inquiry identification number by calling Underground Service Alert (USA) 1 (800) 422-4133 or by such other means as may be required; shall conform to all requirements of Government Code Sections 4215 through 4217 regarding any such displacement or excavation, including the payment of any fees required; and shall facilitate performance by the Owner of any obligation required of the County under said sections.
Contractor, except in an emergency, shall contact the appropriate regional notification center at least two (2) days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement that is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the COUNTY OF SANTA BARBARA, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and/or carried out by the Contractor unless an inquiry identification number has been assigned to the Contractor or any Subcontractor and the Contractor has given the COUNTY OF SANTA BARBARA the identification number. Any damages arising from Contractor's failure to make appropriate notification shall be at the sole risk and expense of the Contractor. Any delays caused by failure to make appropriate notification shall be at the sole risk of the Contractor and shall not be considered for an extension of the Contract time.

12.3.2 There shall be no performance under this Contract by either party unless and until the provisions of such Sections are complied with and the Designated Representative is notified regarding thecompliance.

12.4 REMOVAL

12.4.1 Unless otherwise specified, the Contractor shall remove all interfering portions of utilities shown on the plans or indicated in the bid documents as "abandoned" or "to be abandoned in place".

12.4.2 Before starting removal operations, the Contractor shall ascertain from the Designated Representative whether the utility abandonment is complete, and the costs involved in the removal and disposal shall be absorbed in the bid for the items of work necessitating such removals.

12.5 RELOCATION

12.5.1 When feasible, the utility owners responsible for utilities within the area affected by the work will complete their necessary installations, relocations, repairs or replacements before commencement of work by the Contractor. When the Contract Documents or plans indicate that a utility installation is to be relocated, altered or constructed by others, the Owner will conduct all negotiations with the utility owners and the work will be done at no cost to the Contractor.

12.5.2 Utilities which are relocated in order to avoid interference with the proposed permanent work shall be protected in their relocated position and the cost of such protection shall be absorbed in the various items of the contract.

12.5.3 After award of the contract, portions of utilities which are found to interfere with the work will be relocated, altered or reconstructed by the utility owners, or the Owner may order changes in the work to avoid interference. Such changes will be paid for in accordance with Article 13.

12.5.4 When the plans or specifications provide for the Contractor to alter, relocate, or reconstruct a utility, all costs for such work shall be included in the bid for the items of work necessitating such work. Temporary or permanent relocation or alteration of utilities requested by the Contractor for its own convenience shall be its responsibility, and he shall make all arrangements and bear all costs.

12.5.5 The utility owner will relocate service connections as necessary within the limits of the work or within temporary construction or slope easements unless otherwise specified. When directed by the Designated Representative, the Contractor shall arrange for the relocation of service connections as necessary between the meter and property line, or between a meter and the limits of temporary construction or slope easements. The relocation of such service connections when not detailed on the plans or in the specifications will be paid for in accordance with provisions of Article 13. Payment will include the restoration of all existing improvements which may be affected thereby. The Contractor may, for its own convenience or to expedite the work, agree with any utility owner to disconnect and reconnect interfering service connections. The Owner will not be involved in any suchagreement.

12.6 DELAYS

12.6.1 The Contractor shall notify the Designated Representative of its construction schedule insofar as it affects the protection, removal or relocation of utilities. Said notification shall be in writing and shall be included as a part of the construction schedule required in Paragraph 5.10. He shall notify the Designated Representative in writing of any subsequent changes in its construction schedule which will affect the time available for protection, removal or relocation of utilities.

12.6.2 The Contractor will not be entitled to damages or additional payment for delays attributable to utility relocations or alterations if correctly located, noted and completed in accordance with Paragraph 12.1. The Contractor may be given an extension of time for unforeseen delays attributable to utility relocations or alterations not shown or incorrectly shown on the plans, or for unreasonably protracted interference by utilities in performing work correctly shown on the plans. If the Contractor sustains loss due to delays attributable to interferences, relocations or alterations not covered by Paragraph 12.1, which could not have been avoided by the judicious handling of forces, equipment or plant, there shall be paid to the Contractor such amount as the Owner may find to be fair and reasonable compensation for such part of the Contractor's actual loss as was unavoidable.

12.7 COOPERATION

12.7.1 When necessary, the Contractor shall so conduct its operations as to permit access to the work site and provide time for utility work to be accomplished during the progress of the contract work.

ARTICLE 13: CHANGES IN THE WORK

13.1 CHANGE ORDERS

13.1.1 A Change Order is a written order to the Contractor signed by the Owner issued after the execution of the Contract authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by a Change Order. The County Director of General Services is authorized to execute Change Orders for the Owner in accordance with Article 2.3. A Change Order signed by the Contractor indicates its agreement therewith, including the adjustment in the Contract Sum or the Contract Time, and Contractor agrees that the change in the contract sum and contract time set forth in the Change Order shall constitute the complete compensation and time extension for the change in the work including, but not limited to, Contractor's field and home office overhead, profit, and supervision costs. The Contractor shall not proceed with any change in the Work unless directed in writing by the Designated Representative.

13.1.2 The Owner or Designated Representative, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by a Change Order and shall be performed under the applicable conditions of the Contract Documents. Provisions of the Contract shall apply to all changes, modifications and additions with the same effect as if changes were embodied in the base Contract Documents.

13.1.3 A change in the Work may be initiated in one of three ways:

13.1.3.1 A "Request for Quotation" form from the Designated Representative to the Contractor describing the revision to the Work desired. Usually, it is accompanied by revised drawings, sketches or other data.

13.1.3.2 Formal notification from the Contractor documenting a "concealed condition" requesting investigation by the Designated Representative and Architect/Engineer which causes changes in the Contract Documents (and a subsequent Request for Quotation on the revised documents).

13.1.3.3 In response to a Contractor's "Request for Information", the Architect/Engineers' response may include instructions which the Contractor interprets as involving "extra work." In such cases, the Contractor must submit written notice to the Designated Representative requesting review and issuance of an appropriate Request for Quotation. Any other "instruction" given to the Contractor by the Owner, Designated Representative or Architect/Engineer shall require these procedures and as indicated in 13.4.1 below.

13.1.4 The cost or credit to the Owner resulting from changes in the Work, as outlined above, shall be made on the basis of one of the following methods:

(a.) By such applicable unit prices as set forth in the Contract Documents or subsequently agreed upon by both parties to the Contract.

(b.) By a lump sum mutually agreed upon by the Owner and the Contractor.

(c.) The Owner may direct the Contractor through the Designated Representative to proceed with Work on a time and material (T & M) basis, with a not to exceed cost and the Contractor shall keep and present, in such a form as the Designated Representative may direct, a correct account of all costs of the changes together with all vouchers. The costs shall include overhead and profit as subsequently set forth below. These costs then shall be finalized by a Change Order.

(d.) If the parties cannot agree upon a Lump Sum, Unit Pricing or T & M with a not to exceed cost, the Owner may, as recommended by the Designated Representative, issue a written directive Contract Amendment to proceed and the Contractor shall be compensated for the net cost of additional Work. The Contractor shall keep and present in such a form as the Designated Representative may direct a correct account of all costs of the changes together with all vouchers. The costs shall include overhead and profit as subsequently set forth below.

13.1.5 Lump sum prices and compensation for actual net cost plus overhead and profit shall be established as follows:

13.1.5.1 The net cost of Changes in the Work may include all items of labor or material, power tools and equipment actually used, prorate charges for foreman and payroll charges such as Public Liability and Workmen Compensation Insurance. No percentage for overhead, profit and commission shall be allowed on items of premium costs for overtime, social security, old age and unemployment insurance, fringe benefits, and payroll taxes. If deductions are ordered, the credit shall be the net cost. Items considered as overhead shall include insurance, other than that mentioned above, bond or bonds, superintendent, timekeeper, clerks, watchmen, use of small tools, incidental job burdens, transportation, and general offices expense. The percentages for overhead and profit shall be negotiated and may vary according to the nature, extent and complexity of the changed Work (other than those covered by unit prices set forth on the Contract Documents), but in no case shall exceed the following:

(a.) Allowable Mark-ups on Change Orders

Definitions:

Prime Contractor =	General Contractor
First Tier Subcontractor =	Contractor to the Prime Contractor
Second Tier Subcontractor =	Contractor to the First Tier Subcontractor

Case A: For work within the scope of the Change Order performed by forces of the Prime Contractor:
Overhead: 10% to Prime Contractor only.
Profit: 5% to Prime Contractor only.
Commission: No commission to any party.

Case B: For work within the scope of the Change Order performed by forces of the First Tier Subcontractor(s):
Overhead: 10% to First Tier Subcontractor(s) only.
Profit: 5% to First Tier Subcontractor(s) only.
Commission: 5% to Prime Contractor only.

Case C: For work within the scope of the Change Order performed by forces of the Second Tier Subcontractor(s):
Overhead: 10% to the Second Tier Subcontractor(s) only.
Profit: 5% to the Second Tier Subcontractor(s) only.
Commission: 5% to the Prime Contractor.
5% to the First Tier Subcontractor(s).
No commission to Second Tier Subcontractor(s).

(b.) Not more than four (4) mark-ups (Case C), not to exceed the maximum percentages shown above, shall be allowed.

(c.) All Cost Proposals for work shall be submitted to the Designated Representative on the attached document: "County of Santa Barbara General Services/Capital Projects Division Cost Proposal".

13.1.5.2 On proposals covering both increases and decreases in the amount of the contract, overhead, profit and commission shall be allowed on the net increase only as determined above. When the net difference is a deletion, no percentage for overhead profit and commission shall be allowed.

13.1.5.3 Contractor's cost for preparation of change order proposals shall be deemed to be included in amount of change order proposal.

13.1.6 The Contractor shall respond to the Designated Representative's request for a proposal within seven (7) calendar days. In this proposal, the Contractor shall furnish to the Designated Representative an itemized breakdown of the quantities and prices used in computing the value of changes that might be ordered. The Contractor shall submit with its proposal, its request for time extension (if any). If time for completion of the Contractor's Work is not affected by the change, the Contractor shall so state.

13.1.7 In figuring changes, instructions for measurements of quantities set forth in the specifications shall be followed.

13.1.8 After receipt of a proposal with a detailed breakdown, the Designated Representative shall act promptly thereon. However, when the necessity to proceed with a change does not allow sufficient time to properly check a proposal, the Owner through the Designated Representative may order the Contractor to proceed on the basis to be determined at the earliest practicable date. In this event, the value of the change, with the corresponding equitable adjustment to the contract, shall not be more than the increase or less than the decrease proposed.

13.1.9 The Designated Representative will inform the Contractor and the Contractor will inform the Designated Representative when either party recognizes that a proposed Request for Quotations (RFQ) may affect the progress of the Work schedule.

13.1.10 Designated Representative's Audit: Designated Representative's duly authorized auditors shall have access at all reasonable times, to all Contractor's and Subcontractors' personnel, books, records, correspondence, instructions, plans, drawings, receipts, vouchers and memoranda of every description pertaining to Change Orders for the purpose of auditing and verifying Contractor's net cost of Change Order or for any other reasonable purpose. Designated Representative's auditors shall have the right to reproduce any of the aforesaid documents. Contractor shall preserve and shall cause its Subcontractors to preserve all the aforesaid documents for a period of two (2) years after the completion and acceptance or termination of the Work.

13.1.11 If unit prices are stated in the Contract Documents or subsequently agreed upon and if the quantities originally contemplated are so changed in a proposed Change Order, that application of the agreed unit prices to the quantities of Work proposed will cause substantial inequity to the Owner, the Contractor or the Subcontractor, the applicable unit prices shall be equitably adjusted.

13.2 CONCEALED CONDITIONS

13.2.1 Should concealed conditions encountered in the performance of the Work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions in an existing structure of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in this Contract be encountered, the Contractor shall report the conditions to the Designated Representative before the conditions are disturbed. The Designated Representative shall thereupon notify the Architect/Engineer. Upon such notices, or upon its own observation of such conditions, the Architect/Engineer shall promptly make such changes in the Contract Documents as he finds necessary to conform to the different conditions. Any change in the cost of the Work or the time needed for completion resulting from concealed conditions shall be determined in accordance with Paragraph 13.1 provided a notice thereof is made within ten (10) days after the first observance of the conditions.

13.3 CLAIMS FOR ADDITIONAL COST

13.3.1 If the Contractor claims that any instructions given to him by the Owner or Designated Representative or by the Architect/Engineer, by drawings or otherwise, involve extra Work not covered by the Contract, he shall give the Designated Representative written notice thereof within ten (10) days after the receipt of such instructions and before proceeding to execute the Work, except in emergencies endangering life or property, in which case the Contractor shall proceed in accordance with Paragraph 11.3. Should it not be clear to the Contractor that a change will involve extra Work, written notice given within ten (10) days that the change may involve extra work will be considered sufficient notice. If it is later determined that the Work involved in such instruction shall be recognized as an extra, the amounts of additional compensation to be paid therefore, should be determined in accordance with Paragraph 13.1. Except as otherwise specifically provided, no claim for additional cost shall be allowed unless the notice specified by this Subparagraph is given by the Contractor or unless such Work is performed as provided in Subparagraph 13.1.4. Any change in the contract sum resulting from such claim shall be authorized by agreement amendment.

13.3.2 If the Contractor claims that additional cost is involved because of, but not limited to, (1) written interpretation issued pursuant to Subparagraph 3.2.2, (2) any order by the Owner or Designated Representative to stop the Work pursuant to Paragraph 4.3 where the Contractor was not at fault, or (3) any written order for a minor change in the Work issued pursuant to Paragraph 13.4, the Contractor shall make such claims as provided in Subparagraph 13.3.1.

13.3.2.1 Any claim for damages of any character, delays for which the Owner is liable under the Contract Documents, extra work or extra compensation of any other nature, shall be waived unless notice thereof is given to the Owner, in writing, within ten (10) days after the initial occurrence of the first event, which is relied upon to justify the claim or within such time as the event should have reasonably been discovered by the Contractor and in any event, before extra cost is incurred.

13.3.2.2 Any claim for a delay for which the Owner is liable will not be allowed where there is a concurrent delay that is the responsibility of the Contractor.

13.3.2.3 No claim for damages of any character due to delays caused by adverse weather, acts of God, strikes, fire or unavoidable casualties will be allowed. The Contractor shall bear the expenses related to additional time granted for "force majeure" events.

13.3.2.4 The written notice of potential claim shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. The said notice as above required must have been given to the Designated Representative prior to the time that the Contractor shall have performed the work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Designated Representative, or in all other cases within ten (10) days after the happening of the event, thing or occurrence giving rise to the potential claim. It is the intention of this paragraph that differences between the parties arising under and by virtue of the contract be brought to the attention of the Designated Representative at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken. The Contractor hereby agrees that he shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was filed.

13.4 MINOR CHANGES IN THE WORK

13.4.1 The Architect/Engineer will have the authority to order, through the Designated Representative, minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order and such changes shall be binding on the Owner, the Designated Representative and the Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 14: UNCOVERING AND CORRECTION OF WORK

14.1 UNCOVERING OF WORK

14.1.1 If any portion of the Work should be covered contrary to the request of the Owner through the Designated Representative or Architect/Engineer, or to requirements specifically expressed in the Contract Documents, it shall, if required in writing by the Designated Representative, be uncovered for their observation and replaced, at the Contractor's expense.

14.1.2 If any other portion of the Work has been covered which neither the Designated Representative nor the Architect/Engineer has specifically requested to observe prior to being covered, the Architect/Engineer or Designated Representative, with written approval of the Owner, may request to see such work and it shall be uncovered by the Contractor. If such work is found in accordance with the Contract, the cost of uncovering and replacement shall, by an appropriate Change Order, be charged to the Owner, as the case may be. If such Work is found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it is found that this condition was caused by a separate contractor employed as provided in Article 7 and in that event, the separate contractor shall be responsible for payment of such costs.

14.2 CORRECTION OF WORK

14.2.1 The Contractor shall promptly correct all Work rejected by the Architect/Engineer or the Designated Representative as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Architect/Engineer's and Designated Representative's additional services made necessary thereby.

14.2.2 Notwithstanding acceptance of the Work by the Owner,if any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Designated Representative to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. This obligation shall survive the termination of the Contract. The Designated Representative shall give such notice promptly after discovery of the condition.

14.2.2.1 If, within one (1) year after the Date of Substantial Completion of the Work or the designated portion thereof, or within one (1) year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner or Designated Representative to do so unless the Owner or the Designated Representative has previously given the Contractor written acceptance of such condition. This obligation shall survive the termination of the Contract. The Owner or Designated Representative shall give such notice promptly after discovery of the condition.

14.2.3 The Contractor shall remove from the site all portions of the Work which are defective or nonconforming and which have not been corrected under Subparagraph 5.5.1, 14.2.1 and 14.2.2 unless removal has been waived by the Owner.

14.2.4 If the Contractor fails to correct the defective or nonconforming Work as provided in Subparagraph 5.5.1, 14.2.1 and 14.2.2, the Owner may correct it in accordance with Subparagraph 4.3.2.

14.2.5 If the Contractor does not proceed with the correction of such defective or nonconforming Work within a reasonable time fixed by written notice from the Designated Representative, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, the Owner may, upon ten (10) additional days written notice, sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all costs that should have been borne by the Contractor, including compensation for the Designated Representative's additional services made necessary thereby. If such proceeds of sale do not cover all costs, which the Contractor should have borne, the difference shall be charged to the Contractor and the appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

14.2.6 The Contractor shall bear the cost of making good all Work of the Owner or other contractors destroyed or damaged by such removal or correction.

14.2.7 Nothing contained in this Paragraph 14.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 5.5 hereof. The establishment of the time period of one (1) year after the Date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligations other than specifically to correct the Work.

14.3 ACCEPTANCE OF DEFECTIVE OR NONCONFORMING WORK

14.3.1 If the Owner prefers to accept defective or nonconforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be affected whether or not Final Payment has been made.

ARTICLE 15: TERMINATION OF THE CONTRACT

15.1 TERMINATION BY THE Contractor

15.1.1 If the Work is stopped under an order of any court or other public authority having jurisdiction for a period of three (3) months, through no fault of the Contractor or a Subcontractor or their agents or employees or any other person performing any of the Work under a contract with the Contractor, he may, upon thirty (30) additional days written notice by the Contractor, stop Work or terminate the Contract and recover from the Owner payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery.

15.2 TERMINATION BY THE OWNER

15.2.1 If the Contractor is adjudged bankrupt or if he makes a general assignment for the benefit of its creditors or if a receiver is appointed on account of its insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he fails to make prompt payment to Subcontractors after payment is rendered or for materials or labor, or persistently disregards laws, ordinances, rules regulations, orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the Owner may, without prejudice to any right or remedy and after giving the Contractor and its surety, fourteen (14) calendar days written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished.

15.2.1.1 If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including compensation for the Designated Representative's additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner.

15.2.1.2 The expenses incurred by the Owner or Designated Representative and the damage incurred through the Contractor's default shall be certified by the Architect/Engineer.

15.2.2 The Owner may terminate the contract at its own discretion or when conditions encountered during the work make it impossible or impracticable to proceed, or when the Owner is prevented from proceeding with the contract by act of God, by law, or by official action of a public authority.

15.2.3 After receipt of a Notice of Termination, the Contractor shall submit to the Owner through the Designated Representative its written termination claim in the form and with the certification which the Owner or Designated Representative may require. Such claims shall be submitted promptly, but in no event more than thirty (30) days after the effective date of termination.

ARTICLE 16: PROJECT REQUIREMENTS

16.1 PROJECT REPORTS

16.1.1 Contractor Reports: Immediately after the contract is awarded, a meeting will be scheduled at the project site to review project procedures, designation of name and title of the authorized person or persons, representing the Contractor and responsible for the project management and field operation, designation of Emergency Contact, designation of representative for progress meetings, the requirements for daily, weekly and monthly reports and other submittals required to perform and administer the project. Without limiting the reports required, several reports are indicated below with their requirements:

16.1.2 Daily Force and Activity Reports: The Contractor shall prepare and submit to the Designated Representative, including similar data for each of its Subcontractors, a Daily Force and Activity Report. This report shall be on a form approved by the Designated Representative and shall indicate all Supervisors, Journeymen, Laborers or Helpers and, by crew, the activities, related to the Contractor's schedule, that are being performed. The Daily Force and Activity Report shall include information on material deliveries, tests, weather conditions and other significant events. Each Daily Force and Activity Report shall be delivered to the Designated Representative at the job site by 9:00 a.m. on the next succeeding business day.

16.1.3 Daily Change Documentation: The Contractor shall submit to the Designated Representative for review and verification, separate daily documentation of any "Change in the Work" being performed on any basis, other than agreed upon lump sum, as described in Article 13 of the General Conditions. This report shall be on a form approved by the Designated Representative. The Contractor shall certify the accuracy of this report.

16.1.4 Safety Reports: The Contractor shall submit to the Designated Representative copies of all accident reports and weekly minutes/reports of Safety Program "Tool Box" meeting and other safety information.

16.1.5 Material Status Reports: The Contractor shall prepare a Materials Status Report not later than fifteen (15) calendar days after the Notice to Proceed. The report shall include a complete list of suppliers, items to be purchased from them, the fabricator and manufacturer, the time required and the promised delivery dates for each item. This report shall be updated and submitted with the payment requisition monthly as an integral part thereof and more frequently as requested by the Designated Representative.

16.1.6 Purchase Orders: A copy of each purchase order as issued by the Contractor shall be furnished to the Designated Representative, except that prices may be omitted.

16.1.7 Job Cost Breakdown: The Contractor shall submit job cost breakdown reports for record and tax purposes to the Designated Representative. The first report shall be submitted within thirty (30) calendar days after date of each Notice to Proceed on any portion of the Work and shall be consistent in format with the schedule of values. Another report shall be submitted at the completion of the job and shall include all additions and deletions. Interim reports on various elements of the Work shall be submitted as required by the Owner for investment, tax credit, pollution control, financing and other purposes.

16.1.8 Monthly Progress Payment Applications: The Contractor shall submit Monthly Progress Payment Applications in the form and at the time as approved by the Designated Representative.

16.1.9 Monthly Reports: The Contractor shall submit to the Designated Representative copies of all monthly reports, such as MBE Participation, etc., required by governing bodies.

16.1.10 Monthly Certification: The Contractor shall submit to the Designated Representative periodic evidence and a monthly certification that "Record Documents", Test Reports and other Project Record Documents are being maintained for ultimate submittal to the Designated Representative and Owner at the completion of the Work.

16.1.11 Weekly Request for Information Status: The Contractor shall submit, each week on a day agreed to between the Contractor and the Designated Representative, a Request for Information Status Report indicating the Contractor's perception of the status of all submitted Requests for Information. The Request for Information Status Report will include a brief description of the request, date the request was submitted to the Designated Representative, date a response is needed from the Architect/Engineer, date a response is actually made by the Architect/Engineer, and any pertinent remarks. The Request for Information Status Report shall be in a format approved by the Designated Representative.

16.2 DRAWINGS, PRODUCT DATA AND SAMPLES

16.2.1 Shop Drawings: Shop drawings are drawings, diagrams, schedules and other data especially prepared for the Work by the Contractor, Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work. Shop drawings shall be signed by a registered professional engineer where required by law.

16.2.2 Product Data: Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product, equipment or system for some portion of the Work.

16.2.3 Samples: Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

16.2.4 Submittals: Submittals forwarded by the Contractor to the Designated Representative shall be in conformance with the requirements of the Contract Documents. The Contractor shall notify the Architect/Engineer and Designated Representative in writing of any deviations in the submittals from the requirements of the Contract Documents at the time of submission. Before submission of each Shop Drawing, Product Data or Sample, the Contractor shall have determined and verified all quantities, dimensions, specified design and performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and review or coordinated each Shop Drawing, Product Data or Sample with other Shop Drawings, Product Data and Samples and with the requirements of the Work and the Contract Documents. The term "submittal" as used herein includes Shop Drawings, Product Data and/or Samples as required by the Contract Documents. All submittals shall be submitted thirty (30) days prior to commencement of work affected.

16.2.5 Notice of Variation: At the time of each submission, the Contractor shall give the Architect/Engineer specific written notice of each Contractor perceived variation that the submittal may have from the requirements of the Contract Documents and, in addition, the Contractor shall cause a specific notation to be made on each Shop Drawing, Product Data and/or Sample submitted to the Architect/Engineer for review and "approval" demonstrating each such perceived variation.

16.2.6 Architect/Engineer Submittal Review: The Architect/Engineer will review and "approve" with reasonable promptness the required submittals. The Architect/Engineer's review and approval of the Contractor's submittal does not constitute a complete check, but indicates only that design, general method of construction and detailing is satisfactory. The Architect/Engineer's review and approval does not permit any deviation from the Contract Requirements and does not relieve the Contractor of the responsibility for errors in dimensions, details, sizes of member, etc., or the coordinating of installation and construction with actual conditions of the Work. The Architect/Engineer's review and "approval" will be only for conformance with the design concept of the Project and

for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, the methods, technique sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or safety programs incident thereto. The individual review and "approval" of a component item as such will not indicate "approval" of the integrated final assembly into which the item is placed and in which the item must function. The Contractor shall make any corrections required by the Architect/Engineer, without any additional cost to the Owner. The Contractor shall return the required number of corrected copies of submittals to the Architect/Engineer who will promptly, as required, review the re-submittals for conformance with the design concept.

16.2.7 Resubmission Notice: The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to all revisions other than those requested by the Architect/Engineer or Designated Representative on previous submittals.

16.2.8 Contractor Responsibility: Review and "approval" of submittals by the Architect/Engineer shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Documents unless the Contractor has in writing called the Architect/Engineer's attention to each such variation at the time of submission as required and the Architect/Engineer has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the submittal "approval"; nor will any "approval" by the Architect/Engineer relieve the Contractor from the responsibility for the Contractor's own errors or omissions in the submittal or from the Contractor's responsibility for compliance with all Contract Document provisions.

16.2.9 No Work Prior to Submittal Approval: The Contractor shall resubmit submittals as required until the Architect/Engineer's approval is obtained. No work requiring submittals shall be executed until the Architect/Engineer's approval is given. Where a submittal is required by the Specifications, any related work performed prior to the Architect/Engineer's review and "approval" of the pertinent submission will be at the sole risk, expense and responsibility of the Contractor.

16.2.10 Transmittal Requirements: After checking and verifying all field measurements and complying with applicable procedures specified in the Contract Documents, the Contractor shall transmit all submittals to the Architect/Engineer with one (1) copy to the Designated Representative and shall include:

(a.) Date and revision dates.
(b.) Project title and number.
(c.) The names of:
  (1.) Architect/Engineer
  (2.) Designated Representative
  (3.) Contractor
  (4.) Contract Number
  (5.) Subcontractor or Supplier
  (6.) Manufacturer
  (7.) Separate Detailer when pertinent

(d.) Number of Shop Drawings, Product Data and Sample submitted. (System to be established by Designated Representative.)
(e.) Identification of product or material.
(f.) Relation to adjacent structure or materials.
(g.) Field dimensions, clearly identified as such.
(h.) Specification section number and paragraph.
(i.) Applicable standards such as ASTM number or Federal Specification.
(j.) A blank space, minimum of 2 1/2 by 3 1/2 inches for the Architect/Engineer stamp.
(k.) Identification of deviations from Contract Documents.
(l.) Other pertinent data.

16.2.11 Approval Delays: The Contractor shall be responsible for any delays caused by the rejection of the submittal for inadequate or incorrect shop drawings, manufacturer's data or other information.

16.2.12 Working Drawings: The Contractor is responsible for seeing that only "Approved" copies of shop drawings bearing the stamp of the Architect/Engineer are allowed on the job.

16.2.13 Approved Equals: The Contractor's attention is directed to Article 5.4 LABOR AND MATERIALS. Where two or more products are specified for an item of Work, either one thereof is acceptable and the choice is left to the Contractor. Where only one product is specified and where the term "or approved equal" or similar wording is used in connection with specified products, the Contractor may, if he so desires, offer for consideration a substitute product which he judges to be equal in every respect to the required product. When a specific process is specified as well as a guarantee of the results, the Contractor shall, if in its judgement the process may not produce the required result, submit for approval, an alternative process which he would guarantee. All such submittals shall be made, within forty (40) calendar days after award of the Contract, in writing to the Designated Representative, who in turn will forward them to the Architect/Engineer. Review of any substitute product will (1) be contingent upon submission of substantiating serviceability to specified product; (2) use of the item will not entail changes in details and construction of related Work; (3) item conforms to required design and artistic effect. The Contractor shall furnish with the first submittal, a sufficient number of drawings, specifications, samples, performance data and other information necessary to assist the Architect/Engineer in determining whether the proposed substitution is

acceptable. The burden of proof shall be upon the Contractor. No consideration will be given to incomplete submittals. Substitutions shall be approved in writing before they may be used.

16.2.14 Conflicting Instructions: When product manufacturer's instructions are in conflict with the Contract Documents, the Contractor shall notify the Designated Representative for clarification before proceeding. The Contractor shall keep a copy of the various product manufacturer's instructions applicable to the Work at the project site.

16.2.15 Submittal Log: Each week on a day agreed to between the Contractor and the Designated Representative, the Contractor shall submit an updated submittal log to the Designated Representative indicating the Contractor's perception of the status of all required submittals and reviews. Similar information to that outlined below shall be provided for any required re-submittals. The submittal log will include such information as:

(a.) The schedule date to receive information from a subcontractor or supplier.
(b.) The actual date information was received from a subcontractor or supplier.
(c.) The scheduled date to submit information to the Architect/Engineer.
(d.) The date information was submitted to Architect/Engineer.
(e.) Anticipated date of return of information from Architect/Engineer.
(f.) Actual date information was received from Architect/Engineer.
(g.) Status or actions required.

16.2.16 Sample Submission: The Contractor shall submit all required samples for review and "approval" by the Architect/Engineer, with such promptness as to cause no delay in the Work. All samples shall be checked by the Contractor and accompanied by a specific written indication that the Contractor has satisfied Contractor's responsibilities under the Contract Documents with respect to the Contractor's review of the submission. The samples shall be identified clearly as to equipment, material, supplies and include pertinent data such as demonstrating compliance with a certain Specification Section, catalog number, etc., and the use for which the material is intended. An approved sample of each material shall be provided to the Designated Representative prior to delivery of any materials for which submission of samples is required.

16.2.17 Sample Review: The Contractor shall submit four (4) samples of materials to the Architect/Engineer for approval as indicated in the Specifications. All samples shall be properly labeled to indicate type of material submitted, intended use, manufacturer's name, trade name, project name, Designated Representative's name, Contractor's, Subcontractor's and Supplier's names; and shall be transmitted as required by paragraph 16.2.10. Samples will be inspected and tested as required and if acceptable an approved notice will be sent to the Contractor along with one (1) approved sample. Rejected samples will be returned along with a statement of reasons for rejection. Accepted samples will be retained by the Architect/Engineer, one of which will be provided to the Designated Representative and shall become the property of the Owner.

16.2.18 Submittals Affecting the Contract Sum: The Architect/Engineers approval of submittals which deviate from the Contract Documents does not authorize changes to the Contract Sum. The Contractor shall notify the Architect/Engineer and the Designated Representative in writing at the time of transmittal of any changes to the Contract Sum affected by such approval of a submittal; otherwise, claim for extras will not be considered.

16.2.19 Ductwork Layout Drawings: As soon as practical and in no case starting later than thirty (30) days after the award of contract, the Mechanical Subcontractor shall prepare layout drawings of all duct work and piping at not less than 3/8" scale. The ductwork layout drawings shall show registers, grilles, diffusers and similar features as well as locations of all valves, dampers and other items requiring access for service and maintenance. The ductwork layout drawings shall also show beams, ceiling heights, walls, floor to floor dimensions, columns, doors and other major architectural and structural features as shown on the architectural and structural drawings.

16.2.20 Coordination with Subcontractors: The Contractor shall, within sixty (60) days after award, send a reproducible and two (2) prints of the ductwork layout drawings to the plumbing, materials handling, fire protection and electrical subcontractors who shall then make on the reproducible their own routings as well as other major items such as valves, access panels, switch panels, etc., as required to determine interrelationship and possible interferences with the mechanical ductwork and architectural or structural features. The marked-up reproducible shall then be returned to the Mechanical Subcontractor through the Contractor with copies to the Designated Representative no less than thirty (30) days after receipt by the other Subcontractors.

16.2.21 Composite Drawings: The Mechanical Subcontractor shall prepare preliminary composite drawings of such layout drawings, incorporating all the information and routings provided by the other Subcontractors. (At its option, a group of transparent overlays may be substituted, provided that they clearly show the relationship of all proposed installations.) The preliminary composite drawings, or the overlays, shall be reviewed during a series of meetings, called by the Contractor and attended by the Architect/Engineer and the Designated Representative, at which all Subcontractors and trades shall be represented, in order to review and resolve any real or apparent interferences or conflicts.

16.2.22 Agreement by Subcontractors: After all conflicts or interferences are resolved the Mechanical Subcontractor shall develop a final set of composite drawings showing the agreed upon routing, layout and juxtaposition of all ductwork, conveyers, piping, major conduit, valves, panels, lighting fixtures and all other major mechanical and electrical installations. In areas where no mechanical ductwork occurs, but where other mechanical and electrical installations are installed, each Subcontractor shall be responsible for its own Work and shall cooperate in preparing similar composite drawings, shall perform its own drafting Work and pay its own costs in connection therewith. In

preparation of all the final composite drawings, large scale details as well as cross and longitudinal sections shall be as required to fully delineate all conditions. Particular attention shall be given to the locations, size and clearance dimensions of equipment items, shafts and similar features. These final composite drawings shall then be signed-off by each of the Subcontractors, including the Mechanical Subcontractor, and the Contractor indicating their awareness of and agreement with the indicated routings and layouts and their interrelationship with the adjoining or contiguous Work. Thereafter, no unauthorized deviations will be permitted and if made without knowledge or agreement of the Architect/Engineer and Designated Representative, this unauthorized Work will be subject to removal and correction at no additional cost to Owner.

16.2.23 Minor Changes: In preparing the composite drawings, minor changes in duct, pipe or conduit routings that do not affect the intended function may be made as required to avoid space conflicts, when mutually agreed, but items may not be resized or exposed items relocated without the Architect/Engineers and Designated Representative's written approval No changes shall be made in any wall or chase locations, ceiling heights, door swings or locations, window or other openings or other features affecting the function or aesthetic effect of the building. If conflicts or interferences cannot be satisfactorily resolved, the Architect/Engineer and the Designated Representative shall be notified and their decision obtained.

16.2.24 Distribution of Composite Drawings: After the final composite drawings have been agreed upon and signed by all Subcontractors, the Contractor shall provide and distribute four (4) prints to each of the Subcontractors, to the Architect/Engineer and to the Designated Representative for reference and record purposes. The Contractor shall make similar distribution of all supplementary composite drawings, initiated by other Subcontractors as indicated herein before. All Subcontractors desiring additional prints of such drawings, beyond the basic distribution indicated above, shall arrange for and pay the cost of the same.

16.2.25 Record Composite Drawings: The record copies of the final composite drawings shall be retained by the Designated Representative and each Contractor as a working reference. All shop drawings, prior to their submittal to the Architect/Engineer, shall be compared with the composite drawings and developed accordingly by the Contractor and the responsible Subcontractor. Any revision to the composite drawings which may become necessary during the progress of the Work shall be noted by the Contractor and all Subcontractors and shall be neatly and accurately recorded on the record copies. The Contractor and each Subcontractor shall be responsible for the up-to-date maintenance of its record copies of the composite drawings and to keep two (2) copies available at the site. The composite drawings and any subsequent changes thereto, shall be utilized by the Contractor and each Subcontractor in the development of its "Record Document" drawings.

16.2.26 Timely Submissions: The composite drawings need not be submitted as a whole, but they shall be submitted in all cases in ample time to avoid construction delay. The coordination drawings may lack complete data in certain instances pending receipt of shop drawings, but sufficient space shall be allotted for the items affected. When final information is received, such data shall be promptly inserted on the composite drawings.

16.2.27 Improperly Coordinated Work: No extra compensation will be paid for relocating any duct, pipe, conduit, or other material that has been installed without proper coordination between the Contractor and all Subcontractors involved. If any improperly coordinated Work or Work installed that is not in accordance with the approved composite drawings, necessitates additional Work by the Contractor or other Subcontractors, the costs of all such additional Work shall be borne solely by the Contractor or the Subcontractor responsible for the nonconforming Work.

16.2.28 Incorporation of Changes: All changes in the scope of Work due to revisions formally issued and approved shall be shown on the composite drawings.

16.2.29 Quality Draftsmanship: All Work on shop drawings, ductwork layout drawings, coordination drawings, and composite drawings shall be performed by competent draftsmen and shall be clear and fully legible. The Architect/Engineer shall be the sole judge of the acceptability of the drawings.

16.2.30 Structural Cutting: The Contractor shall obtain specific positive written instructions from the Architect/Engineer through the Designated Representative before cutting beams or other structural members, arches or lintels, and the Contractor shall be guided by such instructions.

16.3 TEMPORARY SERVICES, SYSTEMS AND FACILITIES

16.3.1 Temporary Lighting, Power and Water: At its own expense, the Contractor shall furnish, install, maintain, and remove all temporary lighting, electric power, and potable water, including piping, wiring, lamps, and other equipment necessary for the execution and security of the Work; and shall be responsible for the cost of power and water usage. The Contractor shall not draw water from any fire hydrant, except to extinguish a fire, without first obtaining permission from the water agency concerned. The Contractor shall provide for distribution of drinking water to all work forces under this Contract.

16.3.2 Sanitation: The Contractor shall provide and maintain portable enclosed toilets for the use of all work forces under this Contract. These accommodations shall be maintained in a neat and sanitary condition. They shall also comply with all applicable laws, ordinances and regulations pertaining to the public health and sanitation of dwellings and camps. The Contractor shall not interrupt the flow of existing sanitary sewers. Should the Work involve the disruption of existing sewer facilities, the Contractor shall convey the sewage in closed containers and shall dispose of it in a sanitary sewer system as approved by local health authorities and the Designated Representative. Sewage shall not be permitted to flow in trenches or be covered by backfill.

16.3.3 Vermin Control: The Contractor shall maintain the job site free of rodents, insects, vermin and pests throughout all phases of construction, including suspensions of work, and until final acceptance of the Work. Necessary extermination work shall be arranged and paid for by the Contractor as part of the contract work and contract time and shall be performed by a licensed agency in accordance with requirements of governing authorities. The Contractor shall be liable for injury to persons or property and responsible for the elimination of offensive odors resulting from extermination operations.

16.3.4 Water Pollution Control: The Contractor shall exercise every reasonable precaution to protect channels, storm drains, and bodies of water from pollution and shall conduct and schedule its operations so as to minimize or avoid muddying and silting of said channels, drains, and waters. Water pollution control work shall consist of constructing those facilities which may be required to provide prevention, control, and abatement of water pollution.

16.3.5 Air Pollution Control: The Contractor shall not discharge smoke, dust, or any other air contaminants into the atmosphere in such quantity as will violate the regulations of any legally constituted authority.

16.3.6 Project Site Maintenance: Throughout all phases of construction, including suspensions of work, and until final acceptance of the Work, the Contractor shall keep the job site, including the interior of all structures, clean and free from rubbish and debris. The Contractor shall provide and maintain rubbish containers and periodic rubbish removal services as required by the pace of the Work and health regulations, and as acceptable to the Designated Representative.

16.3.6.1 The Contractor shall abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. The use of water resulting in mud on public streets will not be permitted as a substitute for sweeping or other methods.

16.3.6.2 Materials and equipment shall be removed from the site as soon as they are no longer necessary; and upon completion of the Work and before final inspection the entire work site shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. All cleanup costs shall be absorbed in the Contractor's bid.

16.3.6.3 The Contractor shall take care to avoid spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned by the Contractor.

16.3.6.4 Burning or burying of rubbish and waste materials on the project site is prohibited. Disposal of volatile fluid wastes in storm and sanitary sewer systems is prohibited.

16.3.6.5 Waste materials shall not be dropped or thrown from heights. Cleaning operations shall be scheduled so that dust and other contaminants resulting from the cleaning process will not fall on wet or newly painted surfaces. Dusty debris shall be sprinkled lightly with water as required to control dust.

16.3.6.6 The Contractor shall vacuum clean the interior of buildings prior to the start of finish painting. The Contractor shall continue vacuum cleaning thereafter on an as needed basis until the building is ready for acceptance.

16.3.6.7 Failure of the Contractor to comply with the Designated Representative's cleanup orders may result in an order to suspend the Work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

16.3.7 Final Cleaning: At the completion of the Work, the Contractor at its sole expense shall remove all waste materials and rubbish from and about the project, as well as all tools, construction equipment, temporary facilities, machinery, and surplus materials.

16.3.7.1 At completion of construction and just prior to final inspection, the Contractor shall thoroughly clean the interior and exterior of the buildings, including hardware, floors, roofs, sills, ledges, glass, or other surfaces where debris, plaster, paint, spots, and dirt or dust may have collected. All glass shall be washed clean and polished. All grease, stains, labels, fingerprints, and other foreign materials shall be removed from interior and exterior surfaces. The Contractor shall repair, patch, and touch up marred surfaces to match adjacent finishes.

16.3.7.2 The Contractor shall use only experienced workmen or professional cleaners for final cleaning. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned, and use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

16.3.7.3 The Contractor shall broom clean all paved surfaces and rake clean other surfaces of grounds.

16.3.7.4 The Contractor shall replace air conditioning filters, if units were operated during construction. The Contractor shall clean all ducts, blowers, and coils if air conditioning units were operated at any time without filters during construction.

16.3.7.5 The Contractor shall maintain the building in a clean condition until it is accepted by the Owner.

16.3.8 Fire Protection: The Contractor at its sole expense shall provide temporary fire safety equipment for general use. The Contractor shall provide fire extinguishers for its trailers, for use as required when cutting and burning is

performed, and as required throughout the job site as instructed by the local fire marshal.

16.3.9 Communication Systems: The Contractor shall provide telephone services at its own expense. The Contractor at its sole expense shall maintain in service a facsimile telecopy machine whenever telephone service is available at the job site. The use of portable radios shall be in accordance with Federal Regulations and shall not interfere with other local radio operations.

16.3.10 Office Facilities: The Contractor at its sole expense shall provide, maintain and remove temporary field office facilities, including all furniture, equipment, copiers, heating, cooling, lighting, power, telephones, drinking water, plumbing and toilet fixtures as necessary for its performance of the Work; and shall make these spaces, telephones, and services available for the use of the Owner, the Designated Representative and the Architect/Engineer. A designated work area shall be provided for the use of the Owner, the Designated Representative and the Architect/Engineer.

16.3.11 Weather Protection: The Contractor at its sole expense shall be responsible for providing protection for its own Work against inclement weather, in order to maintain all Work, materials, apparatus, and equipment. All Work subject to damage by adverse weather conditions shall be covered or otherwise protected as required. Weather protection shall be adequate to permit the Contractor to Work on a continuous basis without shutdown due to temperature or weather conditions as far as possible.

16.3.12 Dewatering: The Contractor at its sole expense shall provide all temporary drainage and dewatering measures including all pumping, drainage, erosion control or other work required to protect the Work while in progress.

16.3.12.1 Inundation of partially completed work due to lack of control during non-working periods will not be permitted, and may be cause for requiring removal of work already completed with replacement at the Contractor's expense.

16.3.12.2 The Contractor shall be responsible for obtaining the use of any property, in addition to that provided for in the plans and specifications, which may be required for the diversion and protective works so as not to create a hazard to persons or property or to interfere with the water rights of others.

16.3.12.3 It shall be understood and agreed that the Contractor shall hold the Owner and the Designated Representative harmless from legal action taken by any third party with respect to construction and operation of the diversion and protective works.

16.3.12.4 All works installed by the Contractor in connection with dewatering, control, and diversion of water but not specified to become a permanent part of the project, shall be removed and the site restored, insofar as practical, to its original condition prior to completion of construction or when directed by the Designated Representative.

16.3.13 Material Handling: The Contractor at its sole expense shall be responsible for handling and transporting, including lifting, its material and equipment to the location of need in a timely manner.

16.3.14 Cranes, Hoists and Scaffolds: The Contractor at its sole expense shall furnish, erect, maintain and remove all cranes, temporary hoists and scaffolding as may be required by the Contractor for the performance of the Work.

16.3.15 Storage: The Contractor at its sole expense shall provide and remove whatever temporary storage facilities, sheds, buildings, enclosures, partitions, etc., he deems necessary for the protection of its materials, tools and equipment after receiving approval from the Designated Representative on specific details of the method proposed. Any damage caused to Work in place by these temporary measures will be repaired / replaced at the Contractor's expense.

16.3.16 Security Fences: The Contractor at its sole expense shall provide temporary site enclosures (fences), barriers, and pedestrian walkways as indicated by the Contract Documents or as required to control access to the job site.

16.3.17 Security Services: The Contractor at its sole expense shall be responsible for job site security during various phases of the Work, including non-working hours and at other times, and as may be required for the protection of the Owner and the Designated Representative's interests. All costs for same will be paid by the Contractor.

16.3.18 Openings, Sleeves and Supports: The Contractor at its sole expense shall provide all necessary openings, channels, chases, flues, sleeves, inserts, hangers, etc, if any, and such cutting, patching, finishing, etc., if any, required by the Contract Documents to complete the Work.

16.3.19 Protection and Restoration of Existing Improvements: The Contractor at its sole expense shall be responsible for the protection of public and private property adjacent to the Work and shall exercise due caution to avoid damage to such property. All costs to the Contractor for protecting, removing, and restoring existing improvements shall be paid by the Contractor.

16.3.19.1 The Contractor at its sole expense shall repair or replace all existing improvements which are damaged or removed as a result of its operations and which are not designated for removal (e.g. curbs, sidewalks, driveways, fences, walls, ceilings, floor coverings, signs, utility installations, pavements, structures, trees, shrubbery, grass etc.).

16.3.19.2 Repairs and replacements shall be at least equal to existing improvements and shall match them in finish and dimensions in such a manner that the repaired work will not be readily noticeable.

16.3.20 Excavation Protection: The Contractor at its sole expense shall provide and maintain fencing, shoring and bracing and dewatering of all excavation.

16.3.21 Temporary Safety Measures: The Contractor at its sole expense shall provide, maintain and remove when no longer required all temporary safety measures, including all construction supplies, barricades, pedestrian walkways and equipment as may be required by the Contract Documents for its Work.

16.3.22 Advertising: The names of the Contractor, Subcontractors, the Architect/Engineer, including their consultants, with their addresses and the designation of their particular specialties, may be displayed on removable signs. The size, format and location of such signs shall be subject to the Designated Representative's approval. Commercial advertising matter shall not be attached or painted on the surfaces of buildings, fences, canopies, or barricades. All signs shall be removed when directed by the Designated Representative but not later than final acceptance of the Work.

16.4 SAFETY

16.4.1 Contractor shall comply with Section 01 35 29, Health, and Safety Requirements.
16.4.2 Contractor shall comply with Section 01 35 60, Site Security Procedures.

16.4.3 Post hazard warning signage compliant with requirements of 29 CFR 1926.200, “Accident Prevention Signs and Tags”, and recommendations of ANSI Z535.5 at perimeter of construction zone. Promptly remove signage after the COUNTY OF SANTA BARBARA’s Designated Representative verifies that Work hazards no longer exist.

16.4.4 Contractor shall restrict access temporarily (if possible) or erect temporary covered passageways as required to ensure safe passage of persons on public rights of way during the conduct of the operations.

16.4.5 Contractor shall protect adjacent properties from dust and damage caused by the Work.

16.4.6 OSHA and California Codes and Regulations: The Contractor at its sole expense shall provide, erect, maintain, dismantle and remove any and all barricades, railings, covers, warning lights, safety netting, and similar safety devices required to complete its Work and protect the public in accordance with OSHA, California Administrative Code, Title 8 Industrial Relations, Chapter 4 Division of Industrial Safety, Section 4 Construction and Safety Orders, Article 8 Explosives, and all other applicable code requirements.

16.4.7 Traffic Control: The Contractor shall conduct its Work so as to interfere as little as possible with pedestrian and vehicular traffic and he shall, at its sole expense, provide and maintain proper warnings and detour signs at all pedestrian and vehicular closures, intersections and along detours, directing traffic around closed portions of roadways. He shall, at its own expense, wherever necessary or required, provide and maintain fences, temporary roadways, temporary crossing signs, watchmen, warning lights and take such other precautions as may be necessary to protect life and property and shall be responsible for all damages occasioned in any way by its act or neglect. All barricades and obstructions shall be illuminated at night and all lights shall be kept on from one-half hour before sunset until one-half hour after sunrise.

16.4.8 Fall Protection: When performing any cutting, removal, creating openings or holes, etc., the Contractor at its sole expense, by use of barricades, flagmen or other means, shall provide protective measures to assure that other workmen or the public are not exposed to potential injury by the operation being conducted.

16.4.9 Welding Protection: The Contractor at its sole expense shall provide, maintain and remove all shielding or similar precautions required to be taken adjacent to welding operations.

16.4.10 Personal Equipment: The Contractor at its sole expense shall provide and supervise the use of all proper safety and protective devices by its employees during any potentially dangerous phases of its Work.

16.4.11 Safety Orders: The Contractor shall have at the work site, copies or suitable extracts of: Construction Safety Orders, Electrical Safety Orders, and General Industrial Safety Orders issued by the State Division of Industrial Safety. The Contractor shall comply and shall require the compliance by all Subcontractors with provisions of these Safety Orders and all other applicable laws, ordinances, and regulations.

16.4.12 Trench Excavations: As required by Section 6705 of the California Labor Code and in addition thereto, whenever work under the Contract involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall submit for acceptance by the Owner, a detailed plan showing protection of the worker from the hazard of caving ground.

16.4.13 Use of Explosives: Explosives may be used only when authorized in writing by the Owner, or as otherwise stated in the Contract Documents. Explosives shall be handled, used, and stored in accordance with all applicable regulations. The Owner's approval of the use of explosives shall not relieve the Contractor from its liability for claims caused by its blasting operations.

16.4.14 Hazardous Materials: The Contractor shall immediately stop work if unforeseen suspected hazardous material conditions are encountered. The Contractor shall immediately report the unforeseen conditions in the written form of

a request for information submitted to the Designated Representative. Work shall be resumed after the Owner has fully resolved the questions related to the unforeseen conditions and has remediated any hazardous materials determined to be present.

END OF GENERAL CONDITIONS

EXHIBIT C

Indemnification and Insurance Requirements
(For Construction Contracts)

INDEMNIFICATION

CONTRACTOR agrees to indemnify, defend (with counsel reasonably approved by COUNTY) and hold harmless COUNTY and its officers, officials, employees, agents and volunteers from and against any and all claims, actions, losses, damages, judgments and/or liabilities arising out of this Agreement from any cause whatsoever, including the acts, errors or omissions of any person or entity and for any costs or expenses (including but not limited to attorneys' fees) incurred by COUNTY on account of any claim except where such indemnification is caused by the active negligence, sole negligence, or willful misconduct of the COUNTY.

NOTIFICATION OF ACCIDENTS AND SURVIVAL OF INDEMNIFICATION PROVISIONS

CONTRACTOR shall notify COUNTY immediately in the event of any accident or injury arising out of or in connection with this Agreement. The indemnification provisions in this Agreement shall survive any expiration or termination of this Agreement.

INSURANCE

CONTRACTOR shall procure and maintain for the duration of this Agreement insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the CONTRACTOR, its agents, representatives, employees or subcontractors.

A. Minimum Scope and Limit of Insurance
Coverage shall be at least as broad as:

1. **Commercial General Liability (CGL):** Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis, including products-completed operations, personal & advertising injury, with limits no less than $5,000,000 per occurrence and $10,000,000 in the aggregate.
2. **Automobile Liability**: Insurance Services Office Form CA 0001 covering Code 1 (any auto), with limits no less than $2,000,000 per accident for bodily injury and property damage.
3. **Workers' Compensation**: Insurance as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease.
4. **Contractor's Pollution Legal Liability and/or Asbestos Legal Liability:** (if project involves environmental hazards) with limits no less than $1,000,000 per occurrence or claim, and $2,000,000 policy aggregate.

If the CONTRACTOR maintains broader and/or higher limits than the minimums shown above, the COUNTY requires and shall be entitled to the broader coverage and/or higher limits maintained by the CONTRACTOR. Any available insurance proceeds in excess of

the specified minimum limits of insurance and coverage shall be available to the COUNTY.

B. Other Insurance Provisions
The insurance policies are to contain, or be endorsed to contain, the following provisions:

1. **Additional Insured** – COUNTY, its officers, officials, employees, agents and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the CONTRACTOR including materials, parts, or equipment furnished in connection with such work or operations. General liability coverage can be provided in the form of an endorsement to the CONTRACTOR'S insurance at least as broad as ISO Form CG 20 10 11 85 or **both** CG 20 10, CG 20 26, CG 20 33, or CG 20 38; **and** CG 20 37 forms if later revisions used).
2. **Primary Coverage** – For any claims related to this Agreement, the CONTRACTOR'S insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the COUNTY, its officers, officials, employees, agents and volunteers. Any insurance or self-insurance maintained by the COUNTY, its officers, officials, employees, agents or volunteers shall be excess of the CONTRACTOR'S insurance and shall not contribute with it.
3. **Notice of Cancellation** – Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the COUNTY.
4. **Waiver of Subrogation Rights** – **CONTRACTOR hereby agrees to waive rights of subrogation which any insurer of CONTRACTOR may acquire** from CONTRACTOR by virtue of the payment of any loss. CONTRACTOR agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. **The Workers' Compensation policy shall be endorsed with a waiver of subrogation** in favor of the COUNTY for all work performed by the CONTRACTOR, its employees, agents and subcontractors. This provision applies regardless of whether or not the COUNTY has received a waiver of subrogation endorsement from the insurer.
5. **Deductibles and Self-Insured Retention** – Any deductibles or self-insured retentions must be declared to and approved by the COUNTY. At the option of the COUNTY, either: the CONTRACTOR shall cause the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the COUNTY, its officers, officials, employees, agents and volunteers; or the CONTRACTOR shall provide a financial guarantee satisfactory to the COUNTY guaranteeing payment of losses and related investigations, claim administration, and defense expenses.
6. **Acceptability of Insurers** – Unless otherwise approved by Risk Management, insurance shall be written by insurers authorized to do business in the State of California and with a minimum A.M. Best's Insurance Guide rating of "A- VII".
7. **Verification of Coverage** – CONTRACTOR shall furnish the COUNTY with proof of insurance, original certificates and amendatory endorsements as required by this Agreement. The proof of insurance, certificates and endorsements are to be received and approved by the COUNTY before work commences. However, failure to obtain the required documents prior to the work beginning shall not waive the CONTRACTOR'S obligation to provide them. The CONTRACTOR shall furnish evidence of renewal of coverage throughout the term of the Agreement. The

COUNTY reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

8. **Failure to Procure Coverage** – In the event that any policy of insurance required under this Agreement does not comply with the requirements, is not procured, or is canceled and not replaced, COUNTY has the right but not the obligation or duty to terminate the Agreement. Maintenance of required insurance coverage is a material element of the Agreement and failure to maintain or renew such coverage or to provide evidence of renewal may be treated by COUNTY as a material breach of contract.

9. **Subcontractors** – CONTRACTOR shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and CONTRACTOR shall ensure that COUNTY is an additional insured on insurance required from subcontractors. For CGL coverage subcontractors shall provide coverage with a format least as broad as CG 20 38 04 13.

10. **Claims Made Policies** – If any of the required policies provide coverage on a claims-made basis:

    i. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work.
    ii. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work.
    iii. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the CONTRACTOR must purchase “extended reporting” coverage for a minimum of five (5) years after completion of contract work.

11. **Special Risks or Circumstances** – COUNTY reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

Any change requiring additional types of insurance coverage or higher coverage limits must be made by amendment to this Agreement. CONTRACTOR agrees to execute any such amendment within thirty (30) days of receipt.

Any failure, actual or alleged, on the part of COUNTY to monitor or enforce compliance with any of the insurance and indemnification requirements will not be deemed as a waiver of any rights on the part of COUNTY.

CONSTRUCTION DRAWINGS
See Separate File

SPECIFICATIONS
See Separate File

ATTACHMENTS

ATTACHMENT 1

Earth Systems Pacific, Inc. Geotechnical Engineering Report Dated June 5, 2025

GEOTECHNICAL ENGINEERING REPORT
SANTA BARBARA COUNTY MAIN JAIL IRC EXPANSION PROJECT 20041
4436 CALLE REAL
SANTA BARBARA, CALIFORNIA

June 5, 2025

Prepared for

Tully Wyatt
County of Santa Barbara
Capital Projects Division
General Services Department

Prepared by

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Santa Maria, CA 93454

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June 5, 2025

FILE NO.: 306476-003

Mr. Tully Wyatt
County of Santa Barbara
Capital Projects Division
General Services Department
912 W. Foster Road
Santa Maria, CA 93455

PROJECT: SANTA BARBARA COUNTY MAIN JAIL IRC EXPANSION PROJECT 20041
4436 CALLE REAL
SANTA BARBARA, CALIFORNIA

SUBJECT: Geotechnical Engineering Report

REF: Proposal for a Geotechnical Engineering Report, Santa Barbara County Jail Accessibility Improvements, 4436 Calle Real, Santa Barbara, California, prepared by Earth Systems Pacific, dated May 5, 2025, Doc. No. SM-2505-007.PRP

Dear Mr. Wyatt:

This geotechnical engineering report has been prepared for use in the development of plans and specifications for the Santa Barbara County Mail Jail IRC Expansion project at 4436 Calle Real in Santa Barbara, California. Preliminary geotechnical engineering recommendations for site preparation, grading, foundations, utility trenches, slabs-on-grade and exterior pedestrian flatwork, vehicular pavement, drainage and maintenance, and observation and testing are presented to guide the development of project plans and specifications. One electronic copy has been provided to you.

We appreciate the opportunity to have provided services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

Earth Systems Pacific

Samuel Venable, PE
Staff Engineer

Josue Montes, PE, GE
Prinicipal Engineer

REGISTERED PROFESSIONAL ENGINEER
JOSUE A. MONTES, JR.
No. GE2904
Exp. 12-31-26
GEOTECHNICAL
STATE OF CALIFORNIA

Doc. No.: 2506-004.SER/ln

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1.0 INTRODUCTION AND SITE SETTING

The site is located at 4436 Calle Real in Santa Barbara, California, as shown in Figure 1 – Site Vicinity Map in Appendix A. Based upon our correspondence, we understand the South County Main Jail will be closed with the exception of the existing Intake and Reception Center (IRC). The project will consist of the renovation of the existing IRC and the construction of an addition to the IRC. The renovations and new construction will consist of adding a fire wall and fire doors, access compliance improvements (holding detox, observation, changing, visiting, booking, housing cells, showers, toilets, etc.), clinical interview space in pre-booking and booking area, clinician space, toilets for officers and pre-book detainees, and full height fall protection at tier levels. It is anticipated the proposed addition structure will utilize a metal frame over a slab-on-grade supported by conventional shallow foundations. Dead plus live loads are anticipated to be on the order of 2 kips per foot for maximum wall loads and about 100 kips for maximum columns loads. Cuts and fills of up to 1 to 2 feet are anticipated for site grading.

The approximate site coordinates of latitude 34.4448N and 119.7765W were obtained from the Google Earth website (Google Earth 2025). The addition will be located to the north of the existing IRC in the location of an existing canopy and modular building, which is currently in use as a pre-booking and clinical interview space. The area around the existing canopy and modular building is asphalt paved and relatively flat (Google Earth 2025).

2.0 SCOPE OF SERVICES

The scope of work for this geotechnical engineering report included a general site reconnaissance, field exploration, laboratory testing, geotechnical analysis of the data gathered, and preparation of this report. The geotechnical analysis and subsequent recommendations were based, in part, upon correspondence with the client.

This report and recommendations are intended to comply with the considerations of Sections 1803.1 through 1803.6, J104.3 and J104.4, as applicable, of the 2022 California Building Code (CBC) and common geotechnical engineering practice in this area under similar conditions at this time. The test procedures were accomplished in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

Preliminary geotechnical engineering recommendations for site preparation, grading,

foundations, utility trenches, slabs-on-grade and exterior pedestrian flatwork, vehicular pavement, drainage and maintenance, and observation and testing are presented to guide the development of project plans and specifications. As there may be geotechnical issues yet to be resolved, the geotechnical engineer should be retained to provide consultation as the design progresses, and to review project plans as they near completion to assist in verifying that pertinent geotechnical issues have been addressed and to aid in conformance with the intent of this report.

It is our intent that this report be used exclusively by the client to form the geotechnical basis of the design of the project and in the preparation of plans and specifications. Application beyond this intent is strictly at the user's risk.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, excavatability, dewatering, temporary slope angles, construction means and methods, etc. Analyses of site or areal geology, a geologic hazards study, and analyses of the soil for lead or mold potential, radioisotopes, asbestos (either man-made or naturally occurring), hydrocarbons, or other chemical properties are beyond the scope of this report. Evaluation of ancillary features such as fences, flag poles, signage, and nonstructural fills are all not within our scope and are also not addressed. Design and/or suitability of LID (Low Impact Development) features such as retention basins, bioswales, or other improvements, infiltration and percolation testing, retaining walls, determination of site suitability, and design of on-site effluent disposal systems are also beyond our scope.

In the event that there are any changes in the nature, design, or location of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report modified or verified by the geotechnical engineer in writing. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions have been observed by the geotechnical engineer in the field during construction, and the recommendations have been verified as appropriate, or modified by the geotechnical engineer in writing.

3.0 FIELD INVESTIGATION AND LABORATORY ANALYSIS

The subsurface investigation was conducted at the site on May 13, 2025, and consisted of two exploratory borings drilled to a maximum depth of 30.9 feet below the existing ground surface (bgs). The borings were drilled with a truck mounted GTech GT8 drill rig equipped with a 6-inch outside diameter hollow stem auger and an automatic hammer for sampling. As the borings were advanced, soil samples were obtained using a 3-inch outside diameter ring-lined barrel sampler (ASTM D 3550-17 with shoe similar to ASTM D 2937-17) and a standard penetrometer (ASTM D 1586-18). Bulk samples were also obtained from the auger cuttings. The approximate locations of the borings are shown on the Exploration Location Map presented in Appendix A.

Soils encountered in the borings were categorized and logged in general accordance with the Unified Soil Classification System and ASTM D 2488. Logs of the borings are presented in Appendix A, along with a Boring Log Legend. In reviewing the boring logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the characteristics observed during drilling. These include, but are not limited to, the presence of cobbles or boulders, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the reader must exercise judgment in interpreting soil characteristics, possibly resulting in soil descriptions that vary from the legend. The reader should also consider the sampler type used when reviewing the blow counts.

Selected samples from the borings were tested in the laboratory for in-situ moisture content and dry unit weight (ASTM D 2937-17, as modified for ring liners), expansion index (ASTM D 4829-21), one-dimensional consolidation (ASTM D 2435-11 [2020]), shear strength (ASTM D 3080D/D 3080M-11, in-situ), and R-Value (ASTM D 2844-18). The results of the laboratory test are presented in Appendix B.

4.0 GENERAL SUBSURFACE PROFILE

The subsurface profiles found in the exploratory borings consisted of fill overlying soil of the Santa Barbara Formation. Fill extended to depths of 2.0 to 2.5 feet bgs and consisted of very stiff sandy lean clay. The fill was logged as moist. The soil of the Santa Barbara Formation consisted of sandy lean clay, clayey sand, silty sand, poorly graded sand, poorly graded sand with gravel, and well-graded sand. The clay had a stiff to very stiff consistency and the sand was medium dense to very dense. The Santa Barbara Formation was logged as slightly moist to moist.

Free subsurface water was not encountered to the maximum depth explored of 30.9 feet bgs. Please refer to the boring logs presented in Appendix A for a more complete description of the subsurface conditions encountered at the site.

5.0 CONCLUSIONS

In our opinion, the site is suitable, from a geotechnical engineering standpoint, for the proposed addition and other improvements discussed in the "Introduction and Site Setting" section of the report, provided the recommendations contained herein are implemented in the design and construction. In our opinion, the primary geotechnical engineering concerns at the site are the potential for strong seismic shaking and the presence of expansive soils to impact the site. A discussion regarding the potential for liquefaction is also included below.

Strong Seismic Shaking

The site is in a region of high seismic activity with the potential for large seismic events that could generate strong ground shaking. The CBC requires that seismic loads be considered in structural design. A seismic analysis was undertaken to provide seismic acceleration design parameters; the results are presented in the "Foundations" section of this report for use by others in the structural design process.

Expansive Soil

An expansion index test was performed on a sample of the near-surface soil and yielded a value of 76. Based on this result, ASTM classifies this material as having "medium" expansion potential; criteria from Section 1803.5.3 of the 2022 CBC also indicates the soils are expansive. Expansive soils tend to swell with seasonal increases in moisture and shrink during the dry season as subsurface moisture decreases. The volume changes that these materials undergo in this cyclical pattern can stress and damage slabs and foundations if precautionary measures are not incorporated into the design and construction procedures. Recommendations for improvements overlying expansive soils are provided in the subsequent sections of this report.

Liquefaction Settlement

Liquefaction is the loss of soil strength caused by a significant seismic event. It occurs primarily in loose, fine to medium-grained sands, and in very soft to medium stiff silts that are saturated by groundwater. During a major earthquake, the saturated sands and silts tend to compress and decrease in volume. Pore-water pressure builds up in the soil causing them to lose their strength and transition into a liquefied state.

Seismically induced settlement of dry sand is also caused by a significant seismic event, and may occur in lower density sand and silt soils that are not saturated by groundwater. During a major earthquake, the void spaces between the unsaturated soil particles that filled with air tend to compress which translates to a decrease in volume or settlement.

The site is mapped by Santa Barbara County as being in an area of low liquefaction potential (SBCO 2023). Based on the lack of subsurface water present in our borings (which is required for liquefaction to occur) and the relatively shallow Santa Barbara Formation soil encountered in our borings, which is not considered susceptible to liquefaction, as well as our experience in the area, we concur with the mapping by the County as the site being in an area of low liquefaction potential. In order to estimate the potential for seismically induced settlement of dry sand, we reviewed the boring data and utilized methods suggested by the Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117A (CDMG, 2008). Based on our analysis and the relatively shallow depth of Santa Barbara Formation soils, dynamic settlement due to seismically induced settlement of dry sand is not anticipated to exceed 0.25 inches.

6.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

These recommendations are applicable for the proposed project as described in the "Introduction and Site Setting" section of this report. If other improvements not previously mentioned are included, the geotechnical engineer should be contacted for revised recommendations.

Unless otherwise noted, the following definitions are used in the recommendations presented below. Where terms are not defined, definitions commonly used in the construction industry are intended.

- **Building Area:** The area within and extending a minimum of 5 feet beyond the perimeter of the foundations for a structure. The building area also includes the foundation area (plus 5 feet to each side) of any ancillary structure that will be rigidly attached to the main structure and is expected to perform in a similar manner.
- **Flatwork Areas:** The footprints of all areas to receive exterior pedestrian flatwork.
- **Vehicle Pavement Areas:** The areas within and extending a minimum of 1 foot

beyond the limits of any areas to receive HMA and/or PCC pavement for vehicular use, such as parking areas, driveway aprons, and/or trash enclosure pads.

- **Grading Area:** The entire area to be graded, including building areas, vehicle pavement areas, flatwork areas, and any other areas where surface improvements will also be constructed, or fill will be placed.
- **Existing Grade:** Elevations of the site that existed as of the date of this report.
- **Finish Pad Grade:** The elevation in the building area where earthwork operations are typically considered to be complete. It does not include any sand or gravel that might be placed below slabs-on-grade in association with vapor protection for the slabs.
- **Subgrade:** The elevation in exterior flatwork areas or vehicle pavement areas where soil or aggregate base (AB) are placed to support the flatwork.
- **Scarified:** Thoroughly plowed or ripped in two orthogonal directions to a depth of not less than 8 inches.
- **Moisture Conditioned:** Soil moisture content adjusted by wetting or drying to optimum moisture content, or just above, prior to application of compactive effort.
- **Compacted / Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density, unless specified otherwise. The standard tests used to establish maximum dry density and field density should be ASTM D1557 (2021) and ASTM D 6938-23, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction.

Site Preparation

1. The ground surface in grading areas should be prepared for construction by removing all existing improvements, large roots, debris, organic topsoil, and other deleterious materials. Existing utility lines that will not remain in service should be either removed or abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

2. Voids created by the removal of materials or utilities described above should be called to the attention of the geotechnical engineer. No fill should be placed unless the underlying soil has been observed by the geotechnical engineer.

Grading

1. Following site preparation, the soil within the building area should be removed to 18 inches below planned bottom of slab grade. The exposed surface should be scarified moisture conditioned, and recompacted. The building area excavation should then be backfilled with moisture conditioned, properly compacted fill consisting of imported non-expansive material.

2. Non-expansive materials are defined by the GW, SP, SW, SC or SM per ASTM D 2487-17, with an expansion index of 10 or less (ASTM D 4829-21). Proposed non-expansive materials should be reviewed by the geotechnical engineer before being brought to the site, and on an intermittent basis during placement. The aggregate based layer described in the "Slabs-on-Grade" section of this report is considered part of the minimum recommended depth of non-expansive material, not in addition to it.

3. Following excavation and prior to placement of formwork, reinforcing steel and concrete, foundation trenches should be scarified, moisture conditioned, and recompacted in the upper 12 inches below bottom of trench. Soils exposed in foundation excavations should be kept at or above optimum moisture content, and no desiccation cracks should be present, during the entire formwork, reinforcing steel and concrete placement process. To achieve and maintain these conditions, foundation excavations should be lightly sprayed with water, and minor puddles of water should be left in the bottoms of the trenches, on a daily basis until concrete is placed.

4. Following site preparation, and prior to placement of fill or following excavations to grade, the soil within the vehicular pavement areas, flatwork areas, and the balance of the grading areas, the exposed surfaces should be scarified, moisture conditioned, and recompacted.

5. Within vehicle pavement areas, subgrade should be compacted to a minimum of 95 percent of maximum dry density. If fill is required to bring existing grades up to subgrade elevation, existing grades should be scarified, moisture conditioned, and compacted. Fill

should then be placed in compacted lifts with the top 12 inches compacted to a minimum of 95 percent of maximum dry density within vehicle pavement areas.

6. Voids created by dislodging cobbles and/or debris during scarification should be backfilled and compacted, and the dislodged materials should be removed from the area of work.

7. Previously removed soils as well as approved imported non-expansive soil may be replaced in thin, moisture conditioned, and compacted lifts to finish pad grade within building areas, to subgrade within vehicle pavement and flatwork areas, and to finish grade in all other areas.

8. To create conditions that are as uniform as possible, all earthwork operations should be completed throughout the individual building areas in a uniform manner at the same time, from the bottom of the overexcavation through fill placement to finish grade. Earthwork operations that complete only a portion of the area at one time (i.e., “flipflopping”, “checkerboarding”, etc.) should not be allowed.

9. All fill soil (site derived or imported) should be placed in uniform lifts across the particular building or improvement area being constructed; these soils should not be mixed or placed in non-uniform layer thicknesses.

10. Imported soils used in the building areas should have strength qualities equal to or better than the site soils, and they should not exceed the geotechnical corrosivity potential of the site soils. Proposed imported materials should be reviewed by the geotechnical engineer before being brought to the site, and on an intermittent basis during placement.

11. All materials used as fill should be cleaned of all debris and any rocks larger than 6 inches in maximum dimension. When fill material includes rocks, the rocks should be placed in a sufficient soil matrix to ensure that voids caused by nesting of the rocks will not occur and that the fill can be properly compacted.

12. Imported soils to be used in landscape areas should be reviewed and approved by the landscape architect or others.

13. If the soils are overly moist so that they become unstable or if the recommended compaction cannot be readily achieved, drying the soil to optimum moisture content, or

just above, may be necessary. Placement of gravel layers or geotextiles may also be necessary to help stabilize unstable soils. If such conditions are found, the geotechnical engineer should be available to assist the contractor in selecting appropriate measures for stabilization of unstable soils. Soils that are disturbed in any manner should be removed, moisture conditioned, and recompacted.

14. The recommended soil moisture contents should be maintained throughout construction and during the lives of the structures and sitework improvements. Failure to maintain the soil moisture content can result in loosening of the soil and disturbance, which are an indication of degradation of the soil compaction. If soils near improvements such as foundations, flatwork, etc. are disturbed, the improvements may become damaged. Soils that have been disturbed should be removed, moisture conditioned and recompacted.

Utility Trenches

1. Utility trenches adjacent to foundations should not be excavated within the zone of foundation influence, as shown in Typical Detail A presented in Appendix C.

2. Utilities that must pass beneath a foundation should be placed with properly compacted utility trench backfill and the foundation should be designed to span the trench.

3. A select, non-corrosive, easily compacted sand should be used as bedding and shading immediately around utilities. The site soil or approved import soil may be used for trench backfill above the select material. In building and flatwork areas, the upper portion of the trench backfill should match the thickness of non-expansive soil, AB, or other select material used to support these improvements.

4. In general, trench backfill should be compacted to a minimum of 90 percent of maximum dry density.

5. Trench backfill should be moisture conditioned prior to applying compactive effort. Trench backfill should be placed in level lifts not exceeding 6 inches in loose thickness and compacted to the minimums recommended above.

6. Compaction of trench backfill by jetting or flooding is not recommended except under extraordinary circumstances. However, to aid in encasing utility conduits, particularly corrugated drain pipes, and multiple, closely spaced conduits in a single trench, jetting or

flooding may be useful. Flooding or jetting should only be attempted with extreme caution, and any jetting operation should be subject to review by the geotechnical engineer.

7. Long-term settlement of properly compacted imported sand should be assumed to be about 0.25 to 0.5 percent of the depth of the backfill. Long-term settlement of properly compacted site soils should be assumed to be approximately double that of imported sand. Improvements constructed over or near trenches should be designed to accommodate the potential for settlement.

8. The recommendations of this section are minimums only and may be superseded by the requirements of the architect/engineer, the recommendations of pipe manufacturers or utility companies, or the requirements of the governing jurisdiction based upon soil corrosivity or other factors.

Foundations

1. The proposed addition may be supported by continuous and/or spread footings bearing in firm, native site soils of the Santa Barbara Formation, as recommended in the "Grading" section of this report.

2. Footings should have a minimum embedment depth of 30 inches below the lowest adjacent grade and should be embedded a minimum of 6 inches into the Santa Barbara Formation. All spread footings should be at least 24 inches square and continuous footings should be a minimum of 15 inches wide. Footing excavation should be horizontal. Spread footings should be interconnected with grade beams a minimum of 12 inches wide and 21 inches deep to create a foundation system that acts in a uniform manner; isolated spread foundations should not be utilized.

3. Continuous footings should be reinforced in accordance with the requirements of the architect/engineer; minimum continuous footing and grade beam reinforcement should consist of two No. 4 rebar, one near the top and one near the bottom. Spread footings should be reinforced in accordance with the requirements of the architect/engineer.

4. Footings should be designed using a maximum allowable bearing capacity of 2,000 for dead loads and 3,000 psf for dead plus live loads. Using these criteria, maximum and differential settlement over a horizontal distance of 25 feet are expected to be on the

order of 0.75 inch and 0.5 inch, respectively.

5. The allowable bearing capacity may be increased by one-third when transient loads such as wind or seismicity are included.

6. In accordance with Chapter 20 of ASCE 7-16 (2017), Site Class D (Stiff Soil) was selected based on subsurface data from our borings. We have assumed that the Architect/Engineer intends to apply the exception allowed under Note 1 in ASCE 7-16 Supplement 3 (ASCE 2021) to this project; therefore, we are providing the general procedure seismic design parameters based on the site coordinates stated in the "Introduction and Site Setting" section and Site Class D in accordance with Section 11.4.4 of ASCE 7-16. Unscaled seismic design parameters are shown in the following table. The Architect/Engineer should verify these assumptions during the design process. The project was considered to be Risk Category II as described in Table 1604.5 of the CBC (CBSC 2022).

Table 1: General Procedure Seismic Parameters – Site Class D

Seismic Design Category	E
Site Class	D
Mapped and Code Based Ground Motion	
Short Period Spectral Response, S_s	2.251 g
1 second mapped Spectral Response, S_1	0.798 g
Design Earthquake Ground Motion	
Short Period Spectral Response, S_{DS}	1.501 g
1 second Spectral Response, S_{D1}	0.904 g
Peak Ground Acceleration (PGA_M)	1.083 g
MCE Spectral Response Acceleration	
Short Period Spectral Response, S_{MS}	2.251 g
1 Second Period Spectral Response, S_{M1}	1.357 g
Site Amplification Factors	
Short Period Site Coefficient, F_a	1.000
1 Second Period Site Coefficient, F_v	1.700
Vertical Site Coefficient, C_v	1.500
Risk Coefficient (Short Period), C_{Rs}	0.878
Risk Coefficient (1 Second Period), C_{R1}	0.876

7. In calculating resistance to lateral loads, an ultimate passive equivalent fluid pressure of

300 pcf may be used for foundations bearing in native soils of the Santa Barbara Formation. A coefficient of friction of 0.30 may also be utilized in the design. The lateral capacities are based on the assumption that the soil adjacent to the foundations is undisturbed and/or properly compacted if disturbed. Passive and friction resistance components may be combined in the analysis without reduction to either value. An appropriate factor of safety should be applied to the values presented above.

8. Foundation excavations should be observed by the geotechnical engineer during excavation and prior to placement of formwork, reinforcing steel or concrete. Soil in foundation excavations should be moistened to optimum moisture content or just above and no desiccation cracks should be present prior to concrete placement.

Interior Slabs-on-Grade and Exterior Pedestrian Flatwork

Interior Slabs-on-Grade

1. Interior slabs-on-grade should have a minimum thickness of 4 inches and should be reinforced and doweled to foundations per the specifications of the architect/engineer. At a minimum, interior slabs should be reinforced with No. 3 rebar at 24 inches on center each way, placed as directed by the architect/engineer. All structural slabs should contain minimum rebar meeting the criteria of ACI 318, Section 7.6.1.1 (ACI 2019). At a minimum, foundation dowels should be lap spliced to the slab rebar. The size and spacing of the dowels should match the size and spacing of the slab rebar.

Exterior Pedestrian Flatwork

1. Exterior pedestrian flatwork should have a minimum thickness of 4 inches. Minimum reinforcement for exterior pedestrian flatwork should consist of No. 3 rebar placed at 24 inches on-center each way.

2. In conventional construction, it is common to use 4 to 6 inches of imported sand beneath flatwork. However, due to the expansion potential of the site soils, there will be a risk of movement and damage to the flatwork if conventional measures are used. Heaving and cracking could occur. To reduce the potential for movement and damage, flatwork should be supported by up to 15 inches of imported non-expansive soils. The more non-expansive material provided, the better the protection from the expansive soils.

3. To further reduce the risk of movement of flatwork due to seasonal moisture variations

or loss of soil from erosion, thickened edges or grade beams can be provided around the perimeters of the flatwork. The deeper the perimeter thickened edges/grade beams provided, the better the protection from the expansive soils. At a minimum, any thickened edge or grade beam should be reinforced by two No. 4 rebar, one at the top and one at the bottom.

4. It is recognized that the measures recommended in the previous paragraphs for protecting flatwork from seasonal moisture variations are an added expense, possibly more expensive than simply replacing flatwork that has settled and/or cracked. Consequently, the above measures for protecting flatwork are only suggestions for consideration by the owner and/or architect/engineer. The degree to which flatwork is protected is left to the discretion of the owner and/or architect/engineer.

5. Flatwork should be constructed with frequent joints to allow articulation as the flatwork moves in response to seasonal soil temperature and moisture variations. The soil below flatwork should be moisture conditioned prior to casting the flatwork.

6. Flatwork at doorways, and at other areas where maintaining the elevation of the flatwork is desired, should be doweled to the perimeter foundations, at a minimum, by No. 3 dowels lapped to the flatwork rebar at 24 inches on center. In other areas, the flatwork may be doweled to the foundation, or the flatwork may be allowed to "float free," at the discretion of the architect/engineer. Flatwork that is intended to float free should be separated from foundations by a felt joint or other means.

Moisture Vapor Transmission

1. Due to the current use of impermeable floor coverings, water-soluble flooring adhesives, and the speed at which buildings are now constructed, moisture vapor transmission through slabs is a much more common problem than in past years. Where moisture vapor transmitted from the underlying soil would be undesirable, slabs should be protected from subsurface moisture vapor. A number of options for vapor protection are discussed below; however, the means of vapor protection, including the type and thickness of the vapor retarder, if specified, are left to the discretion of the architect/engineer.

2. Where specified, vapor retarders should conform to ASTM Standard E 1745-17/23. This standard specifies properties for three performance classes: Class A, B and C. The

appropriate class should be selected based on the potential for damage to the vapor retarder during placement of slab reinforcement and concrete. Unless it is determined that a permeance of 0.10 perms will not allow vapor to accumulate beneath moisture sensitive flooring, adhesives, stored products and/or equipment, then a vapor retarder permeance of 0.01 perms is recommended, per ACI 302.1-15 (ACI 2015). Permeance of vapor retarders should remain below 0.01 perms after the conditioning tests of ASTM E 1745-17/23.

Note: ASTM E 1745-17/23 has the same permeance threshold for Class A, B and C (0.1 perms). The class that is chosen will make a difference in how resistant the vapor retarder is to punctures and tears, but it will not ensure any better permeance values to protect floor coverings.

3. Several studies, including those of American Concrete Institute Committee 302 (ACI 2015), have concluded that excess water above the vapor retarder increases the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. The studies also concluded that it is preferable to eliminate the typical sand layer beneath the slab and place the slab concrete in direct contact with a Class A vapor retarder, particularly during wet weather construction. However, placing the concrete directly on the vapor retarder requires special attention to using the proper vapor retarder, a very low water-cement ratio in the concrete mix, and special finishing and curing techniques.

4. Another option that may be a reasonable compromise between effectiveness and cost considerations is the use of a subslab vapor retarder protected by a sand layer. If a Class A vapor retarder is specified, the retarder can be placed directly on the subgrade. The retarder should be covered with a minimum 2 inches of clean sand. If a less durable vapor retarder is specified (Class B or C), a minimum of 4 inches of clean sand should be provided, and the retarder should be placed in the center of the clean sand layer. Clean sand is defined as a well or poorly graded sand (ASTM D 2487-17) of which less than 3 percent passes the No. 200 sieve. Clean sand is considered to be part of the minimum 15 inches of imported non-expansive materials recommended in the “Grading” section of this report to be placed below interior slabs-on-grade, not in addition to it.

5. Regardless of the underslab vapor retarder selected, proper installation of the retarder

per ASTM E 1643-18 is critical for optimum performance. Where utilized, the vapor retarder should be placed a minimum of 1 inch above the flow line of the drainage path surrounding the structures, or 1 inch above the area drain grates if area drains are used to collect runoff around the structures. As required by ASTM E 1643-18a, all seams and utility penetrations should be properly sealed. At terminating edges of the vapor retarder, the vapor retarder should be effectively sealed with accessories specifically designed to seal the material to new or existing concrete; details for edge sealing of the vapor retarder should be provided by the architect/engineer.

6. If the sand is used between the vapor retarder and the slab, it should be moistened only as necessary to promote concrete curing; saturation of the sand should be avoided, as the excess moisture would be on top of the vapor retarder, potentially resulting in vapor transmission through the slab for months or years.

7. Positive drainage away from the structures should be maintained; see the "Drainage and Maintenance" section of this report for additional discussion of this issue. If water is allowed to pond near the structures, it may seep into the ground and migrate laterally through cracks or utility penetrations in the foundation, ultimately gaining access above the vapor retarder.

Slabs-on-Grade – General

1. To reduce shrinkage cracks in all interior slabs-on-grade and exterior pedestrian flatwork, the concrete aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the concrete should be properly placed and finished, contraction joints should be installed, and the concrete should be properly cured. This is particularly applicable to slabs that will be cast directly upon a vapor retarder and those that will be protected from transmission of vapor by use of admixtures or surface sealers. Concrete materials, placement, and curing specifications should be at the direction of the architect/engineer; AC 302.1R-15 (ACI 2015) is suggested as a resource for the architect/engineer in preparing such specification.

2. To provide stability for curbs adjacent to exterior pedestrian flatwork, curbs should be set back a minimum distance equal to one-third the height of any adjacent descending slope, but not less than 5 feet from the tops of slopes. Alternately, curbs may be deepened to provide stability. The geotechnical engineer should review, on an individual basis, any

situation where curbs must be deepened to meet this recommendation.

Vehicle Pavements

An R-value, or resistance to deformation under repeated loading, test was performed on a sample of the soil expected to be exposed at subgrade in the planned parking and driveway area; the test yielded a result of 10.

1. The following HMA (flexible) pavement sections are based upon the tested R-value and assumed Traffic Indices (TIs) of 4.0 through 8.0. Determination of the appropriate TI for specific areas of the project is left to others. The HMA sections were calculated in accordance with the method presented in the "Highway Design Manual" (Caltrans 2018). The calculated HMA and Class 2 AB thicknesses are for compacted material. Normal Caltrans construction tolerances should apply.

Table 2: HMA Pavement Sections for R-Value = 10

Traffic Index	HMA* (in)	Class 2 AB** (in)
4.0	2.25	7.50
5.0	2.75	9.50
6.0	3.25	12.00
7.0	4.00	14.25

*Per Caltrans (2023) Section 39
**Per Caltrans (2023) Section 26

2. If unreinforced Portland cement concrete pavement is planned, the following minimum section is recommended:

Table 3: PCC Pavement Sections for R-Value = 10

Traffic Index	PCC* (in)	Class 2 AB (in)
4.0	6.00	3.50
5.0	6.25	4.00
6.0	6.50	4.50
7.0	7.00	5.00

*28-day Compressive Strength = 4,000 psi

3. Alternatively, the pavement may be designed by the architect/engineer for the

appropriate loads. Provided that a minimum of 12 inches of AB compacted to a minimum of 95 percent of maximum dry density is placed above pavement subgrade, the design may be based on a subgrade modulus (K_{30}) of 190 pci (psi/in). Specification of concrete properties and reinforcing is left to the architect/engineer.

4. The above sections should also apply to trash enclosures and stress pads, which are the areas loaded by the front axle of the garbage truck when lifting dumpsters during trash collection.

Pavement Sections - General

1. HMA and PCC pavement should be constrained by curbs, gutters, flatwork, walls, etc.; free edges to the pavement should be avoided.

2. HMA and PCC pavement should be set back a minimum of 5 feet from any descending slope. Alternately, deepened curbs may be used to constrain the pavement. Where curbs will be deepened in lieu of the recommended setback, the individual situation should be reviewed, and specific recommendations prepared by the geotechnical engineer.

3. The upper 12 inches of subgrade and all aggregate base in pavement areas should be compacted to a minimum of 95 percent of maximum dry density. Subgrade and AB should be firm and unyielding when proof-rolled with heavy, rubber-tired grading equipment prior to continuing construction.

4. Finished pavement surfaces should be sloped to freely drain toward appropriate drainage facilities. Water should not be allowed to stand or pond on or adjacent to pavement, as it could cause premature pavement deterioration or improvement damage.

5. To reduce migration of surface drainage into the subgrade, maintenance of pavement areas is critical. Any cracks that develop in the pavement should be promptly sealed.

6. The local jurisdiction may have additional requirements for pavement that could take precedence over the above recommendations.

Drainage and Maintenance

1. Unpaved ground surfaces should be graded during construction, and per Section 1804.4 of the 2022 CBC, finish graded to direct surface runoff away from foundations, slopes,

and other improvements at a minimum 5 percent grade for a minimum distance of 10 feet. If this is not feasible due to the terrain, property lines, or other factors, swales with improved surfaces, area drains, or other drainage features should be provided to divert drainage away from these areas.

2. Finished surfaces should be sloped to freely drain toward appropriate drainage facilities. Water should not be allowed to stand or pond on or adjacent to slopes or other improvements.

3. Stabilization of surface soils, particularly those disturbed during construction, by vegetation or other means *during and following construction,* should be implemented to protect the site from erosion damage. Care should be taken to establish and maintain vegetation.

4. To reduce the potential for damage due to erosion it is essential that the surface soils, particularly those disturbed during construction, be stabilized by vegetation or other means during and following construction. Care should be taken to establish and maintain vegetation. Any landscaping should be installed to maintain the surface drainage recommended above.

5. To reduce the potential for disruption of drainage patterns and undermining of foundations and other improvements, rodent activity should be aggressively controlled.

Observation and Testing

1. It must be recognized that the recommendations contained in this report are based on a limited number of borings and rely on continuity of the subsurface conditions encountered. Therefore, the geotechnical engineer should be retained to provide consultation during the design phase, to review plans as they near completion, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

2. At a minimum, the geotechnical engineer should be retained to provide:

    - Review of the project plans as they near completion
    - Professional observation during grading, trench backfill, foundation construction, and pavement section installation
    - Oversight of soil special inspection during grading, trench backfill, foundation construction, and pavement section installation

3. Special inspection of grading and backfill should be provided as per Section 1705.6 and Table 1705.6 of the 2022 CBC. The special inspector should be under the direction of the geotechnical engineer. It is our opinion that none of the grading construction is of a nature that should warrant continuous special inspection; periodic special inspection should suffice. Subject to approval by the Building Official, the exception to continuous special inspection is described in Section 1704.2 of the 2022 CBC and should be specified by the architect/engineer and periodic special inspection of the following items should be provided by the special inspector.

    - Stripping and clearing of all existing improvements, vegetation and unsuitable materials
    - Overexcavation to the recommended depths
    - Scarification, moisture conditioning, and recompaction of the soil
    - Fill quality, placement, moisture conditioning and compaction
    - Utility trench backfill
    - Foundation excavations
    - Subgrade, AB, and AC compaction and proof-rolling

4. A program of quality control should be developed prior to beginning grading. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

5. Locations and frequency of compaction tests should be per the recommendation of the geotechnical engineer at the time of construction. The recommended test location and frequency may be subject to modification by the geotechnical engineer, based upon soil

and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

6. A preconstruction conference among the owner, the geotechnical engineer, the governing agency, the special inspector, the project inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements.

7. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

7.0 Closure

Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project and under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the “Scope of Services” section. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

If changes with respect to project type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. Any items not specifically addressed in this report should comply with the CBC (CBSC 2022) and the requirements of the governing jurisdiction.

The preliminary recommendations of this geotechnical report are based upon the geotechnical

conditions encountered at the site and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by the geotechnical engineer based on conditions exposed at the time of construction.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. This report shall be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text.

TECHNICAL REFERENCE LIST

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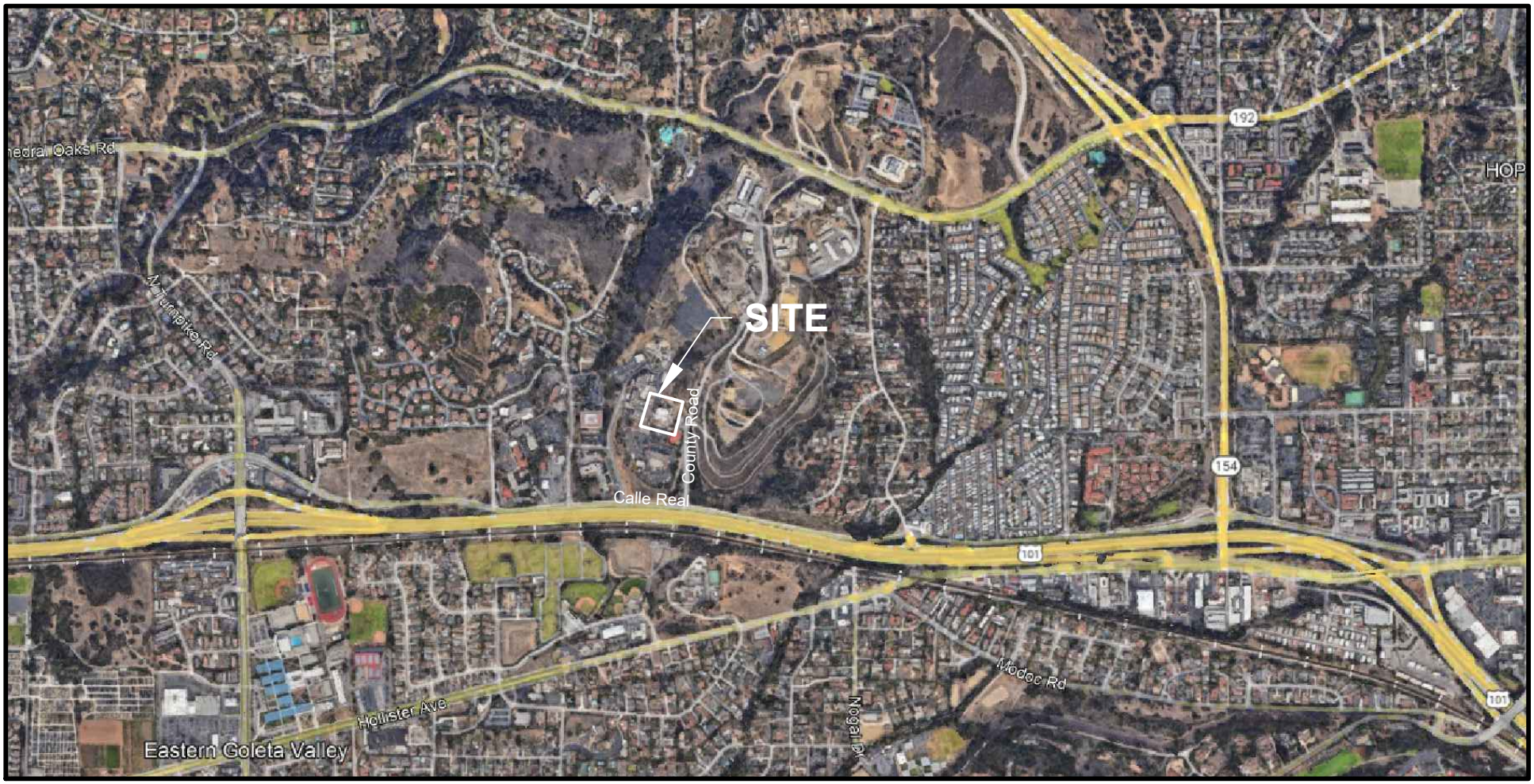
APPENDIX A

Figure 1 – Site Vicinity Map

Figure 2 – Exploration Location Map

Boring Log Legend

Boring Logs



N

NOT TO SCALE

BASE MAP PROVIDED BY: Google Earth (2025)

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
www.earthsystems.com
(805) 544-3276 ● Fax (805) 544-1786

SITE VICINITY MAP

Santa Barbara County Main Jail IRC Expansion
4436 Calle Real
Santa Barbara, California

Date
June 2025

Project No.
306476-003

Figure 1

306476-003 SB County Jail_maps.dwg



LEGEND

B2 Boring Location (Approx.)

BASE MAP PROVIDED BY: Google Earth (2025)

N

NOT TO SCALE

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
www.earthsystems.com
(805) 544-3276 • Fax (805) 544-1786

EXPLORATION LOCATION MAP

Santa Barbara County Main Jail IRC Expansion
4436 Calle Real
Santa Barbara, California

Date
June 2025

Project No.
306476-003

Figure 2

306476-003 SB County Jail_maps.dwg

Earth Systems Pacific

BORING LOG LEGEND

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	
STANDARD PENETRATION TEST (SPT)	
SHELBY TUBE	
BULK	
SUBSURFACE WATER DURING DRILLING	
SUBSURFACE WATER AFTER DRILLING	

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISIONS	GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	GP	POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
	SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	
	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	
FINE GRAINED SOILS (HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE)	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET (SATURATED)

CONSISTENCY

COARSE GRAINED SOILS			FINE GRAINED SOILS		
BLOWS/FOOT		DESCRIPTIVE TERM	BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER		SPT	CA SAMPLER	
0-10	0-16	LOOSE	0-2	0-3	VERY SOFT
11-30	17-50	MEDIUM DENSE	3-4	4-7	SOFT
31-50	51-83	DENSE	5-8	8-13	MEDIUM STIFF
OVER 50	OVER 83	VERY DENSE	9-15	14-25	STIFF
			16-30	26-50	VERY STIFF
			OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL BEDROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL BEDROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
FRESH	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES: SOME FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY"
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

drafting/masters/Boring Log Legend121714.dwg

Earth Systems Pacific

Boring No. 1

LOGGED BY: S. Venable
DRILL RIG: GTech GT 8 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 306476-003
DATE: 05/13/2025

Santa Barbara County Main Jail IRC Expansion
4436 Calle Real
Santa Barbara, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0		4" AC / 5" AB					
1	CL	SANDY LEAN CLAY: yellowish brown, very stiff, moist (Fill)	1.0 - 5.0	○			8
2			2.0 - 3.5	■	99.4	25.6	16
3	SC	CLAYEY SAND: yellowish brown with pale brown mottling, medium dense, moist (Santa Barbara Formation)					23
4							
5	SM	SILTY SAND: dark yellowish brown, medium dense, moist	5.0 - 6.5	■	108.4	17.4	6 15 27
6							
7							
8	CL	SANDY LEAN CLAY: dark gray brown with orange mottling, very stiff, moist, trace shell fragments					
9							
10			10.0 - 11.5	■	101.3	25.0	6 14 22
11							
12							
13		dark yellowish brown, stiff					
14							
15			15.0 - 16.5	●			4 7 9
16							
17							
18	SC	CLAYEY SAND: dark orange brown with orange mottling, dense, moist					
19							
20			20.0 - 21.5	●			9 15 39
21							
22	SP	POORLY GRADED SAND: light yellowish brown with orange mottling, dense, moist					
23							
24							
25			25.0 - 26.5	●			19 40 50/4"
26							

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 1

LOGGED BY: S. Venable
DRILL RIG: GTech GT 8 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 306476-003
DATE: 05/13/2025

Santa Barbara County Main Jail IRC Expansion
4436 Calle Real
Santa Barbara, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27			see previous page					
28	SP		POORLY GRADED SANDY WITH GRAVEL: dark orange brown to yellowish brown, very dense, slightly moist	30.0 - 30.9	●			35 50/5"
31			End of Boring @ 30.9' No subsurface water encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 2

LOGGED BY: S. Venable
DRILL RIG: GTech GT 8 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 306476-003
DATE: 05/13/2025

Santa Barbara County Main Jail IRC Expansion
4436 Calle Real
Santa Barbara, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			2.5" AC / 6.5" AB					
1	CL		SANDY LEAN CLAY: yellowish brown, very stiff, moist (Fill)	1.0 - 5.0	○			5
2	CL		SANDY LEAN CLAY: dark gray brown with orange mottling, very stiff, moist, trace shell fragments (Santa Barbara Formation)	2.0 - 3.5	■	93.0	29.5	11 17
5			dark gray	5.0 - 6.5	■	103.0	23.8	7 15 20
10			orange mottling	10.0 - 11.5	■	102.9	23.5	9 14 22
13	SP		POORLY GRADED SAND: orange brown, very dense, slightly moist	15.0 - 16.4	●			17 33 50/5"
18			light yellowish brown, dense	20.0 - 21.5	●			13 22 50
23	SW		WELL-GRADED SAND: orange brown, dense, slightly moist	25.0 - 26.5	●			15 23 43
26			End of Boring @ 26.5' No subsurface water encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

APPENDIX B

Laboratory Test Results

Santa Barbara County 306476-003
Main Jail IRC Expansions Proj. 20041 GER

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

May 29, 2025

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1	3.0 - 3.5	25.6	124.8	99.4
1	6.0 - 6.5	17.4	127.3	108.4
1	11.0 - 11.5	25.0	126.6	101.3
2	3.0 - 3.5	29.5	120.5	93.0
2	6.0 - 6.5	23.8	127.6	103.0
2	11.0 - 11.5	23.5	127.1	102.9

EXPANSION INDEX TEST RESULTS

ASTM D 4829-21

BORING NO.	DEPTH feet	EXPANSION INDEX
2	1.0 - 5.0	76

Santa Barbara County
Main Jail IRC Expansions Proj. 20041 GER

306476-003

DIRECT SHEAR

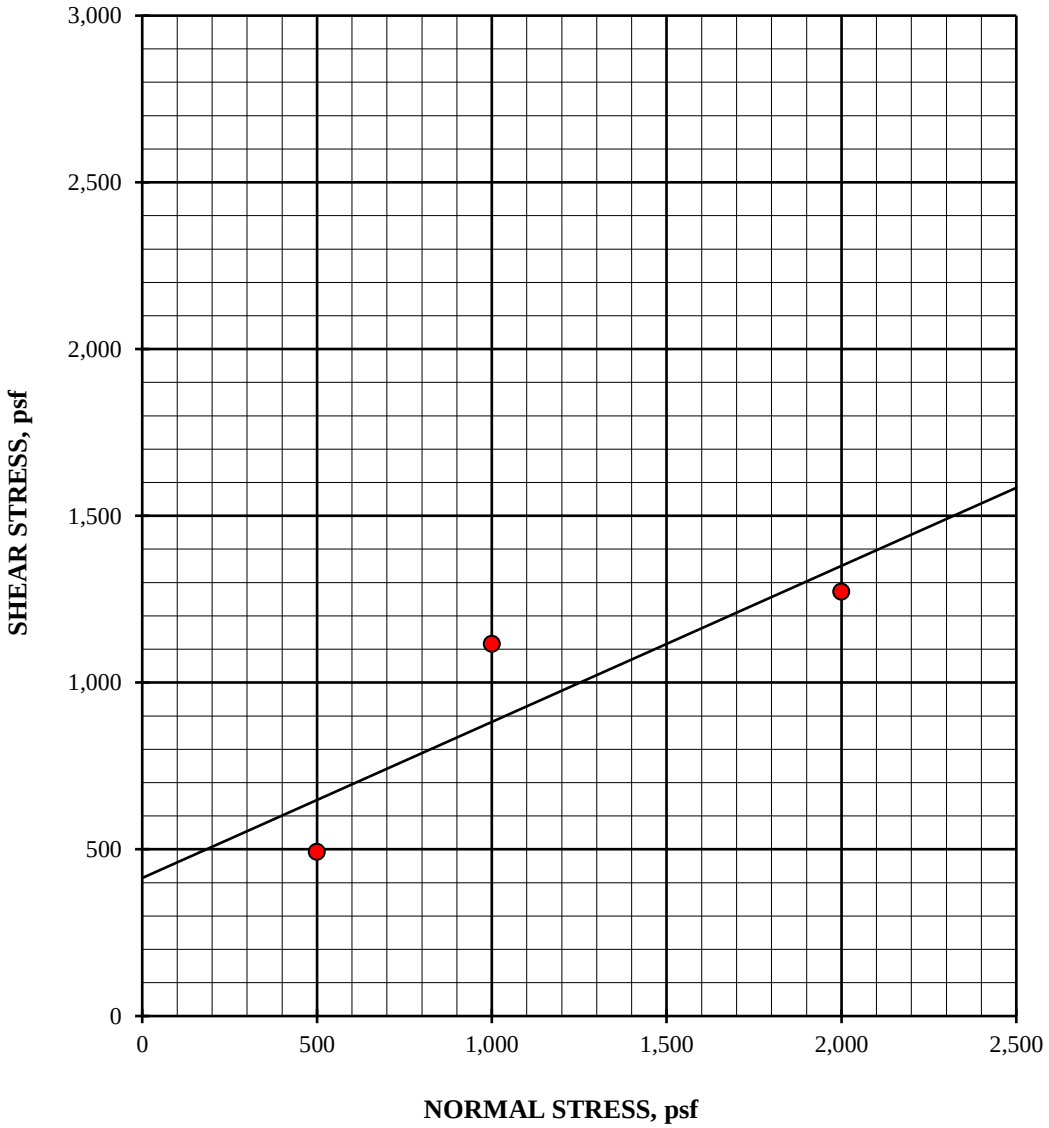
ASTM D 3080-23 (modified for consolidated, undrained conditions)

May 29, 2025

Boring #2 @ 3.0 - 3.5'
Sandy Lean Clay (CL)
Ring sample, saturated

INITIAL DRY DENSITY: 91.5 pcf
INITIAL MOISTURE CONTENT: 29.5 %
PEAK SHEAR ANGLE (Ø): 25°
COHESION (C): 414 psf

SHEAR vs. NORMAL STRESS



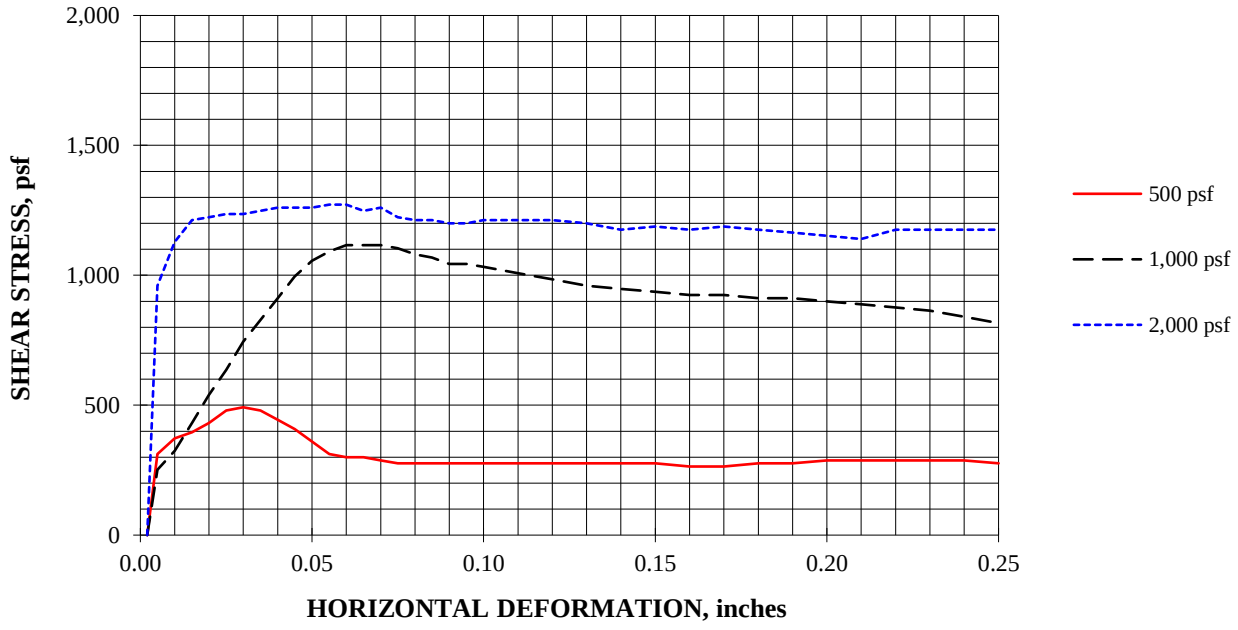
Santa Barbara County 306476-003
Main Jail IRC Expansions Proj. 20041 GER

DIRECT SHEAR continued

ASTM D 3080-23 (modified for consolidated, undrained conditions)

Boring #2 @ 3.0 - 3.5' May 29, 2025
Sandy Lean Clay (CL)
Ring sample, saturated SPECIFIC GRAVITY: 2.70 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	29.5	29.5	29.5	29.5
DRY DENSITY, pcf	91.4	92.2	91.0	91.5
SATURATION, %	94.5	96.2	93.5	94.7
VOID RATIO	0.842	0.828	0.852	0.841
DIAMETER, inches	2.410	2.410	2.410	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	40.4	39.7	40.1	
DRY DENSITY, pcf	92.6	95.3	95.6	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.818	0.768	0.763	
HEIGHT, inches	0.99	0.97	0.95	



Santa Barbara County 306476-003
Main Jail IRC Expansions Proj. 20041 GER

CONSOLIDATION TEST

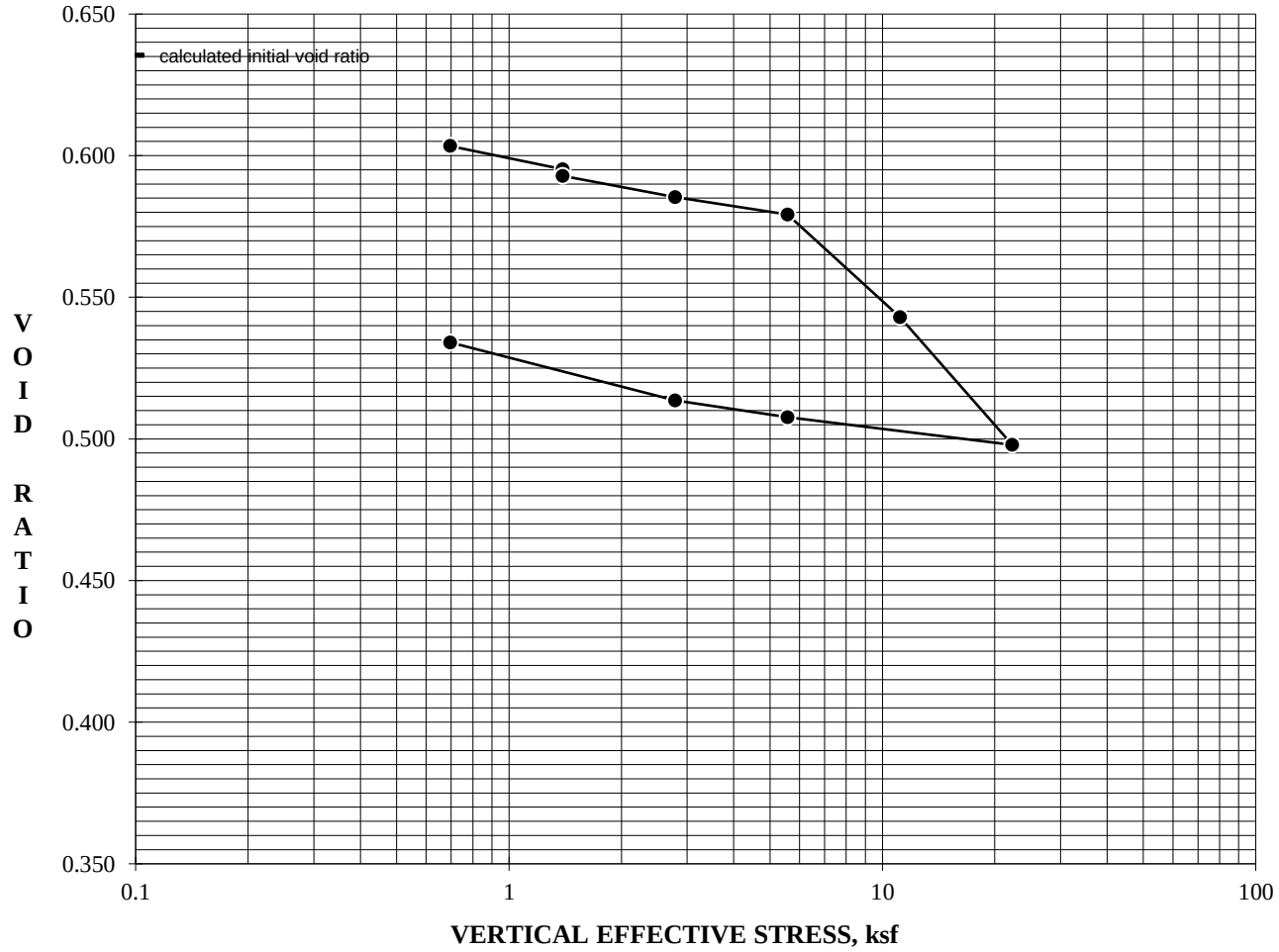
ASTM D 2435-11R20

May 29, 2025

Boring #2 @ 6.0 - 6.5'
Sandy Lean Clay (CL)
Ring Sample

DRY DENSITY: 103.1 pcf
MOISTURE CONTENT: 23.8%
SPECIFIC GRAVITY: 2.70 (assumed)
INITIAL VOID RATIO: 0.635

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



Santa Barbara County
Main Jail IRC Expansions Proj. 20041 GER

306476-003

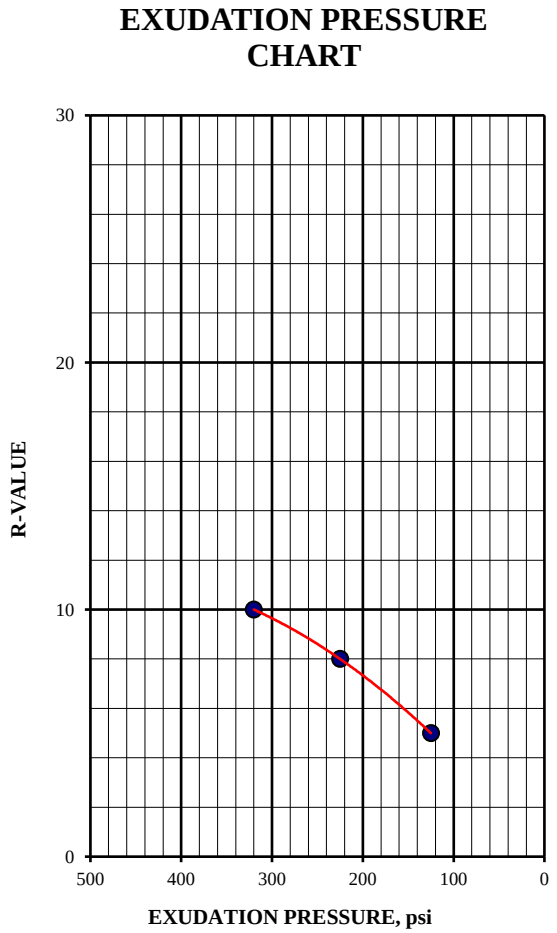
RESISTANCE '*R* ' VALUE AND EXPANSION PRESSURE

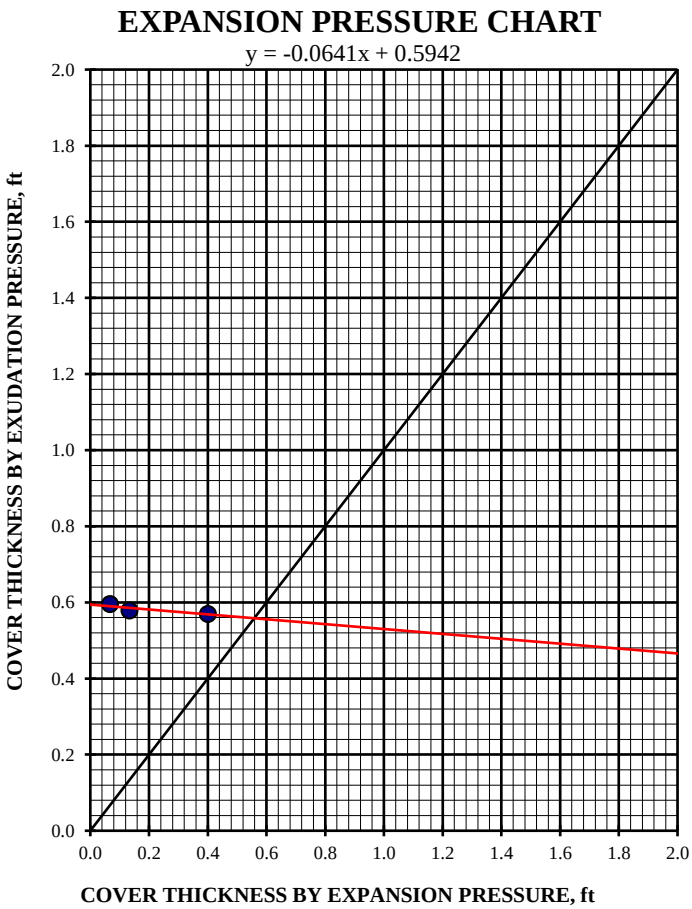
ASTM D 2844-18

May 29, 2025

Boring #2 @ 1.0 - 5.0'
Dark Yellowish Brown Sandy Lean Clay (CL)
Specified Traffic Index: 5.0

Dry Density @ 300 psi Exudation Pressure: 110.3-pcf
% Moisture @ 300 psi Exudation Pressure: 26.8%
R-Value - Exudation Pressure: 10
R-Value - Expansion Pressure: 11
R-Value @ Equilibrium: 10

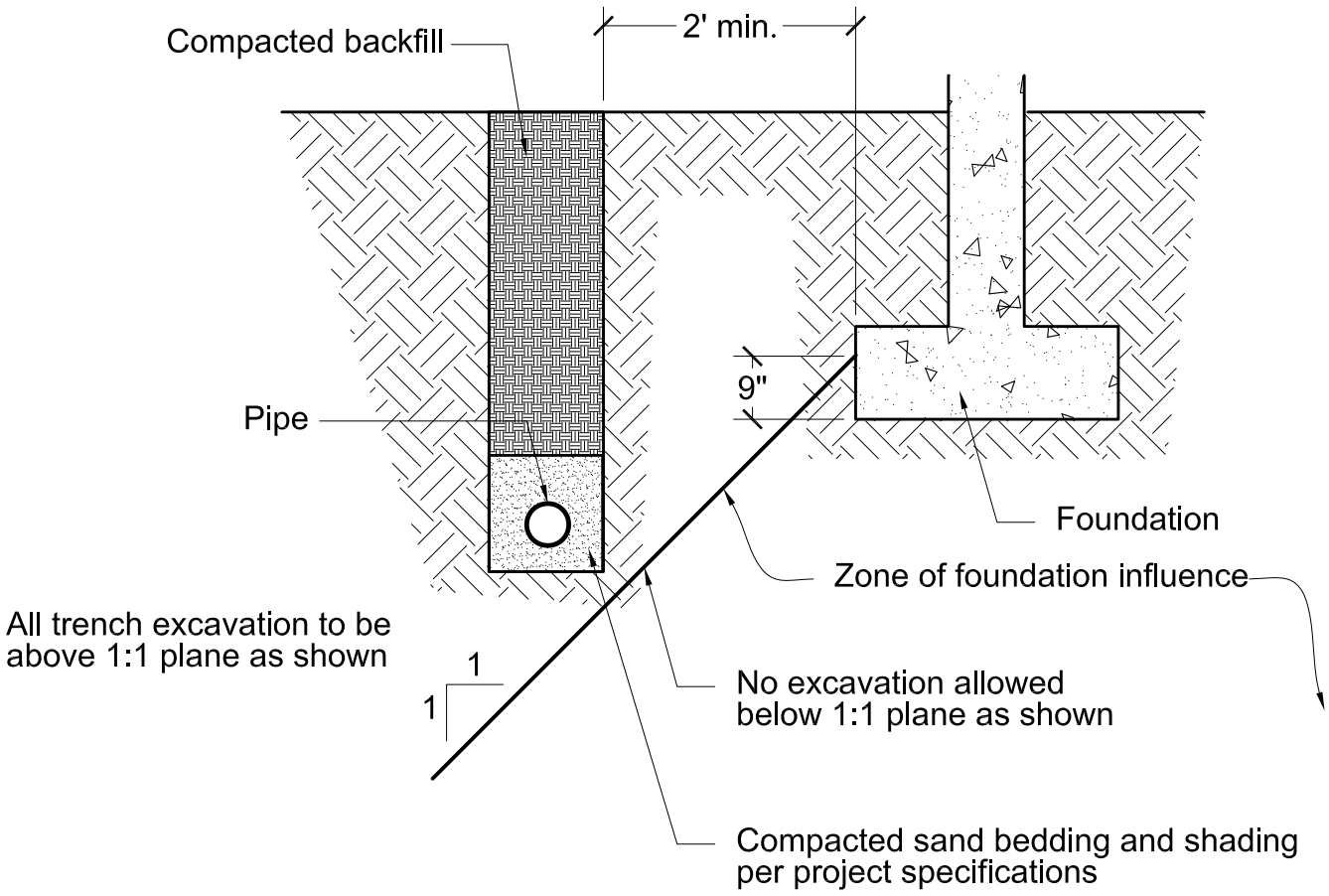




APPENDIX C

Typical Detail A: Pipe Placed Parallel to Foundations

TYPICAL DETAIL A:
PIPE PLACED PARALLEL TO FOUNDATIONS



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems

2049 Preisker Lane, Suite E
Santa Maria, California 93454

(805) 928-2991 • FAX (805) 928-9253
E-mail: esc@earthsystems.com

ATTACHMENT 2

Insight Environmental, Inc. Limited Asbestos Survey, Dated May 2, 2025

Insight
ENVIRONMENTAL, INC.
TESTING & CONSULTING

Asbestos • Mold • Lead • Indoor Air Quality
www.InsightEnviro.com info@InsightEnviro.com
tel: 805.898.1123 1180 Eugenia Place, Ste. 103
fax: 805.569.6466 Carpinteria, CA 93013

LIMITED ASBESTOS SURVEY

DATE: May 2, 2025

ATTENTION: County of Santa Barbara

SUBJECT PROPERTY: 4436 Calle Real – Main Jail
Santa Barbara, California 93110

INTRODUCTION:

On April 30, 2025, Insight Environmental, Inc. performed a Limited Asbestos Survey at the subject property. The purpose of this survey was to determine the presence or absence of asbestos containing materials present in the property prior to disturbance. This Survey was limited to the accessible building materials within the areas identified by the client. This survey was conducted by Thomas Knouse (Cal-OSHA CSST #18-6355) under the direct supervision of Robert Augspurger (CAC #19-6515).

ASBESTOS GUIDELINES

According to standards established by the Environmental Protection Agency (EPA), any material that contains greater than 1% of asbestos is considered to be an Asbestos Containing Material (ACM), and is subject to regulatory provisions under 40 CFR 61.

Materials containing greater than one tenth of one percent (>0.1%) and less than one percent are considered Asbestos Containing Construction Materials (ACCM) according to Cal-OSHA. These materials are subject to regulatory provisions under the California Code of Regulations (CCR), Title 8; Section 1529.

All material samples were forwarded to EMSL Analytical, Inc., (NVLAP #101048-0 and Cal ELAP #1877). See attached laboratory report for details.

ASBESTOS SAMPLING SUMMARY

Non-Asbestos Containing Materials: According to independent laboratory analysis, no asbestos was detected in the following sampled materials:

- The drywall/ joint compound wall and ceiling materials sampled at five locations in homogeneous group #1(locker room)
- The drywall/ joint compound wall and ceiling materials sampled at three locations in homogeneous group #2 (bathroom)
- The stucco materials sampled at five locations
- The concrete foundation materials sampled at two locations

CONCLUSIONS & RECOMMENDATIONS:

1. Insight Environmental Inc. concludes, according to independent laboratory analysis, no asbestos was detected in the sampled building materials collected from the areas of anticipated disturbance as identified by the client.

2. If during the course of any renovation/demolition, any other suspected asbestos or lead containing materials are discovered, Insight Environmental, Inc. should be contacted for further testing and recommendations.

LIMITATIONS:

The findings set forth in this survey are strictly limited to the time, date, and the scope of the evaluation. Insight Environmental, Inc. does not guarantee that all asbestos will be removed or that asbestos materials in concealed locations have been discovered or disclosed.



Thomas Knouse
Insight Environmental Inc.
Cal-OSHA CSST #18-6355



Robert Augspurger
Insight Environmental Inc.
Cal-OSHA CAC # 19-6515
CDPH Sampling Technician #LRC-0000-2979

Insight
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TESTING & CONSULTING

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fax: 805.569.6466 Carpinteria, CA 93013

LIMITED ASBESTOS SURVEY

DATE: **May 2, 2025**

ATTENTION: **County of Santa Barbara**

SUBJECT PROPERTY: **4436 Calle Real – Main Jail**
Santa Barbara, California 93110

INTRODUCTION:

On April 30, 2025, Insight Environmental, Inc. performed a Limited Asbestos Survey at the subject property. The purpose of this survey was to determine the presence or absence of asbestos containing materials present in the property prior to disturbance. This Survey was limited to the accessible building materials within the areas identified by the client. This survey was conducted by Thomas Knouse (Cal-OSHA CSST #18-6355) under the direct supervision of Robert Augspurger (CAC #19-6515).

ASBESTOS GUIDELINES

According to standards established by the Environmental Protection Agency (EPA), any material that contains greater than 1% of asbestos is considered to be an Asbestos Containing Material (ACM), and is subject to regulatory provisions under 40 CFR 61.

Materials containing greater than one tenth of one percent (>0.1%) and less than one percent are considered Asbestos Containing Construction Materials (ACCM) according to Cal-OSHA. These materials are subject to regulatory provisions under the California Code of Regulations (CCR), Title 8; Section 1529.

All material samples were forwarded to EMSL Analytical, Inc., (NVLAP #101048-0 and Cal ELAP #1877). See attached laboratory report for details.

ASBESTOS SAMPLING SUMMARY

Non-Asbestos Containing Materials: According to independent laboratory analysis, no asbestos was detected in the following sampled materials:

- The drywall/ joint compound wall and ceiling materials sampled at five locations in homogeneous group #1(locker room)
- The drywall/ joint compound wall and ceiling materials sampled at three locations in homogeneous group #2 (bathroom)
- The stucco materials sampled at five locations
- The concrete foundation materials sampled at two locations

CONCLUSIONS & RECOMMENDATIONS:

1. Insight Environmental Inc. concludes, according to independent laboratory analysis, no asbestos was detected in the sampled building materials collected from the areas of anticipated disturbance as identified by the client.

2. If during the course of any renovation/demolition, any other suspected asbestos or lead containing materials are discovered, Insight Environmental, Inc. should be contacted for further testing and recommendations.

LIMITATIONS:

The findings set forth in this survey are strictly limited to the time, date, and the scope of the evaluation. Insight Environmental, Inc. does not guarantee that all asbestos will be removed or that asbestos materials in concealed locations have been discovered or disclosed.



Thomas Knouse
Insight Environmental Inc.
Cal-OSHA CSST #18-6355



Robert Augspurger
Insight Environmental Inc.
Cal-OSHA CAC # 19-6515
CDPH Sampling Technician #LRC-0000-2979

LA Testing

520 Mission Street South Pasadena, CA 91030
Tel/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com / pasadenalab@latesting.com

LA Testing Order:	322508750
Customer ID:	DEVR72
Customer PO:	
Project ID:	

Attention:	Lab Reports	**Phone:**	(805) 898-1123
	Insight Environmental Inc.	**Fax:**	(805) 569-6466
	1180 Eugenia Place	**Received Date:**	05/01/2025 9:45 AM
	Suite 103	**Analysis Date:**	05/01/2025
	Carpinteria, CA 93013	**Collected Date:**	04/30/2025
Project:	4436 Calle Real Goleta		

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
1-Drywall *322508750-0001*	Locker ceiling - Drywall/JC HG.1	Brown/White Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
1-Joint Compound *322508750-0001A*	Locker ceiling - Drywall/JC HG.1	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2-Drywall *322508750-0002*	Locker ceiling - Drywall/JC HG.1	Brown/White Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
2-Joint Compound *322508750-0002A*	Locker ceiling - Drywall/JC HG.1	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
3-Drywall *322508750-0003*	Locker ceiling - Drywall/JC HG.1	Brown/White Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
3-Joint Compound *322508750-0003A*	Locker ceiling - Drywall/JC HG.1	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
4-Drywall *322508750-0004*	Locker wall - Drywall/JC HG.1	Brown/White Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
4-Joint Compound *322508750-0004A*	Locker wall - Drywall/JC HG.1	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
5-Drywall *322508750-0005*	Locker wall - Drywall/JC HG.1	Brown/White Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
5-Joint Compound *322508750-0005A*	Locker wall - Drywall/JC HG.1	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
6-Drywall *322508750-0006*	Bath ceiling - Drywall/JC HG.2	White Non-Fibrous Homogeneous	3% Cellulose	97% Non-fibrous (Other)	None Detected
6-Joint Compound *322508750-0006A*	Bath ceiling - Drywall/JC HG.2	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
7-Drywall *322508750-0007*	Bath wall - Drywall/JC HG.2	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass	78% Non-fibrous (Other)	None Detected
7-Joint Compound *322508750-0007A*	Bath wall - Drywall/JC HG.2	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
8-Drywall *322508750-0008*	Locker wall - Drywall/JC HG.2	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass	78% Non-fibrous (Other)	None Detected
8-Joint Compound *322508750-0008A*	Locker wall - Drywall/JC HG.2	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 05/01/2025 15:48:44

LA Testing

520 Mission Street South Pasadena, CA 91030

Tel/Fax: (323) 254-9960 / (323) 254-9982

http://www.LATesting.com / pasadenalab@latesting.com

LA Testing Order:	322508750
Customer ID:	DEVR72
Customer PO:	
Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
9-Finish Coat *322508750-0009*	Locker wall - Stucco	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
9-Base Coat *322508750-0009A*	Locker wall - Stucco	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
10-Finish Coat *322508750-0010*	Locker wall - Stucco	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
10-Base Coat *322508750-0010A*	Locker wall - Stucco	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
11-Finish Coat *322508750-0011*	Locker wall - Stucco	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
11-Base Coat *322508750-0011A*	Locker wall - Stucco	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
12-Finish Coat *322508750-0012*	Bath wall - Stucco	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
12-Base Coat *322508750-0012A*	Bath wall - Stucco	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
13-Finish Coat 1 *322508750-0013*	Bath wall - Stucco	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
13-Base Coat *322508750-0013A*	Bath wall - Stucco	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
13-Base Coat *322508750-0013B*	Bath wall - Stucco	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
14 *322508750-0014*	Foundation - Concrete	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
15 *322508750-0015*	Foundation - Concrete	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

James Siepler (12)
Nahid Motamedi (17)

Feng Liang, Laboratory Manager
or Other Approved Signatory

LA Testing maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by LA Testing. LA Testing bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore LA Testing recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by LA Testing South Pasadena, CA NVLAP Lab Code 200232-0, CA ELAP 2283

Initial report from: 05/01/2025 15:48:44

#322508750

OrderID: 322508750

EMAIL RESULTS TO:	CHAIN OF CUSTODY
labs@insightenviro.com	INSIGHT ENVIRONMENTAL, INC. – Customer ID: DEVR72 ADDRESS: 1180 Eugenia Place, #103, Carpinteria, CA 93013 Office Phone # 805-898-1123 / Fax # 805-569-6466

Insight ENVIRONMENTAL, INC. www.InsightEnviro.com 805.898.1123

Project Name:	4436 Calle Real Goleta
Turnaround Time:	3 Hour (X) | 6 Hour ( ) | 8 Hour ( ) | 24 Hour ( ) | 48 Hour ( ) | 72 Hour ( ) | Other:
Special Instructions:	( ) **400 Point Count**– Perform a 400 point count on all positive materials (<1% - 2%) - (X) **Composite Analysis** – Perform a composite analysis on **ONE** positive Drywall/Joint Compound sample for disposal purposes

Analysis - (X) **ASBESTOS BULK:** PLM (reporting limit) PLM EPA 600/R-93/116 (<1%) ( ) **ASBESTOS AIR:** PCM NIOSH 7400 ( ) **ASBESTOS TAPE:** PLM Qualitative
( ) **LEAD PAINT CHIP:** PPM (mg/kg) SW846-7000B FAA (reporting limit) 0.01% ( ) **LEAD WIPE** – Non ASTM SW846-7000B FAA (reporting limit) 10 µg/wipe
( ) **MOLD AIR:** Non Culturable Spore Trap (Allergenco - D) **OR** (Air-O-Cell M001) Fungal Direct Examination ( ) **MOLD BULK/TAPE:** Fungal Direct Examination ( ) **OTHER:**

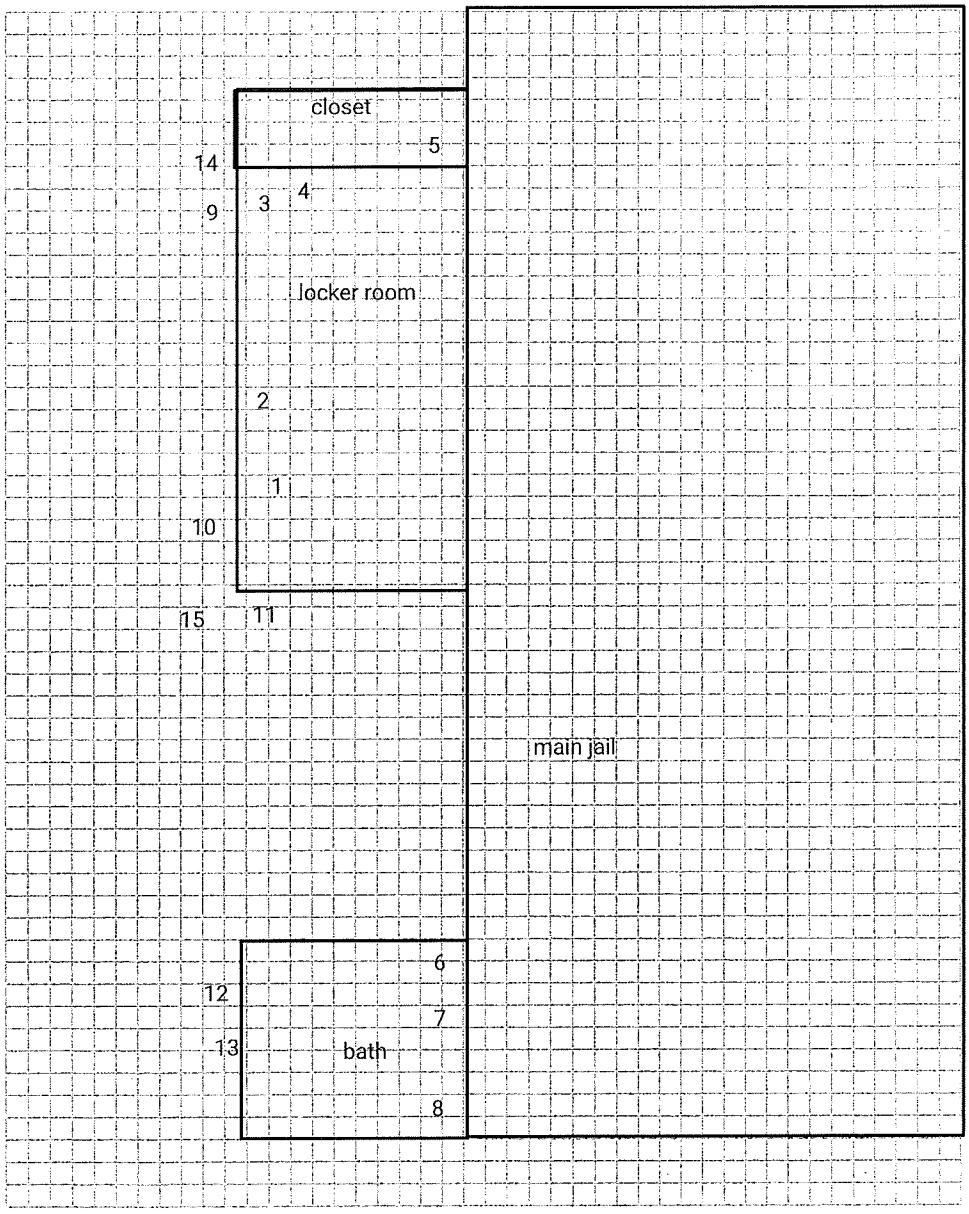
Sample #	Material Description	Sample Location	Volume / Area	Estimated Quantity	Estimated Damage/ Qty.	Date / Time
1	drywall/J.C. HG.1	locker ceiling				4/30
2	↓ ↓	↓ ↓				
3						
4		wall				
5		↓				
6	HG.2	bath ceiling				
7	↓	↓ wall				
8						
9	Stucco	locker				
10	↓	↓				
11						
12		bath				
13		↓				
14	Concrete	Foundation				
15	↓	↓				

Collected & Relinquished By: Thomas Knouse	Date:	Relinquished Time:	Samples Received By:	Date:	Time:
TK	4/30/25		Rey Garcia (JJ)	5/1/25	9:45AM

Site Map

Site Address: 4436 Calle Real
Santa Barbara, California 93110

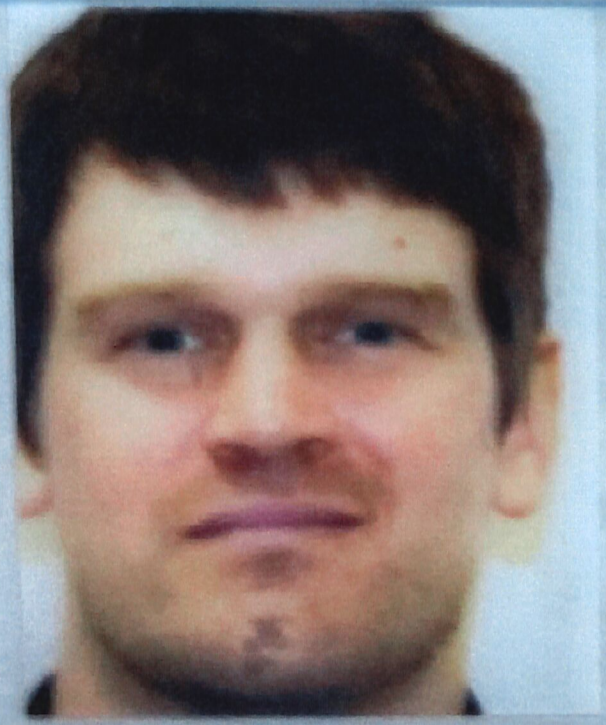
Insight
ENVIRONMENTAL, INC.
www.InsightEnvir.com
805.898.1123



State of California
Division of Occupational Safety and Health

Certified Site Surveillance Technician

Thomas S Knouse
Name



Certification No. **18-6355**

Expires on **10/17/25**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

State of California

Division of Occupational Safety and Health

Certified As tos Consultant

Name **Robert S Augspurger**



Certification No. **19-6515**

Expires on **05/15/25**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

ATTACHMENT 3

CEQA Notice of Exemption, Dated March 6, 2024

NOTICE OF EXEMPTION

TO: Santa Barbara County Clerk of the Board of Supervisors

Clerk of the Board-Filing Date

FROM: GENERAL SERVICES DEPARTMENT, LEAD AGENCY

Based on a review of the project and project description, the following activity is determined as indicated below. Specific findings are indicated below and environmental review requirements of the California Environmental Quality Act (CEQA) of 1970, as amended, as defined in the State and County Guidelines for the implementation of CEQA are included, if applicable.

APN(s) (or N/A): **059-140-029** **Case No. GSD-030624-20041-0001**
(current date, project# and NOE number for this project)

LOCATION(city/unincorporated area/NA): **City of Santa Barbara**

PROJECT TITLE: Santa Barbara County Main Jail Renovation

PROJECT DESCRIPTION : The Santa Barbara County Main Jail, located at 4436 Calle Real in the City of Santa Barbara in the County, will be renovated to address immediate requirements identified pursuant to a settlement reached in 2020 between Santa Barbara County and the Santa Barbara Sheriff's Office, and Disability Rights California, Prison Law Office, and King & Spalding LLP. The project will include division of the existing recreation yard for inmates to provide additional out-of-cell time, Americans with Disabilities improvements within the existing Inmate Reception Center (the "IRC"), and renovations to the IRC to accommodate an improved intake area. Improvements are part of a larger initiative to reduce the Main Jail used capacity from 751 to 128 beds as a result of the County opening a new jail located in the northern area of the County, improve booking and arraignment in south county and generate operational savings. The project will also include capital improvements to extend the useful life of the facilities, including roofing and HVAC replacement in specified areas, parking lot and walkway replacements, elevator replacement, and door system and lock replacement within the IRC.

Construction is expected to commence in March 2024, with completion expected in February 2027.

DETERMINATION:

☐ **NOT A PROJECT** (§15378): A *project* as defined by CEQA is one in which the whole of the action has a potential for resulting in either a direct or indirect physical change in the environment, or a reasonably foreseeable indirect physical change in the environment. The action described above has been determined by the Lead Agency to not be a Project under CEQA. **No further environmental review is required.**

EXEMPT STATUS: (Check Only One)
☐ Ministerial (§15369)
☐ Statutory (§15260)
☒ Categorical Exemption (§15301, §15302, §15304)
☐ Emergency Project (§15359)
☒ Cite specific CEQA Guideline Sub-Section(s) §15301(a)(c)(d)(e), §15302, §15304(a)

FINDINGS TO SUPPORT DETERMINATION:

This project consists of operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. In terms of replacement or reconstruction of existing structures or facilities, the structures or facilities will be located on the same site and will have substantially the same purpose and capacity of the structure replaced. For alterations in the condition of land, such work does not involve the removal of healthy, mature, scenic trees.

DISTRIBUTION: File, Clerk of the Board

Patrick Zuroske, GS Patrick M. Zuroske 3/06/2024

Department/Division Representative (print & sign name) Date

NOTE: A copy must be posted at least 6 days prior to consideration of the activity by the decision-makers to comply with County CEQA guidelines and a copy must be filed with the County Clerk of the Board after project approval to begin a 35 day statue of limitations on legal challenges.

COUNTY of SANTA BARBARA

one COUNTY one FUTURE

Technical Specifications

SANTA BARBARA COUNTY
SOUTH COUNTY MAIN JAIL IRC ADA AND INTAKE RENOVATION

nacht&lewis

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Architecture:
Nacht & Lewis Architects
600 Q Street, STE. 100
Sacramento, CA 95811



Eric P. Fadness 9/8/2025

Date

Civil Engineering:
Willdan
2374 Poli Street, Suite 101
Ventura, CA 93001



Tyrone Peter 9/3/2025
Date

Structural Engineering:
CYS Structural Engineers
2710 Gateway Oaks Drive, Suite 190N
Sacramento, CA 95833



Art Ross 9/3/2025
Date

Mechanical & Plumbing Engineering:
Capital Engineering Consultants, Inc.
11020 Sun Center Drive, Suite 100
Rancho Cordova, CA 95670



Anthony Colacchia 9/3/2025
Date

Electrical Engineering:
JMPE Electrical Engineering & Lighting Design
627 Olive Street
Santa Barbara, CA 93101



John Maloney 9/3/2025
Date

Security Engineering:
AVS Security and Electrical
842 Boggs Avenue, Suite H
Fremont, CA 94539



Timothy Lincoln
Date

Fire Protection Engineering:
Collings & Associates, LLC
260 Maple Court, Suite 241
Ventura, CA 93003



D. Ted Edelmann 9/3/2025

Date

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. List of unit prices, for use in preparing Bids.

B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

1.2 COSTS INCLUDED

A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.3 UNIT QUANTITIES SPECIFIED

A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.4 MEASUREMENT OF QUANTITIES

A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

B. Assist by providing necessary equipment, workers, and survey personnel as required.

C. Measurement by Weight: Measured by weight in metric tonnage.

D. Measurement by Area: Measured by square dimension using mean length and width or radius.

E. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

1.5 PAYMENT

A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.

B. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected Products.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 012200

SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General administrative requirements.

B. Web-based project software service.

C. Electronic document submittal service.

D. Preconstruction meeting.

E. Site mobilization meeting.

F. Progress meetings.

G. Construction progress schedule.

H. Contractor's daily reports.

I. Progress photographs.

J. Coordination drawings.

K. Submittals for review, information, and project closeout.

L. Number of copies of submittals.

M. Requests for Interpretation (RFI) procedures.

N. Submittal procedures.

1.2 RELATED REQUIREMENTS

A. Section 007200 - General Conditions: Dates for applications for payment.

B. Section 007200 - General Conditions: Duties of the Construction Manager.

C. Section 007300 - Supplementary Conditions: Duties of the Construction Manager.

D. Section 013329.02 - Sustainable Design Reporting - LEED v4: Reporting related to sustainability certification project procedures.

E. Section 013329.03 - Sustainable Design Reporting - Green Globes: Reporting related to sustainability certification project procedures.

F. Section 013329.12 - Sustainable Design Reporting - LEED v4.1: Reporting related to sustainability certification project procedures.

G. Section 016000 - Product Requirements: General product requirements.

H. Section 017000 - Execution and Closeout Requirements: Additional coordination requirements.

I. Section 017800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

J. Section 019113 - General Commissioning Requirements: Additional procedures for submittals relating to commissioning.

K. Where submittals are indicated for review by both Architect and the Commissioning Authority, submit one extra and route to Architect first, for forwarding to the Commissioning Authority.

L. Where submittals are not indicated to be reviewed by Architect, submit directly to the Commissioning Authority; otherwise, the procedures specified in this section apply to commissioning submittals.

1.3 REFERENCE STANDARDS

A. AIA G716 - Request for Information; 2004.

B. AIA G810 - Transmittal Letter; 2001.

C. CSI/CSC Form 12.1A - Submittal Transmittal; Current Edition.

D. CSI/CSC Form 13.2A - Request for Information; Current Edition.

1.4 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 017000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Make the following types of submittals to Architect:

C. Requests for Interpretation (RFI).

D. Requests for substitution.

E. Shop drawings, product data, and samples.

F. Test and inspection reports.

G. Design data.

H. Manufacturer's instructions and field reports.

I. Applications for payment and change order requests.

J. Progress schedules.

K. Coordination drawings.

L. Correction Punch List and Final Correction Punch List for Substantial Completion.

M. Closeout submittals.

N. _____.

1.5 PROJECT COORDINATOR

A. Project Coordinator: Construction Manager.

B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for _____ access, traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Project Coordinator.

D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 011000 - Summary.

F. Coordinate field engineering and layout work under instructions of the Project Coordinator.

G. Make the following types of submittals to Architect through the Project Coordinator:

H. Requests for Interpretation.

I. Requests for substitution.

J. Shop drawings, product data, and samples.

K. Test and inspection reports.

1. Design data.
2. Manufacturer's instructions and field reports.
3. Applications for payment and change order requests.
4. Progress schedules.
5. Coordination drawings.
6. Correction Punch List and Final Correction Punch List for Substantial Completion.
7. Closeout submittals.

PART 1 - PRODUCTS - Not Used

PART 2 - EXECUTION

1.6 Web-Based Project Software Service

A. Web-Based Project Software Service: Provide, administer, and use web-based project software to host and manage project communication and documentation.

1. Include, at minimum, the following features:
    a. Project directory, including Owner, Contractor, subcontractors, Architect, Architect's consultants, and other entities involved in the project. Include names of contact persons and contact information for each entity.
    b. Access control for each entity and for each workflow process to determine each entity's digital rights to create, modify, view, and print documents.
    c. Workflow planning, allowing customization of workflow for each project entity.
    d. Creation, logging, tracking, and notification for project communications.
    e. Tracking of project communication statuses in real time, including timestamped response log.
    f. Procedures for viewing PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
    g. Processing and tracking of payment applications.
    h. Processing and tracking of contract modifications.
    i. Creation and distribution of meeting minutes.
    j. Document management for drawings, specifications, and coordination drawings, including revision control.
    k. Management of construction progress photographs.
    l. Mobile device compatibility.

m. Creation of data analytics reports.

n. Creation and export of editable logs for software functions. Provide Owner, Architect, and Architect's consultants with rights and ability to download logs when requested.

2. Provide up to 20 user licenses for use by Owner, Architect, Architect's consultants, and other entities involved in the project.

3. Comply with the software service's current published licensing agreements.

4. Training: Provide one-hour, web-based training session for users of software service. Further training is the responsibility of the user.

a. Representatives of Owner are scheduled and included in this training.

5. Project Closeout: Architect determines when to terminate the software service for the project and is responsible for obtaining archive copies of files for Owner.

6. Web-Based Project Software Services: The selected service is:

1.7 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.

1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.

2. Contractor and Architect are required to use this service.

3. It is Contractor's responsibility to submit documents in allowable format.
4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.

C. Submittal Service: The selected service is:

D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.

E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

1.8 PRECONSTRUCTION MEETING

A. Project Coordinator will schedule a meeting after Notice of Award.

B. Attendance Required:

1. Owner.
2. Architect.

3. Contractor.

C. Agenda:

1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
5. Designation of personnel representing the parties to Contract, _____ and Architect.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

1.9 SITE MOBILIZATION MEETING

A. Project Coordinator will schedule meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:

1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.

C. Agenda:

1. Use of premises by Owner and Contractor.

2. Owner's requirements.

3. Construction facilities and controls provided by Owner.

4. Temporary utilities provided by Owner.

5. Survey and building layout.

6. Security and housekeeping procedures.

7. Schedules.

8. Application for payment procedures.

9. Procedures for testing.

10. Procedures for maintaining record documents.

11. Requirements for start-up of equipment.

12. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

1.10 PROGRESS MEETINGS

A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Attendance Required:

1. Contractor.

2. Owner.

3. Architect.

4. Special consultants.

5. Contractor's superintendent.

6. Major subcontractors.

C. Agenda:

1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of RFIs log and status of responses.
7. Review of off-site fabrication and delivery schedules.
8. Maintenance of progress schedule.
9. Corrective measures to regain projected schedules.
10. Planned progress during succeeding work period.
11. Coordination of projected progress.
12. Maintenance of quality and work standards.
13. Effect of proposed changes on progress schedule and coordination.
14. Other business relating to work.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

1.11 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.

1. Include written certification that major contractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

1.12 DAILY CONSTRUCTION REPORTS

A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.

B. In addition to transmitting electronically a copy to Owner and Architect, submit two printed copies at weekly intervals.

1. Submit in format acceptable to Owner.
2. Submit using required form, a sample of which is appended to this section.

C. Prepare a daily construction report recording the following information concerning events at Project site and project progress:

1. Date.
2. High and low temperatures, and general weather conditions.
3. List of subcontractors at Project site.
4. List of separate contractors at Project site.
5. Approximate count of personnel at Project site.
    a. Include a breakdown for supervisors, laborers, journeymen, equipment operators, and helpers.
6. Major equipment at Project site.
7. Material deliveries.
8. Safety, environmental, or industrial relations incidents.
9. Meetings and significant decisions.
10. Unusual events (submit a separate special report).
11. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual

activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.

12. Meter readings and similar recordings.
13. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
14. Change Orders received and implemented.
15. Testing and/or inspections performed.
16. Signature of Contractor's authorized representative.

1.13 PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.

B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.

C. Photography Type: Digital; electronic files.

D. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.

E. In addition to periodic, recurring views, take photographs of each of the following events:

1. Completion of site clearing.
2. Excavations in progress.
3. Foundations in progress and upon completion.
4. Structural framing in progress and upon completion.
5. Final completion, minimum of ten (10) photos.

F. Take photographs as evidence of existing project conditions as follows:

1. Interior views: ____.

2. Exterior views: ____.

G. Views:

1. Provide aerial photographs from four cardinal views at each specified time, until structure is enclosed.
2. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
3. Consult with Architect for instructions on views required.
4. Provide factual presentation.
5. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
6. Point of View Sketch: Provide sketch identifying point of view of each photograph.

H. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.

1. Delivery Medium: Via email.
2. File Naming: Include project identification, date and time of view, and view identification.
3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
5. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

I. Optical Slides: 35 mm, color; 1 set assembled into transparent slide holder sheets for 3-ring binder.

1. Identification: Mark each slide with project identification, date and time of view, and view identification.

2. Point of View Sketch: Include printed copy of point of view sketch with each submittal; include point of view identification on each slide.

J. Photographer Quality Prints: Full color; three prints of each view.

1. Glossy; smooth texture; white tint; single weight; high contrast.
2. Size: 8 by 10 inch (200 by 250 mm); mounted for binder and tabs.
3. Identify each print on back. Identify name of Project, contract number, phase, orientation of view, date and time of view, name and address of photographer, and photographer's numbered identification of exposure.
4. Binders: Provide one 2-inch binder with initial submittal.
5. Point of View Sketch: Include printed copy of point of view sketch with each submittal; include point of view identification on each print.
6. Negatives: Include negatives with print submittal, arranged in chronological sequence, with typed table of contents.
7. Negatives: Negatives will remain property of photographer; require that photographer maintain negatives for ten years from date of Substantial Completion.

1.14 COORDINATION DRAWINGS

A. Provide information required by Project Coordinator for preparation of coordination drawings.

B. Review drawings prior to submission to Architect.

1.15 REQUESTS FOR INTERPRETATION (RFI)

A. Definition: A request seeking one of the following:

1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the

same space (interference); or when an item of work is described differently at more than one place in Contract Documents.

2. A resolution to an issue which has arisen due to field conditions and affects design intent.

B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.

1. Prepare a separate RFI for each specific item.
    a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
    b. Do not forward requests which solely require internal coordination between subcontractors.
2. Prepare in a format and with content acceptable to Owner.
    a. Use AIA G716 - Request for Information .
    b. Use CSI/CSC Form 13.2A - Request for Interpretation.
3. Prepare using an electronic version of the form appended to this section.
4. Prepare using software provided by the Electronic Document Submittal Service.
5. Combine RFI and its attachments into a single electronic file. PDF format is preferred.

D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.

1. Official Project name and number, and any additional required identifiers established in Contract Documents.

2. Owner's, Architect's, and Contractor's names.
3. Discrete and consecutive RFI number, and descriptive subject/title.
4. Issue date, and requested reply date.
5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.

E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.

1. Indicate current status of every RFI. Update log promptly and on a regular basis.
2. Note dates of when each request is made, and when a response is received.
3. Highlight items requiring priority or expedited response.
4. Identify and include improper or frivolous RFIs.

G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.

1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.

H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

1. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
2. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
3. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

1.16 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format.

1. Submit at the same time as the preliminary schedule specified in Section - 013216 - Construction Progress Schedule.
2. Coordinate with Contractor's construction schedule and schedule of values.
3. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
4. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

1.17 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:

1. Product data.
2. Shop drawings.
3. Samples for selection.
4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 017800 - Closeout Submittals.

1.18 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:

1. Design data.
2. Certificates.
3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions.
6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

1.19 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 017800 - Closeout Submittals:

1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

1.20 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.

1. After review, produce duplicates.
2. Retained samples will not be returned to Contractor unless specifically so stated.

1.21 SUBMITTAL PROCEDURES

A. General Requirements:

1. Use a separate transmittal for each item.

2. Use a single transmittal for related items.
3. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
4. Transmit using approved form.
    a. Use Form AIA G810.
    b. Use Form CSI/CSC Form 12.1A.
    c. Use Contractor's form, subject to prior approval by Architect.
    d. Use form generated by Electronic Document Submittal Service software.
5. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
6. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
7. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
8. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    a. Deliver submittals to Architect at business address.
    b. Deliver submittals to Construction Manager at business address.
    c. Deliver submittals to _____ at business address.
    d. Send submittals in electronic format via email to Architect.

e. Upload submittals in electronic form to Electronic Document Submittal Service website.

9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
10. Provide space for Contractor and Architect review stamps.
11. When revised for resubmission, identify all changes made since previous submission.
12. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
13. Submittals not requested will not be recognized or processed.
14. Submittals not requested will be recognized, and will be returned "Not Reviewed",

B. Product Data Procedures:

1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Submit concurrently with related shop drawing submittal.
4. Do not submit (Material) Safety Data Sheets for materials or products.
5. Submit sustainable design reporting submittals under separate cover.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Do not reproduce Contract Documents to create shop drawings.
3. Use of reproductions of Contract Documents in digital data form to create shop drawings is only permitted as defined _____.
4. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

1.22 SUBMITTAL REVIEW

A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.

C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.

D. Architect's and consultants' actions on items submitted for review:

1. Authorizing purchasing, fabrication, delivery, and installation:
   a. "Approved", or language with same legal meaning.
   b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
   c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.

1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.

2) Non-responsive resubmittals may be rejected.

2. Not Authorizing fabrication, delivery, and installation:

a. "Revise and Resubmit".

1) Resubmit revised item, with review notations acknowledged and incorporated.

2) Non-responsive resubmittals may be rejected.

b. "Rejected".

1) Submit item complying with requirements of Contract Documents.

E. Architect's and consultants' actions on items submitted for information:

1. Items for which no action was taken:

a. "Received" - to notify the Contractor that the submittal has been received for record only.

2. Items for which action was taken:

a. "Reviewed" - no further action is required from Contractor.

END OF SECTION 013000

SECTION 013513.16 - SPECIAL PROJECT PROCEDURES FOR DETENTION FACILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of This Section Includes: Special project procedures for coordination of detention work.

B. The DEC shall submit an aggregate bid for Work described in the following specification sections. The details and specific Scope of Work related to the installation of the equipment shall be defined between the DEC and General Contractor at the time of Bid. The DEC shall be responsible for performing the coordination required between detention equipment and the security electronic systems, as well as the Electrical work as it relates to security hardware.

C. Detention work required by, but not specified in, this Section includes the following:

1. Section 088853 "Security Glazing."
2. Section 095753 "Security Ceiling Assemblies."
3. Section 102813.63 "Detention Toilet Accessories."
4. Section 104413 "Fire Protection Cabinets."
5. Section 119812 "Detention Doors and Frames."
6. Section 119814 "Detention Door Hardware."
7. Section 125500 "Detention Furniture."
8. Section 224600 "Security Plumbing Fixtures."
9. Section 281300 "Access Control Software and Database Management."
10. Section 281500 "Access Control Hardware Devices."
11. Section 282000 "Video Surveillance."
12. Section 285213 "Detention Monitoring and Control System and Interfaces."

D. Approved DEC firms must base their bid on the equipment and products specified herein. Design changes or substitutions will not be allowed unless approved prior to bidding. Value engineering proposals will not be considered.

E. The DEC shall have in their employ a full time project manager and superintendent to supervise the work of this section. The superintendent’s sole responsibility shall be to supervise and coordinate the scope of work of the DEC. The superintendent shall be at the site at all times when the work is being performed.

F. If any portion of the work listed in paragraph 1.2.A.1.a above is subcontracted, the responsibility for equipment and system coordination remains with the DEC.

G. The DEC shall be fully responsible for acquiring and paying for any and all licenses and permits required to perform their Work. If licenses are required before bidding, then the DEC shall not bid any portion of the Work until the required licenses are obtained.

1.2 SCOPE AND RESONSIBILITY

A. The DEC shall be fully responsible for performing the coordination required between the Division 08 Detention Scope of Work with the Division 28 Security Electronics Scope of Work Coordinate size and location of recesses in wall construction to receive detention furniture.

B. The DEC shall be responsible for the coordination, integration and interfacing of the products and systems specified in Division 8 and Division 28, and in accordance with shop drawings and submittals approved by the Architect / Consultant.

C. The DEC shall be responsible for all labor and equipment for receiving, unloading, distributing, setting and installation of all security related items. This includes, but may not be limited to, bars, plates, angles, access frames and doors, security frames and security sidelights, and miscellaneous security frames specified in Division 8.

D. Under the requirements of this Section, the DEC shall be responsible for furnishing and installing the following, as specified in all locations. The details and specific scope of work related to a portion of the installation of this equipment shall be defined between the DEC and General Contractor at the time of Bid.

1. Detention Hollow Metal Frames, Sidelights, and Interior Security Windows.
2. Detention Hollow Metal Doors.
3. Detention Hardware.
4. Security and Non-Security Glass and Glazing for Security Hollow Metal and Security Windows.

E. Installation of all systems and equipment is subject to clarifications as indicated in the reviewed shop drawings and field coordination drawings.

F. The DEC shall be fully responsible for acquiring and paying for all licenses and permits required to per- form their Work. If licenses are required before bidding, then the DEC shall not bid any portion of the Work until the required licenses are obtained.

1.3 INFORMATIONAL SUBMITTALS

A. General: Submittals shall be made in accordance with Conditions of Contract and Division 1 Sections. DEC shall review Detention Work submittals and verify construction details and provide answers to manufacturer’s questions prior to submission to the General Contractor.

B. Product Data: Mark each copy to show applicable choices and options where printed product data includes information on several products, some of which are not required, mark copies to indicate the applicable information.

C. Shop Drawings: Highlight, encircle, or otherwise indicate deviations from the Contract Documents.

D. Coordination Drawings: Prepare and submit Project-specific coordination drawings, drawn to scale, on which the following items are shown and coordinated with each

other, using input from installers of the items involved. Address the following, as applicable:

1. See individual Sections for specific coordination drawing requirements for products and equipment.
2. Show relationship of components indicated on separate Shop Drawings.
3. Show dimensions and clearances of interrelated detention work.
4. Provide templates and patterns.
5. Indicate required operation sequences of interrelated detention work.
6. Indicate required installation sequences.
7. Include information necessary for interface with other trades and building components.
8. See special construction, mechanical, plumbing, electrical, communications, and electronic safety and security Sections for specific coordination drawing requirements for required installations.

E. The submittal shall reflect the equipment and material as they are defined by the project plans and specifications, contract and signed/documented clarifications, substitutions and changes to the above documents by the Architect.

F. It is the DEC's responsibility to coordinate detention/security items in this scope of work, and to answer all manufacturer questions or concerns that are not strictly design related. The DEC shall redline the manufacturers' individual shop drawings and/or schedules, and note corrections prior to submittal for Architectural/Consultant review. When multiple items are submitted by the manufacturer on a single cut sheet, the DEC shall note with an arrow, circle or note cloud, to show which product on the sheet is submitted for this scope of work. DEC submittals not reviewed and redlined prior to submittal to Architect/Consultant for final review, will be returned rejected.

G. Qualified installers trained by the manufacturer shall perform the installation of all detention hardware and sliding devices. Submittal of written confirmation from the manufacturer showing individual field technicians as approved installers shall be required.

H. The submittal documents shall be updated throughout the project construction. These documents shall be included with the operation and maintenance manuals to provide accurate as-built documentation of all installed equipment and material.

I. Submittals not organized as specified shall be considered incomplete and will be rejected.

J. Detention Specialist Qualification Data: For qualified Detention Specialist to demonstrate capabilities and experience. Include list of completed projects with project names and addresses; names, addresses, and telephone numbers of architects, owners, and contractors; and date of occupancy by Owner.

K. Examination reports, documenting inspections of substrates, areas, and conditions.

L. Anchor inspection reports, documenting inspections of built-in and cast-in anchors.

M. Field quality-control reports.

N. Field quality-control certification, signed by Contractor and Detention Specialist.

1.4 QUALITY ASSURANCE

A. Detention Specialist Qualifications: An experienced installer of detention products and equipment who has completed detention work installations similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

1. Experience: No fewer than five completed detention projects (jails or prisons) that have been in operation for a minimum of five years.

a. Experienced in administration and supervision of detention work, including mechanical and electrical detention work, and integration of its various components.

1.5 DETENTION SPECIALIST

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. C.M. Security Group Inc.
2. Cornerstone Inc.
3. Southern Folger Detention Equipment Company.
4. Capital Builders Hardware.
5. Forderer Cornice Works
6. Universal Security Products, Inc.

B. Responsibilities:

1. Detention work coordination.
2. Administrative procedures.
3. Examination.
4. Field quality control.
5. Demonstration.

1.6 DETENTION WORK COORDINATION

A. Coordinate detention work to ensure efficient and orderly installation and proper operation of each part of detention work. Coordinate detention work that depends on separate entities for proper installation, connection, and operation.

1. Develop special procedures required for coordination of detention work.
2. Coordinate installation of different detention components to ensure maximum accessibility for required maintenance, service, and repair.

B. Coordinate selection of detention products and equipment and ensure compatibility.

C. Verify qualifications of detention lock Installer detention monitoring and control Installer specified in other Sections.

D. Coordinate installation of products furnished by Owner.

E. Assemble and coordinate Shop Drawings, work submittals, and applicable coordination drawings for detention work provided by separate entities responsible for detention work. Submit all submittal items required for each Detention Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

F. Detention Work Subschedule: Coordinate sequencing and scheduling of detention work. Prepare a subschedule to Contractor's Construction Schedule for detention work. Base subschedule on preliminary construction schedule. Secure time commitments for performing critical construction activities from separate entities responsible for detention work.

1. Schedule construction operations in sequence required to obtain best results where installation of one part of detention work depends on installation of other components, before or after its own installation.
2. Coordinate sequence of detention work activities to accommodate tests and inspections.

G. Coordinate installation of anchorages and embedments for detention work. Obtain and distribute, to parties involved, setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Coordinate type of security fasteners for detention work so no more than two different sets of tools are required to operate security fasteners for entire Project. Coordinate submittal of extra fasteners and tools for maintenance material submittals.

I. Check Shop Drawings of other related work to verify that adequate provisions are made for locating and installing detention work to comply with indicated requirements.

J. Coordinate temporary facilities and controls required by detention work.

K. Coordinate, schedule, and approve interruptions of existing utilities related to maintaining existing levels of security, including those necessary to make connections for temporary services.

1. Provide information necessary to adjust, move, or relocate existing detention utility structures affected by detention work.
2. Locate connection points to existing detention utility systems.

L. Coordinate protection of detention work.

M. Coordinate preparation of Project Record Documents for detention work and integrate information from entities responsible for detention work to form one combined record.

N. Coordinate preparation of operation and maintenance manuals for detention work and

integrate information from entities responsible for detention work to form one combined record.

1.7 ADMINISTRATIVE PROCEDURES

A. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of detention work. Such administrative activities include, but are not limited to, the following:

1. Preparation of detention work subschedule for Contractor's Construction Schedule.
2. Installation and removal of temporary facilities and controls for detention work.
3. Delivery and processing of detention work submittals.
4. Preinstallation conferences for detention work.
5. Project closeout activities for detention work.

B. Notifications: Prepare memoranda for distribution to each party involved with detention work, outlining special procedures required for coordination of detention work. Include such items as required notices, reports, and attendance at meetings.

C. Coordination Meetings: Conduct coordination meetings specifically for detention work at regular intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor, each subcontractor, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of detention work activities are to be represented at these meetings. All participants at meetings are to be familiar with Project and authorized to conclude matters relating to detention work.
2. Agenda: Review and correct or approve minutes of previous detention work coordination meetings. Review other items of significance that could affect progress of detention work. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Detention Work Subschedule: Review progress since last detention work coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Schedule Updating: Revise Contractor's construction detention work subschedule after each detention work coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    c. Review present and future needs of each entity present, including the following:

        1) Detention work interface requirements.
        2) Sequence of detention work operations.

3) Status of detention work submittals.
4) Access to detention work.
5) Temporary facilities and controls required by detention work.
6) Quality and work standards of detention work.
7) Change Orders for detention work.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention work.

B. Examine roughing-in for embedded conduits and tubing and built-in anchors to verify actual locations of detention work connections before detention work installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention work.

D. Inspect built-in and cast-in anchors after installation but before connection to detention work to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Where inspections indicate that anchors do not comply with specified requirements, reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

E. Verify locations of detention work with those indicated on coordination drawings.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FIELD QUALITY CONTROL

A. Inspect installed detention work to verify compliance with requirements and that work is installed and connected in accordance with the Contract Documents.

B. Verify that wiring installation has been installed according to manufacturer's submittal and written installation requirements in electrical, communications, and electronic safety and security Sections.

C. Observe installation and startup checks of detention work according to manufacturer's written instructions.

D. Testing: After installing electrified detention work and after electrical circuitry has been energized, test for compliance with requirements.

1. When testing reveals detention work does not comply with requirements, perform additional random testing to determine extent of noncompliance.
2. Where test results indicate that detention work does not comply with specified requirements, retest after repairs or replacements are made.
3. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work.

E. Inspection Reports: Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

1. Perform additional inspections to determine compliance of replaced or additional work.

F. Field Quality-Control Certification: Prepare field quality-control certification endorsed by Detention Specialist that states installed detention work complies with requirements in the Contract Documents.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to train Train Owner's maintenance personnel to adjust, operate, and maintain detention products and equipment.

END OF SECTION 013513.16

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. References and standards.

D. Testing and inspection agencies and services.

E. Contractor's construction-related professional design services.

F. Contractor's design-related professional design services.

G. Control of installation.

H. Mock-ups.

I. Tolerances.

J. Manufacturers' field services.

K. Defect Assessment.

1.2 RELATED REQUIREMENTS

A. Document 003100 - Available Project Information: Soil investigation data.

B. Document 007200 - General Conditions: Inspections and approvals required by public authorities.

C. Section 012100 - Allowances: Allowance for payment of testing services.

D. Section 013000 - Administrative Requirements: Submittal procedures.

E. Section 014216 - Definitions.

F. Section 016000 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2023).

B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2024.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2023.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2023.

E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2023.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.

G. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.

H. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2021.

1.4 DEFINITIONS

A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.

B. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.

1. Design Services Types Required:

a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor’s sole responsibilities for construction means, methods, techniques, sequences, and procedures.

b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.

C. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.5 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.

B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:

1. Temporary sheeting, shoring, or supports.
2. Temporary scaffolding.
3. Temporary bracing.
4. Temporary falsework for support of spanning or arched structures.
5. Temporary foundation underpinning.

6. Temporary stairs or steps required for construction access only.
7. Temporary hoist(s) and rigging.
8. Investigation of soil conditions to support construction equipment.
9. _____.

1.6 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.

B. Base design on performance and/or design criteria indicated in individual specification sections.

1. Submit a Request for Interpretation to Architect if the criteria indicated are not sufficient to perform required design services.

C. Scope of Contractor's Professional Design Services: Provide for the following items of work:

1. Structural Design of Reinforcement Splices: As described in Section 030100 - Maintenance of Concrete.
2. Structural Design of Formwork: As described in Section 031000 - Concrete Forming and Accessories.
3. Structural Design of Formwork: As described in Section 031119 - Insulating Concrete Forming.
4. Concrete Mix Design: As described in Section 033000 - Cast-in-Place Concrete. No specific designer qualifications are required.
5. Structural Calculations and Design: As described in Section 033800 - Post-Tensioned Concrete.

6. Structural Calculations and Design: As described in Section 034100 - Precast Structural Concrete.
7. Concrete Mix and Structural Design: As described in Section 034113 - Precast Concrete Hollow Core Planks.
8. Concrete Mix and Structural Design: As described in Section 034500 - Precast Architectural Concrete.
9. Concrete Mix and Structural Design: As described in Section 034713 - Tilt-Up Concrete.
10. Concrete Mix and Structural Design: As described in Section 034900 - Glass-Fiber Reinforced Concrete.
11. Structural Design of Steel Connections: As described in Section 051200 - Structural Steel Framing.
12. Structural Design of Steel Connections: As described in Section 052100 - Steel Joist Framing.
13. Structural Design of Steel Decking: As described in Section 053100 - Steel Decking.
14. Structural Design of Metal Framing: As described in Section 054000 - Cold-Formed Metal Framing.
15. Structural Design of Steel Trusses: As described in Section 054400 - Cold-Formed Metal Trusses.
16. Structural Design of Formwork: As described in Section 054500 - Metal Support Assemblies.
17. Structural Design of Metal Fabrications: As described in Section 055000 - Metal Fabrications.
18. Structural Design of Stairs: As described in Section 055100 - Metal Stairs.
19. Structural Design of Railings: As described in Section 055213 - Pipe and Tube Railings.

20. Structural Design of Gratings and Plates: As described in Section 055305 - Metal Gratings and Floor Plates.
21. Structural Design of Decorative Metal Stairs: As described in Section 057100 - Decorative Metal Stairs.
22. Structural Design of Spiral Stairs: As described in Section 057113 - Fabricated Metal Spiral Stairs.
23. Structural Design of Insulated Panels: As described in Section 061219 - Structural Insulated Panels.
24. Structural Design of Heavy Timber Framing: As described in Section 061323 - Heavy Timber Framing.
25. Structural Design of Wood Decking: As described in Section 061500 - Wood Decking.
26. Structural Design of Metal-Web Wood Joists: As described in Section 061736 - Metal-Web Wood Joists.
27. Structural Design of Wood Trusses: As described in Section 061753 - Shop-Fabricated Wood Trusses
28. Structural Design of Glued-Laminated Construction: As described in Section 061800 - Glued-Laminated Construction.
29. Structural Design of FRP Composite Systems: As described in Section 067100 - Structural Composite Shapes and Plates.
30. Structural Design of Fabrications: As described in Section 068200 - Composite Trim.
31. Design of Cladding Support Systems: As described in Section 070543 - Cladding Support Systems.
32. Structural Design of Exterior Insulation and Finish Systems: As described in Section 072400 - Exterior Insulation and Finish Systems.

33. Structural Calculations: As described in Section 074213.23 - Metal Composite Material Wall Panels.
34. Fire Protection Design: As described in Section 078700 - Smoke Containment Barriers.
35. Structural Design: Include calculations for resisting wind loads, physical characteristics, and resulting dimensional limitations as described in Section 083510 - Folding Panel Doors and Grilles.
36. Structural Design Calculations for Exterior Assemblies: As described in Section 084126 - All-Glass Entrances and Storefronts.
37. Structural Design: Include physical characteristics, engineering calculations, and resulting dimensional limitations as described in Section 084313 - Aluminum-Framed Storefronts.
38. Structural design: Include calculations for resisting wind loads, anchor locations, and loads at points of attachment as described in Section 084327 - Channel Glass Storefronts.
39. Structural Design: Include calculations for resisting wind loads, anchor locations, loads at points of attachment to building structure, physical characteristics, and resulting dimensional limitations as described in Section 084411 - Glazed Timber Curtain Walls.
40. Structural Design: Include calculations for resisting wind loads, anchor locations, loads at points of attachment to building structure, physical characteristics, resulting dimensional limitations as described in Section 084413 - Glazed Aluminum Curtain Walls.
41. Structural Design: Include calculations for resisting wind loads, anchor locations, loads at points of attachment to building structure, physical characteristics, resulting dimensional limitations as described in Section 084418 - Glazed Steel Curtain Walls.

42. Structural Design: Include calculations for resisting wind loads, anchor locations, loads at points of attachment to building structure, physical characteristics, resulting dimensional limitations as described in Section 084426 - Structural Glass Curtain Walls.
43. Structural Design: Include physical characteristics, engineering calculations, and resulting dimensional limitations as described in Section 084435 - Protective Framed Glazing Assemblies.
44. Structural Design: Include calculations for resisting wind loads, physical characteristics, resulting dimensional limitations as described in Section 084500 - Translucent Wall and Roof Assemblies.
45. Structural Design: Include calculations for resisting wind loads, provisions for accomodating thermal movement, physical characteristics, and resulting dimensional limitations as described in Section 084600 - Window Wall Assemblies.
46. Structural Design: Include calculations for resisting wind loads, physical characteristics, resulting dimensional limitations as described in Section 086300 - Metal-Framed Skylights.
47. Structural Calculations for Glazed Canopy System: Include calculations for resisting wind loads, physical characteristics, and resulting dimensional limitations as described in Section 086500 - Glazed Canopies.
48. Structural Calculations for Framing System: As described in Section 088836.16 - Electronically Controlled Switchable Glass.
49. Structural Design for Seismic Loads: As described in Section 095100 - Acoustical Ceilings.
50. Structural Design for Seismic Loads: As described in Section 095423 - Linear Metal Ceilings.

51. Structural Design for Seismic Loads: As described in Section 095426 - Suspended Wood Ceilings.
52. Structural Design of Floor System: As described in Section 096900 - Access Flooring.
53. Structural Design of Suspension System: Include loads at points of attachment to building structure, physical characteristics, and resulting dimensional limitations as described in Section 102239 - Folding Panel Partitions.
54. Structural Design: Include anchor locations, loads at points of attachment to building structure, physical characteristics, and resulting dimensional limitations as described in Section 102239.13 - Folding Glass-Panel Partitions.
55. Structural Design: Include loads at points of attachment to building structure, physical characteristics, and resulting dimensional limitations as described in Section 102241 - Operable Glass Partitions.
56. Structural Design: Include anchor locations, loads at points of attachment to building structure, physical characteristics, and resulting dimensional limitations as described in Section 102310 - Glazed Interior Wall and Door Assemblies.
57. Structural Design for Seismic Loads: As described in Section 105613 - Metal Storage Shelving.
58. Structural Design for Seismic Loads: As described in Section 105626 - Mobile Storage Shelving.
59. Structural Design of Pallet Storage Racks System: As described in Section 105629.16 - Pallet Storage Racks.
60. Structural Design and Calculations: As described in Section 107113.43 - Fixed Sun Screens.

61. Structural Design of Awnings: Include calculations for resisting wind loads, provisions for accomodating thermal movement, physical characteristics, and resulting dimensional limitations as described in Section 107313 - Awnings.
62. Structural Design of Canopy: As described in Section 107316.13 - Metal Canopies.
63. Structural Design of Awnings: Include calculations for resisting wind loads, provisions for accomodating thermal movement, physical characteristics, and resulting dimensional limitations as described in Section 107316.23 - Fabric Canopies.
64. Structural Design of Awnings: Include calculations for resisting wind loads, provisions for accomodating thermal movement, physical characteristics, and resulting dimensional limitations as described in Section 107326 - Walkway Coverings.
65. Structural Design of Foundation: As described in Section 107500 - Flagpoles.
66. Structural Design and Calculations: As described in Section 108213 - Exterior Grilles and Screens.
67. Structural Design and Calculations: As described in Section 108223 - Interior Grilles and Screens.
68. Control System Design. As described in Section 111400 - Pedestrian Control Equipment.
69. Structural Design of Stage Curtains: As described in Section 116143 - Stage Curtains.
70. Structural Design of Patient Lift Support System: As described in Section 117311 - Patient Lifts.
71. Structural Design of Facade Access Equipment: As described in Section 118123 - Facade Access Equipment.
72. Structural Design of Fall Protection Anchors: As described in Section 118129 - Facility Fall Protection.

1.7 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.

1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.

c. Full name.

d. Professional licensure information.

e. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.

C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.

E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.

1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.

1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.9 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.10 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ services of an independent testing agency to perform certain specified testing; payment for cost of services will be derived from allowance specified in Section 012100; see Section 012100 and applicable sections for description of services included in allowance.

B. Owner will employ and pay for services of an independent testing agency to perform other specified testing.

C. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

D. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

E. Contractor Employed Agency:

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in

individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.

C. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

E. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

F. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.4 TESTING AND INSPECTION

A. Testing Agency Duties:

1. Test samples of mixes submitted by Contractor.
2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified standards.

4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
6. Perform additional tests and inspections required by Architect.
7. Attend preconstruction meetings and progress meetings.
8. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the Work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:

1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
3. Provide incidental labor and facilities:
    f. To provide access to Work to be tested/inspected.
    g. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    h. To facilitate tests/inspections.
    i. To provide storage and curing of test samples.

4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.5 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment, and _____ as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.6 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION 014000

SECTION 01 57 13 - TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Performance bond.

E. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 REFERENCE STANDARDS

A. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit.

1.03 PERFORMANCE REQUIREMENTS

A. Comply with requirements of EPA (NPDES) for erosion and sedimentation control, as specified by the NPDES, for Phases I and II, and in compliance with requirements of Construction General Permit (CGP).

B. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.

C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

D. Provide to Owner a Performance Bond covering erosion and sedimentation preventive measures only, in an amount equal to 100 percent of the cost of erosion and sedimentation control work.

E. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

F. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.

1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

G. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.

1. Control movement of sediment and soil from temporary stockpiles of soil.
2. Prevent development of ruts due to equipment and vehicular traffic.
3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.

1. Prevent windblown soil from leaving the project site.
2. Prevent tracking of mud onto public roads outside site.
3. Prevent mud and sediment from flowing onto sidewalks and pavements.
4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

I. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

J. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

K. Open Water: Prevent standing water that could become stagnant.

L. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.04 SUBMITTALS

A. Erosion and Sedimentation Control Plan:

1. Include:

a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.

b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.

c. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.

d. Schedule of temporary preventive measures, in relation to ground disturbing activities.

e. Other information required by law.

f. Format required by law is acceptable, provided any additional information specified is also included.

2. Obtain the approval of the Plan by authorities having jurisdiction.

3. Obtain the approval of the Plan by Owner.

B. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

1.05 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

1.06 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

1.07 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:

1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
2. Straw bale row blocking entire inlet face area; anchor into pavement.

C. Soil Stockpiles: Protect using one of the following measures:

1. Cover with polyethylene film, secured by placing soil on outer edges.
2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

D. Sandbag Barrier: Installed along the perimeter of the site

E. Install Concrete Waste Management: Install at location shown on plan.

1.08 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Clean out temporary sediment control structures weekly and relocate soil on site.

D. Place sediment in appropriate locations on site; do not remove from site.

1.09 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION 01 57 13

SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, _____.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

J. General requirements for maintenance service.

1.2 RELATED REQUIREMENTS

A. Section 011000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 013000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

C. Section 014000 - Quality Requirements: Testing and inspection procedures.

D. Section 015000 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 015000 - Temporary Facilities and Controls: Temporary interior partitions.

F. Section 015100 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.

G. Section 015713 - Temporary Erosion and Sediment Control: Additional erosion and sedimentation control requirements.

H. Section 017123 - Field Engineering: Additional requirements for field engineering and surveying work.

I. Section 017419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.

J. Section 017610 - Temporary Protective Coverings: Materials for protection of installed work.

K. Section 017800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

L. Section 017900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

M. Section 019113 - General Commissioning Requirements: Contractor's responsibilities in regard to commissioning.

N. Section 024100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

O. Section 028400 - Polychlorinate Biphenyl (PCB) Remediation: Removal of equipment containing substances regulated under the Federal Toxic Substances Control Act (TSCA), including but not limited to PCB- and mercury-containing equipment.

P. Section 078400 - Firestopping.

Q. Individual Product Specification Sections:

1. Advance notification to other sections of openings required in work of those sections.

2. Limitations on cutting structural members.

1.3 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.

1. On request, submit documentation verifying accuracy of survey work.
2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
3. Submit surveys and survey logs for the project record.

C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.

1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
2. Identify demolition firm and submit qualifications.
3. Include a summary of safety procedures.

D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate Contractor.

6. Include in request:

    a. Identification of Project.

    b. Location and description of affected work.

    c. Necessity for cutting or alteration.

    d. Description of proposed work and products to be used.

    e. Alternatives to cutting and patching.

    f. Effect on work of Owner or separate Contractor.

    g. Written permission of affected separate Contractor.

    h. Date and time work will be executed.

E. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.5 QUALIFICATIONS

A. For demolition work, employ a firm specializing in the type of work required.

    1. Minimum of ___ years of documented experience.

B. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

D. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.6 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Perform dewatering activities, as required, for the duration of the project.

E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

F. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

1. Minimize amount of bare soil exposed at one time.
2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

H. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
2. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
3. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.

I. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

1. Pest Control Service: Weekly treatments.

J. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

K. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.7 COORDINATION

A. See Section 011000 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 - PRODUCTS

2.1 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000 - Product Requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of examination, preparation and installation procedures.

2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Owner will locate and protect survey control and reference points.

D. Control datum for survey is that indicated on drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and _____.

2. Grid or axis for structures.

3. Building foundation, column locations, ground floor elevations, and _____.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

L. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

3.5 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as indicated.

2. Report discrepancies to Architect before disturbing existing installation.

3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.

1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings.
2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

D. Remove existing work as indicated and as required to accomplish new work.

1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
2. Remove items indicated on drawings.
3. Relocate items indicated on drawings.
4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, Telecommunications, and _____): Remove, relocate, and extend existing systems to accommodate new construction.

1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    b. See Section 011000 for other limitations on outages and required notifications.
    c. Provide temporary connections as required to maintain existing systems in service.
4. Verify that abandoned services serve only abandoned facilities.
5. Remove abandoned pipe, ducts, conduits, and equipment , including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

F. Protect existing work to remain.

1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.

G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.

H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

I. Refinish existing surfaces as indicated:

1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

J. Clean existing systems and equipment.

K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

L. Do not begin new construction in alterations areas before demolition is complete.

M. Comply with all other applicable requirements of this section.

3.7 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:

1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-complying work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 078400, to full thickness of the penetrated element.

J. Patching:

1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.8 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.9 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.

G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

H. Prohibit traffic from landscaped areas.

I. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.10 SYSTEM STARTUP

A. Coordinate with requirements of Section 019113 - General Commissioning Requirements, and _____.

B. Coordinate schedule for start-up of various equipment and systems.

C. Notify Architect and Owner seven days prior to start-up of each item.

D. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

E. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

F. Verify that wiring and support components for equipment are complete and tested.

G. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

H. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

I. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 DEMONSTRATION AND INSTRUCTION

A. See Section 017900 - Demonstration and Training.

3.12 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Section 230593 - Testing, Adjusting, and Balancing for HVAC.

3.13 FINAL CLEANING

A. Owner will provide comprehensive cleaning after final acceptance.

B. Execute final cleaning prior to final project assessment.

1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

C. Use cleaning materials that are nonhazardous.

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, drainage systems, and _____.

F. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

G. Clean Owner-occupied areas of work.

3.14 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

1. Provide copies to Architect.
2. Provide copies to Owner.
3. Provide copies to Architect and Owner.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Owner will occupy all of the building as specified in Section 011000.

F. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

H. Accompany Project Coordinator on Contractor's preliminary final inspection.

I. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

J. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.15 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION 017000

SECTION 017800 - CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Materials transparency manual.

D. Warranties and bonds.

1.2 RELATED REQUIREMENTS

A. Section 007200 - General Conditions and 007300 - Supplementary Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 013000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 017000 - Execution and Closeout Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:

1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.

2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Materials Transparency Manual:

1. Compile and submit a digital and a printed version of information disclosing materials content for interior finishes, furnishings (including workstations), built-in furniture. Meet IWBI (BS) requirements for format and content.

D. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

1. Product data, with catalog number, size, composition, and color and texture designations.
2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:

1. Description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

1. Include HVAC outdoor and exhaust air damper calibration strategy.
    a. Include provisions which ensure that full closure of dampers can be achieved.
2. Include Carbon Dioxide Monitoring Protocol.

3. Include Carbon Monoxide Monitoring Protocol.

4. Include Frost Mitigation Strategy for ventilation heat-recovery system.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

O. Include test and balancing reports.

P. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

J. Arrangement of Contents: Organize each volume in parts as follows:

1. Project Directory.
2. Table of Contents, of all volumes, and of this volume.
3. Operation and Maintenance Data: Arranged by system, then by product category.
    a. Source data.
    b. Product data, shop drawings, and other submittals.
    c. Operation and maintenance data.

d. Field quality control data.

e. Photocopies of warranties and bonds.

4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

3.6 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION 017800

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section Includes:

1. Demolition and removal of selected portions of exterior or interior of building or structure and site elements.
2. Removal and salvage of existing items for delivery to Owner and removal of existing items for reinstallation.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.
3. Section 013516 "Alteration Project Procedures" for general protection and work procedures for alteration projects.
4. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.
5. Section 330500 "Common Work Results for Utilities" for removal of site utility systems piping, equipment, and components.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner as indicated.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage; prepare for reuse; and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.5 INFORMATIONAL SUBMITTALS

A. Engineering Survey: Submit engineering survey of condition of building.

B. Survey of Existing Conditions: Submit survey.

C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.

D. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Temporary interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

E. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:

a. **<Insert items to be removed by Owner>**.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials:

1. It is not expected that hazardous materials will be encountered in the Work.

a. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. On-site sale of removed items or materials is not permitted.

1.8 WARRANTY

A. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

C. Sustainable Design Requirements for Building Reuse:

1. Maintain the existing building structure, envelope, and interior nonstructural elements of an abandoned or blighted building. Do not demolish such existing construction beyond indicated limits.
2. Maintain the existing building structural systems where indicated to remain. Do not demolish such existing construction beyond indicated limits.
3. Maintain the existing interior ceilings, interior partitions, and/or demountable walls where indicated to remain. Do not demolish such existing construction beyond indicated limits.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that

existing conditions are same as those indicated in Project Record Documents.

B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video. Comply with Section 013233 "Photographic Documentation."

1. Inventory and record the condition of items to be removed for salvage or reinstallation. Photograph or video conditions that might be misconstrued as damage caused by removal.
2. Photograph or video existing conditions of adjoining construction including finish surfaces, that might be misconstrued as damage caused by selective demolition operations or removal of items for salvage or reinstallation.

3.2 PREPARATION

A. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

B. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location and cleaned and reinstalled in their original

locations after selective demolition operations are complete.

3.3 UTILITY SERVICES AND BUILDING SYSTEMS

A. Existing Services/Systems to Remain: Maintain utilities and building systems and equipment to remain and protect against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utilities and building systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated utilities when requested by Contractor.
2. If disconnection of utilities and building systems will affect adjacent occupied parts of the building, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to those parts of the building.
3. Demolish and remove existing building systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment and components.

4. Abandon existing building systems, equipment, and components indicated on Drawings to be abandoned in place.

    a. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    b. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

5. Remove and reinstall/salvage existing building systems, equipment, and components indicated on drawings to be removed and reinstalled or removed and salvaged:

    a. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment and components; when appropriate, reinstall, reconnect, and make equipment operational.
    b. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and components and deliver to Owner.

3.4 SALVAGE/REINSTALL

A. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Maintain adequate ventilation when using cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.

2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete:

1. Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least **3/4 inch** at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
2. Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive in accordance with recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

1. Form-facing materials.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for formwork related to concrete pavement and walks.
2. Section 321316 "Decorative Concrete Paving" for formwork related to decorative concrete pavement and walks.

1.2 DEFINITIONS

A. Form-Facing Material: The temporary form materials that come in direct contact with the concrete as part of the formwork components in supporting the concrete while the concrete is setting and gaining sufficient strength to be self-supporting. The most common materials are steel, aluminum, and wood.

B. Form Lining: Materials used to line the concreting face of formwork to impart a smooth or patterned finish to the concrete surface, to absorb moisture from the concrete, or to apply a set-retarding chemical to the formed surface of the concrete.

C. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction, movement, contraction, and isolation joints
c. Forms and form-removal limitations.
d. Shoring and reshoring procedures.
e. Anchor rod and anchorage device installation tolerances.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.

C. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.

1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301.

a. Location of construction joints is subject to approval of Architect.

3. Indicate location of waterstops.
4. Indicate form liner layout and form line termination details.
5. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
6. Indicate layout of insulating concrete forms, dimensions, course heights, form types, and details.

D. Samples:

1. For waterstops.
2. For Form Liners: 12- by 12-inch sample, indicating texture.

1.5 INFORMATIONAL SUBMITTALS

A. Research Reports: For insulating concrete forms indicating compliance with ICC's Acceptance Criteria AC353.

B. Field quality-control reports.

C. Minutes of preinstallation conference.

D. Qualification Statements: For testing and inspection agency.

1.6 QUALITY ASSURANCE

A. Testing and Inspection Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Mockups: Formed surfaces to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.

1. Build panel in the location and of a size, as directed by Architect.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Form Liners: Store form liners under cover to protect from sunlight.

B. Insulating Concrete Forms: Store forms off ground and under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

a. For architectural concrete specified in Section 033300 "Architectural Concrete," limit deflection of form-facing material, studs, and walers to 0.0025 times their respective clear spans (L/400).

B. Design, engineer, erect, shore, brace, and maintain insulating concrete forms in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design cross ties to transfer the effects of the following loads to the cast-in-place concrete core:

a. Wind Loads: As indicated on Drawings.

1) Horizontal Deflection Limit: Not more than 1/600.

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-in-Place Concrete, and as follows:

a. Plywood, metal, or other approved panel materials.
b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

1) APA HDO (high-density overlay).
2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces without spiral or vertical seams and not exceeding specified formwork surface class.

1. Provide forms with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation, with straight or tapered end forms.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

2.3 RELATED MATERIALS

A. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners to be acceptable to form liner manufacturer.

F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer to the plane of exposed concrete surface than noted on the Structural Drawings Sheet .
2. Furnish ties that, when removed, leave holes no larger than **1 inch** in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

G. Sealant: One-part moisture cure silicone sealant used with form liners.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-in-Place Concrete" for as-cast finishes and Section 033300 "Architectural Concrete."

C. Limit concrete surface irregularities as follows:

1. Surface Finish-1.0: **ACI 117** Class D, **1 inch**.

D. Construct forms tight enough to prevent loss of concrete mortar.

1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.

1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

I. **Do not chamfer** exterior corners and edges of permanently exposed concrete.

J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.

K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.

L. Form Liners: Install per manufacturer's written installation instructions and recommended tolerances.

M. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
3. Place joints perpendicular to main reinforcement.
4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.

    a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings.

    a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

N. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.

2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

O. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

P. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

Q. Coat contact surfaces of forms with form-release agent, in accordance with manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
5. Clean embedded items immediately prior to concrete placement.

3.3 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved its 28-day design compressive strength and 7 days minimum.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close

joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 INSTALLATION OF SHORING AND RESHORING

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Inspections:

1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

D. Prepare test and inspection reports.

END OF SECTION 031000

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

B. Related Requirements:

1. Section 033816 "Unbonded Post-Tensioned Concrete" for reinforcing related to post-tensioned concrete.
2. Section 034100 "Precast Structural Concrete" for reinforcing used in precast structural concrete.
3. Section 034500 "Precast Architectural Concrete" for reinforcing used in precast architectural concrete.
4. Section 321313 "Concrete Paving" for reinforcing related to concrete pavement and walks.
5. Section 321316 "Decorative Concrete Paving" for reinforcing related to decorative concrete pavement and walks.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction contraction and isolation joints.
c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

1. Each type of steel reinforcement.
2. Epoxy repair coating.
3. Zinc repair material.
4. Bar supports.
5. Mechanical splice couplers.

B. Sustainable Design Submittals:

1. Product Certificates: For regional materials, indicating location of material

manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.

2. Environmental Product Declaration: For each product.
3. Third-Party Certifications: For each product.
4. Third-Party Certified Life Cycle Assessment: For each product.

C. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

D. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

E. Delegated Design Submittal: For structural thermal break insulated connection system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For **testing and inspection agency**.

B. Delegated Design Engineer Qualifications: Include the following:

1. Experience providing delegated design engineering services of the type indicated.
2. Documentation that delegated design engineer is licensed in the [**jurisdiction**][**state**] in which Project is located.

C. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

D. Material Certificates: For each of the following, signed by manufacturers:

1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."
2. Dual-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

E. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:

a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.

2. Mechanical splice couplers.

F. Field quality-control reports.

G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

C. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.

1. Build panel approximately **100 sq. ft. for formed surface** in the location indicated on Drawings or, if not indicated, as directed by Architect.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage **and to avoid damaging coatings on steel reinforcement**.

1. Store reinforcement to avoid contact with earth.
2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design structural thermal break insulated connection system, including attachment to building construction.

B. Structural Performance of Structural Thermal Break Insulating Connection System:

Structural thermal break insulated connection system to withstand the following loads and stresses:

1. Dead Loads: As indicated on Drawings.

    a. Shear Load: As indicated on Drawings.
    b. Bending Moment: As indicated on Drawings.

2. Live Loads: As indicated on Drawings.

    a. Shear Load: As indicated on Drawings.
    b. Bending Moment: As indicated on Drawings.

C. Seismic Performance of Structural Thermal Break Insulated Connection System: Structural thermal break Insulated connection system to withstand the effects of earthquake motions determined according to **ASCE/SEI 7**.

1. Component Importance Factor: 1.0.

2.2 STEEL REINFORCEMENT

1. Regional Materials: Steel shall be manufactured within **500 miles** of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within **500 miles** of Project site. If materials are transported by rail or water, the distance transported by rail or water shall be multiplied by 0.25 to determine the distance to Project site.

B. Reinforcing Bars: ASTM A615/A615M, **Grade 60**, deformed.

C. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.

D. Headed-Steel Reinforcing Bars: ASTM A970/A970M.

E. Galvanized Reinforcing Bars:

1. Steel Bars: **ASTM A615/A615M, Grade 60**, deformed bars.
2. Zinc Coating: ASTM A767/A767M, **Class I**] zinc coated after fabrication and bending.

F. Epoxy-Coated Reinforcing Bars:

1. Steel Bars: **ASTM A615/A615M, Grade 60**, deformed bars.
2. Epoxy Coating: **ASTM A775/A775M or ASTM A934/A934M** with less than 2 percent damaged coating in each **12-inch** bar length.

G. Dual-Coated Reinforcing Bars: ASTM A1055/A1055M.

1. Steel Bars: **ASTM A615/A615M, Grade 60**, deformed bars.
2. Zinc Coating: ASTM A1055/A1055M **Type I**.
3. Epoxy Coating: **ASTM A775/A775M or ASTM A934/A934M** with less than 2

percent damaged coating in each **12-inch** bar length.

H. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

I. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

J. Galvanized-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.

K. Epoxy-Coated Welded-Wire Reinforcement: ASTM A884/A884M, Class A coated, Type 1, **plain** steel.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615/A615M, **Grade 60**, plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A615/A615M, **Grade 60**, plain-steel bars, ASTM A775/A775M epoxy coated.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than **0.0508 inch** in diameter.

1. Finish: **Galvanized**.

E. Stainless Steel Tie Wire: ASTM A1022/A1022M, not less than **0.0508 inch** in diameter.

F. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.

G. Zinc Repair Material: ASTM A780/A780M.

2.4 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than **1 inch**, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with **ACI 318**.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or **24 inches**, whichever is greater.
2. Stagger splices in accordance with **ACI 318**.
3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install structural thermal break insulated connection system in accordance with manufacturer's instructions.

H. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."

a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed **12 inches**.

2. Lap edges and ends of adjoining sheets at least one wire spacing plus **2 inches** for plain wire and **8 inches** for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

I. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

J. Dual-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

K. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material in accordance with ASTM A780/A780M.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with **ACI 117**.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a **special inspector and qualified testing and inspecting agency** to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel-reinforcement placement.
2. Steel-reinforcement mechanical splice couplers.
3. Steel-reinforcement welding.

D. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

1. Concrete standards.
2. Concrete materials.
3. Repair materials.
4. Concrete mixture materials.
5. Concrete mixture class types.
6. Concrete mixing.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
4. Section 033543 "Polished Concrete Finishing" for concrete floors scheduled to receive a polished concrete finish.
5. Section 035300 "Concrete Topping" for concrete floor toppings.
6. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.
7. Section 321313 "Concrete Paving" for concrete pavement and walks.
8. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement or blended hydraulic cement alone or in combination with one or more of the following:

1. Fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cementitious Materials (w/cm) Ratio: The ratio by weight of mixing water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for inspections and acceptance testing of concrete at Project site.
c. Ready-mix concrete manufacturer.
d. Concrete Subcontractor.
e. Special concrete finish Subcontractor.

2. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction joints, control joints, isolation joints, and joint-filler strips.
c. Semirigid joint fillers.
d. Vapor-retarder installation.
e. Anchor rod and anchorage device installation tolerances.
f. Cold- and hot-weather concreting procedures.
g. Concrete finishes and finishing.
h. Curing procedures.
i. Forms and form-removal limitations.
j. Shoring and reshoring procedures.
k. Methods for achieving specified floor and slab flatness and levelness.
l. Floor and slab flatness and levelness measurements.
m. Concrete repair procedures.
n. Concrete protection.
o. Initial curing of standard-cured and field curing of field-cured test cylinders (ASTM C31/C31M.)
p. Protection of field cured field test cylinders.
q. Distribution of test reports.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Portland cement.
2. Blended hydraulic cement.
3. Performance-based hydraulic cement.
4. Fly ash.
5. Aggregates.
6. Admixtures:

a. Include limitations of use. Admixtures that do not comply with reference ASTM International requirements must be submitted with test data for approval.

7. Color pigments.
8. Fiber reinforcement.
9. Vapor retarders.
10. Floor and slab treatments.
11. Liquid floor treatments.
12. Curing materials.

a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.

13. Joint fillers.
14. Repair materials.

B. Sustainable Design Submittals:

1. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.
2. Laboratory Test Reports: For liquid floor treatments and curing and sealing compounds, indicating compliance with requirements for low-emitting materials.

C. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Compressive strength at 28 days or other age as specified.
3. Compressive strength required at stages of construction.
4. Durability exposure classes for Exposure Categories F, S, W, and C.
5. Maximum w/cm ratio.
6. Calculated equilibrium and fresh density for lightweight concrete.
7. Slump or slump flow limit.
8. Air content.
9. Nominal maximum aggregate size.
10. Intended placement method.
11. Submit adjustments to design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant changes.

D. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

a. Location of construction joints is subject to approval of the Architect.

E. Concrete Schedule: For each location of each class of concrete indicated in "Concrete Mixture Class Types" Article, including the following:

1. Concrete class designation.
2. Location within Project.
3. Exposure class designation.
4. Formed surface finish designation and final finish.
5. Final finish for floors.
6. Floor treatment, if any.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Testing Agency: Include documentation indicating compliance with ASTM E329 or ASTM C1077 and copies of applicable ACI certificates for testing technicians or ACI Concrete Construction Special Inspector - MH, ASCC.

B. Material Certificates: For each of the following:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Floor and slab treatments.
5. Bonding agents.
6. Adhesives.
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.

C. Material Test Reports: For the following:

1. Portland cement.
2. Blended hydraulic cement.
3. Performance-based hydraulic cement.
4. Fly ash.
5. Aggregates.
6. Admixtures.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances in accordance with ACI 117 and in compliance with ASTM E1155.

E. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC's Acceptance Criteria AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified Installer who employs Project personnel qualified as an ACI-certified Concrete Flatwork Associate and Concrete Flatwork Finisher and a

supervisor who is a certified ACI Advanced Concrete Flatwork Finisher/Technician or an ACI Concrete Flatwork Finisher with experience installing and finishing concrete.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer's production facilities and delivery vehicles certified in accordance with NRMCA's certification requirements or equivalent approval by a State DOT.

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing that performs duties on behalf of the Architect/Engineer.

1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Level 1. Testing agency laboratory supervisor tests to be an ACI-certified Concrete Laboratory Testing Technician, Level 2.

D. Field Quality-Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1. Personnel conducting field tests on plastic concrete properties are to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with policies from ACI CPP 610.1 or an equivalent certification program.

E. Mockups: Cast concrete slab-on-ground and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship. Provide up to two batches of concrete to demonstrate the number of required mockups.

1. Slab-on-Ground: Build panel in the location indicated or, if not indicated, as directed by Architect.

a. Divide panel into four equal panels to demonstrate saw joint cutting.

2. Formed Surfaces: Build panel in the location indicated or, if not indicated, as directed by Architect.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1. Include the following information in each test report:

a. Admixture dosage rates.
b. Slump.
c. Air content.
d. Seven-day compressive strength.
e. 28-day compressive strength.
f. Evaluation of permeability-reducing admixtures.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 as follows:

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When air temperature has fallen to, or is expected to fall below 40 deg F during the protection period, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE STANDARDS

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I/II, **gray**.
2. Pozzolans: ASTM C618, Class C or F.

C. Normal-Weight Aggregates:

1. Coarse Aggregate: ASTM C33/C33M. Provide aggregates from a single source.
2. Maximum Coarse-Aggregate Size: As indicated on drawings.
3. Fine Aggregate: ASTM C33/C33M.
4. Alkali-Silica Reaction: Comply with one of the following for each aggregate used:

   a. Expansion Result of Aggregate: Not more than 0.04 percent at one year when tested in accordance with ASTM C1293.
   b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567. Do not use this option with fly ash with an alkali content greater than 4.0 percent. Submit supporting data for each aggregate showing expansion in excess of 0.10 percent when tested in accordance with ASTM C1260.
   c. Alkali Content in Concrete: Not to exceed 4 lb./cu. yd. for aggregate with expansion greater than or equal to 0.04 percent and less than 0.12 percent or 3 lb./cu. yd. for aggregate with expansion greater than or equal to 0.12 percent and less than 0.24 percent. Test aggregate reactivity in accordance with ASTM C1293. Calculate alkali content of concrete in accordance with ACI 301. Do not use this option with natural pozzolan or fly ash that has a calcium oxide content greater than 18 percent or an alkali content greater than 4.0 percent; or for an aggregate with expansion at one year greater than or equal to 0.24 percent when tested in accordance with ASTM C1293.

2.3 ADMIXTURES

A. Air-Entraining Admixture: ASTM C260/C260M.

B. Chemical Admixtures: Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M,

Type G.

6. Admixtures with special properties, with documentation of claimed performance enhancement, ASTM C494/C494M, Type S.

C. Mixing Water for Concrete Mixtures and Water Used to Make Ice: ASTM C1602/C1602M. Include documentation of compliance with limits for alkalis, sulfates, chlorides, or solids content of mixing water from Table 2 in ASTM C1602/C1602M.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:

a. Ambient Temperature Below 50 deg F (10 deg C): Black.
b. Ambient Temperature between 50 and 85 deg F (10 and 29 deg C): Any color.
c. Ambient Temperature Above 85 deg F (29 deg C): White.

C. Water: Potable water that does not cause staining of the surface.

2.5 ACCESSORIES

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, **epoxy resin with a Type A shore durometer hardness of 80** in accordance with ASTM D2240.

C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881/C881M, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.6 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
4. Compressive Strength: To match or exceed concrete compressive strength being repaired.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: To match or exceed concrete compressive strength being repaired.

2.7 CONCRETE MIXTURE MATERIALS

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with **ACI 301**.

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland or hydraulic cement in concrete assigned to Exposure Class F3 as follows:

1. Fly Ash or Other Pozzolans: 25 percent by mass.
2. Slag Cement: 50 percent by mass.
3. Silica Fume: 10 percent by mass.
4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
2. Use permeability-reducing admixture in concrete mixtures where indicated.

D. Color Pigment: Add color pigment to concrete mixture in accordance with manufacturer's written instructions and to result in hardened concrete color consistent

with approved mockup.

2.8 CONCRETE MIXTURE CLASS TYPES

A. Class [A] : Normal-weight concrete used for interior slabs-on-ground.

1. Exposure Class: ACI 318 [F0] [S0] [W1] [C1].
2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Maximum w/cm: 0.40.
4. Slump Limit: 4 inches, plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site] <Insert limits>.
5. Air Content:

    a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.

B. Class [B] Normal-weight concrete used for footings, grade beams, and tie beams.

1. Exposure Class: ACI 318 [F0][S0] [W1] [C1].
2. Minimum Compressive Strength: 3000 psi at 28 days.
3. Maximum w/cm: [0.50].
4. Slump Limit: 4 inches, plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture.

C. Class D: Normal-weight concrete used for interior elevated slabs.

1. Exposure Class: ACI 318 [F0] [S0] [W1] [C1].
2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Maximum w/cm: 0.40.
4. Slump Limit: 4 inches, plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site] <Insert limits>.
5. Air Content:

    a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish delivery ticket.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for

each additional 1 cu. yd..

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 TOLERANCES

A. Comply with ACI 117.

3.4 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install reglets to receive waterproofing and through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.5 INSTALLATION OF CAST-IN-PLACE CONCRETE

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Water addition in transit or at the Project site must be in accordance with ASTM C94/C94M and must not exceed the permitted amount indicated on the concrete delivery ticket.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.

    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.6 INSTALLATION OF JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
2. Place joints perpendicular to main reinforcement.

    a. Continue reinforcement across construction joints unless otherwise indicated.

3. Form keyed joints as indicated. Embed keys at least 3/4 inches into concrete.
4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.7 APPLICATION OF FINISHING FLOORS AND SLABS

A. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface. Use of an approved finishing aid is acceptable.
5. Do not apply troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces **exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.**
7. Finish surfaces to the following tolerances, in accordance with **ASTM E1155**, for a randomly trafficked floor surface:

    a. Slabs on Ground:

        1) Specified overall values of flatness, FF 25; and of levelness, FL 20;

    b. Suspended Slabs:

        1) Specified overall values of flatness, FF 25; and of levelness, FL 20;

3.8 APPLICATION OF FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 (ACI 301M) Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.

    a. Patch voids larger than **3/4 inch** wide or **1/2 inch** deep.
    b. Remove projections larger than **1/4 inch**.
    c. Patch tie holes.
    d. Surface Tolerance: **ACI 117**, Class B.
    e. Locations: Apply to concrete surfaces **exposed to public view, to receive a rubbed finish,][or to be covered with a coating or covering material applied directly to concrete**.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling in:

1. Fill in holes and openings left in concrete structures after Work of other trades is in

place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to match color and texture with in-place construction exposed to view.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 6 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.

    a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Cast anchor-bolt insert into bases.
    c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.10 APPLICATION OF CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305R, before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period as follows:

a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
b. Continuous Sprinkling: Maintain concrete surface continuously wet.
c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

1) Recoat areas subject to heavy rainfall within three hours after initial application.
2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing after finishing concrete.
2. Interior Concrete Floors:

a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than **12 inches**.
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least **12 inches**, and sealed by waterproof tape or adhesive.

a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following not in cold weather:

a) Water.
b) Continuous water-fog spray.

b. Floors To Receive Curing and Sealing Compound:

1) Apply uniformly to floors and slabs indicated in a continuous operation

by power spray or roller in accordance with manufacturer's written instructions.

2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 INSTALLATION OF JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least **one** month.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.12 INSTALLATION OF CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to meet specification requirements.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks in excess of 0.01 inch spalls, air bubbles exceeding surface finish limits, honeycombs, rock pockets, fins and other projections on the surface exceeding surface finish limits, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.

a. Limit cut depth to 3/4 inch.
b. Make edges of cuts perpendicular to concrete surface.
c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
d. Fill and compact with patching mortar before bonding agent has dried.
e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.

    a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
    b. Compact mortar in place and match surrounding surface.

3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance, as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.

    a. Correct low and high areas.
    b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by adding patching mortar.

    a. Finish repaired areas to blend into adjacent concrete.

5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.

    a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
    b. Feather edges to match adjacent floor elevations.

6. Correct other low areas scheduled to remain exposed with repair topping.

    a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
    b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.

    a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.

b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
d. Place, compact, and finish to blend with adjacent finished concrete.
e. Cure in same manner as adjacent concrete.

8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.

a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
b. Dampen cleaned concrete surfaces and apply bonding agent.
c. Place patching mortar before bonding agent has dried.
d. Compact patching mortar and finish to match adjacent concrete.
e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency to be responsible for providing curing facility for initial curing of strength test specimens on-site and verifying that test specimens are cured in accordance with standard curing requirements in ASTM C31/C31M.
2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

1) Project name.
2) Name of testing agency.
3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
4) Name of concrete manufacturer.
5) Date and time of inspection, sampling, and field testing.

6) Date and time of concrete placement.
7) Location in Work of concrete represented by samples.
8) Date and time sample was obtained.
9) Truck and batch ticket numbers.
10) Design compressive strength at 28 days.
11) Concrete mixture designation, proportions, and materials.
12) Field test results of fresh concrete, including slump or slump flow, air content, temperature and density.
13) Information on storage and curing of samples at the Project site, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.

4. Provide a space and source of power or other resources for curing and access to test specimens by the testing agency.

C. Delivery Tickets: comply with ASTM C94/C94M.

D. Inspections:

1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 150 cu. yd. or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing is to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

a. One test at point of delivery for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests as needed.

3. Slump Flow: ASTM C1611/C1611M:

a. One test at point of delivery for each composite sample when strength test specimens are cast, but not less than one test for each day's pour of each

concrete mixture.
b. Perform additional tests as needed.

4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.

   a. One test for each composite sample when strength test specimens are cast, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C1064/C1064M:

   a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample when strength test specimens are cast.

6. Concrete Density: ASTM C138/C138M:

   a. One test for each composite sample when strength test specimens are cast.

7. Unit Weight: ASTM C138/C138M density of fresh structural lightweight concrete.

   a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture. The fresh density should be consistent with that associated with the equilibrium density within a tolerance of plus or minus 4 lb/ft.3.

8. Compression Test Specimens: ASTM C31/C31M:

   a. Cast and standard cure two sets of four 6 inches by 12-inches or 4-inch by 8-inch cylindrical specimens for each composite sample.
   b. Cast, and field cure two sets of four standard cylindrical specimens for each composite sample.

9. Compressive-Strength Tests: ASTM C39/C39M.

   a. Test one set of two standard cured specimens at seven days and one set of two specimens at 28 days.
   b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
   c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

10. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
11. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests of standard cured cylinders equals or exceeds specified compressive strength.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

13. Additional Tests:

    a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

        1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.7.6.3.

14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with **ASTM E1155** within **48** hours of completion of floor finishing and promptly report test results to Architect.

3.14 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using floor slab protective covering.

END OF SECTION 033000

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

1. Concrete Masonry Units
2. Miscellaneous masonry accessories.

B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
2. Section 076200 "Sheet Metal Flashing and Trim" for[**exposed**] sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

C. Exposed: Weather-exposed side of a constructed wall.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.4 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Sustainable Design Submittals:

1. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.

C. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry

reinforcing bars. Comply with ACI 315. **Show elevations of reinforced wall.**
3. Lintel design and types required.
4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each type and size of the following:

1. Masonry units.

a. Include **data on material properties material test reports substantiating compliance with requirements**.
b. For masonry units **used in structural masonry**, include data and calculations establishing average net-area compressive strength of units.

2. Integral water repellent used in CMUs, if not surface treated.
3. Cementitious materials. Include name of manufacturer, brand name, and type.
4. Mortar admixtures.
5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
6. Grout mixes. Include description of type and proportions of ingredients.
7. Reinforcing bars.

C. Mix Designs: For each type of mortar **and grout**. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with TMS 402/602.

E. Weather Procedures:

1. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.
2. Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

A. Project team craftworkers of the Masonry Contractor assigned to Project will be required to have the International Masonry Institute - Flashing Training or equal and to provide evidence of certificate or a letter of the firm's commitment to enroll key project personnel in the training program prior to the start of Project.

B. Project team craftworkers of the Masonry Contractor assigned to Project will be required to have the International Masonry Institute - Grouting and Reinforcing Training or equal and to provide evidence of certificate or a letter of the firm's commitment to enroll key project personnel in the training program prior to the start of Project.

C. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.

1.7 MOCKUPS

A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for **each type of exposed unit masonry construction typical exterior and interior walls** in sizes approximately **60 inches** long by **60 inches** high by full thickness, including face and backup wythes and accessories.

    a. Include a sealant-filled joint at least **16 inches** long in **each** mockup.

2. Protect accepted mockups from the elements with weather-resistant membrane.
3. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

    a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. **Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos**.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of **24 inches** down both sides of walls, and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 402/602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is **40 deg F** and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 402/602.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Source Limitations for Integral Water Repellent: Obtain integral water-repellent units from CMU and mortar manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Provide **structural** unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) in accordance with Tables 1 and 2 in TMS 402/602.
2. Determine net-area compressive strength of masonry by testing masonry prisms accordance with ASTM C1314.

B. Regulatory Requirements: Comply with the provisions of the following codes, specifications, and standards, except as otherwise shown or specified:

1. TMS 402/602:

a. Maintain one copy of the standard in Project field office at all times during construction. Contractor's supervisory personnel are to be thoroughly familiar with this material as it applies to Project.

2.3 CONCRETE UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 402/602 except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

C. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints,

headers, bonding, and other special conditions.
2. Provide **square-edged** units for outside corners unless otherwise indicated.
3. Provide bullnose units at all exposed outside corners of interior walls.

D. Building Lintels:

1. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout.

   a. Knockout blocks will not be acceptable.

2. Steel Lintels: See structural construction drawings.

E. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing in accordance with ASTM E119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

A. Regional Materials: Verify CMUs are manufactured within **500 miles** of Project site from aggregates **and cement** that have been extracted, harvested, or recovered, as well as manufactured, within **500 miles** of Project site. If materials are transported by rail or water, multiply the distance by 0.25 to determine the distance to Project site.

B. Standard CMUs: **Load-bearing ASTM C90**.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of **2000 psi**.
2. Density Classification: **Lightweight**.
3. Size (Width): Manufactured to dimensions **3/8 inch** less-than-nominal dimensions.
4. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.5 MORTAR AND GROUT MATERIALS

A. Regional Materials: Verify aggregate for mortar and grout**, cement, and lime** is manufactured within **500 miles** of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within **500 miles** of Project site. If materials are transported by rail or water, multiply the distance by 0.25 to determine the distance to Project site.

B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content is not more than 0.1 percent when tested in accordance with ASTM C114.

C. Hydrated Lime: ASTM C207, Type S.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than **1/4 inch** thick, use aggregate graded with 100 percent passing the **No. 16** sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

F. Aggregate for Grout: ASTM C404.

G. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, **Grade 60**.

2.7 TIES AND ANCHORS

A. General: Ties and anchors as shown on structural construction drawings.

2.8 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use **portland cement-lime**, **masonry cement or mortar cement** mortar unless otherwise indicated.
3. For exterior masonry, use **portland cement-lime** mortar.
4. For reinforced masonry, use **portland cement-lime** mortar.
5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, **Proportion** Specification. Provide

the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use **Type M**.
2. For reinforced masonry, use **Type S**.
3. For mortar parge coats, use **Type S**.
4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.

D. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated on structural construction drwings.
2. Proportion grout in accordance with ASTM C476, **Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi**.
3. Provide grout with a slump of **8 to 11 inches** as measured in accordance with ASTM C143/C143M.

E. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.

1. Application: Use epoxy pointing mortar for exposed mortar joints with pre-faced CMUs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that would impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

D. Where existing masonry occurs, match coursing, bonding, color, and texture of existing masonry.

E. Temperature Control: Perform temperature-sensitive construction procedures while masonry Work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within **10 deg F**.

1. 40 to 32 Deg F (4 to 0 Deg C):

    a. Mortar: Heat mixing water to produce mortar temperature between **40 and 120 deg F**.
    b. Grout: Follow normal masonry procedures.

2. 32 to 25 Deg F (0 to Minus 4 Deg C):

    a. Mortar: Heat mixing water and sand to produce mortar temperatures between **40 and 120 deg F**; maintain temperature of mortar on boards above freezing.
    b. Grout: Heat grout materials to **90 deg F** to produce in-place grout temperature of **70 deg F** at end of workday.

3. 25 to 20 Deg F (Minus 4 to 7 Deg C):

    a. Mortar: Heat mixing water and sand to produce mortar temperatures between **40 and 120 deg F**; maintain temperature of mortar on boards above freezing.
    b. Grout: Heat grout materials to **90 deg F** to produce in-place grout temperature of **70 deg F** at end of workday.
    c. Heat both sides of walls under construction using salamanders or other heat sources.
    d. Use windbreaks or enclosures when wind is in excess of 15 mph.

4. 20 Deg F (Minus 7 Deg C) and Below:

    a. Mortar: Heat mixing water and sand to produce mortar temperatures between **40 and 120 deg F**.
    b. Grout: Heat grout materials to **90 deg F** to produce in-place grout temperature of **70 deg F** at end of workday.
    c. Masonry Units: Heat masonry units so that they are above **20 deg F** at time of laying.
    d. Provide enclosure and auxiliary heat to maintain an air temperature of at least **40 deg F** for 24 hours after laying units.

5. Do not heat water for mortar and grout to above **160 deg F**.

F. Masonry Protection: Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.

1. 40 to 32 Deg F (4 to 0 Deg C): Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.
2. 32 to 25 Deg F (0 to Minus 4 Deg C): Completely cover masonry with weather-resistive membrane for at least 24 hours.
3. 25 to 20 Deg F (Minus 4 to 7 Deg C): Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.
4. 20 Deg F (Minus 7 Deg C) and Below: Except as otherwise indicated, maintain masonry temperature above 32 deg F (0 deg C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry, maintain heated enclosure to **40 deg F** for 48 hours.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus **1/2 inch** or minus **1/4 inch**.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus **1/2 inch**.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus **1/4 inch** in a story height or **1/2 inch** total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than **1/4 inch in 10 ft.**, or **1/2 inch** maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than **1/8 inch in 10 ft.**, **1/4 inch in 20 ft.**, or **1/2 inch** maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than **1/4 inch in 10 ft.**, **3/8 inch in 20 ft.**, or **1/2 inch** maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/8 inch in 10 ft.**, **1/4 inch in 20 ft.**, or **1/2 inch** maximum.
5. For lines and surfaces, do not vary from straight by more than **1/4 inch in 10 ft.**, **3/8 inch in 20 ft.**, or **1/2 inch** maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than **1/4 inch in 10 ft.** or **1/2 inch** maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than **1/16 inch**.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch**, with a maximum thickness limited to **1/2 inch**.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than **1/8 inch**.
3. For head and collar joints, do not vary from thickness indicated by more than plus **3/8 inch** or minus **1/4 inch**.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch**.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in **running bond**; do not use units with less-than-nominal **4-inch** horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

F. Build non-load-bearing fully grouted interior partitions full height of story to underside of solid floor or roof structure above as shown on the structural construction drawings.

3.5 MORTAR BEDDING AND JOINTING

A. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

B. Where applicable, set masonry trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Wet joint surfaces thoroughly before applying mortar.
3. Rake out mortar joints for pointing with sealant.

C. Rake out mortar joints at pre-faced CMUs to a uniform depth of **1/4 inch** and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

F. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, as shown on the structural construction drawings.

3.7 CONTROL JOINTS

A. General: Install control joint materials in CMUs as masonry progresses. Do not allow materials to span control joints without provision to allow for in-plane wall or partition movement.

B. Locate control joints. **See Structural Drawings**.

C. Form control joints in CMUs as follows:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install preformed control joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

3.8 LINTELS

A. Install lintels over openings as indicated on the structural drawings.

3.9 FLASHING

A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated on architectural drawings.

3.10 REINFORCED UNIT MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 402/602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 402/602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than **48 inches**.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements is done at Contractor's expense.

B. Inspections: Special inspections to comply with the International Building Code.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces, grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each **5000 sq. ft.** of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.

G. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for **mortar air content and compressive strength**.

H. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

I. Prism Test: For each type of construction provided, in accordance with ASTM C1314 at **7 days and at** 28 days.

J. Fire-Resistance Rated Construction: Where applicable, inspect fire-rated CMU construction to determine compliance with construction documents per building code compliance.

3.12 PARGING

A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of **3/4 inch**. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of **1/8 inch per foot**. Form a wash at top of parging and a cove at bottom.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.13 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as Work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid-strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 08-04A.

3.14 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than **4 inches** in each dimension.
2. Mix masonry waste with at least 2 parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
3. Do not dispose of masonry waste as fill within **18 inches** of finished grade.

C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

SECTION 050555 - SECURITY METAL FASTENINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Removable and non-removable tamper-proof metal fasteners.
2. Thread adhesive.
3. Tools for installation and removal.

B. Related Sections

1. Additional requirements for the installation of tamper-proof metal fasteners may be in individual Sections.

1.2 REFERENCES

A. AWS D1.1- Structural Welding Code - Steel.

1.3 SUBMITTALS

A. Submit in accordance with Division 01

B. Product Data

1. Product data for each of products and materials indicated.
2. Indicate finish, head design, strength, and corrosion resistance.
3. Manufacturer’s technical bulletins and installation/application instructions.
4. Safety Data Sheets (SDS).

C. Samples: Submit three samples of each type of tamper proof fastener proposed for use.

D. Qualification Data: For manufacturer.

1.4 DEFINITIONS

A. Inmate Accessible Areas: All areas within the Mental Health Facility are considered Inmate Accessible, except as specifically listed below.

1. All areas more than ten feet above adjacent finished floor or grade.
2. Interior of electrical, mechanical, and communications rooms or vaults.
3. Areas above suspended ceilings; behind access panels; and within plumbing chases.

4. Roofs and equipment thereon, except roof hatches or access doors.
5. Interior of control rooms, except control consoles are considered exposed.
6. Areas more than 4 feet from the inside of fences enclosing equipment pads.
7. Interior of PABX/RPE.

B. Tamper Proof Metal Fasteners: Metal fasteners of size and type best suited for intended application, having head design requiring special tools, of controlled availability, for removal.

C. Security Fasteners: Same as Tamper Proof Metal Fasteners.

D. Exposed Fasteners

1. Fasteners not completely concealed by earthwork, paving, or by the finish of a structure.
2. Fasteners which may be accessed and removed, without the prior removal of other fasteners designated as tamper proof or security.

1.5 QUALIFICATIONS

A. Manufacturer: Company regularly and presently engaged in the manufacture of products of the type specified within minimum five years experience.

1.6 COORDINATION

A. Coordinate the required locations, finishes, delivery schedule, and installation of tamper proof metal fastenings with the Work of the Sections requiring the fasteners.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle packaged materials in the manufacturer’s original, sealed containers, each clearly identified with the manufacturer’s name, and name and type of product.

B. Store materials subject to damage by dirt and moisture in a clean, dry location, off the ground, and suitably protected.

C. Store, protect, and handle installation/removal tools to prevent unauthorized use or duplication.

1.8 EXTRA MATERIALS

A. Tamper Proof Metal Fasteners

1. Provide 100 of each type and size, sorted, to the Owner’s Representative.
2. Clearly identify contents of each package; indicate type, size, and name, address and phone number of California distributor where additional fasteners may be

obtained.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Corrosion resistant, hardened, high strength, plated or stainless steel.

B. Nonferrous metal where exposed to weather, moisture, or high humidity.

C. Plating: Cadmium, zinc, nickel, phosphate, or chrome to match adjacent materials.

2.2 FASTENERS

A. Non Removable

1. Twist-off head type, dressed smooth.
2. Allen or similar recessed drive type, drilled to remove drive surfaces, filled with body putty.

B. Removable

1. Allen head (hexagon) with center pin reject, button head, or flat head as required by application.
2. Torx drive (star) with center pin reject, button head, or flat head as required by application.
3. Spanner Head Screws or one-way removable screws: Not permitted.
4. Penta-head security screw.
5. Removable only by tools produced by fastener manufacturer or other licensed fabricator specifically for individual tamper proof fastener.
6. Limit size and shape variations such that no more than six different tools are required for each type of tamper proof fastener used on project.

C. Structural

1. Where tamper proof fastening is required in structural connections, unless otherwise indicated fastening may be accomplished by either:

a. Installing high strength bolts with a torque wrench.
b. Tack welding nuts.

2.3 ACCESSORIES

A. Tools: Provide ten complete sets of manual drive tools required for installation and removal of removable tamper proof fasteners. Package each set in an individual kit and deliver to the Owner’s Representative.

B. Screw-thread Adhesive Sealant

1. Manufacturers

a. Henkel; Loctite No. 271 Thread Locker.
b. Devcon; PermaTek High Strength Thread Locker Red.
c. Master Bond, Inc.; Master Bond Adhesive/Sealants.

C. Expansion Shields, One-Way Sex Bolts, Toggle Bolts, Tamp-ins, and Miscellaneous Accessories: Size and type as indicated, best suited to intended application, and as required for complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive the Work. Notify the Owner's Representative, in writing, of any conditions requiring corrective action.

B. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Coordinate tamper proof metal fastener material, finish, size, type, and threads with requirements of other Sections.

3.3 INSTALLATION

A. Install tamper proof metal fasteners in accordance with manufacturer's instructions, using tools designed for fastener installation and removal.

END OF SECTION 050555

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

1. Structural-steel materials.
2. Shrinkage-resistant grout.
3. Shear stud connectors.

B. Related Requirements:

1. Section 051213 "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
2. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame and miscellaneous steel fabrications and other steel items not defined as structural steel.
3. [**Section 099113 "Exterior Painting" and Section 099123 "Interior Painting"**][**and**][**Section 099600 "High-Performance Coatings"**] for painting requirements.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.

C. Protected Zone: Structural members or portions of structural members indicated as "protected zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.

D. Demand-Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the seismic-load-resisting system and which are indicated as "demand critical" or "seismic critical" on Drawings.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other

construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1.5 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Anchor rods.
4. Threaded rods.
5. End Welded Studs
6. Forged-steel hardware.
7. Slide bearings.
8. Shop primer.
9. Galvanized-steel primer.
10. Etching cleaner.
11. Galvanized repair paint.
12. Shrinkage-resistant grout.

B. Sustainable Design Submittals:

1. Environmental Product Declaration: For each product.
2. Third-Party Certifications: For each product.
3. Third-Party Certified Life Cycle Assessment: For each product.

C. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Identify members and connections of the seismic-load-resisting system.
6. Indicate locations and dimensions of protected zones.
7. Identify demand-critical welds.
8. Identify members not to be shop primed.

D. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint **whether prequalified or qualified by testing** including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand-critical welds.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, fabricator, and testing agency.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural-steel materials, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. End Welded Studs

F. Survey of existing conditions.

G. Source quality-control reports.

H. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).

B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

C. Shop-Painting Applicator Qualifications: Qualified in accordance with AISC's Sophisticated Paint to SSPC-QP 3.

D. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1. Welders and welding operators performing work on bottom-flange, demand-critical welds are to pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G are to be considered separate processes for welding personnel qualification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:

1. ANSI/AISC 303.
2. ANSI/AISC 341.
3. ANSI/AISC 360.
4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:

1. Connection designs have been completed and connections indicated on the Drawings.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A992/A992M Grade 50.

B. Channels, Angles, M-Shapes: ASTM A36/A36M.

C. Plate and Bar: ASTM A36/A36M unless noted otherwise on drawings

D. Corrosion-Resisting (Weathering) Structural-Steel Shapes, Plates, and Bars: ASTM A588/A588M, 50 ksi.

E. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C structural tubing.

F. Corrosion-Resisting (Weathering), Cold-Formed Hollow Structural Sections: ASTM A847/A847M structural tubing.

G. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.

1. Weight Class: As indicated on drawings.
2. Finish: Black except where indicated to be galvanized. Galvanized where exposed to weather.

H. Steel Castings: ASTM A216/A216M, Grade WCB, with supplementary requirement S11.

I. Steel Forgings: ASTM A668/A668M.

J. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.

B. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.
2. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with mechanically deposited zinc coating finish.

C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, round head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: As indicated on drawings.

D. End Welded Studs: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.4 RODS

A. Unheaded Anchor Rods: ASTM F1554, Grade 36 unless noted otherwise on drawings.

1. Configuration: Straight.
2. Nuts: ASTM A563 heavy-hex carbon steel.
3. Plate Washers: ASTM A36/A36M carbon steel.
4. Washers: ASTM F436, Type 1, hardened carbon steel.
5. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

B. Headed Anchor Rods: [ASTM F1554, Grade 36 straight unless noted otherwise on drawings.

1. Nuts: ASTM A563 [heavy-]hex carbon steel.
2. Plate Washers: ASTM A36/A36M carbon steel.
3. Washers: ASTM F436, Type 1, hardened carbon steel.
4. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

C. Threaded Rods: ASTM A36/A36M unless noted otherwise on drawings.

1. Nuts: ASTM A63 heavy-hex carbon steel.
2. Washers: ASTM F436, Type 1, hardened ASTM A36/A36M carbon steel.
3. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

2.5 FORGED-STEEL STRUCTURAL HARDWARE

A. Clevises and Turnbuckles: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1035.

B. Eye Bolts and Nuts: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1030.

C. Sleeve Nuts: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1018.

2.6 PRIMER

A. Steel Primer:

1. Comply with [**Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."**][**Section 099600 "High-Performance Coatings."**][**Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."**]
2. SSPC-Paint 23, latex primer.
3. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

B. Galvanized-Steel Primer: [**MPI#26**][**MPI#80,**][**MPI#134**].

1. Etching Cleaner: MPI#25, for galvanized steel.
2. Galvanizing Repair Paint: [**MPI#18, MPI#19, or SSPC-Paint 20**][**ASTM A780/A780M**].

2.7 SHRINKAGE-RESISTANT GROUT

A. Metallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.8 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 3.

F. End Welded Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to

provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.

H. Welded-Steel Door Frames: Build up welded-steel doorframes attached to structural-steel frame. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated on Drawings.

I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces.Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.9 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.10 PREFABRICATED BUILDING COLUMNS

A. Fire-Resistance Ratings: Provide prefabricated building column listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for ratings indicated, based on testing in accordance with ASTM E119.

1. Fire-Resistance Design: UL Design No. <**Insert designation**>.
2. Fire-Resistance Rating: [**Four hours**][**Three hours**][**Two hours**][**As indicated on Drawings**].

2.11 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel

in accordance with ASTM A123/A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize [**lintels**][**shelf angles**][**and**][**welded door frames**] attached to structural-steel frame and located in exterior walls.

2.12 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces unless indicated to be painted.
6. Corrosion-resisting (weathering) steel surfaces.
7. Surfaces enclosed in interior construction.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7 (WAB)/NACE WAB-4.
4. SSPC-SP 14 (WAB)/NACE WAB-8.
5. SSPC-SP 11.
6. SSPC-SP 6 (WAB)/NACE WAB-3.
7. SSPC-SP 10 (WAB)/NACE WAB-2.
8. SSPC-SP 5 (WAB)/NACE WAB-1.
9. SSPC-SP 8.

C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.13 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
2. Bolted Connections: Inspect shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

    a. Liquid Penetrant Inspection: ASTM E165/E165M.
    b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
    c. Ultrasonic Inspection: ASTM E164.
    d. Radiographic Inspection: ASTM E94/E94M.

4. In addition to visual inspection, test and inspect shop-welded shear stud connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:

    a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear stud connector.
    b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear stud connectors if weld fracture occurs on shear stud connectors already tested.

5. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

C. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

3.5 REPAIR

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.

B. Touchup Painting:

1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

2. Cleaning and touchup painting are specified in [**Section 099113 "Exterior Painting."**][**Section 099123 "Interior Painting."**][**Section 099600 "High-Performance Coatings."**]

C. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

3.6 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

1. Bolted Connections: Inspect bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.

    a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

        1) Liquid Penetrant Inspection: ASTM E165/E165M.
        2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
        3) Ultrasonic Inspection: ASTM E164.
        4) Radiographic Inspection: ASTM E94/E94M.

3. Shear Stud Connectors: In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

    a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
    b. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

END OF SECTION 051200

SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof deck.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete topping over metal deck.

B. Section 04 20 00 - Unit Masonry: Placement of anchors for bearing plates embedded in unit masonry assemblies.

C. Section 05 12 00 - Structural Steel Framing: Placement of embedded steel anchors for bearing plates in cast-in-place concrete.

D. Section 05 50 00 - Metal Fabrications: Steel angle concrete stops at deck edges.

1.3 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

B. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021, with Errata (2023).

C. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.

D. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, with Errata (2022).

E. ICC-ES AC70 - Acceptance Criteria for Power-Actuated Fasteners Driven into Concrete, Steel and Masonry Elements; 2019, with Editorial Revision (2021).

F. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.

B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

D. Submit manufacturer's installation instructions.

E. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

1.5 QUALITY ASSURANCE

A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.1 STEEL DECK

A. Roof Deck: Non-composite type, fluted steel sheet:

1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.

2. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch (0.91 mm).

3. Nominal Height: 1-1/2 inch (38 mm).

4. Profile: Fluted.

5. Side Joints: Lapped, welded.

6. End Joints: Lapped, welded.

2.2 ACCESSORY MATERIALS

A. Welding Materials: AWS D1.1/D1.1M.

B. Fasteners: Galvanized hardened steel, self tapping.

C. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.

D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

E. Flute Closures: Closed cell foam rubber, 1 inch (25 mm) thick; profiled to fit tight to the deck at wall only.

PART 3 EXECUTION

3.1 INSTALLATION

A. On steel supports provide minimum 1-1/2 inch (38 mm) bearing.

B. Fasten deck to steel support members at ends and intermediate supports at 12 inches (300 mm) on center maximum, parallel with the deck flute and at each transverse flute using methods specified.

1. Welding: Use fusion welds through weld washers.

C. At welded male/female side laps weld at 18 inches (450 mm) on center maximum.

D. Weld deck in accordance with AWS D1.3/D1.3M.

E. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.

F. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

1. Load-bearing wall framing.
2. Vertical deflection clips, exterior.
3. Vertical deflection clips, interior.
4. Joist framing.
5. Roof rafter framing.
6. Soffit framing.
7. Sill sealer/termite barrier.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies, with height limitations.
3. Section 092216 "Non-Structural Metal Framing" for standard, interior non-load-bearing, metal-stud framing, within height limitations and ceiling-suspension assemblies.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
3. Signed and sealed by the qualified professional engineer responsible for their preparation.

C. Delegated Design Submittal: For cold-formed steel framing, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD): For each product.
2. Environmental Product Declaration (EPD): For each product.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product Certificates: For each type of code-compliance certification for studs and track.

D. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

E. Research Reports:

1. For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
2. For sill sealer gasket/termite barrier, showing compliance with ICC-ES AC380.

F. Delegated Design Engineer Qualifications: For cold-formed steel framing.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by International Accreditation Service (IAS) to IAS AC98 criteria for testing indicated.

B. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Code-Compliance Certification of Studs and Track: Provide documentation that framing members are certified in accordance with the product-certification program of the Steel

Framing Industry Association, the Steel Stud Manufacturers Association, or the Supreme Steel Framing System Association.

D. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

E. Comply with AISI S230 for one- and two-family dwellings.

F. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in California where Project is located and who is experienced in providing engineering services of the type indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI S202.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated on Drawings.
2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

a. Exterior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height.
b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/240 of the wall height under a horizontal load of 5 lbf/sq. ft. or the loads indicated on the drawings if greater.
c. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height.
d. Interior Non-Load-Bearing Framing: Horizontal deflection of 1/240 of the wall height under a horizontal load of 5 lbf/sq. ft. or the loads indicated on the drawings if greater.
e. Roof Rafter Framing: Vertical deflection of 1/360 of the horizontally projected span for live loads.
f. Ceiling Joist Framing: Vertical deflection of 1/240 of the span for live loads

and 1/180 for total loads of the span.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

    a. Upward and downward movement of 3/4 inch.

5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing complies with AISI S100 and ASTM C955, AISI S202 and AISI S240.

D. Seismic Performance: Cold-formed steel framing to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7 and AISI S400.

E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Product iQ" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

F. Sound-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, in accordance with ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Steel Thickness: As indicated on drawings.
2. Flange Width: 1-5/8 inches minimum or as indicated on drawings.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Minimum Base-Steel Thickness: As inidicated on the drawings.
2. Flange Width: 1-1/2 inches unless noted otherwise.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

C. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

D. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 INTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

C. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.

2. Flange Width: As indicated on drawings.

D. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.5 JOIST FRAMING

A. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, [**unpunched**][**punched with standard holes**][**punched with enlarged service holes**] with stiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

B. Steel Rim Joist Track: Manufacturer's standard U-shaped steel rim joist track, of web depths indicated, unpunched or punched at joist spacing, with unstiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

2.6 ROOF-RAFTER FRAMING

A. Steel Rafters: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

2.7 SOFFIT FRAMING

A. Exterior Soffit Framing: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base Steel Thickness: As indicated on drawings.
2. Flange Width: As indicated on drawings.

2.8 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic-coated steel sheet, of same grade and coating designation used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole-reinforcing plates.
11. Backer plates.

2.9 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process in accordance with ASTM A123/A123M.

B. Anchor Bolts: Unless noted otherwise on drawings anchor bolts shall be ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process in accordance with ASTM A153/A153M, Class C.

C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.

1. Uses: Securing cold-formed steel framing to structure.
2. Type: As indicated on drawings.
3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/ASTM F1941M, Class Fe/Zn 5, unless otherwise indicated.
4. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.10 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A780/A780M or SSPC-Paint 20.

B. Cement Grout: Portland cement, ASTM C476, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.

D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

2.11 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, in accordance with AISI S240 and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install in accordance with Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.

4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, in accordance with Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 ft. and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative errors are not to exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or track to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.

C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/8 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

E. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION OF LOAD-BEARING WALL FRAMING

A. Install continuous top and bottom track sized to match studs. Align track accurately and securely anchor at corners and ends, and at spacings as follows:

1. Anchor Spacing: As shown on Drawings.

B. Squarely seat studs against top and bottom track, with gap not exceeding 1/8 inch between the end of wall-framing member and the web of track.

1. Fasten both flanges of studs to top and bottom track.
2. Space studs as follows:

a. Stud Spacing: As indicated on Drawings.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls

or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs in accordance with AISI S240, Section C3.5.2. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
2. Install track and jack studs above and below wall openings. Anchor track to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced vertically as indicated on Drawings or as indicated on Shop Drawings. Fasten at each stud intersection.

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches deep.
2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges, and secure solid blocking to stud webs or flanges.
3. Bar Bridging: Proprietary bridging bars installed in accordance with manufacturer's written instructions.

J. Install steel sheet diagonal bracing straps to both stud flanges; terminate at and fasten to reinforced top and bottom track. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 INSTALLATION OF JOIST FRAMING

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Drawings.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.

1. Install joists over supporting frame with a minimum end bearing as indicated on Shop Drawings.
2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.

C. Locate joists at corners of abutting walls, and as follows:

1. Joist Spacing: As indicated on Drawings.

D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.

E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.

1. Install web stiffeners to transfer axial loads of walls above.

F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:

1. Joist-Track Solid Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
2. Combination Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.

G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.5 INSTALLATION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 ft. and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error are not to exceed minimum fastening requirements of sheathing or other finishing materials.

3.6 REPAIR

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.

3.7 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

1. Miscellaneous framing and supports.
2. Shelf angles.
3. Metal ships' ladders and pipe crossovers.
4. Metal floor plate.
5. Elevator pit sump covers.
6. Structural-steel door frames.
7. Miscellaneous steel trim.
8. Metal bollards.
9. Vehicular barrier cable systems.
10. Pipe and downspout guards.
11. Cast-iron wheel guards.
12. Loose bearing and leveling plates.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
3. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

C. Related Requirements:

1. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
2. Section 051200 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, divider beams, door frames, and other steel items attached to the structural-steel framing.
3. Section 077200 "Roof Accessories" for manufactured metal roof walkways and metal roof stairs.

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time

for installation.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Fasteners.
3. Shop primers.
4. Shrinkage-resisting grout.
5. Prefabricated building columns.
6. Slotted channel framing.
7. Manufactured metal ladders.
8. Alternating tread devices.
9. Metal ships' ladders and pipe crossovers.
10. Metal bollards.
11. Vehicular barrier cable systems.
12. Pipe and downspout guards.
13. Abrasive metal nosings, treads, and thresholds.
14. Cast-iron wheel guards.
15. Metal downspout boots.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Miscellaneous framing and supports for applications where framing and supports are not specified in other Sections.
2. Elevator machine beams, hoist beams, and divider beams.
3. Steel shapes for supporting elevator door sills.
4. Steel girders for supporting wood frame construction.
5. Steel pipe columns for supporting wood frame construction.
6. Prefabricated building columns.
7. Shelf angles.
8. Metal ladders.
9. Alternating tread devices.
10. Metal ships' ladders and pipe crossovers.
11. Metal floor plate and supports.
12. Elevator pit sump covers.
13. Structural-steel door frames.
14. Metal bollards.
15. Loose steel lintels.
16. Vehicular barrier cable systems.

C. Sustainable Design Submittals:

1. Environmental product declaration.
2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional

material.
3. Environmental Product Declaration: For each product.
4. Third-Party Certifications: For each product.
5. Third-Party Certified Life Cycle Assessment: For each product.

1.4 INFORMATIONAL SUBMITTALS

A. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Research Reports: For post-installed anchors.

E. Delegated design engineer qualifications.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following welding codes:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance of Aluminum Ladders: Ladders, including landings, are to withstand the effects of loads and stresses within limits and under conditions specified in ANSI/ASC A14.3.

B. Structural Performance of Alternating Tread Devices: Alternating tread devices are to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft..

2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Alternating Tread Device Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Comply with applicable railing loadings in Section 055213 "Pipe and Tube Railings."

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Regional Materials: Products shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site. If materials are transported by rail or water, the distance transported by rail or water shall be multiplied by 0.25 to determine the distance to Project site.

C. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

D. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304 or Type 316L.

E. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304 or Type 316L.

F. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.

G. Rolled-Stainless Steel Floor Plate: ASTM A793.

H. Steel Tubing: ASTM A500/A500M Grade C, 50ksi., cold-formed steel tubing.

I. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

J. Zinc-Coated Steel Wire Rope: ASTM A741.

1. Wire Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

K. Stainless Steel Wire Rope: Wire rope manufactured from stainless steel wire complying with ASTM A492, Type 316.

1. Wire Rope Fittings: Stainless steel connectors, Type 316, with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

L. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

M. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.

N. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

O. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.

P. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

Q. Bronze Extrusions: ASTM B455, Alloy UNS No. C38500 (extruded architectural bronze).

R. Bronze Castings: ASTM B584, Alloy UNS No. C83600 (leaded red brass) or UNS No. C84400 (leaded semired brass).

S. Nickel Silver Extrusions: ASTM B151/B151M, Alloy UNS No. C74500.

T. Nickel Silver Castings: ASTM B584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.3 FASTENERS

A. General: Provide Type 304 or Type 316 stainless steel fasteners to match framing for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless steel fasteners for fastening aluminum, stainless steel, or nickel silver.
2. Provide bronze fasteners for fastening bronze.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.

D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 2.

E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

F. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.

G. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.

H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.4 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with **Section 099113 "Exterior Painting."** and **Section 099123 "Interior Painting."**

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer that contains pigments that make it easily distinguishable from zinc-rich primer.

C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

H. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

I. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for

normal-weight, air-entrained concrete with a minimum 28-day compressive strength as indicated on Drawings.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

D. Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.

1. Provide bearing plates welded to beams where indicated.
2. Drill or punch girders and plates for field-bolted connections where indicated.
3. Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches o.c.

E. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
2. Unless otherwise indicated, provide 3/4-inch baseplates with four 3/4-inch anchor bolts and 1/2-inch top plates.

F. Galvanize miscellaneous framing and supports where indicated.

G. Prime miscellaneous framing and supports with **zinc-rich primer** where indicated.

2.7 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize **and prime** miscellaneous steel trim.

D. Prime **exterior** miscellaneous steel trim with **zinc-rich primer.**

2.8 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than **8 inches** unless otherwise indicated.

C. Galvanize **and prime** loose steel lintels located in exterior walls.

D. Prime loose steel lintels located in exterior walls with **zinc-rich primer.**

2.9 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.10 GENERAL FINISH REQUIREMENTS

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.11 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items **not indicated to be galvanized** unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with **universal shop primer** indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with **requirements indicated below:**

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

C. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installation of Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLATION OF MISCELLANEOUS STEEL TRIM

A. Anchor to concrete construction to comply with manufacturer's written instructions.

3.4 INSTALLATION OF LOOSE BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 REPAIRS

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

a. Apply by brush or spray to provide a minimum **2.0-mil** dry film thickness.

2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in **Section 099113 "Exterior Painting. "Section 099123 "Interior Painting."**

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

SECTION 055050 - DETENTION METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Modesty Screens.

B. Related Requirements:

1. Section 033000 - Cast-In-Place Concrete.
2. Section 042200 - Concrete Unit Masonry.
3. Section 055000 - Metal Fabrications.
4. Section 079000 - Joint Protection.
5. Section 125500 - Installation of Owner Furnished , Contractor Installed Detention Equipment.

1.3 REFERENCES

A. ASTM A123 Standard Specification for Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

B. ASTM A153 Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.

C. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

D. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

E. ASTM A653 Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or ZincIron Alloy-Coated (Galvannealed) by the Hot Dip Process.

F. AWS A2.4 Standard Symbols for Welding, Brazing and Nondestructive Examination.

G. AWS D1.1 Structural Welding Code - Steel

H. AWS D1.3 - Structural Welding Code - Sheet Steel.

I. FS TT-C-490 - Cleaning Method and Pretreatment of Ferrous Surfaces for Organic Coatings.

J. SSPC-Paint 25 - Prime Coat for Steel Surfaces.

1.4 SUBMITTALS

A. General Requirements: refer to Schedule of Submittals in Section 013300.

B. Shop Drawings

1. Indicate materials, fabrication, finishes, dimensions, tolerances, quantities, locations, and other items required to describe Work of this Section.
2. Indicate anchor, erection, and electrical plans and elevations at not less than 1/2 inch = 1-foot scale and details at not less than 3 inches = 1 foot scale.
3. Show anchorage and accessory items, dimensions, and finishes.
4. Indicate embedded or surface applied steel frames or shapes necessary for the installation of the Work. Show type and spacing of anchorage for these items. Indicate permissible tolerances for each type.
5. Indicate type, size, and spacing of field welding required for each item.

C. Product Data

1. Product data for products and materials indicated.
2. Manufacturer’s technical bulletins and installation/application instructions.
3. Material Safety Data Sheets (MSDS).

D. Certificates

1. Manufacturer’s certificate that products meet or exceed specified requirements.
2. Welder’s Certificates: Submit certificates for welders employed on the Work, verifying AWS qualifications within the previous 12 months.

E. Qualification Data

1. For manufacturer
2. For installer
3. Detention Equipment Specialist

a. a. Include list of references who can verify experience for each listed project, as follows:

1) Project name.
2) Number of celled units.
3) Date of services.
4) Name of Owner, and current telephone number.
5) Name of Contractor, and current telephone number.
6) Detention Equipment Specialist’s Activity Log: Submit current copy at the end of each two weeks period during product installation.

F. Manufacturer’s Quality Assurance Program

G. Upon request, the manufacturer shall submit a copy of manufacturer’s current Quality Control Procedures.

1.5 DESIGN REQUIREMENTS

A. Shop drawings, material, fabrication and installation specifications shall be based on manufacturer’s hardware templates.

1.6 QUALIFICATIONS

A. Manufacturers: Minimum 3 years documented experience manufacturing products of the type specified in this Section.

B. Installers: Minimum 3 years documented experience installing products of the type specified in this Section.

C. Detention Equipment Specialist

D. Minimum 5 years’ experience in the application and installation of security related equipment and hardware.

1. Thorough knowledge of the products specified in this Section.

1.7 COORDINATION

A. Coordinate the design, construction, and installation of the Work with the requirements of the Work of other Sections.

B. Provide templates required for accurately locating anchorages and fasteners required to anchor or attach items to the Work of other Sections. Supply the templates in a timely fashion so as not to delay the Work of other Sections.

C. Where items specified under this Section are built into the Work of other Sections, provide those items to those Sections in a timely fashion to avoid delay of the Work of other Sections. Coordinate placement to verify accurate locations and correct installation.

1.8 MOCK-UP AND FIELD SAMPLES

A. Mock-ups of Modesty Screens

B. Mock-ups shall be full-scale, complete with all fasteners, attachments, and hardware identical to the final screen to be installed. The Contractor shall coordinate required Mock-Ups with the Authority Having Jurisdiction.

C. The Contractor shall coordinate an inspection with the Authority Having Jurisdiction, and

the Owner's maintenance and operations staff.

D. The Authority Having Jurisdiction will inspect modesty screens for adjustment and final approval. Adjust mock-ups as directed. Mock-up will serve as a guide for final installation of the remainder of screens.

E. Do not order materials for, or begin fabrication of, other modesty screens prior to approval.

F. Upon written approval of the Authority Having Jurisdiction, provide and install remaining modesty screens.

G. Approved mock-ups may remain as part of the work.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Packaging

B. Final assemblies shall be wrapped in protective material or crated so as to provide adequate protection during shipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than the following:

B. Cold-Formed Hollow Structural Sections, Steel Pipe, Plate and Bar: 25 percent.

C. All Other Steel Materials: 25 percent.

D. Cold Rolled Carbon Steel Bars: ASTM A108.

E. Cold Rolled Low Carbon Steel Sheet: ASTM A794.

F. Carbon Steel Bars: ASTM A575.

G. Hot Rolled Low Carbon Steel Sheet: ASTM A568 and ASTM A659, pickled and oiled.

H. Plates and Bars: ASTM A29 or A283, Grade C.

I. Steel Tubing: ASTM A500, Grade B; or ASTM A501.

J. Steel Sections, Plates, Not Otherwise Indicated: ASTM A36.

K. Galvanized Carbon Steel Sheets: ASTM A924 with ASTM A653 G90 Coating.

2.2 ACCESSORIES

A. Screw thread adhesive sealant: Loctite No.271.

B. Caulking: Type C Sealant under provisions of Section 079000.

C. Welding Electrodes: AWS D1.1 or D1.3; type required for materials being welded.

2.3 FINISHES

A. Primer: SSPC-Paint 25.

B. Galvanizing

C. Iron and Steel Hardware: ASTM A153.

D. Shapes, Bars, Plates 1/8 inch or Greater Thickness: ASTM A123.

E. Galvanized items shall be G90 galvanized unless otherwise indicated.

F. Finish painting in accordance with Section 099000.

2.4 FABRICATION - GENERAL

A. Factory assemble items where practicable, true to line and free of distortion or defects.

B. Equipment shall be fully fabricated, assembled, finished, and ready for final installation.

C. Provide plates, angles, bars, bolts, connectors, and other items required for the attachment of the Work of this Section to other construction.

D. Welding

E. Steel components not plant fabricated shall be designed for field-welded connections.

F. Plug or stitch welds unless otherwise indicated.

G. Weld according to AWS D1.1.

H. Fill exposed joints with metallic filler, grind smooth.

I. Remove burrs and rough edges.

2.5 CLEANING AND PREPARATION FOR FINISHING

A. Dress surface imperfections by grinding, filling, and sanding.

B. Clean surfaces of rust, oil, or other impurities.

C. Phosphate coat surfaces in accordance with FS TT-C-490 to condition the surface of the metal to resist and inhibit corrosion and promote paint adhesion.

D. Priming: Surfaces, except embedded portions, shall be coated to a minimum thickness of 1 mil with a rust inhibitive red iron oxide-zinc chromate primer, equal to SSPC-Paint 25, which shall be dried and cured to develop maximum hardness and abrasion resistance of the primer paint before shipment.

2.6 MODESTY SCREENS

A. Components: Steel, galvanized.

B. Tubes: 3-1/2 inch x 3 1/2 inch x 10 gauge and 3 inch x 3 inch x 10 gauge.

C. Base Plate: Per plan x 1/4 inch; radius corners 1/2 inch.

D. Side Plates: 3/16 inch galvanized steel plate.

E. Fabrication

F. Shop fabricate units as detailed on the drawings with one side plate panel installed in the shop leaving the opposite side plate panel be field welded to the frame in the field after unit has been securely attached to the wall.

G. Grind all exposed welds smooth.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive for installation of the Work. Notify the Owner’s Representative, in writing, of any conditions requiring corrective action.

B. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Examine areas, substrates, anchors, and grounds to receive detention equipment.

B. Verify rough in and verify field dimensions.

C. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate Sections.

3.3 INSTALLATION

A. Install Work in accordance with manufacturer's instructions and approved shop drawings under the direction of a Detention Equipment Specialist.

B. Fasteners

C. Bolts, screws, fastening devices, hardware, and other items shall be tightened to their proper torque.

D. Provide Security Metal Fastenings in accordance with Section 050553.

E. Set removable fasteners in Loctite.

F. Tack weld exposed bolts in areas where inmates have access in accordance with Section 050553.

3.4 FINAL ADJUSTMENT

A. Upon completion of the Work of this Section and the Work of the other related Sections and before final inspection, all doors, locks, devices and other hardware shall be thoroughly tested, adjusted, and placed in proper working order.

B. Perform all final adjustments to the Work to ensure a fully functional and operational system.

3.5 FINISHES

A. Prime joint sealers and welds and touch-up abraded areas of the Work under this Section with specified primer, leaving the Work ready for finish painting.

B. Finish painting in accordance with Section 099000.

3.6 FIELD QUALITY CONTROL

A. Detention Equipment Specialist shall:

1. Observe and direct the installation, adjustment and operation of the Work of this Section.
2. Keep a complete log of activities on the job. Include dates, time, instructions given and to whom, potential problems and other pertinent information relating to installation and proper operation of the Work of this Section.
3. Participate in final inspections of the Work.

3.7 FIELD TESTING AND INSPECTION

A. Testing and inspection shall be in accordance with CBC Section 1704A.3 and 1910A.8.

B. Independent Testing Laboratory shall provide the following testing:

C. Perform testing in accordance with Section 014529.

D. Perform nondestructive weld testing as required in accordance with CBC, Section 1704A.3.1.

E. Perform tension testing of post-installed anchors in accordance with CBC 1910A.8.

F. The Owner's Representative will perform the following inspections:

G. Inspect placement of all items for conformance with the Drawings and approved shop drawings.

H. Verify welding materials and welder certifications.

I. Provide welding inspection in accordance with CBC, Section 1704A.3.1.

1. Provide inspection of tension testing of post-installed anchors.

3.8 REPAIR

A. Grind smooth sharp edges, burrs, or projecting materials on detention equipment, steel framing, and welds.

B. Weld spatter shall be cleaned from equipment and from adjacent surfaces. Where finished adjacent surfaces are damaged by welding, restore those surfaces to their previous condition.

3.9 DEFECTIVE WORK

A. Work not conforming to required lines, details, dimensions, tolerances, finishes, strength, or other specified requirements shall be considered defective. Notify the Owner's Representative upon discovery of these conditions.

B. Required repair or replacement of defective assemblies will be determined by the Owner's Representative.

C. Do not patch, fill, touch-up, repair, or replace assemblies except upon express direction of the Owner's Representative for each individual area.

D. Defective Work shall be repaired or replaced as recommended by the Owner's Representative at no additional expense to the Owner.

3.10 3.10 PROTECTION

A. Protect the Work of this Section from damage from subsequent construction operations.

B. Provide protection in accordance with manufacturer's instructions.

END OF SECTION 055050

SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel railings.

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Manufacturer's product lines of mechanically connected railings.
2. Fasteners.
3. Post-installed anchors.
4. Shop primer.
5. Nonshrink, nonmetallic grout.
6. Paint products.

B. Sustainable Design Submittals:

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

D. Samples for Verification: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.
2. Fittings and brackets.
3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.

a. Show method of connecting and finishing members at intersections.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

C. Product Test Reports: For tests on railings performed by a qualified testing agency, in accordance with ASTM E894 and ASTM E935.

D. Research Reports: For post-installed anchors, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Railings, including attachment to building construction, withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of **50 lbf/ ft.** applied in any direction.
b. Concentrated load of **200 lbf** applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides **1-1/2-inch** clearance from inside face of handrail to finished wall surface.

2.3 STEEL RAILINGS

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

C. Tubing: ASTM A500/A500M (cold formed) or ASTM A513/A513M, Type 5.

D. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.

E. Plates, Shapes, and Bars: ASTM A36/A36M.

2.4 FASTENERS

A. Fastener Materials:

1. Ungalvanized-Steel Railing Components: Plated steel fasteners complying with ASTM F1941/F1941M, Class Fe/Zn 5 for zinc coating.
2. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.

D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.

2.5 MISCELLANEOUS MATERIALS

A. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

B. Galvanizing Repair Paint: High-zinc-dust-content paint, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

C. Shop Primers: Provide primers that comply with Section 099123 "Interior Painting." Section 099600 "High-Performance Coatings."

D. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

E. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

F. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

G. Intermediate Coats and Topcoats: Provide products that comply with Section 099123 "Interior Painting." Section 099600 "High-Performance Coatings."

H. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.

I. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.

J. Bituminous Paint: Cold-applied asphalt emulsion, complying with ASTM D1187/D1187M.

K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

L. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: where indicated on Drawings, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.

1. Clearly mark units for reassembly and coordinated installation.
2. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately.

1. Remove burrs and ease edges to a radius of approximately **1/32 inch** unless otherwise indicated.
2. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water.

1. Provide weep holes where water may accumulate.
2. Locate weep holes in inconspicuous locations.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #3 welds; utilitarian appearance not subject to view, partially dressed weld with spatter removed.

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

J. Form changes in direction as follows:

1. As detailed.

K. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.

M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is **1/4 inch** or less.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.

1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
2. Coordinate anchorage devices with supporting structure.

O. For railing posts set in concrete, provide stainless steel sleeves not less than **6 inches** long with inside dimensions not less than **1/2 inch** greater than outside dimensions of post, with metal plate forming bottom closure.

2.7 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize indicated steel railings, including hardware, after fabrication.
2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
4. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
5. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner and as follows.

1. Comply with SSPC-SP 16.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Perform cutting, drilling, and fitting required for installing railings.

1. Fit exposed connections together to form tight, hairline joints.
2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
4. Do not weld, cut, or abrade surfaces of railing components that are coated or

finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

5. Set posts plumb within a tolerance of **1/16 inch in 3 feet**.
6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet**.

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.

B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending **2 inches** beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within **6 inches** of post.

3.3 ANCHORING POSTS

A. Form or core-drill holes not less than **5 inches** deep and **3/4 inch** larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Leave anchorage joint exposed with anchoring material flush with adjacent surface.

C. Anchor posts to metal surfaces with flanges, angle type, or floor type, as required by conditions, connected to posts and to metal supporting members as follows:

1. For steel railings, weld flanges to post and bolt to metal supporting surfaces.

3.4 REPAIR

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

    a. Apply by brush or spray to provide a minimum **2.0-mil** dry film thickness.

2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099123 "Interior Painting."

3.5 CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

3.6 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

SECTION 055963 - DETENTION ENCLOSURES ADD ALTERNATE ONLY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Security Mesh assemblies.
2. Chain Link assemblies.

1.2 COORDINATION

A. Coordinate installation of anchorages for detention enclosures. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention enclosures.

B. Sustainable Design Submittals:

1. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.
2. Environmental Product Declaration: For each product.
3. Third-Party Certifications: For each product.
4. Third-Party Certified Life Cycle Assessment: For each product.
5. Environmental Product Declaration: For each product.
6. Third-Party Certifications: For each product.
7. Third-Party Certified Life Cycle Assessment: For each product.

C. Shop Drawings: For detention enclosures.

1. Include plans, elevations, sections, and attachment details.

2. Indicate location, plan, and dimension of each detention enclosure.
3. Indicate type of steel for each detention enclosure component.
4. Show elevations of each detention enclosure door and indicate location, dimensions, door swing/slide direction, details of detention door hardware and accessories, and preparations for power, signal, and control systems.

D. Samples for Verification: For each type of detention enclosure indicated.

1. Include **12-by-12-inch** cut-away corner section of bar-grille assembly, constructed of specified round and flat bars, showing fabrication techniques and workmanship.
2. Include **12-by-12-inch** cut-away corner section of woven-rod-mesh assembly, constructed of specified framing and woven-rod panel, showing fabrication techniques and workmanship.
3. Include one full-size security grille and vent unit.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer manufacturer.

B. Welding certificates.

C. Material Certificates: For tool-resisting steel indicating compliance with the performance requirements for complete test sequence in accordance with applicable ASTM standard.

D. Material Test Reports: For tool-resisting steel, by a qualified testing agency.

E. Mill Certificates: For tool-resisting-steel rods used in woven-rod mesh assemblies, certifying that rods were fabricated from material with same chemical and physical properties as material used to fabricate tool-resisting-steel round bars.

F. Examination reports documenting inspections of substrates, areas, and conditions.

G. Anchor-inspection reports documenting inspections of built-in and cast-in anchors.

H. Field quality-control reports documenting inspections of installed products.

1. Field quality-control certification signed by Contractor.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For doors in detention enclosures to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
2. Tools: Provide two sets of tools for installing and removing security fasteners.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.9 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of construction contiguous with detention enclosures by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 SECURITY MESH ASSEMBLIES

A. Steel Wire mesh fence panels shall be welded by resistance welding per ASTM F2453 using pre-galvanized steel wire; using Vertical 4 GA (6mm) pre-galvanized steel wires and Horizontal 8 GA (4mm) pre-galvanized steel wires, plus an extra wire every 6” (152.4mm), to form a mesh opening of 3” x 0.5” (76.2mm x 12.7mm).

B. The cold rolled wire shall have a tensile strength of at least 74,000 psi (510 MPa) and 68,000 psi (469 MPa) shear strength. Wire strand shall be galvanized before welded (GBW), 0.50 ounces per square foot zinc coating conforming to the ASTM A641.

C. Installed with he 8 GA wire running in the vertical direction.

D. Coatings

1. Hot-dip galvanized: The wire mesh is coated with 0.5 oz./sq. ft. (150 g/m2) zinc in conformity with ASTM A641 (1989) Class 1.
2. Pre-galvanized and polyester powder coated: The polyester surface coating color shall be standard black or optional color as per RAL chart. Polyester coating to be minimum 4 mils (0.102mm) with an average thickness of 100µm (4 mils approx.) applied by an electrostatic method. Coating shall cover all surfaces of the wire sections.
3. Corrosion: The wires are galvanized according to ASTM A641/A641M with a minimum of 40 gr/m2. After the welding process the panels will be pre-treated and provided with a conversion layer for a better anti-corrosion effect and better adhesion of the polyester powder coating.

2.2 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Coordinate dimensions and attachment methods of detention enclosures with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Form and grind edges and corners to be free of sharp edges or rough areas.

E. Form metal in maximum lengths to minimize joints. Form sheet-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

F. Weld corners and seams continuously to comply with referenced AWS standard and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention enclosures rigidly in place and to support indicated loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.

H. Cut, reinforce, drill, and tap detention enclosures as indicated to receive hardware, security fasteners, and similar items.

I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.

J. Form exposed connections with hairline joints flush and smooth using concealed fasteners where possible. Use exposed security fasteners of type indicated or, if not indicated, flat-head (countersunk) security screws. Locate joints where least conspicuous.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention enclosures.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention enclosure connections before installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention enclosures.

D. Inspect proprietary built-in masonry anchors to verify that anchor installations comply with requirements in Section 042000 "Unit Masonry."

E. Verify locations of detention enclosures with those indicated on Shop Drawings.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install detention enclosures plumb, rigid, properly aligned, and securely fastened in place, complying with manufacturer's written recommendations.

B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention enclosures to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.

C. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention enclosures. Set detention enclosures accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

D. Provide temporary bracing or anchors in formwork for items that are to be built into adjacent construction.

E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

F. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.3 FIELD QUALITY CONTROL

A. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Remove and replace detention work if inspections indicate that work does not comply with specified requirements. Remove malfunctioning units; replace with new units.

C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

3.4 CLEANING AND PROTECTION

A. Touchup Painting:

1. Immediately after erection, clean bolted connections and abraded areas of shop paint, and paint exposed areas with same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
2. Cleaning and touchup painting of bolted connections and abraded areas of shop paint are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas; repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055963

SECTION 071900 - WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes penetrating water-repellent treatments for the following vertical and horizontal surfaces:

1. Cast in place concrete.
2. Concrete unit masonry.
3. Masonry Veneer

B. Related requirements:

1. 033000 Cast-in-Place Concrete
2. 042000 Concrete Unit Masonry
3. 04 26 13 Masonry Veneer

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Water repellents shall meet performance requirements indicated without failure due to defective manufacture, fabrication, or installation.

1. Water Repellents: Comply with performance requirements specified, as determined by testing on manufacturer's standard substrate assemblies representing those indicated for this Project.

B. Water Absorption: Minimum 90 percent reduction of water absorption after 24 hours in comparison of treated and untreated specimens.

1. Cast-in Place Concrete: ASTM C 642.
2. Cast Stone: ASTM C 1195.
3. Concrete Masonry Units: ASTM C 140.

C. Water-Vapor Transmission: Comply with one or both of the following:

1. Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, according to ASTM E 96/E 96M.
2. Minimum 80 percent water-vapor transmission in comparison of treated and untreated specimens, according to ASTM D 1653.

D. Water Penetration and Leakage through Masonry: Minimum 90 percent reduction in leakage rate in comparison of treated and untreated specimens, according to ASTM E 514.

E. Durability: Maximum 5 percent loss of water-repellent properties after 2500 hours of weathering according to ASTM G 154 in comparison to water-repellent-treated specimens before weathering.

F. Chloride-Ion Intrusion in Concrete: NCHRP Report 244, Series II tests.

1. Reduction of Water Absorption: 80 percent.
2. Reduction in Chloride Content: 80 percent.

1.4 SUBMITTALS

A. Additional Requirements:

1. Product Data: For each type of product indicated.
2. Include manufacturer's printed statement of VOC content.
3. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.
4. Warranty: Special warranty specified in this Section. (For language)
5. Maintenance Data.
6. Special Warranty.
7. Samples: For each type of water repellent and substrate indicated, 12 by 12 inches in size, with specified water-repellent treatment applied to half of each Sample.
8. Qualification Data: For qualified Applicator.
9. Product Certificates: For each type of water repellent, from manufacturer.
10. Closeout submittals:

a. Preconstruction Testing Reports: For water-repellent-treated substrates.
b. Field quality-control reports.
c. Warranty: Executed Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.

B. Conduct field quality control testing as indicated in Part 3 below.

1.6 PROJECT CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

1. Concrete surfaces and mortar have cured for not less than 28 days.
2. Building has been closed in for not less than 30 days before treating wall assemblies.
3. Ambient temperature is above 40 deg F and below 100 deg F and will remain so for 24 hours.
4. Substrate is not frozen and substrate-surface temperature is above 40 deg F and below 100 deg F.
5. Rain or snow is not predicted within 24 hours.
6. Not less than seven days have passed since surfaces were last wet.
7. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency specified in "Performance Requirements" Article within specified warranty period.

1. Warranty Period: Five years from date of Acceptance of the Work.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS

A. Silane, Penetrating Water Repellent: Clear, containing 20 percent or more solids of alkyltrialkoxysilanes; with alcohol, mineral spirits, water, or other proprietary solvent carrier; and with 400 g/L or less of VOCs.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals, LLC; Elastocoat (PU).
b. Evonik Corp; Protectosil Aqua-Trete 20
c. Rain Guard; Rainguard Pro Micro-Seal
d. MasterProtect; H 1000
e. Or approved equal.

2. Alternate Manufacturers:Proposed equals are subject to substitution process per Section 012500 SUBSTITUTION PROCEDURES. Refer to additional requirements for individual items.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with

requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.
2. Inspect for previously applied treatments that may inhibit penetration or performance of water repellents.
3. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
4. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions and as follows:

1. Cast-in-Place Concrete, Cast Stone and Concrete Unit Masonry: Remove oil, curing compounds, laitance, and other substances that inhibit penetration or performance of water repellents according to ASTM E 1857.

B. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live vegetation.

C. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.

D. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Apply a heavy-saturation coating of water repellent, on surfaces indicated for treatment, using 15 psi- pressure spray with a fan-type spray nozzle to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.

1. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

C. Field Quality Control Test—A manufacturer's technical representative shall be present at the job site during the application of the water repellent.

3.4 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION 071900

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. This Specification shall be read as a whole by all parties concerned. Each Section may contain more or less the complete Work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their Work and coordinate overlapping Work.

1.2 SYSTEM DESCRIPTION

A. Supply labor, materials and equipment for a mechanically attached water-resistive vapor permeable air barrier membrane system and drainage material.

B. Complete Work as shown on the Drawings and specified herein to bridge gaps and seal the water-resistive vapor permeable air barrier membrane against air leakage and water intrusion.

1. Connections of the walls to the roof membrane
2. Connections of the walls to the foundations
3. Seismic and expansion joints
4. Openings and penetrations of window and door frames, store front, curtain wall
5. Piping, conduit, duct and similar penetrations
6. Masonry ties, screws, bolts and similar penetrations
7. All other air leakage pathways in the building envelope

C. Install primary water-resistive vapor permeable air barrier, flashings, lap seam sealants, sill pan and ventilation strip accessories.

1.3 RELATED REQUIREMENTS

A. Cast-in-Place Concrete: Section 03 30 00

B. Concrete Unit Masonry: Section 04 22 00

C. Thermal Insulation: Section 07 21 00 D.

D. Gypsum Board Assemblies: Section 09 21 16

1.4 REFERENCE STANDARDS

A. American Association of Textile Chemists and Colorists (AATCC): ATCC 127 - Test Method for Water Resistance: Hydrostatic Pressure Test.

B. ASTM International (ASTM):

1. ASTM D 882 - Test Method for Tensile Properties of Thin Plastic Sheeting
2. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials
3. ASTM E 96/E 96M - Test Methods for Water Vapor Transmission of Materials
4. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
5. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials

C. International Code Council Evaluation Service, Inc. (ICC-ES): ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers.

1.5 SUBMITTALS

A. Submit manufacturers' current product data sheets, details and installation instructions for the mechanically attached water-resistive vapor permeable air barrier membrane components and accessories.

B. Submit samples of the following:

1. ASTM D 882 - Test Method for Tensile Properties of Thin Plastic Sheeting
2. Water-resistive vapor permeable air barrier sheet, minimum 8 by 10 inches (203 by 254 mm)
3. Components, minimum 12-inch (305-mm) lengths
4. Membrane flashings and lap seam sealants
5. Fasteners, clips, strapping and masonry ties
6. Sealants
7. Drainage material.

1.6 QUALITY ASSURANCE

A. Single Source: Water-resistive vapor permeable air barrier membrane components and accessories must be obtained as a single-source membrane system to ensure total system compatibility and integrity.

B. Manufacturer Qualification

1. Manufacturer of specified products listed in this Section to have minimum 8 years of continued experience in the manufacture and supply of highly vapor permeable water resistive air barrier products successfully installed in similar project applications.
2. Manufacturer of specified products listed in this Section to have experienced in-house technical and field observation personal qualified to provide expert technical support.

C. Fire Performance Characteristics: Provide water-resistive barrier meeting the following fire-test characteristics.

1. Surface-Burning Characteristics: ASTM E 84
2. Flame spread index: 25 or less
3. Smoke developed index: 450 or less

1.7 MOCK-UP

A. Construct mock-up in accordance with Div. 1 requirements.

B. Provide mock-up of specified water-resistive vapor permeable air barrier materials under provisions of Section 01 33 23 Shop Drawings, Product Data and Samples.

1.8 PRE-INSTALLATION CONFERENCE

A. Contractor shall convene one week prior to commencing Work of this section, under provisions of Div. 1.

B. Ensure all contractors responsible for creating a continuous plane of water and air tightness are present.

1.9 DELIVERY, STORAGE AND HANDLING

A. Refer to current Product MSDS for proper storage and handling.

B. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

C. Store roll materials flat or on end in original packaging. Protect rolls from direct sunlight and inclement weather until ready for use.

D. Waste Management and Disposal

1. Separate and recycle waste materials in accordance with Section 013500 Special Procedures, and with the Waste Reduction Work Plan.

1.10 COORDINATION

A. Ensure continuity of the water-resistive vapor permeable air barrier system throughout the scope of this section.

1.11 ALTERNATES

A. Submit request for alternates in accordance with Section 01 25 00 – Substitution Procedures.

B. Submit requests for alternates a minimum of ten (10) working days prior to bid date.

1.12 WARRANTY

A. Provide manufacturer’s standard material warranty in which manufacturer agrees to provide replacement material for water-resistive vapor permeable air barrier sheets installed in accordance with manufacturer's instructions that fails due to material defects within 20 years of the date of purchase.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Primary water-resistive vapor permeable air barrier membrane components and accessories must be obtained as a single-source to ensure total system compatibility and integrity. No external face applied tapes will be permitted.

1. Basis of Design: Water-resistive vapor permeable air barrier membrane with integrated tape by VaproShield LLC., Gig Harbor, WA, Ph (866) 731-7663, Email: info@VaproShield.com, Website: www.vaproshield.com or www.vaproshield.ca.

2.2 WATER-RESISTIVE VAPOR PERMEABLE AIR BARRIER MATERIALS (Basis of Design)

A. Primary water-resistive air barrier sheet membrane shall be WrapShield® with Integrated Tape by VaproShield, a zero VOC, mechanically attached, water-resistive, vapor permeable, air barrier, sheet membrane consisting of multiple layers of UV stabilized spun-bonded polypropylene having the following properties:

1. Color: Orange with allowable UV exposure for 180 days
2. Integrated tape (clear) factory applied continuously to the exterior face (color side) of membrane at the horizontal lap seam, covered with release paper.
3. Horizontal Shingle Lap Line: Factory applied continuous dashed line applied to exterior face (color side) of membrane, located 6” from top of the horizontal lap edge, used to mark the horizontal lap edge placement of the top course of membrane and to set the tape of both the upper and lower courses of membrane into position to create continuous, sealed horizontal shingle overlap.
4. Integrated tape (clear) factory applied continuously to the interior face (orange side) of membrane at the horizontal lap seam, covered clear release tape paper.
5. Air Leakage: 0.0019 cfm/sq.ft. (0.009 L/s/sq.m) when tested in accordance with ASTM E 2178 and 0.000034 cfm/sq.ft. (0.00017 L/s/sq.m) when tested in accordance with ASTM E 283
6. Water Vapor Permeance tested to ASTM E 96 Method B: 50 perms (2875ng/Pa.s.m2)
7. Water Resistance tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage
8. Tensile Strength tested to ASTM D 882: 44.8 lbf/inch (78 N/mm), machine direction; 25 lbf/inch (43.8 N/mm), cross-machine direction
9. Application Temperature: No temperature restrictions
10. Surface Burning Characteristics tested to ASTM E 84: Class A, Flame-spread index of less than 25, Smoke-development index of less than 450

11. Physical Dimensions: 0.020 inches (0.51 mm) thick and 59 inches (1.5 m) wide and 5 oz per sq. yd. (17 g/sq. m).

2.3 WATER-RESISTIVE AIR BARRIER SHEET MEMBRANE FASTENERS

A. Do not install fasteners in the horizontal integrated tape line before removal of the tape release paper.

B. Water-resistive air barrier sheet membrane fasteners shall be corrosion-resistant screws with preformed head caps.

C. Screw head caps for water-resistive air barrier sheet membrane shall be VaproCaps by VaproShield, a 1¾ inch diameter preformed head caps with a center throat hole that seals the membrane at the fastener penetration, specifically designed and tested to withstand wind loads and protect against water intrusion at screw penetrations.

D. Selection of fastener type is subject to sheathing board and substrate type. Manufacturer recommends subcontractor to supply and place corrosion-resistant stainless steel screws sized to penetrate gypsum sheathing board through to solid backing or steel studs by ¾ inch in conjunction with preformed screw head caps.

2.4 WATER-RESISTIVE AIR BARRIER JOINT SEALANT

A. Water-resistive air barrier sealant compatible with sheet membrane shall be Dow Corning® 758, a modified silicon-based Sealant tested for compatibility with VaproShield products.

2.5 WATER-RESISTIVE AIR BARRIER TRANSITION AND FLASHING MEMBRANES

A. Mechanically attached air barrier transition and flashing membrane shall be VaproFlashing by VaproShield a zero VOC mechanically attached water-resistive vapor permeable membrane having the following properties:

1. VaproFlashing Orange: 6 1/2 inches, 11 3/4 inches or 19 2/3 inches wide x 164 feet long
2. Air Leakage: 0.0000263 cfm/sq. ft. @ 75 Pa (0.000134 L/s/m sq @ 75 Pa) when tested in accordance with ASTM E 2178
3. Water Vapor Permeance tested to ASTM E 96 Method B: 50 perms (2875ng/Pa.s.m2)
4. Water Resistance tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage

2.6 VAPROLIQUI-FLASH VAPOR PERMEABLE WATER RESISTIVE FLASHING FOR ROUGH OPENINGS

A. Liquid-applied window and door flashing shall be VaproLiqui-Flash by VaproShield, a liquid-applied vapor permeable air barrier flashing material with vapor permeance and

resistance to air leakage properties compatible with the primary air barrier membrane.

2.7 WATER-RESISTIVE FLASHING AND PENETRATION TAPES

A. Tapes shall be VaproTape™ by VaproShield: UV stable, single sided, moisture-resistant flexible tape with adhesive backing having the following properties:

1. VaproTape (Single-Sided): 2 inch (5.08cm), 3 inch (7.62cm) or 4 inch (10.16cm) wide seam tape
2. VaproAlumaTape: 20 mil thick by 4 inches (114 mm) and 9 inches (229 mm) wide, foil faced, UV stable, moisture-resistant flashing and membrane transition tape for use with silicone sealants

2.8 PREFORMED WINDOW AND DOOR CORNERS

A. Preformed window and door flashing membrane shall be VaproFlashing™ Factory Formed Corners by VaproShield an 18 inch x 18 inch preformed 90 degree inside corner membrane with the same vapor permeance and resistance to air leakage physical properties as the primary air barrier membrane.

2.9 PENETRATION SEALANT

A. Provide sealant for penetrations as recommended by manufacturer and as specified under Division 07 Section: Sealants. Appropriate sealants shall be Dow Corning® 758 or VaproLiqui-Flash.

2.10 DRAINAGE MATERIAL

A. VaproMat™ lightweight, hydrophobic polyester filter fabric with an attached polypropylene drainage matrix.

1. Depth: 3mm.
2. Flamespread: 0-Class A, ASTM E84
3. Smoke Developed: 100- Class ASTM E84
4. Drainage Test: Exceeds 90% per ASTM A2273

PART 3 - EXECUTION

3.1 GENERAL

A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify architect in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.

B. All surfaces must be sound, clean, and free of oil, grease, dirt, excess mortar, or other

contaminants detrimental to the adhesion of the water-resistive air barrier flashings. Fill voids and gaps in the substrate to provide an even surface. Strike masonry joints full-flush.

C. Minimum application temperature self-adhered membrane flashings to be above 20 degrees F (minus 6.0 degrees C).

D. Ensure all preparatory Work is complete prior to applying primary water-resistive weather barrier membrane.

E. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

3.2 PROTECTION

A. Protect wall areas covered with primary water-resistive vapor permeable air barrier from damage due to construction activities, high wind conditions, and extended exposure to inclement weather.

B. Review condition of water-resistive weather barrier prior to installation of cladding. Repair, or remove and replace damaged sections with new membrane.

C. Recommend to cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed primary water-resistive weather barrier installations.

D. Remove and replace water-resistive vapor permeable air barrier affected by chemical spills or surfactants.

END OF SECTION 072500

SECTION 078100 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes sprayed fire-resistive materials.

1.3 DEFINITIONS

A. SFRM: Sprayed fire-resistive materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Framing plans or schedules, or both, indicating the following:

1. Extent of fireproofing for each construction and fire-resistance rating.
2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
4. Treatment of fireproofing after application.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer .

B. Product Certificates: For each type of fireproofing.

C. Evaluation Reports: For fireproofing, from ICC-ES.

D. Preconstruction Test Reports: For fireproofing.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on fireproofing.

1. Provide test specimens and assemblies representative of proposed materials and construction.

B. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.

1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E 736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
2. Density: Test for density according to ASTM E 605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with fireproofing.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, obtain applied-fireproofing manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is **44 deg F** or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.

B. Source Limitations: Obtain fireproofing for each fire-resistance design from single source.

C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263 ; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Steel members are to be considered unrestrained unless specifically noted otherwise.

D. Asbestos: Provide products containing no detectable asbestos.

2.2 SPRAYED FIRE-RESISTIVE MATERIALS

A. Sprayed Fire-Resistive Material as indicated on drawings : Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application .

1. Bond Strength: Minimum **150-lbf/sq. ft.** 200-lbf/sq. ft. cohesive and adhesive strength based on field testing according to ASTM E 736.
2. Density: Not less than density specified in the approved fire-resistance design, according to ASTM E 605.
3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than **0.375 inch**.
4. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    a. Flame-Spread Index: 10 or less.
    b. Smoke-Developed Index: 10 or less.
5. Compressive Strength: Minimum 8.3 lbf/sq. ft. according to ASTM E 761.
6. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
7. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
8. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.
9. Air Erosion: Maximum weight loss of **0.025 g/sq. ft.** in 24 hours according to ASTM E 859.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.

B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:

1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E 736.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.

1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
2. Verify that objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
3. Verify that substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.

B. Verify that concrete work on steel deck is complete before beginning fireproofing work.

C. Verify that roof construction, installation of rooftop HVAC equipment, and other related work are complete before beginning fireproofing work.

D. Conduct tests according to fireproofing manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.

E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.

B. Clean substrates of substances that could impair bond of fireproofing.

C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.

D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.

B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.

1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.

D. Metal Decks:

1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, is completed.
2. Do not apply fireproofing to underside of metal roof deck until roofing is completed; prohibit roof traffic during application and drying of fireproofing.

E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.

F. Spray apply fireproofing to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method

recommended in writing by fireproofing manufacturer.

G. Extend fireproofing in full thickness over entire area of each substrate to be protected.

H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.

I. Where sealers are used, apply products that are tinted to differentiate them from fireproofing over which they are applied.

J. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.

K. Cure fireproofing according to fireproofing manufacturer's written instructions.

L. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Test and inspect as required by the IBC , Subsection 1705.13, "Sprayed Fire-Resistant Materials."

B. Fireproofing will be considered defective if it does not pass tests and inspections.

1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

3.5 CLEANING, PROTECTING, AND REPAIRING

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing is without damage or deterioration at time of Substantial Completion.

C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.

D. Repair fireproofing damaged by other work before concealing it with other construction.

E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.

B. Related Requirements:

1. Section 07 84 43 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 UNIT PRICES

A. Work of this Section is affected by unit prices.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have

been installed in compliance with requirements and manufacturer's written instructions.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

B. Firestopping installations shall be coordinated with related trades to ensure penetrations are properly prepared and sealed prior to concealment.

C. Before proceeding with full-scale work, a test installation in a concealed area shall be performed for review by the Architect/Engineer and Inspector of Record (IOR).

D. Manufacturer’s technical representative shall be available to review installation procedures as required.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.10 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping systems shall bear classification marking of a

qualified testing agency.

1) UL in its "Fire Resistance Directory."
2) Intertek Group in its "Directory of Listed Building Products."
3) FM Approval in its "Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

A. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg**.

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

B. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg**.

1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

C. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.

D. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Permanent forming/damming/backing materials.
2. Substrate primers.
3. Collars.
4. Steel sleeves.

2.3 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined

with intumescent material sized to fit specific diameter of penetrant.

D. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

E. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

F. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

G. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than **3 inches** high and with minimum **0.375-inch** strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at **15 feet** from end of wall and at intervals not exceeding **30 feet**.

3.5 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified

requirements.

3.6 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."

C. Where FM Approval-approved systems are indicated, they refer to design numbers listed in FM Approval's "Approval Guide" under "Wall and Floor Penetration Fire Stops."

D. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing FS- 1:

1. UL-Classified Systems: C-AJ- 1001-1999.
2. F-Rating: 2 hours .

E. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing FS- 2:

1. UL-Classified Systems: C-AJ- 2001-2999.
2. F-Rating: 2 hours .

F. Penetration Firestopping Systems for Electrical Cables FS- 3:

1. UL-Classified Systems: C-AJ- 3001-3999.
2. F-Rating: 2 hours .

G. Penetration Firestopping Systems for Cable Trays with Electric Cables FS- 4:

1. UL-Classified Systems: C-AJ- 4001-4999.
2. F-Rating: 2 hours .

H. Penetration Firestopping Systems for Insulated Pipes FS- 5:

1. UL-Classified Systems: C-AJ- 5001-5999.
2. F-Rating: 2 hours .

I. Penetration Firestopping Systems for Miscellaneous Electrical Penetrants FS- 6:

1. UL-Classified Systems: C-AJ- 6001-6999.
2. F-Rating: 2 hours .

J. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants FS- 7:

1. UL-Classified Systems: W-L- 7001-7999.
2. F-Rating: 2 hours .

K. Penetration Firestopping Systems for Groupings of Penetrants FS- 8:

1. UL-Classified Systems: C-AJ- 8001-8999.

2. F-Rating: 2 hours .

END OF SECTION 078413

SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section Includes:

1. Floor-to-floor joints.
2. Floor-to-wall joints.
3. Head-of-wall joints.
4. Wall-to-wall joints.
5. Perimeter fire-resistive joint systems consisting of floor-to-wall joints between perimeter edge of fire-resistance-rated floor assemblies and exterior curtain walls.

1.2 REFERENCES

A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

B. UL - Underwriters' Laboratories, Inc.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.

B. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, and with movement capabilities indicated as determined by UL 2079.

1. Load-bearing capabilities as determined by evaluation during the time of test.

C. Perimeter Fire-Resistive Joint Systems: For joints between edges of fire-resistance-rated floor assemblies and exterior curtain walls, provide systems of type and with ratings indicated below and those indicated in the Fire-Resistive Joint System Schedule at the end of Part 3, as determined by UL 2079.

1. UL-Listed, Perimeter Fire-Containment Systems: Integrity ratings equaling or exceeding fire-resistance ratings of floor or floor/ceiling assembly forming one side of joint.

D. For fire-resistive systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each fire-resistive joint system, show each kind of construction condition in which joints are installed; also show relationships to adjoining construction. Include fire- resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with

1. requirements for each condition indicated.
2. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.

C. Product Certificates: For each type of fire-resistive joint system, signed by product manufacturer.

D. Field quality-control test reports.

E. Evaluation Reports: Evidence of fire-resistive joint systems' compliance with ICC Evaluation Service.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."

B. Source Limitations: Obtain fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:

1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.
2. Fire-resistive joint systems are identical to those tested per methods indicated in Part 1 "Performance Requirements" Article and comply with the following:

a. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.
b. Fire-resistive joint systems correspond to those indicated by referencing system designations of the qualified testing and inspecting agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver fire-resistive joint system products to Project site in original, unopened

containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer,

1. date of manufacture, lot number, shelf life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

1. Coordinate sizing of joints to accommodate fire-resistive joint systems.

B. Notify OWNER Resprestative inspecting agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on days preceding each series of installations.

C. Do not cover up fire-resistive joint system installations that will become concealed behind other construction until OWNER Resprestative inspecting agency and building inspector of authorities having jurisdiction have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 3M

B. Hilti

C. Approved Equal

2.2 FIRE-RESISTIVE JOINT SYSTEMS

A. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.

B. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates or damaging adjoining surfaces.

3.3 INSTALLATION

A. General: Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.

1. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

B. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
2. Apply fill materials so they contact and adhere to substrates formed by joints.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

A. Inspecting Agency: OWNER representative will engage a qualified independent inspecting agency to inspect fire-resistive joint systems and prepare inspection reports. FM6 4911

B. Testing Services: Inspecting of completed installations of fire-resistive joint systems shall take place in successive stages as installation of fire-resistive joint systems proceeds. Do not proceed with installation of joint systems for the next area until inspecting agency determines completed work shows compliance with requirements.

1. Inspecting agency shall state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.

C. Remove and replace fire-resistive joint systems where inspections indicate that they do not comply with specified requirements.

D. Additional inspecting, at Contractor's expense, will be performed to determine compliance

1. of replaced or additional work with specified requirements.

E. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and fire-resistive joint systems comply with requirements.

3.5 CLEANING AND PROTECTING

A. Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire- resistive joint systems complying with specified requirements.

3.6 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

A. Designation of System as indicated on Drawings.

END OF SECTION 078443

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

B. Preparing sealant substrate surfaces.

C. Sealant and backing.

1.2 SUBMITTALS

A. Samples: Submit showing the standard colors available for each sealant material intended for installation in an exposed location.

B. Certificates: Submit certificate that materials specified and proposed for use are suitable for intended application.

C. Manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

A. Applicator: Company with minimum three years experience in the application of materials of the type specified in this Section.

B. Regulatory Requirements: Joint Sealers shall meet all current limits set by regulatory agencies regarding Volatile Organic Compounds (VOC).

1.4 FIELD SAMPLES

A. Construct field sample panel of size approved by Owner's Representative, illustrating sealant types, colors, and tooled surfaces.

B. Locate as directed.

C. Accepted sample may remain as part of the work.

1.5 MOCK-UPS

A. Provide sealant and related accessories for mock-ups.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in the unopened, original containers or unopened packages with manufacturer's name, labels, product identification, and lot numbers where appropriate.

B. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.

1.7 GUARANTY

A. Guaranty sealant Work against leakage for 2 years.

B. Include coverage of installed sealants and accessories which fail to achieve air tight and water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 SEALANTS

A. Type A Sealant:

1. Manufacturers:

a. Euclid Chemical Company, Eucolastic II – Pourable
b. Mameco International, Vulkem 245
c. Pecora Corp., Urexpan NR-200
d. Sika Corp., Sikaflex 2C-SL
e. Sonneborn Building Products Sonolastic SL II

2. Multiple components, self-leveling polyurethane based sealant conforming to ASTM C920, Type M, Grade P, Class 25.

B. Type B (Security) Sealant:

1. Manufacturers:

a. Euclid Chemical Company, Euco #452 Gel
b. Sika Corporation Sikadur 31 Hi-Mod Gel
c. Pecora Corporation, Dyna-Poxy EP-1200

2. High solids, two component epoxy resin; ASTM C881, Type 1, Grade 3, Classes B and C.
3. Compressive Strength: 10,000 psi in 7 days when tested in accordance with ASTM D695 at 75 degrees F and 50 percent relative humidity. Material shall attain 75 percent ultimate strength within 16 hours.

C. Type E Sealant:

1. Manufacturers:

    a. Adco Seal No. B-100
    b. Pecora Corp. BC-158
    c. PTI Sealants No. 707
    d. Tremco Butyl Sealant

2. Butyl rubber based sealant conforming to ASTM C920, Type S, Grade NS, Class 7.5.

D. Type F Sealant:

1. Manufacturers:

    a. Pecora Corp. AC-20
    b. Sonneborn Building Products, Sonolac
    c. Tremco, Acrylic Latex Caulk

2. Latex acrylic based sealant conforming to ASTM C834.

E. Type G Sealant:

1. Manufacturers:

    a. Dow Corning Corp. No. 795
    b. General Electric Co. Silpruf
    c. Pecora Corp., 864
    d. Sonneborn Building Products Omniseal
    e. Tremco Spectrem 1

2. Low-modulus silicone sealant conforming to ASTM C920, Type S, Grade NS, Class 50.

F. Type H (Acoustical) Sealant:

1. Tape:

    a. Manufacturers:

        1) Arlon, Series 6A
        2) Norton Co., Norseal V30 Series
        3) Williams Products, Inc., U-Gasket

    b. Polyvinylchloride foam tape with pressure sensitive adhesive on one side, 3/4 inch wide by the thickness required to accommodate unevenness of substrate and completely fill openings between partition framing and building floors and concrete or masonry walls.

2. Compound:

    a. Manufacturers:

1) Ohio Sealants, Sound Caulk (solvent type)
2) Pecora Corp. BA-98
3) Tremco, Acoustical Sealant

b. Permanently resilient type manufactured specifically for acoustical applications.

2.2 MISCELLANEOUS MATERIALS

A. Backer Rod:

1. Material: Closed-cell foam, nonstaining, non-gassing, resilient material such as neoprene, butyl, or polyurethane, compatible with sealant to be used.
2. Sized and shaped to control depth of sealant and to provide 20 percent to 50 percent compression upon insertion.

B. Joint Cleaner:

1. For metal and glass:, Xylol, xylene, toluol, or toluene
2. For removing lacquer coatings:, Lacquer thinner

C. Primer: As recommended by sealant manufacturer for use intended.

D. Masking Tape: Pressure-sensitive adhesive paper type.

E. Bond Breaker: Pressure-sensitive adhesive polyethylene tape.

2.3 SEALANT COLORS

A. Sealant color for use in exposed locations shall be as selected by Owner's Representative from manufacturer's standard colors.

B. Wherever sealants are not exposed to view, provide manufacturer's standard color which has the best overall performance characteristics for the application indicated.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect joints to be sealed to determine if conditions are satisfactory for the proper installation of joint sealants.

B. If unsatisfactory conditions exist, do not commence Work until such conditions have been corrected.

3.2 GENERAL

A. Provide sealant wherever necessary to:

B. Prevent light leakage.

C. Prevent moisture leakage.

1. Facilitate cleaning and sanitation.
2. Seal exposed joints around door and window frames, signs, display boards, casework, fire extinguisher cabinets, fire alarm boxes, plumbing fixtures, electrical device cover plates, light fixtures, and other items indicated to be set in sealant.

3.3 PREPARATION

A. Cleaning: Clean joint surfaces, using joint cleaner as necessary, of dust, dirt, oil, grease, rust, lacquers, laitance, release agents, moisture, and other matter which could adversely affect adhesion of sealants.

B. Masking: Mask areas adjacent to joints.

C. Priming: Apply primer, if required, following manufacturer's printed instructions.

D. Joints shall enclose sealant on three sides.

1. Where adequate joints for sealants have not been provided, suitable joints shall be cleaned out to the depth required, or as indicated, and ground to a minimum width of 1/4 inch without damage to the adjoining Work, unless otherwise specified or indicated.
2. No grinding shall be performed on metal surfaces.

3.4 APPLICATION

A. Install sealant and backing materials in accordance with manufacturer's instructions.

B. Apply in accordance with manufacturer's instructions regarding ambient temperature for application and curing. Do not apply Type B Sealant at temperatures below 60 degrees F.

C. Install backing materials in joints using blunt instrument to avoid puncturing.

1. Do not twist backing while installing.
2. Install backing so that joint depth is 50 percent of joint width, minimum 1/4 inch deep.

D. Apply sealants in joints using pressure gun with nozzle cut to fit joint width.

E. Place sealants in uniform, continuous beads without gaps or air pockets.

F. Tool joints to required configuration within 10 minutes of sealant application.

G. If masking materials are used, remove immediately after tooling.

H. Seal joints adjacent to painted Work before the final coat of paint is applied.

I. Verify adhesion of sealants to substrates.

3.5 CLEANING

A. Remove spilled and excess materials adjacent to joints without damaging adjacent surfaces.

B. Leave finished Work in neat, clean condition with no evidence of spillovers or damage to adjacent surfaces.

3.6 SCHEDULE

A. Type A:

1. Joints in concrete and tile floors and paved surfaces subject to foot traffic.

B. Type B:

1. All construction joints, window and hollow metal frame perimeters, and bedding of furnishings, equipment, plumbing fixtures, electrical fixtures, mechanical ducts and other items fastened to wall, ceiling, and floor surfaces in the following locations:

    a. Cells.
    b. Holding cells, including inmate toilets within holding cells or dormitories
    c. All inmate toilets and showers in housing units.
    d. Inmate toilets where all walls (with the exception of chase walls) are of CMU and/or concrete construction, metal wall construction.

2. Housing unit dayrooms.

    a. Bedding of plumbing fixtures and equipment in housing unit dayrooms.

3. Inmate side of enclosed non-contact visiting rooms or interview rooms.
4. Bedding of plumbing fixtures in group yards and small management yards.
5. Other locations indicated.
6. Do not apply Type B sealant until all building wall and roof loads have been imposed for a period of not less than 7 days.

C. Type C:

1. Interior wall penetrations for pipe and conduit that will be concealed by escutcheons and other trim and plate, and for lap joints in sheet metal.

D. Type D:

1. Joints, voids and penetrations not otherwise specified for interior surfaces exposed to view and requiring painting.
2. Bedding of fixtures, partitions, equipment and accessories fastened to walls and floors, and flanges and escutcheons of items penetrating surfaces in the following locations: kitchens, dining rooms, staff and public toilet rooms, inmate toilet rooms except as otherwise specified, change rooms, and other areas requiring sanitary conditions to eliminate any open joints between contact surfaces.

E. Type E:

1. Exterior and interior joints in contact with organically-coated aluminum.
2. Exterior and interior vertical joints in concrete, except as otherwise specified.
3. Exterior joints in masonry and portland cement plaster.
4. Around metal door, window and louver frames penetrating exterior concrete, masonry and portland cement plaster surfaces, except as otherwise specified.

F. Type F:

1. Perimeter joints around sound-retardant partitions and electrical boxes and other penetrations in such partitions.

G. Conflicts:

1. In the event of conflict between the above Schedule and sealant type indicated on Drawings, notify Owner's Representative.
2. Owner's Representative will determine sealant type to be installed in location in question.
3. Install sealant type directed by Owner's Representative, complete with all necessary joint preparation and accessories.

END OF SECTION 079200

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Acoustical joint sealants.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for nonacoustical applications.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants, showing full range of available colors for each product exposed to view.

C. Samples for Verification: For each type and color of acoustical joint sealant required.

1. Size: **1/2-inch-** wide sealant joints formed between two **6-inch-** long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Acoustical Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

E. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

1.3 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports:

1. Product Test Reports: For each type of acoustical joint sealant, for tests performed by qualified testing agency.

B. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Warranty Documentation:

1. Manufacturers' special warranties.
2. Installer's special warranties.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained between **40 and 95 deg F**.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 35 and 100 deg F.

1.7 WARRANTY

A. Installer's Special Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Manufacturer's Special Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

PART 2 - PRODUCTS

2.1 ACOUSTICAL JOINT SEALANTS

A. Acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies in accordance with ASTM E90.

1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
3. Sealant shall comply with the testing and product requirements of the California

Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 9 mcg/cu. m or 7 ppb, whichever is less.

4. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." The building concentration of formaldehyde shall not exceed half of the indoor recommended exposure limit, or 33 mcg/cu. m, and that of acetaldehyde shall not exceed 9 mcg/cu. m.

B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Pecora Corporation
   b. Tremco Incorporated
   c. USG Corporation

2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.2 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by acoustical joint-sealant manufacturer where required for adhesion of sealant to joint substrates.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where recommended by acoustical joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.

B. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

SECTION 079513.13 - INTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall expansion joint covers.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

1. Floor expansion joint covers.
2. Wall expansion joint covers.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Samples: For each expansion joint cover assembly and for each color and texture specified, full width by **6 inches** long in size.

D. Samples for Verification: For each type of expansion joint cover assembly, full width by **6 inches** long in size.

E. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion joint cover assembly.
2. Expansion joint cover assembly location cross-referenced to Drawings.
3. Nominal, minimum, and maximum joint width.
4. Movement direction.
5. Materials, colors, and finishes.
6. Product options.
7. Fire-resistance ratings.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for

tests performed by manufacturer and witnessed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Expansion joint cover assemblies to withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 by a qualified testing agency.

1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies to be subjected to hose stream testing.

C. Expansion Joint Design Criteria As Indicated on Drawings:

1. Type of Movement: Wind sway.

a. Nominal Joint Width: 8 inches.

2. Seismic Movement:

a. Joint Movement: As indicated on Drawings.

2.3 WALL EXPANSION JOINT COVERS

A. Elastomeric-Seal Wall Joint Cover: Assembly consisting of elastomeric seal anchored to frames fixed to sides of joint gap.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Balco; a CSW Industrials Company
b. Construction Specialties, Inc.
c. inpro Corporation

2. Application: Wall to corner.
3. Fire-Resistance Rating: Not less than 2 hours.

4. Exposed Metal:

    a. Stainless Steel: No. 4.

5. Seal: Preformed elastomeric membranes or extrusions.

    a. Color: Gray.

2.4 MATERIALS

A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304 for plates, sheet, and strips.

B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.

D. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

E. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 STAINLESS STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

    1. Directional Satin Finish: No. 4.

C. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

2.6 ACCESSORIES

A. Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.

    1. Provide where indicated on Drawings.

B. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Repair or grout block out as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
2. Install frames in continuous contact with adjacent surfaces.
    a. Shimming is not permitted.
3. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
4. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
5. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
6. Locate anchors at interval recommended by manufacturer, but not less than **3 inches** from each end and not more than **24 inches** o.c.

C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

G. Moisture Barrier Drainage: If indicated, provide drainage fittings and connect to drains.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion joint cover assemblies. Reinstall cover plates or seals prior to Substantial Completion.

END OF SECTION 079513.13

SECTION 079513.16 - EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior expansion joint covers.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

1. Exterior expansion joint covers.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Samples: For each exposed expansion joint cover assembly and for each color and texture specified, full width by **6 inches** long in size.

D. Samples for Initial Selection: For each type of exposed finish.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Expansion joint cover assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.3 EXTERIOR EXPANSION JOINT COVERS

A. Exterior Elastomeric-Seal Joint Cover: Assembly consisting of elastomeric seal anchored to surface-mounted frames fixed to sides of joint gap.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Inpro Corporation; Series 611 or 612 or comparable product by one of the following:

a. Architectural Art Manufacturing; a division of Pittcon Architectural Metals, LLC
b. Balco; a CSW Industrials Company

2. Application: Wall to wall.
3. Installation: Recessed.
4. Fire-Resistance Rating: Not less than that indicated on Drawings.
5. Exposed Metal:

a. Aluminum: Manufacturer's standard.

1) Color: As selected by Architect from full range of industry colors and color densities.

6. Seal: Preformed elastomeric membrane or extrusion.

a. Color: As selected by Architect from manufacturer's full range.

2.4 MATERIALS

A. Aluminum: **ASTM B221**, Alloy 6063-T5 for extrusions; **ASTM B209**, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

2.5 ACCESSORIES

A. Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.

1. Provide where indicated on Drawings.

B. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
3. Cut and fit ends to accommodate thermal expansion and contraction of metal

without buckling of frames.

4. Install frames in continuous contact with adjacent surfaces.

    a. Shimming is not permitted.

5. Locate anchors at interval recommended by manufacturer, but not less than **3 inches** from each end and not more than **24 inches** o.c.

C. Elastomeric Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Preformed Foam Joint Seals: Install in compliance with manufacturer's written instructions. Install with minimum number of end joints.

1. Install each length of seal immediately after removing protective wrapping.
2. Firmly secure compressed joint seals to joint gap side to obtain full bond using exposed pressure-sensitive adhesive or field-applied adhesive as recommended by manufacturer.
3. Do not pull or stretch material. Produce seal continuity at splices, ends, turns, and intersections of joints.
4. For applications at low ambient temperatures, heat foam joint seal material in compliance with manufacturer's written instructions.

E. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

F. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

G. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

H. Moisture Barrier Drainage: If indicated, provide drainage fitting and connect to drains.

3.4 CONNECTIONS

A. Transition to Roof Expansion Joint Covers: Coordinate installation of exterior wall and soffit expansion joint covers with roof expansion joint covers specified in Section 077129 "Manufactured Roof Expansion Joints." Install factory-fabricated units at transition between exterior walls and soffits and roof expansion joint cover assemblies.

3.5 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections.

END OF SECTION 079513.16

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

B. Related Requirements:

1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
2. Section 119812 "Detention Doors and Frames" for hollow-metal doors and frames for detention facilities.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.3 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

B. Product Data Submittals: For each product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

C. Sustainable Design Submittals:

1. Environmental Product Declaration: For each product.
2. Third-Party Certifications: For each product.
3. Third-Party Certified Life Cycle Assessment: For each product.

D. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

E. Samples for Verification:

1. Finishes: For each type of exposed finish required, prepared on Samples of not less than **3 by 5 inches**.
2. Fabrication: Prepare Samples approximately 8 by 10 inches to demonstrate compliance with requirements for quality of materials and construction:

a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

F. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For door inspector.

1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.

B. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly

for tests performed by a qualified testing agency indicating compliance with performance requirements.

C. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.8 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies is to meet the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum **4-inch-** high wood blocking. Provide minimum **1/4-inch** space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 HOLLOW METAL DOORS AND FRAMES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ceco Door; AADG, Inc.; ASSA ABLOY
2. Concept Frames, AADG, Inc.; ASSA ABLOY Group
3. Curries, AADG, Inc.; ASSA ABLOY Group
4. Fleming Door Products Ltd.; ASSA ABLOY Group
5. National Custom Hollow Metal Doors & Frames
6. Republic Doors and Frames; a Allegion brand
7. Security Metal Products; a brand of ASSA ABLOY
8. Steelcraft; Allegion plc

9. Trillium Steel Doors Limited

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing in accordance with NFPA 257 or UL 9.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1; ANSI/SDI A250.4, Level C. At locations indicated in the Door and Frame Schedule on Drawings.

1. Doors:

   a. Type: As indicated in the Door and Frame Schedule on Drawings.
   b. Thickness: 1-3/4 inches.
   c. Face: Uncoated steel sheet, minimum thickness of **0.032 inch**.
   d. Edge Construction: Model 2, Seamless.
   e. Edge Bevel: Bevel lock and hinge edges 1/8 inch in 2 inches.
   f. Core: Manufacturer's standard.
   g. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.

2. Frames:

   a. Materials: Uncoated steel sheet, minimum thickness of **0.042 inch**.
   b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
   c. Construction: Full profile welded.

3. Exposed Finish: Prime.

C. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule on Drawings.

1. Doors:

   a. Type: As indicated in the Door and Frame Schedule on Drawings.

b. Thickness: **1-3/4 inches**.
c. Face: Uncoated steel sheet, minimum thickness of **0.042 inch**.
d. Edge Construction: Model 2, Seamless.
e. Edge Bevel: Bevel lock and hinge edges 1/8 inch in 2 inches.
f. Core: Manufacturer's standard.
g. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of **0.053 inch**.
b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
c. Construction: Full profile welded.

3. Exposed Finish: Prime.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule on Drawings.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule on Drawings.
b. Thickness: **1-3/4 inches**.
c. Face: Metallic-coated steel sheet, minimum thickness of **0.042 inch**, with minimum A60 coating.
d. Edge Construction: Model 2, Seamless.
e. Edge Bevel: Bevel lock and hinge edges 1/8 inch in 2 inches.
f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
h. Core: Vertical steel stiffener.
i. Fire-Rated Core: Manufacturer's standard vertical steel stiffener with insulation core for fire-rated doors.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of **0.053 inch**, with minimum A60 coating.
b. Construction: Full profile welded.

3. Exposed Finish: Prime.

2.5 BORROWED LITES

A. Fabricate of uncoated steel sheet, minimum thickness of 0.042 inch.

B. Construction: Full profile welded.

C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.7 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each **24 inches** of frame height above **7 feet**.
3. Postinstalled Expansion Anchor: Minimum **3/8-inch-** diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Material: ASTM A879/A879M, Commercial Steel (CS), **04Z** coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.8 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.9 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum **3/4 inch** beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for

hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted hairline joints.

1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than **9 inches** o.c. and not more than **2 inches** o.c. from each corner.

2.10 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

    a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    b. Install frames with removable stops located on secure side of opening.

2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
3. Floor Anchors: Secure with postinstalled expansion anchors.

    a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

    a. Squareness: Plus or minus **1/16 inch**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus **1/16 inch**, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus **1/16 inch**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus **1/16 inch**, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 101.

3.4 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint in accordance with manufacturer's written instructions.

C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish in accordance with manufacturer's written instructions.

D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 083113.53 - SECURITY ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Security access doors and frames for walls and ceilings.

1.3 ALLOWANCES

A. Security access doors and frames are part of a security access door and frame allowance.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details materials, individual components and profiles, and finishes.

B. Samples: For each type of security access door and frame and for each finish specified, complete assembly minimum **6 by 6 inches** in size.

C. Product Schedule: For security access doors and frames.

PART 2 - PRODUCTS

2.1 SECURITY ACCESS DOORS AND FRAMES

A. Maximum-Security Flush Access Doors :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Babcock-Davis.

2. Locations: Wall and ceiling .
3. Door Size: 24" x 30".
4. Metallic-Coated Steel Sheet for Door: Nominal **0.183 inch**, 7 gage; factory primed.
5. Frame: Minimum **3/16-by-2-by-2-by-3-inch** angle welded with joints ground smooth.
6. Hinges: Heavy-duty steel welded to door and frame.
7. Latch and Lock: Detention deadbolt with parametric key with interior release.

2.2 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum **G60** or **A60** metallic coating.

D. Stainless Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

E. Stainless Steel Flat Bars: ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

F. Frame Anchors: Same type as door face.

G. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

D. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
2. Keys: Furnish two keys per lock and key all locks alike.
3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept

cylinder specified in

2.4 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Factory-Primed Finish: Apply manufacturer's standard lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

E. Stainless Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113.53

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hinges.
2. Mortise locks.
3. Delayed-egress electromagnetic locks.
4. Surface closers.
5. Door gasketing.
6. Thresholds.

B. Related Requirements:

1. Section 081113 "Hollow Metal Doors and Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.
2. Section 119812 "Detention Doors and Frames" for door silencers provided as part of detention frames.
3. Section 119814 "Detention Door Hardware" for hardware for detention doors.
4. Section 281000 "Access Control" for coordination of access control system components.
5. Section 281400 "Access Control System Hardware" for access control system units, power, battery chargers, and computer equipment.

1.2 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field-verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

B. Keying Conference: Conduct conference at Project site.

1. Incorporate conference decisions into keying schedule after reviewing door hardware keying system, including, but not limited to, the following:

a. Flow of traffic and degree of security required.
b. Preliminary key system schematic diagram.
c. Requirements for key control system.
d. Requirements for access control.
e. Address for delivery of keys.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For electrified door hardware.

1. Include diagrams for power, signal, and control wiring.
2. Include details of interface of electrified door hardware and building safety and security systems.

C. Samples: For each exposed product in each finish specified, in manufacturer's standard size.

1. Tag Samples with full product description to coordinate Samples with door hardware schedule.

D. Samples for Verification: For each type of exposed product, in each finish specified.

1. Sample Size: Full-size units or minimum **2-by-4-inch** Samples for sheet and **4-inch** long Samples for other products.
2. Tag Samples with full product description to coordinate Samples with door hardware schedule.

E. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of product data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:

    a. Identification number, location, hand, fire rating, size, and material of each door and frame.
    b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
    c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
    d. Fastenings and other installation information.
    e. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
    f. Mounting locations for door hardware.
    g. List of related door devices specified in other Sections for each door and frame.

F. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Architectural Hardware Consultant.

B. Product Certificates: For each type of electrified door hardware.

1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.

C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

D. Field quality-control reports.

E. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals.

B. Schedules: Final door hardware and keying schedule.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and

approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedule.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lockup for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:

a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
b. Exit Devices: Two years from date of Substantial Completion.
c. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of door hardware from single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to

authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

B. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Means of Egress Doors: Latches do not require more than **15 lbf** to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with California Building Code 2022.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than **5 lbf**.
2. Comply with the following maximum opening-force requirements:

    a. Interior, Non-Fire-Rated Hinged Doors: **5 lbf** applied perpendicular to door.
    b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than **1/2 inch** high.
4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 HINGES

A. Hinges: ANSI/BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Allegion plc
    b. Design Hardware; Mesker Openings Group; dormakaba
    c. Hager Companies
    d. Lawrence Hardware Inc.
    e. McKinney Products Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY

f. STANLEY; dormakaba USA, Inc.

2.4 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum **1/2-inch** latchbolt throw.
2. Mortise Locks: Minimum **3/4-inch** latchbolt throw.
3. Deadbolts: Minimum 1.25-inch bolt throw.

C. Lock Backset: **2-3/4 inches** unless otherwise indicated.

D. Lock Trim:

1. Description: As indicated on Drawings.
2. Levers: Cast.
3. Escutcheons (Roses): Cast.
4. Dummy Trim: Match lever lock trim and escutcheons.

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

F. Mortise Locks: ANSI/BHMA A156.13, Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Adams Rite Manufacturing Company, an ASSA ABLOY Group company
b. Allegion plc
c. BEST Access Solutions, Inc.; dormakaba USA Inc.
d. dormakaba USA Inc.
e. Hager Companies
f. RR Brink Locking Systems, Inc.
g. SARGENT Manufacturing Company; ASSA ABLOY
h. STANLEY; dormakaba USA, Inc.

2.5 LOCK CYLINDERS

A. Standard Lock Cylinders: ANSI/BHMA A156.5, Grade 1 permanent cores; face finished to match lockset.

1. Core Type: Removable.

B. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.6 KEYING

A. Keying System: Factory registered, complying with guidelines in ANSI/BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.

1. Master Key System: Change keys and a master key operate cylinders.

a. Provide three cylinder change keys and five master keys.

2. Existing System:

a. Master key or grand master key locks to Owner's existing system.
b. Re-key Owner's existing master key system into new keying system.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: Information to be furnished by Owner.

2.7 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: ANSI/BHMA A156.3; consisting of active-leaf, hold-open lever, and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.

B. Carry-Open Bars: ANSI/BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.

C. Astragals: ANSI/BHMA A156.22.

2.8 SURFACE CLOSERS

A. Surface Closers: ANSI/BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-

sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Allegion plc
    b. Corbin Russwin, Inc.; an ASSA ABLOY Group company
    c. dormakaba USA Inc.
    d. Hager Companies
    e. SARGENT Manufacturing Company; ASSA ABLOY
    f. STANLEY; dormakaba USA, Inc.

2.9 DOOR GASKETING

A. Door Gasketing: ANSI/BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Hager Companies
    b. M-D Building Products, Inc
    c. Pemko Manufacturing Company Inc.; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
    d. Reese Enterprises, Inc
    e. Zero International; Allegion plc

B. Maximum Air Leakage: When tested in accordance with ASTM E283/E283M with tested pressure differential of **0.3 inch wg**, as follows:

1. Gasketing on Single Doors: **0.3 cfm/sq. ft.** of door opening.
2. Gasketing on Double Doors: **0.50 cfm per ft.** of door opening.

2.10 THRESHOLDS

A. Thresholds: ANSI/BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Hager Companies
    b. M-D Building Products, Inc
    c. Pemko Manufacturing Company Inc.; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
    d. Reese Enterprises, Inc
    e. Zero International; Allegion plc

2.11 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and ANSI/BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended; however, aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.12 FINISHES

A. Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for

installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.

B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION OF DOOR HARDWARE

A. Mounting Heights: Mount door hardware units at heights indicated on Drawings unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every **30 inches** of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every **30 inches** of door height greater than **90 inches**.

E. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as directed by Owner.

F. Key Control System:

1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
2. Key Lock Boxes: Install where indicated or approved by Architect to provide controlled access for fire and medical emergency personnel.
3. Key Control System Software: Set up multiple-index system based on final keying schedule.

G. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.

1. Configuration: Provide one power supply for each door opening with electrified door hardware.

H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with

accessibility requirements of authorities having jurisdiction.

3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

A. Engage Installer to train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.9 DOOR HARDWARE SCHEDULE

A. Hardware per door hardware schedule.

END OF SECTION 087100

SECTION 08 88 53 - SECURITY GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Security glass and glazing for hollow metal work, doors, windows, and other items referencing this Section.

B. Related Documents and Sections:
1. Section 07 90 00 - Joint Protection.
2. Section 08 34 63 - Detention Doors and Frames.
3. Section 13 50 00 - Security Hollow Metal Wall Panels.

1.2 REFERENCES

A. Appendix H, California Department of Corrections, Standards for Security Glazing Products. Appendix H is included at the end of this specification section for reference.

B. ANSI Z26.1 Safety Glazing Material.

C. ANSI Z97.1 Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

D. ASTM C1036 Flat Glass.

E. ASTM C1048 Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

F. ASTM D256 Standard Test Method for Determining the Izod Pendulum Impact Resistance of Plastics.

G. ASTM D635 Standard Test Method Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

H. GANA - Glass Association of North America Glazing Manual.

I. GANA - Sealant Manual.

J. Laminators Safety Glass Association - Standards Manual.

K. SIGMA - Sealed Insulated Glass Manufacturers Association.

L. UL 752 Standard for Bullet-Resisting

M. CFR 1201 – Code of Federal Regulations for Safety Standards of Architectural Glazing

1.3 DEFINITIONS

A. Security Glass:
   1. Multiple-ply, glass and polycarbonate laminate, in which all plies are bonded together with polyurethane.
   2. Single layer polycarbonate.
   3. Glass types indicated as:

      a. Security Classification Level 1: Ballistic Glazing
         1) GS-1 (standard – no fire resistant rating)

      b. Security Classification Level 2: Maximum Security Glazing
         1) GS-2 (standard – no fire resistant rating)

      c. Security Classification Level 3: Maximum/Medium Security Glazing
         1) GS-3 (standard – no fire resistant rating)

      d. Security Classification Level 4: Medium Security Glazing
         1) GS-4 (standard – no fire resistant rating)
   4. The above listing represents all potential security glazing types, although not all of these types are used on this project.

1.4 PERFORMANCE REQUIREMENTS

A. Meet or Exceed the Following:
   1. CDCR APPENDIX H.
   2. ANSI Z97.1 – Safety Performance Specification and Test Method for Safety Glazing used in Buildings.
   3. ANSI Z26.1 AS9 for light, stability, luminous transmittance, bake, humidity, boil, weatherometer, dimensional stability, and impact.
   4. ASTM D635.

B. Provide air-tight and water-tight installation in each opening.

C. Each completed installation must withstand normal temperature changes and wind loading without failure. Failure includes:
   1. Loss or breakage of glass.
   2. Failure of sealants or gaskets to remain watertight and airtight.
   3. Deterioration of glazing materials.
   4. Other defects.

D. Each installation shall withstand vandalism to a degree consistent with the security classification level of the glazing panel.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 00 and 01 33 23.

B. Product Data:
   1. Manufacturer’s standard descriptive product literature for each product type. Include test results indicating modulus of rupture for each type and thickness of glass.

2. Submit technical data describing assembly, fabrication, glazing methods, and glazing products to be used for installation.

C. Samples:
1. Three samples 12 inch x 12 inch square of each type, glass and thickness.
2. Each sample shall bear permanent product marking. Markings shall conform to the marking requirements of CDCR APPENDIX H.

D. Shop Drawings: Show full size glazing details for each type of glass and framing condition.

E. Testing Laboratory Reports:
1. Submit certified Sampling and Plant Inspection Report prepared by a Owner-approved Independent Laboratory, indicating compliance with CDCR APPENDIX H.
2. Submit certified Test Report from the Owner-approved Independent Testing Laboratory for Project Certification of each glazing class required. Indicate materials and test results are in compliance with CDCR APPENDIX H.

F. Manufacturer's Certificate:
1. Stating that products conform to specified requirements.
2. Verify materials proposed to be used under the Work of this Section are compatible with each other in the combinations to be used in the Work. Prior to submittal of Product Data, submit data indicating anticipated incompatibilities and unfavorable reactions.

G. Submit documentation indicating qualifications of Detention Equipment Contractor conform to specified requirements from Section 11 19 00.

H. Detention Equipment Contractor's Activity Log: Submit current copy at the end of each two-week period during product installation.

I. Manufacturer's Installation Instructions: Indicate special precautions required.

J. Manufacturer's Maintenance Instructions: Indicate cleaning requirements.

K. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer of Strengthened Glass: Minimum 5 years experience in the manufacture of products of the type specified in this Section.

B. Exterior and interior glass and glazing shall contain a minimum of 25 percent recycled content.

DELIVERY, STORAGE AND HANDLING

C. Protect edges of glazing panels with cushioned tape during shipment and storage prior to installation.

D. Ship glazing panels and materials to site in original packaging, seals unbroken.

E. Ship lights of glass to site bearing product marking. Markings shall conform to the marking requirements of CDCR APPENDIX H.

F. Store glass and glazing under conditions which protect the materials from breakage, scratching or other damage.

G. Store materials on blocking at a lean of 5 to 7 degrees off vertical, or as recommended by manufacturer, against broad and sturdy uprights capable of supporting material load.

H. Maintain protective conditions at all times.

1.7 PROJECT CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum 40 degree F temperature 24 hours after installation of glazing compounds.

1.8 COORDINATION

A. Coordinate the Work of this Section with Sections specifying work to receive security glazing.

1.9 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace, including the cost of materials and labor, coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
   1. Warranty Period: 10 years from date of Project completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace, including the cost of labor and materials, laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, discoloration, cracking of polycarbonate products, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
   1. Warranty Period: 5 years from date of Project completion.

C. Manufacturer's Special Warranty for Abrasion- and UV-Resistant, Multiwalled Structured Polycarbonate: Manufacturer's standard form, made out to Owner and signed by polycarbonate manufacturer, in which manufacturer agrees to replace

polycarbonate products that break or develop defects from normal use that are attributable to manufacturing process and not to practices for maintaining and cleaning plastic glazing contrary to manufacturer's written instructions. Defects include coating delamination, haze, excessive yellowing, and loss of light transmission beyond the limits stated in plastic glazing manufacturer's standard form.

1. Warranty Period: Five years from date of Project completion.

PART 2 PRODUCTS

2.1 MATERIALS

A. Clear Heat Strengthened Glass
1. .125 inch
2. .25 inch
3. As required

B. Urethane
1. .025 inch
2. .050 inch
3. As required

C. Polycarbonate
1. .125 inch
2. .25 inch
3. .375 inch
4. As required

D. Polycarbonate (Abrasion Resistant)
1. .118 inch
2. As required

E. Intumescent Layer
1. .75 inch (45 minutes)
2. 1 inch (60 minutes)
3. 1-7/16 inch (90 minutes)
4. 1-9/16 inch (120 minutes)
5. As required

2.2 TECHNICAL DATA

A. ASTM C 1036-01: Standard Specification for Flat Glass

B. ASTM C 1048-01: Standard Specification for Heat Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass

C. ASTM C 1349-04: Standard Specification for Architectural Flat Glass Clad Polycarbonate

D. ASTM F 1915-98: Standard Test Method for Glazing for Detention Facilities

E. ANSI (American National Standard Institute Inc.) Z97.1: For Safety Materials used in buildings – Specifications & Methods of Test

F. CPSC 16 CFR 1201 (Category I and II) Safety Standard for Architectural Glazing Materials

G. CDCR 860-14a Appendix H

2.3 ATTACK RESISTANCE

A. Security Classification 1
1. ASTM F 1915 Grade 1 (60 minute containment)
2. WMFL Level 1 (60) Minute Physical Attack

B. Security Classification 2
1. ASTM F 1915 Grade 2 (40 minute containment)
2. HP White TP-0500.03 Level IV
3. WMFL Level III

C. Security Classification 3
1. ASTM F 1915 Grade 3 (20 minute containment)
2. HP White TP-0500.02 Level II

D. Security Classification 4
1. ASTM F 1915 Grade 4 (10 minute containment)
2. H.P. White Level 1 (TP-0500.03) forced entry

2.4 BULLET RESISTANCE

A. Bullet Resistance in accordance with UL752 Level III

B. No spall; no penetration

2.5 GLAZING ACCESSORIES

A. Setting Blocks and Spacers: Santoprene by Monsanto; Shore A hardness 70 plus/minus 3 durometer. Neoprene setting blocks or spacers meeting the same Shore A hardness requirements are acceptable where located between the steel frame and the Santoprene glazing gasket (neoprene setting blocks or spacers shall not be in direct contact with security glazing).

B. Glazing Gasket:
1. Santoprene by Monsanto; vulcanized thermoplastic rubber, Shore A hardness 70 plus/minus 3 durometer.
2. Extruded “U” shape, continuous the length of each side of the glass sheet, width as required for glazing.
3. 1/8 inch wall thickness each side of glazing, height of each leg to match stop height.
4. Fabricators:

a. Fabricated Extrusions, Modesto, California.

C. Sealant for Exterior Windows:
1. General: Provide products of type indicated, complying with the following requirements:

a. Non-sag silicone; acetoxy cured.

b. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Manufacturers

a. General Electric Company; Construction 1200

b. Dow Corning; 999

c. Tremco; Proglaze

2.6 ASSEMBLED GLAZING PANELS

A. Glazing Panel Fabricators:
1. Global Security Glazing (basis of design)
2. McGrory Glass
3. Oldcastle Glass
4. Approved Equal

2.7 TOLERANCES

A. Maximum Variation from Indicated Glazing Panel Thickness:
1. Notwithstanding provisions of referenced ASTM and other Standards, only tolerances indicated in CDCR APPENDIX H will be permissible in the thickness of components of glazing panels.

2.8 SOURCE QUALITY CONTROL

A. Owner-approved Independent Laboratory shall perform Plant Inspection and production observation in accordance with CDCR APPENDIX H.

B. Identification of Glazing Panels:
1. Each glazing panel class shall bear permanent marking in accordance with CDCR APPENDIX H.

a. GS-1 series glazing
1) Security Classification Level 1
2) Maximum Security Ballistic Glazing
3) 60 minute containment/attack rating
4) Standard non-rated glazing equivalent to CDCR Appendix H Type A glazing
5) Thickness: 1-3/8 inch nominal

b. GS-2 series glazing

1) Security Classification Level 2
2) Maximum Security Glazing
3) 40 minute containment/attack rating
4) Standard non-rated glazing equivalent to CDCR Appendix H Type B glazing
5) Thickness: ¾” nominal

c. GS-3 series glazing
1) Security Classification Level 3
2) Maximum/Medium Security Glazing
3) 20 minute containment/attack rating
4) Standard non-rated glazing equivalent to CDCR Appendix H Type C glazing
5) Thickness: 11/16” thick nominal

d. GS-4 series glazing
1) Security Classification Level 4
2) Medium Security Glazing
3) 10 minute containment/attack rating
4) Standard non-rated glazing equivalent to CDCR Appendix H Type D glazing
5) Thickness: 9/16” thick nominal

C. Certification Testing:
1. Test fabricated glazing panels for use in the Work in accordance with CDCR APPENDIX H.
2. Certification testing is required for each manufacturer, and limited to only one type of each class of fabricated panel on this project.
3. Testing requirements will be waived for each class of fabricated panel, irrespective of type, for which the fabricator has previously passed Certification Testing for use on another Bid Package in this project.
4. If any panel fails the required tests, the Owner representative may prohibit the installation of panels of the type failing the test which were fabricated in the same production run as the failed panel.
5. Upon direction of the Owner representative, uninstall and remove from buildings and site panels of the type failing the test which were fabricated in the same production run as the failed panels.
6. Upon direction of the Owner representative, replace and retest fabricated glazing panels of the type and from the production run which failed the initial testing. Repeat this sequence until fabricated glazing panels pass the required testing.

2.9 INTERGRADED WINDOW FILM

A. Privacy window film:
1. Basis of design: 3M Crystal Glass Finishes Pittsburgh Plate Glass (PPG) by 3M Company - Commercial Solutions Division [CSD]

a. Dusted - 3.2 mils (81 microns)

2. Fire Performance: Surface burning characteristics when tested in accordance with ASTM E84, Class A:

   a. Flame Spread: 25 maximum.

   b. Smoke Developed: 450 maximum.

3. Optical Performance: Crystal Dusted Decorative / Privacy Glazing Film:

   a. Ultraviolet Transmittance (ADTM E 903): 27 percent.

   b. Visible Light Transmittance (ASTM E 903, ASTM E308): 85 percent.

   c. Visible Light Reflectance (ASTM E 903): 79 percent.

   d. Solar Heat Transmittance: 76 percent.

   e. Solar Heat Reflectance: 7 percent.

   f. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): 0.93.

2.10 STANDARD SPECKER PORT

A. Basis of Design Manufacturer: C.R. Laurence Company, Inc.
   1. Description: Brushed Stainless Steel 5 inch speak-Thru.
   2. Model no: SST5
   3. Diameter: 5 inches
   4. Material: 11 Gauge Stainless Steel
   5. Finish: Brushed Stainless Steel
   6. Glazing Thickness: 1/4 inches to 1 – 1/4 inches

B. Alternate Manufacturers:
   1. Armortex
   2. Norix
   3. Frameless Hardware Company

2.11 ELECTRONIC SPECKER PORT

A. Basis of Design Manufacturer: C.R. Laurence Company, Inc.
   1. Description: Norcon Standard Electronic Communicator Level 1 Bullet Resistant
   2. Model no: TTU1ABX1
   3. Diameter: 5 inches
   4. Material: Aluminum

5. Finish: Satin Anodized
6. Glazing Thickness: up to 1 – 3/16 inches, Extension kit TTU1X for Custom Thicknesses

B. Alternate Manufacturers:
1. Armortex
2. Haventech
3. Frameless Hardware Company

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that openings for glazing are correctly sized.

B. Examine surfaces adjacent to glazing components, backing, stop design, and conditions under which glazing is to be installed. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

C. Inspect each piece of glass immediately prior to installation.
1. Verify glass is not damaged or defective.
2. Verify glass has required security rating markings permanently affixed.
3. Verify Class A glass has bullet resistance marking permanently affixed.

D. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

A. Clean and remove dirt, oil, grease or other material affecting proper installation of the glazing.

B. Clean contact surfaces with cleaner recommended by glazing manufacturer and wipe dry.

3.3 INSTALLATION

A. Install Work in accordance with manufacturer’s instructions and shop drawings:
1. Observe and direct the installation, adjustment and operation of the Work of this Section.
2. Keep a complete log of activities on the job. Include dates, time, instructions given and to whom, potential problems and other pertinent information relating to installation and proper operation of the Work of this Section.
3. Participate in final inspections of the Work.
4. Meet other requirements of 11 19 00.

B. Perform work in accordance with GANA Glazing Manual, GANA Sealant Manual, manufacturer’s instructions and approved shop drawings. Notify the Owner representative in writing in case of conflict between the above criteria.

C. Gasket Glazing: Use gasket glazing method, continuous for each straight run, for glazing installed under this Section. Miter-cut and bond ends together at corners to prevent gaskets from pulling away at corners. Protect glass where welding must be done in place.

D. Install glass with security rating identifying marks in lower corner.

E. Do not install glass with edge damage.

F. Do not field cut, nip, or abrade glass.

G. To unify the appearance of each series of lights, set each piece to match others, as nearly as possible, with pattern, draw, and bow oriented in the same direction.

H. Install setting blocks at the quarter points in adhesive or sealant.

I. Provide 3/16 inch head clearance.

J. Install glass to provide 1 inch frame coverage around entire perimeter of opening.

K. Install glazing to drain off water in glazing channel in exterior locations and locations subject to high moisture conditions.

L. Apply 3/16 inch by 1/4 inch sealant bead on exterior sides of windows.
   1. Install sealants as recommended by sealant manufacturer.
   2. Force sealant beads into channel to eliminate voids and to ensure complete wetting and bond of sealant to glass and channel surfaces.
   3. Tool exposed surfaces of glazing sealants to provide a substantial “wash” away from glass. Clean and trim excess glazing materials from glass, stops, and frames promptly after installation to eliminate stains and discolorations.

3.4 CLEANING

A. Comply with glass manufacturer’s recommendations.

B. Maintain glass clean during construction, so that it will not be damaged by corrosive action and will not contribute to deterioration of other materials.

C. Remove glazing materials from finish surfaces.

D. Remove temporary labels after work is complete.

E. Wash and polish glass on both faces not more than 7 days prior to acceptance of Work.

3.5 CURING AND PROTECTION OF FINISHED WORK

A. Protect glass, glazing sealants, and compounds from damage from all sources, including alkaline wash from uncured concrete surfaces. Do not apply anything to the surface of the glass.

B. Cure glazing sealants and compounds in accordance with manufacturers' instructions.

C. Remove, and replace damaged glass.

PART 4 CDCR APPENDIX H (PROVIDED FOR REFERENCE ONLY)
STANDARDS FOR SECURITY GLAZING PRODUCTS - MAY 24, 2017

This Standard supersedes CDCR 860 standards for security glazing products and is subject to revision at any time. CDCR takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this Standard. Users of this Standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

1. Scope

1.1 This document covers requirements for determination of the suitability of an individual glazing product produced by an individual manufacturer for use as Security Glazing by CDCR.

1.1.1 Part I covers the requirements for manufacturing and labeling of Security Glazing.

1.1.2 Part II covers the requirements for the inspection, sampling, and testing for approval.

1.1.2.1 These tests are useful as a method for the determination of the level of security afforded by the configuration of the glass panels tested.

1.1.2.2 The fundamental assumption inherent in the tests is that the test methods fairly approximate the maximum physical attack in the prescribed 60-40-20-10 minute time period as defined by ASTM F-1915 “Standard Test Method for Glazing for Detention Facilities”.

1.2 The costs associated with manufacturing, testing and labeling of products for approval or use in construction shall be borne by the manufacturer or fabricator. CDCR is not responsible for any costs associated with manufacturing, inspection, sampling, approval testing, or labeling.

2. Referenced Documents

2.1 Reference to these documents shall be the latest revision unless otherwise specified by the authority applying this specification.

2.2 American Society for Testing and Materials (ASTM) Standards

2.2.1 ASTM C1036 - Standard Specification for Flat Glass

2.2.2 ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT, and Uncoated Glass

2.2.3 ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass

2.2.4 ASTM F-1915 - Standard Test Method for Glazing For Detention Facilities

2.2.5 ASTM C-1349 - Standard Specification for Architectural Flat Glass Clad Polycarbonate

2.2.6 ASTM E-2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation

2.2.7 ASTM E-2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units

2.2.8 ASTM E-2188 - Standard Test Method for Insulating Glass Unit Performance
2.2.9 ASTM E-1300 - Standard Practice for Determining Load Resistance of Glass in Buildings
2.2.10 ASTM F-1450 - Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
2.2.11 ASTM F-1592 - Standard Test Methods for Detention Hollow Metal Vision Systems
2.2.12 ASTM E-119 - Standard Test Methods for Fire Tests of Building Construction and Materials
2.2.13 ASTM standards are available from:
American Society of Testing and Materials www.astm.org
Copyright Clearance Center
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
(610) 832-9539

2.3 International Organization for Standardization (ISO) Standards
2.3.1 ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories
2.3.2 ISO/IEC 17020 - Conformity Assessment - Requirements for the operation of various types of bodies performing inspection
2.3.3 ISO/IEC 17065 - Conformity Assessment - Requirements for bodies certifying products, processes and services
2.3.4 ISO/IEC 17011 - Conformity Assessment - General Requirements for Accreditation Bodies Accrediting Conformity Assessment Bodies
2.3.5 ISO standards are available from:
American National Standards Institute www.ansi.org
1899 L Street, NW
11th Floor
Washington, DC 20036
(202) 293-8020

2.4 Underwriters' Laboratories, Inc. (UL) Standards
2.4.1 UL 752 - Bullet-Resisting Equipment
2.4.2 UL 9, 10, & 10B/C - Fire resistance or Door and Window Assemblies
2.4.3 UL 263 - Standard for Fire of Building Construction and Materials
2.4.4 UL standards are available from:
Underwriter's Laboratories, Inc.
333 Pfinsten Road
Northbrook, Illinois 60062
(847) 272-8800

PART ONE: PRODUCT STANDARDS

1. Terminology Specific to the Product Standards
   1.1 Lite: A panel or sheet of glass or polycarbonate; a panel or sheet of fabricated security glazing.
   1.2 Base Security Glazing Type: Within this standard, glass-clad polycarbonate security glazing assembly types, as defined below, without the addition of a glazing make-up option. Base types are designated with a single letter: Type A, Type B, Type C, and Type D.
   1.3 Composite Security Glazing Type: Within this standard, glazing assembly types, as defined below, which include the lamination of an approved make-up option to the glass-clad polycarbonate base security glazing type. Composite types are designated by the addition of make-up option labeling to the base type such as: Type A-FR, Type A-FR-IG, Type B-FR, Type B-IG, etc.

2. Security Classification Levels

2.1 Glazing Classes: Security Glazing is designated as Class A, B, C, D, and E.
   2.1.1 Class A: Maximum Security - ASTM F-1915 Security Grade 1 (60 min) and UL 752 Level III (Super-Small Arms) Bullet-Resistant rated for both indoor and outdoor use. (1-1/2 inches, nominal thickness)
   2.1.2 Class B: Maximum Security - ASTM F-1915 Security Grade 2 (40 min). (3/4 inch, nominal thickness)
   2.1.3 Class C: Maximum/Medium Security - ASTM F-1915 Security Grade 3 (20 min). (11/16 inch, nominal thickness)
   2.1.4 Class D: Medium/Minimum Security - ASTM F- 1915 Security Grade 4 (10 min). (9/16 inch, nominal thickness)
   2.1.5 Class E: Not Used
   2.1.6 Class F: General Use (Class F glazing is not covered by this Standard).

2.2 Security Glazing Make Up Options: The following are additional additions to the standard CDCR Glazing Classes to provide additional fire rating, energy performance, or visual alteration, where appropriate. Make-up options are to be provided by laminating the additional glazing to the overall assembly, on the exterior/non-protected face, without exceeding the maximum thickness tolerance, as defined in the table within Paragraph 4.3 below. Application of a make-up option to be completed only with CDCR approval or code requirements.
   2.2.1 Fire Rated (FR): Any utilization of security glazing required to meet UL9, 10B, or 10C for 45, 60, or 90 minute fire testing to comply with fire rating regulations and requirements. Standard glazing classes modified by adding intumescent-based, fire-rated glazing to the assembly such that the entire assembly complies with fire resistance performance. Note: Intumescent material cannot be allowed to freeze at any time.
   2.2.2 Insulated Glass Units (IG): Any utilization of security glazing, separated by an airspace, required to meet ASTM E-2190, E-2189, and/or E-2188 as well as energy performance for “R”. “U”, Light Transmission, and Solar Heat Gain coefficient as determined by CBC Title 24 and/or appropriate current code requirements.

2.2.3 Visual Alteration: Application of tints, colors, mirror, or frit pattern glass to modify, enhance, or alter otherwise clear glazing for specified applications or energy performance improvement.

2.3 Glazing Types: Each Glazing Class is further subdivided into Types.

2.3.1 **Type A**: 1-1/2 inches, nominal thickness, Class A (ASTM F-1915 Security Grade 1 - 60 min - and UL 752 Level III), glass-clad polycarbonate with mar-resistant polycarbonate or glass installed to the interior or protected face. Color: Clear

2.3.2 **Type A-FR**: Lamination of intumescent-based, fire-rated glazing to a Type A (ASTM F-1915 Security Grade 1 - 60 min - and UL 752 Level III) glazing assembly. Entire glazing assembly to meet the minimum fire rating per code requirements. Color: Clear

2.3.3 **Type A-IG**: Insulated glass units manufactured using Glazing Type A (ASTM F-1915 Security Grade 1 - 60 min - and UL 752 Level III), airspace (1/4 inch or as required to meet energy performance criteria), and exterior lite of glazing to meet minimum design and code requirements for thermal resistance (R-Value), thermal transmittance (U-Value), solar heat gain coefficient, and light transmission. Color: Clear

2.3.4 **Type A-FR-IG**: Insulated glass units manufactured using Glazing Type A-FR, airspace (1/4 inch or as required to meet energy performance criteria), and exterior lite of glass to meet minimum design and code requirements for thermal resistance (R-Value), thermal transmittance (U-Value), solar heat gain coefficient, and light transmission. Color: Clear

2.3.5 **Type B**: 3/4” nominal thickness, Class B (ASTM F-1915 Security Grade 2 - 40 min - rated), glass clad polycarbonate. Color: Clear

2.3.6 **Type B-FR**: Lamination of intumescent-based, fire-rated glazing to a Type B (ASTM F-1915 Security Grade 2 - 40 min - rated) glazing assembly. Entire glazing assembly to meet the minimum fire rating per code requirements. Color: Clear

2.3.7 **Type B-IG**: Insulated glass units manufactured using Glazing Type B (ASTM F-1915 Security Grade 2 - 40 min, airspace (1/4 inch or as required to meet energy performance criteria), and exterior lite of glazing to meet minimum design and code requirements for thermal resistance (R-Value), thermal transmittance (U-Value), solar heat gain coefficient, and light transmission. Color: Clear

2.3.8 **Type B-FR-IG**: Insulated glass units manufactured using Glazing Type B-FR, airspace (1/4 inch or as required to meet energy performance criteria), and exterior lite of glass to meet minimum design and code requirements for thermal resistance (R-Value), thermal transmittance (U-Value), solar heat gain coefficient, and light transmission. Color: Clear

2.3.9 **Type C**: 11/16 inch, nominal thickness, Class C (ASTM F-1915 Security Grade 3 - 20 min - rated), glass clad polycarbonate. Color: Clear 2.3.10 Type C-FR: Lamination of intumescent-based, fire-rated glazing to a Type C (ASTM F-1915 Security Grade 3 - 20 min - rated) glazing assembly. Entire glazing assembly to meet the minimum fire rating per code requirements. Color: Clear

2.3.11 **Type C-IG**: Insulated glass units manufactured using Glazing Type C (ASTM F-1915 Security Grade 3 - 20 min, airspace (1/4 inch or as required

to meet energy performance criteria), and exterior lite of glazing to meet minimum design and code requirements for thermal resistance (R-Value), thermal transmittance (U-Value), solar heat gain coefficient, and light transmission. Color: Clear

2.3.12 **Type C-FR-IG**: Insulated glass units manufactured using Glazing Type C-FR, airspace (1/4 inch or as required to meet energy performance criteria), and exterior lite of glass to meet minimum design and code requirements for thermal resistance (R-Value), thermal transmittance (U-Value), solar heat gain coefficient, and light transmission. Color: Clear

2.3.13 **Type D**: 9/16 inch, nominal thickness, Class D (ASTM F-1915 Security Grade 4 - 10 min - rated), glass clad polycarbonate. Color: Clear

2.3.14 **Type D-FR**: Lamination of intumescent-based, fire-rated glazing to a Type D (ASTM F-1915 Security Grade 4 - 10 min - rated) glazing assembly. Entire glazing assembly to meet the minimum fire rating per code requirements. Color: Clear

2.3.15 **Type D-IG**: Insulated glass units manufactured using Glazing Type D (ASTM F-1915 Security Grade 2 - 10 min, airspace (1/4 inch or as required to meet energy performance criteria), and exterior lite of glazing to meet minimum design and code requirements for thermal resistance (R-Value), thermal transmittance (U-Value), solar heat gain coefficient, and light transmission. Color: Clear

2.3.16 **Type D-FR-IG**: Insulated glass units manufactured using Glazing Type D-FR, airspace (1/4 inch or as required to meet energy performance criteria), and exterior lite of glass to meet minimum design and code requirements for thermal resistance (R-Value), thermal transmittance (U-Value), solar heat gain coefficient, and light transmission. Color: Clear

3. Submittal Requirements

3.1 Manufacturers shall include the following information in submittal documents:

3.1.1 Title, number, date, and version of this specification.

3.1.2 Type of security glazing, as referred to in this specification.

3.1.3 Thickness Requirements:

3.1.3.1 Overall maximum and minimum allowable thickness of the laminated lite.

3.1.3.2 Length and width of the laminated lite.

3.1.4 Color or tint of each individual component of glass, polycarbonate, and interlayer, along with identification of product used to enhance or modify standard glazing class with a security glazing make-up option.

3.1.5 The luminous transmittance of the fabricated panel.

3.1.6 Standards or regulations to which the fabricated panels must conform.

3.1.7 Identification of all data required to facilitate glazing replacement, if required.

4. Fabrication Requirements

4.1 Materials

4.1.1 Glass-clad Polycarbonate: ASTM C1349

4.2 Marking

4.2.1 Each fabricated panel shall bear a plain marking in a lower corner, at a location that is visible after installation, indicating the following information:

4.2.1.1 Manufacturer's name

4.2.1.2 Name of Independent, 3rd Party Laboratory

4.2.1.2.1 Include laboratory supplied marking, certifying that manufacturing and fabrication techniques are in accordance with those used at the time of product testing per ISO/IEC 17065.

4.2.1.2.2 Include identification of compliance with ISO/IEC 17025 from a laboratory accreditation service per ISO/IEC 17011.

4.2.1.3 Date of manufacture by month and year

4.2.1.4 Glazing Type, as determined by this Standard

4.2.1.5 Bullet-resisting rating in accordance with UL 752 (Class A Glass only)

4.2.2 Markings affixed to a product shall be permanent and sufficiently durable to resist the deleterious effects of handling, cleaning agents, and expected use.

4.2.3 Markings to be placed such that they remain visible after installation is complete, Markings must not be covered/obscured by glazing gasket and/or stops.

4.3 Thickness Tolerances: Tolerances for each completed fabricated panel must conform to the following:

Glass-clad Polycarbonate Component: The glass-clad polycarbonate component of each glazing assembly must remain within the thickness tolerance identified below for the glazing class identified:

Class	Nominal Thickness	Maximum total thickness of glass-clad polycarbonate assembly (Inches)
A	1 1/2”	Max. 1.683 / Min. 1.381
B	3/4"	Max. 0.908 / Min. 0.647
C	11/16”	Max. 0.791 / Min. 0.544
D	9/16”	Max. 0.620 / Min. 0.488

4.3.1 Glazing assembly total thickness: In addition to the glass-clad polycarbonate component thickness tolerance, the total thickness of the glazing assembly, including security glazing make-up options and gasketing/spacer materials, must not exceed depth of the detention frame glazing pocket after installation.

PART TWO: TESTING STANDARDS

1. All testing of security glazing must comply with the requirements of this standard and all applicable reference standards. The testing laboratory must be:

1.1 3rd Party Independent: Not funded (monetarily or otherwise) by private organizations that may influence its outcomes.

1.2 Accredited: Assessed for technical competency in performing all testing per ISO/IEC 17025. Laboratories must be accredited specifically for all testing, calibration, or product certification required to meet compliance with these.

1.3 Certified: Laboratory must certify the successfully tested product(s) per ISO/IEC 17065. Testing and certification conducted for a base glazing type (e.g., Type A) may be extended to cover composite make-ups of the same type (e.g., Type A-FR A-IG, A-FR-IG) if the testing laboratory explicitly identifies all of the composite types on the test report cover sheet and the laboratory clearly indicates that all of the identified composite types are certified per the testing conducted.

2. Validity of Approvals

2.1 Approvals of products fabricated, inspected, and tested under this Standard shall be valid for a period of five three years from date of issue. After the expiration of this time period, fabricators desiring re-approval of products under this Standard shall conform to the requirements of the version of this Standard then in effect.

3. Test Specimens and Accompanying Data for Testing

3.1 Accompanying Data: In addition to ISO/IEC 17065 requirements for certification, test specimens delivered to the Independent Laboratory shall be accompanied by the following data:

3.1.1 Complete description of the product, including:

3.1.1.1 Glass Type

3.1.1.2 Total Thickness

3.1.1.3 Thickness and type (annealed, polycarbonate, etc.) of each ply or component

3.1.1.4 Thickness, generic name, and proprietary name of each interlayer

3.1.1.5 Name of the manufacturer of each panel component

3.1.1.6 Name of the laminator

3.1.2 Evidence of compliance for Class A assemblies with current UL 752 requirements including:

3.1.2.1 Testing certification for Ballistics Tests of UL 752 with a bullet-resistance rating for Level 3, Super Small Arms (0.44 Magnum lead semi-wadcutter gas checked).

3.1.2.2 Compliance with Indoor and Outdoor use. Supplementary Shotgun is not required by this Standard.

4. Certification Scheme

4.1 The laboratory certification scheme shall include the following minimum rules and procedures for implementing certification.

4.1.1 Representative of Independent Laboratory will visit Manufacturer's fabrication plant prior to and during fabrication of panels to be tested.

4.1.1.1 The Representative will observe and record the material and thickness of each component of each sample panel and overall panel thickness and size.

4.1.1.2 The Representative will observe the assembly and fabrication process; record times, temperatures, and other salient features of the processes involved.

4.1.1.3 The Representative will observe the condition of each sample, noting scratches, cracks, breaks, and other defects.

4.1.1.4 The Representative will initial or otherwise place an identifying mark on the panels selected for testing.

4.1.2 The Representative will keep a detailed Observation Log of all observations and activities at the fabrication plant. This Observation Log will be used to assist in the evaluation of the process used to fabricate products for actual use in CDCR projects. One copy of this log will be left at the fabrication plant for the fabricator's records after all pre-test observations and related activities are complete. The original Observation Log will be transmitted to the Independent Testing Laboratory.

4.1.2.1 The Independent Testing Laboratory and the Representative stipulate and expressly acknowledge that the Observation Log may contain trade secrets which are proprietary and confidential. This acknowledgment is based on the express understanding that the information which may be contained in the Observation Log is not known outside the fabricator's business, is known only to a limited extent and only by a limited number of employees of the fabricator, is safeguarded while in fabricator's possession, is extremely valuable to the fabricator, and could be extremely valuable to the fabricator's competitors. The Independent Testing Laboratory and the Representative further acknowledge that the Observation Log and the information contained therein is made available to the Laboratory only because such action is an essential element of the approval of the fabricator's products.

4.1.2.2 The Independent Testing Laboratory and the Representative agree to safeguard the Observation Log, and all information contained therein, against disclosure to the fullest extent permitted by law.

4.1.3 Surveillance must be conducted by the Independent Testing Laboratory at a period of no less than once per year to ensure ongoing validity of the demonstration of fulfilment of product requirements and compliance with this standard.

4.2 Inspection, Marking, and Retention of Products for Use in Testing

4.2.1 When those panels arrive at the Independent Laboratory, the Representative will witness the unpacking of those samples, and verify the identifying marks as being the marks that were placed on the samples by the Representative at the factory. Verified panels will then become the specimens used for testing.

4.2.2 Measure Overall Bow and Warp per ASTM C1349.

4.2.3 Independent Laboratory shall retain tested panels for the duration of time during which panel type and manufacturer are approved for use based on the tests in this Standard.

5. Testing Calculation and Reports

5.1 Manufacturer desiring approval shall submit a report, prepared, and certified by a CDCR approved Independent Laboratory, indicating test results. Report to be prepared in accordance with ISO/IEC 17065, ASTM F1915 reporting requirements and CDCR-specific requirements identified below.

5.2 Items identified within ISO/IEC 17020, Annex B as optional elements of inspection reports and certificates are to be included in all testing reports and certifications as required elements.

5.3 For each Glass Type and each test temperature, the report shall include the following information:

5.3.1 Recording of each test to be provided in DVD format, using a separate DVD for each test

5.3.1.1 Label each DVD as follows:

5.3.1.1.1 Security Glazing Test

5.3.1.1.2 Testing Laboratory File Number

5.3.1.1.3 Manufacturer

5.3.1.1.4 California Department of Corrections and Rehabilitation Glass Type

5.3.1.2 Tests using physical attack weapons shall be recorded in modified, elapsed-time format. Only blows need be recorded. Setup does not be recorded

5.3.1.3 Tests of flame attack shall be fully-recorded

5.3.1.4 Each test shall have the following data clearly displayed:

5.3.1.4.1 California Department of Corrections and Rehabilitation Classification

5.3.1.4.2 Manufacturer

5.3.1.4.3 Panel face temperature.

5.3.1.4.4 Number of blows of physical attack weapon

5.3.1.4.5 Elapsed time indication of flame attack test

5.3.1.4.6 Laboratory accreditation in accordance with ISO/IEC 17025

5.3.2 Dates and Requirements

5.3.2.1 General cover letter outlining conformance to this Standard

5.3.2.2 Seal and wet signature of responsible Registered Professional Engineer

5.3.3 Descriptions of Test Samples

5.3.3.1 Glass Type as indicated in Part One of this Standard to which test sample conforms

5.3.3.2 Manufacturer's product designation used to describe test panel

5.3.3.3 Total panel thickness to the nearest 0.001 inch

5.3.3.4 Composition and actual thickness of each individual component of test panel to the nearest 0.001 inch.

5.3.4 Certifications

5.3.4.1 Certification of compliance for Class A assemblies with UL 752, 2006 edition, as required by this Standard
5.3.4.2 Testing Laboratory certification in accordance with ISO/IEC 17065 including but not limited to:
5.3.4.2.1 Name and address of the certification body
5.3.4.2.2 Evidence of Testing Laboratory's Independent Third-Party impartiality
5.3.4.2.3 Date certification was granted
5.3.4.2.4 Scope of certification including certification scheme
5.3.4.2.5 Term or expiry date of certification
5.3.4.2.6 Date of surveillance activities
5.3.4.2.7 Documentation of testing laboratory accreditation per ISO/IEC 17025

5.3.5 Observations
5.3.5.1 Provide documentation detailing observation of compliance with all testing requirements in accordance with ASTM F1915

5.4 Test Results
5.4.1 Impact Test Pass/Fail Determination
5.4.1.1 Indicate for each Glass Type whether glass passes or fails the summary of all tests in accordance with ASTM F1915 Impact Test Criteria
5.4.1.2 For non-symmetrical panels tested on both faces, indicate pass or fail results for each face separately

5.5 Report Distribution

5.5.1 One copy of Report with DVD to:
Design and Environmental Services and Standards Branch
Facility Planning, Construction and Management
California Department of Corrections and Rehabilitation
P. O. Box 942883
Sacramento, CA 94283-0001
Attn: Security Glazing Liaison

5.5.2 Additional copies as directed by CDCR.

6. Replacement Glazing for Existing CDCR Institutions

6.1 CDCR will not require testing of security glazing used in replacement applications provided the following conditions are met:
6.1.1 The security glazing used is procured from one of the currently approved manufacturers of security glazing currently listed in the DCG Section 08 88 53 - Security Glazing.
6.1.2 The manufacturer or accredited testing laboratory (per accreditation/certification requirement of this standard) shall submit to the CDCR Procurement Officer signed certification stating that the product "is

identical to the product qualified or certified by testing under this standard or the prior CDCR 860 standard and complies with this standard and DCG Section 08 88 53 - Security Glazing in all other aspects".

6.2 Conversion from CDCR 860-9a to this Standard

6.2.1 The following table provides a direct conversion between the security glazing types of CDCR 860-9a and this standard for convenience in identifying replacement glazing. This table is only a guide to assist in identifying the proper replacement type. CDCR institution staff must verify that the correct replacement glazing type is utilized per this and other referenced standards.

CDCR 860-9a (obsolete)		Current Glazing Type
Glazing Type	Nominal Thickness	
A1	1-5/8"	Type A
A2	1-5/8"	Type A-FR
B1	13/16"	Type B
B2	15/16"	Type B-FR
C1	9/16"	Type C
C3	3/4"	Type C-FR
D1	1/2"	Type D
D2	--	Type D-FR
E1	--	Type D
E2	--	Type D-FR

7. Product Acceptance by CDCR

7.1 CDCR will review test results and other pertinent information submitted in support of product and manufacturer or fabricator acceptance and notify manufacturer or fabricator of product acceptance or rejection. CDCR, as the authority having jurisdiction, may reject testing without explanation.

END OF SECTION

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nonstructural steel framing.

B. Related Requirements:

1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior loadbearing, structural framing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of nonstructural steel framing and fastening and anchorage details.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, and attachments to adjoining work.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For code-compliance certification of studs and track.

B. Evaluation Reports: From ICC-ES showing compliance with Project requirements, for the following:

1. Studs and track.
2. Post-installed anchors.
3. Power-actuated fasteners.

1.4 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Track: Provide documentation that framing members are certified in accordance with product-certification program of the Steel Stud Manufacturers Association.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Protect materials from corrosion, deformation, and other damage during delivery, storage, and handling in accordance with AISI S202.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: Where indicated on Drawings, provide assemblies incorporating nonstructural steel framing identical to those of assemblies tested for fire resistance in accordance with ASTM E119 by an independent testing agency.

B. Horizontal Deflection: For composite wall assemblies, limited to 1/360 of the wall height based on the following horizontal loading:

1. Horizontal Loading: 5 lbf/sq. ft..

2.2 NONSTRUCTURAL STEEL FRAMING

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Framing Members, General: Comply with requirements in AISI S220 for conditions indicated on Drawings.

1. Protective Coating: ASTM A653/A653M, G40 or coating with demonstrated equivalent corrosion resistance. Galvannealed products are unacceptable.

a. Equivalent Corrosion-Resistant Coating: Evaluation report acceptable to authorities having jurisdiction demonstrates corrosion resistance equivalent to specified protective coating.

C. Studs and Track: Conventional members, roll-formed into standard shapes without surface deformations to stiffen framing members.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. CEMCO; California Expanded Metal Products Co.
b. ClarkDietrich
c. SCAFCO Steel Stud Company; Stone Group of Companies

2. Minimum Base-Steel Thickness: 0.0179 inch.

3. Minimum Yield Strength: **33 ksi**.
4. Depth: As indicated on Drawings.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Post-Installed Anchors: Fastener systems with an evaluation report, acceptable to authorities having jurisdiction, based on ICC-ES AC01 AC193 as appropriate for the substrate.

1. Securing Hangers:

a. Type: or adhesive anchor.
b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated on Drawings.

C. Power-Actuated Anchors: Fastener systems with an evaluation report, acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Flat Hangers: ASTM A653/A653M G40 hot-dip galvanized steel sheet, 1 by 3/16 inch by length indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, substrates, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling track to surfaces indicated on Drawings to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than **24 inches** o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of nonstructural steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated on

Drawings. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION OF NONSTRUCTURAL METAL FRAMING, GENERAL

A. Installation Standard: ASTM C754.

1. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C1063 that apply to framing installation.
2. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with framing members. Frame both sides of joints independently.

3.4 INSTALLATION OF NONSTRUCTURAL STEEL FRAMING

A. Install framing system components at spacings indicated on Drawings, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches o.c. unless otherwise indicated on Drawings.
2. Multilayer Application: 16 inches o.c. unless otherwise indicated on Drawings.
3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated on Drawings.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install track at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated on Drawings to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.

a. Install two studs at each jamb unless otherwise indicated on Drawings.
b. Install cripple studs at head adjacent to each jamb stud, with a minimum **1/2-**

inch clearance from jamb stud to allow for installation of control joint in finished assembly.

c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure unless otherwise indicated on Drawings.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated on Drawings. Install framing below sills of openings to match framing required above door heads.

E. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced **24 inches** o.c.

F. Wall-Furring Bracket Systems: Install brackets with serrated edges facing upward spaced at minimum **48 inches** o.c. vertically with **6 inches** maximum from floor and ceiling, and minimum **36 inches** o.c. horizontally with **4 inches** maximum from abutting construction, unless otherwise indicated on Drawings.

G. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.

H. Installation Tolerances for Nonstructural Steel Framing:

1. Framing Members: Install each framing member so fastening surfaces vary not more than **1/8 inch** from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092400 - CEMENT PLASTERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal lath.
2. Accessories.
3. Base-coat cement plaster.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Shop Drawings: Locations and installation of control and expansion joints, including plans, elevations, sections, and attachment details.

C. Samples for Initial Selection: For each type of factory-prepared finish coat and for each color and finish texture specified.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.5 FIELD CONDITIONS

A. Comply with ASTM C926 requirements.

B. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than **40 deg F**.

3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Where indicated on Drawings, provide cement plaster assemblies identical to those of assemblies tested for fire resistance in accordance with ASTM E119 by a qualified testing agency.

2.2 METAL LATH

A. Expanded Metal Lath: ASTM C847; cold-rolled carbon steel sheet, hot-dip galvanized with ASTM A653/A653M G60 zinc coating.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. AMICO, a Gibraltar Industries company
b. CEMCO; California Expanded Metal Products Co.
c. ClarkDietrich

2. Self-Furring Diamond-Mesh Lath: V-grooved.

a. Weight: 2.5 lb/sq. yd..
b. Water-Resistive Barrier: Vapor-permeable paper, factory bonded to back of lath; complying with requirements in FS UU-B-790a for Type I, Grade D and with 60-minute water resistance.

1) Provide water-resistive barrier at exterior locations.

2.3 ACCESSORIES

A. General: Comply with requirements in ASTM C1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. AMICO, a Gibraltar Industries company
b. Brand X Metals, Inc
c. CEMCO; California Expanded Metal Products Co.

d. ClarkDietrich

2. Foundation Weep Screed: Fabricated from hot-dip-galvanized steel sheet with ASTM A653/A653M G60 zinc coating.
3. Cornerite: Fabricated from metal lath, hot-dip galvanized with ASTM A653/A653M G60 zinc coating.
4. External- (Outside-) Corner Reinforcement: Fabricated from metal lath, hot-dip galvanized with ASTM A653/A653M G60 zinc coating.
5. Cornerbeads: Fabricated from zinc-coated (galvanized) steel.

   a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
   b. Smallnose cornerbead with perforated flanges; use on curved corners.
   c. Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.

6. Casing Beads: Fabricated from zinc-coated (galvanized) steel anodized aluminum; square-edged style; with expanded flanges.
7. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on exposed face of control joint.

C. TRIM and REVEALS

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Fry Reglet Corporation
   b. Brand X Metals, Inc.
   c. ClarkDietrich

2. Reveal: Basis of Design: Fry Reglet FPM 75-V-75; vented
3. Material and Finish: Extruded Aluminum; Factory spray and bake-on primer to serve as a base for field painting.
4. Fasteners:

   a. Aluminum to aluminum: Aluminum to Type 302 or 304 stainless steel.
   b. Aluminum to stainless steel or carbon steel: Type 302 or 304 stainless steel.

2.4 BASE-COAT CEMENT PLASTER

A. General: Comply with requirements in ASTM C926 for applications indicated.

1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed **1 lb of fiber/cu. yd.** of cementitious materials.
2. Aggregate:

   a. Sand: Use Sand Aggregate: ASTM C897..

B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:

1. Portland Cement Mixes:

a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

C. Base-Coat Mix for Use over Solid Plaster Bases: Single base (scratch) coat for two-coat plasterwork as follows:

1. High-Absorption Unit Masonry and Concrete Substrates:

a. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

2.5 CEMENT PLASTER FINISH COATS

A. Job-Mixed Finish-Coat Mix: Comply with requirements in ASTM C926.

1. Aggregates:

a. Sand: Use over base coats containing sand.

2. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.

2.6 PLASTER MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I.

1. Color for Finish Coats: White.

B. Lime: ASTM C206, Type S; or ASTM C207, Type S.

C. Sand Aggregate: ASTM C897.

1. Color for Job-Mixed Finish Coats: White.

2.7 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, **1/2 inch** long, free of contaminants, manufactured for use in cement plaster.

C. Bonding Compound: ASTM C932.

D. Fasteners for Attaching Metal Lath to Substrates: ASTM C1063.

E. Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, not less than **0.0475-inch** diameter unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Reject plaster materials that are wet or moisture damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

B. Prepare smooth, solid substrates for plaster in accordance with ASTM C926.

3.3 INSTALLATION, GENERAL

A. Fire-Resistance-Rated Assemblies: Install components in accordance with requirements for design designations from listing organization and publication indicated on Drawings.

3.4 INSTALLATION OF METAL LATH

A. Metal Lath: Install in accordance with ASTM C1063.

1. Flat-Ceiling and Horizontal Framing: Install flat diamond-mesh lath.
2. On Solid Surfaces, Not Otherwise Furred: Install self-furring diamond-mesh lath.

3.5 INSTALLATION OF ACCESSORIES

A. Install in accordance with ASTM C1063 and at locations indicated on Drawings.

B. Reinforcement for External (Outside) Corners:

1. Install lath-type, external-corner reinforcement at exterior locations.
2. Install cornerbead at interior locations.

C. Control Joints: Locate as approved by Architect for visual effect and as follows:

1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:

   a. Vertical Surfaces: **144 sq. ft.**.
   b. Horizontal and Other Nonvertical Surfaces: **100 sq. ft.**.

2. At distances between control joints of not greater than **18 ft.** o.c.
3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
4. Where control joints occur in surface of construction directly behind plaster.
5. Where plastered ceiling framing or furring changes direction.
6. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

D. Expansion Joints: Locate where expansion joints occur in supporting construction.

3.6 APPLICATION OF BASE-COAT CEMENT PLASTER

A. General: Comply with ASTM C926.

1. Install so that finished plaster surfaces will not deviate more than plus or minus **1/4 inch in 10 ft.** from a true plane when measured by a **10-ft.** straightedge placed on surface.
2. Install so finished plaster surfaces will be flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets.

B. Bonding Compound: Apply on unit masonry substrates for direct application of plaster.

C. Wall/Vertical Base Coats:

1. Three-Coat Plasterwork Over Metal Lath: Install base-coat mixes for use over metal lath to produce scratch and brown coats having **3/4-inch** total thickness.

D. Ceiling/Horizontal Base Coats:

1. Three-Coat Plasterwork Over Metal Lath: Install base-coat mixes for use over metal lath to produce scratch and brown coats with 1/2-inch total thickness.

3.7 REPAIR

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check

cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.8 CLEANING

A. Remove temporary protection and enclosure of other work after plastering is complete.

B. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered.

C. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 092400

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

B. Related Requirements:

1. Section 079219 "Acoustical Joint Sealants" for acoustical joint sealants installed in gypsum board assemblies.
2. Section 092216 "Non-Structural Metal Framing" for nonstructural steel framing and suspension systems that support gypsum board panels.
3. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Locations and installation of control and expansion joints, including plans, elevations, sections, and attachment details.

C. Samples for Verification: Actual sample of finished products for the following:

1. Trim Accessories: Actual sample of finished products for each profile of aluminum trim required.

a. Size: Full size profile, 6 inches long,

2. Textured Finishes: Manufacturer's standard size for each textured finish required and on same backing indicated for Work.

D. Sustainable Design Submittals:

1. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.
2. Laboratory Test Reports: For ceiling and wall materials, indicating compliance with requirements for low-emitting materials.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings in accordance with ASTM E119; tested by a qualified testing agency.

B. Verify ceiling and wall materials comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less.

2.3 GYPSUM BOARD, GENERAL

A. Size: Provide panel products in maximum lengths and widths available that will minimize joints in each area and that correspond with support system specified or indicated on Drawings.

2.4 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Gypsum
    b. CertainTeed; SAINT-GOBAIN
    c. Georgia-Pacific Gypsum LLC
    d. Gold Bond Building Products, LLC provided by National Gypsum Company
    e. USG Corporation

2. Thickness: 5/8 inch.
3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

B. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. American Gypsum
    b. CertainTeed; SAINT-GOBAIN
    c. Georgia-Pacific Gypsum LLC
    d. Gold Bond Building Products, LLC provided by National Gypsum Company
    e. USG Corporation

2. Thickness: 5/8 inch.
3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

C. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Gypsum
    b. CertainTeed; SAINT-GOBAIN
    c. Georgia-Pacific Gypsum LLC
    d. Gold Bond Building Products, LLC provided by National Gypsum Company
    e. USG Corporation

2. Thickness: 5/8 inch.
3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

D. Impact-Resistant Gypsum Board: ASTM C1396/C1396M or ASTM C1658/C1658M, tested in accordance with ASTM C1629/C1629M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not

limited to, the following:

a. American Gypsum
b. CertainTeed; SAINT-GOBAIN
c. Georgia-Pacific Gypsum LLC
d. Gold Bond Building Products, LLC provided by National Gypsum Company
e. USG Corporation

2. Core: 5/8 inch, Type X.
3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 3 requirements.
4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 3 requirements.
5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 3 requirements.
6. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
7. Long Edges: Tapered.

E. Mold-Resistant Gypsum Board: ASTM C1396/C1396M; manufactured with moisture- and mold-resistant core and paper surfaces.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Gypsum
b. CertainTeed; SAINT-GOBAIN
c. Georgia-Pacific Gypsum LLC
d. Gold Bond Building Products, LLC provided by National Gypsum Company
e. USG Corporation

2. Core: 5/8 inch, Type X.
3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
4. Long Edges: Tapered.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized-steel sheet or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:

a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Expansion (control) joint.
g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C1047.

1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
2. Shapes:

a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.
c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M requirements.

1. Mold-Resistant Joint Compound: Use mold-resistant formulations with mold-resistant panel products.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Tile Backing Panels: As recommended in writing by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
2. Glass-Mat Gypsum Sheathing Board: As recommended in writing by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended in writing by backing panel manufacturer.

2. Cementitious Backer Units: As recommended in writing by backer unit manufacturer.
3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended in writing by manufacturer for directly adhering gypsum panels to continuous substrate.

1. Verify adhesives have a VOC content of 50 g/L or less.

C. Steel Drill Screws: ASTM C1002 unless otherwise specified or indicated on Drawings.

1. Use screws complying with ASTM C954 for fastening panels to steel members from **0.033 to 0.112 inch** thick.
2. For fastening cementitious backer units, use screws of type and size recommended in writing by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers as follows:

1. Non-Fire-Resistance-Rated Assemblies: slag or rock wool.
2. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

2.8 TEXTURE FINISHES

A. Primer: As recommended in writing by textured finish manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840 requirements.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch** of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft.** in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch-** wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide **1/4- to 1/2-inch-** wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Install sound-attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Gypsum Wallboard: Vertical surfaces unless otherwise indicated.
2. Gypsum Board, Type X: Where required for fire-resistance-rated assembly.
3. Gypsum Ceiling Board: Ceiling surfaces.

4. Impact-Resistant Gypsum Board: As indicated on Drawings.
5. Mold-Resistant Gypsum Board: In all wet rooms.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated on Drawings.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise specified or indicated on Drawings or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLATION OF EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Apply panels perpendicular to supports, with end joints staggered and located over supports.

1. Install with **1/4-inch** open space where panels abut other construction or structural penetrations.
2. Fasten with corrosion-resistant screws.

3.5 APPLICATION OF JOINT TREATMENT MATERIALS

A. Finishing Panel Products: Treat joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare panel surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over panel joints, except for trim products specifically indicated as not intended to receive tape.

D. Interior Gypsum Board: Finish panels to levels indicated below and in accordance with ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 3: Where indicated on Drawings.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

5. Level 5: Where indicated on Drawings.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

E. Exterior Gypsum Board for Ceilings and Soffits: Finish in accordance with manufacturer's written instructions.

3.6 PROTECTION

A. Protect adjacent surfaces from joint compound and promptly remove from floors and other non-gypsum board surfaces. Repair surfaces stained, marred, or otherwise damaged during gypsum board installation and finishing.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ceramic mosaic tile.
2. Thresholds.
3. Tile backing panels.
4. Waterproof membranes.
5. Setting material.
6. Grout materials.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing of movement joints in tile surfaces.
2. Section 092900 "Gypsum Board" for tile backing panels.

1.2 DEFINITIONS

A. General: Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Face Size: Actual tile size, excluding spacer lugs.

C. Large Format Tile: Tile with at least one edge **15 inches** or longer.

D. Module Size: Actual tile size plus joint width indicated.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations, plans, and elevations, of each type of tile and tile pattern. Show widths, details, and locations of movement joints in tile substrates and finished tile surfaces. Show thresholds.

C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Stone thresholds in **6-inch** lengths.
5. Metal flooring transitions **6-inch** lengths.

D. Sustainable Design Submittals:

1. Environmental Product Declaration: For each product.
2. Environmental Product Declaration: For each product.
3. Environmental Product Declaration: For each product.
4. Third-Party Certifications: For each product.
5. Third-Party Certified Life Cycle Assessment: For each product.
6. Product Data: For adhesives, indicating VOC content.
7. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
8. Laboratory Test Reports: For sealers, indicating compliance with requirements for low-emitting materials.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product, including product use classification.

D. Product Test Reports:

1. Tile-setting and -grouting products.
2. Certified porcelain tile.
3. Slip-resistance test reports from qualified independent testing agency.

E. Field Quality-Control Reports: Water test reports of membrane in wet areas.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Supervisor Certification.
3. Installer employs only Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers for Project.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.10 WARRANTY

A. System Warranty: Manufacturer's non-prorated comprehensive warranty that agrees to repair and replace defective installation areas, material, and labor that fail under normal usage within specified warranty period.

1. Warranty Period: Five years from date of Product Purchase.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Accessory Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Backer units.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard Grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 CERAMIC MOSAIC TILE

A. Ceramic Mosaic Tile Type: Unglazed.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. American Olean; a brand of Dal-Tile Corporation
b. Crossville, Inc.

c. Daltile; a brand of Dal-Tile Corporation

2. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
3. Module Size: 2 by 2 inches.
4. Thickness: **1/4 inch**.
5. Face: Plain with cushion edges.
6. Surface: Slip resistant, with abrasive admixture.
7. Product Use Classification: Interior, Wet (IW).
8. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
9. Grout Color: As selected by Architect from manufacturer's full range.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. Base Cove: Cove, module size 1 by 1 inch.
    b. Base Cap for Thinset Mortar Installations: Surface bullnose, module size 2 by 2 inches.
    c. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 2 by 2 inches.
    d. External Corners for Thinset Mortar Installations: Surface bullnose, module size 2 by 2 inches.
    e. Internal Corners:

        1) Cove, module size 1 by 1 inch.
        2) Field-butted square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.

    f. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from **1/2 to 1/4 inch** across nominal **4-inch** dimension.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges in maximum lengths available to minimize end-to-end butt joints.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. CertainTeed; SAINT-GOBAIN
    b. Custom Building Products
    c. James Hardie Building Products, Inc.
    d. USG Corporation

2. Thickness: 5/8 inch.
3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.5 WATERPROOF MEMBRANES

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and ANSI A118.12and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Waterproof Membrane, Sheet: Polyethylene sheet faced on one or both sides with polyester fabric.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Blanke Corporation
b. Laticrete International, Inc.
c. MAPEI Corporation
d. Schluter Systems L.P.
e. Schonox HPS North America, Inc.

2. Nominal Thickness: 0.03 inch.

2.6 SETTING MATERIALS

A. Standard Dry-Set Mortar (Thinset): ANSI A118.1.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ARDEX Americas
b. Custom Building Products
c. H.B. Fuller Construction Products Inc. / TEC
d. Laticrete International, Inc.
e. MAPEI Corporation
f. Parex, a Sika brand
g. Siena Tile & Stone Installation Products; Omega Products International

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.1.

2.7 GROUT MATERIALS

A. Standard Cement Grout: ANSI A118.6.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ARDEX Americas
b. Custom Building Products
c. Laticrete International, Inc.
d. MAPEI Corporation
e. Parex, a Sika brand
f. Siena Tile & Stone Installation Products; Omega Products International
g. Sika Corporation

B. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.

B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D4397, **4.0 mils** thick.

C. Temporary Protective Coating: Formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products and easily removable after grouting is completed without damaging grout or tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.

B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

C. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1 and is sloped **1/4 inch per foot** toward drains.

D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

E. Substrate Flatness:

1. For tile shorter than **15 inches**, confirm that structure or substrate is limited to variation of **1/4 inch in 10 ft.** from the required plane, and no more than **1/16 inch in 12 inches** when measured from tile surface high points.
2. For large format tile, tile with at least one edge **15 inches** or longer, confirm that structure or substrate is limited to **1/8 inch in 10 ft.** from the required plane, and no more than **1/16 inch in 24 inches** when measured from tile surface high points.

F. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM

A. Install tile backing panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

B. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

1. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

C. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

1. Allow crack isolation membrane to cure before installing tile or setting materials over it.

D. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

1. Add materials, water, and additives in accurate proportions.
2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

E. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

a. Tile floors in wet areas.
b. Tile floors consisting of rib-backed tiles.

2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
3. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
4. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
5. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
6. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

a. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets, so joints between sheets are not apparent in finished Work.
b. Where adjoining tiles on floor, base, walls, or trim are specified or indicated

to be same size, align joints.

c. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

7. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

F. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

G. Thresholds: Install stone and solid surface thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in improved modified dry-set mortar (thinset).
2. Do not extend waterproof membrane under thresholds set in improved modified dry-set mortar. Fill joints between such thresholds and adjoining tile set on waterproof membrane with elastomeric sealant.

H. Metal Flooring Transitions: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

I. Metal Wall Trim: Install at locations indicated on Drawings.

J. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors in accordance with manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 FIELD QUALITY CONTROL

A. Water Test:

1. Test of waterproofing membrane in showers and similar areas to be performed by Installation Contractor before setting tile.

a. Perform test after 24 hours of waterproof membrane installation.
b. Insert test plug in drain or waste line.
c. Fill shower base with water, high enough that the membrane-to-drain connection and floor-to-wall transition can be evaluated, and mark wall.
d. Check for leaks after 24 hours.

B. Nonconforming Work:

1. Waterproof membrane will be considered defective if water level has dropped.
2. Remove and replace defective components and retest.

3.5 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile in accordance with tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. TCNA F111 Unglazed: Method ANSI A108.1C. Cement mortar bed (thickset) installed over cleavage membrane.

    a. Ceramic Tile Type: Unglazed.
    b. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
    c. Grout: Sand-portland cement grout.
    d. Joint Width: 1/8 inch.
    e. Movement Joints: Types located on Drawings.

2. TCNA F125-Full Waterproofing: Thinset mortar on crack isolation membrane.

    a. Ceramic Tile Type: Unglazed.

b. Thinset Mortar: Improved modified dry-set mortar.
c. Grout: Standard sanded cement grout.
d. Crack Isolation Membrane: Polyethylene sheet.
e. Joint Width: 1/8 inch.
f. Movement Joints: Types located on Drawings.

B. Interior Wall Installations, Masonry or Concrete:

1. TCNA W202I Unglazed: Thinset mortar over waterproof membrane.

a. Ceramic Tile Type: Unglazed.
b. Thinset Mortar: Improved modified dry-set mortar.
c. Grout: Standard sanded cement grout.
d. Waterproof Membrane: Polyethylene sheet.
e. Joint Width: 1/8 inch.
f. Movement Joints: Types located on Drawings.

C. Interior Wall Installations, Wood or Metal Studs or Furring:

1. TCNA W245 Unglazed: Thinset mortar on glass-mat, water-resistant gypsum backer board over waterproof membrane.

a. Ceramic Tile Type: Unglazed.
b. Thinset Mortar: Improved modified dry-set mortar.
c. Grout: Sand-portland cement grout.
d. Waterproof Membrane: Polyethylene sheet.
e. Joint Width: 1/8 inch.
f. Movement Joints: Types located on Drawings.

END OF SECTION 093013

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical panels.

B. Related Requirements:

1. Section 09 51 23 "Acoustical Tile Ceilings" for ceilings consisting of mineral-base acoustical tiles used with fully concealed suspension systems, stapling, or adhesive bonding.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1.3 ACTION SUBMITTALS

A. Product Data:

1. Acoustical panels.
2. Metal suspension system.
3. Metal edge moldings and trim.

B. Samples: For each exposed product and for each color and texture specified, **6 inches** in size.

C. Samples for Initial Selection: For components with factory-applied finishes.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Panels: Set of **6-inch-** square Samples of each type, color, pattern, and texture.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of **6-inch-** long Samples of each type, finish, and color.
3. Clips: Full-size hold-down impact and seismic clips.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.
2. Structural members to which suspension systems will be attached.
3. Method of attaching hangers to building structure.
    a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:
    a. Lighting fixtures.
    b. Diffusers.
    c. Grilles.
    d. Speakers.
    e. Sprinklers.
    f. Access panels.
    g. Perimeter moldings.
7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
8. Minimum Drawing Scale: **1/4 inch = 1 foot** .

B. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency .

C. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials , from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2

percent of quantity installed.
3. Hold-Down Clips: Equal to 2 percent of quantity installed.
4. Impact Clips: Equal to 2 percent of quantity installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Suspended ceilings to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A in accordance with ASTM E1264.
2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries;Ultima Fine Fissured, High NRC or comparable product by one of the

following:

1. CertainTeed.
2. USG Corporation.
3. Rockfon North America.

B. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Classification: Provide fire-resistance-rated panels as follows:

1. Type and Form, Type III: Mineral base with painted finish; Form 2, water felted .
2. Pattern: CE (perforated, small holes and lightly textured) .

D. Color: White .

E. Light Reflectance (LR): Not less than 0.80 0.85 .

F. Ceiling Attenuation Class (CAC): Not less than 35 .

G. Noise Reduction Coefficient (NRC): Not less than 0.70 .

H. Edge/Joint Detail: Square .

I. Thickness:

1. **5/8 inch** .

J. Modular Size: **24 by 48 inches** .

2.4 METAL SUSPENSION SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions; Prelude XL or comparable product by one of the following:

1. CertainTeed
2. USG Corporation.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M and designated by type, structural classification, and finish indicated.

C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.

1. Fire Rating: As indicated on Drawings.
2. Structural Classification: Heavy-duty system.

3. End Condition of Cross Runners: Override (stepped) or butt-edge type.
4. End Condition of Cross Runners: Override (stepped) or butt-edge type.
5. Face Design: Flat, flush.
6. Cap Material: Cold-rolled steel.
7. Cap Finish: Painted white.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing in accordance with ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.

    a. Type: Cast-in-place Postinstalled expansion Postinstalled bonded anchors.
    b. Corrosion Protection, Carbon Steel: Components zinc plated in accordance with ASTM B633, Class SC 1 (mild) service condition.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing in accordance with ASTM E1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.080-inch diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Hold-Down Clips: Manufacturer's standard hold-down.

E. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

F. Seismic Clips: Armstrong BERC-2 seismic clips designed to secure acoustical panels in place during a seismic event.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions; or comparable product by one of the following:

1. CertainTeed; SAINT-GOBAIN.
2. USG Corporation.

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Edge moldings to fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.7 ACOUSTICAL SEALANT

A. Acoustical Sealant: As specified in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

A. Install acoustical panel ceilings in accordance with ASTM C636/C636M , seismic design requirements, and manufacturer's written instructions.

1. Fire-Rated Assembly: Install fire-rated ceiling systems in accordance with tested fire-rated design.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than **48 inches** o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than **8 inches** from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than **16 inches** o.c. and not more than **3 inches** from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. Arrange directionally patterned acoustical panels as follows:

a. As indicated on reflected ceiling plans.

2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
4. Install hold-down impact and seismic clips in areas indicated; space in accordance with panel manufacturer's written instructions unless otherwise indicated.

a. Hold-Down Clips: Space **24 inches** o.c. on all cross runners.

5. Protect lighting fixtures and air ducts in accordance with requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of **1/8 inch in 12 feet** , non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of **1/8 inch in 12 feet** , non-cumulative.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Periodic inspection during the installation of suspended ceiling grids in accordance with ASCE/SEI 7.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.

1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for **200 lbf** of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for **440 lbf** of tension.
2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 095123 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical tiles.
2. Accessories.
3. Metal edge moldings and trim.

B. Related Requirements:

1. Section 09 51 13 "Acoustical Panel Ceilings" for ceilings consisting of mineral-base and glass-fiber-base acoustical panels and exposed suspension systems.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1.3 ACTION SUBMITTALS

A. Product Data:

1. Acoustical tiles.
2. Accessories.
3. Metal edge moldings and trim.

B. Samples: For each exposed product and for each color and texture specified, **6 inches** in size.

C. Samples for Initial Selection: For components with factory-applied finishes.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Tiles: Set of full-size Samples of each type, color, pattern, and texture.
2. Concealed Suspension-System Members: **6-inch-** long Sample of each type.
3. Exposed Moldings and Trim: Set of **6-inch-** long Samples of each type and color.
4. Seismic Clips: Full size.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each acoustical tile ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency .

B. Evaluation Reports: For each acoustical tile ceiling suspension system and anchor and fastener type, from ICC-ES.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials , from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size tiles equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.7 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical ceiling area as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical tiles, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations for Directly Attached Acoustical Tile Ceiling Tile: Obtain each type of acoustical ceiling tile from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A in accordance with ASTM E1264.
2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL TILES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc. or comparable product by one of the following:

1. Certain Teed Corporation.
2. USG Corporation.
3. Rockfon North America.

B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Classification: Provide tiles as follows:

1. Pattern: as indicated by manufacturer's designation .

D. Color: White .

E. Light Reflectance (LR): Not less than 0.85 .

F. Noise Reduction Coefficient (NRC): Not less than 0.80 .

G. Edge/Joint Detail: As indicated by manufacturer's designation .

H. Thickness: **5/8 inch** .

I. Modular Size: 24 by 24 inches .

2.4 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

2.5 ACOUSTICAL SEALANT

A. Acoustical Sealant: As specified in Section 07 92 00 "Joint Sealants."

2.6 MISCELLANEOUS MATERIALS

A. Acoustical Tile Adhesive: Type recommended in writing by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Testing Substrates: Before adhesively bonding tiles to wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.

B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

C. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF DIRECTLY ATTACHED ACOUSTICAL TILE CEILINGS

A. Adhesive Installation: Install acoustical tile by bonding to substrate, using acoustical tile adhesive and procedure recommended in writing by tile manufacturer and as follows:

1. Wipe and prime ceiling.
2. Remove loose dust from backs of tiles by brushing.
3. Install splines in joints between tiles and maintain bottom surface to a uniform level. Shim tile or correct substrate as required to maintain levelness.
4. Maintain tight butt joints, aligned in both directions and coordinated with ceiling fixtures.

B. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units.

C. Arrange directionally patterned acoustical tiles with pattern running in one direction parallel to long axis of space .

3.4 ERECTION TOLERANCES

A. Directly Attached Ceilings: Install bottom surface of tiles to a tolerance of **1/8 inch in 12 feet** and not exceeding **1/4 inch** cumulatively .

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of **1/8 inch in 12 feet** , non-cumulative.

3.5 ADJUSTING

A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 096100 - FLOORING TREATMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Clear penetrating-type sealer/densifier/hardener for interior horizontal exposed concrete flooring surfaces. Provide one of the following for the entire project; do not mix systems.

a. Sodium-silicate type.
b. Lithium-silicate type.

B. Related Sections:

1. Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES

A. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete.

B. ASTM C779 - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.

C. ASTM C1353 - Standard Test Method for Abrasion Resistance of Dimension Stone Subject to Foot Traffic Using a Rotary Platform, Double-Head Abraser.

D. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

F. ASTM E96 - Standard Test Method for Water Vapor Transmission of Materials.

G. ASTM E303 - Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.

1.3 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer’s instructions. Store at temperatures above 40 degrees F.

1.4 PROJECT CONDITIONS

A. Environmental Requirements: Maintain ambient air temperature between 60- and 110- degrees F during installation and for at least 24 hours after installation. Provide enclosure and conditioning if required by CDCR or manufacturer's installation instructions.

B. Ensure adequate illumination, ventilation, and dust free environment during application and curing of materials.

PART 2 - PRODUCTS

2.1 INDOOR ENVIRONMENTAL QUALITY

A. VOC Content of Field-Applied Interior Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Floor Coatings: VOC not more than 100 g/L.

B. Chemical Components of Field-Applied Interior Coatings:

1. Aromatic Compounds: Coatings must not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing 1 or more benzene rings).
2. Restricted Components: Paints and coatings must not contain any of the following:

a. Acrolein.
b. Acrylonitrile.
c. Antimony.
d. Benzene.
e. Butyl benzyl phthalate.
f. Cadmium.
g. Di (2-ethylhexyl) phthalate.
h. Di-n-butyl phthalate.
i. Di-n-octyl phthalate.
j. 1,2-dichlorobenzene.
k. Diethyl phthalate.
l. Dimethyl phthalate.
m. Ethylbenzene.
n. Formaldehyde.
o. Hexavalent chromium.
p. Isophorone.
q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.

w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

2.2 SODIUM-SILICATE TYPE PENETRATING SEALER/DENSIFIER/HARDENER

A. Manufacturers/Products: Subject to compliance with requirements herein, provide the Basis of Design product listed below, or provide equivalent product by one of the other listed manufacturers.

1. Basis of Design: Euclid Chemicals; EUCO Diamond Hard.
2. L+M Construction Chemicals Inc.; Seal Hard.
3. Dayton Superior; Sure Hard Densifier J17.
4. W.R. Meadows; Liqui-Hard.

B. Materials:

1. Penetrating Type Sealer/Densifier/Hardener: Manufacturer's silicate and siliconate polymer blend or proprietary alkaline compound methylsilicate blend.

a. Active ingredients: Sodium silicate.
b. Breatheable, non-film forming.
c. Zero VOC, odorless.
d. Non-yellowing, colorless.
e. Must not alter concrete appearance nor slip resistance/coefficient of friction.
f. Abrasion and Wear Resistance: ASTM C779; not less than 100 percent increase.
g. Coefficient of Friction: ASTM E303; greater than 0.6 dry or wet.
h. Water Vapor Transmission Rate: ASTM E96; not less than 5 perms.
i. Moisture Absorption: ASTM C642, 81% reduction in 24 hours.

2. Accessory Materials: Fillers, thinners, and other materials of type recommended by sealer manufacturer for intended application.
3. Fire Hazard Classification: Class A in accordance with ASTM E84.

2.3 LITHIUM-SILICATE TYPE PENETRATING SEALER/DENSIFIER/HARDENER

A. Manufacturers/Products: Subject to compliance with requirements herein, provide the Basis of Design product listed below, or provide equivalent product by one of the other listed manufacturers.

1. Basis of Design: Prosoco Inc.; Consolideck LS.
2. L+M Construction Chemicals Inc.; LiON HARD.
3. L.M. Scofield Company; Formula One Lithium Densifier MP.
4. Sinak Corporation; Lithium Cure 1000.

B. Materials:

1. Penetrating Type Sealer/Densifier/Hardener: Manufacturer's proprietary lithium-

silicate formulation that penetrates and reacts with concrete substrate to produce insoluble calcium silicate hydrate within the concrete pores.

a. Active ingredients: 100% lithium silicate.
b. Breatheable, non-film forming.
c. Zero VOC, odorless.
d. Non-yellowing, colorless.
e. Must not alter concrete appearance nor slip resistance/coefficient of friction.
f. Abrasion and Wear Resistance: ASTM C1353, not less than 40 percent increase.
g. Coefficient of Friction: ASTM E303, greater than 0.6 dry or wet.
h. Water Vapor Transmission Rate: ASTM E96, not less than 5 perms.
i. Moisture Absorption: ASTM C642, 75% min. reduction in 24 hours.

2. Accessory Materials: Fillers, thinners, and other materials of type recommended by sealer manufacturer for intended application.
3. Fire Hazard Classification: Class A in accordance with ASTM E84.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions are suitable to receive the Work of this Section.

1. Do not begin application until unsuitable conditions have been corrected. Beginning application means acceptance of existing conditions.

3.2 PREPARATION

A. Remove or protect items not required to be coated.

B. Clean and prepare substrate surfaces in accordance with manufacturer’s instructions.

C. Remove any membrane-forming cure and seal products from existing concrete substrate.

D. Remove dust, dirt, loose and foreign materials.

E. Ensure new concrete has properly cured for at least 7 days in accordance with ACI 302 before applying sealer/densifier/hardener, unless being used also as a concrete curing agent in a manner recommended by manufacturer.

F. Fill hairline cracks, holes, and similar defects with filler compatible with finish treatment.

3.3 APPLICATION

A. Mix and apply sealer/densifier/hardener in accordance with manufacturer’s instructions,

using brush, roller, or spray. Avoid ponding. Remove excess after application of each coat; then allow to dry.

1. First Coat: As densifier/hardener.
2. Second Coat: As sealer.

B. Apply each coat at coverage rate recommended by manufacturer.

C. Edges abutting other materials must be sharp and clean without overlapping.

D. After drying, remove residue with broom or dry buffer.

E. Finish surfaces must be uniform in finish and appearance.

3.4 CLEANING AND PROTECTION

A. For sodium-silicate type, clean residue per manufacturer's recommendations, to a clean usable surface, and dispose of residue in a safe manner.

B. During progress of the Work, and upon completion, clean adjacent surfaces and materials of spills, splatters, spills, and stains resulting from application. Remove using methods recommended by manufacturer and approved by the CDCR Representative, exercising care to prevent damage to finish surfaces and materials.

C. Touch up damaged surfaces before final acceptance.

D. Protect finished Work from traffic for at least the period recommended by sealer/densifier manufacturer's written recommendations.

END OF SECTION 096100

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Thermoplastic-rubber base.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than **12 inches** long.

C. Samples for Initial Selection: For each type of product indicated.

D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than **12 inches** long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials , from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 20 linear feet for every **500 linear feet** or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **90 deg F**.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than **70 deg F** or more than **95 deg F** , in spaces to receive resilient products during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than **55 deg F** or more than **95 deg F** .

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE RB

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Armstrong World Industries, Inc.
2. Johnsonite; a Tarkett company.
3. Roppe Corporation; Roppe Holding Company.
4. VPI Corporation.

B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).

1. Group: I (solid, homogeneous)
2. Style and Location:

a. Style A, Straight: Provide in areas with carpet
b. Style B, Cove: Provide in areas with resilient floor coverings

C. Thickness: 0.125 inch.

D. Height: 4 inches.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed.

G. Inside Corners: Job formed.

H. Colors: As selected by architect from manufacturers full range of colors.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than **3 inches** in length.

a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than **3 inches** in length.

a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Unbacked vinyl sheet flooring.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of resilient sheet flooring.

1. Include sheet flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
2. Show details of special patterns.

C. Samples: For each exposed product and for each color, texture, and pattern specified, in manufacturer's standard size, but not less than **6-by-9-inch** sections.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than **9 inches** long, of each color required.

D. Samples for Initial Selection: For each type of resilient sheet flooring indicated.

E. Samples for Verification: For each type of resilient sheet flooring, in manufacturer's standard size, but not less than **6-by-9-inch** sections of each color, texture, and pattern required.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than **9 inches** long, of each color required.

F. Welded-Seam Samples: For seamless-installation technique indicated and for each resilient sheet flooring product, color, and pattern required; with seam running lengthwise and in center of **6-by-9-inch** Sample applied to a rigid backing and prepared by Installer for this Project.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials , from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Resilient Sheet Flooring: Furnish not less than **10 linear feet** for every **500 linear feet** or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **90 deg F**. Store rolls upright.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than **70 deg F** or more than **85 deg F** , in spaces to receive resilient sheet flooring during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than **55 deg F** or more than **95 deg F** .

C. Close spaces to traffic during resilient sheet flooring installation.

D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.

E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 INSTALLATION MATERIALS

A. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.

B. Seamless-Installation Accessories:

1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.

a. Colors: As selected by Architect from manufacturer's full range to contrast with flooring .

C. Integral-Flash-Cove-Base Accessories:

1. Cove Strip: **1-inch** radius provided or approved by resilient sheet flooring manufacturer.
2. Cap Strip: Tapered vinyl cap provided or approved by resilient sheet flooring manufacturer.
3. Corners: Metal inside and outside corners and end stops provided or approved by resilient sheet flooring manufacturer.

D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed **1000 sq. ft.** , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft.** in 24 hours.
    b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Do not install resilient sheet flooring until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3 RESILIENT SHEET FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient sheet flooring.

B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.

C. Lay out resilient sheet flooring as follows:

1. Maintain uniformity of flooring direction.
2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least **6 inches** away from parallel joints in flooring substrates.
3. Match edges of flooring for color shading at seams.
4. Avoid cross seams.

D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Seamless Installation:

1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.

J. Integral-Flash-Cove Base: Cove resilient sheet flooring **6 inches** up vertical surfaces. Support flooring at horizontal and vertical junction with cove strip. Butt at top against cap strip.

1. Install metal corners at inside and outside corners.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient

sheet flooring.

B. Perform the following operations immediately after completing resilient sheet flooring installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.

1. Apply two coat(s).

E. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 096516

SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

1. Resinous flooring.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1. Review manufacturer's written instructions for substrate preparation and environmental conditions affecting resinous flooring installation.
2. Review details of integral cove bases.
3. Review manufacturer's written instructions for installing resinous flooring systems.
4. Review protection measures for adjacent construction and installed flooring, floor drainage requirements, curbs, base details, and so forth.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.

B. Samples: For each resinous floor system required and for each color and texture specified, **6 inches** square in size, applied to a rigid backing by Installer for this Project.

C. Samples for Initial Selection: For each type of exposed finish required.

D. Samples for Verification: For each resinous flooring system required and for each color and texture specified, **6 inches** square, applied to a rigid backing by Installer for this Project.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Material Certificates: For each resinous flooring component.

C. Material Test Reports: For each resinous flooring system, by a qualified testing agency.

D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Apply full-thickness mockups on **96-inch-** square floor area indicated on Drawings .

a. Include **96-inch** length of integral cove base with inside and outside corner.

2. Simulate finished lighting conditions for Architect's review of mockups.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.

C. Close spaces to traffic during resinous flooring installation and for 24 hours after installation unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Flammability: Self-extinguishing in accordance with ASTM D635.

2.2 RESINOUS FLOORING SEP

A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

C. System Characteristics:

1. Color and Pattern: As selected by Architect from manufacturer's full range .
2. Wearing Surface: Textured for slip resistance .
3. Overall System Thickness: **1/8 inch** .

D. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested in accordance with test methods indicated:

1. Compressive Strength: 10,000 psi minimum in accordance with ASTM C579.
2. Tensile Strength: 1,750 psi minimum in accordance with ASTM C307.
3. Flexural Modulus of Elasticity: 2,000,000 psi minimum in accordance with ASTM C580.
4. Water Absorption: 0.2 percent percent maximum in accordance with ASTM C413.
5. Impact Resistance: No chipping, cracking, or delamination and not more than **1/16-inch** permanent indentation in accordance with MIL-D-3134J.
6. Abrasion Resistance: 0.1 gm maximum weight loss in accordance with ASTM D4060.
7. Hardness: 85 to 90 , Shore D in accordance with ASTM D2240.

E. Primer: Type recommended in writing by resinous flooring manufacturer for substrate and resinous flooring system indicated.

1. Formulation Description: 100 percent solids Water based .

F. Patching and Fill Material: Resinous product of or approved by resinous flooring

manufacturer and recommended in writing by manufacturer for installation indicated.

G. Body Coats:

1. Resin: Epoxy .
2. Formulation Description: 100 percent solids .
3. Type: Pigmented .
4. Installation Method: Troweled or screeded.
5. Number of Coats: Two .
6. Thickness of Coats: **1/8 inch** .
7. Aggregates: Colored quartz (ceramic-coated silica) .

H. Topcoats: Sealing or finish coats.

1. Resin: Urethane .
2. Formulation Description: 100 percent solids .
3. Type: Clear .
4. Number of Coats: One .
5. Thickness of Coats: **8 mils** .
6. Finish: Gloss.

2.3 INTEGRAL COVE BASE ACCESSORIES

A. Installation Adhesive: As recommended in writing by accessory manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resinous flooring systems.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare and clean substrates in accordance with resinous flooring manufacturer's written instructions for substrate indicated to ensure adhesion.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Roughen concrete substrates as follows:

    a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

2. Repair damaged and deteriorated concrete in accordance with resinous flooring manufacturer's written instructions.
3. Moisture Testing: Perform tests so that each test area does not exceed **1000 sq. ft.** , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft.** in 24 hours.
    b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

4. Alkalinity and Adhesion Testing: Perform tests recommended in writing by resinous flooring manufacturer. Proceed with installation only after substrate alkalinity is not less than 6 or more than 8 pH unless otherwise recommended in writing by flooring manufacturer,

C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates in accordance with manufacturer's written instructions.

1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring in accordance with manufacturer's written instructions.

D. Resinous Materials: Mix components and prepare materials in accordance with resinous flooring manufacturer's written instructions.

3.3 INSTALLATION

A. Apply components of resinous flooring system in accordance with manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness specified.

1. Coordinate installation of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring components in accordance with manufacturer's written instructions. Prevent contamination during installation and curing processes.
3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Primer: Apply primer over prepared substrate at spreading rate recommended in writing by manufacturer.

C. Integral Cove Base Accessories: Adhesively install precast accessories before applying

flooring coats and in accordance with manufacturer's written instructions.

D. Field-Formed Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring coats. Apply in accordance with manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

1. Integral Cove Base: **4 inches** high.

E. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness specified for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended in writing by manufacturer.

F. Topcoats: Apply topcoats in number indicated for flooring system specified, at spreading rates recommended in writing by manufacturer, and to produce wearing surface specified.

3.4 FIELD QUALITY CONTROL

3.5 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Definitions:

1. "Paint" and "painting" refer to applied coatings.
2. Mechanical work (and equipment): Work included in Mechanical Specification Divisions.
3. Electrical work (and equipment): Work included in Electrical Specification Divisions.

B. Work included:

1. Exterior surfaces scheduled to be painted, unless indicated to be painted under other sections.
2. Except for colored, split-face, patterned, ground-face, glazed, and other concrete masonry units with integral architectural finish; paint exposed exterior and on-site concrete masonry unit surfaces, including areaway walls, backside faces of parapets, screen walls, and retaining walls.
3. Mechanical and electrical work:

    a. Exterior equipment and items not completely factory finished.

1.2 SUBMITTALS

A. Product data:

1. Manufacturer's data for each paint type to be applied indicating conformance to specifications.

B. Samples:

1. Manufacturers complete range of colors for selection.
2. Gloss samples.

C. Contract closeout information:

1. Maintenance data.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver in original labeled containers.

B. Protect from freezing or damage.

C. Store materials in place designated by Owner or Architect.

D. Keep storage neat and clean.

E. Repair damage thereto or to surroundings.

F. Remove rags and waste from building daily.

G. Avoid danger of fire.

1.4 JOB CONDITIONS

A. Install when temperature, humidity, and surface conditions are acceptable to manufacturer.

B. Maintain schedule indicating when painter expects to complete respective coats of paint for various areas.

1. Keep schedule current as job progress dictates.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acceptable manufacturers:

1. Provide paint as product of one manufacturer as far as possible.
2. Paint, stain, and coating systems listed are Sherwin Williams unless noted otherwise.

a. Use comparable performance and aesthetic requirements for paints by Optional manufacturers.

3. Paints:

a. Base:

1) Sherwin-Williams.

b. Optional:

1) Benjamin Moore.
2) ICI Dulux Paint.
3) PPG Architectural Finishes.
4) Pratt & Lambert.

4. Stains:

a. Base:

1) Sherwin-Williams.

b. Optional:

1) Benjamin Moore.
2) ICI Dulux Paint.
3) PPG Architectural Finishes.
4) Pratt & Lambert.

5. Other manufacturers desiring approval comply with Section 01 25 13

B. Paints and stains: As Scheduled in Part 3.

1. Unscheduled items: Bring to the attention of Architect.
2. Colors:

a. Architect reserves right to select colors from entire range of manufacturer's colors, including deep colors.
b. Mechanical: See Section 23 00 00

3. Gloss range: MPI Standards as measured in accordance with ASTM-D523:

a. Gloss Level 1 (Flat): Maximum 5 at 60 degrees, maximum 10 at 85 degrees.
b. Gloss Level 2 (Velvet): Maximum 10 at 60 degrees, 10-35 at 85 degrees.
c. Gloss Level 3 (Eggshell): 10-25 at 60 degrees, 10-35 at 85 degrees.
d. Gloss Level 4 (Satin): 20-35 at 60 degrees, minimum 35 at 85 degrees.
e. Gloss Level 5 (Semi-gloss): 35-70 at 60 degrees.
f. Gloss Level 6 (Gloss): 70-85 at 60 degrees.
g. Gloss Level 7 (High gloss): More than 85 at 60 degrees.

4. If the gloss range is not indicated, provide top coat with a MPI Gloss Level 3 (Eggshell) finish.
5. Submit gloss samples for approval prior to use.
6. Add flatteners if necessary to achieve specified gloss.
7. Part 3 includes a listing of surfaces and type of paint to be applied.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine surfaces carefully for defects which cannot be corrected and might prevent satisfactory results.

B. Commencing of work in a specific area constitutes acceptance of surfaces, and responsibility for performance.

3.2 SURFACES NOT TO BE PAINTED

A. Anodized aluminum, stainless steel, chromium plate, glass, copper, bronze or similar materials.

B. Moving parts of valves, operating units, mechanical and electrical parts, such as valve and damper operators, sending devices, motor and fan shafts.

C. Code labels, such as UL, FM that are mylar or flat (non-embossed) plates.

1. Embossed plates and labels stamped into frames will be painted, label and information on label to be readily visible and convenient for identification by authority having jurisdiction.

D. Equipment identification or rating plates.

E. Items having complete factory finish with exception of:

1. Exterior mechanical equipment.
2. Exterior electrical equipment.

3.3 PREPARATION - GENERAL

A. Assure that surfaces are clean and dry.

B. Assure that surfaces are free of foreign materials which will affect adhesion or appearance.

C. Remove mildew and neutralize surface.

D. Eliminate efflorescence before painting.

E. Before painting, test surfaces with moisture meter.

F. Paint when moisture is within paint manufacturer's acceptable limits.

3.4 PREPARATION - EXISTING SURFACES

A. Wherever existing work is cut, patched, or added to; touch up to match new work as closely as possible.

1. Check compatibility of new coating to previously painted surfaces by applying test patch. Allow to dry and test adhesion before continuing painting work.

B. Put existing work scheduled for repainting in condition to provide good adhesion and to receive paint.

1. Wash thoroughly surfaces to be repainted with abrasive kitchen cleaner or sand to manufacturer's recommendations.
2. Remove residue from cleaning and abrading procedures.

3. Spot prime bare areas.

C. Where a wall or ceiling is disturbed and patched, repaint entire wall or ceiling.

D. On surfaces to be refinished remove hardware, accessories, plates, surface mounted lighting fixtures, and similar items not to be coated, or provide protection during preparation and coating operations.

E. Protect (and do not paint) code labels, such as UL, FM that are mylar or flat (non- embossed) plates.

1. Embossed plates and labels stamped into frames may be painted, label and information on label to be readily visible and convenient for identification by authority having jurisdiction.

3.5 MATERIAL PREPARATION

A. Mix and prepare materials per manufacturer's specifications.

B. Stir, agitate or blend materials to produce a mixture of uniform density as required for application of materials.

3.6 PREPARATION - WOOD

A. General:

1. Immediately before applying finish:

a. Sand all surfaces with 180-grit, or finer, as necessary to accomplish the following:

1) Remove fingerprints and other marks which may have occurred during shipment to site and during installation.
2) Restore surface to smooth surface texture.
3) Prepare grain to receive finish.

b. Remove dust.

B. Opaque Finishes:

1. After priming coat has dried, seal knots, pitch and resinous sapwood.

C. Stained and Clear Finishes:

1. Treat wood with compatible wash-coat prior to stain application.
2. Putty nail holes and minor defects, to match wood color.

3.7 PREPARATION - FERROUS METAL SURFACES AND HOLLOW METAL

A. Follow requirements of SSPC SP1 and SP3.

1. Except where higher prep levels are indicated.

B. Wire brush, or grind as necessary to remove shoulders at edge of sound paint to prevent telegraphing.

C. Touch up damaged shop coats.

D. For surfaces with touched up shop coat, omit first coat.

E. Hollow metal frame joints at intersections of Rabbets, Stops, and Soffit Joints:

1. Neatly fill corner seam with painter's caulk (in field) prior to painting.

3.8 PREPARATION - GALVANIZED METAL SURFACES AND NON-ANODIZED ALUMINUM

A. Follow requirements of SSPC SP1.

B. Treat surfaces with galvanized surface cleaner as recommended by primer and topcoat manufacturer.

3.9 PREPARATION - GYPSUM WALLBOARD

A. Repair minor irregularities left by finishers.

B. Exercise care to avoid raising nap of paper.

C. Apply prime coat.

D. Notify gypsum wallboard finisher to repair and refinish areas which indicate defects after application of primer.

E. Re-prime refinished areas.

3.10 PREPARATION – CONCRETE AND MASONRY

A. Repair minor defects.

B. Remove oil from concrete by washing with xylol.

C. Block Filler:

1. Apply masonry to fill pinholes and minor surface defects, and to prime surface for topcoat(s).
2. Apply by brush, roller or sprayer.

a. Where spray-applied: Back-roll with roller or squeegee.

3. Minimum Nominal Thickness: 10 mil DFT.

a. Comply with manufacturer’s recommended coverage rates for conditions encountered.

4. Provide complete cover with recommended coating system.

D. Obtain architect's approval of finish for surfaces to receive high build glazed coatings.

3.11 APPLICATION - GENERAL

A. Paint surfaces as specified in paragraphs "Schedule - Exterior Paint Systems".

B. Provide complete coverage and hide.

1. Paint systems are to cover.
2. When color or undercoats show through, apply additional coats at no additional cost until paint film is of uniform finish and color.

C. Employ only skilled mechanics.

D. Mix and apply as recommended by manufacturer.

E. If Architect so directs, do not apply succeeding coats until Architect has an opportunity to observe previous coat.

F. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.

G. Upon completion of painting, carefully replace removed items and/or remove protection.

H. Apply materials under adequate illumination.

I. Evenly spread and smoothly flow on for full, smooth cover.

J. Assure that coats are dry before recoating.

K. Touch up suction or hot spots in plaster, concrete block, and concrete before painting.

L. Touch up abraded areas of shop prime coats before subsequent coats are applied.

M. Back prime wood trim with penetrating sealer.

N. Finish colors not indicated shall be selected by Architect from paint manufacturer’s standard colors.

3.12 PROTECTION AND CLEANUP

A. Protect adjacent work against damage by painting and finishing work.

B. Clean, repair or replace, and repaint damaged work as directed by Architect.

C. Provide "WET PAINT" signs.

D. Remove temporary protective wrappings, after completion of operations.

E. Clean paint spattered surfaces.

F. Use care not to damage finished surfaces.

G. Remove surplus materials, scaffolding and debris.

H. Leave areas broom clean.

3.13 SCHEDULE - EXTERIOR PAINT SYSTEMS

A. Concrete:

1. Latex:

a. Sherwin Williams:

1) Primer coat: Loxon Acrylic Primer; A24 W300. 2) Topcoat: A-100 100%.

b. ICI:

1) Primer coat: Prep & Prime Hydrosealer Waterborn Multipurpose Primer Sealer; 6001.
2) Intermediate coat: Exterior 100% Acrylic Satin Finish; 2402.
3) Topcoat: Exterior 100% Acrylic Satin Finish; 2402.

c. PPG:

1) Primer coat: Perma-Crete Acrylic Primer; 4-2.
2) Topcoat: Timeless Exterior Satin Latex; 73-410.

B. Concrete block:

1. Latex:

a. Sherwin Williams:

1) Primer coat: Loxon Block Surfacer; A24 W200. 2) Topcoat: A-100 100%.

b. ICI:

1) Primer coat: Bloxfil Interior/Exterior Heavy Duty Acrylic Block Filler; 4000.
2) Intermediate coat: Exterior 100% Acrylic Satin Finish; 2402.
3) Topcoat: Exterior 100% Acrylic Satin Finish; 2402.

c. PPG:

1) Primer coat: Perma-Crete Block Surfacer; 4-100.
2) Topcoat: Timeless Exterior Satin Latex; 73-410.

C. Plaster:

1. Elastomeric, smooth:

a. Sherwin Williams:

1) Primer coat: Loxon Acrylic Primer; A24 W300.
2) Intermediate coat; ConFlex XL Elastomeric High Build Smooth; A5-400.
3) Topcoat: ConFlex XL Elastomeric High Build Smooth; A5-400.

b. ICI:

1) Primer coat: Prep & Prime Hydrosealer Waterborn Multipurpose Primer Sealer; 6001.
2) Intermediate coat: Decra-Flex 300 Elastomeric Coating; 2260.
3) Topcoat: Exterior: Decra-Flex 300 Elastomeric Coating; 2260.

c. PPG:

1) Primer coat: Perma-Crete Block Surfacer; 4-100.
2) Intermediate coat: Pitt Flex Elastomeric; 4-110.
3) Topcoat: Pitt Flex Elastomeric; 4-110.

D. Gypsum wallboard soffits:

1. Latex:

a. Sherwin Williams:

1) Primer coat: Exterior Latex Primer; B42W41.
2) Intermediate coat: A-100 100% acrylic.
3) Topcoat: A-100 100% acrylic.

b. PPG:

1) Primer coat: Speedhide Exterior Latex Wood Primer; 6-609.
2) Primer coat-1: Timeless Exterior Satin Latex; 73-410.
3) Top coat: Timeless Exterior Satin Latex; 73-410.

E. Metal doors and frames; Metal stairs, handrails, and guardrails; Miscellaneous metals

(ferrous, primed, zinc-coated, and aluminum):

1. Water based urethane, Gloss Level 6 (Gloss):

a. Sherwin Williams:

1) Primer coat: Pro-Cryl Universal Acrylic Primer, B66-310 Series.
2) Intermediate coat: Sher-Cryl High Performance Acrylic, B66-350.
3) Topcoat: Sher-Cryl High Performance Acrylic, B66-350.

b. ICI:

1) Primer coat: Universal Epoxy Primer; 205.
2) Intermediate coat: Devthane UVA Aliphatic Urethane; 379.
3) Topcoat: Devthane UVA Aliphatic Urethane; 379.

c. PPG:

1) Primer coat: Pitt Tech 100% Acrylic Primer; 90-712.
2) Intermediate coat: Durethane WB Water Based Urethane; 98-8200.
3) Topcoat: Durethane WB Water Based Urethane; 98-8200.

F. Structural steel (exposed):

1. Water based urethane, Gloss Level 6 (Gloss):

a. Sherwin Williams:

1) Primer coat: Shop-applied. See Section 05 12 10

a) Touch-up in field as required.

2) Intermediate coat: Sher-Cryl High Performance Acrylic, B66-350.
3) Topcoat: Sher-Cryl High Performance Acrylic, B66-350.

b. ICI:

1) Primer coat: Shop-applied. See Section 05 12 10

a) Touch-up in field as required.

2) Intermediate coat: Devthane UVA Aliphatic Urethane Gloss Enamel; 389.
3) Topcoat: Devthane UVA Aliphatic Urethane Gloss Enamel; 389.
4) Clear coat: Manufacturer recommended.

c. PPG:

1) Primer coat: Shop-applied. See Section 05 12 10

a) Touch-up in field as required.

2) Intermediate coat: Durethane WB Water Based Urethane; 98-8200.
3) Topcoat: Durethane WB Water Based Urethane; 98-8200.
4) Clear coat: Durethane WB Water Based Urethane; 98-8200.

G. Wood:

1. Sherwin Williams:

a. Latex:

1) Primer coat: A-100.
2) Top coat: A-100.

b. PPG:

1) Primer coat: Timeless Exterior Satin Latex; 73-410.
2) Top coat: Timeless Exterior Satin Latex; 73-410.

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Definitions:

1. "Paint" and "painting" refer to applied coatings, except Section 09 91 13, and Section 09 96 03.
2. Finished room or space: One that has finish called for on Room Finish and Color Schedule.
3. Mechanical work (and equipment): Work included in Mechanical Specification Divisions.
4. Electrical work (and equipment): Work included in Electrical Specification Divisions.

B. Work included:

1. Interior surfaces in finished rooms or spaces, unless indicated not to be painted or indicated to be painted under other sections.
2. Mechanical and electrical work:
3. Interior mechanical and electrical equipment not completely factory finished.
4. In finished rooms and spaces with finished ceilings: Exposed ductwork, piping, insulated piping, conduit, busways, raceways, and associated accessories.

1.2 SUBMITTALS

A. Product data:

1. Manufacturer's data for each paint type to be applied indicating conformance to specifications.
2. Contract closeout information:

a. Maintenance data.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver in original labeled containers.

B. Protect from freezing or damage.

C. Store materials in place designated by Owner or Architect.

D. Keep storage neat and clean.

1. Repair damage thereto or to surroundings.

E. Remove rags and waste from building daily.

1. Avoid danger of fire.

1.4 JOB CONDITIONS

A. Install when temperature and humidity conditions approximate conditions that will exist when building is occupied. Maintain conditions after installation.

B. Install prior to adhesively applied flooring and wall covering.

1. Install prior to carpet and acoustical material.

C. Schedule installation to minimize accumulation of air contaminants that cannot be removed prior to occupancy.

D. Air out construction with 100% outside air.

E. Do not recirculate prior to occupancy.

1. Ventilate during installation. Seal return air ducts and use direct exhaust to outdoors.

F. Maintain schedule indicating when painter expects to complete respective coats of paint for various areas.

1. Keep schedule current as job progress dictates.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acceptable manufacturers:

1. Provide paint as product of one manufacturer as far as possible.
2. Paint, stain, and coating systems listed are Sherwin Williams unless noted otherwise.

a. Use comparable performance, environmental, and aesthetic requirements for paints by Optional manufacturers.
b. Manufacturers listed in Room Finish and Color Schedule are for color reference only.

3. Paints:

a. Base:

1) Sherwin-Williams.

b. Optional:

1) Benjamin Moore.
2) ICI Dulux Paint.
3) PPG Architectural Finishes.
4) Pratt & Lambert.

4. Stains:

a. Base:

1) Sherwin-Williams.

b. Optional:

1) Benjamin Moore.
2) ICI Dulux Paint.
3) PPG Architectural Finishes.
4) Pratt & Lambert.

5. Other manufacturers desiring approval comply with Section 01 25 13 01 25 13

B. Paints and stains: As Scheduled in Part 3.

1. Unscheduled items: Bring to the attention of Architect.
2. Colors: As noted in Room Finish and Color Schedule and as indicated in Section 20 05 53

a. Architect reserves right to select accent colors from entire range of manufacturer's colors, including deep colors.
b. Architect reserves right to require that one or more walls in a room or space be painted a contrasting accent color, except in janitor's and electric closets and other small miscellaneous rooms and spaces.
c. Primer color: White.

1) Bold, deep, vivid, and transparent top coats: Gray tint.

a) Coordinate with top coat color.

3. Gloss range: MPI Standards as measured in accordance with ASTM-D523:

a. Gloss Level 1 (Flat): Maximum 5 at 60 degrees, maximum 10 at 85 degrees.
b. Gloss Level 2 (Velvet): Maximum 10 at 60 degrees, 10-35 at 85 degrees.
c. Gloss Level 3 (Eggshell): 10-25 at 60 degrees, 10-35 at 85 degrees.
d. Gloss Level 4 (Satin): 20-35 at 60 degrees, minimum 35 at 85 degrees.
e. Gloss Level 5 (Semi-gloss): 35-70 at 60 degrees.
f. Gloss Level 6 (Gloss): 70-85 at 60 degrees.
g. Gloss Level 7 (High gloss): More than 85 at 60 degrees.

4. If the gloss range is not indicated, provide top coat with a MPI Gloss Level 3 (Eggshell) finish.
5. Submit gloss samples for approval prior to use.
6. Add flatteners if necessary to achieve specified gloss.
7. Part 3 includes a listing of surfaces and type of paint to be applied.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine surfaces carefully for defects which cannot be corrected and might prevent satisfactory results.

B. Commencing of work in a specific area constitutes acceptance of surfaces, and responsibility for performance.

3.2 SURFACES NOT TO BE PAINTED

A. Anodized aluminum, stainless steel, chromium plate, glass, copper, bronze or similar materials.

B. Moving parts of valves, operating units, mechanical and electrical parts, such as valve and damper operators, sending devices, motor and fan shafts.

C. Code labels, such as UL, FM that are mylar or flat (non-embossed) plates.

1. Embossed plates and labels stamped into frames will be painted, label and information on label to be readily visible and convenient for identification by authority having jurisdiction.

D. Equipment identification or rating plates.

E. Items having complete factory finish with exception of:

1. Electrical panels.
2. Control cabinets.
3. Similar surfaces in finished areas.

3.3 PREPARATION - GENERAL

A. Assure that surfaces are clean and dry.

B. Assure that surfaces are free of foreign materials which will affect adhesion or appearance.

C. Remove mildew and neutralize surface.

D. Eliminate efflorescence before painting.

E. Before painting, test surfaces with moisture meter.

F. Paint when moisture is within paint manufacturer's acceptable limits.

3.4 PREPARATION - EXISTING SURFACES

A. Wherever existing work is cut, patched, or added to, touch up to match new work as closely as possible.

1. Check compatibility of new coating to previously painted surfaces by applying test patch. Allow to dry and test adhesion before continuing painting work.

B. Put existing work scheduled for repainting in condition to provide good adhesion and to receive paint.

1. Wash thoroughly surfaces to be repainted with abrasive kitchen cleaner or sand to manufacturer's recommendations.
2. Remove residue from cleaning and abrading procedures.
3. Spot prime bare areas.

C. Where a wall or ceiling is disturbed and patched, repaint entire wall or ceiling.

D. On surfaces to be refinished remove hardware, accessories, plates, surface mounted lighting fixtures, and similar items not to be coated, or provide protection during preparation and coating operations.

E. Protect (and do not paint) code labels, such as UL, FM that are mylar or flat (non- embossed) plates.

1. Embossed plates and labels stamped into frames may be painted, label and information on label to be readily visible and convenient for identification by authority having jurisdiction.

3.5 MATERIAL PREPARATION

A. Mix and prepare materials per manufacturer's specifications.

B. Stir, agitate or blend materials to produce a mixture of uniform density as required for application of materials.

3.6 PREPARATION - WOOD

A. General:

1. Immediately before applying finish:

a. Sand all surfaces with 180-grit, or finer, as necessary to accomplish the following:

1) Remove fingerprints and other marks which may have occurred during shipment to site and during installation.
2) Restore surface to smooth surface texture.
3) Prepare grain to receive finish.

b. Remove dust.

B. Opaque Finishes:

1. After priming coat has dried, seal knots, pitch and resinous sapwood.

C. Stained and Clear Finishes:

1. Treat wood with compatible wash-coat prior to stain application.
2. Putty nail holes and minor defects, to match wood color.

3.7 PREPARATION - FERROUS METAL SURFACES AND HOLLOW METAL

A. Follow requirements of SSPC SP1 and SP3.

1. Except where higher prep levels are indicated.

B. Wire brush, or grind as necessary to remove shoulders at edge of sound paint to prevent telegraphing.

C. Touch up damaged shop coats.

D. For surfaces with touched up shop coat, omit first coat.

E. Hollow metal frame joints at intersections of Rabbets, Stops, and Soffit Joints:

1. Neatly fill corner seam with painter's caulk (in field) prior to painting.

3.8 PREPARATION - GALVANIZED METAL SURFACES AND NONANODIZED ALUMINUM

A. Follow requirements of SSPC SP1.

B. Treat surfaces with galvanized surface cleaner as recommended by primer and topcoat manufacturer.

3.9 PREPARATION - GYPSUM WALLBOARD

A. Repair minor irregularities left by finishers.

B. Exercise care to avoid raising nap of paper.

1. Apply prime coat.

C. Notify gypsum wallboard finisher to repair and refinish areas which indicate defects after

application of primer.

1. Re-prime refinished areas.

3.10 PREPARATION – CONCRETE AND MASONRY

A. Repair minor defects.

B. Remove oil from concrete by washing with xylol.

C. Block Filler:

1. Apply masonry to fill pinholes and minor surface defects, and to prime surface for topcoat(s).
2. Apply by brush, roller or sprayer.

    a. Where spray-applied: Back-roll with roller or squeegee.

3. Minimum Nominal Thickness: 10 mil DFT.

    a. Comply with manufacturer’s recommended coverage rates for conditions encountered.

4. Provide complete cover with recommended coating system.

D. Obtain architect's approval of finish for surfaces to receive high build glazed coatings.

3.11 APPLICATION - GENERAL

A. Paint surfaces as specified in paragraphs "Schedule - Interior Paint Systems".

B. Provide complete coverage and hide.

1. Paint systems are to cover.
2. When color or undercoats show through, apply additional coats at no additional cost until paint film is of uniform finish and color.

C. Employ only skilled mechanics.

D. Mix and apply as recommended by manufacturer.

E. If Architect so directs, do not apply succeeding coats until Architect has an opportunity to observe previous coat.

F. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.

G. Upon completion of painting, carefully replace removed items and/or remove protection.

H. Apply materials under adequate illumination.

I. Evenly spread and smoothly flow on for full, smooth cover.

J. Assure that coats are dry before recoating.

K. Touch up suction or hot spots in plaster, gypsum wallboard, concrete block, and concrete before painting.

L. Touch up abraded areas of shop prime coats before subsequent coats are applied.

M. Back prime wood trim with penetrating sealer.

3.12 APPLICATION - INTERIOR

A. Finish door edges same as faces of doors.

B. Finish closets, semi-exposed surfaces behind grilles, radiation, etc., to match nearest adjoining surfaces.

3.13 PROTECTION AND CLEANUP

A. Protect adjacent work against damage by painting and finishing work.

1. Clean, repair or replace, and repaint damaged work as directed by Architect.

B. Provide "WET PAINT" signs.

C. Remove temporary protective wrappings, after completion of operations.

1. Clean paint spattered surfaces.

D. Use care not to damage finished surfaces.

1. Remove surplus materials, scaffolding and debris.

E. Leave areas broom clean.

3.14 SCHEDULE - INTERIOR PAINT SYSTEMS

A. Concrete and concrete block walls:

1. Latex (PTEG), Gloss Level 3 (Eggshell):

a. Sherwin Williams:

1) Primer coat: Latex block filler, PrepRite Block Filler; B25W25.
2) Intermediate coat: ProGreen 200 Interior Latex Eg-Shel; B20W651.
3) Topcoat: ProGreen 200 Interior Latex Eg-Shel; B20W651.

b. ICI:

1) Primer coat: Prep & Prime Block Filer; 3010.
2) Intermediate coat: Pro Premium Eggshell Interior Wall & Trim Enamel; 1402.
3) Topcoat: Pro Premium Eggshell Interior Wall & Trim Enamel; 1402.

c. PPG:

1) Primer coat: Speedhide Latex Block Filler; 6-7.
2) Intermediate coat: Speedhide Latex Eggshell; 6-411.
3) Topcoat: Speedhide Latex Eggshell; 6-411.
4) Topcoat-1: Lifemaster Eggshell Interior Enamel; LM9300.

d. PPG-1:

1) Primer coat-1: Speedhide Latex Block Filler; 6-7.
2) Intermediate coat-1: Pure Performance 0 VOC Latex; 9-300.
3) Topcoat-2: Pure Performance 0 VOC Latex; 9-300.

2. Epoxy (PTEP), Gloss Level 5 (Semi-gloss):
3. Sherwin Williams:

a. Primer coat: Loxon Block Surfacer, A24W200.
b. Intermediate coat: SW B58W00620 Macropoxy 646-100 fast cure epoxy or equal.
c. Topcoat: SW B58W00620 Macropoxy 646-100 fast cure epoxy or equal.

4. ICI:

a. Primer coat: Bloxfil Heavy Duty Acrylic Block Filler; 4000.
b. Intermediate coat: Tru-Glaze-WB Wateborn Epoxy Semi-Gloss; 4406.
c. Topcoat: Tru-Glaze-WB Wateborn Epoxy Semi-Gloss; 4406.

5. PPG:

a. Primer coat: Perma-Crete Block Surfacer; 4-100.
b. Intermediate coat: Aquapon WB Water Based Epoxy; 98-1.
c. Topcoat: Aquapon WB Water Based Epoxy; 98-1.

B. Gypsum wallboard and plaster surfaces (walls):

1. Latex (PTEG), Gloss Level 3 (Eggshell):

a. Sherwin Williams:

1) Primer coat: ProGreen 200 Interior Latex Primer; B28W600.
2) Intermediate coat: ProGreen 200 Interior Latex Eg-Shel; B20W651.
3) Topcoat: ProGreen 200 Interior Latex Eg-Shel; B20W651.

b. ICI:

1) Primer coat: Prep & Prime Griper Multi-Purpose Primer; 3210.

2) Intermediate coat: Pro Premium Eggshell Interior Wall & Trim Enamel; 1402.
3) Topcoat: Pro Premium Eggshell Interior Wall & Trim Enamel; 1402.

c. PPG:

1) Primer coat: Pure Performance 0 VOC Latex Primer; 9-900.
2) Intermediate coat: Speedhide Latex Eggshell; 6-411.
3) Topcoat: Speedhide Latex Eggshell; 6-411.

2. Epoxy (PTEP), Gloss Level 5 (Semi-gloss):

a. Sherwin Williams:

1) Primer, For Plaster, use A24W08300 Loxon Masonary primer.
2) Primer, For Gypsum wallboard, use Promar 200 latex primer or Progreen 200 primer or equal.
3) Intermediate coat: SW K46W00151 Precat epoxy semi-gloss or equal.
4) Topcoat: SW K46W00151 Precat epoxy semi-gloss or equal.

b. ICI:

1) Primer coat: Prep & Prime Griper Multi-Purpose Primer; 3210.
2) Intermediate coat: Tru Glaze Waterborne Acrylic Epoxy Coating 4418.
3) Topcoat: Tru Glaze Waterborne Acrylic Epoxy Coating 4418.

c. PPG:

1) Primer coat: Primer coat: Pure Performance 0 VOC Latex Primer; 9-900.
2) Intermediate coat: Aquapon WB Water based Epoxy; 98-1.
3) Topcoat: Aquapon WB Water based Epoxy; 98-1.

C. Gypsum wallboard and plaster surfaces (ceiling):

1. Latex (PTEG), Gloss Level 1 (Flat):

a. Sherwin Williams:

1) Primer coat: ProGreen Primer, B28W600.
2) Intermediate coat: ProGreen 200 Interior Latex Flat; B30W600.
3) Topcoat: ProGreen 200 Interior Latex Flat; B30W600.

b. ICI:

1) Primer coat: Prep & Prime Griper Multi-Purpose Primer; 3210.
2) Intermediate coat: Pro Premium Eggshell Interior Wall & Trim Enamel; 1402.
3) Topcoat: Pro Premium Eggshell Interior Wall & Trim Enamel; 1402.

c. PPG:

1) Primer coat: Pyre Performance 0 VOC Latex Primer; 9-900.
2) Intermediate coat: Speedhide Latex Flat; 6-70.
3) Topcoat: Speedhide Latex Flat; 6-70.

2. Epoxy (PTEG), Gloss Level 5 (Semi-gloss):

a. Sherwin Williams:

1) Use same primer and finish system listed for walls.

b. For Plaster, use A24W08300 Loxon Masonary primer.

1) For drywall, use Promar 200 latex primer or Progreen 200 primer or equal.
2) SW K46W00151 Precat epoxy semi-gloss or equal.

c. ICI:

1) Primer coat: Prep & Prime Griper Multi-Purpose Primer; 3210.
2) Intermediate coat: Devflex QD Waterborn Semi-Gloss Enamel; 4206.
3) Topcoat: Devflex QD Waterborn Semi-Gloss Enamel; 4206.

d. PPG:

1) Primer coat: Primer coat: Pure Performance 0 VOC Latex Primer; 9-900.
2) Intermediate coat: Aquapon WB Water based Epoxy; 98-1.
3) Topcoat: Aquapon WB Water based Epoxy; 98-1.

D. Metal stairs, handrails, and guardrails; Miscellaneous metals (ferrous, primed, zinc- coated, and aluminum):

1. Water based urethane, Gloss Level 6 (Gloss):

a. Sherwin Williams:

1) Primer coat: Pro-Cryl Universal Acrylic Primer, B66-310 Series.
2) Intermediate coat: Acrolon 100 Water Based Urethane Gloss, B65-720.
3) Topcoat: Acrolon 100 Water Based Urethane Gloss, B65-720.

b. ICI:

1) Primer coat:
2) Intermediate coat:
3) Topcoat:

c. PPG:

1) Primer coat: Pitt Tech 100% Acrylic Primer; 90-712.
2) Intermediate coat: Durethane WB Water Based Urethane; 98-8200.

3) Topcoat: Durethane WB Water Based Urethane; 98-8200.

E. Metal doors and frames (Standard doors and frames):

1. Waterborne acrylic, Gloss Level 5 (Semi gloss):

a. Sherwin Williams:
b. Primer coat: Pro-Cryl Universal Acrylic Primer, B66-310 Series.

1) Intermediate coat: Pro Classic Waterborne Acrylic Semi-Gloss, B31 Series.
2) Topcoat: Pro Classic Waterborne Acrylic Semi-Gloss, B31 Series.

c. ICI:

1) Primer coat:
2) Intermediate coat:

d. Topcoat:
e. PPG:

1) Primer coat: Pitt Tech 100% Acrylic Primer; 90-712.
2) Intermediate coat: Acrylic Metal Finish S/G; 7-374.
3) Topcoat: Acrylic Metal Finish S/G; 7-374.

F. Security doors and frames: see Section 09 96 59 High Performance Coatings.

G. Structural steel (exposed):

1. Water based urethane, Gloss Level 6 (Gloss):

a. Sherwin Williams:

1) Primer coat: Shop-applied. See Section 05 12 10

a) Touch-up in field as required.

2) Intermediate coat: Acrolon 100 Water Based Urethane Gloss, B65-720.
3) Topcoat: Acrolon 100 Water Based Urethane Gloss, B65-720.

b. ICI:

1) Primer coat: Shop-applied. See Section 05 12 10

a) Touch-up in field as required.

2) Intermediate coat: Devthane UVA Aliphatic Urethane Gloss Enamel; 389.
3) Topcoat: Devthane UVA Aliphatic Urethane Gloss Enamel; 389.
4) Clear coat: Manufacturer recommended.

c. PPG:

1) Primer coat: Shop-applied. See Section 05 12 10

a) Touch-up in field as required.

2) Intermediate coat: Durethane WB Water Based Urethane; 98-8200.
3) Topcoat: Durethane WB Water Based Urethane; 98-8200.
4) Clear coat: Durethane WB Water Based Urethane; 98-8200.

H. Wood:

1. Exposed items, Gloss Level 3 (Eggshell):

a. Sherwin Williams:

1) Primer coat: Harmony Interior Latex Primer, B11W900.
2) Intermediate coat: Harmony Interior Low Odor Latex Eg-Shel, B9.
3) Topcoat: Harmony Interior Low Odor Latex Eg-Shel, B9.

b. ICI:

1) Primer coat: Lifemaster Prep & Prime Primer-Sealer; LM9116.
2) Intermediate coat: Lifemaster Eggshell Interior Enamel; LM9300.
3) Topcoat: Lifemaster Eggshell Interior Enamel; LM9300.

c. PPG:

1) Primer coat: Pure Performance 0 VOC Latex Primer; 9-900.
2) Intermediate coat: Pure Performance 0 VOC Latex; 9-300.
3) Topcoat: Pure Performance 0 VOC Latex; 9-300.

2. Concealed items, Gloss Level 3 (Eggshell):

a. Sherwin Williams:

1) Primer coat: ProGreen Primer, B28W600.
2) Intermediate coat: ProGreen 200 Interior Latex Eg-Shel; B20W651.
3) Topcoat: ProGreen 200 Interior Latex Eg-Shel; B20W651.

b. ICI:

1) Primer coat: Ultra-Hide Interior Primer; 1030.
2) Intermediate coat: Pro Premium Eggshell Interior Wall & Trim Enamel; 1402.
3) Topcoat: Pro Premium Eggshell Interior Wall & Trim Enamel; 1402.

c. PPG:

1) Primer coat: Pure Performance 0 VOC Latex Primer; 9-900.
2) Intermediate coat: Speedhide Interior Latex Eggshell; 6-411.

3) Topcoat: Speedhide Interior Latex Eggshell; 6-411.

END OF SECTION 099123

SECTION 099603 - SPECIAL GLAZED COATING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and application of special coating systems for toilet partitions, showers, walls, and floors on the following substrates:

1. Interior Substrates:

a. Concrete and vertical surfaces.
b. Concrete masonry units (CMU).
c. Steel.
d. Galvanized metal.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated including generic description, technical data, surface preparation, and application instructions.

B. Color Samples: Full range of manufacturer's standard colors.

C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Qualification Data: For Installer and Manufacturer.

1.3 QUALITY ASSURANCE

A. Single-source Responsibility: Coatings and coating application accessories to be products of a single manufacturer.

B. Installer's Qualification: Furnish list of projects using materials specified for this project that applicator has furnished during the past five years. Include the following:

1. Letter of training certification from the manufacturer/distributor stating that contractor is an approved installer of the products specified in this Section.
2. Submit written description of the contractors' experience with the specified material over the last five (5) years. Include job size (in square feet) and complexity of projects. List a minimum of five (5) projects with different Owners giving contact

names and phone numbers.

3. Submit resume of the key person(s) who will be performing the actual work and list a minimum of five (5) projects with different Owners giving contact names and phone numbers that this key person has performed work for.

C. Manufacturer's Qualifications: Specializing in manufacture of coatings with minimum of ten years successful in-service performance.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained between 65 deg F and 90 deg F or as recommended by product manufacturer.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 PROJECT CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 65 and 90 deg F and surface temperature is a minimum of 5 deg F above dew point.

B. Do not apply coatings in areas where dust is being generated, to damp or wet surfaces, or where relative humidity is outside range per manufacturer's instructions.

C. Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with manufacturer's instructions.

D. Cover or otherwise protect finish work of other trades and surfaces not to be coated concurrently or not to be coated.

PART 2 - PRODUCTS

2.1 GENERAL

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2.2 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to,

the following:

1. Prime Coat Coating Systems, Libertyville, IL.
2. Tnemec Company, Inc., Kansas City, MO.

2.3 MATERIALS

A. Wall and Ceilings Coating: Spray applied fiber-reinforced, 100% solids, accelerated aliphatic amine cured epoxy system.

B. Floor Coating: High performance 100% solids floor coating system of aggregate-filled polyamine epoxy.

C. Product Characteristics and Composition:

1. Epoxy Wall and Ceiling System.

a. Compressive Strength: 11,700 psi (ASTM D-695-77).
b. Tensile Strength: 3,900 psi (ASTM D638-77a).
c. Tensile Elongation: 2% (ASTM D638-77a).
d. Flexural Modulus: 1.8 x 106 psi (ASTM D 790-71).
e. Flexural Strength: 10,400 psi (ASTM D 790-71).
f. Water Absorption: 0.1% (ASTM C413).
g. Heat Resistance Limitation: Continuous exposure: 140 F; Intermittent spills 200 F.
h. Abrasion Resistance: 0.03 gm. Maximum weight loss (ASTM D 4060, Taber Abrader CS-17 wheel, 1,000 gm load, 1,000 revolutions).
i. Flammability: Self-extinguishing (ASTM D 635).
j. Hardness: 88 Shore D (ASTM D 2240) minimum.
k. Bond Strength: 400 psi or substrate failure (ASTM D4542).
l. Chopped fiberglass strands, premixed into the material.
m. Form a horizontal matrix within the finished coating.
n. 100% solids products.
o. Color continuous throughout the entire system.

2. Aggregate Filled Epoxy Floor Coating.

a. Compressive Strength: 12,400 psi after 7 days (ASTM C-579).
b. Tensile Strength: 2,200 psi (ASTM C-307).
c. Flexural Strength: 4,800 psi (ASTM C-307).
d. Bond Strength: 400 psi or substrate failure (ASTM D-4541).
e. Indentation: No indentation (MIL-D-3134F).
f. Abrasion Resistance: 0.04 gm max. loss (ASTM D-4060, Taber Abrader).
g. Hardness: 85-90 Shore D (ASTM D2240).
h. Flammability: Self-extinguishing. Burning 0.25 inches max. (ASTM D-635).
i. Thermal Coefficient of Linear Expansion: 3.5 x 10-5 C (ASTM E-831).
j. Water Absorption: 0.1% (ASTM C-413).
k. All 100% solids material.
l. Color quartz throughout the entire floor system.
m. Capable of achieving a chemical bond with wall system.

n. Finish coat to be manufacturer's clear finish coat material.

2.4 MIXES

A. Walls and Ceilings.

1. Mix components in containers furnished by the manufacturer.
2. Proportioning of two-part and three-part coatings shall be done in accordance with manufacturer's recommended procedures.
3. Mix prime coat using a variable speed drill. Parts A and B shall be pre-mixed and then combined and mixed together a minimum of two minutes. Ensure full blending of both parts with all material measured into the mixing container. Apply the mixed material within the pot life and temperatures recommended by the manufacturer.
4. Intermediate fiber reinforced coats shall be mixed similar to that method employed for the prime coat.
5. Glaze coat, consisting of Parts A and B, shall be mixed similar to that method employed for the prime coat.
6. For all mixing operations, the system components shall be considered as hazardous materials. Read and observe container label warnings and Safety Data Sheets for health and safety information prior to starting mixing operations.
7. Do not reseal mixed material. Permit final chemical set to occur in the container and when set has been achieved, dispose of hardened material by legal means.
8. Do not apply any material that has exceeded shelf and pot life as determined by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

a. Concrete: 12 percent.
b. Masonry: 12 percent.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
4. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.

C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.

D. Concrete Wall and Ceiling Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

1. Prepare surfaces in accordance with manufacturer’s instructions, SSPC-SP13/NACE
2. Surface to be clean, dry and free of contaminants prior to installing coating system.

E. Concrete Floor Slabs-on-Grade Substrates:

1. Smooth troweled dense finish concrete that shall have been properly cured not less than twenty-eight (28) days after placement.
2. Employ a radio frequency moisture meter to determine that residual uncombined moisture content of concrete slab is less than five (5) percent by weight. Conduct ASTM F1869 to further record the Moisture Vapor Emission Rate. Do not apply high performance floor coatings to floor slabs that exceed 5 percent moisture content or 3 pounds per 1,000 square feet per 24 hours unless approved by the material manufacturer.
3. Prepare all concrete floor surfaces per SSPC-SP13/NACE 6.
4. Remove and legally dispose of all debris and contaminants produced by the surface preparation process.

F. CMU Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

1. Verify mortar joints are struck clean and filled tightly to avoid gaps or holes and provide a uniform appearance.
2. Remove mortar spatter, protruding mortar edges and other excessive mortar.
3. Grind rough edges smooth.
4. Clean CMU as specified.
5. Verify all surfaces are clean, dry and free of contaminants prior to installing coating system.

G. Steel Substrates: Remove rust and loose mill scale.

1. Clean using methods recommended by coating manufacturer and in accordance with SSPC guidelines.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings, in accordance with SSPC guidelines.

3.3 APPLICATION

A. Apply special coatings according to manufacturer's written instructions and approved shop drawings.

1. Use applicators and techniques suited for coating and substrate indicated.

B. Walls and Ceilings:

1. Do not apply initial coating until moisture content of surface is within limitations recommended by coating manufacturer.
2. Apply primer at coverage rates recommended by manufacturer but at a rate that will produce a dry film thickness not less than 8 mils. Airless spray, brush or rollers may be used to apply the primer.
3. After primer has become tacky, apply the fiber reinforced epoxy system using an air powered airless spray rig with a gravity fed hopper attachment.
4. When the fiber reinforced epoxy system has cured, abrade the substrates to remove exposed fiberglass and other surface imperfections. Apply glazing coat with a brush, roller or airless sprayer. A total DFT of the complete system shall be a minimum 45 mils thick.
5. Keep all application equipment free from contaminates and suitable for the finish required.
6. Comply with recommendation of product manufacturer for cure times and re-coat windows. Unless specifically allowed by the manufacturer, re-coat windows will not be violated.
7. Finish coats shall be smooth to the touch and free of skipped or missed areas. An
8. Make edges where adjoining other materials or colors, clean and sharp with no overlapping.
9. Change colors at points designated by Owner’s agent and/or on color schedule where colors differ between adjoining spaces or rooms and where door frames match wall colors.

C. Floors:

1. Do not apply initial coating until moisture content of surface is within limitations recommended by coating manufacturer.
2. Apply primer at coverage rates as recommended by manufacturer. Airless spray,
3. Apply two intermediate coats of clear, mixed liquids at a rate to achieve approximately 20 mils wet film thickness. After each intermediate coat, broadcast onto the liquid surface colored quarts aggregate passing 40 to 60 mesh screen to rejection. Remove excess aggregate after film is dried by broom sweeping or industrial grade vacuum. A total dry film thickness of the intermediate coat shall be

not less than 40 mils including encapsulated aggregate.

4. When the intermediate coats have cured and excess aggregate thoroughly removed, apply the final clear glazing coat to a minimum dry film thickness of 10 mils. Apply glazing coat with a brush, roller or airless sprayer. The finished floor to meet ADA specifications for this project. Use a Sullmair FSC 2000-1346 floor tester to validate ADA requirements.
5. Please note to achieve the required ADA coefficient of friction, additional topcoat material or anti-slip additives may be necessary.
6. A total DFT of the broadcast system shall be a minimum 250 mils thick.
7. Comply with recommendations of manufacturer of high performance floor system for drying time between prime and succeeding coats.
8. Finished product shall be uniform in color and texture and free of skipped or missed areas.
9. Where walls and floors abut insure a seamless installation.

D. Finished Work Requirements:

1. Curtaining on face not permitted.
2. Damage to finished surfaces caused by other than coating contractor shall be repaired to acceptable condition by coating contractor under cost reimbursement by Contractor.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.5 COLOR SCHEDULE

A. SGC-1: Match Prime Coat, PC Fibercoat Color White.

B. SGC-2: Match Prime Coat, PC Quartzcoat Color 321.

END OF SECTION 099603

SECTION 101423.16 - ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes room-identification signs that are directly attached to the building.

1.2 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.3 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For room-identification signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Room-Identification Signs: Full-size Sample.
2. Variable Component Materials: 8-inch Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not

included in Samples above.

3. Exposed Accessories: Half-size Sample of each accessory type.

E. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Variable Component Materials: 12 replaceable text inserts and interchangeable characters (letters, numbers, and graphic elements) of each type.
2. Tools: One set(s) of specialty tools for assembling signs and replacing variable sign components.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.

b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design".

2.2 ROOM-IDENTIFICATION SIGNS

A. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ASI Sign Systems, Inc
b. Best Sign Systems, Inc.
c. inpro Corporation
d. Seton Identification Products; a Brady Corporation company
e. Vista System, LLC

2. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.

a. Composite-Sheet Thickness: 0.25 inch.
b. Surface-Applied Graphics: Applied vinyl film.
c. Subsurface Graphics: Reverse etch image.
d. Color(s): As selected by Architect from manufacturer's full range.

3. Sign-Panel Perimeter: Finish edges smooth.

a. Edge Condition: As indicated on Drawings.
b. Corner Condition in Elevation: Rounded to radius indicated.

4. Frame: Entire perimeter.

a. Material: Aluminum.
b. Frame Depth: Convex-curved frame to receive removable face sheet and changeable subsurface graphics.
c. Profile: Rounded.
d. Corner Condition in Elevation: Rounded to radius indicated.

e. Finish and Color: As selected by Architect from manufacturer's full range.

5. Mounting: Surface mounted to wall with countersunk flathead through fasteners adhesive.
6. Text and Typeface: Accessible raised characters and Braille. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.3 SIGN MATERIALS

A. Aluminum Sheet and Plate: **ASTM B209**, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

B. Aluminum Extrusions: **ASTM B221**, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

C. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

D. Vinyl Film: UV-resistant vinyl film with pressure-sensitive, permanent adhesive; die cut to form characters or images as indicated on Drawings.

E. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. Exposed Metal-Fastener Components, General:

a. Fabricated from same basic metal and finish of fastened sign unless otherwise indicated.
b. Fastener Heads: Use flathead screws and bolts with tamper-resistant Allen-head slots unless otherwise indicated.

3. Sign Mounting Fasteners:

a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.
b. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, and installed in predrilled holes.

B. Adhesive: As recommended by sign manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, **0.045 inch** thick, with adhesive on both sides.

D. Hook-and-Loop Tape: Manufacturer's standard two-part tape consisting of hooked part on sign back and looped side on mounting surface.

E. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
4. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of **1.5 mils**. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations on walls as indicated on Drawings.

C. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

    a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
    b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

2. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
3. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
4. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.2 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423.16

SECTION 101453 – TRAFFIC SIGNAGE

PART 1- GENERAL

1.1 SECTION INCLUDES

A. Traffic Signage

B. Accessories including but not limited to brackets, supports, sign posts, connectors, fasteners, and anchors

1.2 PRICE AND PAYMENT PROCEDURES

A. Unit Prices:

1. See Section 012200 - Unit Prices for additional requirements.
2. Basis of Measurement for traffic signage and posts: By Lump Sum

1.3 REFERENCE STANDARDS

A. CA MUTCD – Manual on Uniform Traffic Control Devices.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacture’s data sheets on each product to be used.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Traffic Signage: Minimum 0.067 inch thick (aka 14 gauge) sheet steel and reflectorized, size required by sign type and Caltrans Standard Specifications.

1. Post Mounted: 2 inch square “Qwik Punch” posts. The length of the metal post shall be sufficient to extend from the top of the sign to 30-inches below the top of the concrete

footing and provide a 7-foot clearance between the finished grade and the bottom of the sign.

2. Concrete Footing: Shall be sufficient to extend at least 6 inches below the bottom of the posts. ¼ -inch expansion paper shall be placed between the sign foundation and sidewalk.

PART 3- EXECUTION

3.1 INSTALLATION

A. Install traffic signage in accordance with the Contract Documents, Caltrans Standard Specifications or as directed by the Engineer.

END OF SECTION 101453

SECTION 101473 - PAINTED SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Field-lettered signs painted directly on substrates in good condition.
2. Wall-identification signs for fire and smoke assemblies.

1.2 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

B. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

C. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

D. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

E. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

F. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

G. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For paints and coatings, indicating VOC content.
2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For painted signs.

1. Show sign locations and mounting heights.
2. Show message list, typestyles, graphic elements, and layout for each sign at least quarter scale.

D. Samples: For each type of paint, paint system, color, and gloss; minimum 4 inches long in least dimension; on hardboard.

1. Include stepped Samples defining each separate coat, if any. Resubmit until each required sheen, color, and texture is achieved.
2. Include a list of materials for each coat of each Sample.
3. Label each Sample for location and application.

E. Product Schedule: For painted signs. Use same designations indicated on Drawings or specified.

1.4 INFORMATIONAL SUBMITTALS

A. Color Matching Certificate: For computer color matching of colors.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra paint materials, from the same production run, that match products applied and that are packaged with protective covering for storage and identified with labels describing contents, including material, finish, source, and sign location on building.

1. Quantity: Furnish Owner with an additional 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

A. Color Matching: Custom computer-match paint colors to colors indicated on Drawings. For colors indicated by a standardized coding system, obtain a color chip for each color indicated from the color-coding-system company; computer-match paint colors to the color chips.

B. Mockups: Prepare mockups of painted signs for each type of sign material and substrate indicated and each color and finish required to demonstrate aesthetic effects and to set quality standards for materials and execution. Duplicate appearance of approved Sample submittals.

1. Locate mockups in locations that enable viewing under same conditions as the completed Work.
2. Sign Mockups: Two sign texts that represent surfaces and conditions for signage application under same conditions as the completed Work.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 FIELD CONDITIONS

A. Weather Limitations: Proceed with painting signs only when existing and forecasted

weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

B. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between **50 and 95 deg F**.

C. Do not apply paint in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than **5 deg F** above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to have painted signs are enclosed and heated within temperature limits specified by manufacturer for surface preparation and during paint application and drying periods.

PART 2 - PRODUCTS

2.1 SIGN PAINT

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Matthews Paint; A Subsidiary of PPG
2. Ronan Paints; Coventry Coatings Company

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.3 PAINTED SIGNS

A. Painted Sign as indicate on the drawings: Sign painted directly on indicated substrate, including primers, sealers, undercoats, and transition coats as required.

1. Paint Type: Epoxy.

a. Gloss: Level 2.

2. Substrate: As indicated on Drawings.
3. Text and Typeface: As indicated on Drawings.

a. Size: As indicated on Drawings.

4. Background: Overall rectangular background.

a. Thickness or Extent: As indicated on Drawings.
b. Color: As indicated on Drawings.

2.4 PAINT MATERIALS

A. Sign Paints and Coatings: Inks, dyes, and paints that are recommended in writing by manufacturer for optimum adherence to substrate and are UV and water resistant for colors and exposure indicated.

1. Compatibility: Provide paint materials that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. Transition Coat: Paint manufacturer's recommended coating for use where a residual existing coating is incompatible with the paint system.

B. Emissions Requirements: Field-applied paints and coatings that are inside the weatherproofing system shall comply with either of the following:

1. Low-Emitting Materials: VOC emissions shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
2. VOC content shall not exceed limits of authorities having jurisdiction and the following:

a. Flat Coatings: 50 g/L.
b. Nonflat Coatings: 100 g/L.
c. Primers, Sealers, and Undercoats: 100 g/L.
d. Floor Coatings: 100 g/L.
e. Shellacs, Clear: 730 g/L.
f. Shellacs, Pigmented: 550 g/L.
g. Stains: 250 g/L.
h. Clear Wood Finishes (Varnishes, Sanding Sealers, and Lacquers): 275 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance. Comply with paint manufacturer's written instructions for inspection.

B. If existing surfaces cannot be prepared to an acceptable condition for proper painting, notify Architect in writing.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surface is dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 INSTALLATION

A. Appearance Standard: Completed sign work shall have a sharp and uniformly delineated appearance as viewed by Architect from building interior at 10 feet away from painted surface and from building exterior at 20 feet away from painted surface.

B. Comply with manufacturers' written instructions for surface preparation and paint-application for each substrate condition.

C. Apply primers, sealers, undercoats, and transition coats so that they do not extend beyond the limits of the painted signage. Remove excess without damaging the substrate.

D. Install signs level, plumb, true to line, with uniform delineation and borders, and at locations and heights indicated.

1. Prespaced characters with template, cutout stencil, or ruler and straightedge.

E. Accessible Signage: Install in locations on walls as indicated on Drawings.

3.3 MARKING FIRE AND SMOKE ASSEMBLIES

A. Wall-Identification Signs: Permanently identify both sides of each fire and smoke assembly indicated on Drawings. Place signs in accessible, concealed floor, floor-ceiling, or attic space at maximum 15 feet from end of wall and at maximum intervals of 30 feet, measured horizontally along the assembly. Locate signs for greatest visibility in the space.

3.4 ADJUSTING AND CLEANING

A. Remove and reapply damaged or deformed signs and signs that do not comply with specified requirements. Reapply signs with damaged or deteriorated finishes that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. After completing sign application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. Remove temporary protective coverings and strippable films as signs are installed.

END OF SECTION 101473

SECTION 102800 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public/ Private-use washroom accessories
2. Grab Bars
3. Waste Receptacle
4. Toilet paper dispenser
5. Toilet seat cover dispenser
6. Sanitary Napkin Dispenser
7. Mirror
8. Attachment Hardware

1.2 REFERENCES

A. ICC/ANSI Al 17.1- Accessible and Usable Buildings and Facilities.

B. ASTM A123- Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

C. ASTM A167- Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

D. ASTM A1008- Steel Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Allow with Improved Formability, Solution Hardened and Bake Hardenable.

E. ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium

F. and Nickel PlusChromium.

G. NEMA LD 3 - High-Pressure Decorative Laminates.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s catalog data complete with descriptions of materials, finishes, fastening and anchoring devices.

B. Manufacturer’s installation instructions.

C. Operation and maintenance data.

1.4 REGULATORY REQUIREMENTS

A. Accessibility - Perform Work in accordance with the all applicable codes having jurisdiction over the project.

1.5 QUALITY ASSURANCE

A. Design Criteria: Grab bars will be capable of withstanding a force of 900 pounds, minimum, and will be installed in accordance with the manufacturer’s instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Provide factory wrapping, packaging, and other means necessary to prevent damage or deterioration during shipment, handling and storage.

B. Attach quality designation and guarantee label to each mirror, or submit manufacturer’s certification that mirrors meet specified requirements

C. Maintain protective coatings or coverings on units until installation is complete.

PART 2 - PRODUCTS

2.1 TYPICAL TOILET ROOM ACCESSORIES

A. Basis of Design Manufacturer: Bobrick

B. Alternate manufacturers:

1. ASI (American Specialties, Inc.).
2. Bradley Corporation.
3. Gamco.

2.2 GRAB BARS

A. Basis of Design: Bobrick

B. Description: 1 ¼ inch diameter tubing; straight with radiused ends returning to snap flange.

C. Model no: B-5806 series.

D. Finish: Type 304 stainless steel.

E. Lengths: As required on drawings: 18”- 54”.

F. Mounting: Refer to typical mounting heights indicated on drawings.

2.3 FRAMED MIRROR

A. Basis of Design: Bobrick

B. Description: Tempered glass welded-frame mirror.

C. Model no: B-2908 1836

D. Size: 18-inches by 36 inches.

E. Finish: Type 304 stainless steel.

F. Mounting: Refer to typical mounting heights indicated on drawings.

2.4 PAPER TOWEL DISPENSER WITH WASTE RECEPTACLE

A. Basis of Design: Bobrick

B. Description: Semi-recessed dispenser and waste receptacle.

C. Model no: B-3942

D. Size: 16 inches wide by 54-3/4 inches tall.

E. Finish: Type 304 stainless steel.

F. Mounting: Refer to typical mounting heights indicated on drawings.

2.5 SOAP DISPENSER

A. Basis of Design: Bobrick

B. Description: Wall mounted liquid soap dispenser.

C. Model no: B-4112

D. Finish: Type 304 stainless steel.

E. Mounting: Refer to typical mounting heights indicated on drawings.

2.6 SANITARY NAPKIN DISPOSAL

A. Basis of Design: Bobrick

B. Description: Sanitary Napkin Disposal

C. Model no: B-270

D. Finish: Type 304 stainless steel.

E. Mounting: Refer to typical mounting heights indicated on drawings.

2.7 TOILET TISSUE DISPENSER

A. Basis of Design: Bobrick

B. Description: Surface mounted dispenser.

C. Model no: B-4288

D. Finish: Type 304 stainless steel.

E. Mounting: Refer to typical mounting heights indicated on drawings.

2.8 TOILET SEAT COVER

A. Basis of Design: Bobrick

B. Description: Surface mounted dispenser.

C. Model no: B-221

D. Finish: Type 304 stainless steel.

E. Mounting: Refer to typical mounting heights indicated on drawings.

2.9 KEYING

A. Keyed (tumbler lock) accessories will be keyed alike with the exception of coin receiving boxes on vending equipment.

B. Provide for each key combination, 5 keys plus 5 blanks.

C. Deliver keys to the OWNER Representative in clearly identified sealed envelopes before Acceptance.

2.10 FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from single sheet of stock, free of joints.

C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or joints.

D. Backpaint components where contact is made with building components to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings.

F. Provide steel anchor plates, adapters, and anchor components for installation.

G. Hot Dip Galvanize exposed and painted ferrous metal and fastening devices.

2.11 FACTORY FINISHING

A. Galvanizing: ASTM A123 to 1.25 oz/sq yd.

B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats baked enamel.

D. Chrome/Nickel Plating: ASTM B456, Type SC 2 satin finish.

E. Stainless Steel: No. 4 satin luster finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that conditions are satisfactory for the installation of accessory items.

B. Verify instructions are as recommended by manufacturer.

C. Verify that supports and reinforcements are in place and proper for accessory installation.

D. Do not begin installation until conditions are satisfactory. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site at the appropriate time for building in.

B. Provide templates and rough-in measurements as required.

C. Verify exact location of accessories for installation.

3.3 INSTALLATION

A. Install accessories in accordance with manufacturer’s written instructions.

B. Install accessories plumb and level, accurately aligned, and securely attached. Use security fasteners where indicated.

C. Bed components attached to walls in sealant in accordance with Section 07 90 00 Clean

up extruded sealant and finish smooth and flush with edges.

D. Grab Bars:

1. Install grab bars in lengths and locations as indicated.
2. Install grab bars with concealed mounting in accordance with manufacturer's instructions and as indicated.
3. Secure grab bars located in Inmate Toilets and Cells by welding to wall plates as shown on the Drawings.

3.4 ADJUST AND CLEAN

A. Remove protective coatings and coverings in accordance with manufacturer's printed instructions.

B. Exposed surfaces will be clean and free from scratches, dents, tool marks, stains, discoloration, and other defects and damage.

C. Adjust accessories for proper operation.

D. After completion of installation, clean and polish exposed surfaces.

END OF SECTION 102800

SECTION 102813.63 - DETENTION TOILET ACCESSORIES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Drawings and Conditions of Contract, including General and Supplementary Conditions and Division 01 Administration Sections, apply to this Division.

1.2 SUMMARY

A. Section Includes:

1. Safety hooks.
2. Miscellaneous toilet accessories.
3. Stainless-steel mirrors.
4. Grab bars.
5. Shower seats.
6. Shower curtain tracks

1.3 COORDINATION

A. Coordinate installation of anchorages for detention toilet accessories. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in adjoining construction. Deliver such items to Project site in time for installation.

B. Coordinate size and location of recesses in wall construction to receive recessed detention toilet accessories.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples for Verification: For each type of detention toilet accessory indicated.

1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: For detention toilet accessories. Indicate types, quantities, sizes, and installation locations by room of each accessory required. Use same designations indicated on Drawings and in Detention Toilet Accessory Schedule.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Drawings showing location of each built-in anchor supporting detention toilet accessories, including anchors to be installed as work of other Sections, drawn to scale and coordinating anchorage with detention toilet accessories. Show the following:

1. Locations, dimensions, and profiles of wall and floor reinforcements.
2. Locations and installation details of built-in anchors.
3. Elevations of each detention toilet accessory showing dimensions of accessory, preparations for receiving anchors, and locations of anchorage.
4. Details of attachment of each detention toilet accessory to built-in anchors.

B. Examination reports documenting inspection of substrates, areas, and conditions.

C. Anchor inspection reports documenting inspections of built-in and cast-in anchors.

D. Field quality-control certification signed by Contractor and Detention Specialist.

E. Welding certificates.

F. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For detention toilet accessories to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Security Fasteners: Furnish not less than 20 of each type and size of security fastener installed.
2. Tools: Provide two sets of tools for installing and removing security fasteners.

1.8 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of detention toilet accessory from single source from single manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

3. AWS D1.6, "Structural Welding Code - Stainless Steel."

C. Preinstallation Conference: Conduct conference at Project site.

D. Coordination Meetings: Conduct coordination meetings at Project site to comply with requirements in Division 01 Section "Special Project Procedures for Detention Facilities."

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace detention toilet accessories that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including deflection exceeding 1/4 inch.
b. Faulty operation of hardware.
c. Deterioration of metals, metal finishes, and other materials.

2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, CS (Commercial Steel), Type B.

B. Metallic-Coated Steel Sheet: ASTM A 653, CS (Commercial Steel), Type B; with G60 zinc (galvanized) coating designation.

C. Stainless-Steel Sheet: ASTM A 666 or ASTM A 240, austenitic stainless steel, Type 304; Type 430 for mirrors.

D. Steel Plates, Shapes, and Bars: ASTM A 36.

E. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.

F. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, a load equal to 4 times the load imposed, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47malleable iron or ASTM A 27cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153.

G. Embedded Plate Anchors: Fabricated from steel shapes and plates, minimum 3/16 inch

thick; with minimum 1/2-inch- diameter headed studs welded to back of plate.

H. Welding Rods and Bare Electrodes: Select according to AWS specifications.

2.2 SECURITY FASTENERS

A. Fasteners that are operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific type of fastener.

1. See Division 05 Section “Security Metal Fastenings.”

2.3 DETENTION SAFETY HOOKS

A. Ball and Pin Single Safety Hooks:

1. Configuration: **4 inches long x 4 inches high x 1 inch deep.**
2. Mounting: Front mounting with security fasteners.
3. Finish: Stainless Steel #4 finish.
4. Construction” 14 gauge.
5. Mounting height: Refer to standard mounting heights indicated in drawings.

2.4 MISCELLANEOUS DETENTION TOILET ACCESSORIES

A. Recessed, Detention Soap Dish (DSD): Minimum inside dimensions of 5-3/4 inches wide by 4- 1/2 inches high by 2-1/2 inches deep with 3/4-inch lip around entire face; formed from 0.062-inch- thick, stainless-steel sheet. Secure to wall with rear-mounting steel strap and adjustment bolts. Provide No. 4 finish.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. American Specialties, Inc.; Security Recessed Soap Dish, Model No. 140.
b. Accepted equal.

2. Mounting height: Refer to standard mounting heights indicated in drawings.

2.5 DETENTION MIRRORS

A. Large, Framed Detention Mirror with Square Corners (DMR-1): Minimum 18 inches wide by 36 inches (high; formed from 0.038-inch- thick, stainless-steel sheet with fiberboard backing and No. 8 finish; enclosed in a No. 4 finish metal frame.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Ripco; Majestic Solutions, model MRS-1836
b. Accepted equal

2. Mounting: Front mounting with security fasteners.
3. Mounting height: Refer to enlarged elevations.

B. Integrally Framed Detention Mirror with Round Corners (DMR): Minimum 11 inches wide by 16 inches high; with mirror and integral frame formed from minimum 0.062-inch-thick, stainless-steel sheet; with round corners. Provide No. 8 finish for mirror, chrome plating for frame.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Ripco; Majestic Solutions, model MRS-1217
b. Accepted equal

2. Mounting: Front mounting with security fasteners.
3. Mounting height: Refer to enlarged elevations.

2.6 DETENTION GRAB BARS

A. Grab Bars (DSGB): 1-1/2 inches in diameter; formed from 0.042-inch- thick, stainless-steel tubing, with 3-inch- diameter flanges formed from 0.125-inch- thick, stainless steel. Closure plates for suicide prevention formed from 0.125-inch- thick, stainless steel. All-welded construction. Provide No. 4 finish.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Security Grab Bars with closure plate (DSGB)

1) Ripco; Majestic Solutions, model numbers X-SGB18, X-SGB24, X-SGB36, X-SGB42, X-SGB48, X-SGB54.
2) Approved Equal.

2. Length: As indicated on plans.
3. Mounting: Front mounting with security fasteners.
4. Mounting height: Refer to enlarged elevations and standard mounting heights in drawings.

2.7 DETENTION SHOWER SEATS

A. Shower Seats (DSS): Stainless steel surface mounted shower seat, formed from minimum 10 gauge stainless-steel sheets for the seat; 7 gauge stainless-steel sheet for the surrounding frame. Minimum 500 lb. loading capacity. Provide No. 4 finish.

1. Products: Limited to sole product allowed by BSCC and meeting Title 24 accessibility requirements.

a. Ripco; Majestic Solutions, model CSS-1624SM.
b. Approved equal.

2. Length:

a. Approximately 27-inches for alternate accessible shower layout.
b. Approximately 21-inches for alternate accessible shower layout.

2.8 DETENTION SHOWER CURTAIN

A. Safety Track for Breakaway Shower Curtain: Soffit mounted, straight, cut to fit opening (approximately 36-inches).

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. American Detention Supplies, track type 69; breakaway shower curtain.

1) Cortech, model CTRK 36; CCUR4078.
2) Accepted equal.

2.9 FABRICATION

A. Coordinate dimensions and attachment methods of detention toilet accessories with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

B. Shear and punch metals cleanly and accurately. Remove burrs.

C. Form edges and corners to be free of sharp edges and rough areas. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch- wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.

D. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Weld corners and seams continuously to comply with referenced AWS standard and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Provide smoothly finished eased edges of 1/32inch minimum at outside corners.
6. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate

and space anchoring devices to secure detention toilet accessories rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.

G. Cut, reinforce, drill, and tap detention toilet accessories to receive hardware, security fasteners, and similar items.

H. Form exposed work true to line and level with accurate angles and surfaces. Grind off and ease edges unless otherwise indicated.

I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed security fasteners of type indicated or, if not indicated, flat-head (countersunk) security fasteners. Locate joints where least conspicuous.

2.10 FINISHES

A. Finish detention toilet accessories after assembly.

B. Stainless-Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.

    a. Run grain of directional finishes with long dimension of each piece.
    b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
    c. Directional Satin Finish: No. 4.
    d. For mirror surfaces provide #8 non directional polished surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention toilet accessories.

1. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention toilet accessory connections before detention toilet accessory installation.
2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention toilet accessories.

B. Inspect built-in and cast-in anchor installations before installing detention toilet

accessories to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

C. Verify locations of detention toilet accessories.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention toilet accessories to in-place construction. Include threaded fasteners for concrete and masonry inserts, security fasteners, and other connectors.

B. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry or similar construction.

C. Apply security sealant around perimeter in a continuous ribbon on back of detention toilet accessories before installation.

D. Security Fasteners: Install detention toilet accessories using security fasteners with head style appropriate for installation requirements, strength, and finish of adjacent materials. Provide stainless-steel security fasteners in stainless-steel materials.

3.3 FIELD QUALITY CONTROL

A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Remove and replace detention work where inspections indicate that work does not comply with specified requirements.

C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

D. Prepare field quality-control certification endorsed by Detention Specialist that states installed products and their installation comply with requirements in the Contract Documents.

3.4 ADJUSTING AND CLEANING

A. Remove temporary labels and protective coatings.

B. Adjust safety hooks to release with application of 8-lbf load.

C. Touchup Painting: Immediately after erection, clean bolted connections and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

D. Touchup Painting-1: Cleaning and touchup painting of bolted connections and abraded areas of shop paint are specified in Division 09 painting Sections.

END OF SECTION 102813.63

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:
2. Fire-protection cabinets for the following:

    a. Portable fire extinguisher.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semi recessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

B. Shop Drawings: For fire-protection cabinets.

1. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

D. Samples for Initial Selection: For each type of exposed finish required.

E. Samples for Verification: For each type of exposed finish required, prepared on samples **6 by 6 inches** square.

F. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semi recessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.3 FIRE-PROTECTION CABINET

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. JL Industries; Activar Construction Products Group, Inc.
2. Larsen's Manufacturing Company
3. Potter Roemer LLC; a Division of Morris Group International

B. Fire-Protection Cabinet Type: Suitable for fire extinguisher.

C. Cabinet Construction: Nonrated.

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from **0.043-inch-** thick cold-rolled steel sheet lined with minimum **5/8-inch-** thick fire-barrier material. Provide factory-drilled mounting holes.

D. Cabinet Material: Cold-rolled steel sheet.

1. Shelf: Same metal and finish as cabinet.

E. Semi Recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: **1-1/4- to 1-1/2-inch** backbend depth.
2. Rolled-Edge Trim: 2-1/2-inch backbend depth.

F. Cabinet Trim Material: Steel sheet.

G. Door Material: Steel sheet.

H. Door Style: Fully glazed panel with frame.

I. Door Glazing: Tempered float glass (clear).

1. Acrylic Sheet Color:

a. Clear transparent acrylic sheet.
b. Clear transparent acrylic sheet painted red on unexposed side.

J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide projecting lever handle with cam-action latch.
2. Provide manufacturer's standard hinge, permitting door to open 180 degrees.

K. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
3. Door Lock: Cylinder lock, keyed alike to other cabinets.
4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate .

a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet door.
2) Application Process: Pressure-sensitive vinyl letters.
3) Lettering Color: White.
4) Orientation: Horizontal.

L. Materials:

1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.

a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
c. Color: As selected by Architect from manufacturer's full range.

2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

2.4 SECURITY FIRE-PROTECTION CABINET

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. JL Industries; Activar Construction Products Group, Inc.
2. Larsen's Manufacturing Company
3. Potter Roemer LLC; a Division of Morris Group International

B. Security Fire-Protection Cabinet Type: Suitable for fire extinguisher.

C. Cabinet Construction: Nonrated.

D. Cabinet Material: 0.068-inch- thick steel sheet.

E. Semi Recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: **1-1/4- to 1-1/2-inch** backbend depth.
2. Rolled-Edge Trim: **2-1/2-inch** backbend depth.

F. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.

G. Cabinet Trim Material: Same material and finish as door.

H. Door Material: 0.097-inch- thick steel sheet.

I. Door Style: Solid opaque panel with frame.

J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated, and as follows:

1. Recessed door pull.
2. Continuous Hinge: Same material and finish as trim, permitting door to open 180 degrees.
3. Mechanical Deadlock:

a. Lockbolt retracted and extended by five-tumbler paracentric cylinder; keyed one side.

1) Lockbolt: **1-1/2 inches high by 3/4 inch** thick; **5/8-inch** throw.

b. As specified in Section 119814 "Detention Door Hardware."

K. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to security fire-protection cabinet, of sizes required for types and

capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate .

   a. Identify fire extinguisher in security fire-protection cabinet with the words "FIRE EXTINGUISHER."

      1) Location: Applied to cabinet door.
      2) Application Process: Pressure-sensitive vinyl letters.
      3) Lettering Color: White.
      4) Orientation: Horizontal.

3. Keys: Three per door lock.

L. Materials:

1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.

   a. Finish: Baked enamel or powder coat.
   b. Color: As selected by Architect from full range of industry colors.

2.5 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Miter corners and grind smooth.
3. Provide factory-drilled mounting holes.
4. Prepare doors and frames to receive locks.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum **1/2 inch** thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames and grind smooth.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION OF FIRE-PROTECTION CABINETS

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at height indicated below:

1. Fire-Protection Cabinet Mounting Height: 42 inches above finished floor to top of fire extinguisher.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semi recessed fire-protection cabinets.
2. Provide inside latch and lock for break-glass panels.
3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification:

1. Apply decals at locations indicated.
2. Apply decals on field-painted fire-protection cabinets after painting is complete.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes portable, hand-carried fire extinguishers.

B. Owner-Furnished Material: Hand-carried fire extinguishers.

C. Related Requirements:

1. Section 10 44 13 "Fire Protection Cabinets."

1.3 REFERENCES

A. CCR, Title 19, Division 1, Chapter 3.

B. NFPA 10 – Standard for Portable Fire Extinguishers.

1.4 DEFINITIONS

A. Administration Areas: Non-Inmate spaces, such as public lobbies and non-inmate circulation accessible only to staff.

1.5 QUALITY ASSURANCE

A. Code Compliance: Fabricate and label fire extinguishers to comply with:

1. ANSI/UL Standard 711 (latest edition).
2. ANSI/UL Standard 299 (latest edition).
3. CCR, Title 19, Division 1, Chapter 3.
4. California State Fire Marshal.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire

extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.7 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.9 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
b. Faulty operation of valves or release levers.

2. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Potter Roemer LLC; or comparable product by one of the following:

a. JL Industries, Inc. a division of the Activar Construction Products Group
b. Larsens Manufacturing Company

2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
3. Valves: Manufacturer's standard .
4. Handles and Levers: Manufacturer's standard .
5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B , and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Regular Dry-Chemical Type in Steel Container : UL-rated 60-B:C, **10-lb** nominal capacity, with sodium bicarbonate-based dry chemical in enameled-steel container.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION 104416

SECTION 111916 - DETENTION GUN LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pistol lockers.

B. Related Requirements:

1. Section 119814 "Detention Door Hardware" for cylinders and keying for detention gun lockers.

1.2 COORDINATION

A. Detention Specialist: Coordinate with Section 013513.16 "Special Project Procedures for Detention Facilities" for requirements of this Section that are to be performed by a Detention Specialist or other entity.

B. Coordinate installation of anchorages for detention gun lockers. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

C. Coordinate size and location of recesses in wall construction to receive recessed detention gun lockers.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention gun lockers.

B. Sustainable Design Submittals:

C. Shop Drawings: For detention gun lockers.

1. Include plans, elevations, sections, and attachment details.

2. Indicate locations, dimensions, and profiles of wall and floor reinforcements.
3. Indicate locations and installation details of built-in anchors.
4. Show elevations and indicate dimensions of detention gun lockers, preparations for receiving anchors, and locations of anchorage.
5. Show details of attachment of detention gun lockers to built-in anchors.

D. Samples for Initial Selection: For detention gun lockers with factory-applied color finishes.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Examination reports documenting inspections of substrates, areas, and conditions.

C. Anchor inspection reports documenting inspections of built-in and cast-in anchors.

D. Field quality-control reports documenting inspections of installed products.

1. Field quality-control certification signed by Contractor and Detention Specialist.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify openings for recessed detention gun lockers by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 PISTOL LOCKERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to,

the following:

1. American Jail Products L.L.C.
2. BarkerBuilt, Division of Bob Barker Company, Inc
3. Detention Device Systems (DDS); DDS Group
4. Southern Folger Detention Equipment Company
5. Sweeper Metal Fabricators Corp

B. Cabinet: Minimum **8 inches** wide by **5 inches** high by **16 inches** deep; formed from 0.134-inch nominal-thickness steel sheet. Line each compartment with mothproofed felt or nonabsorbing, closed-cell padding.

1. Compartments: Six.

C. Doors: Formed from 0.180-inch nominal-thickness steel sheet, supported by heavy-duty continuous bottom hinge.

D. Locks: Snap type, keyed differently and master keyed; provide one lock for each compartment.

1. Lock Preparation: Prepare door panel to accept cylinder specified in Section 119814 "Detention Door Hardware."

E. Mounting: Surface.

F. Materials:

1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
3. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
4. Stainless Steel Sheet, Strip, Plate, and Flat Bars: ASTM A666 or ASTM A240/A240M, austenitic stainless steel, Type 304.

G. Finishes:

1. Steel Factory Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
2. Steel Baked-Enamel or Powder-Coat Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of **2 mils**.

a. Color and Gloss: As selected by Architect from manufacturer's full range.

3. Stainless Steel Finish:

a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
b. Polished Finish: Grind and polish surfaces to produce uniform finish, free of

cross scratches.

1) Run grain of directional finishes with long dimension of each piece.
2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3) Directional Satin Finish: No. 3.

2.3 FABRICATION

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Coordinate dimensions and attachment methods of detention gun lockers with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Form and grind edges and corners to be free of sharp edges or rough areas.

E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

F. Weld corners and seams continuously to comply with referenced AWS standard and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish exposed welds and surfaces smooth and blended at exposed connections, so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention gun lockers rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.

H. Cut, reinforce, drill, and tap detention gun lockers as indicated to receive hardware, fasteners, and similar items.

I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.

J. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.

2.4 ACCESSORIES

A. Concealed Bolts: ASTM A307, Grade A unless otherwise indicated.

B. Cast-in-Place Anchors in Concrete: Fabricated from corrosion-resistant materials capable of sustaining, without failure, a load equal to 4 times the load imposed, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified testing agency; of type indicated below.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed; hot-dip galvanized in accordance with ASTM A153/A153M or ASTM F2329/F2329M.

C. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum **3/16 inch** thick; with minimum **1/2-inch-** diameter, headed studs welded to back of plate.

D. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention gun lockers.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention gun lockers before detention gun locker installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention gun lockers.

D. Inspect built-in and cast-in anchor installations, before installing detention gun lockers, to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

E. Verify locations of detention gun lockers with those indicated on Shop Drawings.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention gun lockers to in-place construction. Include threaded fasteners for masonry inserts and other connectors.

B. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention gun lockers. Set detention gun lockers accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into masonry or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.

E. Adjust doors and latches of detention gun lockers to operate easily without binding. Verify that integral locking devices operate properly.

F. Assemble detention gun lockers requiring field assembly with security fasteners with no exposed fasteners on exposed faces and frames.

3.3 FIELD QUALITY CONTROL

A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Remove and replace detention work if inspections indicate that work does not comply with specified requirements. Remove malfunctioning units; replace with new units.

C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

D. Prepare field quality-control certification, endorsed by Detention Specialist, that states installed products and their installation comply with requirements in the Contract Documents.

END OF SECTION 111916

SECTION 119713 – DEAL DRAWER THRU-WALL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Through-wall transactions drawer.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For recessed currency tray.

C. Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.

D. Show locations and sizes of cutout and holes for items installed in countertops.

1.4 DELICERY, STORAGE, AND HANDLING

A. Deliver product only after casework and supports on which it will be installed have been completed in installation areas.

B. Store product in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

C. Keep Tray covered with protective covering during handling and installation.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install countertop-mounted trays until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Field Measurements: Where countertop-mounted items are indicated to fit to other

construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Established Dimensions: Where countertop-mounted trays are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 FABRICATORS

A. Basis of design: Subject to compliance with requirements, provide products by the following:

1. Total Security Solutions, Inc., 935 Garden Lane, Fowlerville, MI 48836, 866 734-6277. Attn: Sales Department, sales@tssbulletproof.com. Web: www.tssbulletproof.com.

B. Alternate manufacturers:

1. US Bullet Proofing
2. Gaffco Ballistics
3. Armortex
4. C.R. Laurence Company, Inc.

2.2 TRANSACTION DRAWER

A. The TSS Thru-Wall Drawer shall consist of an inner shell of bullet-resistant materials, including stainless steel sides with a No. 4 finish on all sides with openings facing the customer and the employee.

B. The drawer shall be installed through a wall, allowing packages to be passed through a barrier between customer and employee without a breach of security.

C. A deal tray shall be located on top of the sliding drawer, while other larger items may be passed through the drawer area.

D. Product size shall be:

1. Box Outside Dimension 18” W x 9” H x 25” D.

E. Drawer and trays shall be designed to permit passing of materials without sacrificing security of the system.

F. Material: Drawer shall be fabricated from minimum 18-gauge stainless steel and with No. 4 finish.

G. Bullet Resistance:

1. Level 1 in accordance with UL 752 – Testing for Ballistic Resistance for the complete assembly.

H. Components shall be manufactured in strict accordance with the specifications, design and details, to be in conformance with required UL ballistics level indicated.

I. No field alterations to the construction of the units fabricated under the acceptable standards shall be allowed unless approved by the manufacturer and the architect.

J. Standard manufacturing tolerances shall be +/- 1/16".

2.3 FABRICATION

A. Fabricate tray to dimensions, profiles, and details indicated. If applicable, insert subparagraph here to describe conditions where eased edges are not required.

B. Complete fabrication to maximum extent possible before shipment to Project site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition tray and countertop to receive tray to average prevailing humidity conditions in installation areas.

B. Prior to installing the bullet resistive material, the contractor shall verify that all supports have been installed as required by the contract documents and architectural drawings, and approved shop/CAD drawings, if required. Installer shall notify architect of any unsatisfactory preparation that is responsibility of another installer.

C. Clean and prepare all surfaces per manufacturers recommendations for achieving the best results for the substrate under the project conditions.

3.2 ADJUSTING AND CLEANING

A. Repair damaged and defective material, where possible, to eliminate functional and visual defects. Where not possible to repair, replace material. Adjust joinery for uniform appearance.

B. Clean exposed and semi exposed surfaces.

C. Protection: Provide Kraft paper or other suitable covering over drawer surfaces. Remove protection at Substantial Completion.

END OF SECTION 111916

SECTION 11 98 12 - DETENTION DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Swinging detention doors.
2. Detention panels.
3. Detention frames.

B. Related Requirements:

1. Section 08 88 53 “Security Glazing” for security glazing in detention doors and frames.
2. Section 11 98 14 "Detention Door Hardware" for door hardware for detention doors

1.3 DEFINITIONS

A. Minimum-Thickness Steel: Indicated as the specified minimum thicknesses for base metal without coatings, according to NAAMM-HMMA 803.

B. Nominal-Thickness Stainless Steel: Indicated as the specified thicknesses for which over- and under-thickness tolerances apply, according to ASTM A 480/A 480M.

1.4 COORDINATION

A. Coordinate anchorage installation for detention frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, temperature-rise ratings, and finishes for each detention door and frame type specified.

B. Shop Drawings: In addition to requirements below, provide a schedule using same reference numbers for details and openings as those on Drawings:

1. Elevations of each door type.
2. Direction of swing.
3. Inmate and non-inmate sides.
4. Details of doors, including vertical and horizontal edge details, and metal thicknesses.
5. Details of frames, including dimensioned profiles, and metal thicknesses.
6. Locations of reinforcement and preparations for hardware.
7. Details of each different wall opening condition.
8. Details of anchorages, joints, field splices, and connections.
9. Details of food-pass openings louvers speaking apertures and gun ports.
10. Details of moldings, removable stops, and glazing.
11. Details of conduits, junction boxes, and preparations for electrically operated door hardware.

C. Samples for Verification:

1. For each type of exposed finish required, prepare Samples not less than 3 by 5 inches (76 by 127 mm).
2. For "Detention Doors" and "Detention Frames" subparagraphs below, prepare Samples approximately 12 by 12 inches (305 by 305 mm) to demonstrate compliance with requirements for quality of materials and construction:
   a. Detention Doors: Show vertical-edge, top, and bottom construction; insulation; face stiffeners; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
   b. Detention Frames: Show profile, welded corner joint, welded hinge reinforcement, grout-cover boxes, floor and wall anchors, and silencers. Include separate section showing fixed steel panels and glazing if applicable.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Welding certificates.

C. Product Test Reports: For each type of detention hollow-metal door and frame assembly including vision and side lights, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Examination reports documenting inspection of substrates, areas, and conditions.

E. Anchor inspection reports documenting inspections of built-in and cast-in anchors.

F. Field quality-control reports documenting inspections of installed products.

1. Field quality-control certification signed by Contractor.

G. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
2. Tools: Provide two sets of tools for installing and removing security fasteners.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."
3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver detention hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

B. Deliver welded detention frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store detention hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch (102-mm) high wood blocking. Provide minimum 1/4-inch (6.3-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Trussbilt, LLC basis of design.
2. American Steel Products.
3. Titan Steel Door.
4. Accepted equal.

B. Source Limitations: Obtain detention doors and frames from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
2. Oversize Fire-Rated Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 DETENTION DOOR AND FRAME ASSEMBLIES

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Detention Door and Frame Assemblies: Provide detention door and frame assemblies that comply with the following, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project:

1. Security Grade: Assemblies pass testing requirements in ASTM F 1450 for security grades specified.
2. Bullet Resistance: Level 3 rated when tested according to UL 752.
3. Tool-Attack Resistance: Small-tool-attack-resistance rated when tested according to UL 437 and UL 1034.

C. Detention Frames: Provide sidelight and borrowed-light detention frames that comply with ASTM F 1592 and removable stop test according to NAAMM-HMMA 863, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

2.4 DETENTION DOORS

A. General: Provide flush-design detention doors of seamless hollow construction, 2 inches (51 mm) thick unless otherwise indicated. Construct detention doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges.

1. For single-acting swinging detention doors, bevel both vertical edges 1/8 inch in 2 inches (3 mm in 51 mm).

B. Core Construction: Provide the following core construction of same material as detention door face sheets, welded to both detention door faces:

1. Steel-Stiffened Core: 0.042-inch (1.0-mm) thick, steel vertical stiffeners extending full- door height, with vertical webs spaced not more than 4 inches (102 mm) apart, spot welded to face sheets a maximum of 3 inches (76 mm) o.c. Fill spaces between stiffeners with insulation.
2. Truss-Stiffened Core: 0.013-inch (0.3-mm) thick, steel, truncated triangular stiffeners extending between face sheets and for full height and width of door; with stiffeners welded to face sheets not more than 3 inches (76 mm) o.c. vertically and 2-3/4 inches (70 mm) horizontally. Fill spaces between stiffeners with insulation.

C. Vertical Edge Channels: 0.123-inch (3.1-mm) thick, continuous channel of same material as detention door face sheets, extending full-door height at each vertical edge; welded to top and bottom channels to create a fully welded perimeter channel. Noncontiguous channel is permitted to accommodate lock-edge hardware only if lock reinforcement is welded to and made integral with channel.

D. Top and Bottom Channels: 0.123-inch (3.1-mm) thick metal channel of same material as detention door face sheets, spot welded, not more than 4 inches (102 mm) o.c., to face sheets.

1. Reinforce top edge of detention door with 0.053-inch (1.3-mm) thick closing channel, welded so channel web is flush with top door edges.

E. Hardware Reinforcement: Fabricate reinforcing plates from same material as detention door face sheets to comply with the following minimum thicknesses:

1. Full-Mortise Hinges and Pivots: 0.187 inch (4.7 mm) thick.
2. Maximum-Security Surface Hinges: 0.250 inch (6.3 mm) thick.
3. Strike Reinforcements: 0.187 inch (4.7 mm) thick.
4. Slide-Device Hanger Attachments: As recommended by device manufacturer.
5. Lock Fronts, Concealed Holders, and Surface-Mounted Closers: 0.093 inch (2.3 mm) thick.
6. All Other Surface-Mounted Hardware: 0.093 inch (2.3 mm) thick.
7. Lock Pockets: 0.123 inch (3.1 mm) thick at non-inmate side, welded to face sheet.

F. Hardware Enclosures: Provide enclosures and junction boxes for electrically operated detention door hardware of same material as detention door face sheets, interconnected with UL-approved, 1/2-inch (12.7-mm) diameter conduit and connectors.

1. Access Plates: Where indicated for wiring installation, provide access plates to junction boxes, fabricated from same material and thickness as face sheet and fastened with at least four security fasteners spaced not more than 6 inches (152 mm) o.c.

G. Interior and Exterior Detention Doors: Construct interior and exterior doors to comply with materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances indicated in NAAMM-HMMA 863 and as specified.

1. Security Grade 1 (DHM12 indicated on drawings): Provide doors with face sheets of 0.093-inch (2.3-mm) minimum-thickness, metallic-coated, cold-rolled steel 0.109-inch (2.8-mm) nominal-thickness stainless steel.
2. Security Grade 3 (DHM14 indicated on drawings): Provide doors with face sheets of 0.067-inch (1.7-mm) minimum-thickness, cold-rolled, steel, 0.067-inch (1.7-mm) minimum-

thickness, metallic-coated, cold-rolled, steel or 0.078-inch (2.0-mm) nominal- thickness stainless steel.

2.5 DETENTION FRAMES

A. General: Provide fully welded detention frames with integral stops, of seamless construction without visible joints or seams. Fabricate detention frames with contact edges closed tight and corners mitered, reinforced, and continuously welded full depth and width of detention frame.

B. Stop Height: Provide minimum stop height of 0.750 inch (19 mm) for detention door openings and minimum stop height of 1-1/4 inches (32 mm) in security glazing or detention panel openings unless otherwise indicated.

C. Interior and Exterior Detention Frames: Construct interior and exterior frames to comply with materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances indicated in NAAMM-HMMA 863 and as specified.

1. Security Grade 1 (DHM12 indicated on drawings): Provide frames fabricated from 0.093-inch (2.3-mm) minimum-thickness, metallic-coated, cold-rolled steel 0.109-inch (2.8-mm) nominal-thickness stainless steel.
2. Security Grade 3 (DHM12 indicated on drawings): Provide frames fabricated from 0.093-inch (2.3-mm) minimum-thickness, metallic-coated, cold-rolled steel 0.109-inch (2.8-mm) nominal-thickness stainless steel.

D. Hardware Reinforcement: Fabricate reinforcing plates from same material as detention frame to comply with the following minimum thicknesses:

1. Hinges and Pivots: 0.187 inch (4.7 mm) thick by 1-1/2 inches (38 mm) wide by 10 inches (254 mm) long.
2. Strikes, Flush Bolts, and Closers: 0.187 inch (4.7 mm) thick.
3. Surface-Mounted Hardware: 0.093 inch (2.3 mm) thick.
4. Lock Pockets: 0.123 inch (3.1 mm) thick at non-inmate side, welded to face sheet. Provide 0.123-inch (3.1-mm) thick, lock protection plate for attachment to lock pocket with security fasteners.

E. Hardware Enclosures: Provide enclosures and junction boxes for electrically operated detention door hardware, interconnected with UL-approved, 1/2-inch (12.7-mm) diameter conduit and connectors.

1. Access Plates: Where indicated for wiring installation, provide access plates to junction boxes, fabricated from same material and thickness as face sheet and fastened with at least four security fasteners spaced not more than 6 inches (152 mm) o.c.

F. Mullions and Transom Bars: Provide closed or tubular mullions and transom bars where indicated. Fasten mullions and transom bars at crossings and to jambs by butt welding. Reinforce joints between detention frame members with concealed clip angles or sleeves of same metal and thickness as detention frame.

G. Jamb Anchors: Weld jamb anchors to detention frames near hinges and directly opposite on strike jamb or as required to secure detention frames to adjacent construction.

1. Number of Anchors: Provide two anchors per jamb plus the following:

a. Detention Door Frames: One additional anchor for each 18 inches (457 mm), or fraction thereof, above 54 inches (1372 mm) in height.
b. Detention Frames with Security Glazing or Detention Panels: One additional anchor for each 18 inches (457 mm), or fraction thereof, above 36 inches (914 mm) in height.

2. Masonry Anchors: Adjustable, corrugated or perforated, strap-and-stirrup anchors to suit detention frame size; formed of same material and thickness as detention frame; with strap not less than 2 inches (51 mm) wide by 10 inches (254 mm) long.
3. Embedded Anchors: Provide detention frames with removable faces at jambs where embedded anchors are indicated. Anchors consist of the following three parts:
   a. Embedded Plates: Steel plates, 0.188 inch thick by 4 inches wide by 6 inches long (4.7 mm thick by 102 mm wide by 152 mm long). Continuously weld two steel bars, 1/2 inch (12.7 mm) in diameter and 10 inches (254 mm) long with 2-inch (51- mm) 90-degree turndown on ends, to the embedded end of each plate. Weld steel angles, 0.188 inch thick by 2 by 2 by 4 inches long (4.7 mm thick by 51 by 51 by 102 mm long), to the exposed end of each plate. Embed at locations to match frame angles.
   b. Frame Angles: Steel angles, 0.188 inch thick by 2 by 2 by 4 inches long (4.7 mm thick by 51 by 51 by 102 mm long), welded to detention frames with 1-inch- (25-mm-) long welds at each end of angle.
   c. Connector Angles: Steel angles, of size required, to connect frame angles and embedded plates.
4. Post-installed Anchors: Minimum 1/2-inch (12.7-mm) diameter concealed bolts with expansion shields or inserts. Provide conduit spacer from detention frame to wall, welded to detention frame. Reinforce detention frames at anchor locations.

H. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same material and thickness as detention frame, and as follows:

1. Monolithic Concrete Slabs: Clip anchors, with two holes to receive fasteners, welded to bottom of jambs and mullions with at least four spot welds per anchor.
2. Separate Topping Concrete Slabs: Adjustable anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment, welded to jambs and mullions with at least four spot welds per anchor. Terminate bottom of detention frames at finish floor surface.

I. Rubber Door Silencers: Except on weather-stripped detention doors, drill stops in strike jambs to receive three silencers on single-detention-door frames and drill head jamb stop to receive two silencers on double-detention-door frames. Keep holes clear during construction. Project owner may reserve the right to exclude silencer prep.

J. Grout Guards: Provide factory-installed grout guards of same material as detention frame, welded to detention frame at back of hardware cutouts, silencers, and glazing-stop screw preparations to close off interior of openings and prevent mortar or other materials from obstructing hardware operation or installation.

2.6 FOOD PORT

A. Basis of design: Southern Folger Food Passes

B. Frame size: 20 1/4” W x 10” H

C. Frame and door: 7 gauge mild steel

D. Clear opening: 5” H x 15 1/4” W

E. Hinge: 3” H x 3” W x 5/32” TK mild steel with cold-rolled steel, non-removable pin

F. Lock: 7010M (Mogul)

G. Finish: Primed for painting finish

2.7 DETENTION PANELS

A. Provide fixed detention panels of same materials, construction, and finish as specified for adjoining detention door.

2.8 MOLDINGS AND STOPS

A. Provide fixed moldings on inmate side of glazed openings and removable stops on non-inmate side.

1. Height: As required to provide minimum 1-inch (25-mm) glass engagement, but not less than 1-1/4 inches (32 mm).
2. Fixed Moldings: Formed from same material as detention door and frame face sheets, but not less than 0.093 inch (2.3 mm) thick, and spot welded to face sheets a maximum of 5 inches (127 mm) o.c.
3. Removable Stops: Formed from 0.123-inch- (3.1-mm-) thick angle, of same material as detention door face sheets. Secure with button head security fasteners spaced uniformly not more than 6 inches o.c. and not more than 2 inches (51 mm) from each corner, and as necessary to satisfy performance requirements. Form corners with notched or mitered hairline joints.

B. Coordinate rabbet width between fixed and removable stops with glass or panel type and installation type indicated.

2.9 MATERIALS

A. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, CS (Commercial Steel), Type B; with G60 (Z180) zinc (galvanized) or A60 (ZF180) zinc-iron-alloy (galvannealed) coating designation.

D. Stainless-Steel Sheet: ASTM A 240/A 240M, austenitic stainless steel, Type 304.

E. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

F. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.

G. Masonry Anchors: Fabricated from same steel sheet as door face.

H. Embedded Anchors: Fabricated from mild steel shapes and plates, hot-dip galvanized according to ASTM A 153/A 153M.

I. Post-Installed Anchors: Torque-controlled expansion anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1)Group 2 (A4)stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

J. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

K. Glazing: Comply with Section 08 88 53 "Security Glazing."

L. Grout: Comply with ASTM C 476, with a slump of not more than 4 inches (102 mm) as measured according to ASTM C 143/C 143M.

M. Insulation: Slag-wool-fiber/rock-wool-fiber or glass-fiber blanket insulation. ASTM C 665, Type I (unfaced); with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics. Minimum 1.5-lb/cu. ft. (24- kg/cu. m) density.

N. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.10 FABRICATION

A. Fabricate detention doors and frames rigid, neat in appearance, and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate detention doors and frames to comply with manufacturing tolerances indicated in NAAMM-HMMA 863.

C. Removable Jamb Faces: Provide removable jamb faces where required for access to embedded anchors. Fabricate to allow secure reattachment of removable face with security fasteners.

D. Fabricate multiple-opening detention frames with mullions that have closed tubular shapes and with no visible seams or joints.

E. Exterior Detention Doors: Provide weep-hole openings in bottoms of detention doors to permit entrapped moisture to escape. Seal joints in top edges of detention doors against water penetration.

F. Hardware Preparation: Factory prepare detention doors and frames to receive mortised hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final Door Hardware Schedule and templates provided by detention door hardware supplier.

1. Reinforce detention doors and frames to receive surface-mounted door hardware. Drilling and tapping may be done at Project site.
2. Locate door hardware according to NAAMM-HMMA 863.

G. Factory cut openings in detention doors.

H. Weld components to comply with referenced AWS standard. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

2.11 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish detention doors and frames after assembly.

2.12 METALLIC-COATED STEEL SHEET FINISHES

A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and apply galvanizing repair paint, complying with SSPC-Paint 20, to comply with ASTM A 780.

B. Factory Priming for Field-Painted Finish: Apply shop primer specified in "Shop Primer" Subparagraph below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mil (0.02 mm).

1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, lead- and chromate- free primer complying with SDI A250.10 acceptance criteria; recommended by primer manufacturer for zinc-coated steel; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

2.13 STEEL SHEET FINISHES

A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning".

B. Factory Priming for Field-Painted Finish: Apply shop primer specified in "Shop Primer" Subparagraph below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mil (0.02 mm).

1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with SDI A250.10 acceptance criteria; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

2.14 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

2.15 SECURITY FASTENERS

A. Operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific fastener type. Provide drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Acument Global Technologies North America.
   b. Bryce Fastener.
   c. Safety Socket LLC.
   d. Tamperproof Screw Co., Inc.
   e. Tamper-Pruf Screws.
2. Drive-System Type: Pinned Torx-Plus.
3. Fastener Strength: 120,000 psi (827 MPa).
4. Socket Button Head Fasteners:
   a. Heat-treated alloy steel, ASTM F 835 (ASTM F 835M).
   b. Stainless steel, ASTM F 879 (ASTM F 879M), Group 1 CW.
5. Socket Flat Countersunk Head Fasteners:
   a. Heat-treated alloy steel, ASTM F 835 (ASTM F 835M).
   b. Stainless steel, ASTM F 879 (ASTM F 879M), Group 1 CW.
6. Socket Head Cap Fasteners:
   a. Heat-treated alloy steel, ASTM A 574 (ASTM A 574M).
   b. Stainless steel, ASTM F 837 (ASTM F 837M), Group 1 CW.
7. Protective Coatings for Heat-Treated Alloy Steel:
   a. Zinc and clear trivalent chromium where indicated.
   b. Zinc phosphate with oil, ASTM F 1137, Grade I, or black oxide unless otherwise indicated.

2.16 SEALANTS

A. Polyurethane Security Sealants: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement.

1. Security sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. BASF Construction Chemicals, LLC, Building Systems; Sonolastic Ultra.

b. Pecora Corporation; DynaFlex.

B. Epoxy Security Sealants: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with no movement.

1. Security sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. BASF Construction Chemicals, LLC, Building Systems; Epolith-G.
   b. Euclid Chemical Company (The), an RPM company; Euco Model No. 452-P.
   c. Pecora Corporation; DynaPoxy EP-1200.

2.17 ACCESSORIES

A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.

B. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum 3/16 inch (4.8 mm) thick; with minimum 1/2-inch (12.7-mm) diameter, headed studs welded to back of plate.

C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

D. Pass-Through Openings: Fabricate flush openings using 0.093-inch (2.3-mm) thick interior channels of same material as detention door faces, inverted to be flush with openings, welded to inside of both face sheets and with corners fully welded. Mount shutters on non-inmate side of detention doors. Reinforce for locks and food-pass hinges.

1. Inset Shutters: Fabricate from two steel plates, 0.123 inch (3.1 mm) thick, of same material as detention door face sheets, spot welded together and sized to inset inside opening and to prevent inmate tampering of lock and hinges.
2. Overlapping Shutters: For surface application on non-inmate side of door. Fabricate from a single steel plate, of same material as detention door face sheets, 0.187 inch (4.7 mm) thick, sized to overlap food-pass openings by 1/2 inch (12.7 mm).

E. Speaking Apertures: Consist of a rectangular pattern of holes, minimum 1 inch high by 4 inches wide (25 mm high by 102 mm wide), with holes 1/4 inch (6.3 mm) in diameter. Locate holes in both face sheets directly across from each other and spaced not more than 1 inch (25 mm) o.c. vertically and horizontally. Provide 0.067-inch (1.7-mm) thick, pressed-steel baffles in interior of detention door between hole patterns to prevent passage of objects.

F. Gun Ports: Fabricate units to comply with UL 752 and to resist same security level as detention doors in which they are installed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention frame connections before detention frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Inspect embedded plate installations before installing detention frames to verify that plate installations comply with requirements. Prepare inspection reports.

1. Remove and replace plates where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory.

B. Before installation and with shipping spreaders removed, adjust detention frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb and perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of face.
3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of door rabbet.
4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

3.3 INSTALLATION

A. General: Install detention doors and frames plumb, rigid, properly aligned, and securely fastened in place, complying with Drawings, schedules, and manufacturer's written recommendations.

B. Anchorage: Set detention frame anchorage devices according to details on Shop Drawings and according to anchorage device manufacturer's written instructions.

1. Masonry Anchors: Coordinate frame installation to allow for solidly filling space between frames and masonry with grout.
2. Embedded Anchors: Install embedded plates in wall surrounding frame openings to match frame angle locations.
3. Post-installed Anchors: Drill holes in existing construction at locations to match bolt locations, and install bolt expansion shields or inserts.

C. Where detention frames are fabricated in sections due to shipping limitations, assemble frames and install angle splices at each corner, of same material and thickness as detention frame, and extend at least 4 inches (102 mm) on both sides of joint.

1. Field splice only at approved locations. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
2. Continuously weld and finish smooth joints between faces of abutted, multiple-opening, detention frame members.
3. Field Welding: Comply with the following requirements:
   a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   b. Obtain fusion without undercut or overlap.
   c. Remove welding flux immediately.
   d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Apply bituminous coating to backs of frames before filling with grout.

E. Placing Detention Frames: Install detention frames of sizes and profiles indicated. Set detention frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

1. Embedded Anchors: Remove jamb faces from detention frames and set detention frames into opening. Weld steel connector angle to frame angle and to embedded plate with 1-inch (25-mm) long welds at each end of connector angle to form a rigid frame assembly that is solidly anchored. Reinstall jamb faces using security fasteners.
2. Post-installed Anchors: Install bolt. After bolt is tightened, weld bolt head to provide non-removable condition. Grind, dress, and finish smooth welded bolt head.
3. At fire-rated openings, install detention frames according to NFPA 80.
4. Install detention frames with removable stops located on non-inmate side of opening.

F. Grout: Fully grout detention frame jambs and heads. Completely fill space between frames and adjacent substrates. Hand trowel grout and take other precautions, including bracing detention frames, to ensure that frames are not deformed or damaged by grout forces.

G. Security Sealant: Apply polyurethane, epoxy security sealant at all exposed gaps between detention frames and adjacent substrates.

H. Swinging Detention Doors: Fit non-fire-rated detention doors accurately in their frames, with the following clearances:

1. Between Doors and Frames at Jambs and Head: 1/8 inch (3.2 mm).
2. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm).
3. At Door Sills with Threshold: 3/8 inch (9.5 mm).
4. At Door Sills without Threshold: 3/4 inch (19 mm).
5. Between Door Bottom and Nominal Surface of Floor Covering: 1/2 inch (12.7 mm).

I. Fire-Rated Detention Doors: Install with clearances as specified in NFPA 80.

J. Smoke-Control Detention Doors: Install according to NFPA 105.

K. Installation Tolerances: Comply with installation tolerances indicated in NAAMM-HMMA 863.

L. Glazing: Comply with installation requirements in Section 08 88 53 "Security Glazing" unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Detention work will be considered defective if it does not pass tests and inspections.

C. Perform additional inspections to determine compliance of replaced or additional work.

D. Prepare field quality-control certification endorsed by Detention Specialist that states installed products comply with requirements in the Contract Documents.

E. For verification that construction complies with requirements, select one detention door at random from detention doors delivered to Project and have it cut in half or otherwise taken apart.

1. Test Method: Verify weld strength by prying or chiseling door apart at edge seams, end channels, or stiffeners. Not more than 5 percent of welds may fail test.
   a. If tested door fails, replace or rework all detention doors to bring them into compliance at Contractor's expense.
   b. If tested door passes, replace tested door at Contractor's expense.

F. Prepare test and inspection reports.

3.5 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including detention doors and frames that are warped, bowed, or otherwise unacceptable.

B. Clean grout and other bonding material off detention doors and frames immediately after installation.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780.

D. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

1. After finishing smooth field welds, apply air-drying primer.

E. Stainless-Steel Surfaces: Clean surfaces according to manufacturer's written instructions.

END OF SECTION 11 98 12

SECTION 11 98 14 - DETENTION DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Detention hardware for security doors.

B. Related Sections

1. Section 05 05 55 – Security Metal Fastenings.
2. Section 07 92 00 – Joint Sealants.
3. Section 08 70 00 – Door Hardware.
4. Section 11 98 12 - Detention Doors and Frames.
5. Division 26 for electrical requirements.
6. Division 27 for communications requirements.
7. Division 28 for electronic safety and security requirements.

1.2 REFERENCES

A. AISI 304 - Stainless Steel Sheet.

B. AISI 1010 - Hot Rolled Mild Steel Bars.

C. AISI 1018 - Cold Rolled Mild Steel Bars.

D. AISI 1020 - Hot Rolled Mild Steel Bars.

E. ASTM A29 - Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements.

F. ASTM A36 - Carbon Structural Steel.

G. ASTM A108 - Steel Bars, Carbon and Alloy, Cold-Finished.

H. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

I. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

J. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

K. ASTM A240 - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

L. ASTM A283 - Low and Intermediate Tensile Strength Carbon Steel Plates.

M. ASTM A307 - Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

N. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

O. ASTM A501 - Hot-Formed Welded and Seamless Structural Steel Tubing.

P. ASTM A568 - Steel Sheet, Carbon and High Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For.

Q. ASTM A575 - Steel Bars , Carbon, Merchant Quality, M-Grades.

R. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

S. ASTM A924 - Steel Sheet, Metallic Coated by the Hot-Dip Process.

T. ASTM A1008 - Steel, Sheet, Carbon, Cold-Rolled, Carbon, Structural High Strength Low-Alloy, High Strength Low-Alloy with Improved Formability, Solution Hardened and Bake Hardenable.

U. ASTM A1011 - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High Strength Low-Alloy, High Strength Low-Alloy with Improved.

V. ASTM F-1577 - Standard Test Methods for Detention Locks for Swinging Doors.

W. ASTM F-1758 - Standard Test Methods for Detention Hinges used on Detention Grade Swinging Doors.

X. AWS D1.1 - Structural Welding Code-Steel.

Y. AWS D1.3 - Structural Welding Code-Sheet Steel.

Z. AWS D1.6 - Structural Welding Code-Stainless Steel.

AA. FS TT-C-490 - Cleaning Methods for Ferrous Surfaces and Pretreatments for Organic Coatings.

BB. SSPC-paint 25 - Primer, raw Linseed Oil and Alkyd Primer (without Lead and Chromate Pigments).

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 00 and 01 33 23.

B. Shop Drawings

1. Indicate materials, fabrication, finishes, dimensions, tolerances, quantities, locations, and other items required to describe the Work of this Section.
2. Indicate anchor, erection and electrical plans and elevations at not less than 1/2 inch to 1’-0” scale and details at not less than three inches to 1’-0” scale. Show anchorage and accessory items, dimensions and finishes.
3. Indicate embedded or surface applied steel frames or shapes necessary for the installation of this Work. Show type and spacing of anchorage for these items. Indicate permissible tolerances for each type. Indicate type, size and spacing of field welding required for each item.

C. Submit copies of manufacturer's material and fabrication specifications and installation instructions, modified as required to conform to these specifications.

1. Include instructions for handling, storage, and protection of each product.
2. Submit two additional copies to each installing Bid Pack contractor.

D. Submit hardware templates for door and frame preparation. Submit two additional copies to each installing Bid Pack contractor.

E. Independent Testing Laboratory Reports

1. Submit results of anchor bolt pull-out test.

F. Certificates

1. Submit manufacturer's certificate that products meet or exceed specified requirements.
2. Submit evidence of AWS certification for shop and field welders.
3. Submit testing reports for ASTM F-1577.

G. Submit documentation indicating qualifications of Detention Equipment Contractor conform to specified requirements.

1. Include list of references who can verify experience for each listed project, as follows:
   a. Project name.
   b. Number of celled units.
   c. Date of services.
   d. Name of owner, and current telephone number.
   e. Name of contractor, and current telephone number.
2. For each listed project, indicate types of doors and hardware used; include manufacturers and model numbers.
3. Other requirements of Section 11 19 00

H. Detention Equipment Contractor's Activity Log: Submit current copy at the end of each two-week period during product installation.

I. Manufacturer's Quality Assurance Program

1. Upon request, the Manufacturer shall submit a copy of manufacturer's current Quality Control Procedures.

J. Operation and Maintenance Data.

K. Warranties: Sample of special warranties.

1.4 DEFINITIONS

A. Detention Equipment Installer: Shall be a subcontractor under the Contractor, and shall be responsible for the installation of the equipment specified in this Section.

B. Door Control System Installer: Shall be either the Building Electronics Subcontractor or the Site Electronics Contractor, as defined in Division 27 and Division 28 . Local Door Controls shall be installed by the Building Electronics Subcontractor; Regional Door Controls shall be installed by

the Site Electronics Contractor. Local Door Controls and Regional Door Controls are indicated on Drawings.

1.5 QUALIFICATIONS

A. Manufacturers: Minimum 5 years documented experience manufacturing products of the type specified in this Section.

B. Detention Equipment Installers: Minimum 5 years documented experience installing products of the type specified in this Section.

C. Detention Equipment Contractor (DEC):

1. Minimum 5 years experience in the application and installation of security doors and related hardware.
2. Having completed 5 projects of at least 200 celled units and one project of 800 celled units, all in satisfactory operation for at least one year.
3. Submit to the Owner representative documentation from the approved Detention Equipment manufacturer on this project stating that the subcontractor and DEC is a certified factory trained, fully authorized installer of their product specified for this section which includes sliding devices, locks and required detention accessories.
4. Other requirements of Section 11 19 00

1.6 REGULATORY REQUIREMENTS

A. Welding: In accordance with AWS D1.1, AWS D1.3 and AWS D1.6.

1.7 FIELD SAMPLE

A. Provide field sample in accordance with Section 01 45 00

B. Hardware:

1. Provide, as a Field Sample, hardware for Field Samples required in accordance with Section 08 70 00
2. Production of materials or assemblies shall not commence until approval of the Field Sample is received from the Owner representative.

C. Welds:

1. Provide sample weld, ground smooth, filled and prepared for final finish of each type of weld.
2. Upon approval by the Owner representative, weld shall constitute a standard of acceptability for welds of that type.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packaging

1. Final assemblies shall be wrapped in protective material or crated so as to provide adequate protection during shipment.
2. Units shall be appropriately marked with plan door numbers, size handling and hardware type.

1.9 SEQUENCING, SCHEDULING, AND COORDINATION

A. Where items specified under this Section are to be built into work specified under other Sections, provide those items to such other in a timely fashion to avoid delay of work. Coordinate placement; verify accurate locations and correct installation.

B. Coordinate the Work of this Section with other Sections affecting or affected by the Work of this Section.

C. Advise electrical, electronic systems and mechanical subcontractors regarding standard and special installation requirements to ensure full and proper operation of equipment.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer, Installer, and Contractor jointly and severally agree to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including excessive deflection, cracking, or breakage.
   b. Faulty operation of operators and detention door hardware.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering or detention use.
2. The warranty shall be signed by officers of each company.
3. Warranty Period: Two years from date of Project completion.
4. Warranty Period for Continuous-Pin Detention Hinges: 10 years from date of Project completion.
5. Warranty Period for Security Door Closers: 10 years from date of Project completion.

1.11 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of detention door hardware.

B. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of detention door hardware Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper detention door hardware operation. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

1.12 EXTRA MATERIALS

A. Spare Hardware: Furnish as required by Hardware Schedule on Drawings.

B. Accessories: Furnish 5 percent extra fasteners and other miscellaneous accessories required for installation.

C. Deliver spare hardware and extra accessories to location directed by the Owner representative; items will be retained by Owner and will not be released for use in the installation.

1.13 MAINTENANCE MATERIALS

A. Furnish, for institution use only, four complete sets of:

1. Special tools required for locking device and hardware maintenance.
2. Lock repair kits.

1.14 ELECTRICAL WORK

A. The responsibilities of the Detention Equipment Installer shall include but not be limited to the following:

1. Install door locks, door position switches, limit switches, keyswitches, and lock feature switches, as required for the system.
2. Interconnect all components described herein to include cable harnesses where applicable, and provide a single point of interconnection for the Door Control System Installer. For swing doors and gates, the interface point shall be the lock pocket.
3. The wiring interface shall be a connector type (Molex type). The mating connector to which the Door Control System conductors are connected shall be furnished as part of the connector assembly and shall be furnished with conductor “pigtail” having a minimum length of 6”.
4. Furnish wiring drawings and other information as required for design and installation of the Door Control System.
5. If locking hardware has direct current (DC) solenoids, ensure the solenoids include diodes for transient protection.
6. Coordinate with the frame manufacturer to provide boxes or pockets in the door frame as required to accommodate door position switches, locks, etc. Provide boxes or pockets in the gate assembly as required to accommodate door position switches, locks, etc.
7. Coordinate with the frame manufacturer to provide interconnecting conduit in the door frame between all feature switches and monitoring devices and the lock pocket. Coordinate with the frame manufacturer to provide interconnecting conduit in the gate assembly between all feature switches and monitoring devices and the lock pocket.
8. After installation, adjust all locks and switches for proper mechanical alignment. The door position switch shall be adjusted to provide an open indication before the door or gate is opened far enough to provide a 1/16 inch gap between the strike plate and the lock.

B. The responsibilities of the Door Control System Installer shall include the following unless noted otherwise:

1. For electrical mechanical locks and devices and exterior electrical mechanical locks and devices at pedestrian and vehicular gates, furnish and install conductors and cables required from the equipment cabinet in the equipment room to the field device.
2. Furnish and install all conduit systems as shown on the SC series drawings.
3. Ensure that adequate conduit facilities are installed to support the intended functions of the Door Control System.

4. Furnish and install relay interface equipment in the Security Electronic Equipment rooms as required to interface the Door Control Systems with the door hardware specified in Division 8 and 28.
5. For electrical mechanical locks and devices and exterior electrical mechanical locks and devices at pedestrian and vehicular gates, connect the mating connector “pigtails” to the control conductors at the locks and devices and connect to Door Control System in the security equipment rooms.
6. Provide all control hardware and systems including power supplies as required to control or monitor each door in accordance with the requirements of Division 28 and the wiring diagrams provided by the Detention Equipment Installer and Finish Hardware Installer.
7. Some Division 8 equipment may require a specific power supply that is ether listed or packaged with the Division 8 hardware. These power supplies shall be furnished by the Finish Hardware Installer but installed by Door Control System Installer. Where allowed by code, install these power supplies in the electronics equipment room.
8. After installation, verify proper control and monitoring operation of all doors.
9. Coordinate with specific hardware used by Division 8 and 28, or builders’ hardware and/or security hardware.
10. Coordinate with Division 26 the exact locations and requirements for electrical power provided to the security equipment.
11. Coordinate all interfaces with the Fire Alarm System that may be required for the Door Control Systems. Connect Fire Alarm System door release circuits to the door lock and device power supplies as required to release specific doors upon alarm notification in designated building areas.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers for individual items are indicated below.

2.2 MATERIALS

A. Cold Rolled Low Carbon Steel Sheet: ASTM A1008.

B. Hot Rolled Low Carbon Steel Sheet: ASTM A568 and ASTM A1011, pickled and oiled.

C. Plates and Bars: ASTM A29 or A283, Grade C.

D. Steel Sections, Plates, Not Otherwise Indicated: ASTM A36.

E. Stainless Steel: ASTM A240, Type 304, Austenitic.

F. Galvanized Carbon Steel Sheets: ASTM A924 with ASTM A653 G90 Coating.

G. Fasteners

1. Exposed Screws, Bolts, Nuts: ASTM A307 Grade A; in accordance with Section 05 05 55 and approved shop drawings.
2. Screw thread adhesive sealant: Loctite No. 271 A; in accordance with Section 05 05 55 and approved shop drawings.

H. Primer: USP/BHMA 600.

2.3 REMOTE CAPABLE JAMB MOUNTED LOCKS AND LATCHES

A. Solenoid Operated Maximum Security Electro-Mechanical Deadlatch – 51E Deadlatch Series

1. Manufacturers:
   a. Folger Adams product line; Model as indicated on Drawings.
   b. No substitutions.
   c. Provide the product line that matches the existing facility; match existing keys.
2. Description:
   a. Tumblers: Six hard brass lever tumblers, flat phosphor bronze springs.
   b. Paracentric key, one side or two sides.

2.4 MANUAL DOOR MOUNTED LOCKS AND LATCHES

A. Maximum Security Deadlock – 80 Deadlock Series

1. Manufacturers:
   a. Folger Adams product line; Model as indicated on Drawings.
   b. No substitutions.
   c. Provide the product line that matches the existing facility; match existing keys.
2. Description:
   a. Steel bolt, 3/4" x 1-1/2” inch; with 5/8” throw.
   b. Deadbolt: Six hard brass lever tumblers, flat phosphor bronze springs.
   c. Paracentric key, one side or two sides.

2.5 MORTISE LOCKSETS AND LATCHSETS with lever handles

A. Minimum/Medium Security Manual Mortise Locks: D9300 Maxi-Mortise.

1. The Lever Mortise Lock Devices must pass the Lever Handle Strength Test.
2. Manufacturers:
   a. Folger Adams product line; Model as indicated on Drawings.
   b. No substitutions.
   c. Provide the product line that matches the existing facility; match existing keys.
3. Description:
   a. Institutional Electric Mortise Lock.
   b. Minimum and medium security mortise locksets
   c. 1-1/8”H x 3/4” thick stainless steel latchbolt, 3/4” throw
   d. Stainless steel lever handles and high security rose.
   e. Mogul key, one side or two sides
   f. Function as listed in the door schedule.

B. Minimum/Medium Security Manual Mortise Locks: D9300 Electric Maxi-Mortise.

1. The Lever Mortise Lock Devices must pass the Lever Handle Strength Test.
2. Manufacturers:
   a. Folger Adams product line; Model as indicated on Drawings.
   b. No substitutions.
   c. Provide the product line that matches the existing facility; match existing keys.

3. Description:
   a. Institutional Electric Mortise Lock.
   b. Minimum and medium security mortise locksets
   c. 1-1/8”H x 3/4” thick stainless steel latchbolt, 3/4” throw
   d. Stainless steel lever handles and high security rose.
   e. Mogul key, one side or two sides
   f. Function as listed in the door schedule.
   g. Requires electrified hinge.

2.6 HINGES:

A. Detention Door Hinges: 4-1/2FM-ICS Full Mortise Hinge

1. Manufacturers:
   a. Southern Folger Detention Equipment Company; Model as indicated on Drawings.
   b. Folger Adams product line; Model as indicated on Drawings.
   c. No substitutions.
   d. Provide the product line that matches the selected lock product line.
2. Description:
   a. Heavy duty institutional hinges.
   b. Hinge leaves: cast stainless steel; 4 -1/2”x4-1/2”x3/16”
   c. Hinge pin: stainless steel.
   d. Fully mortised
3. Hollow Metal Doors: Hinges shall be screwed with security “break-off screws” to doors and frames.
   a. Prime coat finish, except galvanize exterior.

B. Detention Door Electrified Hinges: 4-1/2EH Full Mortise Electric Power Transfer Hinge

1. Manufacturers:
   a. Folger Adams product line; Model as indicated on Drawings.
   b. No substitutions.
   c. Provide the product line that matches the selected lock product line..
2. Description:
   a. Heavy duty institutional hinges.
   b. Hinge leaves: investment cast brass; 4 -1/2”x4-1/2”x3/16”
   c. Hinge pin: 5/8” diameter O.D. tubing steel.
   d. Electrical: 1amp capacity, 40 volts maximum
   e. Fully mortised

2.7 PULLS

A. Hand Pulls: No.2 Raised Door Pull

1. Manufacturers:
   a. Folger Adams product line; Model as indicated on Drawings.
   b. No substitutions.
   c. Provide the product line that matches the selected lock product line.
2. Description:
   a. Heavy duty; 8-3/4” length.
   b. Fasten with 3/8” - 16 x 3/4” hex head security screws.

B. Recessed Pulls: No.4 Pull

1. Manufacturers:
   a. Folger Adams product line; Model as indicated on Drawings.
   b. No substitutions.
   c. Provide the product line that matches the selected lock product line.
2. Description:
   a. Heavy duty; 5”x4”x1”.
   b. Fasten with security fasteners

2.8 LOCKBOLT KEEPER/DUST BOOTS

A. Keeper Switches

1. Manufacturers:
   a. Folger Adams product line; Model as indicated on Drawings.
   b. No substitutions.

2.9 MISCELLANEOUS HARDWARE

A. Cylinder Shield

1. Manufacturers:
   a. Southern Folger; Model 219.
   b. Comparable Folger Adams
2. Description:
   a. Cylinder shield and escutcheon (stainless steel).

B. Escutcheon – No. 1

1. Manufacturers:
   a. Southern Folger; Model 218.
   b. Comparable Folger Adams
2. Description:
   a. Three inch diameter, .105 inch thick, for security locks.
   b. Fasten with 1/4” – 20 x 5/16” security screws.

C. Lock Mountings - HM

1. Manufacturers:
   a. Folger Adams
   b. Comparable Southern Steel
2. Description:
   a. Lock mountings for manual security locks in hollow metal doors.
   b. Cover plates shall be 3/16 inch steel and shall include escutcheon.
   c. Galvanize for exterior doors.
   d. Fasteners: Break-off head security screws.

2.10 DOOR AND GATE POSITION INDICATORS

A. Position Indicator

1. Manufacturers:
   a. Southern Folger Model 200MRS-TB (as indicated on Drawings).
   b. Comparable Southern Steel, Folger Adams.
2. Description:
   a. Built-in triple biased switch.
   b. Device shall be wired to provide a single contact to the Door Control System. The contacts shall be “closed” when the door is shut, otherwise the contacts shall be open, displaying a red light when the door is in every condition but closed and locked.

2.11 CLOSERS

A. Concealed Security Closer

1. Manufacturers:
   a. Assa Ablo DC860 Series (as indicated on Drawings).
   b. Or Equal.
2. Description:
   a. High security vandal resistant design with TORX tamper resistant screw heads.
   b. Concealed in door frame head with protected closer adjustments.
   c. Single lever arm.
   d. Meets ADA opening force requirements.

2.12 KEYING

A. Keying Schedule will be provided by the Owner representative after shop drawing hardware schedule has been approved.

B. Provide six cut keys plus one blank key per lock. Do not cut keys prior to receipt of keying schedule. Final quantities of each key shall be determined by the keying schedule.

C. Keys shall be delivered to the Owner representative, who will be responsible for key issue during construction.

D. Provide and set up complete visible card indexed system with key tags and control slips.

E. Keys will not be required for spare locks except for padlocks. Locks will be keyed by others.

F. Provide extended shank keys for locks keyed both sides at fences, roof hatches, and elsewhere as required for convenient lock operation.

G. Keys shall be engraved with 5-digit identification as directed by the Owner representative. No other identifying characters shall appear on key.

2.13 ACCESSORIES

A. Fasteners not otherwise described herein shall be security type in accordance with Section 05 05 55, requiring special tools to install and remove.

B. Provide plates, angles, bars, bolts, connectors, and other items required for the attachment of Work of this Section to other construction.

C. Post-Installed Anchors: Proprietary type, designed for intended uses, and ICC ESR evaluated.

1. Where post-installed anchors are indicated, they shall be adhesive type.
2. Mechanical anchors, such as expansion and sleeve type, shall be used only as approved by the Owner representative.
3. Manufacturers
   a. ITW Ramset/Red Head.
   b. Simpson.
   c. Hilti Co.

2.14 FABRICATION

A. Factory assemble items where practicable, true to line and free of distortion or defects.

B. Welding

1. Steel and stainless steel components not plant fabricated shall be designed for field-welded connections.
2. Plug or stitch welds unless otherwise indicated.
3. Weld according to American Welding Society standards.
4. Fill exposed joints with metallic filler, grind smooth.
5. Remove burrs and rough edges.

C. Equipment shall be fully fabricated, assembled and finished, ready for final installation.

D. Hardware

1. Hardware that is essentially non-projecting shall be installed in doors and frames, at the factory, including the following:
   a. Mechanical locks and their associated strikes, keepers and escutcheons.
   b. Hinges, either screwed or welded, shall be fastened to doors.
   c. Flush pulls.
2. Other hardware shall be field installed; including closers, position indicators, pulls, cylinder shields, door hangers and guides, door bottoms and weather protection, projecting angle clips for cell door boots and gun ports in Control Room hollow metal frames.
3. The field installed hardware group for each opening shall be separately packaged, accompanying the doors and clearly identified with its opening.

2.15 CLEANING AND FINISHING

A. Galvanizing

1. Iron and Steel Hardware: ASTM A153.
2. Shapes, Bars, Plates 1/8 inch or Greater Thickness: ASTM A123.
3. Galvanized items shall be G90 galvanized unless otherwise indicated.
4. Galvanize exterior lock cases.

B. Factory apply an additional coat of aluminum paint to unexposed surfaces of cover panels, cover boxes, control cabinets and door locking or operating parts.

2.16 FINISHES

A. Hardware: US32D/BHMA 630 stainless steel, unless otherwise indicated.

PART 3 - EXECUTION

3.1 Examination

A. Verify existing conditions are suitable for installation of the Work of this Section.

B. Verify existing conditions in other Bid Packs are suitable for installation of items furnished to such other Bid Packs for installation. Notify the Owner representative in writing of improper conditions noted.

C. Examine areas, substrates, anchors and grounds to receive detention equipment.

D. Verify rough in and verify field dimensions.

E. Do not begin installation until unsatisfactory conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION

A. Install Work in accordance with manufacturer's instructions and approved shop drawings under the direction of a Detention Equipment Contractor (DEC). DEC shall:

1. Witness the installation by other Bid Pack contractors of products furnished under this Section.
2. Observe and direct the installation, adjustment and operation of the Work of this Section.
3. Keep a complete log of activities on the job. Include dates, time, instructions given and to whom, potential problems and other pertinent information relating to installation and proper operation of the Work of this Section.
4. Participate in final inspections of the work.

B. Install locks, pulls, closers and other hardware not factory installed in doors and frames.

C. Members shall be welded to embeds as indicated on approved shop drawings. Post-installed anchors shall be used only as specifically shown and approved by the Owner representative.

D. Bolts, screws and other fastenings in devices, hardware, and other items shall be tightened to the torque specification as indicated in the manufacturer installation instructions and in accordance with the approved shop drawings.

E. Grind Smooth: Sharp edges, burrs, or projecting materials on detention equipment, steel framing and welds.

F. Fasteners

1. Set removable fasteners in Loctite.

G. Welding

1. Stitch Welds: Minimum 3 inches long, 12 inches on center.
2. Plug Welds: 1/2 inch diameter, 4 inches on center unless otherwise indicated.
3. Hinges and members 6 x 6 inches, or less, shall be continuously welded except as follows:
   a. Model 205 and Model 203 butts used on hollow metal doors shall be screwed to the doors and welded to the frames.
4. Materials forming corners shall be welded along each line of transition at the corner.
5. Where exposed to view, fill between welds with Type C sealant in accordance with Section 07 90 00, grind and finish smooth.
6. Welds shall be smooth with no sharp points or edges.
7. Tack weld exposed bolts in areas where inmates have access.
8. Contractor's Option
   a. Where welds not specifically indicated, either stitch or plug welds may be used.
   b. Contractor may request optional welds.
   c. Where stitch welding allowed in lieu of spot welds, repair so as to conceal prepared areas.
9. Where specified weld may cause damage to members or concrete due to excessive heat, consult the Owner representative.

3.3 DETENTION EQUIPMENT CONTRACTOR INSPECTION AND CERTIFICATION

A. Detention Equipment Contractor shall inspect the installation of items furnished to other Bid Packs, and certify that those items have been installed in accordance with these specifications and manufacturer's instructions.

3.4 FIELD TESTING AND ADJUSTMENT

A. All door locks, door position switches, limit switches, keyswitches, and lock feature switches installed by the Detention Equipment Installer shall be in perfect operating order prior to the Door Control System Installer's System Test and Final Acceptance Test.

B. When the Door Control System Installer is from a Bid Package other then this Bid Package, the locks, door position switches, limit switches, keyswitches, and lock feature switches that are connected to the other Bid Package contractor's Door Control System shall be in perfect operating order at least 50 days prior to project completion.

1. At least 50 days prior to project completion provide written notification to the Owner representative stating that the locks, door position switches, limit switches, keyswitches, and lock feature switches that are connected to the other Bid Package contractor's Door Control System are in perfect operating order. The written notification shall include a list of the doors that are connected to the other Bid Package contractor's Door Control System. The Owner representative will use this time period to notify the other Bid Package contractor that the locks, door position switches, limit switches, keyswitches, and lock feature switches are ready to be tested with the door controls. The Owner representative will schedule a date during the 50 day period in which the Detention Equipment Installer shall demonstrate jointly with the Door Control System Installer the successful operation of the locks, door position switches, limit switches, keyswitches, and lock feature switches for witness by the Owner representative.
2. The Detention Equipment Installer shall connect test jigs to the locks, door position switches, limit switches, keyswitches, and lock feature switches to ensure that they are in perfect operating order prior to demonstration with the other Bid Package contractor's Door Control System.

3. The Detention Equipment Installer shall carefully plan and coordinate the required activities of the Door Control System Installer. If the demonstration with the other Bid Package contractor's Door Control System is deemed a failure and is required to be rescheduled due to the fault of the Detention Equipment Installer, the Contractor shall be responsible for all additional expenses incurred for the other Bid Package contractor who installed the Door Control System.

C. Upon completion of the Work of this Section and the Work of the other related Sections and before final inspection, all doors, locks, devices and other hardware shall be thoroughly lubricated with manufacturer's recommended lubricant, adjusted and retested as required, and placed in proper working order.

D. Maximum effort to manually operate doors shall not exceed 5 pounds for exterior and interior; such pull or push effort being applied at right angles to hinged doors, and at the center plane of sliding doors.

1. The maximum effort required to operate fire rated doors may be increased to 15 pounds maximum.

E. Doors shall operate freely with no binding on frame or hardware.

F. Test controlled doors utilizing the Control Console under normal operating procedures.

3.5 PRIME COAT TOUCH-UP AND CLEANING

A. Weld spatter shall be cleaned from equipment and from adjacent surfaces. Where finished adjacent surfaces are damaged by welding, restore those surfaces to their previous condition.

B. Prime joint sealers and welds and touch-up abraded areas of work under this Section with specified primer, leaving the work ready for finish painting.

C. Finish painting is specified under Section 09 90 00

3.6 HARDWARE DEMONSTRATION AND PERSONNEL INSTRUCTION

A. Instruct Owner's personnel in accordance with Section 01 78-23.

B. Provide instruction for 8 people.

C. Duration: 2 working days.

D. Demonstrate hardware and instruct the Owner personnel in operation, repair and maintenance of the Work specified in this Section. Include items furnished to other Bid Packs for installation.

3.7 PROTECTION

A. Protect installed Work from damage or soiling.

3.8 SCHEDULE

A. Hardware Schedule is indicated on the Drawings.

END OF SECTION 11 98 14

SECTION 123216 - MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad casework.
2. Hardware and accessories.

B. Related Requirements:

1. Section 092216 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring casework.
2. Section 096513 "Resilient Base and Accessories" for resilient base applied to plastic-laminate-clad casework.
3. Section 123623.13 "Plastic-Laminate-Clad Countertops."

1.2 DEFINITIONS

A. Definitions in the AWI/AWMAC/WI's "Architectural Woodwork Standards" apply to the Work of this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

B. Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying requirements.

1.4 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

1.5 ACTION SUBMITTALS

A. Product Data:

1. Plastic-laminate-clad casework.
2. Hardware and accessories.

B. Sustainable Design Submittals:

1. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.
2. Environmental Product Declaration: For each product.
3. Third-Party Certifications: For each product.
4. Third-Party Certified Life Cycle Assessment: For each product.
5. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
6. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
7. Product Data: For composite wood products, indicating that product contains no urea formaldehyde.

C. Shop Drawings: For plastic-laminate-clad casework.

1. Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
2. Indicate types and sizes of casework.
3. Indicate manufacturer's catalog numbers for casework.
4. Show fabrication details, including types and locations of hardware.
5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and equipment.

D. Keying Schedule: Include schematic keying diagram, and index each key set to unique designations that are coordinated with the Contract Documents.

E. Samples: For casework and hardware finishes.

F. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.

a. Provide one Sample applied to core material with specified edge material applied to one edge.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For casework manufacturer and Installer.

B. Sample Warranty: For special warranty.

C. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Licensed participate in AWI's Quality Certification Program.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during remainder of construction period.

B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

C. Field Measurements: Where casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.

D. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before enclosing them, and indicate measurements on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of components or other failures of glue bond.
b. Warping of components.
c. Failure of operating hardware.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR CASEWORK

A. Quality Standard: Unless otherwise indicated, comply with the AWI/AWMAC/WI's

"Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.

1. Grade: Premium.

B. Regional Materials: Wood products shall be manufactured within **500 miles** of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within **500 miles** of Project site. If materials are transported by rail or water, the distance transported by rail or water shall be multiplied by 0.25 to determine the distance to Project site.

C. Certified Wood: Wood products shall contain not less than 60 percent certified wood tracked through a chain-of-custody process. Certified wood documentation shall be provided by sources certified through a forest certification system with principles, criteria, and standards developed using ISO/IEC Guide 59 or the World Trade Organization's "WTO Agreement on Technical Barriers to Trade."

D. Product Designations:

1. Drawings indicate sizes, configurations, and finish materials of manufactured plastic-laminate-clad casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."
2. Drawings indicate configurations of manufactured plastic-laminate-clad casework by referencing designations of Casework Design Series numbering system in the Appendix of the AWI/AWMAC/WI's "Architectural Woodwork Standards."

2.2 PLASTIC-LAMINATE-CLAD CASEWORK

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Advanced Cabinet Systems (ACS)
2. Case Systems Inc
3. R. C. Smith Company
4. Sidney Millwork Company
5. Stevens Industries, Inc.
6. TMI Systems Corporation
7. Windham Millwork, Inc

B. Source Limitations: Obtain from single source from single manufacturer.

C. Design: Frameless cabinet construction with the following door and drawer-front style:

1. Flush overlay.

D. Grain Direction for Wood-Grain Plastic Laminate:

1. Doors: Vertical with continuous vertical matching.
2. Drawer Fronts: Vertical with continuous vertical matching.
3. Face Frame Members: Lengthwise.
4. End Panels: Vertical.
5. Bottoms and Tops of Units: Side to side.
6. Knee Space Panels: Vertical.
7. Aprons: Horizontal.

E. Exposed Materials:

1. Plastic-Laminate Grade: HGS.

a. Colors and Patterns: As selected by Architect from manufacturer's full range.

2. Edgebanding: PVC.

a. PVC Edgebanding Color: As selected by Architect from casework manufacturer's full range.

F. Semiexposed Materials:

1. Plastic Laminate: Grade VGS unless otherwise indicated. Provide plastic laminate for semiexposed surfaces unless otherwise indicated.

a. Colors and Patterns: As selected by Architect from manufacturer's full range.
b. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.

2. Unless otherwise indicated, provide specified edgebanding on all semiexposed edges.

G. Concealed Materials:

1. Plastic Laminate: Grade VGS.

2.3 HARDWARE AND ACCESSORIES

A. Hardware: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.

1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.

B. Butt Hinges: Stainless steel, semiconcealed, five-knuckle hinges complying with ANSI/BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two hinges for doors less than **48 inches** high, and provide three hinges for doors more than **48 inches** high.

C. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, Type B01602,

self-closing. Provide two hinges for doors less than **48 inches** high, and provide three hinges for doors more than **48 inches** high.

1. Degrees of Opening: 135 degrees.

D. Wire Pulls: Solid stainless steel wire pulls, fastened from back with two screws.

1. For sliding doors, provide recessed stainless steel flush pulls.
2. Provide two pulls for drawers more than **24 inches** wide.

E. Door Catches: Zinc-plated, dual, self-aligning, permanent magnet catch. Provide two catches on doors more than **48 inches** high.

F. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.

1. Doors: Provide one bumper at top and bottom of closing edge of each swinging door.
2. Drawers: Provide one bumper on back side of drawer front at each corner.

G. Drawer Slides: ANSI/BHMA A156.9.

1. Manufacturer's standard.
2. Heavy Duty (Grade 1HD-100): Side mount.
    a. Type: Full extension.
    b. Material: Zinc-plated steel slides.
    c. Motion Feature: Self-closing mechanism.
3. General-purpose drawers; provide 100 lb load capacity.
4. File drawers; provide 150 lb load capacity.

H. Drawer and Hinged-Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with ANSI/BHMA A156.11, Grade 1.

1. Provide a minimum of two keys per lock and six master keys.
2. Provide locks where indicated.
    a. Master key for up to 500 key changes.

2.4 MATERIALS

A. Composite Wood Products: Products shall be made without urea formaldehyde.

B. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.

C. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.

D. Softwood Plywood: DOC PS 1.

E. Particleboard: ANSI A208.1, Grade M-2.

F. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.

G. Plastic Laminate: High-pressure decorative laminate complying with ISO 4586-3.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Arborite, Division of Wilsonart Canada ULC
b. Formica Corporation
c. Nevamar Company, LLC
d. Pionite; a Panolam Industries International, Inc. brand
e. Wilsonart LLC

2. Source Limitations: Obtain from single source from single manufacturer.

H. PVC Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3.0 mm thick at doors and drawer fronts, 1.0 mm thick elsewhere.

I. Thermally Fused Laminate Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of ISO 4586.

1. Edgebanding for Thermally Fused Laminate (TFL) Panels: PVC or polyester edgebanding matching thermally fused laminate panels.

J. Adhesives: Do not use adhesives that contain urea formaldehyde.

2.5 FABRICATION

A. Plastic-Laminate-Clad Cabinet Construction: As required by referenced quality standard, but not less than the following:

1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: **3/4-inch** particleboard.
2. Shelves: 3/4-inch- thick particleboard.
3. Backs of Casework: **1/2-inch-** thick particleboard or MDF where exposed, 1/4-inch- thick hardboard dadoed into sides, bottoms, and tops where not exposed.
4. Drawer Fronts: **3/4-inch** particleboard.
5. Drawer Sides and Backs: **1/2-inch-** thick particleboard or MDF, with glued dovetail or multiple-dowel joints.
6. Drawer Bottoms: **1/4-inch-** thick particleboard or MDF glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24 inches wide.
7. Drawer Bodies: Steel drawer pans formed from **0.0359-inch-** thick metal, metallic phosphate treated, and finished with manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of **1 mil** for topcoat and **2 mils** for system.
8. Cabinet Doors:

a. 48 Inches (1220 mm) High or Less: **3/4 inch** thick, with particleboard or MDF cores.
b. 48 Inches (1220 mm) or More in Height: 1-1/8 inches thick, with particleboard cores.

B. Filler Strips: Provide as needed to close spaces between casework and walls, ceilings, and equipment. Fabricate from same material and with same finish as casework.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Grade: Install casework to comply with same quality standard grade as item to be installed.

B. Install casework level, plumb, and true in line; shim as required using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within **1/16 inch** of a single plane. Align similar adjoining doors and drawers to a tolerance of **1/16 inch**. Bolt adjacent cabinets together with joints flush, tight, and uniform.

D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within **1/16 inch** of a single plane. Fasten cabinets to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of **1/16 inch**.

E. Fasten casework to adjacent units and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards."

F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

G. Adjust operating hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 CLEANING

A. Repair or remove and replace defective work as directed on completion of installation.

B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123216

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad countertops.

1.2 ACTION SUBMITTALS

A. Shop Drawings:

1. Plans, sections, details, edge and backsplash profiles, and attachments to other work.
2. Locations and details of joints.
3. Locations and sizes of cutouts and holes for items installed in countertop.
4. Apply AWI's Quality Certification Program label to Shop Drawings.

B. Samples for Verification:

1. Plastic Laminates: For each type, color, pattern, and surface finish required, 8 by 10 inches in size.
2. Fabrication Sample: For each type and profile of countertop required, provide one sample applied to core material with specified edge material applied to one edge.

C. Sustainable Design Submittals:

1. Product Data: For laminating adhesives, indicating that product contains no urea formaldehyde.
2. Laboratory Test Reports: For composite wood products, indicating compliance with the formaldehyde emissions evaluation.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Indicate locations and sizes of cutouts and holes for items installed in countertop and backsplashes.

B. Product Certificates: For the following:

1. Composite wood products.
2. High-pressure decorative laminate.
3. Chemical-resistant, high-pressure decorative laminate.

C. Quality Standard Compliance Certificates: AWI's Quality Certification Program.

D. Qualification Statements: For Installer fabricator.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1. Shop Certification: AWI's Quality Certification Program accredited participant.

B. Installer Qualifications: AWI's Quality Certification Program accredited participant.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.

B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.6 FIELD CONDITIONS

A. Environmental Limitations without Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Environmental Limitations with Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between **60 and 90 deg F** and relative humidity between 25 and 55 percent during the remainder of the construction period.

C. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

D. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD COUNTERTOPS

A. Plastic-Laminate-Clad Countertop Type As Indicated on Drawings:

B. Quality Standard: Unless otherwise indicated, comply with ANSI/AWI 1236 for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain requirements that are more stringent than that of the referenced quality standard. Comply with requirements of the Contract Documents in addition to those of referenced quality standard.

C. Grade: Premium.

1. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.

D. Certified Wood: Verify product is labeled in accordance with the AF&PA's Sustainable Forestry Initiative, certified as "FSC Pure" in accordance with FSC STD-01-001 and FSC STD-40-004, or certified and labeled in accordance with the standards of the Programme for Endorsement of Forest Certification.

E. High-Pressure Decorative Laminate: ISO 4586-3, Grade HGS.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Formica Corporation
b. Laminart LLC
c. Nevamar Company, LLC
d. Pionite; a Panolam Industries International, Inc. brand
e. Wilsonart LLC

F. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated by manufacturer's designations.
2. Match Architect's sample.
3. As selected by Architect from manufacturer's full range in the following categories:

a. Solid colors, matte finish.
b. Solid colors with core same color as surface, matte finish.
c. Wood grains, matte finish with grain running parallel to length of countertop.
d. Patterns, matte finish.

G. Edge Treatment: PVC edging.

H. Core Material: MDF.

I. Core Material at Sinks: MDF made with exterior glue.

J. Core Thickness: 1-1/8 inches.

1. Build up countertop thickness to **1-1/2 inches** at front, back, and ends with additional layers of core material laminated to top.

K. Backer Sheet: Provide plastic-laminate backer sheet, ISO 4586-3, grade to match exposed surface, on underside of countertop substrate.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

B. Composite Panel Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.

1. Composite Wood Products: Verify formaldehyde emission rates are not greater than the following when tested in accordance with ASTM D6007 or ASTM E1333:

a. Hardwood Plywood: 0.05 ppm.
b. Particleboard: 0.09 ppm.
c. MDF More Than 5/16 Inch (8 mm) Thick: 0.11 ppm.
d. MDF 5/16 Inch (8 mm) or Less in Thickness: 0.13 ppm.

2. Product Data: For recycled content, indicating percentage of postconsumer and preconsumer recycled content and cost.
3. Medium-Density Fiberboard (MDF): ANSI A208.2.

a. Grade 130.

4. Particleboard: ANSI A208.1.

a. Grade M-2.

5. Veneer-Core Hardwood Plywood: ANSI/HPVA HP-1.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products in accordance with test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Plywood: Products with a flame-spread index of 25 or less when tested in accordance with ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 ft** beyond the centerline of the burners at any time during the test.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.

C. Fire-Retardant Particleboard: Made from softwood particles and fire-retardant chemicals mixed at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less when tested in accordance with ASTM E84.

1. For panels **3/4 inch** thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, **1600 psi**; modulus of elasticity, **300,000 psi**; internal bond, **80 psi**; and screw-holding capacity on face and edge, **250 and 225 lbf**, respectively.
2. For panels **13/16 to 1-1/4 inches** thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, **1300 psi**; modulus of elasticity, **250,000 psi**; linear expansion, 0.50 percent; and screw-holding capacity on face and edge, **250 and 175 lbf**, respectively.

D. Fire-Retardant MDF: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less in accordance with ASTM E84.

2.4 MISCELLANEOUS MATERIALS

A. Adhesives: Do not use adhesives that contain urea formaldehyde.

B. Adhesive for Bonding Plastic Laminate: Type II water-resistant type as selected by fabricator to comply with requirements.

1. Adhesive for Bonding Edges: Hot-melt adhesive.

C. Installation Adhesive: Manufacturer's standard product that is recommended for application indicated.

1. Verify adhesives have a VOC content of 70 g/L or less.
2. Verify adhesive complies with testing and product requirements of the California

Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 9 mcg/cu. m or 7 ppb, whichever is less.

2.5 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of **1 inch** over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: **1/16 inch** unless otherwise indicated.

C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of cutouts by saturating with varnish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.3 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
2. Seal edges of cutouts by saturating with varnish.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where indicated on Shop Drawings.

1. Secure field joints in countertops with concealed clamping devices located within **6 inches** of front and back edges and at intervals not exceeding **24 inches**. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical-treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

E. Countertop Installation:

1. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
3. Anchor wall cleating necessary for proper setting for countertops not supported by casework.
4. Install countertops level and true in line. Use concealed shims as required to maintain not more than **1/8-inch-in-96-inch** variation from a straight, level plane.
5. Secure backsplashes to walls with adhesive.
6. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.4 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where impossible to repair, replace countertops. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semiexposed surfaces.

C. Protection: Provide kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of **48 inches** o.c. Remove protection at Substantial Completion.

END OF SECTION 123623.13

SECTION 123661 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for cantilever supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of countertop material and sink.

B. Shop Drawings:

1. Plans, sections, details, edge and backsplash profiles, and attachment to other work.
2. Locations and details of joints.
3. Locations, quantity, and type of supports/brackets.
4. Direction of directional pattern, if any.
5. Locations and sizes of cutouts and holes for items installed in countertop.
6. Apply AWI's Quality Certification Program label to Shop Drawings.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Indicate locations and sizes of cutouts and holes for items installed in countertops or backsplashes.

B. Qualification Statements: For fabricator.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include product data for care products used or recommended by Installer and

names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.

B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.7 FIELD CONDITIONS

A. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of countertops by field measurements before countertop fabrication is complete and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work..

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Quality Standard: Unless otherwise indicated, comply with ANSI/AWI 1236 for grades of simulated stone countertops indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain more stringent requirements than that of the referenced quality standard. Comply with requirements of the Contract Documents in addition to those of referenced quality standard.

2.2 SOLID SURFACE MATERIAL COUNTERTOPS

A. Solid Surface Countertop Type As Indicated on Drawings:

1. Grade: Premium.

B. Solid Surface Material: Homogeneous fabrication of mineral fillers and pigments bound together with a matrix of polymers and resins, complying with ISFA 2-01.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. DuPont; DuPont de Nemours, Inc.
b. Durasein Solid Surface; a brand of Relang International, LLC
c. Formica Corporation
d. Wilsonart LLC

2. Colors and Patterns: As selected by Architect from manufacturer's full range.
3. Countertop:

a. Type: Standard.
b. Thickness:

1) 3/4-inch- thick, solid surface material with front edge built up with same material.

c. Exposed Edge Treatment: Radius.
d. Provide drip groove 1/8 inch by 1/8 inch set back 3/8 inch from front edge of countertop.
e. Backsplash: Detached straight.

1) Height: 4 inches.
2) Thickness: Matching countertop.

f. End Splash: Matching backsplash.

4. Sink Bowls:

a. Separate unit for under-counter mounting.
b. Material: Stainless steel.
c. Shape: As Indicated on Drawings.

2.3 FABRICATION

A. Fabricate countertops in sizes and shapes required to comply with requirements indicated.

B. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.

C. Joints:

1. Fabricate countertops without joints.

2. Fabricate countertops in sections for joining in field, with joints at locations indicated.

    a. Joint Locations: Not within **18 inches** of a sink or cooktop and not where a countertop section less than **36 inches** long would result, unless unavoidable.
    b. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints where indicated. Make width of cuts slightly more than thickness of splines to provide snug fit.

D. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

    a. Provide vertical edges, rounded to **3/8-inch** radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting **3/16 inch** into fixture opening.

2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for grommets, plumbing fittings, undercounter soap dispensers, and similar items.

2.4 INSTALLATION MATERIALS

A. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

1. Laboratory Test Reports: For composite wood products, indicating compliance with the formaldehyde emissions evaluation.
2. Composite Wood Products: Verify formaldehyde emission rates are not greater than the following when tested in accordance with ASTM D6007 or ASTM E1333:

    a. Hardwood Plywood: 0.05 ppm.
    b. Particleboard: 0.09 ppm.
    c. MDF More Than 5/16 Inch (8 mm) Thick: 0.11 ppm.
    d. MDF 5/16 Inch (8 mm) or Less in Thickness: 0.13 ppm.

C. Adhesive: Product recommended by manufacturer.

1. Verify adhesive complies with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 9 mcg/cu. m or 7 ppb, whichever is less.

D. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.3 INSTALLATION OF SIMULATED STONE COUNTERTOPS

A. Grade: Install countertops to comply with specified grade.

B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.

1. Provide cutouts not finished in the shop. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

C. Countertop Installation:

1. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
3. Anchor wall cleating necessary for proper setting for countertops not supported by casework.
4. Install countertops level to a tolerance of **1/8 inch in 8 ft.**, **1/4 inch** maximum. Do not exceed **1/64-inch** difference between planes of adjacent units.
5. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

6. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
7. Secure countertops to subtops with adhesive according to manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
8. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

    a. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

9. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
10. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
11. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls. Comply with Section 079200 "Joint Sealants."

3.4 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semi-exposed surfaces.

C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of **48 inches** o.c. Remove protection at Substantial Completion.

END OF SECTION 123661

SECTION 125500 - DETENTION FURNITURE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Detention bunks.
2. Detention mattresses.
3. Detention desks.
4. Detention seating.

B. Related Requirements:

1. Section 102813.63 "Detention Toilet Accessories" for detention toilet and bath accessories.
2. Section 111916 "Detention Gun Lockers" for detention gun lockers.
3. Section 119814 "Detention Door Hardware" for security key cabinets.

1.2 COORDINATION

A. Detention Specialist: Coordinate with Section 013513.16 "Special Project Procedures for Detention Facilities" for requirements of this Section that are to be performed by a Detention Specialist or other entity.

B. Coordinate installation of anchorages for detention furniture. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

C. Coordinate size and location of recesses in wall construction to receive detention furniture.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention furniture.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For detention furniture.

1. Include plans, elevations, sections, and attachment details.
2. Indicate locations, dimensions, and profiles of wall and floor reinforcements.
3. Indicate locations and installation details of built-in anchors.
4. Show elevations of detention furniture and indicate dimensions of furniture, preparations for receiving anchors, and locations of anchorage.
5. Show details of attachment of detention furniture to built-in anchors.

D. Samples for Verification: For each type of detention furniture indicated.

1. Furniture: Full-size units. Approved Samples may become part of the completed Work.
2. Detention Mattresses: Not less than **6 inches** square by full depth, including core and cover fabric.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Examination reports, documenting inspections of substrates, areas, and conditions.

C. Anchor inspection reports, documenting inspections of built-in and cast-in anchors.

D. Field quality-control reports, documenting inspections of installed products.

1. Field quality-control certification, signed by Contractor and Detention Specialist.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For detention mattresses to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
2. Tools: Provide two sets of tools for installing and removing security fasteners.

1.8 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

B. Mockups: Build mockups to set quality standards for fabrication and installation.

1. Build mockup of typical detention cell with furniture as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of detention furnishings that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures including deflection exceeding 1/4 inch (6mm).
2. Faulty operation of hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal detention use.

B. Warranty Period: Two years from date of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Detention Mattresses: Deliver wrapped to provide protection during transit and Project-site storage. Protect from contact with moisture.

1.11 FIELD CONDITIONS

A. Field Measurements: Verify openings for recessed detention furniture by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 DETENTION BUNKS

A. Wall-Mounted Bunks:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. BarkerBuilt, Division of Bob Barker Company, Inc
    b. Detention Device Systems (DDS); DDS Group
    c. Maximum Security Products Corp
    d. Norix Group, Inc.
    e. PSI LLC
    f. Sweeper Metal Fabricators Corp

2. Bunk Pan: Formed from 0.134-inch nominal-thickness steel sheet.

    a. Size: Minimum **30 inches** wide by **76 inches** long with bunk pan **0 inches** from wall.
    b. Omit holes in bed pan.
    c. Edges: Turn up edges of back, sides, and front, with minimum **2-inch** flanges.
    d. Wall Brackets: 10"x2"x3/16" gusset to be welded or mechanically fastened to wall.

B. Materials:

1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
3. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Finishes:

1. Steel Baked-Enamel or Powder-Coat Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of **2 mils**.

    a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.2 DETENTION MATTRESSES

A. Detention Mattresses: Comply with 16 CFR 1633 and California Technical Bulletin 121 as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. BarkerBuilt, Division of Bob Barker Company, Inc
    b. Norix Group, Inc.
    c. UNICOR, Federal Prison Industries, Inc. (FPI)

d. Cornerstone

B. Core: Fire-resistive densified polyester.

C. Cover Fabric: Vinyl bonded to nylon scrim; with a minimum total weight of **10 oz./sq. yd.**. Fabricate cover using all sealed-seam construction with radio-frequency welded inverted seams.

1. Color: Manufacturer's standard.

D. Thickness: 4 inches.

2.3 DETENTION DESKS

A. Wall-Mounted Desk and Seat:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. American Jail Products L.L.C.
b. Maximum Security Products Corp

2. Desk: Formed from 0.134-inch nominal-thickness steel sheet, with minimum **1-1/2-inch** flanged edges.

a. Size: Minimum 24 inches wide by 18 inches deep. As indicated on drawings.
b. Visitation cell size: Minimum 48 inches wide by 18 inches deep.
c. Wall Brackets: 6"x2"x3/16" gusset to be welded or mechanically fastened to wall.

B. Materials:

1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
3. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
4. Stainless Steel Sheet, Strip, Plate, and Flat Bars: ASTM A666 or ASTM A240/A240M, austenitic stainless steel, Type 304.
5. Steel Tubing: ASTM A513/A513M, Type B unless otherwise indicated; thickness indicated or required by structural loads.

C. Finishes:

1. Steel Baked-Enamel or Powder-Coat Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of **2 mils**.

a. Color and Gloss: As selected by Architect from manufacturer's full range.

2. Stainless Steel Finish:

a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
b. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1) Run grain of directional finishes with long dimension of each piece.
2) Directional Satin Finish: No. 3.

2.4 DETENTION SEATING

A. Wall-Mounted Stool:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Jail Products L.L.C.
b. Maximum Security Products Corp
c. Willo Products Company, Inc.

2. Seat: Minimum **12-inch** diameter, formed from 0.134-inch nominal-thickness steel sheet; reinforced with **0.134-inch-** thick steel sheet cut to interior dimension of seat, with minimum **1-1/2-inch** flanged edges.
3. Seat Support: Formed from **1-by-2-by-0.075-inch-** thick, steel tubing; **2-inch-OD-by-0.075-inch-** thick, steel tubing; or **3/8-inch-** thick, steel plate bar; welded to seat reinforcement and wall bracket.
4. Swivel Wall Bracket: Minimum **1/2-inch** pivot pin, with **3/8-inch-** thick, steel plate punched with four holes for wall anchorage.

B. Floor-Mounted Bench:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Jail Products L.L.C.
b. BarkerBuilt, Division of Bob Barker Company, Inc
c. Maximum Security Products Corp
d. Willo Products Company, Inc.

2. Bench Top: Formed from 0.134-inch nominal-thickness steel sheet, with minimum **1-1/2-inch** flanged edges.

a. Size: Minimum **12 inches** deep by 48 inches long.

3. Supports: Formed from **0.164-inch-** thick, formed-steel channels or **2-1/2-inch-OD-by-0.0677-inch-** thick, steel tubing; welded to bench and base plate for an overall bench height of not less than **18 inches**. Provide three supports for

benches with length of more than 72 inches.

4. Base Plates: Minimum **8-inch-square by 1/4-inch-** thick, steel plate punched with four holes for floor anchorage.
5. Capacity: As indicated on Drawings.

C. Materials:

1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
3. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
4. Stainless Steel Sheet, Strip, Plate, and Flat Bars: ASTM A666 or ASTM A240/A240M, austenitic stainless steel, Type 304.
5. Steel Tubing: ASTM A513/A513M, Type B unless otherwise indicated; thickness indicated or required by structural loads.
6. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless another weight is indicated or required by structural loads.

D. Finishes:

1. Steel Baked-Enamel or Powder-Coat Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of **2 mils**.

   a. Color and Gloss: As selected by Architect from manufacturer's full range.

2. Stainless Steel Finish:

   a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
   b. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.

      1) Run grain of directional finishes with long dimension of each piece.
      2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
      3) Directional Satin Finish: No. 3.

2.5 FABRICATION

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Coordinate dimensions and attachment methods of detention furniture with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Form and grind edges and corners to be free of sharp edges or rough areas.

1. Fabricate detention furniture with no more than **1/32-inch** gap between component materials. Weld edges that cannot be crimped to meet tolerance so as to provide a seamless joint with no place for concealment of contraband.

E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

F. Weld corners and seams continuously to comply with referenced AWS standard and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention furniture rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.

H. Cut, reinforce, drill, and tap detention furniture as indicated to receive hardware, security fasteners, and similar items.

I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.

J. Form exposed connections with hairline joints, flush and smooth using concealed fasteners where possible. Use exposed security fasteners of type indicated or, if not indicated, flat-head (countersunk) security fasteners. Locate joints where least conspicuous.

2.6 SECURITY SEALANTS

A. Polyurethane Security Sealants: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Master Builders Solutions; brand of MBCC Group
b. Pecora Corporation

2. Sealant shall have a VOC content of 250 g/L or less.

3. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.7 ACCESSORIES

A. Concealed Bolts: ASTM A307, Grade A unless otherwise indicated.

B. Cast-in-Place Anchors in Concrete: Fabricated from corrosion-resistant materials capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing per ASTM E488/E488M, conducted by a qualified testing agency; of type indicated below:

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed; hot-dip galvanized per ASTM A153/A153M or ASTM F2329/F2329M.

C. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum **3/16 inch** thick; with minimum **1/2-inch-** diameter, headed studs welded to back of plate.

D. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention furniture.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention furniture before detention furniture installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention furniture.

D. Inspect built-in and cast-in anchor installations, before installing detention furniture, to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.

2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

E. Verify locations of detention furniture with those indicated on Shop Drawings.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention furniture to in-place construction. Include threaded fasteners for masonry inserts, security fasteners, and other connectors.

B. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention furniture. Set detention furniture accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into masonry or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Fillet Welds:

    a. Minimum size of **1/8 inch by 1-1/2 inches** long, spaced not greater than **12 inches** o.c. Fill spaces between welds with epoxy security sealant where weld is exposed.
    b. Continuous.

F. Assemble detention furniture requiring field assembly with security fasteners with no exposed fasteners on exposed faces and frames.

G. Anchor furniture with security fasteners to floors and walls at intervals required by expected loads, but not more than **12 inches** o.c.

1. Install anchors through backup reinforcing plates where necessary to avoid metal distortion.
2. Use security fasteners with head styles appropriate for installation requirements,

strength, and finish of adjacent materials, except that a maximum of two different sets of tools shall be required to operate security fasteners for Project.

3. Weld nuts onto cast-in-place anchors after installation so as to be nonremovable.

H. Apply epoxy security sealant at all exposed gaps between detention furniture and adjacent construction greater than **1/16 inch**.

I. Install one detention mattress for each detention bunk.

3.3 FIELD QUALITY CONTROL

A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Remove and replace detention work if inspections indicate that work does not comply with specified requirements. Remove malfunctioning units; replace with new units.

C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

D. Prepare field quality-control certification endorsed by Detention Specialist that states installed products and their installation comply with requirements in the Contract Documents.

3.4 CLEANING AND PROTECTION

A. Touchup Painting:

1. Immediately after erection, clean bolted connections and abraded areas of shop paint, and paint exposed areas with same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 125500

SECTION 135000 - SECURITY HOLLOW METAL WALL PANEL

PART 1 - GENERAL

1.1 SUMMARY

A. This specification section covers the furnishing and installation of cell walls for custom shower and accessible cell, comprising metal wall panels. Security hollow metal wall panels are to be installed on an existing concrete slab. The scope of work covered by this section includes furnishing, installing and finish painting the security hollow metal wall panel system.

1.2 PRODUCTS FURNISHED AND INSTALLED UNDER THIS SECTION

A. Prior to initiation of the work under this section, the detention equipment contractor will be provided with a completed slab, in conformity with thickness and reinforcing required for seismic and structural requirements at the site. The detention equipment contractor will have clear access to the location where cells will be erected, without interference of other trades during cell construction.

Metal Wall Panel System Installation Matrix						
Division of Responsibility	DPM		DEC		GC/Other Trades	
	Materials	Labor	Materials	Labor	Materials	Labor
2" Thick Metal Wall Panels	X			X		
~~Fire Rated Metal Wall Panels~~	~~X~~	-	-	~~X~~	-	
~~Composite Metal Floor Decking (Mezzanine Floors)~~	~~X~~	-	-	~~X~~	-	-
~~Concrete and Rebar for Composite Metal Floor Decking (Mezzanine Floors)~~	-	-	-	-	~~X~~	~~X~~
2" Thick Metal Ceiling Panels	X			X		
~~Stairs and Railings~~	-	-	-	-	~~X~~	~~X~~
~~Structural Designs and Stamped Calculations by Licensed Structural Engineer~~	X					
SHM Frames, Chases and Windows Located in Metal Wall Panels	X	X				

SHM Doors Located in Metal Wall Panels	X			X		
Detention Hardware for SHM Doors and Frames Located in Metal Wall Panels			X	X		

Metal Wall Panel System Installation Matrix (continued)						
Division of Responsibility	DPM		DEC		GC/Other Trades	
	Materials	Labor	Materials	Labor	Materials	Labor
Floor, Ceiling Channels and All Associated Connection Materials for the Metal Wall Panel System	X			X		
MEP Penetrations in Metal Wall Panels (Combi, Sprinklers, SEC Devices, Air Grilles, Light Fixtures, etc.)		X				
MEP Penetrations in Metal Ceiling Panels (Air Grilles, Light Fixtures, etc.)				X		
Grout Infill for Metal Wall Panel System	X	X				
Lightweight Grout Infill for Metal Wall Panel System	X	X				
Rockwool Insulation for Metal Wall Panel System	X	X				
Conduit That is Required to Be Installed In The Metal Wall Panel System	X	X				
Surface Conduit Installed in Chase					X	X
Detention Furnishings Located Inside the Cell (Desks, Seats, Bunks, Mirrors, Shelves, etc.)	X			X		
Detention Lavatory Units (Shower Units When Applicable)					X	X
Detention Light Fixture					X	X
Security Glazing			X	X		
SEC Devices (Intercoms, Call Buttons, etc.)					X	X
PC 105 Prime Coat Primer Applied to all Metal Panels and Trim	X	X				
Primer Applied to Composite Metal Decking (When Prime Coat Coating System is not specified)					X	X
Prime Coat Coating Systems - Panel to Panel Invis-a-seam filler	X	X				
Prime Coat Coating Systems - Security Caulk	X	X				
Prime Coat Coating Systems - PC 105 Prime Coat Primer Applied to Composite Metal Decking	X	X				
Prime Coat Coating Systems - PC 509 Finish Coat	X	X				
Prime Coat Coating Systems - Anti Microbial and Anti Mersa	X	X				

1.3 RELATED SECTIONS

A. Section 087163…...Detention Door Hardware

B. Section 083463…...Detention Doors and Frames

C. Section 088853…...Security Glazing

D. Section 095753…...Detention Security Ceiling Assemblies

E. Section 033000…...Cast in Place Concrete

F. Section 099123……Interior Painting

1.4 REFERENCES

A. ASTM A 1008 / A 1008M-16, Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

B. ASTM A 1011 / A 1011 M-17, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

C. ASTM A 653/A 653M-15, Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot Dipped Process, (Commercial Steel)

D. ASTM A240/240M-16a, Standard Specification for Chromium-Nickel Stainless Steel Plate, Sheet and Strip.

E. NAAMM HMMA 803-08, Steel Tables

F. ASTM B117-16, Standard Practice for Operating Salt Spray (Fog) Apparatus

G. ASTM C39/C39M-15a, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

H. ASTM C143/C143M-15a, Standard Test Method for Slump of Hydraulic Cement Concrete

I. ASTM D610-08 (2012), Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces

J. ASTM D714-02 (2009), Standard Test Method for Evaluating Degree of Blistering of

paints

K. ASTM D1735-14, Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus

L. ANSI A 250.10 – 2011, Standard Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

M. ASTM-E119-16a, Standard Methods of Fire Tests of Building Construction and Materials

N. NFPA-251-06, Fire Tests of Building Construction and Materials

O. UL-263, 14th Edition 2011, Fire Tests of Building Construction and Materials

P. CAN/ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials

Q. ASTM F 1450-12a, Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention and Correctional Facilities

R. ASTM F 1592-12, Standard Test Methods for Detention Hollow Metal Vision Systems

S. ASTM F 2322 – 12, Standard Test Methods for Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities

T. ASTM F2697-15, Standard Test Methods for Physical Assault on Overhead Horizontal Fixed Barriers for Detention and Correctional Facilities

U. ASTM F 2956-16, Standard Test Methods for Anchor Systems Used for Detention Hollow Metal Systems

V. UL 752-05, 11th Edition, Bullet Resisting Equipment

W. IBC 2015 International Building Code

1.5 TESTING AND PERFORMANCE

Performance Grades for each detention security wall and detention security hollow metal opening shall be as indicated on the contract documents. Performance test requirements for each cell and opening shall be as indicated for individual grade number designations shown in the tables in ASTM F 2322, ASTM F 1450 and ASTM F 1592. Test procedures shall be performed on wall designs as described in Sections A, B, C, D, E, F and G.

A. Wall Assembly Impact Test performed in accordance with ASTM F 2322

1. Scope and Significance

2. This test method is a simulated service test for determining the performance characteristics of walls designed to incarcerate inmates in detention and correctional institutions. The testing provides for the setup and impact testing of a sample wall.

3. Test Sample

4. A wall consisting of two 8’-0” x 8’-0” (2438 mm x 2438 mm) wall sections shall be constructed in accordance with section 2.01.

5. Test Requirements

6. Subject one location on the sample wall to 600 blows equally divided between a sharp and a blunt impactor. The blunt impactor shall deliver the required impacts at 200 foot pounds per impact while the sharp impactor shall deliver the required impacts at 100 foot pounds per impact to the sample location. Repeatability of impact location during each series shall be no more than +/- 2 inches (50.8mm) horizontally and vertically from the designated impact target. Testing shall take no longer than 60 minutes.

7. Pass/Fail Criteria

8. Specimen fails if a 5” x 8” x 8” (127mm x 127mm x 203mm) rectangular box can pass through the wall following impacts.

B. Wall De-Lamination Test

1. Scope and Significance

   a. This test documents the overall integrity of the panel system, resistance to possible delamination, and prevention of bulging of panels during grout application.

   b. Test Sample

   c. A 4’ x 4’ (101.6 mm x 101.6 mm) sample shall be constructed in accordance with section 2.01 in this specification. No end closing pieces are to be used in this test. The sample shall not be grouted.

2. Apparatus

a. Using a steel I-beam table capable of withstanding a load of 10,000 pounds (5,080 kg) with no deflection, fix to the tabletop a steel I-beam enclosure to accommodate the sample.

3. Procedure

a. Mount the sample in the test fixture and weld the bottom face sheet at its center to the I-beam tabletop.

b. Weld a 3” x 3” (76 mm x 76 mm) .250” (6.4 mm) thick steel plate centered horizontally and vertically to the top face sheet. Center on the 3” x 3” (76 mm x 76 mm) .250” (6.4 mm) thick steel plate an eyelet assembly capable of withstanding 6,000 lbs. (3,048 kg) of pulling force.

c. Using a hydraulic porta-power and a calibrated load cell to measure pounds force, pull on the eyelet in an upward direction.

d. Use a dial indicator to measure the deflection at the center of the sample.

4. Pass/Fail Criteria

a. Apply 3,000-pound load and measure the deflection. The maximum deflection allowable is .125” (3.2 mm).

C. Cell Furnishing Static Load Test

1. Scope

a. This test simulates a wall panel’s resistance to bending when loads are applied to cell furnishings.

2. Significance of Use

a. The primary purpose of this test is to approximate the levels of pressure apparent when an inmate jumps on the outer edge of a bunk, desk or stool.

3. Test Sample

a. Erect a wall or use the same wall as specified under the Wall Impact Test consisting of three 3’-0” x 8’0” (914 mm x 2438 mm) panels constructed in accordance with section 2.01.

4. Apparatus

a. Attach the piece of furniture by typical means (bolting or welding) to the wall panel system.

5. Procedure

a. Apply a load to the outer edge of the furniture item using a hydraulic porta-power and a load cell to measure pounds force. Apply 1,500 pounds.

6. Pass/Fail Criteria

a. Maximum allowable disfigurement of wall panel surface is +/- 1/16”.

D. Acoustical Tests

1. Fabricate panels constructed in accordance with section 2.01 that when assembled meet the minimum size requirement of the respective ASTM test standards or the test laboratories test fixture. At least one (1) seam is required.

2. Conduct these tests in accordance with: ASTM E90 Standard Test Classification for Determination of Sound Transmission Class and ASTM E1332 Standard Test Classification for Determination of Outdoor-Indoor Transmission Class.

3. Minimum STC class rating of 45-49) and minimum OITC class rating is 41 required for field grouted wall panels.

4. Minimum STC class rating of 40-44) and minimum OITC class rating is 36 required for lightweight grouted wall panels.

E. Grout Testing – Field Installed Grout

1. Scope

a. The grout shall be tested to ensure it achieves the required strength and does not leave voids within the panel.

2. Slump

a. Every delivery of grout shall be tested for slump per ASTM C143. The grout shall have a slump of 9, +/- 1.

3. Compressive Strength

a. Every delivery of grout shall be tested for compressive strength per ASTM C39. The grout must achieve a minimum compressive strength per the manufacturer’s recommendations after 28 days.

b. shall remove the face sheet from the panels to ensure the grout mixture did not leave any pockets or voids.

F. Test Reports

1. The manufacturer shall provide test reports and documentation by an independent testing / monitoring agency documenting successful completion of each performance test.

1.6 CEILING TESTING AND PERFORMANCE

Performance Grades for each detention security ceiling system shall be as indicated on the contract documents. Performance test requirements for each ceiling system shall be as indicated for individual grade number designations shown in the tables in ASTM F 2697. Test procedures shall be performed on wall designs as described in Sections A and B.

A. Ceiling System Impact Test performed in accordance with ASTM F 2697

1. Scope and Significance

a. This test method is designed to evaluate the capability of a complete test ceiling to resist repetitive impact forces at the designated critical areas.

2. Test Sample

a. A ceiling assembly 8’-0” x 8’-0” (2438 mm x 2438 mm) minimum shall be constructed and installed in a test apparatus as shown in ASTM F2697. It is acceptable to modify the test ceiling support fixture from that shown to accommodate longer lengths or larger sizes of test samples.

3. Test Requirements

a. Subject one location on the sample wall to 600 blows equally divided between a sharp and a blunt impactor. The blunt impactor shall deliver the required impacts at 200-foot pounds per impact while the sharp impactor shall deliver the required impacts at 100 foot pounds per impact to the sample location. Repeatability of impact location during each series shall be no more than +/- 2 inches (50.8mm) horizontally from the designated impact target. Perform the test in the cyclic sequence and at the locations specified in the F2697 standard.

4. Pass/Fail Criteria

a. Specimen fails if a 5” x 8” x 8” (127mm x 127mm x 203mm) rectangular box can pass through the ceiling following impacts, or if the impact test cannot be

continued in a practical manner.

B. Ceiling System Static Load Test performed in accordance with ASTM F 2697

1. Scope and Significance

a. This test method is designed to evaluate the capability of a section of ceiling to resist a steadily increasing force applied at a small area concentrated at the center of the section. This test method is intended to simulate an inmate pushing against the ceiling with his feet, hands, or back (from a squat position) from either the top bunk in a cell or other elevated object in a cell or day room in an attempt to damage, dislodge, or break through the ceiling for purpose of escaping out of the secure area.

2. Test Sample

a. A ceiling assembly 8’-0” x 8’-0” (2438 mm x 2438 mm) minimum shall be constructed and installed in a test apparatus as shown in ASTM F2697. It is acceptable to modify the test ceiling support fixture from that shown in order to accommodate longer lengths or larger sizes of test samples.

3. Test Requirements

a. Use a hydraulic ram and pump, equipped with a gauge, or a load cell, to provide the static at the locations specified in the F2697 standard. Apply the steadily increasing force against the sample and record the force in pounds-force (Newtons) and deflection in inches (millimeters) in increments of 500 lbf. (2224 N) to produce a graph of static load versus deflection. Increase the static load until target loads are reached.

4. Pass/Fail Criteria

a. The maximum allowable deflection (A) under load shall be L/180 in. (mm), where L = The unsupported length of the sample being tested. The maximum allowable permanent deflection shall be 0.25 × A in. Required results for location 5, 6, and 7 are that the seam is not permitted to open more than 0.50 in. (12.7 mm), and that no fasteners are permitted to break or pull out.

1.7 QUALITY ASSURANCE

A. Manufacturer's Qualification

1. Manufacturer shall provide evidence of the financial ability to support personnel, plant and equipment capable of fabricating hollow metal wall panel assemblies of the type specified herein and the capacity to fabricate and ship a minimum of 200 panels per day. Manufacturer shall provide current documentation of the number of employees, a listing of their production equipment, and a description of their manufacturing facility.

2. Manufacturers shall be ISO 9001 certified and shall be required to present their Certificate of Registration upon request. The manufacturer's registrar shall be nationally recognized and shall provide the manufacturer with bi-annual factory follow-up-audits reaffirming the manufacturer's continuing compliance with their written quality program.

3. Manufacturers must have evidence that they have retained a structural engineering firm licensed in the state that the project resides in.

4. Manufacturer's production welders shall be qualified under AWS guidelines. Provide copies of Welders Qualifications in accordance with AWS D1.3 for mild and galvanized steel products and D1.6 when there are stainless steel products on the project.

5. Manufacturers shall have evidence of having successfully completed a steel wall project of at least 100 cells that has been in continual operation for a minimum of ten (10) years.

6. The manufacturer shall provide a list of a minimum of 25 successfully completed steel wall panel projects where at least six were over 100 cells and at least one was over 750 cells. This list shall identify completion dates, the names and contact information of the architects of record, and the installing DECs.

7. The manufacturer and the Detention Equipment Contractor shall provide a list of three (3) projects that were completed together where at least one project was 100 cells and has been in operation for at least five years.

8. Manufacturers shall have written test reports validated by an independent third-party certification of their having passed the testing requirements of section 1.05 using their current materials and production processes.

B. Acceptable Manufacturers

1. Trussbilt, LLC – Huron, SD
Telephone: 605.352.5283
Website: www.trussbilt.com

a. Other manufacturers must submit their qualifications, test reports and product deviations to the architect ten (10) days prior to the bid for approval. Test reports must include name and address of laboratory, date laboratory completed the tests, name and address of manufacturer, description of identifying markings on all components of test assembly, location of testing equipment, diagrams, details and photographs of testing equipment, specifications and details of components of test assembly drawings, door and frame component drawings, hardware templates and instructions, wall specifications, and details of anchoring devices, and all test data and load deflection graphs.

Note: Being listed as an acceptable manufacturer is not the acceptance of the manufacturer's standard product. Acceptance is only approval to bid the project per the plans and specifications.

C. Quality Criteria

1. All panel construction shall be in accordance with section 2.01 construction of assemblies and shall meet the testing requirements of Sections 1.05 and 1.06.

2. The manufacturer must be ISO 9001 certified. (see 107.A.2)

3. Fabrication methods and product quality shall performance standards and test requirements set forth in the ASTM standards.

4. Job Site Panel Check

a. At the owner's option, a panel at the job site shall be selected at random and sawn in half or otherwise taken apart as deemed necessary for verification that construction is in accordance with these specifications. The maximum number of panels tested shall not exceed five (5) panels. The manufacturer shall include the cost of the replacement panels in their quotation. If the panel construction does not conform to these specifications all panels at the project site shall be subject to review and the non-conforming panels shall be repaired or replaced at the manufacturer's expense.

1.8 SUBMITTALS

A. Submittal Schedule

1. The panel manufacturer shall electronically submit their approval package to the DEC within 4 to 6 weeks after given written notice to proceed.

2. The panel manufacturer shall electronically submit the structural calculation package to the DEC within 3-4 weeks after item 1 above has been submitted.

3. The DEC shall submit their package electronically to the General Contractor and Architect within 2 weeks of receipt from panel manufacturer.

4. The Architect shall [approve as noted, revise and resubmit, reject and resubmit] within 3 to 4 weeks of receipt of the submittal package.

5. Approval processes taking longer than 60 days shall allow the DEC and suppliers to re-price their packages and adjust lead times for the time delay.

B. Submittal Drawings

1. Show panel elevations and sections.

2. Show listing of opening descriptions including locations, material thicknesses and mounting system.

3. Show location and details of all openings.

C. Samples (if required)

1. Panel: 1’-0” x 1’-0” (305 mm x 305 mm) corner section showing internal construction.

2. All samples submitted shall be of the production type and shall represent in all respects the minimum quality of work to be furnished by the manufacturer. No work represented by the samples shall be fabricated until the samples are approved, and any downgrading of quality demonstrated by the samples can be cause for rejection of the work.

D. Test Report

1. Manufacturer shall submit to the architect, an independent testing laboratory’s report certifying that products meet all test requirements set forth in Sections 1.05 and 1.06 above.

E. Engineering Documentation

1. Manufacturer shall provide certification by an independent professional engineering firm documenting the required welding schedule for the panels, floor channels and the like, and establishing required ceiling/mezzanine structures. Engineering documentation shall address compliance with project specific structural and seismic requirements.

1.9 WARRANTY

A. All panels shall be warranted by the panel manufacturer from defects in workmanship and quality for a period of ten (10) years from shipment.

PART 2 - PRODUCTS

2.1 HOLLOW METAL WALL PANELS

A. Materials

1. Panel face sheets, mounting angles, channels and cover plates shall be constructed of 0.093 in. (2.3 mm) nominal thickness and shall have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A 653 M Commercial Steel (CS), coating designation A60 (Z180). The steel shall be free of scale, pitting, coil breaks or other surface blemishes. It shall also be free of buckles, waves or any other defects caused using improperly leveled sheets.

2. For severely corrosive conditions and where specified, panel face sheets shall be constructed of 0.093 in. (2.3mm) minimum thickness stainless steel meeting ASTM A240/A240M Type 304.

3. Floor mounting channels shall be constructed of 0.093 in (2.3 mm) minimum thickness steel conforming to ASTM A 653/A 653M Commercial Steel (CS), coating designation [A60 (Z180)] or stainless-steel meeting ASTM A240/A240M, [Type 409]. For severely corrosive conditions, channels shall be stainless steel meeting ASTM A240/A240M, [Type 304].

B. All panels shall be grouted:

1. All fire rated panels shall be fully grouted in the field by the wall panel manufacturer as a condition of warranty. Grout specifications shall be the manufacturer’s proprietary design which meets or exceeds all requisite testing per section 1.05, structural and seismic requirements and STC ratings specified for this project.

C. Construction

1. All panels shall be of the types and sizes shown on the approved submittal drawings, shall be constructed in accordance with the specifications and shall

meet the performance requirements of section 1.05 A through F, where applicable.

2. Panel face sheets shall be joined at their vertical edges by a continuous rabbeted joint extending the full height of the panel.

3. Panel thickness shall be 2 in. (50 mm) minimum. Panels grouted on site shall be furnished with grout installation access along the top edge for grouting in place at the job site. After grouting, grout installation access will be concealed by a cover plate. Panels shall be neat in appearance and free from warp or buckle. Edge bends shall be true and straight and of minimum radius for the thickness of material used.

4. Panels shall be reinforced by one of the following systems:

   a. Roll formed continuous steel truss design core material, .013 in. (.33 mm) minimum mild steel, having truncated triangular sections extending continuously from one panel face to the other, spot welded to each face sheet 2 ¾ in. (69.9 mm) o.c. horizontally and 3 in. (76.2 mm) o.c. vertically. Core material shall extend the full height and width of the panel.

5. Door and Window Openings

   a. Where specified, panels shall be provided with cutouts reinforced with steel moldings, not less than 0.093 in. (2.3 mm) to secure door frames and windows in accordance with sizes shown on the contract drawings. Hollow metal door frames and windows shall be manufactured by the panel manufacturer at their factory. Moldings for windows will have an additional 0.093 in. (2.3 mm) back up reinforcement for glass stop screws or have threaded screw inserts installed for screws.

6. Mechanical, Electrical and Plumbing (MEP) Penetrations

   a. Where specified, panels shall be provided with MEP cutouts reinforced with steel molding, not less than 0.093 in. (2.3 mm).

   b. All MEP penetration locations shall be verified by the MEP contractors on the approved submittal drawings. Non-verified penetration locations shall be the responsibility of the MEP contractors and shall be cut and grout protected in the field by others.

2.2 CELL CEILING

A. Materials

1. Double skin ship-lap joint plank ceiling system. Panel face sheets shall be constructed of [0.067 in. (1.7mm)] [0.093 in. (2.3 mm)] minimum thickness steel and shall have a zinc coating applied by the hot-dip process conforming to ASTM

A 653/A 653 M Commercial Steel (CS), coating designation A60 (Z180). The steel shall be free of scale, pitting, coil breaks or other surface blemishes. It shall also be free of buckles, waves or any other defects caused by the use of improperly leveled sheets.

2. For severely corrosive conditions and where specified, panel face sheets shall be constructed of [0.067 in. (1.7mm)] [0.093 in. (2.3mm)] minimum thickness stainless steel meeting ASTM A240/A240M Type 304.

3. Mounting angles and channels shall be constructed of 0.093 (2.36 mm) minimum thickness steel conforming to ASTM A 653/A 653 M Commercial Steel (CS), coating designation A60 (Z180). For severely corrosive conditions, angles and channels shall be stainless steel meeting ASTM A240/A240M, [Type 304].

4. Panels shall be insulated with 6-pound minimum density mineral rockwool.

B. Construction

1. All panels shall be of the types and sizes shown on the approved submittal drawings, shall be constructed in accordance with the specifications and shall meet the performance requirements of section 1.05.A through G, where applicable.

2. Panel face sheets shall be joined at their horizontal edges by a continuous rabbeted joint extending the full length of the panel.

3. Panel thickness shall be 2 in. (50 mm) minimum and shall be neat in appearance and free from warpage or buckle. Edge bends shall be true and straight and of minimum radius for the thickness of material used.

4. Panels shall be reinforced by one of the following systems:

   a. Roll formed continuous steel truss design core material, .013 in. (.33 mm) minimum mild steel, having truncated triangular sections extending continuously from one panel face to the other, spot welded to each face sheet 2 ¾ in. (69.9 mm) o.c. horizontally and 3 in. (76.2 mm) o.c. vertically. Core material shall extend the full height and width of the panel.

5. Mechanical, Electrical and Plumbing (MEP) Penetrations

   a. All MEP cutouts shall be cut in the field by others.

C. Security Sealant

1. Materials: Interior Security Sealant and Caulking Compounds

a. Polyurethane or epoxy sealant; except as otherwise indicated: provide manufacturers 2 part polyurethane or epoxy based elastomeric sealant complying with either ASTM C920 Type S or M, Class 25, grade NS or FS-TT-S-00230C, Class A, non-sag, having a Shore A hardness of 55-60 or ASTM C881-90, Grade 3, epoxy resin adhesive.

2. Acceptable Products

a. Sika:

1) Sikador 31, Hi-Mod Gel, is a 2-component, 100% solids, solvent-free, moisture-tolerant, high-modulus, high-strength, structural epoxy paste adhesive.
2) Sikador 51 NS, is a 2-component, non-sagging, solvent-free, moisture tolerant, flexible epoxy control joint sealer and adhesive.

b. Pecora:

1) Dynaflex, two-part, non-sag, tamper resistant elastomeric polyurethane joint sealant.
2) Dyna-Poxy™ EP-1200, rigid, two-part, high-solids, high-modulus epoxy resin compound.

c. Tremco HPL, hybrid, multi-component, chemically curing, sag resistant polyurethane sealant.

d. Or equal.

2.3 WALL, FLOOR PANEL and CEILING FINISH

Refer to Division 9 – Finishes, Section 09900 Special Coatings

A. After fabrication, all tool marks and surface imperfections shall be filled and sanded as required to make face sheets, vertical edges and weld joints free from irregularities. After appropriate metal preparation, all exposed surfaces of panels shall receive a rust inhibitive primer which meets or exceeds ASTM B117 Salt Spray for 150 hours with a rust grade of not less than 6 as defined in ASTM D610, and ASTM D1735 Water Fog Test for organic coatings for 200 hours with any quantity of #8 blisters but no more than a few #6 blisters as illustrated in ASTM D714.

1. In order to prevent removal of zinc galvanizing material from panel surfaces, panels shall not be finish sanded on panel surfaces. Light, visible spot welding marks from the fabrication process will be visible after finish painting and shall not be deemed cause for rejection of panel surfaces.

2. All panels, furniture and ceilings within the inmate cells shall be factory primed with Prime Coat Corporation (847-972-2141) PC 105 and finish coated in the field with Prime Coat PC 509 with anti-microbial or approved equal.

3. The underside of all floor decking shall be prime painted with PC-105 and finish coated with PC 509 in the field by Trussbilt.

4. All field touch ups and welds shall be spot primed with PC105.

5. Finish coat shall be free of runs, sags and misses.

6. The use of alkyd primers will not be allowed for any metal wall panel primer or any security hollow metal primer attached to the metal panel system.

7. The panel manufacturer will be responsible for the inside finish of all the inmate cells. They will be responsible for the finish painting of all four walls (including any pre-cast walls, CMU or cast in place concrete) and the associated ceiling for each cell. All other painting is scoped out in Division 9 by the appropriate trades.

8. The field applied coatings inside the cell shall be installed by the materials manufacturer’s factory trained employee installers.

PART 3 - EXECUTION

3.1 SCHEDULE AND DELIVERY

A. The DEC shall supply the panel manufacturer a shipping schedule as part of the returned submittal package. The schedule shall indicate the sequencing of the entire project.

B. The panel manufacturer shall be released to manufacture per the DEC’s shipping schedule and either onsite or offsite storage shall be the responsibility of and provided by the General Contractor.

C. All shipments shall be delivered to the project site on flatbed trailers for side off -loading. Panels shall be palletized per the DEC’s written instruction with a maximum weight of 5,000 pounds.

D. Shipping damage and quantity discrepancies shall be noted on the bills of lading and receiving documents and shall be reported to the panel manufacturer within 24 hours of unloading.

E. All shipping and packaging materials shall be disposed of by the General Contractor pursuant to local environmental regulations.

3.2 SITE STORAGE AND PROTECTION OF MATERIALS

A. The detention equipment contractor shall remove wraps or covers from panels, doors, frames, and cell furnishings upon delivery at the building site. The detention equipment contractor shall see that any scratches or disfigurement caused in shipping or handling are promptly sanded smooth, cleaned and touched up with a compatible rust inhibitive primer.

B. The detention equipment contractor shall see that materials are properly stored on planks or dunnage in a dry location. Panels shall be stored in a horizontal position and spaced by blocking. Materials shall be covered to protect them from damage but in such a manner as to permit air circulation.

3.3 INSTALLATION

A. The detention equipment contractor shall be a certified installer of the panel manufacturer and shall perform the following:

1. Inspect floor slab to ensure any gap at any point between the concrete surface and an unleveled freestanding 10’ straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4” or is compliant with project standards for flatness if they are more stringent. Floor levelness shall be per project requirements.

2. Prior to installation, all panels, mounting channels and angles shall be checked for size and staged at the appropriate locations.

3. Install floor channels with fasteners and ceiling angles as required by approved submittal drawings and manufacturer’s installation instructions.

4. Weld panels to floor channels, wall and ceiling mounting angles and weld panel seams as required by engineering documentation and manufacturer’s recommendations. Exposed field welds shall be finished smooth and touched up with PC105 primer prior to caulking. Caulk between welds using an approved pick proof epoxy caulk.

5. Fill panel to panel seams with security filler.

6. Materials shall be 100% solids epoxy joint filler or patching compound.

    a. Provide manufacturers 2-part epoxy based joint filler complying with ASTM C661 with a Shore D hardness of 70-72.

7. Products

a. Trussbilt “Prime Coat, Invis-A-Joint”.

b. Or equal.

8. Miscellaneous Products

a. Joint Primer/Sealer: Provide type of joint sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

B. Panel installation tolerances:

1. Wall panel plumbness: 1/8 in. in 10 ft.
2. Vertical alignment with mezzanine panels: ¼ in.
3. Panel to panel face alignment: 1/16 in.
4. Weld length: + ½ in.; -0 in.
5. Weld spacing: +/- ½ in.
6. Wall straightness: +/- ½ in. in 80 ft.
7. Panel to panel gap: max. 1/16”

C. Install door and/or window frames into panel openings. Weld to panels in accordance with the manufacturer’s recommendations. Frame installation tolerances to be in accordance with those shown in NAAMM HMMA 863. Caulk between welds using an approved pick proof epoxy caulk.

D. After installation, wall panels that are not factory grouted and frames shall be fully grouted. Grout mix and slump to be per the panel manufacturer’s recommendations. The grouting contractor must be pre-approved by the panel manufacturer. Standard hollow metal wall panels 8’ or less in height are to be grouted in two (2) equal lifts. Standard panels greater than 8’ and up to 10’ shall be grouted in three (3) equal lifts. All fire rated hollow metal wall panels shall be grouted in three (3) equal lifts. Cure time between lifts is dependent on the grout mix. A minimum of six (6) hours is recommended, but it is the responsibility of the grout installer to ensure each lift is set before the next lift is poured. Grouting of a panel should be done in a sweeping motion from one edge of the panel to the other to ensure the hydraulic pressure is applied evenly as the panel fills.

E. Any grout or other bonding material shall be cleaned off of panels immediately following installation. Exposed panel surfaces shall be kept free of grout, tar, or other bonding material or sealer.

F. Install metal decking and concrete flooring for mezzanine level cells, in accordance with engineering standards, approved submittal drawings and manufacturer’s installation instructions, and thereafter install mezzanine level cells, railings and stairways. Ensure decking is supported with shoring to prevent sagging.

G. Install required mezzanine cell ceilings, welding in accordance with manufacturer’s approved submittal drawings.

H. Install all furnishings per approved submittal drawings and manufacturer’s installation

instructions.

I. Install doors into frame openings. Door installation tolerances to be in accordance with those shown in NAAMM HMMA 863.

J. Primed or painted surfaces which have been scratched or otherwise marred during installation (including field welding) and/or cleaning shall promptly be finished smooth, cleaned, treated for maximum paint adhesion and touched up with PC105 primer .

K. Finish paint interior cell walls, security hollow metal doors and frames and cell ceilings with Prime Coat PC 509 with anti-microbial or approved finish coat as manufactured by Rock-Tred Corporation (224.377.6048) or Vanberg Coatings (913.599.5939). Paint damage occasioned by installation of cell furniture, plumbing, electrical or other trades shall be corrected by the firm having responsibility for finish painting under section 09900.

L. Field Finishing

1. Security Filler:

a. Apply Security Filler between welds using Security Filler specified herein. Exposed field welds shall be finished smooth and touched up with PC105 primer prior to application of Security Filler. All panel to panel joints are to be sanded smooth and shall appear seamless after finish painting is applied.

b. Provide Security filler along all exposed back edges of mounting channels and angles abutting adjacent structures, walls, floor and ceiling using Security Filler specified herein.

2. Finish Painting:

a. The field applied coatings inside the cell must be installed by the materials manufacturers factory trained employee installers.

b. Manufacturer Supervision: An employee of the materials manufacturer must be present on site for the duration of the preparation and for all phases of the installation of the specialty coating application.

M. Clean and remove debris, leaving cells ready for installation of plumbing, electrical, heating/ventilating, furniture and other trades or materials.

END of SECTION

SECTION 211313 – WET-PIPE FIRE SPRINKLER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:

1. Fabricate, install, and secure necessary approvals for the Automatic Fire Sprinkler System for the Santa Barbara County Jail IRC in Santa Barbara, California. The fire sprinkler system is to include fire sprinkler coverage throughout the new addition of the existing Building as shown on the Construction Documents. Install a complete fire protection system acceptable to the authorities having jurisdiction for the proposed system.

2. Provide all materials and equipment, and perform all labor required to provide shop drawings and install complete fire protection system from the fire sprinkler riser locations indicated on the fire sprinkler system construction document sheets continuing throughout the buildings per the construction documents in accordance with this specification, the current adopted edition of the CBC, CFC, NFPA 24, NFPA 13, and the Santa Barbara County Fire Department requirements.

3. Provide personnel and materials to perform all acceptance tests, and to assist in inspections. Tests to be witnessed by the Authority Having Jurisdiction.

4. Provide all fire stopping material and installation labor, using UL Listed fire blocking systems, at all fire sprinkler system penetrations of fire rated assemblies.

5. The fire sprinkler system installation is to comply with the basis of design summary for the noted fire areas as indicated on Sheet FP-0.0 of the construction documents, listed under the “DESIGN CRITERIA” heading.

1.2 QUALITY ASSURANCE

A. Contractors and Manufacturers:

1. The performance of the work described in this Section is restricted to established Contractors and Manufacturers specializing in automatic fire sprinkler systems that have satisfactorily completed jobs of this size and type, who are acceptable to the Authority Having Jurisdiction. The Contractor shall hold a valid California C-16 contractor’s license. The Contractor shall demonstrate satisfactory installations of comparable systems within the proceeding five years, and shall supply references.

B. Installation Responsibility:

1. The Contractor is hereby advised that the responsibility for the installation of the fire protection system is totally that of the Contractor, and that all designs and resolutions proposed in their Shop Drawings, calculations and related documentation must be demonstrated not only in the test procedure but also throughout the guarantee period.

2. The System specified herein is for defining design intent, installation intent and minimum performance requirements and may not be downgraded without written consent of the Architect, Owner, and AHJ.

3. See Architect's Construction Documents for location requirements of fire sprinkler system.

4. No changes to AHJ approved drawings are permitted without approval by the architect, engineer, and the AHJ inspection staff.

C. Testing Laboratories: All material and equipment used in the installation of the fire protection systems shall be listed as approved by the Underwriters Laboratories, Inc., List of Fire Protection Equipment and Materials, or approved by other appropriate, nationally recognized testing laboratories for use in sprinkler systems, and shall be the latest design of the manufacturer.

D. Requirements of Regulatory Agencies: Obtain necessary approvals from, have all materials approved by, and comply with requirements of all Authorities Having Jurisdiction.

E. Coordinate and secure installation of fire service line and connect to fire service lateral as required.

F. Comply with the requirements of the 2022 adopted editions of the CBC/CFC, NFPA pamphlets 13 and 24.

1.3 PRODUCTS AND SUBMITTALS

A. Product Data: Complete materials list of items with available finishes proposed to be provided under this Section. The quality of materials required for this installation shall be that which comply with the requirements of the Authority Having Jurisdiction and the 2022 edition of NFPA 13. All materials must be UL Listed for fire protection. All piping shall be free from rust.

B. Shop Drawings:

1. Prior to submitting shop drawings and product submittals to the Architect, indicate any proposed re-locations of the following items on plans and submit to the Architect and Owner for review:

   a. Sprinklers in finished rooms:
   b. Grills and registers:
   c. Light fixtures, speakers, and smoke detectors:
   d. All underground fire service piping, backflow assemblies, thrust blocks and related appurtenances.

2. Required fire sprinkler locations:

PART 1 - Per Construction documents, any proposed revisions are to comply with the following:

a. Corridors and halls: Align sprinklers symmetrically so as not to conflict with other ceiling items.
b. Rooms: Center sprinklers in-line with other ceiling devices.
c. Acoustical tile or panel ceilings: Locate sprinklers in center of tile or panel.

3. Architect will review layout and may relocate or add sprinklers to achieve an orderly pattern of ceiling elements, at the Contractors sole expense.

4. If required by Architect, meetings will be held at their office to coordinate locations of sprinklers with other ceiling elements.

5. After obtaining Architect approval of sprinkler locations, prepare final shop drawings and product submittals for review by the Architect. Indicate all elements indicated in paragraph 1.3, B, 1 above, and any other required information.

C. Project Record Documents:

1. Submit three (3) copies of Project Record Documents

2. Contractor to provide a completed and signed NFPA 13 Contractors Material and Test Certificate upon acceptance of the system by the Authority Having Jurisdiction.

D. Operation/Maintenance Data And Warranty:

1. Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Owner and the Architect (3) copies of an Operation and Maintenance Manual. Include in each copy of the Manual of a copy of the Project Record Documents

2. The Contractor shall provide a minimum warranty of one year after final inspection and sign-off of the fire sprinkler system, including all parts, materials of construction and labor for the installation.

E. General Piping Requirements

1. Underground Piping: Provide an installation which is complete in all regards including, but not necessarily limited to:

a. Provide fire service supply piping per Civil Engineers' water utility plans, Sheet and FP-0.0, and site water line specification.
b. Connections from main to base of riser shall be as shown on project drawings.
c. When using approved PVC piping for underground supply piping, a transition shall be made to ferrous pipe shall be accomplished at the following locations:
   1) A minimum distance of five feet from a 90-degree elbow designed to supply a sprinkler riser.

2) A minimum distance of five feet from the underground elbows on the supply and service side of an above ground exterior check valve and other above grade exposed piping, fittings, connections, or valves.
3) A minimum distance of five feet prior to entering a building.
4) A minimum distance of five feet prior to passing under or through a footing or retaining wall.

2. Above Grade Piping – All pipe shall be made in the USA domestically manufactured, and shall be UL Listed for Fire Protection System installation.

a. Flanged fittings shall be used at above grade exterior locations.
b. Connections and fittings shall be threaded, flanged, grooved, or welded. Grooveless clamp or saddle fittings are not acceptable. Fittings and couplings shall be Class 125 (standard) weight minimum.

F. Fire Sprinklers:

1. In soffits and interior ceilings: Victaulic Semi-Recessed or Concealed Quick Response Pendents (finish selected by architect) or approved equal, per fire sprinkler system construction document plans.

2. In hard ceilings: Victaulic Semi-Recessed or Concealed Quick Response Pendents (finish selected by architect) or approved equal, per fire sprinkler system construction document plans.

3. Sidewall interior sprinkler to be Victaulic Quick Response (finish to be selected by Architect) or approved equal.

4. Concealed and open roof spaces: Victaulic Quick Response upright or pendents, brass finish, as approved for use.

G. Fire Sprinkler System Piping:

1. Pipe sized 1” thru 2”: Use domestically manufactured Schedule 40 black steel pipe with threaded, banded cast or malleable iron fittings, or equivalent, UL Listed for fire protection.

2. Pipe sized 2 ½” thru 8”: Use domestically manufactured Schedule 10 black steel pipe with welded and/or grooved cast iron fittings of required pressure rating, UL Listed for fire protection.

3. Piping sized 8” and larger to be Schedule 10, UL Listed steel piping.

H. Fire Department Connection (FDC)

1. Provide appropriate sized (four inch or larger, depending on system design) freestanding pipe mount, cast brass FDC with 2-1/2-inch individually clappered fire department inlet connections with breakable cast iron domed caps, one-inch cast lettering. The Fire Department Connection shall be Potter Roemer Standard No. 5500 series, UL listed with a finish as selected by the Architect.

2. Fire department connection shall be located where indicated on Sheet C-1.0 Note: Where conditions do not permit, the fire department connections shall be placed where readily accessible in case of fire and not liable to injury or fire exposure. All fire department connection locations shall be approved by the Authority Having Jurisdiction.

3. Where subject to mechanical injury, protection shall be provided. The means of protection shall be approved and shall be arranged in a manner, which will not interfere with the connection to inlets.

4. Maintain a 36-inch clear radius around the fire department connection. Grade variation within this radius shall not exceed 1:12. The fire department connection shall be arranged so that hose lines can be readily and conveniently attached to inlets without interference from any nearby objects including buildings, fences, posts, or other fire department connections.

5. The fire department connection shall be clearly visible from the street and provided with identification sign as approved by the School District Representative.

I. Supervisory switch: Designed so that it will operate between the first and second revolution of the valve control wheel or when the stem moves no more than one fifth of the distance from its normal position or if the unit is removed from its mounting.

J. Flow switch: All wetted parts of brass or stainless steel. Flow switch to be complete with retard setting providing 30 second delay before actuating.

K. Valves: U.L. listed Kennedy, Nibco or Stockham or approved alternate. Valves shall be rated for minimum 175 psi working pressure zones.

L. Pressure gauge: Bourdon spring pressure type with non-corrodible movements, set in cast iron case with black flange and with rings of pressed brass, flared type construction. Cases and rings black enamel finish. Gauges shall have 4-1/2” dials with white background, black lines, and figures, calibrated for 2 times working pressure. Installation: Each gauge connected to its respective pipe line located where shown and at inlet and outlet of each pump, by means of suitable brass pipe, pigtails and fittings containing a brass cock, Ashcroft, U.S. Gauge Company or Crosby.

M. Piping Seismic Separation Joints, where required, shall be Metraloop-Fireloop UL Listed Flexible Expansion Loops, as manufactured by the Metraflex Company Chicago, Illinois.

N. Sprinkler Cabinet

1. Provide cabinet containing spare sprinklers and equipment of the following type and number installed at an interior location nearest the wall at the system riser, in an accessible location as directed by Architect, and as approved by AHJ. Provide 6 sprinklers of each type used in the installation, with sprinkler wrenches.

2. The cabinet shall be distinctly labeled, designating the type and quantity of equipment it contains.

1.4 INSTALLATION AND EXECUTION

A. Install the work of this Section in strict accordance with the reviewed Shop Drawings and the requirements of the Division of State Architect and other Authorities Having Jurisdiction. Relocate any sprinklers not aligned with other ceiling fixtures or outlets at Contractors sole expense.

B. Coordinate routing of sprinkler piping with all other trades that will be affected by the installation of the fire sprinkler system so as to avoid interferences. The cost of any field to work in place due to incomplete or inaccurate coordination revisions with other trades will be the responsibility of the Contractor

C. Maintain maximum clearances above ceilings. All piping to be concealed unless specifically noted otherwise on the plans.

D. Install drains on main risers and auxiliary drains in accordance with standard practices and local ordinances. Install one Inspector's Test drain on each system and discharge to an approved exterior location where indicated on the project drawings and approved by the Architect.

E. Access: Do not locate any device requiring access in walls or above ceilings of public areas without Architect's prior approval. Provide access doors complying with specifications and signs for all concealed devices.

F. Piping, Hangers, Supports, Anchors and Sleeves: Install in complete accordance with NFPA 13 requirements, using UL Listed components by Cooper B-Line.

G. Install all horizontal piping so as to run parallel to or perpendicular to the building walls, unless otherwise shown on the Drawings or approved by the Architect. Do not install sprinkler piping that obstructs any door openings.

H. Guide and support all vertical risers or piping in accordance with standard practice. Fabricate and construct pipe joints so that they produce a true alignment of the pipe. Ream all pipe ends. Construct welded pipe joints in accordance with applicable codes.

I. Run all piping in such a manner as to provide appropriate flexibility with respect to expansion and contraction. In general, accomplish this with flexible couplings, expansion loops and/or leads from mains with proper lengths and appropriate fittings. Anchor piping is required.

J. Where exposed piping penetrates the floors, walls, or ceiling of finished areas, provide chromium plated pipe escutcheons at the penetrations.

K. Provide pipe sleeves through partitions, walls, and slabs and outside walls for piping furnished and installed under this Section. Extend all vertical pipe sleeves in floor 6" above the finish. Provide Drawings showing openings for proper installation of the work specified.

L. Provide all UL Listed hangers and supports required for the installation. Bracing the pipes to bottom flanges of steel beams is not permitted.

M. Use hot dipped galvanized materials in any exterior or open spaces such as canopies or covered walkways.

N. Clean pipe and fittings and keep interiors clean throughout installation. Provide caps on ends of cleaned piping.

O. Use full pipe lengths; random lengths joined by couplings will not be accepted.

P. Provide for expansion and contraction of all pipes and for seismic movement. Provide reducing fittings for all changes in pipe size; provide fittings for all changes in pipe direction. Riser piping shall be installed plumb with ofFPet fittings used where alignment adjustment is necessary.

Q. Provide unions for pipe sizes below two-inch and flanged or grooved fittings for sizes two-inch and above to permit disconnection of equipment and fixtures.

R. Prepare all piping having welds for Authority Having Jurisdiction inspection prior to installation.

S. On-site fire code welding permits shall be obtained from the Authority Having Jurisdiction.

T. Piping arrangement shall avoid beams, columns, ducts, lighting fixtures, doors, windows, and similar obstructions for openings.

U. All piping that penetrates fire rated construction shall be fire stopped in accordance with these specifications and project drawings.

V. Underground Piping Installation

1. All bolts, nuts, washers, and rodding used for the installation of underground piping, valves, and fittings from the riser flange back to, and including all parts of the water main tap shall be stainless steel conforming ASTM A194 Grade 8M or ASTM A320 Grade B8M. All of the above materials shall be thoroughly coated with bituminous mastic. After coating, all valves and ferrous fittings shall be wrapped in 8-mil polyethylene film and securely taped in place with underground tape. The above materials shall be left visible for inspection by the Authority Having Jurisdiction prior to backfilling.

2. Install in accordance with referenced standards, codes, and manufacturer’s instructions, and this specification.

3. Piping shall have a minimum cover of three feet under driveways, fire lanes, roads, streets, and two and one half feet of cover in open areas. Cover shall be measured from finished grade to top of pipe. Provide a six-inch bed of sand below pipe and twelve-inch cover of sand above piping with locator tape on top of the sand.

4. The depth of the bottom of all horizontal piping below grade shall not exceed the level distance measured from the pipe centerline to the nearest top edge of any adjacent building footing, unless approved by the Architect, shall have not less than 3-foot earth coverage.

5. Clearance shall be provided around all piping extending through floors, walls, platforms, and foundations, including drains, fire department connections, and other auxiliary piping, in accordance with the provisions of NFPA 13.

6. After underground work is complete and has been tested in accordance with referenced standards, the contractor shall complete a NFPA 24 Contractor's Material and Test Certificate for Private Fire Service Mains and provide it to the School District Representative.

7. Installation of underground water piping shall include concrete thrust blocks and anchors where vertical or horizontal deflection is 45 degrees or more, or at the intersection lines. Thrust block locations, design, and installation shall be in accordance with NFPA 24.

W. Fire-Stopping: Fire stop all holes or voids created by penetrations of the Fire Sprinkler System piping through fire rated construction, with UL Listed Fire Stop / Block Systems appropriate for the rated construction penetration.

1.5 TESTING

A. All tests described and referenced in these specifications shall be performed by the Contractor in the presence of the Authority Having Jurisdiction and the School District Representative. Tests and inspections shall apply to all water-sourced fire protection systems, including fire hydrants, sprinklers, standpipes, and all underground piping that is installed to supply these systems and devices.

B. Hydrostatic Test Preparation

1. Interior piping shall be filled with water for two (2) hours preceding hydrostatic testing.
2. Piping shall be purged of all air and other gasses prior to hydrostatic testing.
3. Underground piping shall be center loaded and all fittings, joints, strapping, and thrust blocking shall be exposed for hydrostatic pressure testing and inspection.
4. All above grade and interior piping, fittings, sprinklers and supports shall be exposed for inspections and hydrostatic testing.
5. A hydrostatic pre-test shall be conducted for both aboveground and underground piping prior to calling for Authority Having Jurisdiction final acceptance test. Written confirmation of passed 100% pre-test shall be given to the inspector of record prior to calling for final. All cost associated with delays caused by failure to complete 100% operational pre-test shall be borne by the contractor. A Contractors Material and Test Certificate shall be filled out upon completion of testing.

C. Fire department connections and piping shall be included in hydrostatic testing and shall be back flushed until clear water is observed.

D. Underground mains and supply connections to sprinkler risers shall be flushed thoroughly before connections to sprinkler systems.

E. Tests of drainage facilities shall be conducted by opening each drain valve while the system control valves are open to the supply.

F. All water level sensors, alarm and supervisory signals, tanks and automatic valves shall be performance tested.

G. Water remaining in normally dry piping shall be evacuated at completion of testing.

H. Contractor to provide to the Owner completed copies of the forms depicted in Figure 25.1 “Contractor’s Material and Test Certificate for Above Ground Piping” of the 2022 Edition of NFPA 13, upon completion of the system installation and approval by the AHJ.

END OF SECTION 211313

SECTION 22 00 50 - BASIC PLUMBING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Access Doors.
   2. Expansion loops.
   3. Insulation.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. This Section is a part of each Division 22 Section.

1.3 ADDITIONAL REQUIREMENTS

A. Furnish and install any incidental work not shown or specified which is necessary to provide a complete and workable system.

B. Make all temporary connections required to maintain services during the course of this Contract without additional cost to the Owner. Notify the Owner seven days in advance before disturbing any service.

C. Plumbing work done under this contract shall not adversely affect the operation of the existing plumbing systems.

1.4 REFERENCES AND STANDARDS

A. Where material or equipment is specified to conform to referenced standards, it shall be assumed that the most recent edition of the standard in effect at the time of bid shall be used.

   1. CSA – Canadian Standards Association International.
   2. ANSI - American National Standards Institute.
   3. ASTM - American Society for Testing and Materials.
   4. CCR - California Code of Regulations.

      a. Title 8 - Division of Industrial Safety, Subchapter 7; General Industry Safety Orders, Articles 31 through 36.

   5. NCPWB - National Certified Pipe Welding Bureau.
   6. CEC - California Electrical Code.
   7. NEMA - National Electrical Manufacturers' Association.
   8. NFPA - National Fire Protection Association.
   9. OSHA - Occupational Safety and Health Act.
   10. UL - Underwriters' Laboratories, Inc.

B. Requirements of Regulatory Agencies:

1. The publications listed below form part of this specification; comply with provisions of these publications except as otherwise shown or specified.
   a. California Building Code, 2022.
   b. California Electrical Code, 2022.
   c. California Energy Code, 2022.
   d. California Fire Code, 2022.
   e. California Green Building Standards Code, 2022.
   f. California Mechanical Code, 2022.
   g. California Plumbing Code, 2022.
   h. California Code of Regulations, Title 24.
   i. California Health and Safety Code.
   j. CAL-OSHA.
   k. California State Fire Marshal, Title 19 CCR.
   l. National Fire Protection Association.
   m. Occupational Safety and Health Administration.
   n. Other applicable state laws.

2. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes, or to requirements of authorities having jurisdiction. It is not the intent of Drawings or specifications to repeat requirements of codes except where necessary for clarity.

1.5 DRAWINGS

A. Examine Contract Documents prior to bidding of work and report discrepancies in writing to Architect.

B. Drawings showing location of equipment and materials are diagrammatic and job conditions will not always permit installation in location shown. The Plumbing Drawings show general arrangement of equipment and materials, etc., and shall be followed as closely as existing conditions, actual building construction, and work of other trades permit.

1. Architectural and Structural Drawings shall be considered part of the Work. These Drawings furnish Contractor with information relating to design and construction of the Project. Architectural Drawings take precedence over Plumbing Drawings.
2. Because of the small scale of Plumbing Drawings, not all offsets, fittings, and accessories required are shown. Investigate structural and finish conditions affecting the Work and arrange Work accordingly. Provide offsets, fittings, and accessories required to meet conditions. Inform Architect immediately when job conditions do not permit installation of equipment and materials in the locations shown. Obtain the Architects approval prior to relocation of equipment and materials.
3. Relocate equipment and materials installed without prior approval of the Architect. Remove and relocate equipment and materials at Contactors' expense upon Architects' direction.
4. Minor changes in locations of equipment, piping, etc., from locations shown shall be made when directed by the Architect at no additional cost to the Owner providing such change is ordered before such items of work, or work directly connected to same are installed and providing no additional material is required.

C. Execute work mentioned in Specifications and not shown on Drawings, or vice versa, the same as if specifically mentioned or shown in both.

1.6 FEES AND PERMITS

A. Obtain and pay for all permits and service required in installation of this work; arrange for required inspections and secure approvals from authorities having jurisdiction. Comply with requirements of Division 01.

B. Arrange for utility connections and pay charges incurred, including excess service charges.

1. Bear the cost of construction related to utility services, from point of connection to utility services shown on Contract Documents. This includes piping, excavation, backfill, meters, boxes, check valves, backflow prevention devices, general service valves, concrete work, and the like, whether or not Work is performed by Contractor, local water/sanitation district, public utility, other governmental agencies or agencies' assigns.

C. Prior to the start of construction, contact local gas company representative and coordinate location of gas meter and piping. In addition, coordinate time required for installation, in order to avoid delay to the Project.

D. Obtain permits to operate compressed air tanks required to be furnished under this Work. Pay costs, and perform tests required to obtain permits. Post permits under glass in a conspicuous place on or near tanks, or as required by authorities having jurisdiction.

E. Coordination:

1. General:

a. Coordinate plumbing Work with trades covered in other Specifications Sections to provide a complete, operable and sanitary installation of the highest quality workmanship.

2. Electrical Coordination:

a. Refer to the Electrical Drawings and Specifications, Division 26, for service voltage and power feed wiring for equipment specified under this section. Contractor has full responsibility for the following items of work:

1) Review the Electrical Drawings and Division 26 Specifications to verify that electrical services provided are adequate and compatible with equipment requirements.
2) If additional electrical services are required above that indicated on Electrical Drawings and in Division 26, such as more control interlock conductors, larger feeder, or separate 120 volt control power source, include cost to furnish and install additional electrical services as part of the bid.
3) Prior to proceeding with installation of additional electrical work, submit detailed drawings indicating exact scope of additional electrical work.

3. Mechanical Coordination:

a. Arrange for pipe spaces, chases, slots and openings in building structure during progress of construction, to accommodate mechanical system installation.
b. Coordinate installation of supporting devices. Set sleeves in poured-in-place concrete and other structural components during progress of construction.
c. Coordinate requirements for access panels and doors for mechanical items requiring access where concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section “Access Doors and Frames.”
d. Coordinate with other trades equipment locations, pipe, duct and conduit runs, electrical outlets and fixtures, air inlets and outlets, and structural and architectural features. Provide information on location of piping and seismic bracing to other trades as required for a completely coordinated project.

1.7 SUBMITTALS - GENERAL

A. Refer to Division 01 Submittals Section(s) for additional requirements.

B. Submittal packages may be submitted via email as PDF electronic files, or as printed packages. PDFs shall be legible at actual size (100 percent). Provide seven copies of printed submittal packages.

C. Provide submittal of materials proposed for use as part of this Project. Product names in Specifications and on Drawings are used as standards of quality. Furnish standard items on specified equipment at no extra cost to the Contract regardless of disposition of submittal data. Other materials or methods shall not be used unless approved in writing by Architect. Architect's review will be required even though "or equal" or synonymous terms are used.

1. Partial or incomplete submittals will not be considered.
2. Quantities are Contractor's responsibility and will not be reviewed.
3. Provide materials of the same brand or manufacturer for each class of equipment or material.
4. Identify each item by manufacturer, brand, trade name, number, size, rating, or other data necessary to properly identify and review materials and equipment. Words "as specified" are not sufficient identification.
5. Identify each submittal item by reference to items’ Specification Section number and paragraph, by Drawing and detail number, and by unit tag number.
6. Organize submittals in same sequence as in Specification Sections.
7. Show physical arrangement, construction details, finishes, materials used in fabrications, provisions for piping entrance, access requirements for installation and maintenance, physical size, mechanical characteristics, foundation and support details, and weight.

a. Submit Shop Drawings, performance curves, and other pertinent data, showing size and capacity of proposed materials.
b. Specifically indicate, by drawn detail or note, that equipment complies with each specifically stated requirement of Contract Documents.
c. Drawings shall be drawn to scale and dimensioned (except schematic diagrams). Drawings may be prepared by vendor but must be submitted as instruments of Contractor, thoroughly checked and signed by Contractor before submission to Architect for review.
d. Catalog cuts and published material may be included with supplemental scaled drawings.

D. Review of submittals will be only for general conformance with design concept and general compliance with information given in Contract Documents. Review will not include quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with work of other trades, or construction safety precautions, which are sole responsibility of Contractor. Review of a component of an assembly does not indicate acceptance of an assembly. Deviations from Contract Documents not clearly identified by Contractor are Contractor's responsibility and will not be reviewed by Architect.

E. Within reasonable time after award of contract and in ample time to avoid delay of construction, submit to Architect Shop Drawings or submittals on all items of equipment and materials provided. Provide submittal in at least seven copies and in complete package.

1. Shop Drawings and submittals shall include Specification Section, Paragraph number, and Drawing unit symbol or detail number for reference. Organize submittals into booklets for each Specification section and submit in loose-leaf binders with index. Deviations from the Contract Documents shall be prominently displayed in the front of the submittal package and referenced to the applicable Contract requirement.

F. Furnish to the Project Inspector complete installation instructions on material and equipment before starting installation.

1.8 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing systems materials and products.

B. Shop Drawings.

C. Sustainable Design Submittals:

1. Product Data: For adhesives and sealants, documentation of compliance including printed statement of VOC content and chemical components.
2. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.

D. Pipe, pipe or plumbing fittings, fixtures, solder and flux installed in a system providing water for human consumption shall comply with lead free requirements of the California Health and Safety Code Section 116875. Provide submittal information for products third-party certified by an approved laboratory as complying with California Health and Safety Code Section 116875.

E. Delegated-Design Submittals: For seismic supports, anchorages, restraints, and vibration isolators indicated to comply with performance requirements and design criteria.

1. Calculations performed for use in selection of seismic supports, anchorages, and restraints shall utilize criteria indicated in Structural Contract Documents.
2. Include design calculations and details for selecting vibration isolators and vibration isolation bases complying with performance requirements, design criteria, and analysis data signed and sealed by the California registered structural engineer responsible for their preparation.

3. Supports, anchorages and restraints for piping, ductwork, and equipment shall be an OSHPD pre-approved system such as TOLCO, ISAT, Mason, or equal. Pipes, ducts and equipment shall be seismically restrained in accordance with requirements of current edition of California Building Code. System shall have current OPM number and shall meet additional requirements of authority having jurisdiction. Provide supporting documentation required by the reviewing authority and the Architect and Engineer. Provide layout drawings showing piping, ductwork and restraint locations.

    a. Bracing of Piping and Equipment: Specifically state how bracing attachment to structure is accomplished. Provide shop drawings indicating seismic restraints, including details of anchorage to building. In-line equipment must be braced independently of piping, and in conformance with applicable building codes. Provide calculations to show that pre-approval numbers have been correctly applied in accordance with general information notes of pre-approval documentation. Gas pipe bracing shall be designed in accordance with California Building Code Section 1615A.1.22 and ASCE 7-10 Section 13.6. Coefficient $I_p = 1.5$ shall be used for gas piping bracing calculations.
    b. In lieu of the above or for non-standard installations not covered in the above pre-approved systems, Contractor shall provide layout drawings showing piping, ductwork, and restraint locations, and detail supports, attachments and restraints, and furnish supporting calculations and legible details sealed by a California registered structural engineer, in accordance with 2019 California Building Code
4. Additional Requirements: In addition to the above, conform to all state and local requirements.

1.9 INFORMATIONAL SUBMITTALS

A. Provide layouts for plumbing systems, for inclusion in coordinated layout specified in Section 23 80 00. Comply with requirements for layouts specified in Section 23 80 00.

1.10 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Refer to Division 01 for complete instructions.
2. Furnish three complete sets of Operation and Maintenance Manual bound in hardboard binder, and one compact disc containing complete Operation and Maintenance Manual in searchable PDF format. Provide Table of Contents. Provide index tabs for each piece of equipment in binder and disc. Begin compiling data upon approval of submittals.

    a. Sets shall incorporate the following:

        1) Product Data.
        2) Shop Drawings.
        3) Record Drawings.
        4) Service telephone number, address and contact person for each category of equipment or system.
        5) Complete operating and maintenance instructions for each item of plumbing equipment and systems.
        6) Copies of guarantees/warrantees for each item of equipment and systems.

7) Test data and system balancing reports.
8) Typewritten maintenance instructions for each item of equipment listing lubricants to be used, frequency of lubrication, inspections required, adjustment, etc.
9) Manufacturers' bulletins with parts numbers, instructions, etc., for each item of equipment.
10) Control diagrams and literature.
11) A complete list or schedule of all scheduled valves giving the number of the valve, location and the rooms or area controlled by the valve. Identify each valve with a permanently attached metal tag stamped with number to match schedule. Post list in frame under plastic on wall in mechanical room or where directed by Architect.
12) Check test and start reports for each piece of plumbing equipment provided as part of the Work.
13) Commissioning and Preliminary Operation Tests required as part of the Work.

b. Post service telephone numbers and/or addresses in an appropriate place as designated by the Architect.

B. Record Drawings:

1. Refer to Division 01, Record Documents, for requirements governing Work specified herein.
2. Upon completion of the work, deliver to Architect the following:

a. Originals of drawings showing the Work exactly as installed.
b. One complete set of reproducible drawings showing the Work exactly as installed.
c. One compact disc with complete set of drawings in PDF format showing the Work exactly as installed.
d. Provide Contractor’s signature, verifying accuracy of record drawings.
e. Obtain the signature of the Project Inspector for all record drawings.

1.11 SUBSTITUTIONS

A. Refer to Division 01 for complete instructions. Requirements given below are in addition to or are intended to amplify Division 01 requirements. In the case of conflict between requirements given herein and those of Division 01, Division 01 requirements shall apply.

B. It is the responsibility of Contractor to assume costs incurred because of additional work and or changes required to incorporate proposed substitute into the Project. Refer to Division 01 for complete instructions.

C. Substitutions will be interpreted to be all manufacturers other than those specifically listed in the Contract Documents by brand name, model or catalog number.

D. Only one request for substitution will be considered for each item of equipment or material.

E. Substitution requests shall include the following:

1. Reason for substitution request.
2. Complete submittal information as described herein; see “Submittals.”
3. Coordinated scale layout drawings depicting position of substituted equipment in relation to other work, with required clearances for operation, maintenance and replacement.
4. List optional features required for substituted equipment to meet functional requirements of the system as indicated in Contract Documents.
5. Explanation of impact on connected utilities.
6. Explanation of impact on structural supports.

F. Installation of reviewed substitution is the Contractors’ responsibility. Any mechanical, electrical, structural, or other changes required for installation of reviewed substituted equipment or material must be made by the Contractor without additional cost to the Owner. Review by the Architect of the substituted equipment or material, including dimensioned Drawings will not waive these requirements.

G. Contractor may be required to compensate the Architect for costs related to substituted equipment or material.

1.12 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of plumbing systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with plumbing systems work similar to that required for this Project.

C. California Health and Safety Code Compliance: For products covered under the scope of HSC 116875 for potable water service. Products for potable water service shall be third-party certified by an approved laboratory as complying with California Health and Safety Code Section 116875.

D. Comply with applicable portions of California Plumbing Code pertaining to selection and installation of plumbing materials and products.

E. All materials and products shall be new and shall match existing.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Protect equipment and piping delivered to Project site from weather, humidity and temperature variations, dirt, dust and other contaminants.

1.14 FIELD CONDITIONS

A. Contractor shall visit Project site and examine existing conditions in order to become familiar with Project scope. Verify dimensions shown on Drawings at Project site. Bring discrepancies to the attention of Architect. Failure to examine Project site shall not constitute basis for claims

for additional work because of lack of knowledge or location of hidden conditions that affect Project scope.

B. Information on Drawings relative to existing conditions is approximate. Deviations from Drawings necessary during progress of construction to conform to actual conditions shall be approved by the Architect and shall be made without additional cost to the Owner. The Contractor shall be held responsible for damage caused to existing services. Promptly notify the Architect if services are found which are not shown on Drawings.

1.15 WARRANTY

A. Refer to Division 01 for warranty requirements, and duration and effective date of Contractor's Standard Guarantee.

B. Repair or replace defective work, material, or part that appears within the warranty period, including damage caused by leaks.

C. On failure to comply with the warranty requirements within a reasonable length of time after notification is given, the Architect/Owner shall have the repairs made at the Contractor's expense.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials or equipment of the same type shall be of the same brand wherever possible. All materials shall be new and in first class condition.

B. All sizes, capacities, and efficiency ratings shown are minimum, except that gas capacity is maximum available.

C. Refer to Sections 22 10 00 and 23 80 00 for specific system piping materials.

2.2 MATERIALS AND PRODUCTS

A. No material installed as part of this Work shall contain asbestos.

B. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).

2.3 ACCESS DOORS

A. Where floors, walls, or ceilings must be penetrated for access to mechanical equipment, provide access doors, 14 inch by 14 inch minimum size in usable opening. Where entrance of a serviceman may be required, provide 20 inch by 30 inch minimum usable opening. Locate access doors/panels for non-obstructed and easy reach.

1. All access doors less than 7'-0" above floors and exposed to public access shall have keyed locks.

B. Access doors shall match those supplied in Division 08 in all respects, except as noted herein.

C. Provide stainless steel access doors for use in toilet rooms, shower rooms, kitchens and other damp areas. Provide steel access doors with prime coat of baked-on paint for all other areas.

D. Do not locate access doors in highly visible public areas such as lobbies, waiting areas, and primary entrance areas. Coordinate with the Architect when access is required in these areas.

E. Where specific information or details relating to access panels different from the above is shown or given on the Drawings or other Divisions of work, then that information shall supersede this specification.

F. Manufacturers: Subject to compliance with requirements, available manufacturers offering products which may be incorporated into the Work include Milcor, Karp, Nystrom, or Cesco, equal to the following:

1. Milcor

a. Style K (plaster).
b. Style DW (gypsum board).
c. Style M (Masonry).
d. Style "Fire Rated" where required.

2.4 THERMAL AND SEISMIC EXPANSION LOOPS

A. Manufactured assembly consisting of inlet and outlet elbow fittings, two sections of flexible metal hose and braid, and 180-degree return bend. Return bend section shall have support lug and plugged FPT drain. Flexible hose shall consist of corrugated metal inner hose and braided metal outer sheath. Assemblies shall be constructed from materials compatible with the fluid or gas being conveyed and shall be suitable for the system operating pressure and temperature. Provide assembly selected for 4 inches of movement.

B. Provide CSA certified expansion loops for use in natural or propane gas piping systems.

C. Where used in potable water systems, provide expansion loops of certified lead-free construction.

D. Basis-of-Design Product: Subject to compliance with requirements, provide Metraflex Inc., Metraloop series, or comparable product by one of the following, or equal:

1. Flexicraft Industries.

2.5 PIPE IDENTIFICATION

A. Identify each piping system and indicate the direction of flow by means of Seton, Inc., Marking Services Inc., Reef Industries, Inc., or equal, pre-tensioned, coiled semi-rigid plastic pipe

labels formed to circumference of pipe, requiring no fasteners or adhesive for attachment to pipe.

B. The legends and flow arrows shall conform to ASME A13.1.

2.6 INSULATION WORK

A. General:

1. For insulating domestic hot water pumps, refer to Section 225000, Plumbing Equipment,
2. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).
3. Adhesives and sealants shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.
4. The term "piping" used herein includes pipe, valves, strainers and fittings.
5. Apply insulating cement to fittings, valves and strainers and trowel smooth to the thickness of adjacent covering. Cover with jacket to match piping. Extend covering on valves up to the bonnet. Leave strainer cleanout plugs accessible.
6. Provide pre-formed PVC valve and fitting covers.
7. Provide Calcium Silicate rigid insulation and sheet metal sleeve, 18 inch minimum length at each pipe hanger. Seal ends of insulation to make vapor tight with jacket.
8. Test insulation, jackets and lap-seal adhesives as a composite product and confirm flame spread of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with UL723 or ASTM E84.
9. Clean thoroughly, test and have approved, all piping and equipment before installing insulation and/or covering.
10. Repair all damage to existing pipe and equipment insulation whether or not caused during the work of this contract, to match existing adjacent insulation for thickness and finish, but conforming to flame spread and smoke ratings specified above.

B. Insulation of Piping:

1. Insulate domestic hot and tempered water with minimum 3-1/2 pounds per cubic foot density fiberglass with ASJ-SSL jacket. Insulation thickness shall be the following:

   a. Pipe 3/4 inches and smaller: 1 inch thick.
   b. Pipe 1 inch through 1-1/2 inches: 1-1/2 inches thick.
   c. Pipe 2 inches and larger: 2 inches thick.

2. Insulate domestic hot water piping under slab on grade with Owens Corning Foamglas, preformed pipe insulation, or equal. Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Cover pipe and fittings with insulation manufacturer’s recommended jacketing. Insulation thickness shall be the following:

   a. Pipe 3/4 inches and smaller: 2 inches thick.
   b. Pipe 1 inch and larger: 3 inches thick.

3. Insulate domestic cold water piping located within building, outside of insulation envelope in outside walls, vented attic spaces, and unheated spaces, including

equipment rooms and below raised floor with 1 inch thick molded fiberglass, minimum 3-1/2 pound per cubic foot density, with ASJ-SSL jacket.

4. Insulate domestic cold water piping located outside building exposed to weather with minimum 3-1/2 pounds per cubic foot density fiberglass with ASJ-SSL jacket. Insulation thickness for all pipe sizes: 2 inches.
5. Insulate roof drain and overflow drain bodies, horizontal sections of rainwater leader piping and overflow piping, and condensate drains within the building envelope with 1 inch thick fiberglass, minimum 3-1/2 pound per cubic foot density, with ASJ-SSL jacket.
6.
7. Exposed insulated piping within the building shall have a Zeston 2000 25/50, Proto Lo-Smoke, or equal, PVC jacket and fitting cover installed over the insulation, applied per manufacturer's instructions. Insulation shall be vapor tight before applying PVC jacket and fitting covers. Verify suitability with manufacturer of insulation. Insulation with pre-applied polymer jacket may be substituted at Contractor’s option.
8. Where insulated piping is exposed to the weather apply aluminum jacket secured with 1/2 inch stainless-steel bands on 12 inch centers. Insulation shall be vapor tight before applying metal jacket, and aluminum fitting covers. Install jacketing with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Cover fittings with glass cloth, two coats of Foster Sealfas 30-36, and factory-fabricated aluminum fitting covers, of same material, finish, and thickness as jacket. Insulation shall be vapor tight before applying metal jacket and fitting covers.

    a. Fitting covers:

        1) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
        2) Tee covers.
        3) Flange and union covers.
        4) End caps.
        5) Beveled collars.
        6) Valve covers.
        7) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

    b. Jacket thickness:

        1) Pipes 10 inches diameter and smaller: Minimum .016 inch thick jacket with smooth finish.
        2) Pipes 12 inches diameter and larger: Minimum .020 inch thick jacket with smooth finish.

PART 3 - EXECUTION

3.1 EXISTING MATERIALS

A. Remove existing equipment, piping, wiring, construction, etc., which interferes with Work of this Contract. Promptly return to service upon completion of work in the area. Replace items damaged by Contractor with new material to match existing.

B. Removed materials which will not be re-installed and which are not claimed by Owner shall become property of Contractor and shall be removed from Project site. Consult Owner before removing any material from Project site. Carefully remove materials claimed by Owner to prevent damage and deliver to Owner-designated storage location.

C. Existing piping and wiring not reused and are concealed in building construction may be abandoned in place and all ends shall be capped or plugged. Remove unused piping and wiring exposed in Equipment Rooms or occupied spaces. Material shall be removed from Project premises. Disconnect power, water, gas, pump or any other active energy source from piping or electrical service prior to abandoning in place.

D. Existing piping, ductwork, and equipment modified or altered as part of this Work shall comply with the most recent applicable code requirements.

3.2 FRAMING, CUTTING AND PATCHING

A. Special framing, recesses, chases and backing for Work of this Section, unless otherwise specified, are covered under other Specification Sections.

B. Contractor is responsible for placement of pipe sleeves, hangers, inserts, supports, and location of openings for the Work.

C. Cutting, patching, and repairing of existing construction to permit installation of equipment, and materials is the responsibility of Contractor. Repair or replace damage to existing work with skilled mechanics for each trade.

D. Cut existing concrete construction with a concrete saw. Do not utilize pneumatic devices.

E. Core openings through existing construction for passage of new piping and conduits. Cut holes of minimum diameter to suit size of pipe and associated insulation installed. Coordinate with building structure, and obtain Structural Engineer's approval prior to coring through existing construction.

3.3 PLUMBING DEMOLITION

A. Refer to Division 01 Sections “Cutting and Patching” and “Selective Demolition” for general demolition requirements and procedures.

B. Disconnect, dismantle and remove mechanical systems, equipment, and components indicated to be removed. Coordinate with all other trades.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material. Refrigerant system must be evacuated per EPA requirements.
3. Equipment to Be Removed: Drain down and cap remaining services and remove equipment.

4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.4 ELECTRICAL REQUIREMENTS

A. Provide adequate working space around electrical equipment in compliance with the California Electrical Code. Coordinate the Mechanical Work with the Electrical Work to comply.

B. Furnish necessary control diagrams and instructions for the controls. Before permitting operation of any equipment which is furnished, installed, or modified under this Section, review all associated electrical work, including overload protection devices, and assume complete responsibility for the correctness of the electrical connections and protective devices. Motors and control equipment shall conform to the Standards of the National Electrical Manufacturers' Association. All equipment and connections exposed to the weather shall be NEMA IIIR with factory-wired strip heaters in each starter enclosure and temperature control panel where required to inhibit condensation.

C. All line voltage and low voltage wiring and conduit associated with the Temperature Control System are included in this Section. Wiring and conduit shall comply with Division 26.

3.5 PIPING SYSTEM REQUIREMENTS

A. Drawing plans, schematic and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

3.6 PRIMING AND PAINTING

A. Perform priming and painting on the equipment and materials as specified herein.

B. See Division 09 Painting Section(s) for detailed requirements.

C. Priming and Painting:

1. Exposed ferrous metals, including piping, which are not galvanized or factory-finished shall be primed and painted.

    a. Black Steel Piping:

        1) Primer: One coat gray Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, comparable products by Rust-Oleum, Kelly Moore, or equal.

2) Topcoat: Two coats gray Sherwin-Williams Pro Industrial Waterbased Alkyd Urethane Enamel, comparable products by Rust-Oleum, Kelly Moore, or equal.

2. Metal surfaces of items to be jacketed or insulated except piping shall be given two coats of primer unless furnished with equivalent factory finish. Items to be primed shall be properly cleaned by effective means free of rust, dirt, scale, grease and other deleterious matter and then primed with the best available grade of zinc rich primer. After erection or installation, all primed surfaces shall be properly cleaned of any foreign or deleterious matter that might impair proper bonding of subsequent paint coatings. Any abrasion or other damage to the shop or field prime coat shall be properly repaired and touched up with the same material used for the original priming.
3. Where equipment is provided with nameplate data, the nameplate shall be masked off prior to painting. When painting is completed, remove masking material.

3.7 EXCAVATING

A. Perform all excavating required for work of this Section. Provide the services of a pipe/cable locating service prior to excavating activities to determine location of existing utilities.

B. Unless shown otherwise, provide a minimum of 2'-6" cover above top of pipe to finished grade for all service piping, unless otherwise noted. Trim trench bottom by hand or provide a 4 inch deep minimum bed of sand to provide a uniform grade and firm support throughout entire length of pipe. For all PVC pipe and for PE gas pipe, bed the pipe in 4 inch sand bed. Pipe bedding materials should be clean crushed rock, gravel or sand of which 100 percent will pass a 1 inch sieve. For pipes that are larger than 10 inches in diameter, at least 95 percent should pass a 3/4 inch sieve, and for pipes 10 inches in diameter or smaller, 100 percent should pass a 1/2 inch sieve. All other materials should have a minimum sand equivalent of 50. Only a small proportion of the native soils will meet these requirements without extensive processing; therefore, importation of pipe bedding materials should be anticipated. Pipe bedding materials shall be compacted in lifts not exceeding 6 inches in compacted thickness. Each lift shall be compacted to not less than 90 percent relative compaction at or above the optimum moisture content, in accordance with ASTM Specification D2940, except that bedding materials graded such that 100 percent of the material will pass a No. 200 sieve shall be compacted in 6 inch lifts using a single pass of a flat-plate, vibratory compactor or vibratory drum. Pipe bedding materials should extend at least to the spring line.

C. Maintain all warning signs, barricades, flares, and red lanterns as required.

D. For all trenches 5 feet or more in depth, submit copy of permit detailed drawings showing shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trenches. Obtain a permit from the Division of Industrial Safety prior to beginning excavations. A copy of the permit shall be available at the site at all times.

3.8 BACKFILLING

A. Backfill shall comply with applicable provisions of Division 31 of these Specifications.

B. Except under existing or proposed paved areas, walks, roads, or similar surfaces, backfill for other types of pipe shall be made using suitable excavated material or other approved material. Place backfill in 8 inch layers, measured before compaction, and compact with impact hammer to at least 90 percent relative compaction per ASTM D2940.

1. Backfill plastic pipe and insulated pipe with sand for a minimum distance of 12 inches above the top of the pipe. Compact using mechanical tamping equipment.

C. Entire backfill for excavations under existing or proposed pavements, walks, roads, or similar surfaces, under new slabs on grade, shall be made with clean sand compacted with mechanical tamping equipment vibrator to at least 90 percent relative compaction per ASTM D2940. Remove excess earth. Increase the minimum compaction within the uppermost two feet of backfill to 95 percent.

D. Replace or repair to its original condition all sod, concrete, asphalt paving, or other materials disturbed by the trenching operation. Repair within the guarantee period as required.

3.9 PIPING SYSTEMS INSTALLATION

A. At time of final connection, and prior to opening valve to allow pressurization of water and gas piping from existing systems, on site or off site, perform a pressure test to indicate static pressure of existing systems. If pressure on water piping is greater than 80 psi, or gas pressure is not as indicated on Contract Documents, inform Architect immediately. Do not allow piping systems to be pressurized without written consent of the Architect.

B. General:

1. All piping shall be concealed unless shown or otherwise directed. Allow sufficient space for ceiling panel removal.
2. Installation of piping shall be made with appropriate fittings. Bending of piping will not be accepted.
3. Install piping to permit application of insulation and to allow valve servicing.
4. Where piping or conduit is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.
5. Horizontal runs of pipes and/or electrical conduit suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-6" without written approval from the Architect.
6. Close ends of pipe immediately after installation. Leave closure in place until removal is necessary for completion of installation.
7. Each piping system shall be thoroughly flushed and proved clean before connection to equipment.
8. Pipe the discharge of each relief valve, air vent, backflow preventer, and similar device to floor sink or drain.
9. Install exposed polished or enameled connections with special care showing no tool marks or threads at fittings.
10. Install horizontal valves with valve stem above horizontal.
11. Use reducing fittings; bushings shall not be allowed. Use eccentric reducing fittings wherever necessary to provide free drainage of lines and passage of air.
12. Verify final equipment locations for roughing-in.

13. Service Markers: Mark the location of each plugged or capped pipe with a 4 inch round by 30 inch long concrete marker, set flush with finish grade. Provide 2-1/2 inch diameter engraved brass plate as part of monument marker.
14. Furnish and install anchors or thrust blocks on PVC water lines in the ground, at all changes in direction of piping, and at all connections or branches from mains 1-1/2 inch and larger. Form anchors or thrust blocks by pouring concrete between pipe and trench wall. Thrust blocks shall be of adequate size and so placed as to take thrusts created by maximum internal water pressure. Sizing and placement shall be per manufacturer's recommendations, CPC, and IAPMO installation standards. Anchor piping to building construction.
15. Sanitary Sewer and Storm Drain: Grade piping inside building uniformly 1/4 inch per foot if possible but not less than 1/8 inch per foot. Run piping as straight as possible. Make piping connections between building piping and outside service pipe with cast iron reducers or increasers. Slope sewers uniformly between given elevations where invert elevations are shown.
16. Where piping is installed in walls within one inch of the face of stud, provide a 16 gauge sheet metal shield plate on the face of the stud. The shield plate shall extend a minimum of 1-1/2 inches beyond the outside diameter of the pipe.

C. Expansion Loops:

1. Install expansion loops where piping crosses building expansion or seismic joints, between buildings, between buildings and canopies, and as indicated on Drawings.
2. Install expansion loops of sizes matching sizes of connected piping.
3. Install grooved-joint expansion joints to grooved-end steel piping.
4. Materials of construction and end fitting type shall be consistent with pipe material and type of gas or liquid conveyed by the piping system in which expansion loop is installed.

D. Sleeves:

1. Install Adjus-to-Crete, Pipeline Seal and Insulator, or equal, pipe sleeves of sufficient size to allow for free motion of pipe, 24 gauge galvanized steel. The space between pipe and sleeves through floor slabs on ground, through outside walls above or below grade, through roof, and other locations as directed shall be caulked with oakum and mastic and made watertight. The space between pipe and sleeve and between sleeve and slab or wall shall be sealed watertight.
2. At Contractor's option, Link-Seal, Metraflex Metraseal, or equal, casing seals may be used in lieu of caulking. Wrap pipes through slabs on grade with 1 inch thick fiberglass insulation to completely isolate the pipe from the concrete.

E. Floor, Wall, and Ceiling Plates:

1. Fit all pipes with or without insulation passing through walls, floors, or ceilings, and all hanger rods penetrating finished ceilings with chrome-plated or stainless escutcheon plates.

F. Firestopping:

1. Pack the annular space between the pipe sleeves and the pipe through all floors and walls with UL listed fire stop, and sealed at the ends. All pipe penetrations shall be UL listed, Hilti, 3M Pro-Set, or equal.

    a. Install fire caulking behind mechanical services installed within fire rated walls, to maintain continuous rating of wall construction.

2. Provide SpecSeal Systems UL fire rated sleeve/coupling penetrators for each pipe penetration or fixture opening passing through floors, walls, partitions or floor/ceiling assemblies. All Penetrators shall comply with UL Fire Resistance Directory (Latest Edition), and in accordance with Chapter 7, CBC requirements.
3. Sleeve penetrators shall have a built in anchor ring for waterproofing and anchoring into concrete pours or use the special fit cored hole penetrator for cored holes.
4. Copper and steel piping shall have SpecSeal plugs on both sides of the penetrator to reduce noise and to provide waterproofing.
5. All above Systems to be installed in strict accordance with manufacturer's instructions.
6. Alternate firestopping systems are acceptable if approved equal. However, any deviation from the above specification requires the Contractor to be responsible for determining the suitability of the proposed products and their intended use, and the Contractor shall assume all risks and liabilities whatsoever in connection therewith.

G. Flashing:

1. Flashing for penetrations of metal or membrane roof for mechanical items such as flues and pipes shall be coordinated with the roofing manufacturer and roofing installer for the specific roofing type. The work of this section shall include furnishing, layout, sizing, and coordination of penetrations required for the mechanical work.

    a. Furnish and install flashing and counterflashing in strict conformance with the requirements of the roofing manufacturer. Submit shop drawing details for review prior to installation.
    b. Furnish and install counterflashing above each flashing required. Provide vandalproof top and flashing combination. Provide vandalproof top for each plumbing vent through roof. JR Smith Model 1748, or equal.

2. For all other types of roofing system, furnish and install around each pipe, where it passes through roof, a flashing and counterflashing. All flashing shall be made of four pound seamless sheet lead with 6 inch minimum skirt and steel reinforced boot. Counterflashing shall be cast iron. For vents, provide vandalproof top and flashing combination. JR Smith Model 1748, or equal.

H. Hangers and Supports:

1. General: Support equipment and piping so that it is firmly held in place by approved iron hangers and supports and special hangers. Hanger and support components shall support weight of equipment and pipe, fluid, and pipe insulation based on spacing between supports with minimum factor of safety of five based on ultimate strength of material used. Do not exceed manufacturer's load rating. Pipe attachments or hangers, of same size as pipe or tubing on which used, or nearest available. Rigidly fasten hose faucets, fixture stops, compressed air outlets, and similar items to the building

construction. The Architect shall approve hanger material before installation. Do not support piping with plumbers' tape, wire rope, wood, or other makeshift devices. Where building structural members do not match piping support spacing, provide “bridging” support members firmly attached to building structural members in a fashion approved by the structural engineer.

a. Materials, design, and type numbers per Manufacturers' Standardization Society (MSS), Standard Practice (SP)-58.

1) Provide copper-plated or felt-lined hangers for use on copper tubing.

2. Hanger components shall be provided by one manufacturer: B-Line, Grinnell, Unistrut, Badger, or equal.
3. Riser clamps: B-line model B3373, or equal.
4. Pipe Hanger and Support Placement and Spacing:

a. Vertical piping support spacing: Provide riser clamps for piping, above each floor, in contact with the floor. Provide support at joints, branches, and horizontal offsets. Provide additional support for vertical piping, spaced at or within the following maximum limits:

Pipe Diameter	Steel Threaded or Welded (Note 3)	Steel Gas	Copper Brazed or Soldered (Note 3)	CPVC & PVC (Note 2)
1/2 - 1”	12 ft.	6 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
1-1/4 - 2”	12 ft.	Each Floor, Not to Exceed 10 ft.	Each Floor, Not to Exceed 10 ft..	Base and Each Floor (Note 1)
2-1/2 - 3”	12 ft.	Each Floor, Not to Exceed 10 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
Over 4”	12 ft.	Each Floor, Not to Exceed 10 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)

1) Note 1: Provide mid-story guides.
2) Note 2: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
3) Note 3: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.

b. Vertical cast iron piping support spacing: Base and each floor not to exceed 15 feet.

c. Horizontal piping, hanger and support spacing: Locate hangers and supports at each change of direction, within one foot of elbow, and spaced at or within following maximum limits:

Pipe Diameter	Steel Threaded or Welded (Note 2)	Steel Gas	Copper Brazed or Soldered (Notes 2, 3)	CPVC & PVC (Note 1)
1/2 - 1"	6 ft.	6 ft.	5 ft.	3 ft.
1-1/4 - 2"	7 ft.	10 ft.	6 ft.	4 ft.
2-1/2 - 3"	10 ft.	10 ft.	10 ft.	4 ft.
Over 4"	10 ft.	10 ft.	10 ft.	4 ft.

1) Note 1: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
2) Note 2: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
3) Note 3: Includes all refrigerant piping, including vapor and hot gas pipes.

d. Horizontal cast iron piping support spacing:

1) Support piping at every other joint for piping length of less than 4 feet.
2) For piping longer than 4 feet, provide support on each side of the coupling, within 18 inches of each joint.
3) Hanger shall not be installed on the coupling.
4) Provide support at each horizontal branch connection.
5) Provide sway brace at 40 foot maximum spacing for suspended pipe with no-hub joints, except where a lesser spacing is required by the seismic design criteria used in delegated design for seismic systems. Refer to Article, Submittals.
6) Provide a brace on each side of a change in direction of 90 degrees or more.

5. Suspended Piping:

a. Individually suspended piping: B-Line B3690 J-Hanger or B3100 Clevis, complete with threaded rod, or equal. All hangers on supply and return piping handling heating hot water or steam shall have a swing connector at point of support.

Pipe Size	Rod Size Diameter

2" and Smaller	3/8"
2-1/2" to 3-1/2"	1/2"
4" to 5"	5/8"
6"	3/4"

b. Trapeze Suspension: B-Line 1-5/8 inch width channel in accordance with manufacturer's published load ratings. No deflection to exceed 1/180 of a span.
c. Trapeze Supporting Rods: Shall have a safety factor of five; securely anchor to building structure.
d. Pipe Clamps and Straps: B-Line B2000, B2400; isolate copper pipe with two thicknesses of 2 inches wide 10-mil polyvinyl tape. Where used for seismic support systems, provide B-Line B2400 series pipe straps.
e. Concrete Inserts: B-line B22-I continuous insert or B2500 spot insert. Do not use actuated fasteners for support of overhead piping unless approved by Architect.
f. Steel Connectors: Beam clamps with retainers.

6. Support to Structure:

   a. Steel Structure: Provide and install additional steel bracing as required to suit structure. Provide through bolts with length to suit requirements of the structural components. Burning or welding on any structural member may only be done if approved by the Architect.

7. Rubber Neoprene Pipe Isolators:

   a. Pipe isolators shall comprise an internal rubber or neoprene material that isolates pipe from hanger and structure. Install at all piping located in acoustical walls. Refer to Architectural Drawings for location of acoustical walls.
   b. Isolation material shall be either a rubber or neoprene material that prevents contact between the pipe and the structure. The rubber shall have between a 45 to 55 durometer rating and a minimum thickness of 1/2 inch.
   c. Acceptable Suppliers:

      1) Vertical runs: Acousto-Plumb or equal.
      2) Horizontal runs: B-Line, Vibraclamp; Acousto-Plumb or equal.

8. Provide support for piping through roof, arranged to anchor piping solidly in place at the roof penetration.
9. Provide rigid insulation and a 12 inch long, 18 gauge galvanized sheet iron shield between the covering and the hanger whenever hangers are installed on the outside of the pipe covering.
10. Insulate copper tubing from ferrous materials and hangers with two thicknesses of 3 inch wide, 10 mil polyvinyl tape wrapped around pipe.
11. Provide a support or hanger close to each change of direction of pipe either horizontal or vertical and as near as possible to concentrated loads.
12. Suspend rods from concrete inserts with removable nuts where suspended from concrete decks. Power actuated inserts will not be allowed.

3.10 UNION AND FLANGE INSTALLATION

A. Install Watts, Epco, Nibco, or equal, dielectric unions or flanges at points of connection between copper or brass piping or material and steel or cast iron pipe or material except in drain, waste, vent, or rainwater piping. Bushings or couplings shall not be used. Dielectric unions installed in potable water systems shall conform to the lead-free requirements of the California Health and Safety Code Section 116875.

B. Install unions in piping NPS 2” and smaller, and flanges in piping NPS 2-1/2” and larger whether shown or not at each connection to all equipment and tanks, and at all connections to all automatic valves, such as temperature control valves. Unions installed in potable water systems shall conform to the lead-free requirements of the California Health and Safety Code Section 116875.

C. Locate the unions for easy removal of the equipment, tank, or valve.

3.11 ACCESS DOOR INSTALLATION

A. Furnish and install access doors wherever required whether shown or not for easy maintenance of mechanical systems; for example, at concealed valves, strainers, traps, cleanouts, dampers, motors, controls, operating equipment, etc. Access doors shall provide for complete removal and replacement of equipment.

3.12 CONCRETE WORK

A. Concrete work required for work of this Section shall be included under another section of the Specification, unless otherwise noted, including poured-in-place concrete work for installing precast manholes, catch basins, etc., and shall include reinforced concrete bases for pumps, tanks, compressors, fan units, boilers, unless the work is specifically indicated on the Drawings to be furnished under this Section.

B. Thrust blocks, underground anchors, and pads for cleanouts, valve access boxes and washer boxes are included under this Section of the Specification. Concrete shall be 3000 psi test minimum. Refer to Division 03 for concrete types.

3.13 PIPE PROTECTION

A. Wrap bare galvanized and black steel pipe buried in the ground and to 6" above grade, including piping in conduit, with one of the following, or equal:

1. Polyethylene Coating: Pressure sensitive polyethylene coating, "X-Tru-Coat" as manufactured by Pipe Line Service Corporation or "Green Line" wrap as manufactured by Roystron Products, or equal.

    a. Field Joints and Fittings: Protecto Wrap #1170 tape as manufactured by Pipe Line Service Corporation, or Primer #200 tape by Roystron Products, or equal. Installation shall be as per manufacturer's recommendation and instructions.

2. Tape Wrap: Pressure-sensitive polyvinyl chloride tape, "Transtex #V-l0 or V-20", "Scotchwrap 50", Slipknot l00, PASCO Specialty & Mfg., Inc., or equal, with continuous

identification. Tape shall be a minimum of 20 mils thick for fittings and irregular surfaces, two wraps, 50 percent overlap, 40 mils total thickness. Tape shall be laminated with a suitable adhesive; widths as recommended by the manufacturer for the pipe size. Wrap straight lengths of piping with an approved wrapping machine.

B. Field Joints: Valves and Fittings: double wrap polyvinyl chloride tape as above. Provide at least two thicknesses of tape over the joint and extend a minimum of 4 inches over adjacent pipe covering. Build up with primer to match adjacent covering thickness. Width of tape of fittings shall not exceed 3 inches. Tape shall adhere tightly to all surfaces of the fittings without air pockets.

C. Testing: Test completed wrap of piping, including all epoxy painted piping with Tinker and Rasor Co. test machine (San Gabriel, CA - 818-287-5259), Pipeline Inspection Company (Houston, TX - 713-681-5837), or equal.

D. Cleaning: Clean all piping thoroughly before wrapping.

1. Inspection: Damaged or defective wraps shall be repaired as directed. No wrapped pipe shall be covered until approved by Architect.

E. Sleeve copper piping/tubing installed below slab with “Polywrap-C” polyethylene sleeve, as manufactured by Northtown Pipe Protection Products, or equal. Sleeve shall be a minimum of 6 mils thick, colored blue for domestic water piping and orange for other piping. Install sleeve per manufacturer’s recommendations and instructions.

F. Sleeve copper piping/tubing installed outside building below grade with “Polywrap-C” polyethylene sleeve, as manufactured by Northtown Pipe Protection Products, or equal. Sleeve shall be a minimum of 6 mils thick, colored blue for domestic water piping. Install sleeve per manufacturer’s recommendations and instructions.

G. Sleeve cast iron and ductile iron pipe below grade and below slab with “Polywrap” polyethylene sleeve, as manufactured by Northtown Pipe Protection Products, or equal. Sleeve shall be a minimum of 8 mils thick, colored natural. Install sleeve per manufacturer’s recommendations and instructions.

H. Covering: No rocks or sharp edges shall be backfilled against the wrap or sleeve. When backfilling with other than sand, protect wrap with an outer wrapping of Kraft paper; leave in place during backfill.

3.14 PIPE IDENTIFICATION

A. Provide temporary identification of each pipe installed, at the time of installation. Temporary identification shall be removed and replaced with permanent identification as part of the work.

B. Apply the legend and flow arrow at all valve locations; at all points where the piping enters or leaves a wall, partition, cluster of piping or similar obstruction, at each change of direction and at approximately 20'-0" intervals on pipe runs. Variations or changes in locations and spacing may be made with the approval of the Architect. There shall be at least one marking in each room. Markings shall be located for maximum visibility from expected personnel approach.

C. Wherever two or more pipes run parallel, the markings shall be supplied in the same relative location on each.

D. Apply markings after painting and cleaning of piping and insulation is completed.

3.15 EXPANSION ANCHORS IN HARDENED CONCRETE

A. Refer to Structural Drawings.

B. Qualification Tests: The specific anchor shall have a current ICC-ES report and evaluated in cracked concrete in accordance with Acceptance Criteria AC193. If the specific anchor satisfies cyclic testing requirements per Acceptance Criteria AC01, Section 5.6, the full allowable shear and tension loads listed in the current ICC-ES report and manufacturer's recommendations for the specific anchor may be used. Otherwise, the design shear and tension loads shall not be more than 80% of the listed allowable shear and tension loads for the specific anchor.

C. Installation: The anchors must be installed in accordance with the requirements given in ICC Research Committee Recommendations for the specific anchor.

D. Testing: Fifty percent of the anchors shall be load-tested on each job to twice the allowable capacity in tension, except that if the design load is less than 75 pounds; only one anchor in ten need be tested. If any anchor fails, all anchors must be tested. The load test shall be performed in the presence of a special inspector.

E. The load may be applied by any method that will effectively measure the tension in the anchor, such as direct pull with a hydraulic jack, a torque wrench calibrated using the specific anchor or calibrated spring-loading devices. Anchors in which the torque is used to expand the anchor without applying tension to the bolt may not be verified with a torque wrench.

3.16 PIPING SYSTEM PRESSURE TESTING

A. General:

1. Perform operational tests under simulated or actual service conditions, including one test of complete plumbing installation with fixtures and other appliances connected.
2. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.

B. Piping Systems: Test piping systems in accordance with the following requirements and applicable codes:

1. Authority having jurisdiction shall witness tests of piping systems.
2. Notify Architect at least seven days in advance of testing.
3. All piping shall be tested at completion of roughing-in, or at other times as directed by Architect.
4. Furnish necessary materials, test pumps, gases, instruments and labor required for testing.
5. Isolate from system equipment that may be damaged by test pressure.

6. Make connections to existing systems with flanged connection. During testing of new work, provide a slip-in plate to restrict test pressure to new systems. Remove plate and make final connection to existing system at completion of testing.

    a. Authority having jurisdiction shall witness final connection to system.

C. Test Schedule: No loss in pressure or visible leaks shall show after four hours at the pressures indicated.

D. Testing of Sanitary Sewer, Drain, Vent, and Storm Drain may be done in segments in order to limit pressure to within manufacturer's recommendations. Test to 10 feet above highest point in the system.

System Tested	Test Pressure PSI	Test With
Sanitary Sewer, Drain, Vent	10 Ft. Hd.	Water
Storm Drain, Condensate Drains	10 Ft. Hd.	Water
Domestic Water	125	Water

1. Non-corrosive leak test fluid shall be suitable for use with piping material specified, and with the type of gas conveyed by the piping system.

3.17 TRACER WIRES

A. Provide tracer wire for non-metallic gas and water pipe in ground outside of buildings. Use AWG #14 tracer wire with low density high molecular weight polyethylene insulation, and lay continuously on pipe so that it is not broken or stressed by backfilling operations. Secure wire to the piping with tape at 18 inch intervals. Solder all joints. Tracer wire insulation shall be colored yellow for gas piping, blue for water piping.

B. Terminals: Precast concrete box and cast iron locking traffic cover, Brooks 3TL, or equal; cover marked with name of service; 6 inches of loose gravel below box. Plastic terminal board with brass bolts; identify line direction with plastic tags. Test for continuity between terminals, after backfilling, in presence of Inspector.

C. Alternate: Use electronically detectable plastic tape with metallic core, Terra Tape D, manufactured by Reef Industries, Inc., Seton, Inc., Marking Services, Inc., or equal; tape 2 inches wide, continuously imprinted "CAUTION WATER (GAS, etc.) LINE BELOW". Install, with printed side up, directly over pipe, 18 inches below finish grade. Backfill material shall be as specified for the particular condition where pipe is installed, but avoid use of crushed rock or of earth with particles larger than l/2 inch within the top 12 inches of backfill. Take precautions to insure that tape is not damaged or misplaced during backfill operations. Terminal boxes not required.

3.18 OPERATION OF SYSTEMS

A. Do not operate any plumbing equipment for any purpose, temporary or permanent, until all of the following has been completed:

1. Complete all requirements listed under “Check, Test and Start Requirements.”
2. Piping has been properly cleaned. Piping systems shall be flushed and treated prior to operation.
3. Filters, strainers etc. are in place.
4. Bearings have been lubricated, and alignment of rotating equipment has been checked.
5. Equipment has been run under observation, and is operating in a satisfactory manner.

B. Provide test and balance agency with one set of Contract Drawings, Specifications, Addenda, Change orders issued, applicable shop drawings and submittals and temperature control drawings.

3.19 CHECK, TEST AND START REQUIREMENTS

A. An authorized representative of the equipment manufacturer shall perform check, test and start of each piece of plumbing equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the check test and start of the equipment.

1. As part of the submittal process, provide a copy of each manufacturer’s printed startup form to be used.
2. Some items of specified equipment may require that check, test and start of equipment must be performed by the manufacturer, using manufacturer’s employees. See specific equipment Articles in these Specifications for this requirement.
3. Provide all personnel, test instruments, and equipment to properly perform the check, test and start work.
4. When work has been completed, provide copies of reports for review, prior to final observation of work.

B. Provide copies of the completed check, test and start report of each item of equipment, bound with the Operation and Maintenance Manual.

C. Upon completion of the work, provide a schedule of planned maintenance for each piece of equipment. Indicate frequency of service, recommended spare parts (including filters and lubricants), and methods for adjustment and alignment of all equipment components. Provide a copy of the schedule with each operating and maintenance manual. Provide a copy of certification from the Owner’s representative indicating that they have been properly instructed in maintenance requirements for the equipment installed.

3.20 DEMONSTRATION AND TRAINING

A. An authorized representative of the equipment manufacturer shall train Owner-designated personnel in maintenance and adjustment of equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the Owner training for the equipment installed.

1. As part of the submittal process, provide a training agenda outlining major topics and time allowed for each topic.
2. Some items of specified equipment require that training must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
3. Contractor shall provide three copies of certification by Contractor that training has been completed, signed by Owner's representative, for inclusion in Operation and Maintenance Manual. Certificates shall include:

    a. Listing of Owner-designated personnel completing training, by name and title.
    b. Name and title of training instructor.
    c. Date(s) of training.
    d. List of topics covered in training sessions.

4. Refer to specific equipment Articles for minimum training period duration for each piece of equipment.

END OF SECTION 22 00 50

SECTION 22 10 00 - PLUMBING PIPING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Valves.
3. Domestic water piping specialties.
4. Drain and waste piping specialties.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 22 00 50 Basic Plumbing Materials and Methods.

1.3 ACTION SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing piping systems materials and products.

1.4 INFORMATIONAL SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Gas Pipe Installer Qualifications: Provide evidence of current qualifications for individuals performing work requiring qualifications.

1.5 CLOSEOUT SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Maintenance Data: Submit maintenance data and parts lists for plumbing piping systems materials and products. Include this data in Operation and Maintenance Manual.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish to Owner, with receipt, one valve key for each key operated hydrant, bibb, or faucet installed.

1.7 QUALITY ASSURANCE

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

PART 2 - PRODUCTS

2.1 MATERIALS AND PRODUCTS

A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Provide materials and products complying with California Plumbing Code. Where more than one type of material or product is indicated, selection from materials or products specified is Contractor's option.

B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Plastic piping components shall be marked with "NSF-pw."

2.2 PIPE AND FITTINGS ATTACHED TO AND BELOW BUILDINGS INCLUDING 5 FEET FROM BUILDINGS

A. Piping and fittings attached to covered walkways and corridors shall comply with the requirements of this article.

B. Drain and Waste Pipe Above Grade: Cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard (CISPI) 301 and so marked. Pipe and fittings shall be as manufactured by AB&I, Charlotte, Tyler Pipe, or equal. Pipe and fittings shall be the products of a single manufacturer. At Contractor’s option, vertical piping above floor from lavatories, sinks, and drinking fountains may be Schedule 40 galvanized steel pipe with black cast iron drainage fittings, or DWV weld pipe and fittings.

1. Joints above grade: No-Hub pipe conforming to ASTM A888 and CISPI 301. Couplings conforming to ASTM 1277 and CISPI 310, with stainless steel bands. Provide products by ANACO-Husky, Tyler, Ideal or equal. Provide sway brace at 20'-0" maximum spacing for suspended pipe with No-Hub joints. Provide a brace on each side of a change in direction of 90 degrees or more. Brace riser joints at each floor and at 15 foot maximum intervals (also see Specification Section 22 00 50).

   a. OSHPD Projects: Provide sway brace at each joint per CBC.
   b. Joints located over critical areas including food preparation, food storage, food serving, and eating areas shall be ANACO-Husky SD 4000, Clamp-All 125, or equal, meeting the requirements of FM 1680, SD Class I and ASTM C1540.
   c. Joints located over operating and delivery rooms, nurseries, food preparation centers, food-serving facilities, food storage areas, and other sensitive areas shall be ANACO-Husky SD 4000, Clamp-All 125, or equal, meeting the requirements of FM 1680, SD Class I and ASTM C1540.

C. Drain and Waste Pipe Below Grade: Cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A888 and CISPI 301 and so marked. Pipe and fittings shall be as manufactured by AB&I, Charlotte, Tyler Pipe, or equal. Pipe and fittings shall be the products

of a single manufacturer. At Contractor's option, hub and spigot cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A-74 and so marked, may be used.

1. Joints below grade: ANACO-Husky SD 4000, Clamp-All 125, or equal couplings and No-Hub fittings, meeting the requirements of FM 1680, SD Class I and ASTM C1540.
2. Joints below grade (hub and spigot option): Neoprene gaskets conforming to ASTM C564, as manufactured by Ty-Seal, Dual-Tite, or equal.

D. Vent Pipe:

1. 3 inch and larger: Cast iron soil pipe and fittings conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard 301 and so marked. Joints in cast iron vent pipe shall be the same as specified for cast iron waste pipe above grade.
2. 2-1/2 inch and smaller: Cast iron soil pipe and fittings as specified for sizes 3 inch and larger, Schedule 40 galvanized steel pipe with black cast iron drainage fittings, or DWV copper pipe and fittings.
3. Vent pipe buried in ground and to 6 inches above ground: Cast iron soil pipe and fittings conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard 301 and so marked. Joints in cast iron vent pipe shall be the same as specified for cast iron waste pipe below ground.

E. Type DWV copper tubing or No-Hub cast iron pipe and fittings may be used for concealed rainwater leaders. Where no-hub piping is used, the fittings and couplings shall match those used for waste piping.

F. Water Pipe (Tempered Water, Tempered Water Return, Hot Water, Hot Water Return and Cold Water): ASTM B88, Type L copper tubing, hard-temper, with wrought copper fittings. Provide full solder cup for all fittings. Capped or plugged outlets shall be Schedule 40 screwed brass. Water piping below slab: ASTM B88, Type K copper tubing, hard temper, with wrought copper fittings. At Contractor's option, pipe runs below slab having no branches may be ASTM B88, Type K annealed copper tubing without joints. See Section 22 00 50 for pipe protection requirements for below slab copper piping.

G. Condensate Drain Piping:

1. Inside buildings provide ASTM B88, Type L copper tubing and fittings. Provide Wye fittings with capped cleanout plug for tubing up to 1 inch size. Provide wrought or cast DWV fittings for sizes 1-1/4 inch and larger.
2. Outside buildings provide ASTM B88, Type L copper pipe and fittings, cast iron drain pipe and fittings or Schedule 40 galvanized steel pipe and cast iron drain or vent fittings.
3. Connect condensate drains to mechanical equipment per equipment manufacturer's recommendations; provide P-trap where required. Slope piping to drain, with 1 inch in 10 foot minimum pitch. Provide di-electric couplings or unions at connections to dissimilar materials.
4. Where Drawings indicate installation of mechanical equipment on spring isolation rails spring mounted curbs, or spring hangers, provide threaded metal connector at mechanical equipment, Metraflex Model SST, or equal by Unisource Mfg. Co., or Flexicraft Industries. Arrange flexible connection to ensure drainage of condensate, and support flexible connection at each end of connector, to ensure proper alignment.

5. Where condensate drain P-traps are required, install trap using Wye fitting on inlet and outlet of trap. Provide cap on top of each Wye, made removable for cleaning and inspection. Drill 1/8 inch diameter hole in cap at outlet of the trap to allow venting of the system. Minimum depth of trap should be 4 inches, or as recommended by the manufacturer in printed literature.
6. Provide cleanout tees or “Y” at each change in direction.

H. Condensing-Type Equipment Condensate Drain Pipe: CPVC pipe and fittings conforming to ASTM D-2846.

1. Provide CPVC condensate drain pipe for condensing water heaters, furnaces, and where shown on Drawings.
2. Piping and fittings shall be as manufactured by Spears Manufacturing, Charlotte Pipe and foundry Co., or equal.

2.3 SITE PIPING AND FITTINGS TO 5 FEET FROM BUILDINGS

A. Buried Drain, Waste, and Vent Piping:

1. Install piping from street connection to the property line in accordance with local requirements.
2. 4 inches and larger: PVC, ASTM D3034 - SDR 35; use matching Ring Tite fittings.
3. 3 inches and smaller: Cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard 301 and so marked. Pipe and fittings shall be as manufactured by AB&I, Charlotte, Tyler pipe, or equal. Provide ANACO-Husky SD 4000, Clamp-All 125, or equal couplings and No-Hub fittings, meeting the requirements of FM 1680, SD Class I and ASTM C1540. Pipe and fittings shall be the product of a single manufacturer.

B. Water Service Piping:

1. Sizes 2 inches and larger (not under building): Gasket style PVC conforming to ASTM D2241-SDR21, Class 200 with gasket type fittings or ductile iron mechanical joint couplings. Gasket fittings shall be one piece injection molded PVC fittings, equal to Flo-Seal water main fittings for PVC pressure pipe, 200 psi, ASTM D-3139.
2. Sizes less than 2 inches: Type K copper tubing, hard temper, with wrought copper fittings. See Section 22 00 50 for pipe protection requirements for below grade copper piping.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

    a. J.M. Eagle.
    b. P.W. Pipe.
    c. Ipex Series Pipe.

C. Water Service Piping Above Grade:

1. Sizes 3 inches and larger: Class 150 flanged ductile cast iron water pipe conforming to AWWA/ANSI C150/A21.50 and manufactured in accordance with AWWA/ANSI C151/A21.51. Fittings shall conform to AWWA/AWWA C110/A21.10, Class 250 pattern.

Pipe and fittings shall have factory applied cement-mortar lining in accordance with AWWA/ANSI C104/A21.4. Flanges shall conform to ASME/ANSI B16.1.

2. Piping 2-1/2 inches and smaller: Type K copper tubing, hard temper, with brazed wrought copper fittings.

2.4 FIRE PROTECTION PIPING

A. Refer to specification Section 21 10 00 “Fire Protection.”

2.5 PIPE JOINING MATERIALS

A. Refer to piping Articles in this Section for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated

a. Full-Face Type: For flat-face, Class 125, cast iron and cast bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast iron and steel flanges.

2. AWWA C111, rubber, flat face, 1/8-inch (3.2mm) thick, unless otherwise indicated; and full-face or ring type, unless other indicated.
3. Flange Bolts and Nuts: AWWA C111, carbon steel, unless otherwise indicated.
4. Plastic, Pipe-Flange Gasket, Bolts and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, 100 percent lead free alloys. Include water-flushable flux according to ASTM B813.

D. Brazing Filler Metals: AWS A5.8, BCup-5 Series, copper-phosphorus unless otherwise indicated. Sil-Fos 15, or equal.

2.6 VALVES AND FITTINGS FOR POTABLE WATER SYSTEMS

A. General:

1. Provide valves and fittings conforming to lead-free requirements of California Health and Safety Code Section 116875.

a. Provide valves listed to NSF/ANSI 61-G or NSF/ANSI 372 for valve materials for potable-water service.

1) Exception: Main distribution gate valves above 1-1/2 inches located underground outside building are not required to conform lead-free requirements of California Health and Safety Code Section 116875.

B. Gate Valves:

1. General: Furnish valves in copper lines with adapters to suit valve/line requirements.

2. 1-1/2 inches and smaller: Minimum 200 psi CWP, bronze body, threaded bonnet, rising or non-rising stem, solid wedge, threaded or solder ends, conforming to MSS SP-80. Milwaukee UP148, UP149, Nibco T-113-LF, S-113-LF, or equal.
3. 2 inches through 3 inches: Minimum 200 psi CWP, bronze body, threaded bonnet, non-rising stem, solid wedge, threaded or solder ends, conforming to MSS SP-80. Nibco T-113-LF, S-113-LF, or equal.
4. Main distribution gate valves underground outside building above 1-1/2 inches:

    a. Underground valves 2 inches thru 12 inches: 250 psi, iron body, Non-rising stem, bolted bonnet, resilient wedge valves, conforming to AWWA C509, equipped with operating nuts, Mueller Series 2360, Nibco F-619-RW-SON, or equal.

        1) Underground valves 3 inches and smaller may be furnished with operating nuts or hand-wheels, and with Ring-Tite joint ends.
        2) Furnish and deliver to Owner one wrench of each size required for operating underground valves.

C. Ball Valves:

1. 2 inches and smaller: 600 psi CWP, cast bronze or brass body, full port, two piece, threaded ends, and reinforced PTFE seal, conforming to MSS SP-110. Nibco T-685-80-LF, Milwaukee UPBA400, Apollo 77C-LF10, Kitz 868, or equal.
2. 2-1/2 inches: Apollo 77C-LF10, or equal.

D. Calibrated Balancing Valves:

1. General: Calibrated orifice ball type rated for 400 psig maximum operating pressure and 250 degrees F. maximum operating temperature.

    a. Body: Brass.
    b. Ball: 304 Stainless Steel.
    c. Seat: Glass and Carbon filled TFE.
    d. End Connections: Threaded.
    e. Pressure Gage connections: Integral capped readout valves with internal check valves and drain port, for use with portable pressure differential meter.
    f. Handle Style: Dial, with memory stops to retain set position.

2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

    a. 3 Inch and Smaller: Bell & Gossett model CB, “LF” series.

2.7 VALVES AND FITTINGS FOR NON-POTABLE WATER, COMPRESSED AIR, AND GAS SYSTEMS

A. Gate Valves:

1. 2-1/2 inches and smaller: Class150, bronze body, union bonnet, rising stem, solid wedge, threaded or solder ends, conforming to MSS SP-80. Hammond IB641, IB648, Nibco T-134, S-134, Milwaukee 1151, 1169, or equal.

2. 3 inches and larger: Class 125, iron body, bronze mounted, bolted bonnet, non-rising stem, solid wedge, flanged ends, conforming to MSS SP-70. Hammond IR-1138, Nibco F619, Milwaukee F2882A, Stockham G-612, or equal.
3. Underground valves 2 inches thru 12 inches: 250 psi, iron body, Non-rising stem, bolted bonnet, resilient wedge valves, conforming to AWWA C509, equipped with operating nuts, Mueller Series 2360, Nibco F-619-RW-SON, or equal.

    a. Underground valves 3 inches and smaller may be furnished with operating nuts or hand-wheels, and with Ring-Tite joint ends.
    b. Furnish and deliver to Owner one wrench of each size required for operating underground valves.

B. Ball Valves:

1. 2 inches and smaller: 600 psi CWP, 150 psi SWP, cast bronze body, full port, two piece, threaded ends, and reinforced PTFE seal, conforming to MSS SP-110. Nibco T585-70, Milwaukee BA-400, Stockham T-285, or equal.
2. 2-1/2 inches and larger: Class 150, carbon steel body, full port, two piece, stainless steel vented ball, flanged ends, and reinforced PTFE seal, conforming to MSS SP-72. Nibco F-515-CS-F-66-FS, Milwaukee F20-CS-15-F-02-GO-VB, or equal.
3. Compressed Air Services: 600 psi CWP, 150 psi SWP, bronze body, full port, three piece, threaded ends, and reinforced PTFE seal, conforming to MSS SP-110. Nibco Model T-595-Y, Milwaukee BA-300, or equal.

C. Calibrated Balance Valves (Symbol CBV): Provide globe style valves for precision regulation and control rated 175 psi for sizes 2-1/2 inches through 12 inches and rated 240 psi for bronze sizes 2 inches and below. Each valve shall have two metering/test ports with internal check valves and protective caps. All valves must be equipped with visual position readout and concealed memory stops for repeatable regulation and control.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

    a. Bell & Gossett Circuit Setter Plus.
    b. Armstrong CBV.
    c. Flow Design Inc. Accusetter.
    d. Tour & Andersson.
    e. Circuit Sensor with butterfly valve above 3 inches.
    f. Illinois Series 5000 through 2 inches.

D. Flow Control Valves: Automatic pressure compensating flow control valves shall be Griswold, Flow Design, Inc., or equal.

2.8 DOMESTIC WATER PIPING SPECIALTIES

A. Water Hammer Arrestors:

1. Provide water hammer arrestors conforming to lead-free requirements of California Health and Safety Code Section 116875, with nesting type bellows contained within a casing having sufficient displacement volume to dissipate the calculated kinetic energy

generated in the piping system. Water hammer arrestors shall be sized for type and number of fixtures served. Provide all stainless steel shell construction with stainless steel bellows and threaded connection to water system.

2. Water hammer arrestors shall be certified under P.D.I. Standard WH201 and by ASSE Standard 1010.
3. Select units in accordance with the requirements of Plumbing and Drainage Institute Standard P.D.I. WH201. Install above ceilings or behind wall access door at each plumbing fixture, or where plumbing fixtures are installed in groups, at each group of fixtures.
4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

    a. Josam Company, series 75000.
    b. Smith (Jay R.) Mfg. Co., Hydrotrol 5005-5050.
    c. Mifab, series WHB.

B. Thermostatic Water Temperature Control Valve:

1. Provide thermostatic water temperature control valve conforming to lead free requirements of California Health and Safety Code Section 116875, with size as noted on Drawings, complete with union angle strainer checkstops. Valves shall be thermostatic type, with a maximum temperature setting as follows:
2. Provide surface recessed semi-recessed mounted, white enameled or stainless steel cabinet with locking door for control valves. Including:

    a. Control valve cabinet and valve shall be provided as a package, and include thermostatic water mixing valve, thermometer, safety checkstops, volume control valve and internal piping.

3. Where indicated on drawings, provide a temperature alarm system, utilizing a micro-processor based controller and solid state temperature controller. Provide audible and visual indication of high and low temperature set points. Provide required hardware and wiring for a complete operating system.

    a. Provide isolation transformer for control of the alarm system.
    b. Provide solenoid valve and shock absorber, installed and wired to the alarm module.

4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

    a. Leonard Valve Company.
    b. Lawler Manufacturing Co., Inc.
    c. Powers.

C. Relief Valves:

1. Provide relief valves as indicated, of size and capacity as selected by Contractor for proper relieving capacity, in accordance with ASME Boiler and Pressure Vessel Code.

2. Combined Pressure-Temperature Relief Valves: Bronze body, test lever, thermostat, complying with ANSI A21.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210 degrees F, and pressure relief at 150 psi.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

    a. Watts Regulator Company.
    b. Cash (A.W.) Valve Manufacturing Corporation.
    c. Zurn Industries, Inc.; Wilkins-Regulator Division.

D. Trap Primers:

1. Manufacturers: Drawing schedules indicate Basis of Design products. Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following, or equal:

    a. MiFab, Inc.
    b. Precision Plumbing Products.
    c. Sioux Chief Manufacturing Company.

2.9 DRAIN AND WASTE PIPING SPECIALTIES

A. Cleanouts:

1. General: Install cleanouts of same diameter as pipe (4 inch maximum) in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18 inches from building construction so as to provide sufficient space for rodding. No horizontal run over 50 feet inside buildings or 100 feet outside buildings shall be without cleanout, whether shown on Drawings or not. Provide two-way cleanouts where indicated on drawings, and where required for satisfactory use.

    a. Provide cleanouts in waste drop from each sink and urinal.
    b. Provide one wrench for each size and type of cleanout used. Turn over to Owner at completion of the project, and obtain receipt. Place receipt in Operation and Maintenance Manuals.

2. Cleanouts in floor and in concrete sidewalks: Ducco Cast Iron with nickel bronze top, clamping collar and ABS plastic plug: Zurn ZN-1400-KC, or equal, with square or round top to suit floor construction.
3. Cleanouts in composition floors: Zurn ZN-1400-X-DX, or equal (nickel bronze top).
4. Cleanouts in concealed, aboveground cast-iron soil or waste lines: Zurn Z-1440A, or equal, with ABS plastic plug.
5. Cleanouts in walls: Zurn Z-1441 or Z-1443, or equal, with stainless steel cover. Provide long sweep elbow or combination wye at connection to riser and install with surface of cleanout within ½ inch of front face of finished wall.

    a. Where space does not permit the above installation, provide Zurn Z-1446, or equal, with stainless steel access cover, and vandal resistant screw.

b. Install face of cleanout plug within 1/2 inch of front face of finished wall.

B. Floor Drains:

1. Manufacturers: Drawing schedules indicate Basis of Design products. Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following, or equal:

a. J.R. Smith.
b. MIFAB.
c. Watts.
d. Zurn.

C. Hopper Drains:

1. Manufacturers: Drawing schedules indicate Basis of Design products. Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following, or equal:

a. Zurn.
b. J.R. Smith.

D. Roof Drains and Overflow Drains:

1. See Architectural Drawings for drain style to be used.
2. Provide offset downspout boots where required for connection of exposed sheet metal downspouts to underground cast iron or PVC piping.
3. Provide rainwater leader nozzles on overflow piping. Nozzle body shall be bronze with threaded inlet and bronze wall flange with mounting holes. Size nozzle to match connected rainwater leader.
4. Manufacturers: Drawing schedules indicate Basis of Design products. Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following, or equal:

a. J.R. Smith.
b. Mifab.
c. Zurn.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which plumbing piping systems are to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to Contractor.

B. Make all arrangements for the utilities required. Pay all costs involved in obtaining the services including gas service and meter, water meter, pressure reducing valve, access boxes, street work. Connect to site utilities. Verify the location of all services. No extra cost will be allowed if services are not as shown.

C. Determine sanitary sewer and storm drain location and elevation at all points of connection before installing any piping. Notify Architect immediately if indicated grades cannot be maintained.

D. At time of final connection, and prior to opening valve to allow pressurization of water and gas piping from existing systems, on site or off site, perform a pressure test to indicate static pressure of existing systems. If pressure on water piping is greater than 80 psi, or gas pressure is not as indicated on Contract Documents, inform Architect immediately. Do not allow piping systems to be pressurized without written consent of the Architect.

3.2 INSTALLATION OF WATER PIPING

A. Run all water piping generally level, free of traps or unnecessary bends, arranged to conform to the building requirements, and to suit clearance for other mechanical work such as ducts, flues, conduits, and other work. No piping shall be installed so as to cause unusual noise from the flow of water therein under normal conditions.

B. Provide manufactured water hammer arrestors, sized and installed in accordance with Plumbing and Drainage Institute Standard PDI WH201.

1. Locate water hammer arrestors at every plumbing fixture, or, where fixtures are located in groups, at every group of fixtures, and as indicated on Drawings.
2. Install water hammer arresters above accessible ceilings, or install access doors for service.

C. In freezing locations arrange water piping to drain as shown.

D. Install piping on room side of building insulation.

E. Check final location of rubber rings within couplings on PVC water piping with gauge or as recommended by manufacturer. Make connection to valves with cast iron adapters connected to water pipe with cast iron couplings. Furnish and install anchors or thrust blocks.

3.3 INSTALLATION OF SANITARY AND STORM DRAINAGE SYSTEMS

A. Make joints in PVC sewer pipe with PVC-type couplings and rubber rings.

B. Check final location of rubber rings within the couplings with gauge or as recommended by the manufacturer. Make joints between PVC pipe and cast iron pipe or fittings using cast iron adapter fittings, installed as recommended by the manufacturer.

1. Ring-Tite cast iron pipe fittings may be used in lieu of standard fittings. Make connection to valves with cast iron adapters connected to the pipe with PVC couplings.

C. Sewer Piping: Run all horizontal sanitary drain piping inside of building on a uniform grade of not less than 1/4 inch per foot unless otherwise noted or later approved. Unless otherwise noted on the plans, piping shall have invert elevations as shown and slope uniformly between given elevations.

D. Storm Drain Piping: Run all horizontal storm drain piping inside of building on a uniform grade of not less than 1/4 inch per foot. Unless otherwise noted on the plans, piping shall have invert elevations as shown and slope uniformly between given elevations.

E. Run all drainage piping as straight as possible and provide easy bends with long turns; make all offsets at an angle of 45 degrees or less.

F. Grade all vent piping so as to free itself quickly of any water condensation.

G. Where possible, join groups of vent risers together with one enlarged outlet through roof. Maintain minimum of 10 foot horizontal or 3 foot vertical clearance from air intakes.

H. Hubless Cast Iron Joints: Comply with coupling manufacturer's installation instructions.

3.4 PIPE JOINTS AND CONNECTIONS

A. General:

1. Cutting: Cut pipe and tubing square, remove rough edges or burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt and debris from inside and outside of pipe before assembly.
3. Boss or saddle type fittings or mechanically extracted tube joints will not be allowed.

B. Threaded Pipe: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply thread compound to external pipe threads: Rectorseal No. 5, Permatex No. 1, or equal.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

C. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

D. Copper Pipe and Tubing (Except pneumatic control piping): All joints shall be brazed according to ASME Section IX, Welding and Brazing Qualifications, except domestic water piping 1-1/4 inches and smaller when not buried in the ground or concrete and type DWV plumbing piping may be soldered.

1. Soldered joints: Apply water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828.

E. Cast Iron Soil Pipe:

1. No-Hub fittings shall be made with a torque wrench.
2. Hub joints shall be with Ty-Seal couplings.
3. Wrought iron, steel, or copper pipe shall have a ring or part of a coupling screwed on to form a spigot end if caulked into a joint.

4. Connect cast iron sewer piping to outside service pipe with cast iron or vitrified LOP reducers or increasers as required. Caulking of smaller pipe into the larger without a reducer or increaser will not be permitted.

F. Flexible Connections:

1. Furnish and install Thermo Tech., Inc. F/J/R, Metraflex, or equal, flexible couplings with limiter bolts on piping connections to all equipment mounted on anti-vibration bases, on each connection to each base mounted pump and where shown. Couplings shall be suitable for pressure and type of service.
2. Anchor piping securely on the system side of each flexible connection.

3.5 INSTALLATION OF VALVES

A. Install valves as indicated on Drawings and in the following locations:

1. Shutoff Valves: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated.
2. Drain Valves: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere indicated or required to completely drain potable water system.
3. Provide gate or globe valves on inlet and outlet of each water heater or pump.

B. General:

1. Valves shall be full line size unless indicated otherwise on Drawings.
2. Install horizontal valves with valve stem above horizontal, except butterfly valves.
3. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
4. Locate valves for easy access and provide separate support where necessary.
5. Install valves in position to allow full stem movement.
6. Install exposed polished or enameled connections with special care showing no tool marks or exposed threads.
7. Butterfly valves conforming to the paragraph “Butterfly Valves” may be used in lieu of gate or globe valves for locations above grade.
8. Ball valves conforming to the paragraph “Ball Valves” may be used in lieu of gate valves for locations above grade for services 2-1/2 inches and smaller.
9. Valves 2-1/2 inches and smaller (except ball valves) in nonferrous water piping systems may be solder joint type with bronze body and trim.
10. Rigidly fasten hose bibbs, hydrants, fixture stops, compressed air outlets, and similar items to the building construction.

C. Gate Valves:

1. Furnish valves in copper lines with adapters to suit valve / line requirements.
2. Underground gate valves:

a. Underground valves 3 inches and smaller may be furnished with operating nuts or hand-wheels, and with Ring-Tite joint ends.

b. Furnish and deliver to Owner one wrench of each size required for operating underground valves.

D. Calibrated Balancing Valves: Install calibrated balancing valves per manufacturers' recommendations, including requirements for straight pipe lengths at valve inlet and outlet.

E. Valve Adjustment: Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.6 INSTALLATION OF CLEANOUTS

A. Cleanouts: Install in piping as indicated, as required by California Plumbing Code, at each change in direction of piping greater than 45 degrees. Install at maximum intervals of 50 feet for piping 4 inches and smaller and 100 feet for larger piping inside buildings, and at base of each conductor.

B. Flashing Flanges: Install flashing flange and clamping device with each cleanout passing through water resistant membrane.

3.7 INSTALLATION OF FLOOR DRAINS AND FLOOR SINKS

A. Install drains in accordance with manufacturer's written instructions and in locations indicated. Install floor drains with lip of drain slightly below finished floor to ensure drainage. Install floor sinks flush with finished floor. Coordinate with other trades to ensure that floor slopes to drain. Provide flashing flange and clamping device with each drain passing through water resistant membrane.

B. Install vented P-trap below each drain. Where trap primers are indicated, install trap primer connection in the P-trap.

3.8 INSTALLATION OF ROOF DRAINS AND OVERFLOW DRAINS

A. Install roof drains and overflow roof drains in accordance with manufacturer's written instructions and in locations indicated.

B. Coordinate with roofing as necessary to interface roof drains with roofing work.

3.9 INSTALLATION OF HOPPER DRAINS

A. Install hopper drain in wall, in sheet metal box, with access door.

1. Size access door and box to suit the size required for hopper drain and trap primer, and solder all seams of box. Seal all penetrations to box with non-hardening waterproof sealant. Provide locking door in occupied spaces.

B. Grind top and sides of funnel, if required, to suit wall thickness.

3.10 TRAP PRIMER INSTALLATION

A. Install as indicated in manufacturers printed literature, with 1/2 inch, Type L, hard copper piping to trap primer connection on floor drains and floor sinks where indicated on Drawings. At Contractor's option, Type K annealed copper tubing without joints may be used be used below slab only. See Section 22 00 50 for pipe protection requirements for below slab copper piping/tubing.

B. Install trap primer piping with 1/4 inch per foot slope, to insure that the line will drain fully to the floor drain or floor sink.

1. Provide ball valve to the inlet at each trap primer location.

C. Install trap primer and distribution unit exactly as called for in manufacturers printed installation instructions. Connect to domestic water piping from the top of the water line, in order to prevent foreign material from entering directly into primer assembly.

D. Mount trap primer in wall, in sheet metal box, with Karp or equal access door. Size access door and box to suit valve operation, and solder all seams of box. Seal all penetrations to box with non-hardening waterproof sealant. Provide locking door where installed in occupied spaces.

E. Where one trap primer will be used for more than one trap, provide a distribution unit with feeder piping for a maximum of four traps sized for equal pressure drop to each trap.

3.11 EQUIPMENT CONNECTIONS

A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated.

B. Mechanical Equipment Connections: Connect hot and cold water piping system and gas piping system to mechanical equipment as indicated, and provide with shutoff valve and union for each connection.

3.12 DOMESTIC WATER SYSTEM STERILIZATION

A. Clean and disinfect new or altered hot and cold water piping connected to domestic water systems using methods prescribed by the Health Authority. If the Health Authority does not prescribe methods, clean and disinfect new or altered hot and cold water piping using methods given in the California Plumbing Code.

1. A water treatment company that has a current state EPA license to apply disinfectant chlorine in potable water shall perform the procedure.

3.13 CARE AND CLEANING

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Remove labels from stainless steel sinks, except 316 stainless steel sink labels should be retained to confirm that the correct material has been provided. Leave systems and equipment in satisfactory operating condition.

3.14 OPERATIONAL TESTS

A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.15 TESTING AND BALANCING

A. See Section 23 05 93 of Specifications for testing and balancing requirements.

3.16 CLEANING UP

A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION 22 10 00

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Water supplies and stops.
2. Plumbing fixture hangers and supports.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 22 00 50 Basic Plumbing Materials and Methods.

1.3 ACTION SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Product Data: Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished.

1.4 INFORMATIONAL SUBMITTALS

A. Refer to Section 22 00 50, Basic Plumbing Materials and Methods.

1.5 CLOSEOUT SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Maintenance Data: Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in Operation and Maintenance Manual.

1.6 QUALITY ASSURANCE

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Plumbing Fixture Standards: Comply with applicable portions of the following codes and requirements for all work in this Section:

1. California Building Code – CBC
2. California Plumbing Code – CPC
3. California Health and Safety Code

4. American National Standards Institute - ANSI
5. Federal Standards - F.S.
6. National Sanitary Foundation – NSF International

C. ANSI Standards: Comply with ANSI/NSF 61, “Drinking Water System Components – Health Effects.”

D. PDI Compliance: Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.

E. Americans with Disabilities Act (ADA).

F. California Green Building Standards Code Requirements:

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES

A. General: Provide factory fabricated fixtures of type, style and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete, installation. Where more than one type is dedicated, selection is Contractor's option; but, all fixtures of same type must be furnished by single manufacturer.

1. Take special care with the roughing-in and finished plumbing where batteries of fixtures occur.
2. Take location and mounting heights for roughing-in from Architectural Drawings.
3. Follow schedule on Plumbing Drawings for roughing-in connections. Set roughing-in for all fixtures exactly as per measurements furnished by the manufacturers of the fixtures used.
4. Roughing-in for lavatories and sinks shall be brought in through the wall under the centerline of the drain from the fixture wherever possible and as close to the fixture as possible.

2.2 MATERIALS

A. Provide materials that have been selected for their surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.

B. Where fittings, trim and accessories are exposed or semi-exposed, provide, chromium plated 17 gauge seamless brass and match faucets and fittings. Provide 17 gauge seamless copper or brass where not exposed.

C. Handles on all faucets and stops shall be all metal chromium plated.

D. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.

2.3 PLUMBING FITTINGS, TRIM AND ACCESSORIES

A. Water Outlets: At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required to operate as indicated.

1. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems.

B. P-Traps: Include IAPMO approved removable P-traps where drains are indicated for direct connection to drainage system. P-Traps shall be less trap screw cleanout, and incorporate a chrome plated cast brass body, brass connection nuts, 17 gauge seamless brass wall return and chrome plated wall escutcheon to match trap finish.

C. Carriers: Provide cast iron supports for fixtures of graphitic gray iron, ductile iron, or malleable iron as indicated. Where the carrier for wall mounted water closets are installed more than 6 inches behind the finished wall, provide water closet support for wide pipe chase.

D. Fixture Bolt Caps: Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.

E. Escutcheons: Where fixture supplies and drains penetrate walls in exposed location, provide chrome-plated cast brass escutcheons with setscrews.

F. Aerators: Provide aerators of types approved by Health Departments having jurisdiction. Delete aerators where not allowed by CPC for health care occupancies.

G. Comply with additional fixture requirements contained in Fixture Schedule shown on the drawings.

2.4 MANUFACTURERS

A. In accordance with California Plumbing Code, provide indelibly marked or embossed manufacturers name or logo, arranged so as to be visible after installation.

B. Manufacturers: Drawing schedules indicate Basis of Design products. Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following:

1. Vitrified China Plumbing Fixtures:

a. American Standard, U.S. Plumbing Products.
b. Eljer Plumbingware Div., Wallace-Murray Corp.
c. Kohler Co.
d. VitrA.

2. Plumbing Trim:

a. McGuire Manufacturing Co., Inc.
b. Delta Commercial.
c. Chicago Faucet Co.
d. T&S Brass and Bronze Works, Inc.

3. Flush Valves:

    a. Sloan Valve Co.
    b. Zurn Industries, Hydromechanics Div.
    c. Toto USA, Inc.

4. Faucets:

    a. Chicago Faucet Co.
    b. Symmons Scott.
    c. T&S Brass and Bronze Works, Inc.
    d. Delta Commercial.

5. Fixture Seats:

    a. Church Seat Co.
    b. Bemis Mfg. Co.
    c. Beneke Corp.

6. Water Coolers and Drinking Fountains:

    a. Haws Corporation.
    b. Halsey Taylor Mfg. Co.
    c. Elkay Mfg. Co.
    d. Acorn Aqua.

7. Service Sinks:

    a. American Standard.
    b. Kohler Co.
    c. Williams Serviceptor.
    d. Florestone.
    e. Acorn.

8. Stainless Steel Sinks:

    a. Elkay Mfg. Co.
    b. Just Mfg. Co.
    c. Haws Corporation.

9. Showers:

    a. Acorn.
    b. Bradley.
    c. Symmons.
    d. Powers.

10. Fixture Carriers:

    a. Josam Mfg. Co.
    b. J. R. Smith.

c. Tyler Pipe; Wade Div.
d. Zurn Industries; Hydromechanics Div.
e. Mifab, Inc.

2.5 FLUSH VALVE REQUIREMENTS

A. Metering flush valves where required and specified shall be non-hold open type with exposed parts chrome plated. Conform to all codes and manufacturers' recommendations. All diaphragms are to have multiple filtered bypass and be chloramine resistant synthetic rubber with internal components suitable for l80 degree hot water to l50 pounds pressure, plastic or leather diaphragm not acceptable.

2.6 FIXTURE CONNECTIONS

A. Make connection between fixtures and flanges on soil pipe absolutely gastight and watertight with neoprene type gaskets (wall hung fixtures) or bowl wax (floor outlet fixtures). Rubber gaskets or putty will not be permitted.

B. Provide fixtures not having integral traps with P-traps of chromium-plated 17 gauge cast brass, with 17 gauge seamless brass wall return, connected to concealed waste in wall and sanitary fittings. Provide IAPMO approval for trap, and provide less trap screw cleanout.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

a. Dearborn Brass, Commercial series with brass nuts.
b. Delta Commercial.
c. McGuire Manufacturing Co., Inc.

C. Connections from stacks or horizontal wastes to wall or floor finish for wastes from lavatories, urinals, sinks, and drinking fountains and connection between floor drains and traps shall be IPS 85 percent red brass pipe.

D. Unions on waste pipes on fixture side of traps may be slip or flange joints with soft rubber or lead gaskets. Traps shall rough in full size to waste and vent connection, using deep escutcheon plate to cover wall penetration. Compression adaptor extensions or sweat adaptors are not acceptable.

2.7 WATER SUPPLIES AND STOPS

A. Provide 85 percent IPS threaded red brass nipple, conforming to the lead-free requirements of California Health and Safety Code Section 116875, securely anchored to building construction, for each connection to stops, hose bibbs, etc. Each fixture, except hose bibbs, shall have stop valves installed on water supply lines.

B. Provide water supplies to fixtures with compression shut-off stops with threaded inlets and lock shield-loose key handles. Provide combination fixtures with compression stop and threaded inlet on each water supply fitting. Provide lock shield-loose key handle for each stop.

C. Provide 1/2 inch riser tubes with reducing coupling for fixtures, unless otherwise noted.

D. Provide cast brass escutcheon.

E. Furnish shut-off valves on hose bibbs where directly connected to mains with no intervening valves.

F. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. McGuire Manufacturing Company, Inc., model LFH2167LK.
2. T & S Brass and Bronze Works, Inc., model B-1305.

2.8 PLUMBING FIXTURE HANGERS AND SUPPORTS

A. Floor-affixed supports for off-the-floor plumbing fixtures shall comply with ASME A112.6.1M.

B. Residential type fixture supports are not acceptable.

C. Install wall mounted water closets with combination support and waste fittings, with feet of support securely anchored to floor.

D. Install floor mounted water closets with J.R. Smith, Zurn, or equal government pattern cast iron closet flanges with brass bolts, nuts, washers, and porcelain caps secured with Spackle.

E. Install the following fixtures on concealed support with feet of support securely anchored to floor. Anchor top of support to wall construction in an approved manner.

1. Wall hung lavatories.
2. Wall mounted urinals.
3. Drinking fountains.
4. Electric water coolers.

2.9 PLUMBING FIXTURES

A. Install all plumbing fixtures at height indicated on Architectural Drawings. Where mounting height is not indicated, install at height required by Code.

B. Special Requirements For Accessible Fixtures:

1. Operating handle or valve for accessible water closets, urinals, lavatories, and sinks shall operate with less than 5 pounds force. Metering faucets shall be adjusted to operate between 10 and 15 seconds.
2. Insulate exposed waste piping and domestic water supplies below accessible fixtures with CBC access code compliant molded “closed-cell” vinyl covers. Covers shall be installed using vandal resistant fasteners and must be removable. Covers shall meet flame spread rating not to exceed 25 and smoke density not to exceed 50 when tested in accordance with ASTM E-84, and shall comply with the requirements of California Code of Regulations, Title 24. Plumberex – Handy Shield, Johns Manville – Zeston 2000, or equal.

PART 3 - EXECUTION

3.1 PRODUCT HANDLING AND PROTECTION

A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

3.2 PREPARATORY PROVISIONS

A. The Contractor is responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section. Do not proceed until all unsatisfactory conditions have been corrected. Commencing work will be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

3.3 INSPECTION AND PREPARATION

A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the National Standard Plumbing Code pertaining to installation of plumbing fixtures.

C. Fasten plumbing fixtures securely to supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies to blocking behind or within wall construction so as to be rigid, and not subject to pull or push movement.

D. Install CBC accessible fixtures in accordance with Chapter 4 California Plumbing Code, and Chapters 11A and 11B California Building Code.

E. Refer to Division 26 for wiring for electronic flush valves.

3.4 FAUCET INSTALLATION

A. Provide 85 percent IPS red brass pipe, conforming to lead-free requirements of California Health and Safety Code Section 116875, securely anchored to building construction, for each connection to faucets, stops, hose bibbs, etc. Each fixture, except hose bibbs, shall have a stop valve installed on water supply lines to permit repairs without shutting off water mains.

B. Adjust metering faucets to run for 10 to 15 seconds.

3.5 CLEAN AND PROTECT

A. Clean plumbing fixtures of dirt and debris upon completion of installation.

B. Protect installed fixtures from damage during the remainder of the construction period.

C. Grout voids between all fixtures and adjacent surfaces with white Dow Silicone Sealant, arranged to shed water.

3.6 FIELD QUALITY CONTROL

A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

3.7 EXTRA STOCK

A. General: Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one device for every ten units.

END OF SECTION 22 40 00

SECTION 22 50 00 – PLUMBING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES
   1. Instantaneous electric water heaters.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 22 00 50 Basic Plumbing Materials and Methods.

1.3 ACTION SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Product Data: Submit manufacturer's plumbing equipment specifications, installation and start-up instructions, capacity and ratings, with selection points clearly indicated.

1.4 INFORMATIONAL SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

1.5 CLOSEOUT SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Maintenance Data: Submit maintenance data and parts lists for each item of plumbing equipment. Include "trouble-shooting" maintenance guides. Include this data in Operation and Maintenance Manual.

1.6 QUALITY ASSURANCE

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

B. Trade names or catalog numbers stated herein indicates grade or quality of materials desired.

C. Dimensions, sizes, and capacities shown are minimum and shall not be changed without permission of Architect.

D. UL and NEMA Compliance: Provide electric motors and electrical components required as part of plumbing equipment, which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.

E. Pump types and sizes regulated by the US Department of Energy's "Energy Conservation Standards for Pumps" 10 CRF Parts 429 and 431 shall be marked with a compliant PEI_{CL} or PEI_{VL} (Pump Energy Index, constant or variable load) value, basic model number, and RPM on the nameplate. Regulated pumps shall be listed in the Hydraulic Institute (HI) Energy Rating database (er.pumps.org) and be assigned an Energy Rating as defined in the HI 40.5 program guide.

F. CEC Compliance: Comply with California Electrical Code (Title 24, Part 3) as applicable to installation and electrical connections of ancillary electrical components of plumbing equipment.

G. ASME Relief Valve Stamps: Provide water heaters with safety relief valves bearing ASME valve markings.

H. ASME Code Symbol Stamps: For the following equipment, comply with ASME Boiler and Pressure Vessel Code for construction, and stamp with ASME Code symbol:

1. Water Heaters 200 MBH and greater.

I. California Energy Commission Compliance: Provide written confirmation of listing of all water heaters in the "Appliance Efficiency Database."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

PART 2 - PRODUCTS

2.1 MATERIALS

A. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 and NSF 372.

B. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).

2.2 INSTANTANEOUS ELECTRIC WATER HEATERS

A. General: Wall mounted, microprocessor-controlled, electric heating style.

B. Standard: UL 499 for electric, tankless, (domestic-water heater) heating appliance.

C. Construction: Copper piping or tubing complying with NSF 61 and NSF 372 barrier materials for potable water, without storage capacity.

1. Connections: ASME B1.20.1 pipe thread.
2. Pressure Rating: 150 psig .
3. Heating Element: Resistance heating system.
4. Temperature Control: Flow-control fitting.
5. Safety Control: High-temperature-limit cutoff device or system
6. Jacket: Aluminum or steel with enameled finish or plastic.

D. Support: Bracket for wall mounting.

E. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Chronomite Laboratories, Inc.
2. Eemax, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The Contractor shall be responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section and shall not proceed until all unsatisfactory conditions have been corrected. Commencing work shall be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

3.2 ELECTRIC WATER HEATER INSTALLATION

A. Install electric water heaters as indicated, in accordance with manufacturer's installation instructions and in compliance with applicable codes.

B. Furnish wiring diagram to Electrical Installer. Refer to Division 26 for wiring of units, not work of this section.

C. Connect to hot and cold water lines with shutoff valve, check valve, and dielectric union in the cold water line, and ASME standard pressure and temperature relief valve and dielectric union in the hot water line. Connect drain and relief piping as noted on Drawings.

D. Start-up, test, and adjust electric water heaters in accordance with manufacturer's start-up instructions. Check and calibrate controls.

E. After installation has been completed, seal bottom of heaters without feet to floor with silicone sealer.

3.3 DEMONSTRATION AND TRAINING

A. Provide a minimum of hours of training and orientation of Owners staff in proper care and operation of Plumbing Equipment.

3.4 CARE AND CLEANING

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.

3.5 OPERATIONAL TESTS

A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.6 CLEANING UP

A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION 225000

SECTION 23 00 50 - BASIC HVAC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Electric motors.
2. Motor starters.
3. Strainers.
4. Gauges.
5. Access Doors.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. This Section is a part of each Division 23 Section.

1.3 ADDITIONAL REQUIREMENTS

A. Furnish and install incidental work not shown or specified necessary to provide a complete and workable system.

B. Make all temporary connections required to maintain services, including adequate heat and cooling, during the course of the Contract without additional cost to Owner. Notify Owner seven days in advance before disrupting services.

C. Provide for adjustments or modifications to fan and motor sheaves, belts, damper linkages, and other components as required to achieve specified air balance at no additional cost to Owner.

1.4 REFERENCES AND STANDARDS

A. Where material or equipment is specified to conform to referenced standards, it shall be assumed that the most recent edition of the standard in effect at the time of bid shall be used.

1. AABC - Associated Air Balance Council
2. AFBMA - Anti Friction Bearing Manufacturer's Association
3. AMCA - Air Moving and Control Association Inc.

    a. Standard 210 - Laboratory Methods of Testing Fans

4. ANSI - American National Standards Institute
5. ARI - Air-Conditioning and Refrigeration Institute
6. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
7. ASME - American Society of Mechanical Engineers
8. ASTM - American Society for Testing and Materials

9. CCR - California Code of Regulations

    a. Title 8 - Division of Industrial Safety, Subchapter 7; General Industry Safety Orders, Articles 31 through 36

10. CSA – Canadian Standards Association International
11. CSFM - California State Fire Marshal
12. NCPWB - National Certified Pipe Welding Bureau
13. NIST - National Institute of Standards and Technology
14. NEMA - National Electrical Manufacturers' Association
15. NFPA - National Fire Protection Association
16. OSHA - Occupational Safety and Health Act
17. SMACNA - Duct Manuals
18. UL - Underwriters' Laboratories, Inc.

B. Requirements of Regulatory Agencies:

1. The publications listed below form part of this specification; comply with provisions of these publications except as otherwise shown or specified.
    a. California Building Code, 2022.
    b. California Electrical Code, 2022.
    c. California Energy Code, 2022.
    d. California Fire Code, 2022.
    e. California Green Building Standards Code, 2022.
    f. California Mechanical Code, 2022.
    g. California Plumbing Code, 2022.
    h. California Code of Regulations, Title 24.
    i. California Health and Safety Code.
    j. CAL-OSHA.
    k. California State Fire Marshal, Title 19 CCR.
    l. National Fire Protection Association.
    m. Occupational Safety and Health Administration.
    n. Other applicable state laws.

2. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes, or to requirements of authorities having jurisdiction. It is not the intent of Drawings or specifications to repeat requirements of codes except where necessary for clarity.

1.5 DRAWINGS

A. Examine Drawings prior to bidding of work and report discrepancies in writing to Architect.

B. Drawings showing location of equipment and materials are diagrammatic and job conditions will not always permit installation in location shown. The HVAC Drawings show general arrangement of equipment and materials, etc., and shall be followed as closely as existing conditions, actual building construction, and work of other trades permit.

1. Architectural and Structural Drawings shall be considered part of the Work. These Drawings furnish Contractor with information relating to design and construction of the Project. Architectural Drawings take precedence over HVAC Drawings.
2. Because of the small scale of HVAC Drawings, not all offsets, fittings, and accessories required are shown. Investigate structural and finish conditions affecting the Work and arrange Work accordingly. Provide offsets, fittings, and accessories required to meet conditions. Inform Architect immediately when job conditions do not permit installation of equipment and materials in the locations shown. Obtain the Architects approval prior to relocation of equipment and materials.
3. Relocate equipment and materials installed without prior approval of the Architect. Remove and relocate equipment and materials at Contactors' expense upon Architects' direction.
4. Minor changes in locations of equipment, piping, ducts, etc., from locations shown shall be made when directed by the Architect at no additional cost to the Owner providing such change is ordered before such items of work, or work directly connected to same are installed and providing no additional material is required.

C. Execute work mentioned in the Specifications and not shown on the Drawings, or vice versa, the same as if specifically mentioned or shown in both.

1.6 FEES AND PERMITS

A. Obtain and pay for permits and service required in installation of the Work. Arrange for required inspections and secure approvals from authorities having jurisdiction. Comply with requirements of Division 01.

B. Arrange for utility connections and pay charges incurred, including excess service charges.

C. Coordination:

1. General:

a. Coordinate HVAC Work with trades covered in other Specifications Sections to provide a complete, operable and sanitary installation of the highest quality workmanship.

2. Have fire damper and fire smoke damper installation instructions available at Project site during construction for use by Project Inspector.
3. Electrical Coordination:

a. Refer to the Electrical Drawings and Specifications, Division 26, for service voltage and power feed wiring for equipment specified under this section. Contractor has full responsibility for the following items of work:

1) Review the Electrical Drawings and Division 26 Specifications to verify that electrical services provided are adequate and compatible with equipment requirements.
2) If additional electrical services are required above that indicated on Electrical Drawings and in Division 26, such as more control interlock conductors, larger

feeder, or separate 120 volt control power source, include cost to furnish and install additional electrical services as part of the bid.

3) Prior to proceeding with installation of additional electrical work, submit detailed drawings indicating exact scope of additional electrical work.

4. Mechanical Coordination:

a. Arrange for pipe spaces, chases, slots and openings in building structure during progress of construction, to accommodate mechanical system installation.
b. Coordinate installation of supporting devices. Set sleeves in poured-in-place concrete and other structural components during construction.
c. Coordinate requirements for access panels and doors for mechanical items requiring access where concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section “Access Doors and Frames.”
d. Coordinate with other trades equipment locations, pipe, duct and conduit runs, electrical outlets and fixtures, air inlets and outlets, and structural and architectural features. Provide information on location of piping and seismic bracing to other trades as required for a completely coordinated project.

1.7 SUBMITTALS - GENERAL

A. Refer to Division 01 Submittals Section(s) for additional requirements.

B. Submittal packages may be submitted via email as PDF electronic files, or as printed packages. PDFs shall be legible at actual size (100 percent). Provide seven copies of printed submittal packages.

C. Provide submittal of materials proposed for use as part of this Project. Product names in Specifications and on Drawings are used as standards of quality. Furnish standard items on specified equipment at no extra cost to the Contract regardless of disposition of submittal data. Other materials or methods shall not be used unless approved in writing by Architect. Architect's review will be required even though "or equal" or synonymous terms are used.

1. Partial or incomplete submittals will not be considered.
2. Quantities are Contractor's responsibility and will not be reviewed.
3. Provide materials of the same brand or manufacturer for each class of equipment or material.
4. Identify each item by manufacturer, brand, trade name, number, size, rating, or other data necessary to properly identify and review materials and equipment. Words "as specified" are not sufficient identification.
5. Identify each submittal item by reference to items’ Specification Section number and paragraph, by Drawing and detail number, and by unit tag number.
6. Organize submittals in same sequence as in Specification Sections.
7. Show physical arrangement, construction details, finishes, materials used in fabrications, provisions for piping entrance, access requirements for installation and maintenance, physical size, mechanical characteristics, foundation and support details, and weight.

a. Submit Shop Drawings, performance curves, and other pertinent data, showing size and capacity of proposed materials.

b. Specifically indicate, by drawn detail or note, that equipment complies with each specifically stated requirement of Contract Documents.
c. Drawings shall be drawn to scale and dimensioned (except schematic diagrams). Drawings may be prepared by vendor but must be submitted as instruments of Contractor, thoroughly checked and signed by Contractor before submission to Architect for review.
d. Catalog cuts and published material may be included with supplemental scaled drawings.

D. Review of submittals will be only for general conformance with design concept and general compliance with information given in Contract Documents. Review will not include quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with work of other trades, or construction safety precautions, which are sole responsibility of Contractor. Review of a component of an assembly does not indicate acceptance of an assembly. Deviations from Contract Documents not clearly identified by Contractor are Contractor's responsibility and will not be reviewed by Architect.

E. Within reasonable time after award of contract and in ample time to avoid delay of construction, submit to Architect shop drawings or submittals on all items of equipment and materials provided. Provide submittal as a complete package.

1. Shop drawings and submittals shall include Specification Section, Paragraph number, and Drawing unit symbol or detail number for reference. Organize submittals into booklets for each Specification section and submit in loose-leaf binders with index. Deviations from the Contract Documents shall be prominently displayed in the front of the submittal package and referenced to the applicable Contract requirement.

F. Furnish to the Project Inspector complete installation instructions on material and equipment before starting installation.

1.8 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing systems materials and products.

B. Shop Drawings.

C. Sustainable Design Submittals:

1. Product Data: For adhesives and sealants, documentation of compliance including printed statement of VOC content and chemical components.
2. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.

D. Delegated-Design Submittals: For seismic supports, anchorages, restraints, and vibration isolators indicated to comply with performance requirements and design criteria.

1. Calculations performed for use in selection of seismic supports, anchorages, restraints, and vibration isolators shall utilize criteria indicated in Structural Contract Documents.

2. Include design calculations and details for selecting vibration isolators and vibration isolation bases complying with performance requirements, design criteria, and analysis data signed and sealed by the California registered structural engineer responsible for their preparation.
3. Supports, anchorage and restraints for piping, ductwork, and equipment shall be an OSHPD pre-approved system such as TOLCO, ISAT, Mason, or equal. Pipes, ducts and equipment shall be seismically restrained in accordance with requirements of current edition of California Building Code. System shall have current OPM number and shall meet additional requirements of authority having jurisdiction. Provide supporting documentation required by the reviewing authority and the Architect and Engineer. Provide layout drawings showing piping, ductwork and restraint locations.

    a. Bracing of Piping, Ductwork, and Equipment: Specifically state how bracing attachment to structure is accomplished. Provide shop drawings indicating seismic restraints, including details of anchorage to building. In-line equipment must be braced independently of piping and ductwork, and in conformance with applicable building codes. Provide calculations to show that pre-approval numbers have been correctly applied in accordance with general information notes of pre-approval documentation.
    b. In lieu of the above or for non-standard installations not covered in the above pre-approved systems, Contractor shall provide layout drawings showing piping, ductwork, and restraint locations, and detail supports, attachments and restraints, and furnish supporting calculations and legible details sealed by a California registered structural engineer, in accordance with 2019 California Building Code
4. Additional Requirements: In addition to the above, conform to all state and local requirements.

1.9 INFORMATIONAL SUBMITTALS

A. Provide coordinated layouts for HVAC Ductwork systems, in accordance with Specification Section 23 80 00.

B. Provide evidence of equipment certification to California Energy Code Section 110.1 or 110.2, if not providing Electrically Commutated motors for HVAC fans sized below 1 hp and above 1/12 hp. Refer to specific equipment articles requiring electrically commutated motors.

C. Check, Test, and Start forms, from equipment manufacturers.

D. Check, Test and Start reports.

1.10 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Furnish three complete sets of Operation and Maintenance Manual bound in hardboard binder, and one compact disc containing complete Operation and Maintenance Manual in searchable PDF format. Provide Table of Contents. Provide index tabs for each piece of equipment in binder and disc. Begin compiling data upon approval of submittals.

a. Sets shall incorporate the following:

1) Product Data.
2) Shop Drawings.
3) Record Drawings.

4) Service telephone number, address and contact person for each category of equipment or system.
5) Complete operating instructions for each item of heating, ventilating and air conditioning equipment.
6) Copies of guarantees/warrantees for each item of equipment or systems.
7) Test data and system balancing reports.
8) Typewritten maintenance instructions for each item of equipment listing lubricants to be used, frequency of lubrication, inspections required, adjustment, etc.
9) Manufacturers' bulletins with parts numbers, instructions, etc., for each item of equipment.
10) Temperature control diagrams and literature.
11) Check test and start reports for each piece of mechanical equipment provided as part of the Work.
12) Commissioning and Preliminary Operation Tests required as part of the Work.

2. Post service telephone numbers and addresses in an appropriate place designated by Architect.

B. Record Drawings:

1. Refer to Division 01 for additional requirements.
2. Upon completion of the Work, deliver to Architect the following:

a. Originals of drawings showing the Work exactly as installed.
b. One complete set of reproducible drawings showing the Work exactly as installed.
c. One compact disc with complete set of drawings in PDF format showing the Work exactly as installed.
d. Provide Contractor’s signature, verifying accuracy of record drawings.
e. Obtain the signature of the Inspector of Record for Record Drawings.

1.11 SUBSTITUTIONS

A. Refer to Division 01 for complete instructions. Requirements given below are in addition to or are intended to amplify Division 01 requirements. In case of conflict between requirements given herein and those of Division 01, Division 01 requirements shall apply.

B. It is the responsibility of Contractor to assume costs incurred because of additional work and or changes required to incorporate proposed substitute into the Project. Refer to Division 01 for complete instructions.

C. Substitutions will be interpreted to be manufacturers other than those specifically listed in the Contract Documents by brand name, model, or catalog number.

D. Only one request for substitution will be considered for each item of equipment or material.

E. Substitution requests shall include the following:

1. Reason for substitution request.
2. Complete submittal information as described herein; see “Submittals.”
3. Coordinated scale layout drawings depicting position of substituted equipment in relation to other work, with required clearances for operation, maintenance and replacement.
4. List optional features required for substituted equipment to meet functional requirements of the system as indicated in Contract Documents.
5. Explanation of impact on connected utilities.
6. Explanation of impact on structural supports.

F. Installation of reviewed substitution is Contractors’ responsibility. Any mechanical, electrical, structural, or other changes required for installation of substituted equipment or material must be made by Contractor without additional cost to Owner. Review by Architect of substituted equipment or material, will not waive these requirements.

G. Contractor may be required to compensate Architect for costs related to substituted equipment or material.

1.12 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of HVAC systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with HVAC systems work similar to that required for this Project.

C. Comply with applicable portions of California Mechanical Code pertaining to selection and installation of HVAC materials and products.

D. All materials and products shall be new.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Protect equipment and materials delivered to Project site from weather, humidity and temperature variations, dirt, dust and other contaminants.

1.14 FIELD CONDITIONS

A. Contractor shall visit Project site and examine existing conditions in order to become familiar with Project scope. Verify dimensions shown on Drawings at Project site. Bring discrepancies to the attention of Architect. Failure to examine Project site shall not constitute basis for claims for additional work because of lack of knowledge or location of hidden conditions that affect Project scope.

B. Information on Drawings relative to existing conditions is approximate. Deviations from Drawings necessary during progress of construction to conform to actual conditions shall be approved by

the Architect and shall be made without additional cost to the Owner. The Contractor shall be held responsible for damage caused to existing services. Promptly notify the Architect if services are found which are not shown on Drawings.

1.15 WARRANTY

A. Refer to Division 01 for warranty requirements, and duration and effective date of Contractor's Standard Guarantee.

B. Repair or replace defective work, material, or part that appears within the warranty period, including damage caused by leaks.

C. On failure to comply with warranty requirements within a reasonable length of time after notification is given, Architect/Owner shall have repairs made at Contractor's expense.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials or equipment of the same type shall be of the same brand wherever possible. All materials shall be new and in first class condition.

B. All sizes, capacities, and efficiency ratings shown are minimum, except that gas capacity is maximum available.

C. Refer to Division 22 10 00 and 23 80 00 for specific system piping materials.

2.2 MATERIALS

A. No material installed as part of this Work shall contain asbestos.

B. California Green Building Code Compliance:

1. HVAC and refrigeration equipment shall not contain CFCs.
2. HVAC and refrigeration equipment shall not contain Halons.

2.3 ELECTRIC MOTORS

A. General Motor Requirements: Comply with NEMA MG 1 unless otherwise indicated. Comply with IEEE 841 for severe-duty motors.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

a. U.S. Motors.
b. Century Electric.
c. General Electric.
d. Lincoln.
e. Gould.

B. Motor Characteristics: Designed for continuous duty at ambient temperature of 40 deg. C and at altitude of 3300 feet above sea level. Capacity and torque shall be sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

1. Motors exceeding the nameplate amperage shall be promptly replaced at no cost to the Owner. Horsepower shown is minimum and shall be increased as necessary to comply with above requirements. Furnish motors with splash-proof or weatherproof housings, where required or recommended by the manufacturer. Match the nameplate voltage rating with the electrical service supplied. Check Electrical Drawings. Provide a transformer for each motor not wound specifically for system voltage.

C. Polyphase Motors: NEMA MG 1, Design B, medium induction motor, premium efficiency as defined in NEMA MG 1. Select motors with service factor of 1.15. Provide motor with random-wound, squirrel cage rotor, and permanently lubricated or regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading. Temperature rise shall match insulation rating. Provide Class F insulation.

1. Multispeed motors shall have separate windings for each speed.

D. Polyphase Motors with Additional Requirements:

1. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
2. Motors Used with Variable Frequency Controllers:

    a. Separately Connected Motors: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
    b. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
    c. Premium-Efficient Motors: Class B temperature rise; Class F insulation.
    d. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
    e. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
    f. Each motor shall be provided with a shaft grounding device for stray current protection.

3. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

E. Single-Phase Motors:

1. Select motors with service factor of 1.15.

2. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

    a. Permanent-split capacitor.

b. Split phase.
c. Capacitor start, inductor run.
d. Capacitor start, capacitor run.

3. Motors for HVAC exhaust, transfer, and supply fans larger than 1/12 hp and smaller than 1 hp shall be the following:

a. Electronically Commutated motor (EC type): Motor shall be electronically commutated type specifically designed for applications, with heavy duty ball bearings. The motor shall be speed controllable down to 20% of full speed and 85% efficient at all speeds.

1) Exceptions:

a) Motors in fan-coils and terminal units that operate only when providing heating to the space served.
b) Motors installed in space conditioning equipment certified under California Energy Code Section 110.1 or 110.2.

4. Contractor's Option: Motors scheduled on Drawings as single-phase, and larger than 1/12 hp and smaller than 1 hp, for applications other than HVAC fans, may be EC type.
5. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
6. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
7. Motors 1/20 HP and Smaller: Shaded-pole type.
8. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

2.4 MOTOR STARTERS

A. Square D, Allen Bradley, or equal, in NEMA Type 1 enclosure, unless otherwise specified or required. Minimum starter size shall be Size 1. Provide NEMA 3R enclosure where exposed to outdoors.

B. Provide magnetic motor starters for all equipment provided under the Mechanical Work. Starters shall be non-combination type. Provide part winding or reduced voltage start motors where shown or as hereinafter specified. Minimum size starter shall be Size 1.

1. All starters shall have the following:

a. Cover mounted hand-off-automatic switch. Starters installed exposed in occupied spaces shall have key operated HOA switch.
b. Ambient compensated thermal overload.
c. Fused control transformer (for 120 or 24 volt service).
d. Pilot lights, integral with the starters. Starters located outdoors shall be in NEMA IIIR enclosures.

2. Where three phase motors are provided for two-speed operation, provide two speed motor starters.
3. Starters for single-phase motors shall have thermal overloads. NEMA I enclosure for starters located indoors, NEMA IIIR enclosure for starters located outdoors.
4. Provide OSHA label indicating the device starts automatically.

2.5 STRAINERS

A. Charles M. Bailey #100A, Armstrong, Muessco, or equal, Fig. 11 "Y" pattern, 125 psi WP minimum, with monel screens with 20 square mesh for 2 inches and smaller and 3/64 inch perforations for 2-1/2 inches and larger. Install all strainers with a blow-off hose valve with hose adapter. Strainer shall have gasketed cover with straight thread.

2.6 GAUGES

A. Marsh "Series J", U.S. Gage, Danton 800, or equal, with bronze bushed movement and front recalibration. Dials shall be white with black numerals, 3-1/2 inch dial face. Normal reading shall be at mid-scale. Provide a needle valve on each gauge connection. Supply a gauge piped with branch isolation valves across the inlet and outlet of each pump and where shown on the Drawings.

B. Provide Pete's Plug II, Sisco P/T, or equal, test plug with Nordel core {and gasketed cap}, on inlet and outlet of each coil, boiler, condenser, chiller and heat exchanger and where shown on Drawings.

2.7 ACCESS DOORS

A. Where floors, walls, or ceilings must be penetrated for access to mechanical equipment, provide access doors, 14 inch by 14 inch minimum size in usable opening. Where entrance of a serviceman may be required, provide 20 inch by 30 inch minimum usable opening. Locate access doors/panels for non-obstructed and easy reach.

1. All access doors less than 7'-0" above floors and exposed to public access shall have keyed locks.

B. Access doors shall match those supplied in Division 08 in all respects, except as noted herein.

C. Provide stainless steel access doors for use in toilet rooms, shower rooms, kitchens and other damp areas. Provide steel access doors with prime coat of baked-on paint for all other areas.

D. Where panels are located on ducts or plenums, provide neoprene gaskets to prevent air leakage, and use frames to set door out to flush with insulation.

E. Provide insulated doors where located in internally insulated ducts or casings.

F. Do not locate access doors in highly visible public areas such as lobbies, waiting areas, and primary entrance areas. Coordinate with the Architect when access is required in these areas.

G. Where specific information or details relating to access panels different from the above is shown or given on the Drawings or other Divisions of work, then that information shall supersede this specification.

H. Manufacturers: Subject to compliance with requirements, available manufacturers offering products which may be incorporated into the Work include Milcor, Karp, Nystrom, or Cesco, equal to the following:

1. Milcor

a. Style K (plaster).
b. Style DW (gypsum board).
c. Style M (Masonry).
d. Style "Fire Rated" where required.

2.8 EQUIPMENT IDENTIFICATION

A. Identify each piece of equipment with a permanently attached engraved bakelite plate, 1/2 inch high white letters on black background.

2.9 PIPE IDENTIFICATION

A. Identify each piping system and indicate the direction of flow by means of Seton, Inc., Marking Services Inc., Reef Industries, Inc., or equal, pre-tensioned, coiled semi-rigid plastic pipe labels formed to circumference of pipe, requiring no fasteners or adhesive for attachment to pipe.

B. The legend and flow arrow shall conform to ASME A13.1.

PART 3 - EXECUTION

3.1 EXISTING MATERIALS:

A. Remove existing equipment, piping, wiring, construction, etc., which interferes with Work of this Contract. Promptly return to service upon completion of work in the area. Replace items damaged by Contractor with new material to match existing.

B. Removed materials which will not be re-installed and which are not claimed by Owner shall become the property of Contractor and shall be removed from the Project site. Consult Owner before removing any material from the Project site. Carefully remove materials claimed by Owner to prevent damage and deliver to Owner-designated storage location.

C. Existing piping and wiring not reused and are concealed in building construction may be abandoned in place and all ends shall be capped or plugged. Remove unused piping and wiring exposed in Equipment Rooms or occupied spaces. Material shall be removed from the premises. Disconnect power, water, gas, pump or any other active energy source from piping or electrical service prior to abandoning in place.

3.2 FRAMING, CUTTING, AND PATCHING

A. Special framing, recesses, chases and backing for Work of this Section, unless otherwise specified, are covered under other Specification Sections.

B. Contractor is responsible for placement of pipe sleeves, hangers, inserts, supports, and location of openings for the Work.

C. Cutting, patching, and repairing of existing construction to permit installation of equipment, and materials is the responsibility of Contractor. Repair or replace damage to existing work with skilled mechanics for each trade.

D. Cut existing concrete construction with a concrete saw. Do not utilize pneumatic devices.

E. Core openings through existing construction for passage of new piping and conduits. Cut holes of minimum diameter to suit size of pipe and associated insulation installed. Coordinate with building structure, and obtain Structural Engineer's approval prior to coring through existing construction.

3.3 MECHANICAL DEMOLITION

A. Refer to Division 01 Sections “Cutting and Patching” and “Selective Demolition” for general demolition requirements and procedures.

B. Disconnect, dismantle and remove mechanical systems, equipment, and components indicated to be removed. Coordinate with all other trades.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material. Refrigerant system must be evacuated per EPA requirements.
3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and cap remaining ducts with same or compatible ductwork material.
4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
5. Equipment to Be Removed: Drain down and cap remaining services and remove equipment.
6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.4 ELECTRICAL REQUIREMENTS

A. Provide adequate working space around electrical equipment in compliance with the California Electrical Code. Coordinate the Mechanical Work with the Electrical Work to comply.

B. Furnish necessary control diagrams and instructions for the controls. Before permitting operation of any equipment which is furnished, installed, or modified under this Section, review all associated electrical work, including overload protection devices, and assume complete responsibility for the correctness of the electrical connections and protective devices. Motors and control equipment shall conform to the Standards of the National Electrical Manufacturers' Association. All equipment and connections exposed to the weather shall be NEMA IIIR with factory-wired strip heaters in each starter enclosure and temperature control panel where required to inhibit condensation.

C. All line voltage and low voltage wiring and conduit associated with the Temperature Control System are included in this Section. Wiring and conduit shall comply with Division 26.

3.5 PIPING SYSTEM REQUIREMENTS

A. Drawing plans, schematic and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

3.6 PRIMING AND PAINTING

A. Perform priming and painting on the equipment and materials as specified herein.

B. See Division 09 Painting Section(s) for detailed requirements.

C. Priming and painting:

1. Exposed ferrous metals, including piping, which are not galvanized or factory-finished shall be primed and painted.

a. Black Steel Piping:

1) Primer: One coat gray Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, comparable products by Rust-Oleum, Kelly Moore, or equal.
2) Topcoat: Two coats gray Sherwin-Williams Pro Industrial Waterbased Alkyd Urethane Enamel, comparable products by Rust-Oleum, Kelly Moore, or equal.

b. Interior Ductwork: Refer to Division 09 Painting Section(s). Architect shall select paint color.

2. Metal surfaces of items to be jacketed or insulated except ductwork and piping shall be given two coats of primer unless furnished with equivalent factory finish. Items to be primed shall be properly cleaned by effective means free of rust, dirt, scale, grease and other deleterious matter and then primed with the best available grade of zinc rich primer. After erection or installation, all primed surfaces shall be properly cleaned of any foreign or deleterious matter that might impair proper bonding of subsequent paint coatings. Any abrasion or other damage to the shop or field prime coat shall be properly repaired and touched up with the same material used for the original priming.

3. Where equipment is provided with nameplate data, the nameplate shall be masked off prior to painting. When painting is completed, remove masking material.

3.7 EXCAVATING

A. Perform all excavating required for work of this Section. Provide the services of a pipe/cable locating service prior to excavating activities to determine location of existing utilities.

B. Unless shown otherwise, provide a minimum of 2'-6" cover above top of pipe to finished grade for all service piping, unless otherwise noted. Trim trench bottom by hand or provide a 4 inch deep minimum bed of sand to provide a uniform grade and firm support throughout entire length of pipe. For all PVC pipe and for PE gas pipe, bed the pipe in 4 inch sand bed. Pipe bedding materials should be clean crushed rock, gravel or sand of which 100 percent will pass a 1 inch sieve. For pipes that are larger than 10 inches in diameter, at least 95 percent should pass a 3/4 inch sieve, and for pipes 10 inches in diameter or smaller, 100 percent should pass a 1/2 inch sieve. All other materials should have a minimum sand equivalent of 50. Only a small proportion of the native soils will meet these requirements without extensive processing; therefore, importation of pipe bedding materials should be anticipated. Pipe bedding materials shall be compacted in lifts not exceeding 6 inches in compacted thickness. Each lift shall be compacted to not less than 90 percent relative compaction at or above the optimum moisture content, in accordance with ASTM Specification D2940, except that bedding materials graded such 100 percent of the material will pass a No. 200 sieve shall be compacted in 6 inch lifts using a single pass of a flat-plate, vibratory compactor or vibratory drum. Pipe bedding materials should extend at least to the spring line.

C. Maintain all warning signs, barricades, flares, and red lanterns as required.

D. For all trenches 5 feet or more in depth, submit copy of permit detailed drawings showing shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trenches. Obtain a permit from the Division of Industrial Safety prior to beginning excavations. A copy of the permit shall be available at the site at all times.

3.8 BACKFILLING

A. Backfill shall comply with applicable provisions of Division 31 of these Specifications.

B. Except under existing or proposed paved areas, walks, roads, or similar surfaces, backfill for other types of pipe shall be made using suitable excavated material or other approved material. Place backfill in 8 inch layers, measured before compaction, and compact with impact hammer to at least 90 percent relative compaction per ASTM D2940.

1. Backfill plastic pipe and insulated pipe with sand for a minimum distance of 12 inches above the top of the pipe. Compact using mechanical tamping equipment.

C. Entire backfill for excavations under existing or proposed pavements, walks, roads, or similar surfaces, under new slabs on grade, shall be made with clean sand compacted with mechanical tamping equipment vibrator to at least 90 percent relative compaction per ASTM D2940. Remove excess earth. Increase the minimum compaction within the uppermost two feet of backfill to 95 percent.

D. Replace or repair to its original condition all sod, concrete, asphalt paving, or other materials disturbed by the trenching operation. Repair within the guarantee period as required.

3.9 UNION AND FLANGE INSTALLATION

A. Install Epco, Nibco, or equal, dielectric unions or flanges at points of connection between copper or brass piping or material and steel or cast iron pipe or material except in drain piping. Bushings or couplings shall not be used.

B. Install unions in piping NPS 2” and smaller 3 or flanges in piping NPS 2-1/2” and larger whether shown or not at each connection to all equipment and tanks, and at all connections to all automatic valves, such as temperature control valves.

C. Locate the unions for easy removal of the equipment, tank, or valve.

D. Do not install unions or flanges in refrigerant piping systems.

3.10 ACCESS DOOR INSTALLATION

A. Furnish and install access doors wherever required whether shown or not for easy maintenance of mechanical systems; for example, at concealed valves, strainers, traps, cleanouts, dampers, motors, controls, operating equipment, etc. Access doors shall provide for complete removal and replacement of equipment.

3.11 CONCRETE WORK

A. Concrete work required for work of this Section shall be included under another section of the Specification, unless otherwise noted, including poured-in-place concrete work for installing precast manholes, catch basins, etc., and shall include reinforced concrete bases for pumps, tanks, compressors, fan units, boilers, unless the work is specifically indicated on the Drawings to be furnished under this Section.

B. Underground anchors, and pads for valve access boxes are included under this Section of the Specification. Concrete shall be 3000 psi test minimum. Refer to Division 03 for concrete types.

3.12 PIPE PROTECTION

A. Wrap bare galvanized and black steel pipe buried in the ground and to 6" above grade, including piping in conduit, with one of the following, or equal:

1. Polyethylene Coating: Pressure sensitive polyethylene coating, "X-Tru-Coat" as manufactured by Pipe Line Service Corporation or "Green Line" wrap as manufactured by Roystron Products, or equal.

    a. Field Joints and Fittings: Protecto Wrap #1170 tape as manufactured by Pipe Line Service Corporation, or Primer #200 tape by Roystron Products, or equal. Installation shall be as per manufacturer's recommendation and instructions.

2. Tape Wrap: Pressure-sensitive polyvinyl chloride tape, "Transtex #V-l0 or V-20", "Scotchwrap 50", Slipknot l00, PASCO Specialty & Mfg., Inc., or equal, with continuous

identification. Tape shall be a minimum of 20 mils thick for fittings and irregular surfaces, two wraps, 50 percent overlap, 40 mils total thickness. Tape shall be laminated with a suitable adhesive; widths as recommended by the manufacturer for the pipe size. Wrap straight lengths of piping with an approved wrapping machine.

B. Field Joints: Valves and Fittings: double wrap polyvinyl chloride tape as above. Provide at least two thicknesses of tape over the joint and extend a minimum of 4 inches over adjacent pipe covering. Build up with primer to match adjacent covering thickness. Width of tape of fittings shall not exceed 3 inches. Tape shall adhere tightly to all surfaces of the fittings without air pockets.

C. Testing: Test completed wrap of piping, including all epoxy painted piping with Tinker and Rasor Co. holiday detector, or equal.

D. Cleaning: Clean all piping thoroughly before wrapping.

1. Inspection: Damaged or defective wraps shall be repaired as directed. No wrapped pipe shall be covered until approved by Architect.

E. Covering: No rocks or sharp edges shall be backfilled against the wrap. When backfilling with other than sand, protect wrap with an outer wrapping of Kraft paper; leave in place during backfill.

3.13 PIPE IDENTIFICATION

A. Provide temporary identification of each pipe installed, at the time of installation. Temporary identification shall be removed and replaced with permanent identification as part of the work.

B. Apply the legend and flow arrow at all valve locations; at all points where the piping enters or leaves a wall, partition, cluster of piping or similar obstruction, at each change of direction, and at approximately 20'-0" intervals on pipe runs. Variations or changes in locations and spacing may be made with the approval of the Architect. There shall be at least one marking in each room. Markings shall be located for maximum visibility from expected personnel approach.

C. Wherever two or more pipes run parallel, the markings shall be supplied in the same relative location on each.

D. Apply the markings after painting and cleaning of piping and insulation is completed.

3.14 EXPANSION ANCHORS IN HARDENED CONCRETE

A. Qualification Tests: The specific anchor shall have a current ICC-ES report and evaluated in cracked concrete in accordance with Acceptance Criteria AC193. If the specific anchor satisfies cyclic testing requirements per Acceptance Criteria AC01, Section 5.6, the full allowable shear and tension loads listed in the current ICC-ES report and manufacturer’s recommendations for the specific anchor may be used. Otherwise, the design shear and tension loads shall not be more than 80% of the listed allowable shear and tension loads for the specific anchor.

B. Installation: The anchors must be installed in accordance with the requirements given in ICC Research Committee Recommendations for the specific anchor.

C. Testing: Fifty percent of the anchors shall be load-tested on each job to twice the allowable capacity in tension, except that if the design load is less than 75 pounds; only one anchor in ten need be tested. If any anchor fails, all anchors must be tested. The load test shall be performed in the presence of a special inspector.

D. The load may be applied by any method that will effectively measure the tension in the anchor, such as direct pull with a hydraulic jack, a torque wrench calibrated using the specific anchor or calibrated spring-loading devices. Anchors in which the torque is used to expand the anchor without applying tension to the bolt may not be verified with a torque wrench.

3.15 PIPING SYSTEM PRESSURE TESTING

A. General:

1. Perform operational tests under simulated or actual service conditions.
2. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.

B. Piping Systems: Test the installations in accordance with the following requirements and applicable codes:

1. Notify the Architect at least seven days in advance of testing.
2. Authority having jurisdiction shall witness tests of piping systems.
3. Piping shall be tested at completion of roughing-in, or at other times as directed by the Architect.
4. Furnish necessary materials, test pumps, gases, instruments and labor required for testing.
5. Isolate from system equipment that may be damaged by test pressure.
6. Make connections to existing systems with flanged connection. During testing of new work, provide a slip-in plate to restrict test pressure to new systems. Remove plate and make final connection to existing system at completion of testing.

    a. Authority having jurisdiction shall witness final connection to system.

C. Testing, Evacuating, Charging and Lubrication of Refrigeration Systems:

1. Pressurize with dry nitrogen and/or refrigerant to 300 psig and test all joints with an electronic detector or halide torch. Release the pressure and attach a high vacuum pump. Evacuate to 4 mm (4000 microns) and hold for 30 minutes. Break to 5 psig with dry nitrogen and allow to remain in the system for ten minutes. Evacuate to 2 mm (2000 microns) and hold for 30 minutes. Use a mercury manometer or electronic vacuum gauge. Do not start timing until recommended vacuum range is reached.
2. At the end of the evacuation, if the system has been proved leak-free, charge with refrigerant and fill the crankcase to the oil level specified by the manufacturer. All refrigerant oil shall be delivered to the location in sealed containers.
3. Replenish for a period of one year without cost to the Owner all refrigerant and oil required to maintain the proper levels.

3.16 TRACER WIRE INSTALLATION

A. Provide tracer wire for non-metallic water pipe in ground outside of buildings. Use AWG #14 tracer wire with blue colored low density high molecular weight polyethylene insulation, and lay continuously on pipe so that it is not broken or stressed by backfilling operations. Secure wire to the piping with tape at 18 inch intervals. Solder all joints.

B. Terminals: Precast concrete box and cast iron locking traffic cover, Brooks 3TL, or equal; cover marked with name of service; 6 inches of loose gravel below box. Plastic terminal board with brass bolts; identify line direction with plastic tags. Test for continuity between terminals, after backfilling, in presence of Inspector.

C. Alternate: Use electronically detectable plastic tape with metallic core, Terra Tape D, manufactured by Reef Industries, Inc., Seton, Inc., Marking Services, Inc., or equal; tape 2 inches wide, continuously imprinted "CAUTION WATER (GAS, etc.) LINE BELOW". Install, with printed side up, directly over pipe, 18 inches below finish grade. Backfill material shall be as previously specified for the particular condition where pipe is installed, but avoid use of crushed rock or of earth with particles larger than l/2 inch within the top 12 inches of backfill. Take precautions to insure that tape is not damaged or misplaced during backfill operations. Terminal boxes not required.

3.17 OPERATION OF SYSTEMS

A. Do not operate any mechanical equipment for any purpose, temporary or permanent, until all of the following has been completed:

1. Complete all requirements listed under “Check, Test and Start Requirements.”
2. Ductwork and piping has been properly cleaned. Piping systems shall be flushed and treated prior to operation.
3. Filters, strainers etc. are in place.
4. Bearings have been lubricated, and alignment of rotating equipment has been checked.
5. Equipment has been run under observation, and is operating in a satisfactory manner.

B. Provide test and balance agency with one set of Contract Drawings, Specifications, Addenda, Change orders issued, applicable shop drawings and submittals and temperature control drawings.

C. Operate every fire damper, smoke damper, combination smoke and fire damper under normal operating conditions. Activate smoke detectors as required to operate the damper, stage fan, etc. Provide written confirmation that all systems operate in a satisfactory manner.

3.18 TEMPORARY HEAT

A. The General Contractor will provide for all temporary heat at such times as may be required or directed by the Architect and pay all fuel and energy costs incurred.

B. Temporary heating facilities proposed for use by the Contractor will be subject to review of the Architect. Prior to use of any equipment for temporary heat, install temporary filters on all return air inlets, to preclude dust and construction debris from entering the duct system. In addition, install filters in air handling units, and replace at the completion of temporary operation.

C. Filters used for temporary operation of systems shall be as specified for permanent filters specified herein.

D. Comply with Check, Test and Start Requirements for start-up of equipment prior to operation for temporary heat.

E. Contractor shall complete the permanent heating system as soon as possible, thereby making it available for temporary heat. When available, the system may be used as required at the direction of the Architect after systems are properly prepared for use as specified elsewhere. Contractor shall then be responsible for operating the system during periods required and the General Contractor shall pay the fuel and energy costs incurred. Operation of the heating system prior to the filing of "notice of completion" shall not change the Guarantee provisions in any way.

3.19 CHECK, TEST AND START REQUIREMENTS

A. An authorized representative of the equipment manufacturer shall perform check, test and start of each piece of mechanical equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the check test and start of the equipment.

1. As part of the submittal process, provide a copy of each manufacturer’s printed startup form to be used.
2. Some items of specified equipment may require that check, test and start of equipment must be performed by the manufacturer, using manufacturer’s employees. See specific equipment Articles in these Specifications for this requirement.
3. Provide all personnel, test instruments, and equipment to properly perform the check, test and start work.
4. When work has been completed, provide copies of reports for review, prior to final observation of work.

B. Provide copies of the completed check, test and start report of each item of equipment, bound with the Operation and Maintenance Manual.

C. Upon completion of the work, provide a schedule of planned maintenance for each piece of equipment. Indicate frequency of service, recommended spare parts (including filters and lubricants), and methods for adjustment and alignment of all equipment components. Provide a copy of the schedule with each Operation and Maintenance Manual. Provide a copy of certification from the Owner’s representative indicating that they have been properly instructed in maintenance requirements for the equipment installed.

3.20 PRELIMINARY OPERATIONAL REQUIREMENTS AND TESTS

A. Prior to observation to determine final acceptance, put HVAC, plumbing, and fire protection systems into service and check that work required for that purpose has been done, including but not limited to the following condensed check list. Provide indexed report to tabulating the results of all work.

1. All equipment has been started, checked, lubricated and adjusted in accordance with the manufacturer's recommendations, including modulating power exhausts if present.
2. Correct rotation of motors and ratings of overload heaters are verified.
3. Specified filters are installed and spare filters have been turned over to Owner.
4. All manufacturers' certificates of start-up specified have been delivered to the Owner.
5. All equipment has been cleaned, and damaged painted finishes touched up.
6. Damaged fins on heat exchangers have been combed out.
7. Missing or damaged parts have been replaced.
8. Flushing and chemical treatment of piping systems has been completed and water treatment equipment, where specified, is in operation.
9. Equipment labels, pipe marker labels, ceiling markers and valve tags are installed.
10. Valve tag schedules, corrected control diagrams, sequence of operation lists and start-stop instructions have been posted.
11. Preliminary test and balance work is complete, and reports have been forwarded for review.
12. Automatic control set points are as designated and performance of controls checks out to agree with the sequence of operation.
13. Operation and Maintenance Manuals have been delivered and instructions to the operating personnel have been made.

B. Prior to the observation to determine final acceptance, operate all mechanical systems as required to demonstrate that the installation and performance of these systems conform to the requirements of these specifications.

1. Operate and test all mechanical equipment and systems for a period of at least five consecutive 8 hour days to demonstrate the satisfactory overall operation of the project as a complete unit.
2. Include operation of heating and air conditioning equipment and systems for a period of not less than two 8 hour days at not less than 90 percent of full specified heating and cooling capacities in tests.
3. Commence tests after preliminary balancing and adjustments to equipment have been checked. Immediately before starting tests, install air filters and lubricate all running equipment. Notify the Architect at least seven calendar days in advance of starting the above tests.
4. During the test period, make final adjustments and balancing of equipment, systems controls, and circuits so that all are placed in first class operating condition.
5. Where Utility District rebates are applicable, demonstrate that the systems meet the rebate program requirements.

C. Before handing over the system to Owner replace all filters with complete new set of filters.

D. Review of Contractor's Tests:

1. All tests made by the Contractor or manufacturers' representatives are subject to observation and review by the Owner. Provide timely notice prior to start of each test, in order to allow for observation of testing. Upon the completion of all tests, provide a letter to confirm that all testing has been successful.

E. Test Logs:

1. Maintain test logs listing the tests on all mechanical systems showing dates, items tested, inspectors' names, remarks on success or failure of the tests.

F. Preliminary Operation:

1. The Owner reserves the right to operate portions of the mechanical system on a preliminary basis without voiding the guarantee.

G. Operational Tests:

1. Before operational tests are performed, demonstrate that all systems and components are complete and fully charged with operating fluid and lubricants.
2. Systems shall be operable and capable of maintaining continuous uninterrupted operation during the operating and demonstration period. After all systems have been completely installed, connections made, and tests completed, operate the systems continuously for a period of five working days during the hours of a normal working day.
3. This period of continuous systems operation may be coordinated with the removal of Volatile Organic Compounds (VOCs) from the building prior to occupancy should the Owner decide to implement such a program.
4. Control systems shall be completely operable with settings properly calibrated and adjusted.
5. Rotating equipment shall be in dynamic balance and alignment.
6. If the system fails to operate continuously during the test period, the deficiencies shall be corrected and the entire test repeated.

H. Pre-Occupancy Building Purge:

1. Prior to occupancy, ventilate the building on 100 percent outside air, 100 percent exhaust for a continuous period determined by a qualified industrial hygienist (engaged by the Contractor) to reduce V.O.C's prior to occupancy.
2. Submit report by the industrial hygienist verifying satisfactory completion of the pre-occupancy purge.

3.21 DEMONSTRATION AND TRAINING

A. An authorized representative of the equipment manufacturer shall train Owner-designated personnel in maintenance and adjustment of equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the Owner training for the equipment installed.

1. As part of the submittal process, provide a training agenda outlining major topics and time allowed for each topic.
2. Some items of specified equipment require that training must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
3. Contractor shall provide three copies of certification by Contractor that training has been completed, signed by Owner's representative, for inclusion in Operation and Maintenance Manual. Certificates shall include:

a. Listing of Owner-designated personnel completing training, by name and title.
b. Name and title of training instructor.
c. Date(s) of training.
d. List of topics covered in training sessions.

4. Refer to specific equipment Articles for minimum training period duration for each piece of equipment.

END OF SECTION 23 00 50

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.

2. Balancing Hydronic Piping Systems:

3. Balancing Domestic Water Piping Systems.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 REFERENCES AND STANDARDS

A. Associated Air Balance Council (AABC)

1. National Standards for Total System Balance, latest edition.

B. National Environmental Balancing Bureau (NEBB)

1. Procedural Standards for Testing and Balancing of Environmental Systems, latest edition.

1.4 DEFINITIONS

A. The intent of this Section is to use the standards pertaining to the TAB specialist engaged to perform the Work of this Contract, with additional requirements specified in this Section. Contract requirements take precedence over corresponding AABC or NEBB standards requirements. Differences in terminology between the Specifications and the specified TAB organization standards do not relieve the TAB entity engaged to perform the Work of this Contract of responsibility from completing the Work as described in the Specifications.

B. Similar Terms: The following table is provided for clarification only:

Similar Terms

Contract Term	AABC Term	NEBB Term
TAB Specialist	TAB Agency	NEBB Certified Firm
TAB Standard	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems	Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems
TAB Field Supervisor	Test and Balance Engineer	Test and Balance Supervisor

C. AABC: Associated Air Balance Council.

D. NEBB: National Environmental Balancing Bureau.

E. TAB: Testing, adjusting, and balancing.

F. TAB Organization: Body governing practices of TAB Specialists.

G. TAB Specialist: An entity engaged to perform TAB Work.

1.5 ACTION SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. LEED Submittals:

1. Air-Balance Report for Prerequisite IEQ 1: Documentation of work performed for ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
2. TAB Report for Prerequisite EA 2: Documentation of work performed for ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.6 INFORMATIONAL SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

1. Provide list of similar projects completed by proposed TAB field supervisor.
2. Provide copy of completed TAB report, approved by mechanical engineer of record for a completed project with similar system types and of similar complexity.

C. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

1. Submit examinations report with qualifications data.

D. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

E. Interim Reports. Submit interim reports as specified in Part 3. Include list of system conditions requiring correction and problems not identified in Contract Documents examination report.

F. Certified TAB reports.

1. Provide three printed copies of final TAB report. Provide one electronic file copy in PDF format.

G. Sample report forms.

H. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

a. Instruments to be used for testing and balancing shall have been calibrated within a period of one year, or less if so recommended by instrument manufacturer and be checked for accuracy prior to start of work.

1.7 CLOSEOUT SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Certified TAB reports, for inclusion in Operation and Maintenance Manual.

1.8 QUALITY ASSURANCE

A. Independent TAB Specialist Qualifications: Engage a TAB entity certified by AABC or NEBB.

1. The certification shall be maintained for the entire duration of TAB work for this Project. If TAB specialist loses certification during this period, the Contractor shall immediately notify the Architect and submit another TAB specialist for approval. All work specified in this Section and in other related Sections performed by the TAB specialist shall be invalidated if the TAB specialist loses certification, and shall be performed by an approved successor.

B. To secure approval for the proposed TAB specialist, submit information certifying that the TAB specialist is either a first tier subcontractor engaged and paid by the Contractor, or is engaged

and paid directly by the Owner. TAB specialist shall not be affiliated with any other entity participating in Work of this Contract, including design, furnishing equipment, or construction. In addition, submit evidence of the following:

1. TAB Field Supervisor: Full-time employee of the TAB specialist and certified by AABC or NEBB.

    a. TAB field supervisor shall have minimum 10 years supervisory experience in TAB work.

2. TAB Technician: Full-time employee of the TAB specialist and who is certified by AABC or NEBB as a TAB technician.

    a. TAB technician shall have minimum 4 years TAB field experience.

C. TAB Specialist engaged to perform TAB work in this Project shall be a business limited to and specializing in TAB work, or in TAB work and Commissioning.

D. TAB specialist engaged to perform TAB work shall not also perform commissioning activities on this Project.

E. Certified TAB field supervisor or certified TAB technician shall be present at the Project site at all times when TAB work is performed.

1. TAB specialist shall maintain at the Project site a minimum ratio of one certified field supervisor or technician for each non-certified employee at times when TAB work is being performed.

F. Contractor shall notify Architect in writing within three days of receiving direction resulting in reduction of test and balance scope or other deviations from Contract Documents. Deviations from the TAB plan shall be approved in writing by the mechanical engineer of record for the Project.

G. TAB Standard:

1. Perform TAB work in accordance with the requirements of the standard under which the TAB agencies' qualifications are approved unless Specifications contain different or more stringent requirements:

    a. AABC National Standards for Total System Balance, or

    b. NEBB Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.

2. All recommendations and suggested practices contained in the TAB standard are mandatory. Use provisions of the TAB standard, including checklists and report forms, to the extent to which they are applicable to this Project.
3. Testing, adjusting, balancing procedures, and reporting required for this Project, and not covered by the TAB standard applicable to the TAB specialist engaged to perform the Work of this Contract, shall be submitted for approval by the design engineer.

H. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

I. TAB Report Forms: Use standard TAB specialist's forms approved by Architect.

J. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

K. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

L. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.9 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.10 WARRANTY

A. Provide workmanship and performance warranty applicable to TAB specialist engaged to perform Work of this Contract:

1. AABC Performance Guarantee.
2. NEBB Quality Assurance Program.

B. Refer to Division 01 Specifications for additional requirements.

1.11 COORDINATION

A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air distribution systems have been satisfactorily completed.

C. Coordinate TAB work with work of other trades.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contract Documents Examination Report:

1. TAB specialist shall review Contract Documents, including plans and specifications. Provide report listing conditions that would prevent the system(s) from operating in accordance with the sequence of operations specified, or would prevent accurate testing and balancing:

a. Identify each condition requiring correction using equipment designation shown on Drawings. Provide room number, nearest building grid line intersection, or other information necessary to identify location of condition requiring correction.
b. Proposed corrective action necessary for proper system operation.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

I. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

J. Examine operating safety interlocks and controls on HVAC equipment.

K. Report conditions requiring correction discovered before and during performance of TAB procedures.

L. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures. TAB plan shall be specific to Project and include the following:

1. General description of each air system and sequence(s) of operation.
2. Complete list of measurements to be performed.
3. Complete list of measurement procedures. Specify types of instruments to be utilized and method of instrument application.
4. Qualifications of personnel assigned to Project.
5. Single-line CAD drawings reflecting all test locations (terminal units, grilles, diffusers, traverse locations, etc.
6. Air terminal correction factors for the following:

    a. Air terminal configuration.
    b. Flow direction (supply or return/exhaust).
    c. Effective area of each size and type of air terminal.
    d. Air density.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Balance, smoke, and fire dampers are open.
5. Isolating and balancing valves are open and control valves are operational.
6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.

2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 238000 Heating, Ventilating, and Air Conditioning."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Test each system to verify building or space operating pressure, including all stages of economizer cycle. Maximum building pressure shall not exceed 0.03 inches of pressure.

C. Except as specifically indicated in this Specification, Pitot tube traverses shall be made of each duct to measure airflow. Pitot tubes, associated instruments, traverses, and techniques shall conform to ASHRAE Handbook, HVAC Applications, and ASHRAE Handbook, HVAC Systems and Equipment.
1. Use state-of-the-art instrumentation approved by TAB specialists governing agency..
2. Where ducts' design velocity and air quantity are both less than 1000 fpm/CFM, air quantity may be determined by measurements at terminals served.

D. Test holes shall be placed in straight duct, as far as possible downstream from elbow, bends, take-offs, and other turbulence-generating devices.

E. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

F. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

G. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

H. Verify that motor starters are equipped with properly sized thermal protection.

I. Check dampers for proper position to achieve desired airflow path.

J. Check for airflow blockages.

K. Check condensate drains for proper connections and functioning.

L. Check for proper sealing of air-handling-unit components.

M. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts." Section 238000 "Heating, Ventilating, and Air Conditioning."

N. Provide for adjustments or modifications to fan and motor sheaves, belts, damper linkages, and other components as required to achieve specified air balance at no additional cost to Owner.

O. Automatically operated dampers shall be adjusted to operate as indicated in Contract Documents. Controls shall be checked for proper calibration.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow. Alternative methods shall be examined for determining total CFM, i.e., Pitot-tube traversing of branch ducts, coil or filter velocity profiles, prior to utilizing airflow values at terminal outlets and inlets.

2. Measure fan static pressures as follows to determine actual static pressure:

    a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet.
    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling,

full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Check operation of relief air dampers. Measure total relief air quantity at each stage of normal, economizer, power exhaust, or power exhaust economizer operation, as applicable to installed equipment. Adjust relief air dampers to provide 100 percent relief in economizer mode. Ensure that relief dampers close completely upon unit shutdown.

C. Check operation of outside air dampers. Measure total outside air quantity at each stage of normal, economizer, power exhaust, or power exhaust economizer operation, as applicable to installed equipment. Adjust outside air dampers to provide 100 percent outside air in economizer mode. Ensure that outside air dampers close completely upon unit shutdown.

D. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

    a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

E. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading digital backflow compensating hood. Use outlet manufacturer's written instructions and calculating factors only when direct-reading hood cannot be used due to physical obstruction or other limiting factors. Final report shall indicate where values listed have not been obtained by direct measurement.

F. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents, if included.
2. Adjust patterns of adjustable outlets for proper distribution without drafts. Terminal air velocity at five feet above finished floor shall not exceed 50 feet per minute in occupied air conditioned spaces.

G. Do not overpressurize ducts.

3.6 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter manufacturer’s name, model number, size, type, and thermal-protection-element rating.

    a. Starter strip heater size, type, and rating.

3.7 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

3.8 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.

1. Measure and record the operating speed, airflow, and static pressure of each fan.
2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
3. Check the condition of filters.
4. Check the condition of coils.
5. Check the operation of the drain pan and condensate-drain trap.
6. Check bearings and other lubricated parts for proper lubrication.
7. Report on the operating condition of the equipment and the results of the measurements taken. Report conditions requiring correction.

B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:

1. New filters are installed.
2. Coils are clean and fins combed.
3. Drain pans are clean.
4. Fans are clean.
5. Bearings and other parts are properly lubricated.
6. Conditions requiring correction noted in the preconstruction report are corrected.

C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.

1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.

2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
3. If calculations increase or decrease the air flow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
4. Balance each air outlet.

3.9 GENERAL PROCEDURES FOR PLUMBING SYSTEMS

A. Measure pressure drop across each backflow preventer assembly at design flows.

B. Measure water flow at pumps. Use the following procedures except for positive-displacement pumps:

1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.

    a. If impeller sizes must be adjusted to achieve pump performance, obtain approval from Architect Owner Construction Manager and comply with requirements in

2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.

    a. Monitor motor performance during procedures and do not operate motors in overload conditions.

3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
4. Report flow rates that are not within range given in article, Tolerances.

C. Set calibrated balancing valves, if installed, at calculated presettings.

D. Measure flow at all stations and adjust, where necessary, to obtain first balance.

1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.

E. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.

F. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:

1. Determine the balancing station with the highest percentage over indicated flow.

2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
3. Record settings and mark balancing devices.

G. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.

H. Measure the differential-pressure-control-valve settings existing at the conclusion of balancing.

I. Check settings and operation of each safety valve. Record settings.

3.10 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 10 percent and minus 0 percent .
2. Air Outlets and Inlets: Plus 5 percent and minus 5 percent .
3. Multiple outlets within single room: Plus 5 percent and minus 0 percent for total airflow within room. Tolerance for individual outlets within a single room having multiple outlets shall be as for “Air Outlets and Inlets”.

4. Heating-Water Flow Rate: Plus or minus 10 percent .
5. Cooling-Water Flow Rate: Plus or minus 10 percent .

B. Set plumbing systems water flow rates within plus or minus 10 percent.

3.11 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Interim Reports: Prepare periodic lists of conditions requiring correction and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.12 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing field supervisor. Report shall be co-signed by the

Contractor, attesting that he has reviewed the report, and the report has been found to be complete and accurate.

2. The certification sheet shall be followed by sheet(s) listing items for which balancing objectives could not be achieved. Provide explanation for failure to achieve balancing objectives for each item listed.
3. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:
1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Project Performance Guaranty
6. Architect's name and address.
7. Engineer's name and address.
8. Contractor's name and address.
9. Report date.
10. Signature of TAB supervisor who certifies the report.
11. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
12. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

13. Nomenclature sheets for each item of equipment.
14. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.

E. Air distribution outlets and inlets shall be shown on keyed plans with designation for each outlet and inlet matching designation used in Contract Documents and TAB test reports. Room numbers shall be included in keyed plans and test reports. Where multiple outlets and inlets are installed within a single room, a designation shall be assigned and listed for each outlet and inlet in addition to room number.

F. Test Reports – General:

1. All test reports containing air or liquid flow data shall record flow values prior to system adjustment in addition to required data listed for each test report.

G. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch o.c.
f. Make and model number.
g. Face area in sq. ft.
h. Tube size in NPS.
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Average face velocity in fpm.
c. Air pressure drop in inches wg.
d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
e. Return-air, wet- and dry-bulb temperatures in deg F.
f. Entering-air, wet- and dry-bulb temperatures in deg F.
g. Leaving-air, wet- and dry-bulb temperatures in deg F.
h. Refrigerant expansion valve and refrigerant types.

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:

    a. Motor make, and frame type and size.
    b. Horsepower and rpm.
    c. Volts, phase, and hertz.
    d. Full-load amperage and service factor.
    e. Sheave make, size in inches, and bore.
    f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
    g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

    a. Total airflow rate in cfm.
    b. Total system static pressure in inches wg.
    c. Fan rpm.
    d. Discharge static pressure in inches wg.
    e. Suction static pressure in inches wg.

I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

    a. System and air-handling-unit number.
    b. Location and zone.
    c. Traverse air temperature in deg F.
    d. Duct static pressure in inches wg.
    e. Duct size in inches.
    f. Duct area in sq. ft..
    g. Indicated air flow rate in cfm.
    h. Indicated velocity in fpm.
    i. Actual air flow rate in cfm.
    j. Actual average velocity in fpm.
    k. Barometric pressure in psig.

J. Air-Terminal-Device Reports:

1. Unit Data:

    a. System and air-handling unit identification.
    b. Location and zone.
    c. Apparatus used for test.
    d. Area served.
    e. Make.
    f. Number from system diagram.
    g. Type and model number.
    h. Size.
    i. Effective area in sq. ft.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Air velocity in fpm.
c. Preliminary air flow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final air flow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

K. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.13 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure water flow of at least 5 percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Verify that balancing devices are marked with final balance position.
e. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect.
2. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Architect.
3. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than 10 percent, the measurements shall be noted as "FAILED."

5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contact the TAB specialists' governing organization for remedial action by the governing organization under the workmanship and performance warranty. See article, Warranty.
3. If remedial action is not provided by the TAB specialists' governing organization in a timely manner, Owner may contract the services of another TAB specialist to complete the TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB specialists' final payment.

D. Prepare test and inspection reports.

3.14 ADDITIONAL TESTS

A. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 23 80 00 – HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Variable Refrigerant Flow - Split system heat pump units.
2. Refrigerant piping and fittings.
3. Louvers.
4. Air inlets and outlets.
5. Filters.
6. Dampers.
7. Ductwork.
8. Insulation.
9. Thermal hanger shield inserts.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 23 00 50, Basic HVAC Materials and Methods.

C. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings:

1. Variable Refrigerant Flow System Conference: Installing contractor's foreman shall attend conference at Project site with design Engineer and equipment manufacturer's representative, to comply with requirements of this Section and manufacturer's installation requirements including but not limited to, the following:

a. Proposed deviations from system as shown and described in Contract Documents, including location of system components and impacts to refrigerant pipe sizing.

1) Provide Coordinated Layouts as required by this Section for use in discussion.

b. Refrigerant piping assembly practices.
c. General discussion, question and answer period.
d. Walk site with equipment manufacturer's representative to identify conditions affecting installation of system as designed.

1.4 ACTION SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, dimensions, weight, corner or mounting point weights, furnished specialties and accessories; and installation and start-up instructions. Product data shall include applicable product listings and standards. Refer to Section 23 00 50, Basic HVAC Material and Methods for additional requirements.

1. Upon approval of submittal, provide manufacturer’s installation and operating instructions to the Project inspector for the following:

a. Fire dampers, smoke dampers, and combination smoke-fire dampers.

C. VRF Systems: Submit system documentation for a fully engineered system, including shop drawings, and wiring and control diagrams, showing location of required manufactured system components, component model numbers and capacities, and size and location of all field-installed components, including piping, required seismic and thermal expansion loops, and wiring. Identify proposed deviations from system as shown in Contract Documents.

D. Engineering Data: Submit fan curves and sound power level data for each fan unit. Data shall be at the scheduled capacity. Data shall include the name of the rating agency or independent laboratory.

1.5 INFORMATIONAL SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Economizer Fault Detection and Diagnostics (FDD) System Data: For all air-cooled unitary direct-expansion units equipped with an economizer, provide data for third-party supplied California Energy Commission certified FDD controller, documenting compliance with the requirements of California Building Energy Efficiency Standards. Provide evidence of certification.

C. Record of pre-installation meeting.

D. Training Certificates of Completion: Submit certificate from equipment manufacturer, indicating attendance and successful completion of manufacturer’s training program for variable refrigerant flow systems installation and service. Training shall include manufacturer’s preferred methods for assembling and insulating refrigerant piping and accessories.

E. Coordinated Layouts: Submit coordinated layouts. For requirements refer to article, Coordinated Layouts, in this Section.

1.6 CLOSEOUT SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Maintenance Data: Submit maintenance data and parts list for each piece of equipment, control, and accessory; including "trouble-shooting guide," in Operation and Maintenance Manual.

C. Record Drawings: Submit Record Drawings of installed ductwork, duct accessories, and outlets and inlets in accordance with requirements of Division 01.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Belts: One set(s) for each belt-driven unit.
2. Provide one complete set(s) of filters for each filter bank.

1.8 COORDINATED LAYOUT

A. Coordinated layouts are required to amplify, expand and coordinate the information contained in the Contract Documents.

B. Provide minimum 1/4 inch equals one foot scaled coordinated layout drawings showing plan and pertinent section or elevation views of piping, ductwork, equipment, accessories, and electrical systems. Drawings shall be reproducible and work of each trade represented shall be fully coordinated with structure, other disciplines, and finished surfaces. Drawings shall be presented on a single size sheet. Coordinated layout drawings shall have title block, key plan, north arrow and sufficient grid lines to provide cross-reference to design Drawings.

1. Provide a stamp or title block on each drawing with locations for signatures from all contractors involved, including but not limited to the General, HVAC, Plumbing, Fire Protection, and Electrical contractors. Include statement for signature that the contractor has reviewed the coordinated layout drawings in detail and has coordinated the work of his trade.
2. Show on drawings the intended elevation of all ductwork in accordance with the following example:

   B.O.D. = 9'-0"
   OFFSET UP 6"
   B.O.D. = 9'-6"

3. Highlight, encircle or otherwise indicate deviations from the Contract Documents on the coordinated layouts. Architect will not be responsible for identifying deviations from the original Contract Documents.

C. Since scale of contract drawings is small and all offsets and fittings are not shown, Contractor shall make allowances in bid for additional coordination time, detailing, fittings, offsets, hangers and the like to achieve a fully coordinated installation. If changes in duct size are required, equivalent area shall be maintained and the aspect ratio shall not be in excess of 2 to 1 unless approved by the engineer. Drawings shall be submitted for review prior to fabrication and

installation. Drawings may be submitted in packages representing at least one quarter of the building ductwork.

D. Check routing on all ductwork before fabricating. Report any discrepancies to Architect. No extra cost will be allowed for failure to conform to above.

1.9 QUALITY ASSURANCE

A. Design Criteria:

1. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture. All gas-fired equipment shall be UL, ETL or CSA listed.
2. Supply all equipment and accessories in accordance with requirements of applicable national, state and local codes.
3. All items of a given type shall be products of the same manufacturer.
4. Scheduled equipment performance is minimum capacity required.
5. Scheduled electrical capacity shall be considered as maximum available.
6. Scheduled gas BTU input shall be considered as maximum available.

B. Variable Refrigerant Flow Split-System Heat Pump Installer Training: Installing contractor shall have completed training in installation and service of VRF system, by equipment manufacturer.

1. Installing contractor shall obtain, at his own cost, equipment manufacturer’s VRF system service tool, unless service tool is normally resident on controller specified for this Project.

1.10 FIELD CONDITIONS

A. Interruption of Existing Services: Do not interrupt services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of services.
2. Do not interrupt services without Architect's written permission.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).

2.2 VARIABLE REFRIGERANT FLOW - SPLIT SYSTEM HEAT PUMPS – HEAT RECOVERY TYPE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Carrier.
2. Daikin.
3. LG.
4. Mitsubishi.
5. Basis of Design: Toshiba.

B. Indoor Units

1. General:

a. Galvanized steel casing.
b. Ducted, ceiling-recessed, or in-room units per Drawings schedule. Available styles shall include:

1) Concealed (ducted) units:

a) Horizontal/Vertical air handling unit for closet or above-ceiling installation.

2) Recessed Units:

a) Ceiling-recessed units: One-, two-, and four-way throw configurations.

c. Factory assembled and tested with factory wiring, piping, expansion valve, control circuit board, and fan motor. Units shall have, as a minimum, the following functions:

1) Self-diagnostic function.
2) Auto restart function.
3) Auto changeover function.
4) Emergency operation function.
5) 3-minute time delay shall provide minimum 3 minute run time for cooling and heating.

d. Indoor unit and refrigerant pipes shall be charged with dehydrated air prior to shipment from the factory.
e. The indoor units shall be equipped with a return air thermistor.

2. Unit Cabinet:

a. The cabinet shall be insulated with foamed polystyrene and polyethylene insulation.

3. Fan:

a. The fan shall be direct-drive type, statically and dynamically balanced impeller with multiple high and low fan speeds. Auto fan setting shall automatically adjust fan speed.
b. The fan motor shall be thermally protected.

c. The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings.
d. For single-phase fan motors sized larger than 1/12 hp and smaller than 1 hp, refer to Article, Electric Motors, in Section 23 00 50, Basic HVAC Materials and Methods.
e. Ceiling recessed and wall-mounted units shall have motorized louvers to direct airflow in up and down directions, and manually adjusted vanes for side-to-side adjustment of airflow direction.
f. Ceiling suspended units shall have motorized guide vanes to vary airflow direction.
g. All units shall be provided with a condensate drain pan below the coil. Drain pans shall have primary and overflow drains.
h. Ceiling recessed units shall have an integral condensate pump. Refer to Drawings schedule for additional condensate pump requirements.

4. Coil:

a. Coils shall be aluminum fins bonded to internally grooved copper tubes. Fins shall have corrosion-resistant coating.
b. The coils shall be pressure tested at the factory.
c. Unit shall be provided with ball-type refrigerant service valves at each refrigerant piping connection.
d. A condensate pan and drain connections shall be provided under the coil. Provide overflow cutoff switch to disable unit during overflow condition.

5. Filters:

a. Provide indoor units manufactured to accept washable filter media with two sets for each unit.
b. Refer to Drawings schedule, and article, Filters, in this Section for filter requirements for ducted, above-ceiling units incorporating mixing boxes.

6. Controls:

a. Units shall have controls provided by the manufacturer to perform input functions necessary to operate the system.
b. Operating modes shall include Auto Changeover (heat recovery systems only), Heating, Cooling, Dry, and Fan Only.
c. Units shall be compatible with a BMS system via optional LonWorks or BACnet gateways.
d. Units incorporating mixing boxes for economizer operation shall be furnished with economizer control system certified as meeting the requirements for Fault Detection and Diagnostics (FDD) in the California Building Energy and Efficiency Standards.

C. Outdoor Condensing Units:

1. General:

a. Condensing unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves (when required by manufacturer), 4-way valve,

distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant accumulator and regulator.

b. The following safety devices shall be included as part of the condensing unit; high pressure sensor and switch, low pressure sensor, control circuit fuses, over- and under-current protection, phase failure and phase reversal protection, fusible plug or pressure relief valve, and crankcase heater..
c. All refrigerant lines shall be individually insulated between the condensing units and indoor units. .
d. The system will automatically restart operation after a power failure without loss of settings.
e. The condensing units shall be modular in design and allow for side-by-side installation with minimum spacing. Provide kit for field piping between connected condensing units. Refer to Drawings schedules and diagrams for connected units.
f. To ensure the liquid refrigerant does not flash when supplying to indoor units, the circuit shall be provided with a sub-cooling feature.
g. Oil recovery cycle shall be automatic occurring 2 hours after start of operation, and thereafter every 8 hours of operation. Each system shall maintain continuous heating during oil return operation. Reverse cycle (cooling mode) oil return during heating operation shall not be permitted due to the potential reduction in space temperature.
h. The condensing unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls or an auxiliary heat source.

    1) Provide condensing unit with low ambient kit when scheduled on Drawings. Low ambient kit components shall be furnished with NEMA 4x rated control box for outdoor installation.

2. Unit Cabinet:

    a. The condensing unit cabinet shall be weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed galvanized steel panels coated with a baked enamel or powder coat finish.

3. Fan:

    a. The condensing unit shall consist of one or more direct-drive, vertical discharge propeller fans with blades constructed of thermoplastic polymer material.
    b. The condensing unit fan motor shall be variable-speed digitally commutating (DC) type. Fan motor dipswitch shall allow increase of external static pressure setting.
    c. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted on vibration isolators.
    d. The fan motor shall be provided with a fan guard to prevent contact with moving parts.

4. Condenser Coil:

    a. Coils shall be aluminum fins bonded to internally grooved copper tubes. Fins shall have corrosion-resistant coating.
    b. The coils shall be pressure tested at the factory.
    c. Unit shall be provided with ball-type refrigerant service valves at each refrigerant piping connection.

d. Condensing unit cabinet shall be provided with metal coil guard.

5. Compressor:

a. The scroll compressors shall be variable speed pulse-width inverter (PVM inverter) controlled type, hermetically sealed, which shall vary the compressor speed to follow fluctuations in total cooling and heating load, determined by the suction gas pressure as measured in the condensing unit.

1) The inverter driven compressor motor in each condensing unit shall be the reluctance DC (digitally commutating) type.

b. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
c. Oil separators shall be provided as part of the compressor module together with an intelligent oil management system.
d. The compressor shall be isolated to avoid the transmission of vibration.
e. In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity.
f. Multiple compressor operation sequencing: When multiple condenser modules are combined, operation hours of each compressor shall be balanced by means of a duty cycling function, enabling sequential starting of each module at each start/stop cycle, completion of oil return, and completion of defrost, or every 8 hours.
g. Refrigerant shall be R410a.

D. Indoor Heat Recovery Controllers: Two- or three-pipe refrigerant control units to match outdoor condensing unit configuration. Heat recovery units shall be installed between outdoor condensing units and indoor zone-conditioning units. Indoor heat recovery unit shall operate to remove heat from zones requiring cooling, and distribute that heat to zones requiring heating. Refer to Drawings for unit locations. Refer to Drawings schedules and details for unit configuration and electrical requirements.

E. Refrigerant Piping:

1. All refrigerant lines shall be individually insulated between the condensing units and indoor units.
2. For interconnecting piping between outdoor and indoor equipment, refer to Article, Refrigeration Pipe and Fittings, in this Section.

F. System Controls:

1. General: The controls network shall be capable of supporting remote controllers, schedule timers, system controllers, centralized controllers, an integrated web based interface, graphical user workstation, and system integration to a Building Management Systems via BACnet® and/or LonWorks®.

2. For additional information, Refer to Section 23 09 23, Direct Digital Control System for HVAC.

3. Programmable Local Remote Controller: The programmable local remote controller shall be capable of controlling a minimum of 16 indoor units serving a single zone, and of operation with or without a central controller. Controller shall have the following minimum functions:

    a. On/Off.
    b. Operating mode (cool, heat, auto, dry, and fan, depending on selected system type).
    c. Temperature setting.
    d. Fan speed setting.
    e. Air swing settings.
    f. Room temperature and humidity display.
    g. Occupancy sensor capable.
    h. Schedule operations.
    i. Allow/Prohibit local remote control functions.
    j. Unit level error code display.
    k. Test run.
    l. Set temperature range limit.
    m. Override of scheduled functions for indoor unit groups.
    n. Lock out of On/Off, Mode, Set Temp., Hold-button, and Air Direction.

4. Centralized Controller: The controller shall support system configuration, daily/weekly scheduling, monitoring of operation status, error email notification, online maintenance tool and malfunction monitoring. The controller shall have basic operation controls which can be applied to an individual indoor unit, a group of indoor units, or all indoor units. (cool, heat, auto, dry, and fan)The central controller shall be able to enable or disable operation of local remote controllers via a PC. Controller shall have the following minimum functions:

    a. On/Off.
    b. Operating mode (cool, heat, auto, dry, and fan, depending on selected system type).
    c. Temperature setting.
    d. Fan speed setting.
    e. Air swing settings.
    f. Room temperature display.
    g. Schedule operations.
    h. Morning warm-up/cool-down.
    i. Night setback setting.
    j. Allow/Prohibit local remote control functions.
    k. Unit level error code display.
    l. External input/output.
    m. PC data back-up.

5. BACnet® and/or LonWorks® Gateway: Gateway to allow connection to Energy Management Systems shall allow changes to the following, as a minimum:

    a. On/Off.
    b. Temperature setting.
    c. Alarm.
    d. Operating mode.
    e. Fan speed setting.
    f. Allow/Prohibit local remote control functions.

g. High/Low limit setback temperature (heat recovery systems only).
h. Air direction/swing settings.

6. Web browser: The controls network shall allow multiple individual users to monitor and control user defined zones via a network PC web browser.

G. Owner Training: Manufacturer shall provide one on-site 4 -hour training session for Owners' maintenance personnel.

2.3 REFRIGERATION PIPE AND FITTINGS

A. Refrigeration gas and liquid piping shall be type ACR hard drawn copper tubing, cleaned and capped in accordance with ASTM B280, with wrought copper fittings. All joints shall be brazed with Sil-fos under nitrogen purge. Relief valve discharge piping shall be full size of relief discharge port.

1. Manufactured, pre-charged and pre-insulated refrigerant line-set refrigerant piping may be utilized at Contractor's discretion.

a. VRF Systems: Use of manufactured, pre-charged and pre-insulated refrigerant line-set refrigerant piping between outdoor condensing units and indoor heat recovery controllers, or distribution headers and tees is not allowed. When system manufacturer's installation instructions allow use of refrigerant line-set piping between indoor heat recovery controllers, or distribution headers and tees, and air terminal devices, follow instructions for allowable pipe size range and support to avoid forming traps in the piping.

B. Variable Refrigerant Flow Heat Pump Systems Fittings:

1. For systems manufacturers requiring engineered, pre-assembled headers and branch fittings, Contractor shall obtain such fittings from system manufacturer. Fittings shall be suitable for system type and configuration.
2. For systems manufacturers not requiring engineered, pre-assembled headers and branch fittings, Contractor shall furnish fittings complying with manufacturer's requirements.

C. Refrigeration Piping Specialties: Furnish and install Superior, Sporlan, Alco, Henry, or equal, stop valves, solenoid valves, adjustable thermal expansion valves, sight glass, flexible connection, charging valve, and drier with valve bypass in the liquid lines and Superior DFN shell and cartridge suction line filter sized 2-1/2 times tonnage.

1. Install only those refrigeration piping specialties recommended by manufacturer of specific installed equipment.

2.4 LOUVERS

A. Louvers shall be minimum 16 gauge steel with Bonderite and Epon gray primer and 1/2 inch square mesh, 16 gauge galvanized steel screen on the inside. Louvers shall be Airolite #609, Arrow United Industries, or equal, with 4 inch louver depth.

2.5 AIR INLETS AND OUTLETS

A. Except as otherwise indicated, provide manufacturer's standard inlets and outlets where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.

B. Ceiling, wall or floor Compatibility: Provide inlets and outlets with border styles that are compatible with adjacent ceiling, wall or floor systems, and that are specifically manufactured to fit into ceiling, wall or floor module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems that will contain each type of air outlet and inlet.

C. Refer to Schedule on Mechanical Drawings for details of inlets and outlets to be used.

2.6 AIR FILTERS

A. Provide MERV 8 disposable pleated media type. Refer to specific equipment Articles for filter depth and for exceptions to this specification. Filters shall conform to the following:

1. Standards:

   a. ASHRAE Standard 52.2-2007.
   b. Underwriters Laboratories: U.L. 900, Class 2.

2. Construction:

   a. Media: Synthetic or cotton-synthetic blend with radial pleats.
   b. Media Frame: High wet-strength beverage board.
   c. Media Support: Welded wire or expanded metal grid bonded to air leaving side of the media.

3. Performance: 2” deep filter shall have a maximum initial air resistance of 0.31 inches w.g.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Camfil Farr, Inc., model 30/30.
2. Flanders Corporation, model 40 LPD.

C. Temporary (Construction Period) Filters:

1. Install new temporary filters in all units that have filter systems installed. Temporary filters shall match the permanent filters that are specified for the units. Replace filters as needed, in accordance with manufacturer’s directions, in order to provide protection for the unit prior to occupancy by the Owner.
2. If air handling units are operated during construction of the project, install temporary filters directly over each return air inlet. Filters shall match the permanent filters that are specified for the units. Select size of filter to completely cover the frame of the return air inlet, and tape filters firmly in place to eliminate any construction debris from entering the duct

system or unit. Remove the temporary filters upon completion of the work, and repair all damaged paintwork.

D. Spare Filters:

1. Furnish two new, complete sets of filter cartridges for each filter bank on completion and acceptance of the work. Install one set of filters in units (prior to final air balance). Provide units designed to accommodate washable, permanent filters with one washable, permanent filter.

2.7 DAMPERS

A. Backdraft Dampers: Ruskin CBD2, counterbalanced, Nailer Industries, or equal.

B. Manual Air and Balance Dampers: Provide dampers of single blade type or multi-blade type constructed in accordance with SMACNA, "HVAC Duct Construction Standards," except as noted herein.

1. Rectangular Ductwork:
   a. Single damper blades may be used in ducts up to 10 inches in height. Dampers shall be 16 gauge minimum. Provide self-locking regulators, equal to Ventlok 641. Provide end bearings equal to Ventlok 607 at each damper. Provide continuous solid 3/8 inch square shafts.
   b. Multiple blade dampers shall be equal to Ruskin CD35 Standard Control Damper. Maximum width for multiple damper blades for use in rectangular duct shall not exceed 6 inches.
   c. Where duct velocity may be expected to exceed 1500 fpm, provide Ruskin CD-50, or equal, low leakage dampers with airfoil blades.

2. Round Ductwork:
   a. Single damper blades may be used in ducts up to 12 inches in diameter. Provide multiple blade opposed blade dampers, with connected linkage, for ductwork larger than 12 inches in diameter.
   b. Damper blades for round ductwork shall be 20 gauge steel for ducts up to 12 inches diameter and 16 gauge steel for dampers larger than 12 inches damper. Provide self-locking regulators, equal to Ventlok 641, Durodyne, or equal for operation of dampers. Provide end bearings equal to Ventlok 607 and provide continuous solid 3/8 inch square shafts.

3. Where ductwork is externally insulated, provide self-locking regulators equal to Ventlok 644, Durodyne, or equal for rectangular ductwork, and Ventlok 637, Durodyne, or equal for round ducts.

C. Fire Dampers and Combination Fire/Smoke Dampers:

1. Fire dampers and combination fire/smoke dampers shall be listed and approved by the California State Fire Marshal. Installation shall conform to the manufacturer’s UL approved installation instructions.

a. Fire dampers shall be UL 555 classified and labeled as dynamic fire dampers approved for wall and floor installation. They shall ship from the manufacturer as an assembly with a minimum 20-gauge factory installed sleeve. Sleeve length shall suit the requirements of the wall construction. Each dynamic fire damper/sleeve assembly shall ship complete with factory “roll formed” one-piece angles with pre-punched holes for easy installation. Dynamic fire dampers for vertical installation must consist of a single section on sizes up to 33” x 36” and a single section on sizes up to 24” x 24” for horizontal installation. 1-1/2 hour dynamic fire dampers shall be Ruskin DIBD20, Pottorff, or equal. 3 hour dynamic fire dampers shall be Ruskin DIBD230, Pottorff, or equal.
b. Fire dampers for high pressure/velocity systems where velocities exceed 2000 fpm and/or 4” w.g. pressure fire damper shall be Ruskin FD60, Pottorff, or equal.
c. Fire dampers for ceiling installation shall be UL 555C classified and labeled as ceiling dampers. They shall be provided with a thermal insulating blanket to fit the inlet or outlet condition if required by the application. Ceiling dampers shall be Ruskin CFD 2, 3, 4 or 5. Ceiling dampers for ceilings constructed of wood shall have UL tested in design L501 and shall be Ruskin CFD7, Pottorff, or equal.
d. Combination fire/smoke dampers. Dampers shall be UL classified and labeled as Leakage Class I Smoke Dampers in accordance with the latest version of UL 555S. Dampers shall be warranted to be free from defects in material and workmanship for a period of 5 years after date of shipment. Damper/actuator assembly shall be tested to full open and full close at minimum 2000 fpm 250° F heated air and 4” w.g. with airflow in both directions. (Specified select: 250° / 350°, 2000 fpm/3000 fpm). Each damper shall be equipped with “controlled closure” quick detect heat actuated release device to prevent duct and HVAC component damage resulting from instantaneous damper closure. Release device shall be EFL type and shall allow reset from outside the sleeve after moderate temperature exposure. (Replacement type fusible links not acceptable.)
e. Two position combination fire smoke dampers shall be equipped with one or more factory installed, direct coupled, 120 volt, single phase, electric actuator for energize open – fail close operation. Dampers with multiple actuators shall be factory wired with single point connection at the EFL heat release device for connection to power. Damper actuator shall include minimum one-year energized hold open (no cycles) and spring return (fail) close reliability. Damper/actuator shall include minimum 20,000 full open-full close cycle performances.
f. Modulating combination fire smoke dampers shall be equipped with one or more factory installed contact for modulating signal connection. Damper/actuator shall include minimum 100,000 full open-full close cycle performances with spring return (fail) close on loss of power.
g. Round combination fire smoke dampers up to 24” diameter shall be true round type with minimum 20 gauge galvanized steel designed for lowest pressure drop and noise performance. Bearings shall be stainless steel sleeve turning in an extruded hole in the frame. Blade seals shall be silicone edge designed to withstand 450° F and galvanized steel mechanically locked in to the blade edge (adhesive type seals are not acceptable). Each damper shall be equipped with a factory-installed sleeve of 17 inches minimum length and factory “roll formed” one-piece angles with pre-punched holes. Dampers shall be Ruskin FSDR25, Pottorff, or equal.
h. Round (larger than 24” diameter) or rectangular combination fire smoke dampers shall include roll-formed structural hat channel frame, reinforced at the corners,

formed from a single piece of minimum 16 gauge equivalent thickness formed from single piece galvanized steel. Bearings shall be stainless steel turning in an extruded hole in the frame. Blade edge seals shall be silicone rubber designed to withstand 450° F and galvanized steel mechanically locked in to the blade edge (adhesive type seals are not acceptable). Each damper shall be equipped with a factory-installed sleeve of 17" minimum length and factory "roll formed" one-piece angles with pre-punched holes for easy installation. Dampers shall be Ruskin FSD60, Pottorff, or equal.

i. 3-hour rated combination fire smoke dampers shall be Ruskin model FSD60-3, Pottorff, or equal.

j. All FSD60 type dampers shall be AMCA licensed and shall bear the AMCA Seal for Air Performance. AMCA certified testing shall verify pressure drop does not exceed .03" w.g. at a face velocity of 1,000 fpm on a 24" x 24" damper.

k. Wall type fire/smoke damper:

1) Combination fire/smoke dampers for use in the wall of exit corridors shall be classified and labeled as Leakage Class II Smoke Dampers in accordance with the latest version of UL 555S. Dampers shall meet the requirements for combination fire/smoke dampers in paragraph 3 above except AMCA certified testing shall verify pressure drop does not exceed .07" w.g. at a face velocity of 1,000 fpm on a 24" x 24" damper and blades shall be single skin galvanized steel 10 gauge minimum with 3 longitudinal grooves for reinforcement. Dampers shall be Ruskin FSD36, Pottorff, or equal.

2) Front access combination fire/smoke dampers shall meet all the requirements for combination fire/smoke dampers in paragraph 3 above except pressure drop requirement. In addition the dampers shall be constructed so that actuators and all accessories are accessible from the grille side. Actuators and accessories shall be housed within an integral cabinet on the side of the damper frame and shall not be installed in the air stream in front of the damper. The damper sleeve shall be minimum 14" and flanged to accept a steel framed grille. The sleeve shall be covered with fire resistant material. Dampers shall be Ruskin FSD60FA, Pottorff, or equal.

l. Ceiling type fire/smoke damper for tunnel type corridor construction: Combination fire/smoke dampers for use in the corridor ceiling of tunnel type corridor construction shall be UL classified and labeled as Corridor Damper. Dampers shall meet the requirements of paragraph 4a above except pressure drop testing does not require AMCA certification. Dampers shall be Ruskin FSD36C, Pottorff, or equal.

m. Fusible links shall have temperature rating approximately 50° F above normal maximum operating temperature of the heat producing appliance.

1) If project requires re-openable fire/smoke dampers, provide Ruskin 165 ° F / 350° F TS150, NCA or equal. The TS150 firestat replaces the EFL and allows the damper to be re-opened from remote location up to 350 ° F. TS150 shall include full open and full closed damper position contacts for interface with remote position indication panel.

2) Each fire/smoke damper shall be equipped with "controlled closure" quick detect heat actuated release device to prevent duct and HVAC component damage. Release device shall allow easy reset after moderate temperature

rise outside the sleeve. Heat release device shall be the Ruskin EFL, NCA or equal.

3) Unless the system is using a validation control system, each fire/smoke damper shall be equipped with a control panel including blade position indicator lights and a key operated switch. The panel cover shall be oversized for flush mount into the wall or ceiling and shall have a brushed look. Control panel shall be Ruskin MCP2, Pottorff, or equal.

2. All actuators used for smoke dampers or combination fire/smoke dampers shall have a cycle time requirement of not more than every twelve months and shall be rated for continuous "0n" duty and shall be provided with internal spring return. Actuators shall be equipped with pilot light, remote key test switch, end switch and circuitry to activate pilot light on remote key (test) switch located in corridor ceiling adjacent to damper. Electric motors shall be Invensys MA-250, MA-253, Honeywell H2000, or equal.

2.8 DUCTWORK

A. Construct and install sheet metal ductwork in accordance with the California Mechanical Code for 2 inches static pressure for supply air, and 2 inches minimum for return and exhaust air unless otherwise noted on Drawings.

1. Where not in conflict with the California Mechanical Code, construct and install all sheet metal ductwork in accordance with SMACNA HVAC Duct Construction Standards (Metal and Flexible). Where applicable for HVAC work, construct and install sheet metal work in accordance with SMACNA Architectural Sheet Metal Manual.
2. Provide variations in duct size, and additional duct fittings as required to clear obstructions and maintain clearances as approved by the Architect at no extra cost to the Owner.
3. Gauges, joints and bracing shall be in accordance with the California Mechanical Code.
4. Provide beading or cross breaking for all ductwork inside building. Provide cross breaking for ductwork exposed to weather.
5. At the contractor's option, ductwork may be fabricated using the Ductmate, Nexus, Quickduct, Transverse Duct Connection (TDC), Pyramid-Loc duct connection systems, or equal. Fabricate in strict conformance with manufacturer's written installation instructions and in accordance with California Mechanical Code.

    a. Seal flanged ends with pressure sensitive high density, closed cell neoprene or polyethylene tape gasket, Thermo 440, or equal.
    b. Provide metal clips for duct connections, except at breakaway connections for fire dampers and fire smoke dampers. Provide corner clips at each corner of duct, through bolted, at all locations except at breakaway connections for fire dampers and fire smoke dampers. Where used on locations exposed to weather, provide continuous metal clip at top and sides of duct, with 1 inch overhang for top side.

B. Design and installation standards:

1. SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) for all work in this section.

2. NFPA Compliance: Comply with ANSI/NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems," and ANSI/NFPA 90B, "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."
3. California Mechanical Code.

C. Duct sizes indicated are external sizes.

D. Galvanized Sheet Steel: Lock-forming quality, ASTM A924 and ASTM A653, Coating Designation G 90. Provide mill phosphatized finish for exposed surfaces of ducts exposed to view.

1. Provide mill certification for galvanized material at request of the Project Inspector.

E. Duct Sealants:

1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.
3. Provide one part, non-sag, synthetic latex sealant, formulated with a minimum of 68 percent solids. Sealant shall comply with ASTM E84, Surface Burning Characteristics.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1) Design Polymerics, model DP1010.
2) Polymer Adhesive Sealant Systems Inc, model Airseal #11.
3) McGill Airseal, LLC.

F. Duct Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, straps, trim, and angles for support of ductwork.

G. Rectangular Duct Fabrication:

1. Shop fabricate ductwork of gauges and reinforcement complying with the more stringent of the following standards, except as noted herein.

a. SMACNA HVAC Duct Construction Standards
b. California Mechanical Code

2. Fabricate ducts for 2 inch pressure class with minimum duct gauges and reinforcement as follows, except as otherwise noted:

Table A		
Duct Dimension	Minimum Gauge	Joint Reinforcement Per CMC
Through 12"	26	Not Required

13" through 18"	24	Not Required
19" through 30"	24	C/4
31" through 42"	22	E/4
43" through 54"	22	F/2
55" through 60"	20	G/4
61" through 84"	20	I/2
85" through 96"	20	J/2
Over 96"	18	K/2

3. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1.5 times associated duct width. Fabricate to include single thickness turning vane in elbows where space does not permit the above radius or where square elbows are shown. Limit angular tapers to 30 degrees for contracting tapers and 20 degrees for expanding tapers. Turning vanes shall be E-Z Rail II, Durodyne, or equal.
4. Fabricate round supply connections at rectangular, plenum type fittings using spin-in type fittings, complete with extractor and volume control damper. Refer to Paragraph “DAMPERS” for damper requirements.
5. Provide drive slip or equivalent flat seams for ducts exposed in the conditioned space or where necessary due to space limitations. On ducts with flat seams, provide standard reinforcing on inside of duct. Duct connection to outlet on exposed duct shall be full size of outer perimeter of outlet flange.
6. Ducts exposed in the conditioned space shall be free of dents and blemishes and be mounted tight against adjacent surface with flat hangers. Remove all fabrication labels from ductwork.
7. Provide 20 gauge minimum for ductwork exposed within occupied spaces.

H. Rectangular Internally Insulated Duct Fabrication:

1. Provide internal duct lining where indicated on the Drawings, with a minimum of 10'-0" length in each direction from the fan, fan casing, or unit casing. Line all transfer ducts.

    a. Where ductwork is exposed to weather or outside the building insulation envelope, provide 2 inch thick, 1-1/2 pound density internal lining with matte facing, with an R-Value of 8.0 minimum.
    b. Where ductwork is within the building insulation envelope, lining shall be 1” thick, 1-1/2 pound density, with R-value of 4.2 minimum.
    c. Ducts exposed in the conditioned space shall be free of dents and blemishes and be mounted tight against adjacent surface with flat hangers. Remove all fabrication labels from ductwork.

d. Where installed exposed in the conditioned space, duct shall be minimum 20 gauge with 1 inch insulation layer (minimum R-value – R-4.2).
e. Cement duct liner in place with nonflammable, non-hardening duct adhesive. Seal all raw edges of insulation inside ductwork with adhesive, including longitudinal liner edges.
f. Provide metal nosing at all locations where liner is preceded by unlined metal.
g. Provide sheet metal weld pins and washers or clinch pins and washers on all ductwork on 12 inch intervals with the first row within 3 inches of the leading edge of each piece of insulation and within 4 inches of corners. No use of adhesive mounted pins will be considered.

    1) Install clinched pin fasteners with properly adjusted automatic fastening equipment. Manual installation will not be considered.
    2) Install weld pins with properly adjusted automatic fastening equipment. Installation shall not damage the galvanized coating on the outside of the duct.

h. All ductwork, adhesives, lining, sealant, flex duct and the like shall have a flame spread of 25 or less and developed smoke rating of 50 or less when tested in accordance with one of the following test methods: NFPA 255, ASTM E84, or UL 723.
i. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

Manufacturer:	Product:
Johns Manville	Linacoustic RC
CertainTeed Corporation	ToughGard
Fosters Adhesive	85-62
Swifts Adhesive	7336

I. Round and Oval Ductwork Fabrication:

1. Round and oval duct and fittings shall be spiral lockseam or longitudinal seam as indicated in table below. Provide couplings to join each length of duct.

    a. At contractors' option, round or oval ductwork may be utilized in place of rectangular ductwork shown on Drawings, provided available space allows installation of round or oval ductwork without compromising space required for installation of products and systems of other trades.

1) Round or oval ductwork utilized in place of rectangular ductwork shown on Drawings shall be sized to have a static pressure loss equivalent to rectangular duct shown on Drawings.
2) Unlined round or oval duct shall not be utilized in place of rectangular internally lined ductwork shown on Drawings.

2. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1.5 times associated duct width. Provide two-piece, die-stamped, 45-degree to 90-degree elbows for sizes up to 12 inches; five-piece, 90-degree elbows for sizes 12 inches and above; conical tees; and conical laterals. All reducers shall be placed after a tap has been made on the duct main. Reducers shall be long-taper style.
3. Round Ductwork: Construct of galvanized sheet steel complying with ANSI/ASTM A 653 by the following methods and in minimum gauges listed.

Diameter	Minimum Gauge	Method of Manufacture
Up to 14"	26	Spiral Lockseam
15" to 23"	24	Spiral Lockseam
24" to 36"	22	Spiral Lockseam
37" to 50"	20	Spiral Lockseam
51" to 60"	18	Spiral Lockseam
Over 60"	14	Longitudinal Seam

4. Provide locked seams for spiral duct; fusion welded butt seam for longitudinal seam duct.
5. Fittings and Couplings: Construct of minimum gauges listed. Provide continuous welds along seams at exposed ducts. Provide spot weld bonded seams at concealed ducts.

Diameter	Minimum Gauge
3" to 36"	20
38" to 50"	18
Over 50"	16

6. Ducts exposed in the conditioned space shall be free of dents and blemishes and be mounted tight against adjacent surface with flat hangers. Remove all fabrication labels from ductwork.
7. Provide 20 gauge minimum for ductwork exposed within occupied spaces.

J. Round Internally Insulated Duct and Fittings: Where ductwork is exposed to weather or outside the building insulation envelope, construct with outer pressure shell, 2 inch thick (Minimum R-value = R-8) insulation layer, and perforated inner liner. Where ductwork is within the building insulation envelope, construct with outer pressure shell, 1 inch thick (minimum R-value = R4.2) insulation layer, and perforated inner liner. Construct shell and liner of galvanized sheet steel complying with ANSI/ASTM A 653, of spiral lockseam construction (use longitudinal seam for over 59 inches), in minimum gauges listed in table below. Where installed exposed in the conditioned space: duct and fitting outer pressure shell shall be minimum 20 gauge with 1 inch insulation layer (minimum R-value = R-4.2), and perforated inner liner.

Nominal Duct Diameter	Outer Shell	Inner Liner
3" TO 12"	26 gauge	24 gauge
13" TO 24"	24 gauge	24 gauge
25" to 34"	22 gauge	24 gauge
35" to 48"	20 gauge	24 gauge
49" to 58"	18 gauge	24 gauge
Over 59"	16 gauge	20 gauge

1. Fittings and Couplings: Construct of minimum gauges listed. Provide continuous weld along seams of outer shell at exposed ducts. Provide spot weld bonded seams at concealed ducts.

Nominal Duct Diameter	Outer Shell	Inner Liner
3" to 34"	20 gauge	24 gauge
36" to 48"	18 gauge	24 gauge
Over 48"	16 gauge	24 gauge

2. Inner Liner: Perforate with 3/32 inch holes for 22 percent open area. Provide metal spacers welded in position to maintain spacing and concentricity.
3. Ducts exposed in the conditioned space shall be free of dents and blemishes and be mounted tight against adjacent surface with flat hangers. Remove all fabrication labels from ductwork.
4. Where installed exposed in the conditioned space, duct shall be minimum 20 gauge with 1 inch insulation layer (minimum R-value – R-4.2).
5. All ductwork, adhesives, lining, sealant, flex duct and the like shall have a flame spread of 25 or less and developed smoke rating of 50 or less when tested in accordance with one of the following test methods: NFPA 255, ASTM E84, or UL 723.

6. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

    a. Sheet Metal Div., McGill AirFlow, LLC., Acousti-k27
    b. Semco Duct and Acoustical Products, Inc.
    c. Air Systems Manufacturing, Inc. - Las Vegas

K. Duct Access Doors:

1. Duct Access: Provide hinged access door in rectangular ducts for access to fire dampers, control equipment, etc. Access door size shall be duct diameter wide by duct diameter high for all ducts under 24 inches. Ducts over 24 inches in diameter shall have 24-inch by 18-inch access doors. Minimum size access doors shall be 6 inches by 6 inches.
2. Provide hinged style access doors for round ductwork, NCA Manufacturing, Inc., Model AD-RD-87, Pottorff Series 60, or equal. Access doors shall be 16 gauge galvanized steel with continuous piano hinge. Locks shall be plated steel strike and catch. Provide 1" x 3/8" Polyethylene "Perma Stik" gasket all around door.

L. Flexible Air Ducts:

1. Provide exterior reinforced laminated vapor barrier, fiberglass insulation, encapsulated spring steel wire Helix, and impervious, smooth, non-perforated interior vinyl liner. Individual lengths of flexible ducts shall contain factory fabricated steel connection collars.

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

        1) C.A. Schroeder, Inc., Cal Flex model 2PMJ.
        2) ThermaFlex model M KC.

2. Factory made air ducts shall be approved for the use intended and shall conform to the requirements of UL 181 and NFPA 90A. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with UL 181, Class 1. Ducts shall be UL listed Class 1, maximum 25/50 smoke and flame spread and shall be installed in accordance with the terms of their listing and the requirements of SMACNA HVAC Duct Construction Standards (Metal and Flexible). Factory-made air ducts shall have the following minimum R-values: R-6.0 for ductwork installed within the building insulation envelope, R-8.0 for ductwork installed outside the building insulation envelope.
3. Flexible ductwork shall be maximum of 5 feet long, and shall be extended to the fullest possible length, in order to minimize pressure drop in the duct.
4. Flexible ducts shall be selected for minimum of 6 inch positive static pressure and minimum of 1 inch negative static pressure.

5. Duct Access Panels:

    a. Provide duct access panel assembly of the same material and gauge used for the duct. Duct access panels shall conform to the following:

1) Fasteners: Black steel or stainless steel to match material used for the duct. Panel fasteners shall not penetrate duct wall.
2) Gasket: Comply with NFPA 96, grease-tight, high temperature ceramic fiber, rated for minimum 1500 °F.

M. Flexible Connectors:

1. Materials: Flame-retardant or noncombustible fabrics. Coatings and adhesives shall comply with UL 181, Class 1, with flame spread index of 25 or less, and smoke-developed index of 50 or less.
2. Metal-Edged Connectors: Factory fabricated with a fabric strip 3 inches wide attached to two strips of 3-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
3. Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

    a. Minimum Weight: 26 oz./sq. yd.
    b. Tensile Strength: Minimum 475 lbf/inch in the warp and minimum 375 lbf/inch in the filling.
    c. Service Temperature: Minus 50 to plus 200 deg F.

4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

    a. Ductmate Industries, Inc., model Proflex.
    b. Ventfabrics, Inc., model Ventlon.

2.9 PIPE JOINING MATERIALS

A. Refer to Division 22 and 23 piping sections for special joining materials not listed below.

B. Brazing Filler Metals:
1. Refrigerant Piping:

    a. Joining copper to copper: AWS A5.8, BCup-5 Series, copper-phosphorus unless otherwise indicated. Sil-Fos 15, or equal.
    b. Joining copper to bronze or steel: AWS A5.8, Bag-1, silver alloy unless otherwise indicated.

2.10 INSULATION MATERIALS

A. General:

1. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).
2. Products shall not contain asbestos, lead, mercury, or mercury compounds.

3. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
4. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
5. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
6. Test insulation, jackets and lap-seal adhesives as a composite product and confirm flame spread of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with UL723 or ASTM E84.
7. Adhesives and sealants shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.

B. Insulation Materials:

1. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

        1) Aeroflex USA, Inc.
        2) Armacell LLC.
        3) K-Flex USA.

2. Mineral-Fiber, Preformed Pipe Insulation:

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

        1) Johns Manville; a Berkshire Hathaway company.
        2) Knauf Insulation.
        3) Manson Insulation Inc.
        4) Owens Corning.

    b. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL.

3. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Provide 2-inch wide stapling and taping flange.

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

        1) CertainTeed Corporation.
        2) Johns Manville.
        3) Knauf Insulation.

4) Owens Corning.

C. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

   a. Design Polymerics.
   b. Foster Brand; H. B. Fuller Construction Products.
   c. Knauf Insulation.

2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
3. Service Temperature Range: 0 to plus 180 deg F.
4. Color: White.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

   a. Design Polymerics.
   b. Childers Brand; H. B. Fuller Construction Products.
   c. Foster Brand; H. B. Fuller Construction Products.

2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

   a. Design Polymerics.
   b. Childers Brand; H. B. Fuller Construction Products.
   c. Foster Brand; H. B. Fuller Construction Products.
   d. Knauf Insulation.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: 0 to plus 180 deg F.
4. Color: White.

F. Field Applied Jackets:

1. PVC Jacket and Factory Fabricated Fitting Covers: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1) Johns Manville, model Zeston, with Zeston 2000 fitting covers.
2) Proto Corporation, model LoSmoke.

2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
1) Childers Brand; H. B. Fuller Construction Products.
2) ITW Insulation Systems; Illinois Tool Works, Inc.
3) RPR Products, Inc.

b. Finish and thickness are indicated in field-applied jacket schedules.
c. Moisture Barrier for Outdoor Applications: 2.5-mil- thick polysurlyn.
d. Factory-Fabricated Fitting Covers:

1) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
2) Tee covers.
3) Flange and union covers.
4) End caps.
5) Beveled collars.
6) Valve covers.
7) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.11 THERMAL HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Buckaroos, Inc.
2. Carpenter & Paterson, Inc.
3. Clement Support Services.
4. Rilco Manufacturing Co., Inc.

B. Flame-spread index of 25 or less and smoke-developed index of 50 or less as tested by ASTM E 84.

C. Insulation-Insert Material for Cold or Hot Piping, from Minus 40 to Plus 275 Deg F: ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength or ASTM C 1126, Type III rigid phenolic foam and vapor barrier.

1. Phenolic:

a. NPS 10 and Smaller: 3.75-lb/cu. Ft. minimum compressive strength.
b. NPS 12 to NPS 30: 5.0-lb/cu. ft. minimum compressive strength.

D. Insulation-Insert Material for Piping Above 275 Deg F: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig or ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength.

E. Insulation Protection Shields: Galvanized metal, G90 coating designation, complying with ASTM A 653/A 653M, 180-degree saddle.

F. Heavy Duty Insulation Protection Shields: Galvanized metal, 12-gage, G90 coating designation, complying with ASTM A 653/A 653M, 180-degree saddle. Structural steel plate welded to bottom of galvanized shield for sizes NPS 6 and larger.

G. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

H. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

I. Insert Length: Extend minimum 1-1/2 inches beyond sheet metal shield.

PART 3 - EXECUTION

3.1 SPLIT SYSTEM AC, HEAT PUMP, AND VRF SYSTEMS INSTALLATION

A. General:

1. Install units level and plumb.
2. Install evaporator-fan components as detailed on Drawings.
3. Install ground or roof- mounted condensing units as detailed on Drawings.
4. Install seismic restraints as required by applicable codes. Refer to Article, Submittals, in Section 23 00 50, Basic HVAC Materials and Methods, for delegated design requirements for seismic restraints.
5. Install and connect refrigerant piping as detailed in unit manufacturers' literature. Install piping to allow access to unit.
6. Install cooling coil condensate primary drain pan piping, and overflow, if provided, and run to nearest code-compliant receptacle, or as indicated on Drawings. Install secondary drain pan for units installed over permanent and suspended-tile ceilings. Install secondary drain pan piping and terminate 1/2 inch below ceiling, with escutcheon, in a readily visible location or as shown on Drawings.
7. Install air filters at each indoor unit. Install washable, permanent filters at indoor units designed to accept washable, permanent filters. Refer to Drawings schedule, and Article, Air Filters, in this Section, for filter requirements for ducted, above-ceiling units incorporating mixing boxes.
8. Duct Connections: Duct installation requirements are specified in Article, Ductwork, in this Section. Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Article, Ductwork, in this Section.

B. Variable Refrigerant Flow Split System Heat Pumps:

1. The system shall be installed by a factory-trained and certified contractor, in strict conformance with unit manufacturer's instructions.
2. Install indoor heat recovery controllers as detailed on Drawings. Install condensate drain pan piping and run to nearest code-compliant receptacle, or as indicated on Drawings.

    a. Indoor Heat Recovery Controllers Identification:

        1) Comply with requirements for identification in Section 23 00 50, Basic HVAC Materials and Methods.
        2) Identify each control cable on each end and at each terminal with a number-coded identification tag. Each cable shall have a unique tag.
        3) Identify each refrigerant connection with label or tag corresponding to the indoor fan coil unit served by the refrigerant piping branch. Use equipment numbers scheduled on Drawings.

3. Install ball-type refrigerant service valves in refrigerant piping at downstream connections of indoor heat recovery units.
4. Install ground or roof- mounted condensing units as detailed on Drawings. Connected condensing units shall allow space for coil cleaning and other required maintenance tasks.

3.2 REFRIGERANT PIPING INSTALLATION

A. General:

1. Install refrigerant piping according to ASHRAE 15. Install and connect refrigerant piping as detailed in unit manufacturers' literature. Install piping to allow access to unit.
2. Install piping straight and free of kinks, restrictions or traps.
3. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
4. Slope horizontal suction piping 1 inch/10 feet towards compressor.
5. Install fittings for changes in direction and branch connections.
6. Piping under raised floors shall be kept 6 inches minimum above ground; excavate as necessary.
7. Install locking caps on refrigerant access valves located outside building, including valves located on roofs.
8. Insulate refrigerant piping, including liquid and hot gas pipes when required by system manufacturer, and including headers, branches, and other components as detailed in unit manufacturers' literature.

B. Field Assembled Refrigerant Piping:

1. Select system components with pressure rating equal to or greater than system operating pressure.
2. Where subject to mechanical injury, enclose refrigerant piping in EMT conduit.
3. Where field assembled refrigerant piping is exposed mounted at grade, on walls, and on roof, enclose in 16 gage galvanized steel enclosure.

4. When brazing, remove solenoid valve coils and sight glasses, also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

3.3 AIR INLETS AND OUTLETS INSTALLATION

A. Provide all air inlets and outlets with gaskets and install so that there will be no streaking of the walls or ceilings due to leakage. Duct connection to outlet on exposed duct shall be full size of outer perimeter of outlet flange.

B. Unless otherwise indicated on Drawings, provide rectangular galvanized steel plenum on top of each diffuser and ceiling return for connection to ductwork. Line plenum with internal insulation as indicated for lined ductwork. Size plenum to allow full opening into air terminal. Plenum sheet metal gauge shall be equal to gauge for rectangular equivalent of the branch duct serving the air inlet or outlet.

C. Ceiling-mounted air inlets, outlets, or other services installed in T-Bar type ceiling systems shall be positively attached to the ceiling suspension main runners or to cross runners with the same carrying capacity as the main runners.

1. Air inlets, outlets, or other services weighing not more than 56 pounds shall have two No. 12 gauge hangers connected from the terminal or service to the structure above. These wires may be slack.
2. Support air inlets, outlets, or other services weighing more than 56 pounds directly from the structure above by approved hangers. Provide 4 taut 12 gauge wires each, attached to the fixture and to the structure above. The 4 taut 12 gauge wires, including their attachment to the structure above must be capable of supporting 4 times the weight of the unit.
3. Secure air inlets and outlets to main runners of ceiling suspension system with two No. 8 sheet metal screws at opposing corners.

D. Furnish all air inlets and outlets with a baked prime coat unless otherwise noted. Provide off-white baked enamel finish on ceiling-mounted air inlets and outlets. Paint exposed mounting screws to match the material being secured.

E. Air inlets and outlets shall match all qualities of these specified including appearance, throw, noise level, adjustability, etc.

3.4 FILTER HOUSING INSTALLATION

A. Mount filters in airtight galvanized steel housings furnished by the filter manufacturer, or shop fabricated. Housings shall incorporate integral tracks to accommodate filters, and flanges for connection to duct or casing system.

1. Sealing: Incorporate positive-sealing gasket material on channels to seal top and bottom of filter cartridge frames and to prevent bypass of unfiltered air.
2. Access Doors: Hinged, with continuous gaskets on perimeter and positive-locking latch handle devices.

B. Air filters shall be accessible for cleaning or replacement.

C. Identify each filter access door with 1/2 inch high minimum stenciled letters.

3.5 TEMPORARY FILTERS

A. Provide temporary filters for fans that are operated during construction; after construction dirt has been removed from the building install new filters at no additional cost to the Owner. In addition to temporary filters at filter location, provide temporary filters on all duct openings which will operate under a negative pressure.

1. Filters used for temporary operation shall be the same as permanent filters for the application. Filters used for duct openings may be 1 inch thick pleated media disposable type.

3.6 DAMPER INSTALLATION

A. All dampers automatically controlled by damper motors are specified under "Temperature Control System" except those specified with items of equipment.

B. Provide opposed blade manual air dampers at each branch duct connection and at locations indicated on the drawings and where necessary to control air flow for balancing system. Provide an opposed blade balancing damper in each zone supply duct. Provide an access panel or Ventlok flush type damper regulator on ceiling or wall for each concealed damper.

C. Install fusible link fire dampers full size of duct at points where shown or required.

D. Provide 18 inch x 12 inch minimum hinged access doors in ductwork and furring for easy access to each fire damper; insulated access doors in insulated ducts. Label access doors with 1/2 inch high red letters.

1. Provide Ventlok Series 100, Durodyne, or equal access doors with hardware for convenient access to all automatic dampers and other components of the system, insulated type in insulated ducts. Provide Ventlok #202 for light duty up to 2 inch thick doors, #260 heavy-duty up to 2 inch thick doors and #310 heavy-duty for greater than 2 inch thick doors. Provide #260 hinges on all hinged and personnel access doors; include gasketing.

3.7 DUCTWORK INSTALLATION

A. General:

1. Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight and noiseless (no objectionable noise) systems capable of performing each indicated service. Install each run with minimum of joints. Align ductwork accurately at connections within 1/8 inch misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers, and anchors of type which will

hold ducts true to shape and to prevent buckling. Where possible, install ductwork to clear construction by 1/4 inch minimum, except at air inlets and outlets. Where ductwork will not clear construction, secure duct firmly to eliminate noise in the system.

2. Duct Joints: Install duct sealers, pop rivets or sheet metal screws at each fitting and joint. Duct sealers shall be fire retardant. Sheet metal screws for joints shall be minimum #10 size galvanized.
3. Where ductwork is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.
4. Horizontal runs of ductwork suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-6" without written approval from the Architect.
5. Provide sheet metal angle frame at all duct penetrations to wall, floor, roof, or ceiling.
6. Paint inside of ducts, visible through grille, dull black.
7. Where ductwork is installed in finished areas of buildings that do not have ceilings, paint ductwork, support hangers, and air inlets and outlets to match adjacent architectural surfaces, or as directed by Architect.
8. At the time of rough installation, or during storage on the construction site and until final startup of the heating and cooling equipment, duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal, or other methods acceptable to the enforcing agency.

B. Firestopping:

1. Pack the annular space between duct openings and ducts penetrating floors and walls with UL listed fire stop, and sealed at the ends. All pipe penetrations shall be UL listed, Hilti, 3M Pro-Set, or equal.

    a. Install fire caulking behind mechanical services installed within fire rated walls, to maintain continuous rating of wall construction.

2. Firestopping systems to be installed in strict accordance with manufacturer's instructions.
3. Alternate firestopping systems are acceptable if approved equal. However, any deviation from the above specification requires the Contractor to be responsible for determining the suitability of the proposed products and their intended use, and the Contractor shall assume all risks and liabilities whatsoever in connection therewith.

C. Upper connection of support to wood structure shall be with wood screws or lag screws in shear fastened in the upper one half of the wood structural member. Fasteners shall conform to the following schedule:

For ducts with P/2=30"	#10 x 1-1/2" wood screw
For ducts with P/2=72"	1/4"x 1-1/2" lag screw
For ducts with P/2 over 73"	3/8"x 1-1/2" lag screw

D. Upper connection in tension to wood shall not be used unless absolutely necessary. Where deemed necessary the contractor shall submit calculations to show the size fastener and

penetration required to support loads in tension from wood in accordance with the following schedule:

For ducts with P/2=30"	260 pounds per hanger
For ducts with P/2=72"	320 pounds per hanger
For ducts with P/2=96"	460 pounds per hanger
For duct with P/2 larger than 120"	NOT ALLOWED

E. Install concrete inserts for support of ductwork in coordination with formwork as required to avoid delays in work.

F. Upper connection to manufactured truss construction must comply with truss manufacturers published requirements and Structural Engineers requirements.

G. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct plus insulation with sheet metal flanges of same gauge as duct. Overlap opening on four sides by at least 1-1/2 inches.

H. Support ductwork in manner complying with SMACNA "HVAC Duct Construction Standards," hangers and supports sections. Where special hanging of ductwork is detailed or shown on Drawings, Drawings shall be followed. Angles shall be attached to overhead construction in a manner so as to allow a minimum of 2 inches of movement in all directions with no bending or sagging of the angle.

1. Except where modified in individual paragraphs of this Section, provide hanger support with minimum 18 gauge straps, 1 inch wide. Fold duct strap over at bottom of duct.
2. Install duct supports to rectangular ducts with sheet metal screws. Provide one screw at top of duct and one screw into strap at bottom of duct.

I. Installation of Flexible Ductwork:

1. Provide flexible ducts with supports at 30 inch centers with 2 inch wide, 26 gauge steel hanger collar attached to the structure with an approved duct hanger. Installation shall minimize sharp radius turns or offsets.

    a. Supports shall be in accordance with SMACNA HVAC Duct Construction Standards (Metal and Flexible).
    b. Flexible duct bends shall be not less than 1-1/2 duct diameter bend radius.

2. Make connections to rigid duct and units with Panduit style draw band at inner liner material, and a second draw band over the outer vapor barrier material.
3. Make connection to duct with spin-in fittings, with air scoop and balance damper.

3.8 DUCTWORK SEALING AND LEAK TESTING

A. All ductwork shall receive a Class A seal.

B. Seal airtight all joints and seams, including standing seams and manufactured joints and seams, of all supply, return and exhaust ducts except those exposed in conditioned space.

C. Leakage Classes:

Pressure Class	Leakage Class	
	Round Duct	Rectangular Duct
2"W.G. or less	8	16
4"W.G. or greater	2	4

D. All duct systems (supply, return, outside air intake, and exhaust), except those identified on compliance forms on Drawings as requiring Acceptance Testing per the requirements of the California Energy Code, shall be tested in accordance with the requirements of SMACNA “HVAC Air Duct Leakage Test Manual.” Test pressure shall be equal to the pressure class of the duct.

3.9 PIPING INSTALLATION

A. General:

1. All piping shall be concealed unless shown or otherwise directed. Allow sufficient space for ceiling panel removal.
2. Installation of piping shall be made with appropriate fittings. Bending of piping will not be accepted.
3. Install piping to permit application of insulation and to allow valve servicing.
4. Where piping or conduit is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.
5. Horizontal runs of pipes and conduits suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-6" without written approval from the Architect.
6. Close ends of pipe immediately after installation. Leave closure in place until removal is necessary for completion of installation.
7. Use reducing fittings; bushings shall not be allowed. Use eccentric reducing fittings wherever necessary to provide free drainage of lines and passage of air.
8. Verify final equipment and fixture locations for roughing-in.
9. Where piping is installed in walls within one inch of the face of stud, provide a 16 gauge sheet metal shield plate on the face of the stud. The shield plate shall extend a minimum of 1-1/2 inches beyond the outside diameter of the pipe.
10. Each piping system shall be thoroughly flushed and proved clean before connection to equipment.
11. Install exposed polished or enameled connections with special care showing no tool marks or threads at fittings.
12. Service Markers: Mark the location of each plugged or capped pipe with a 4 inch round by 30 inch long concrete marker, set flush with finish grade. Provide 2-1/2 inch diameter engraved brass plate as part of monument marker.

13. Pipe the discharge of each relief valve, air vent, backflow preventer, and similar device to floor sink or drain.

B. Sleeves:

1. Install Adjus-to-Crete, Pipeline Seal and Insulator, or equal, pipe sleeves of sufficient size to allow for free motion of pipe, 24 gauge galvanized steel. The space between pipe and sleeves through floor slabs on ground, through outside walls above or below grade, through roof, and other locations as directed shall be caulked with oakum and mastic and made watertight. The space between pipe and sleeve and between sleeve and slab or wall shall be sealed watertight.
2. At Contractor's option, Link-Seal, Metraflex Metraseal, or equal, casing seals may be used in lieu of caulking. Wrap pipes through slabs on grade with 1 inch thick fiberglass insulation to completely isolate the pipe from the concrete.

C. Floor, Wall, and Ceiling Plates:

1. Fit all pipes with or without insulation passing through walls, floors, or ceilings, and all hanger rods penetrating finished ceilings with chrome-plated or stainless escutcheon plates.

D. Firestopping:

1. Pack the annular space between pipe sleeves and pipes penetrating floors and walls with UL listed fire stop, and sealed at the ends. All pipe penetrations shall be UL listed, Hilti, 3M Pro-Set, or equal.

    a. Install fire caulking behind mechanical services installed within fire rated walls, to maintain continuous rating of wall construction.

2. Provide SpecSeal Systems UL fire rated sleeve/coupling penetrators for each pipe penetration or fixture opening passing through floors, walls, partitions or floor/ceiling assemblies. All Penetrators shall comply with UL Fire Resistance Directory (Latest Edition), and in accordance with CBC requirements.
3. Sleeve penetrators shall have a built in anchor ring for waterproofing and anchoring into concrete pours or use the special fit cored hole penetrator for cored holes.
4. Copper and steel piping shall have SpecSeal, or equal, plugs on both sides of the penetrator to reduce noise and to provide waterproofing.
5. Firestopping systems to be installed in strict accordance with manufacturer's instructions.
6. Alternate firestopping systems are acceptable if approved equal. However, any deviation from the above specification requires the Contractor to be responsible for determining the suitability of the proposed products and their intended use, and the Contractor shall assume all risks and liabilities whatsoever in connection therewith.

3.10 PIPE JOINTS AND CONNECTIONS

A. General:

1. Cutting: Cut pipe and tubing square, remove rough edges or burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt and debris from inside and outside of pipe before assembly.
3. Boss or saddle type fittings or mechanically extracted tube joints will not be allowed.

B. Copper Pipe and Tubing: All joints shall be brazed according to ASME Section IX, Welding and Brazing Qualifications, except pneumatic control piping, and hydronic piping having grooved-end fittings and couplings.

C. Flexible Connections:

1. Furnish and install Thermo Tech., Inc. F/J/R, Metraflex, or equal, flexible couplings with limiter bolts on piping connections to all equipment mounted on anti-vibration bases, except fan coil units under 2000 cfm, on each connection to each base mounted pump and where shown. Couplings shall be suitable for pressure and type of service.
2. Flexible connections in refrigerant lines; Flexonic, Anaconda or equal, metal hose, full size.
3. Anchor piping securely on the system side of each flexible connection.

3.11 HANGER AND SUPPORT INSTALLATION

A. General: Support ductwork, equipment and piping so that it is firmly held in place by approved iron hangers and supports, and special hangers. Hanger and support components shall support weight of ductwork, equipment and pipe, fluid, and pipe insulation based on spacing between supports with minimum factor of safety of five based on ultimate strength of material used. Do not exceed manufacturer's load rating. Pipe attachments or hangers, of same size as pipe or tubing on which used, or nearest available. Rigidly fasten hose faucets, fixture stops, compressed air outlets, and similar items to the building construction. The Architect shall approve hanger material before installation. Where building structural members do not match piping and ductwork support spacing, provide “bridging” support members firmly attached to building structural members in a fashion approved by the structural engineer.

1. Materials, design, and type numbers for support of piping per Manufacturers' Standardization Society (MSS), Standard Practice (SP)-58.

    a. Provide copper-plated or felt-lined hangers for use on uninsulated copper tubing.

2. Materials and design for ductwork support shall be per SMACNA “HVAC Duct Construction Standards, Metal and Flexible.”

B. Hanger components shall be provided by one manufacturer: B-Line, Grinnell, Unistrut, Badger, or equal.

C. Riser clamps: B-line model B3373, or equal.

D. Rubber Neoprene Pipe Isolators:

1. Pipe isolators shall comprise an internal rubber or neoprene material that isolates pipe from hanger and structure. Install at all piping located in acoustical walls. Refer to Architectural Drawings for location of acoustical walls.
2. Isolation material shall be either a rubber or neoprene material that prevents contact between the pipe and the structure. The rubber shall have between a 45 to 55 durometer rating and a minimum thickness of 1/2 inch.
3. Manufacturers:

    a. Vertical runs: Acousto-Plumb or equal.
    b. Horizontal runs: B-Line, Vibraclamp; Acousto-Plumb or equal.

E. Pipe Hanger and Support Placement and Spacing:

1. Provide a support or hanger close to each change of direction of pipe either horizontal or vertical and as near as possible to concentrated loads.
2. Vertical piping hanger and support spacing: Provide riser clamps for piping, above each floor, in contact with the floor. Provide support at joints, branches, and horizontal offsets. Provide additional support for vertical piping, spaced at or within the following maximum limits:

Pipe Diameter	Steel Threaded or Welded (Note 3)	Copper Brazed or Soldered (Notes 3, 4)	CPVC & PVC (Note 2)
1/2 - 1”	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
1-1/4 - 2”	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
2-1/2 - 3”	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
Over 4”	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)

    a. Note 1: Provide mid-story guides.
    b. Note 2: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
    c. Note 3: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
    d. Note 4: Includes refrigerant piping, including vapor and hot gas pipes.

3. Horizontal piping, hanger and support spacing: Locate hangers and supports at each change of direction, within one foot of elbow, and spaced at or within following maximum limits:

Pipe Diameter	Steel Threaded or Welded (Note 2)	Copper Brazed or Soldered (Notes 2, 3)	CPVC & PVC (Note 1)
1/2 - 1"	6 ft.	5 ft.	3 ft.
1-1/4 - 2"	7 ft.	6 ft.	4 ft.
2-1/2 - 3"	10 ft.	10 ft.	4 ft.
Over 4"	10 ft.	10 ft.	4 ft.

a. Note 1: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
b. Note 2: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
c. Note 3: Includes refrigerant piping, including vapor and hot gas pipes.

4. Suspended Piping:

a. Individually suspended piping: B-Line B3690 J-Hanger or B3100 Clevis, complete with threaded rod, or equal. All hangers on supply and return piping handling heating hot water or steam shall have a swing connector at point of support.

Pipe Size	Rod Size Diameter
2" and Smaller	3/8"
2-1/2" to 3-1/2"	1/2"
4" to 5"	5/8"
6"	3/4"

b. Suspend rods from concrete inserts with removable nuts where suspended from concrete decks. Power actuated inserts will not be allowed.
c. Trapeze Suspension: B-Line, or equal, 1-5/8 inch width channel in accordance with manufacturers' published load ratings. No deflection to exceed 1/180 of a span.
d. Trapeze Supporting Rods: Shall have a safety factor of five; securely anchor to building structure.
e. Pipe Clamps and Straps: B-Line B2000, B2400, or equal. Where used for seismic support systems, provide B-Line B2400 series, or equal, pipe straps.
f. Concrete Inserts: B-line B22-I continuous insert or B2500 spot insert. Do not use actuated fasteners for support of overhead piping unless approved by Architect.
g. Steel Connectors: Beam clamps with retainers.

5. Provide support for piping through roof, arranged to anchor piping solidly in place at the roof penetration.
6. Insulated Piping:

    a. Do not interrupt insulation at pipe hangers and clamps.
    b. Use thermal hanger shield inserts or MSS protection saddles and shields.
    c. Thermal Hanger Shield Inserts:

        1) Use thermal-hanger shield insert with clamp sized to match OD of insert.
        2) Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
        3) For below ambient services, maintain continuous vapor barrier.
        4) For Clevis or Band Hangers: Install thermal-hanger shield inserts with insulation protection shields.
        5) For Trapeze or Clamped Systems: Install thermal-hanger shield inserts with heavy-duty insulation protection shields. Install additional 180-degree galvanized shield for top of support if clamping is required.

    d. MSS Protection Saddles and Shields:

        1) MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
        2) MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
        3) Shield Dimensions for Pipe: Of length recommended in writing by manufacturer to prevent crushing insulation. Not less than the following:

            a) NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
            b) NPS 4: 12 inches long and 0.06 inch thick.
            c) NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
            d) NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
            e) NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.

F. Piping Support to Structure:
    1. Steel Structure: Provide and install additional steel bracing as required to suit structure. Provide through bolts with length to suit requirements of the structural components. Burning or welding on any structural member may only be done if approved by the Architect.

G. Duct Hanger and Support Spacing: Conform to Requirements of CMC and SMACNA “HVAC Duct Construction Standards, Metal and Flexible.”

H. Duct Support to Structure:

    1. Upper connection of support to wood structure shall be with wood screws or lag screws in shear fastened in the upper one half of the wood structural member. Fasteners shall conform to the following schedule:

For ducts with P/2=30"	#10 x 1-1/2" wood screw

For ducts with P/2=72"	1/4"x 1-1/2" lag screw
For ducts with P/2 over 73"	3/8"x 1-1/2" lag screw

2. Upper connection in tension to wood shall not be used unless absolutely necessary. Where deemed necessary the contractor shall submit calculations to show the size fastener and penetration required to support loads in tension from wood in accordance with the following schedule:

For ducts with P/2=30"	260 pounds per hanger
For ducts with P/2=72"	320 pounds per hanger
For ducts with P/2=96"	460 pounds per hanger
For duct with P/2 larger than 120"	NOT ALLOWED

3. Install concrete inserts for support of ductwork in coordination with formwork as required to avoid delays in work.
4. Upper connection to manufactured truss construction must comply with truss manufacturers published requirements and Structural Engineers requirements.

3.12 INSULATION AND FIELD-APPLIED JACKET INSTALLATION

A. General:

1. The term "piping" used herein includes pipe, air separators, valves, strainers and fittings.
2. Clean thoroughly, test and have approved, all piping and equipment before installing insulation and/or covering.
3. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, ductwork, and equipment.
4. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment as specified in insulation system schedules.
5. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
6. Install insulation with longitudinal seams at top and bottom of horizontal runs.
7. Install multiple layers of insulation with longitudinal and end seams staggered.
8. Keep insulation materials dry during application and finishing.
9. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
10. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
11. Install insulation in removable segments on equipment access doors, manholes, handholes, and other elements that require frequent removal for service and inspection. Bevel and seal insulation ends around manholes, handholes, ASME stamps, and nameplates.

12. For piping, ductwork, and equipment, with surface temperatures below ambient, apply mastic to open ends, joints, seams, breaks, and punctures in insulation.
13. Repair all damage to existing pipe, duct and equipment insulation whether or not caused during the work of this contract, to match existing adjacent insulation for thickness and finish, but conforming to flame spread and smoke ratings specified above.
14. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

    a. Install insulation continuously through hangers and around anchor attachments.
    b. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
    c. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
    d. Cover inserts with jacket material matching adjacent insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

B. Piping Insulation Installation:

1. General:

    a. Apply insulating cement to fittings, valves and strainers and trowel smooth to the thickness of adjacent covering. Cover with jacket to match piping. Extend covering on valves up to the bonnet. Leave strainer cleanout plugs accessible.
    b. Provide removable insulation covers for items requiring periodic service or inspection.
    c. Insulation shall be vapor tight before applying PVC jacket and fitting covers. Verify suitability with manufacturer of insulation.
    d. Provide pre-formed PVC valve and fitting covers for indoor piping.
    e. Provide factory-fabricated aluminum valve and fitting covers for outdoor piping.
    f. Provide Calcium Silicate rigid insulation and sheet metal sleeve, 18 inch minimum length at each pipe hanger. Seal ends of insulation to make vapor tight with jacket.

2. Below-Ambient Services Including Chilled Water Supply and Return and Refrigerant Piping:

    a. Insulate valves and irregular surfaces to match adjacent insulation and cover with two layers of woven glass fiber cloth saturated in Foster Sealfas 30-36, 3M, or equal, extending 3 inches over the adjoining pipe insulation. Finish with a coat of Foster Sealfas 30-36, 3M, or equal. The 3 inch wide SSL end laps furnished with the insulation shall be adhered over the end joints. Seal entire surface of insulation vapor tight, including joints and ends of PVC or aluminum fitting covers.
    b. Variable refrigerant flow (VRF) heat pump systems: Insulation for VRF system refrigerant piping shall be installed according to VRF unit manufacturer’s instructions.

3. PVC Jacket Installation:

a. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.

1) Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

4. Aluminum Jacket Installation:

a. Where insulated piping is exposed to the weather apply aluminum jacket secured with 1/2 inch stainless-steel bands on 12 inch centers. Install jacketing with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Cover fittings with glass cloth, two coats of Foster Sealfas 30-36, and factory-fabricated aluminum fitting covers, of same material, finish, and thickness as jacket. Insulation shall be vapor tight before applying metal jacket and fitting covers.

b. Do not install aluminum jackets on refrigerant flexible connectors to vibration isolated outdoor condensing units. Coat elastomeric insulation with insulation manufacturer’s recommended ultraviolet light protective coating.

C. Duct Insulation Installation:

1. General:

a. Insulation applied to the exterior surface of ducts located in buildings shall have a flame spread of not more than 25 and a smoke-developed rating of not more than 50 when tested as a composite installation including insulation, facing materials, tapes and adhesives as normally applied. Material exposed within ducts or plenum shall have a flame-spread rating of not more than 25 and a smoke-developed rating of not more than 50.
b. Duct insulation applied to the exterior surface of ducts installed outside the building insulation envelope shall meet minimum R-value of R-8 at 3 inches thickness and 3/4 pound per cubic foot density.
c. Duct insulation applied to the exterior surface of ducts installed within the building insulation envelope shall meet minimum R-value of R-4.2 at 1-1/2 inches thickness and 3/4 pound per cubic foot density.

2. Mineral Fiber Blanket Installation:

a. Insulate all unlined concealed supply and return ducts with fiberglass duct wrap, manufactured as a blanket of glass fibers factory laminated to a reinforced foil/kraft vapor retarding facing. Provide 2 inch stapling and taping flange. Wrap insulation entirely around duct and secure with outward clinching staples on 6 inch centers. Provide mechanical fasteners at maximum 18 inch centers for all bottoms of duct which are greater than 24 inches. Lap all insulation joints 3" minimum. Insulate ducts installed tight against other work before hanging in place. Seal all seams, both longitudinal and transverse, and all staple and mechanical fastener penetrations of facing with scrim backed foil tape or recommended sealant, to provide a vapor tight installation.

3. PVC Jacket Installation:

a. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.

1) Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.13 TEMPERATURE CONTROL SYSTEM INSTALLATION

A. Provide thermostats where indicated on drawings. All wiring shall be in conduit. Provide all relays, transformers and the like to render the control system complete and fully operable. All control conduit to be rigid steel type.

3.14 EQUIPMENT START-UP

A. Initial start-up of the systems and pumps shall be under the direct supervision of the Contractor.

B. Equipment start-up shall not be performed until the piping systems have been flushed and treated and the initial water flow balance has been completed.

C. It shall be the responsibility of the Contractor to assemble and supervise a start-up team consisting of controls contractor, start-up technician, and test and balance contractor; all to work in concert to assure that the systems are started, balanced, and operate in accordance with the design.

D. After start-up is complete, instruct the Owner's personnel in the operation and maintenance of the systems. Obtain from the Owner's representative a signed memo certifying that instruction has been received.

E. For additional requirements, refer to article, Check, Test and Start Requirements, in Section 23 00 50, Basic HVAC Materials and Methods.

3.15 TESTING AND BALANCING

A. For testing and balancing requirements, refer to Section 23 05 93, Testing and Balancing for HVAC.

3.16 CLEANING AND PROTECTION

A. As each duct section is installed, clean interior of ductwork of dust and debris. Clean external surfaces of foreign substances that might cause corrosive deterioration of metal or where ductwork is to be painted.

B. Temporary Closure: At ends of ducts that are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering that will prevent entrance of dust and debris until connections are to be completed.

C. As each internally lined duct section is installed, check internal lining for small cuts, tears, or abrasions. Repair all damage with fire retardant adhesive.

3.17 EQUIPMENT MOUNTING

A. Mount and anchor equipment in strict compliance with Drawings details. Alternate anchorage methods will not be considered for roof mounted equipment.

3.18 INDOOR PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping, Cooling-Only Systems:

1. Suction and hot-gas piping smaller than 1-1/2 inches diameter:

    a. Flexible Elastomeric: 1/2 inch thick.
    b. Mineral-Fiber, Preformed Pipe: 1/2 inch thick.

2. Suction piping 1-1/2 inches diameter and larger:

    a. Flexible Elastomeric: 1 inch thick.
    b. Mineral-Fiber, Preformed Pipe: 1 inch thick.

B. Refrigerant Vapor and Liquid Piping, Heat Pump Systems:

1. Vapor piping for heat pump applications smaller than 1-1/2 inches diameter:

    a. Flexible Elastomeric: 1-1/2 inches thick.
    b. Mineral-Fiber, Preformed Pipe: 1-1/2 inches thick.

2. Vapor piping for heat pump applications 1-1/2 inches diameter and larger:

    a. Flexible Elastomeric: 2 inches thick.
    b. Mineral-Fiber, Preformed Pipe: 2 inches thick.

3. Liquid piping for heat pump applications smaller than 1 inch diameter:

    a. Flexible Elastomeric: 1 inch thick.
    b. Mineral-Fiber, Preformed Pipe: 1 inch thick.

4. Liquid piping for heat pump applications 1 inch diameter and larger:

    a. Flexible Elastomeric: 1-1/2 inch thick.
    b. Mineral-Fiber, Preformed Pipe: 1-1/2 inch thick.

3.19 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping, Cooling-Only Systems:

1. All Pipe Sizes: Insulation shall be one of the following:

a. Flexible Elastomeric: 1 inch thick.
b. Mineral-Fiber, Preformed Pipe: 1 inch thick.

B. Refrigerant Vapor and Liquid Piping, Heat Pump Systems:

1. Vapor piping for heat pump applications smaller than 1-1/2 inches diameter:

a. Flexible Elastomeric: 1-1/2 inches thick.
b. Mineral-Fiber, Preformed Pipe: 1-1/2 inches thick.

2. Vapor piping for heat pump applications 1-1/2 inches diameter and larger:

a. Flexible Elastomeric: 2 inches thick.
b. Mineral-Fiber, Preformed Pipe: 2 inches thick.

3. Liquid piping for heat pump applications smaller than 1 inch diameter:

a. Flexible Elastomeric: 1 inch thick.
b. Mineral-Fiber, Preformed Pipe: 1 inch thick.

4. Liquid piping for heat pump applications 1 inch diameter and larger:

a. Flexible Elastomeric: 1-1/2 inch thick.
b. Mineral-Fiber, Preformed Pipe: 1-1/2 inch thick.

C. Refrigerant Flexible Connectors:

1. Flexible Elastomeric: Thicknesses as specified for rigid piping.

3.20 INDOOR FIELD-APPLIED PIPING JACKET SCHEDULE

A. Piping, concealed: None.

B. Piping, exposed: PVC, 20 mils thick.

3.21 OUTDOOR FIELD-APPLIED PIPING JACKET SCHEDULE

A. All Piping: Aluminum, Stucco Embossed: Thickness as follows:

Outer Insulation Diameter (Inches)	Minimum Aluminum Jacket Thickness (Inch)

	Rigid Insulation	Non-Rigid Insulation (1)
8 and Smaller	0.024	0.024
Larger Than 8 Thru 11	0.024	0.024
Larger Than 11 Thru 24	0.024	0.024
Larger Than 24 Thru 36	0.024	0.032
Larger Than 36	0.024	0.040

(1) Non-rigid Insulation is defined as having a compressive strength of less than 15 psi.

3.22 INDOOR DUCT INSULATION SCHEDULE

A. Ducts Located Within Building Thermal Envelope:

1. Minimum R-Value = R-4.2.
2. Supply and Return Ducts: Mineral Fiber Blanket, 1-1/2 inches thick, 0.75 lb/cu. ft.

B. Ducts Located Within Building Outside Thermal Envelope:

1. Minimum R-Value – R-8.0.
2. Supply and Return Ducts: Mineral Fiber Blanket, 3 inches thick, 0.75 lb/cu. ft.

3.23 OUTDOOR DUCT INSULATION SCHDULE.

A. Minimum R-Value = R-8.

B. Refer to article, Ductwork, for internal duct lining. Provide 2 inches thick internal duct lining where indicated on Drawings.

3.24 INDOOR FIELD-APPLIED DUCT JACKET SCHEDULE

A. Insulated ducts in concealed spaces: None.

B. Insulated ducts in exposed unconditioned spaces: PVC, 20 mils thick.

END OF SECTION 23 80 00

SECTION 260040 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

1.2 SUMMARY

A. This Section includes general administrative and procedural requirements for electrical installations. The following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 1:

Submittals.
Record documents.
Rough-ins.
Electrical installations.
Cutting and patching.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 15 Section "ELEMENTARY REQUIREMENTS FOR MECHANICAL EQUIPMENT," for factory-installed motors, controllers, accessories, and connections.
2. Division 26 Section "BASIC ELECTRICAL MATERIALS AND METHODS," for materials and methods common to the remainder of Division 26, plus general related specifications including:
3. Access to electrical installations.
4. Excavation for electrical installations within the building boundaries and from building to utility connections.

1.3 SITE VISITS, COORDINATION OF CONTRACT DOCUMENTS, VERIFICATION OF DIMENSIONS

A. Examine existing conditions as applicable. Become acquainted with Specifications and Drawings for all portions of the Project. Notify OWNER’S Representative of apparent discrepancies and of inconsistency between the Specifications and the existing conditions. Secure and follow OWNER’S Representative's instructions. The Drawings serve as working drawings only,

indicating diagrammatically the general layout of the systems and their various components and equipment.

B. Scaled and figured dimensions are approximate and are given for estimate purposes only. Carefully check and verify dimensions and sizes in order to determine if equipment and materials will fit together and if the dimensions of the assembly are compatible with the space provided. Where equipment is furnished by others, verify that dimensions and requirements for assembly are compatible with the space provided before proceeding with the roughing-in connections. Field verifications of locations shown on Drawings are necessary since actual locations, distances, mounting heights, etc., may be affected by field conditions. The right is reserved to make reasonable changes in locations of equipment or other features shown on Drawings prior to rough-in without additional cost to the OWNER.

C. Where apparatus and equipment have been indicated on the Drawings, dimensions have been taken from typical equipment of the class indicated. Carefully check the Drawings to see that the contemplated equipment will fit into the spaces provided, regardless of whether or not it may have been approved for quality and utility as an equal.

D. Rough in all equipment, fixtures, etc., as designated on the Drawings and as specified herein. The Drawings indicate only the approximate location of rough-ins. The exact rough-in locations must be determined from large-scale certified Drawings. The CONTRACTOR shall obtain all certified rough-in information before progressing with any Work for rough-in connections.

E. Be responsible for providing outlets and services of proper size at the required locations.

F. Coordinate requirements of equipment furnished by others, prior to ordering and installation.

G. No allowance will be made for extra expense due to failure or neglect to follow foregoing directives.

1.4 SUBMITTALS

A. General: Follow the procedures specified in Division 1 Section "SUBMITTALS".

B. Additional copies may be required by individual sections of these Specifications.

1.5 RECORD DOCUMENTS

A. Prepare record documents in accordance with the requirements in Division 1 Section "PROJECT CLOSEOUT". In addition to the requirements specified in Division 1, indicate installed conditions for:

1. Major raceway systems, size and location, for both exterior and interior; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker size and arrangements.
2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
3. Approved substitutions, Contract Modifications, and actual equipment and materials installed.

B. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located as specified in Division 1 Section "FIELD ENGINEERING" to record the locations and invert elevations of underground installations.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the project properly identified with names, model numbers, typed, grades, compliance labels, and other information needed for identification.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 SITE VISITS, COORDINATION OF CONTRACT DOCUMENTS, VERIFICATION OF DIMENSIONS

A. Examine existing conditions as applicable. Become acquainted with Specifications and Drawings for all portions of the Project. Notify OWNER’S Representative of apparent discrepancies and of inconsistency between the Specifications and the existing conditions. Secure and follow OWNER’S Representative's instructions. The Drawings serve as working drawings only, indicating diagrammatically the general layout of the systems and their various components and equipment.

B. Scaled and figured dimensions are approximate and are given for estimate purposes only. Carefully check and verify dimensions and sizes in order to determine if equipment and materials will fit together and if the dimensions of the assembly are compatible with the space provided. Where equipment is furnished by others, verify that dimensions and requirements for assembly are compatible with the space provided before proceeding with the roughing-in connections. Field verifications of locations shown on Drawings are necessary since actual locations, distances, mounting heights, etc., may be affected by field conditions. The right is reserved to make reasonable changes in locations of equipment or other features shown on Drawings prior to rough-in without additional cost to the OWNER.

C. Where apparatus and equipment have been indicated on the Drawings, dimensions have been taken from typical equipment of the class indicated. Carefully check the Drawings to see that the contemplated equipment will fit into the spaces provided, regardless of whether or not it may have been approved for quality and utility as an equal.

D. Rough in all equipment, fixtures, etc., as designated on the Drawings and as specified herein. The Drawings indicate only the approximate location of rough-ins. The exact rough-in locations must be determined from large-scale certified Drawings. shall obtain all certified rough-in information before progressing with any Work for rough-in connections.

E. Be responsible for providing outlets and services of proper size at the required locations.

F. Coordinate requirements of equipment furnished by others, prior to ordering and installation.

G. No allowance will be made for extra expense due to failure or neglect to follow foregoing directives.

3.2 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

B. Refer to equipment specifications in Divisions 2 through 26 for rough-in requirements.

3.3 ELECTRICAL INSTALLATIONS

A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:

B. Coordinate electrical systems, equipment, and materials installation with other building components.

C. Verify all dimensions by field measurements.

D. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.

E. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.

F. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.

G. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.

H. Coordinate connection of electrical systems with exterior underground utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service: Telephone, cable TV and Power.

I. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the OWNER'S Representative.

J. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.

K. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

L. Install systems, materials, and equipment giving right-of- way priority to systems required to be installed at a specified slope.

3.4 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with Division 1 Section "CUTTING AND PATCHING". In addition to the requirements specified in Division 1, the following requirements apply:

1. Perform cutting, fitting, and patching of electrical equipment and materials required to:
2. Uncover Work to provide for installation of ill-timed Work.
3. Remove and replace defective Work.
4. Remove and replace Work not conforming to requirements of the Contract Documents.

3.5 VERIFICATION OF DIMENSIONS

A. Scaled and figured dimensions are approximate only. Before proceeding with Work, carefully check and verify dimensions, etc., on architectural Drawings, and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.

B. Drawings are essentially diagrammatic, and many offsets, bends, pull boxes, special fittings, and exact locations are not indicated. Carefully study Drawings and premises in order to determine best methods, exact locations, routes, building obstructions, etc., and install apparatus and equipment in available locations. Install apparatus and equipment in manner and locations to avoid obstructions, preserve headroom, and keep openings and passageways clear.

3.6 IDENTIFICATION OF EQUIPMENT

A. All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedule:

1. Branch Circuit Panelboards:
   a. Panel identification shall be stenciled with 2" high white paint letters on inside face of door. In addition to panel designation, panels on emergency power shall also be stenciled to indicate the branch of the emergency system to which they are connected.
   b. Circuit directory shall be a two-column, typewritten card under a plastic cover inside the door. Each odd numbered circuit shall be in sequence in the left column and the even numbered circuit in the right column (e.g., 1, 3, 5..., 2, 4, 6...). Each circuit shall be identified as to the use and room name(s) or area(s). Confirm room names and/or room numbers with the OWNER'S Representative prior to project completion. Circuit breaker identification shall be by permanently installed metal numbers or plastic numbers under acrylic plastic. "Paste-on" numbers will not be accepted. Refer to "Panelboards" section for additional requirements.

2. Distribution Panelboards: Identification shall be with 1" x 4" laminated, white on black, micarta nameplates on each major component, each with name and/or number of unit and other pertinent data as required. Emergency power distribution panels shall be identified with white on red micarta nameplates. Letters shall be no less than 3/8" high.

3. Circuit breakers and safety switches shall be identified by number and name with 3/4" x 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to circuit breaker or switch.

4. Miscellaneous equipment (electrical), such as individually mounted starters, step-down transformers, pull boxes, junction boxes, etc., shall be identified as required by the use of such equipment with plates as for distribution panelboards.

5. In general, the installed nameplates, as herein called for shall also clearly indicate its use, area served, circuit identification, voltage and any other useful data.

6. All auxiliary systems, including communications, shall be labeled to indicate function.

7. Motor control and motor control centers shall be labeled with the identification given on drawing schedules.

3.7 WIRING OF EQUIPMENT FURNISHED UNDER OTHER SECTIONS

A. All electrical wiring including power wiring and control wiring (except as specified under Automatic Temperature Control), including raceways, wiring, outlet and junction boxes, and labor for installation of the wiring and equipment shall be included in this section of the Specifications.

B. All control devices, and starters not in motor control centers, for equipment furnished under the Air Conditioning section (except as specified under Automatic Temperature Control paragraph), Plumbing section, Fire Sprinkler or Lawn Sprinkler section are to be furnished under that particular section and installed under this section.

C. Wiring diagrams complete with all connection details shall be furnished under each respective section.

D. Coordinate requirements with Division 15 sections prior to ordering and installation.

E. Comply with requirements of Article 430 of the California Electrical Code.

3.8 MOUNTING

A. Provide materials and accessories necessary to properly mount and secure equipment furnished and/or installed under the electrical Work. This includes but is not limited to such items as conduit, outlets, junction boxes, switches, relays, disconnect switches, lighting fixtures, cabinets, and transformers.

B. Inserts and Anchors shall be:

1. Furnished and installed for support of Work under this Division.
2. Adjustable concrete hanger inserts installed in new concrete work as manufactured by Grinnell or as approved.
3. Installed in locations as approved by OWNER’S Representative.

4. Expandable lead type anchors installed in existing concrete with minimum surface damage, as manufactured by Ackerman-Johnson, Pierce, Diamond or Hilti.

5. Toggle bolts, or "molly anchors", where installed in concrete block walls.

6. Complete with 3/16" or heavier steel backup plate where used to support heavy items. Through-bolts or backup plate shall be concealed from view, except as otherwise indicated.

C. Mounting of equipment that is of such size as to be freestanding and that equipment which cannot conveniently be located on walls, such as motor starters, etc., shall be rigidly supported on a framework of galvanized steel angle, Unistrut or as approved.

D. Furnish and install sleeves for the installation of Work under all sections of this Division. Sleeves through floors, roof and walls shall be as described in conduit section.

3.9 INSTALLERS QUALIFICATIONS

A. Installer must have completed an indentured IBEW/NECA apprenticeship program.

B. Foreman must be a Journeyman Wireman with at least ten years experience in the field

3.10 GROUNDING

A. Grounding shall be executed in accordance with applicable codes and regulations of the State of California, California Electrical Code and local authorities having jurisdiction as well as any additional provisions specified or shown on Drawings.

B. Grounding bushings shall be used wherever conduits are grounded. Feeder conduits to panels and air conditioners shall have grounding bushings.

C. Grounding conductors should be located to permit, the shortest and most direct path to ground. Connections shall be readily accessible for inspection and connections shall not be permanently concealed in floors or walls.

D. Non-current carrying metallic parts of electrical equipment and raceways shall be securely grounded to the common system ground. In all locations, ground conductors shall be run through conduits and shall be securely bonded to the conduit at the entrance and exit. The conduit for the grounding conductors shall be continuous from the point of attachment to cabinets or equipment to the grounding electrode and shall be securely fastened to the ground clamp fittings.

E. Ground connections to equipment shall be made with an approved type of exothermic weld or shall be bolted or clamped to equipment or conduit. Sheet metal strap types of ground clamps shall not be used. Contact surfaces shall be thoroughly cleaned and bright before connection is made so as to ensure a good metal to metal contact.

F. Where nonmetallic conduit is used, ground shall be achieved through use of a separate, green-insulated, copper, code-size, ground conductor included in the conduit.

G. Bonding of cold water piping system shall be achieved at the service entrance. A copper saddle shall be installed over the copper pipe at the location of the clamp to avoid damage to the pipe.

END OF SECTION

SECTION 260050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. Requirements specified in Division 26 Section "Basic Electrical Requirements" apply to this Section.

1.2 SUMMARY

A. This Section includes limited scope general construction materials and methods for application with electrical installations as follows:

1. Excavation for underground utilities and service, including underground raceways, vaults, and equipment.

2. Miscellaneous metals for support of electrical materials and equipment.

3. Wood grounds, nailers, blocking, fasteners, and anchorage for support of electrical materials and equipment.

4. Joint sealers for sealing around electrical materials and equipment; and for sealing penetrations in fire and smoke barriers, floors, and foundation walls.

1.3 DEFINITIONS

A. The following definitions apply to excavation operations:

1. Additional Excavation: Where excavation has reached required subgrade elevations, if unsuitable bearing materials are encountered, continue excavation until suitable bearing materials are reached. The Contract Sum may be adjusted by an appropriate Contract Modification.
2. Subbase: As used in this Section refers to the compacted soil layer used in pavement systems between the subgrade and the pavement base course material.
3. Subgrade: As used in this Section refers to the compacted soil immediately below the slab or pavement system.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the OWNER'S Representative.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Product data for the following products: Joint sealers.
2. Shop drawings detailing fabrication and installation for metal fabrications, and wood supports and anchorage for electrical materials and equipment.
3. Samples of joint sealer, consisting of strips of actual products showing full range of colors available for each product.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer for the installation and application joint sealers.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver joint sealer materials in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle joint sealer materials in compliance with the manufacturers' recommendations to prevent their deterioration and damage.

1.7 PROJECT CONDITIONS

A. Conditions Affecting Excavations: The following project conditions apply:

B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by excavation operations.

C. Site Information: Subgrade conditions were investigated during the design of the Project. Reports of these investigations are available for information only; data in the reports are not intended as representations or warranties of accuracy or

continuity of conditions. The OWNER will not be responsible for interpretations or conclusions drawn from this information.

D. Existing Utilities: Locate existing underground utilities in excavation areas. If utilities are indicated to remain, support and protect services during excavation operations.

E. Use of explosives is not permitted.

F. Environmental Conditions: Apply joint sealers under temperature and humidity conditions within the limits permitted by the joint sealer manufacturer. Do not apply joint sealers to wet substrates.

1.8 SEQUENCE AND SCHEDULING

A. Coordinate the connection of electrical service with the OWNER and the utility company.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, or natural or crushed sand.

B. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing a 1-1/2 inch sieve, and not more than 5 percent passing a No. 4 sieve.

C. Backfill and Fill Materials: Materials complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP; free of clay, rock, or gravel larger than 2 inches in any dimension; debris; waste; frozen materials; and vegetable and other deleterious matter.

2.2 JOINT SEALERS

A. General: Joint sealers, joint fillers, and other related materials compatible with each other and with joint substrates under conditions of service and application.

B. Colors: As selected by the OWNER'S Representative from manufacturer's standard colors.

C. Elastomeric Joint Sealers: Provide the following types:

E. One-part, nonacid-curing, silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25, for uses in non- traffic areas for masonry, glass, aluminum, and other substrates recommended by the sealant manufacturer.

F. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:

One-Part, Nonacid-Curing, Silicone Sealant:

"Chem-Calk N-Cure 2000," Bostic Construction Products Div.
"Dow Corning 790," Dow Corning Corp.
"Silglaze N SCS 2501," General Electric Co.
"Silpruf SCS 2000," General Electric Co.
"864," Pecora Corp.
"Rhodorsil 5C," Rhone-Poulenc, Inc.
"Spectrum 1," Tremco, Inc.
"Spectrum 2," Tremco, Inc.
"Dow Corning 795," Dow Corning Corp.
"Rhodorsil 6B," Rhone-Poulenc, Inc.
"Rhodorsil 70," Rhone-Poulenc, Inc.
"Omniseal," Sonneborn Building Products Div.
"Chem-Calk 100," Bostik Construction Products Div.
"Gesil N SCS 2600," General Electric Co.

One-Part, Mildew-Resistant, Silicone Sealant:

"Dow Corning 786," Dow Corning Corp.
"SCS 1702 Sanitary," General Electric Co.
"863 #345 White," Pecora Corp.
"Rhodorsil 6B White," Rhone-Poulenc, Inc.
"Proglaze White," Tremco Corp.
"OmniPlus," Sonneborn Building Products Div.

G. Acrylic-Emulsion Sealants: One-part, nonsag, mildew-resistant, paintable complying with ASTM C834 recommended for exposed applications on interior and protected exterior locations involving joint movement of not more plus or minus 5 percent.

H. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:

"Chem-Calk 600," Bostic Construction Products Div.
"AC-20," Pecora Corp.
"Sonolac," Sonneborn Building Products Div.
"Tremco Acrylic Latex 834," Tremco, Inc.

I. Fire-Resistant Joint Sealers: Two-part, foamed-in-place, silicone sealant formulated for use in through-penetration fire- stopping around cables, conduit, pipes, and duct penetrations through fire-rated walls and floors. Sealants and accessories shall have fire-resistance ratings indicated, as established by testing identical assemblies in accordance with ASTM E 814, by Underwriters' Laboratories, Inc., or other testing and inspection agency acceptable to authorities having jurisdiction.

J. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:

"Dow Corning Fire Stop Foam," Dow Corning Corp.
"Pensil 851," General Electric Co.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting installation and application of joint sealers and access panels. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION FOR JOINT SEALERS

A. Surface Cleaning for Joint Sealers: Clean surfaces of joints immediately before applying joint sealers to comply with recommendations of joint sealer manufacturer.

B. Apply joint sealer primer to substrates as recommended by joint sealer manufacturer. Protect adjacent areas from spillage and migration of primers, using masking tape. Remove tape immediately after tooling without disturbing joint seal.

3.3 EXCAVATION

A. Slope sides of excavations to comply with local codes and ordinances. Shore and brace as required for stability of excavation.

B. Shoring and Bracing: Establish requirements for trench shoring and bracing to comply with local codes and authorities. Maintain shoring and bracing in excavations regardless of time period excavations will be open.

1. Remove shoring and bracing when no longer required. Where sheeting is allowed to remain, cut top of sheeting at an elevation of 30 inches below finished grade elevation.

C. Install sediment and erosion control measures in accordance with local codes and ordinances.

D. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of bearing materials. Provide and maintain dewatering system components necessary to convey water away from excavations.
2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey surface water to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

E. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.

1. Locate and retain soil materials away from edge of excavations. Do not store within drip-line of trees indicated to remain.
2. Remove and legally dispose of excess excavated materials and materials not acceptable for use as backfill or fill.

F. Excavation for Underground Vaults and Electrical Structures: Conform to elevations and dimensions shown with a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.

1. Excavate, by hand, areas within drip-line of large trees. Protect the root system from damage and dry-out. Maintain moist conditions for root system and cover exposed roots with burlap. Paint root cuts of 1 inch in diameter and larger with emulsified asphalt tree paint.
2. Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed.

G. Trenching: Excavate trenches for electrical installations as follows:

1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearance on both sides of raceways and equipment.
2 Excavate trenches to depth indicated or required.
3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.
4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of

raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.

H. Backfilling and Filling: Place soil materials in layers to required subgrade elevations for each area classification listed below, using materials specified in Part 2 of this Section.

1. Under walks and pavements, use a combination of subbase materials and excavated or borrowed materials.
2. Under building slabs, use drainage fill materials.
3. Under piping and equipment, use subbase materials where required over rock bearing surface and for correction of unauthorized excavation.
4. For raceways less than 30 inches below surface of roadways, provide 4-inch-thick concrete base slab support. After installation of raceways, provide a 4-inch thick concrete encasement (sides and top) prior to backfilling and placement of roadway subbase.
5. Other areas, use excavated or borrowed materials.

I. Backfill excavation as promptly as work permits, but not until completion of the following:

1. Inspection, testing, approval, and locations of underground utilities have been recorded.
2. Removal of concrete formwork.
3. Removal of shoring and bracing, and backfilling of voids.
4. Removal of trash and debris.

J. Placement and Compaction: Place backfill and fill materials in layers of not more than 8 inches in loose depth for material compacted by heavy equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

K. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification specified below. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

L. Place backfill and fill materials evenly adjacent to structures, piping, and equipment to required elevations. Prevent displacement of raceways and equipment by carrying material uniformly around them to approximately same elevation in each lift.

M. Compaction: Control soil compaction during construction, providing minimum percentage of density specified for each area classification indicated below.

1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture-density relationship (cohesive soils), determined in accordance with ASTM D 1557 and not less than the following percentages of relative density, determined in accordance with ASTM D 2049, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils).
   a. Areas Under Structures, Building Slabs and Steps, Pavements: Compact top 12 inches of subgrade and each later of backfill or fill material to 90 percent maximum density for cohesive material, or 95 percent relative density for cohesionless material.
   b. Areas Under Walkways: Compact top 6 inches of subgrade and each layer of backfill or fill material to 90 percent maximum density for cohesive material, or 95 percent relative density for cohesionless soils.
   c. Other Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material to 85 percent maximum density for cohesive soils, and 90 percent relative density for cohesionless soils.

2. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water. Apply water in minimum quantity necessary to achieve required moisture content and to prevent water appearing on surface during, or subsequent to, compaction operations.

N. Subsidence: Where subsidence occurs at electrical installation excavations during the period 12 months after Substantial Completion, remove surface treatment (i.e., pavement, lawn, or other finish), add backfill material, compact to specified conditions, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent areas.

3.4 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal fabrications accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

3.5 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.6 APPLICATION OF JOINT SEALERS

A. Comply with joint sealer manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.

1. Comply with recommendations of ASTM C 962 for use of elastomeric joint sealants.
2. Comply with recommendations of ASTM C 790 for use of acrylic- emulsion joint sealants.

B. Tooling: Immediately after sealant application and prior to time shinning or curing beings, tool sealants to form smooth, uniform beads; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

C. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing, and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide fire-stops with fire- resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

END OF SECTION

SECTION 261100 - RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 16.

1.2 DESCRIPTION OF WORK

A. Extent of raceway work is indicated by drawings and schedules.

B. Types of raceways specified in this section include the following:

Electrical metallic tubing (EMT).
Flexible metal conduit.
Liquid-tight flexible metal conduit.
Underground plastic utilities duct.
Rigid metal conduit.
Rigid nonmetallic conduit.
Surface metal raceways.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of raceway systems of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with electrical raceway work similar to that required for this project.

C. Codes and Standards:

1. NEMA Compliance: Comply with applicable requirements of NEMA Standards Publications pertaining to raceways.
2. UL Compliance and Labeling: Comply with applicable requirements of UL safety standards pertaining to electrical raceway systems. Provide raceway products and components which have been UL- listed and labeled.

3. CEC Compliance: Comply with applicable requirements of CEC pertaining to construction and installation of raceway systems.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data, including specifications and installation instructions, for each type of raceway system required. Include data substantiating that materials comply with requirements.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. General: Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) for each service indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements, and comply with applicable portions of CEC for raceways.

B. Rigid Steel Conduit: Provide rigid steel, zinc-coated, threaded type conforming to FS WW-C-581, ANSI C80.1 and UL 6.

1. Provide zinc coating fused to inside and outside walls.

C. Intermediate Steel Conduit: Intermediate steel conduit shall not be used on this project.

D. Flexible Metal Conduit: FS WW-C-566 and UL 1. Formed from continuous length of spirally wound, interlocked zinc-coated strip steel.

E. Liquid-tight Flexible Metal Conduit: Provide liquid-tight flexible metal conduit; construct of single strip, flexible, continuous, interlocked, and double- wrapped steel; galvanized inside and outside; coat with liquid-tight jacket of flexible polyvinyl chloride (PVC).

F. Rigid Metal Conduit Fittings: Cast malleable iron, galvanized or cadmium plated, conforming to FS WW-F-408.

1. Use Type 1 fittings for raintight connections.
2. Use Type 2 fittings for concrete tight connections.
3. Use Type 3 fittings for other miscellaneous connections.

G. Flexible Metal Conduit Fittings: Provide conduit fittings for use with flexible steel conduit of threadless hinged clamp type.

1. Straight Terminal Connectors: One piece body, female end with clamp and deep slotted machine screw for securing conduit, and male threaded end provided with locknut.
2. 45 deg. or 90 deg. Terminal Angle Connectors: Two-piece body construction with removable upper section, female end with clamp and deep slotted machine screw for securing conduit, and male threaded end provided with locknut.

H. Liquid-tight Flexible Metal Conduit Fittings: FS W-F-406, Type 1, Class 3, Style G. Provide cadmium plated, malleable iron fittings with compression type steel ferrule and neoprene gasket sealing rings, with insulated, or non-insulated throat.

I. Minimum conduit size shall be ¾ inch diameter.

J. Electrical Metallic Tubing (EMT): FS WW-C-563, ANSI C80.3 and UL 797.

1. Provide zinc coating fused to inside and outside walls.

K. EMT Fittings: FS W-F-408.

1. Use Type 1 fittings for raintight connections.
2. Use Type 2 fittings for concrete tight connections.
3. Use Type 3 set screw, steel insulated throat-type fittings for miscellaneous connections.
4. Insulated throat bushings shall be used for terminating conduit smaller than 1-1/4”.

2.2 NONMETALLIC CONDUIT AND DUCTS

A. Provide nonmetallic conduit and fittings of types, sizes and weights for each service indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements which comply with provisions of CEC for raceways.

B. Bituminous Fiber Duct and Fittings: Shall not be used. Class 1200 for direct burial in heavy traffic areas, Class 2000 for extremely heavy traffic areas.

C. Asbestos-Cement Conduit and Fittings: Shall not be used.

D. Electrical Plastic Conduit:

1. Heavy Wall Conduit: Schedule 40, 90 C, UL-rated, construct of polyvinyl chloride and conforming to NEMA TC-2, for direct burial, UL-listed and in conformity with CEC Article 347.

2. Extra Heavy Wall Conduit: Schedule 80, UL-rated, construct of polyvinyl chloride compound C-200 PVC, and UL-listed in accordance with CEC Article 347 for direct burial, and for conduit risers.

E. PVC Conduit Fittings: NEMA TC 3, mate and match to conduit or tubing type and material.

F. Underground PVC Plastic Utilities Duct: Shall not be used. Type II for direct burial.

G. Conduit Accessories: Provide conduit, accessories of types, sizes, and materials, complying with manufacturer's published product information, which mate and match with conduit.

H. Conduit Bodies: Provide galvanized cast-metal conduit bodies of types, shapes and sizes as required to fulfill job requirements and CEC requirements. Construct conduit bodies with threaded- conduit-entrance ends, removable covers, either cast or of galvanized steel, and corrosion- resistant screws.

I. Available Manufacturers: Subject to compliance with requirements, manufacturers offering conduit bodies which may be incorporated in the work include, but are not limited to, the following:

Appleton Electric; Div of Emerson Electric Co.
Arrow-Hart Div; Crouse-Hinds Co.
Bell Electric Div; Square D co.
Gould, Inc.
Killark Electric Mfg. Co.
O-Z/Gedney Div; General Signal Co.
Spring City Electrical Mfg. Co.

2.3 SURFACE METAL RACEWAYS

A. Boxes for Surface Raceways: Designed, manufactured and supplied by raceway manufacturer for use with specified raceway.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering surface metal raceways which may be incorporated in the work include, but are not limited to, the following:

B-Line Systems, Inc.
Midland-Ross Corp.
Power-Strut Div; Youngstown Sheet and Tube Co.
Panduit Company
Wiremold Company
Hubbell

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which raceways are to be installed, and substrate which will support raceways. Notify CONTRACTOR in writing of conditions detrimental to proper completion of the Work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF RACEWAYS

A. General: Install raceways as indicated; in accordance with manufacturer's written installation instructions, and in compliance with CEC, and NECA's "Standards of Installation". Install units plumb and level, and maintain manufacturer's recommended clearances.

B. Coordinate with other work including wires/cables, boxes, and panel work, as necessary to interface installation of electrical raceways and components with other work.

3.3 INSTALLATION OF CONDUITS

A. General: Install concealed conduits either in walls, slabs, or above hung ceilings. Use surface metal raceways.

1. Mechanically fasten together metal conduits, enclosures, and raceways for conductors to form continuous electrical conductor. Connect to electrical boxes, fittings and cabinets to provide electrical continuity and firm mechanical assembly.
2. Avoid use of dissimilar metals throughout system to eliminate possibility of electrolysis. Where dissimilar metals are in contact, coat surfaces with corrosion inhibiting compound before assembling.
3. Install miscellaneous fittings such as reducers, chase nipples, 3-piece unions, split couplings, and plugs that have been specifically designed and manufactured for their particular application. Install expansion fittings in raceways every 200' linear run or wherever structural expansion joints are crossed.
4. Use roughing-in dimensions of electrically operated unit furnished by supplier. Set conduit and boxes for connection to units only after receiving review of dimensions and after checking location with other trades.
5. Provide nylon pull cord in empty conduits where indicated.
6. Test all conduits required to be installed, but left empty, test with ball mandrel. Clear any conduit which rejects ball mandrel. Pay costs involved for restoration of conduit and surrounding surfaces to original condition.

B. Conduit Installation: Provide rigid steel zinc-coated conduit where exposed on walls, installed outdoors or subject to physical damage. Follow minimum requirements in other areas as follows:

1. Use rigid steel zinc-coated conduit in mechanical equipment rooms, electrical equipment rooms, for exposed exterior conduit runs, wherever subject to physical damage, and for main feeder circuits.
2. Use steel zinc-coated EMT in all areas unless noted otherwise.
3. Use flexible conduit from outlet boxes to recessed lighting fixtures, and final 24" of connection to motors, or control items subject to movement or vibration.
4. Use liquid-tight flexible conduit where subjected to one or more of the following conditions:

    a. Exterior location.
    b. Moist or humid atmosphere where condensate can be expected to accumulate.
    c. Subjected to water spray or dripping oil, water or grease.
    d. Use plastic conduit where buried in earth.

C. Cut conduits straight, properly ream, and cut threads for heavy wall conduit deep and clean.

D. Field-bend conduit with benders designed for purpose so as not to distort nor vary internal diameter.

E. Size conduits to meet CEC, except no conduit smaller than a 3/4 inch diameter shall be used.

F. Fasten conduit terminations in sheet metal enclosures by 2 locknuts, and terminate with bushing. Install locknuts inside and outside enclosure.

G. Conduits are not to cross pipe shafts, or ventilating duct openings.

H. Keep conduits a minimum distance of 6" from parallel runs of flues, hot water pipes or other sources of heat. Wherever possible, install horizontal raceway runs above water and steam piping.

I. Use of running threads at conduit joints and terminations is prohibited. Where required, use 3-piece union or split coupling.

J. Complete installation of electrical raceways before starting installing of cables/wires within raceways.

K. Concealed Conduits:

1. Metallic raceways installed underground or in floors below grade, or outside are to have conduit threads painted with corrosion inhibiting compound before couplings are assembled. Draw up coupling and conduit sufficiently tight to ensure water-tightness.
2. For floors-on-grade, install conduits under concrete slabs.

3. Install underground conduits minimum of 24" below finished grade.

I. Conduits in Concrete Slabs:

1. Place conduits between bottom reinforcing steel and top reinforcing steel.
2. Place conduits either parallel, or at 90 degrees, to main reinforcing steel.
3. Separate conduits by not less than diameter of largest conduit to ensure proper concrete bond.
4. Conduits crossing in slab must be reviewed for proper cover by Engineer.
5. Embedded conduit diameter is not to exceed 1/3 of slab thickness.

J. Install conduits as not to damage or run through structural members. Avoid horizontal or cross runs in building partitions or side walls.

K. Exposed Conduits:

1. Install exposed conduits and extensions from concealed conduit systems neatly, parallel with, or at right angles to walls of building.
2. Install exposed conduit work as not to interfere with ceiling inserts, lights or ventilation ducts or outlets.
3. Support exposed conduits by use of hangers, clamps, or clips. Support conduits on each side of bends and on spacing not to exceed following: up to 1": 6'-0"; 1-1/4" and over: 8'-0".
4. Run conduits for outlets on waterproof walls exposed. Set anchors for supporting conduit on waterproof wall in waterproof cement.
5. Above requirements for exposed conduits also apply to conduits installed in space above hung ceilings, and in crawl spaces.

L. Non-Metallic Conduits:

1. Make solvents cemented joints in accordance with recommendations of manufacturer.
2. Install PVC conduits in accordance with CEC and in compliance with local utility practices.

M. Conduit Fittings:

1. Construct locknuts for securing conduit to metal enclosure with sharp edge for digging into metal and ridged outside circumference for proper fastening.
2. Insulated throat bushings shall be used for terminating conduits smaller than 1-1/4".
3. Install insulated type bushings for terminating conduits 1- 1/4" and larger. Bushings are to have flared bottom and ribbed sides. Upper edge to have phenolic insulating ring molded into bushing.
4. Bushing of standard or insulated type to have screw type grounding terminal.

5. Miscellaneous fittings such as reducers, chase nipples, 3- piece unions, split couplings, and plugs to be specifically designed for their particular application.

3.4 INSTALLATION OF RACEWAYS

A. General: Mechanically assembly metal enclosures, and raceways for conductors to form continuous electrical conductor, and connect to electrical boxes, fittings and cabinets as to provide effective electrical continuity and rigid mechanical assembly.

1. Avoid use of dissimilar metals throughout system to eliminate possibility of electrolysis. Where dissimilar metals are in contact, coat all surfaces with corrosion inhibiting compound before assembling.
2. Install expansion fittings in all raceways wherever structural expansion joints are crossed.
3. Make changes in direction of raceway run with proper fittings, supplied by raceway manufacturer. No field bends of raceway sections will be permitted.
4. Properly support and anchor raceways for their entire length by structural materials. Raceways are not to span any space un-supported.
5. Use boxes as supplied by raceway manufacturer wherever junction pull or devices boxes are required. Standard electrical "handy" boxes, etc. shall not be permitted for use with surface raceway installations.

3.5 INSTALLATION OF CONDUIT

A. Underground conduit.

1. Keep interior of conduit clean and clear. Clean underground conduits by pulling a mandrel through conduit run followed with a swab before pulling wire.
2. Reroute conduit from locations shown on the Drawings where it is necessary to clear obstructions.
3. Provide junction or pull boxes where required for pulling conductors due to excessive number of bends or length of conduit runs.
4. Bury underground conduit, except those under buildings, a minimum of 24 inches below finished grade. Conduits under roadways shall be a minimum of 36 inches below finished grade. Conduit runs 3/4 inch and smaller in slabs shall be located above vapor barriers. Bury conduit runs larger than 3/4 inch to a minimum depth of 12 inches below floor slabs.
5. Standard factory ells shall not be used in underground service conduits or other long underground runs. Field bends shall not be flattened or kinked and shall not materially reduce the internal diameter of the conduit. Bends in long underground runs shall be made in long sweeping bends. Do not bend at couplings. Approved conduit bending methods shall be used.
6. All conduit runs shall have a code size insulated grounding conductor.
7. Properly separate two or more conduits installed underground in a common concrete envelope with approved factory made conduit spacers.

8. Locate conduit stub-outs dimensionally from building or curb lines on Record Drawings.
9. Pull wires shall be installed in empty conduits including telephone conduits and stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.

B. Exposed/Concealed Conduit:

1. Provide secure mounting facilities for conduits. Wire or plumbers tape shall not be used for hanging conduit. Strap shall be factory made of the one hole malleable iron or two hole galvanized clamp type.
2. Provide expansion couplings wherever conduits cross expansion joints.
3. Run conduit at right angles or parallel to structural members, walls, floors and ceilings. Where several conduits are run together or suspended, they shall be hung on Unistrut trapezes with minimum 3/8-inch rod hangers.
4. Cut ends of conduit square and ream to remove burrs or sharp edges. Terminate conduits properly with bushings, locknuts, etc. Terminate one (1) inch and larger conduits with insulated bushings.
5. Render conduits projecting through the roofing watertight by proper flashings. Securely fasten a sheet metal cap and tighten bank or storm collar to the conduits. Extend flashing a minimum of six (6) inches in all directions. Coordinate and install roof flashing for conduits to the satisfaction of the Project Manager.
6. All conduit runs shall have a code size insulated grounding conductor.
7. Pull wires shall be installed in empty conduits including telephone conduits and stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.
8. Flexible conduit connections shall comply with CEC Section 350-22.
9. Provide wrapped, rigid, galvanized, steel conduit for all 90’s and stub-ups. Wrapping shall extend at least 12” above grade for all stubups.

END OF SECTION

SECTION 261200 – WIRES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

A. This Section includes wires for power, lighting, signal, control and related systems rated 600 volts and less.

1.3 SUBMITTALS

A. Product Data for electrical wires.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with provisions of the following code:

1. NFPA 70 "National Electrical Code".

B. UL Compliance: Provide components which are listed and labeled by UL under the following standards.

1. UL Std. 83 Thermoplastic-Insulated Wires.

C. NEMA/ICEA Compliance: Provide components which comply with the following standards:

1. WC-5 Thermoplastic-Insulated Wire for the Transmission and Distribution of Electrical Energy.
2. WC-7 Cross Linked Thermosetting Polyethylene-Insulated Wire for the Transmission and Distribution of Electrical Energy.
3. WC-8 Ethylene-Propylene-Rubber-Insulated Wire for the Transmission and Distribution of Electrical Energy.

D. IEEE Compliance: Provide components which comply with the following standard.

Std. 82 Test procedures for Impulse Voltage Tests on Insulated Conductors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Wire:
American Insulated Wire Corp.
Carol Cable Co. Inc.
Houston Wire Co.
Rome Cable Co.
Senator Wire and Cable Co.
Southwire Company.
AMP

2.2 WIRES

A. General: Provide wire and cable suitable for the temperature, conditions and location where installed.

B. Conductors: Provide solid conductors for power and lighting circuits no. 10 AWG and smaller. Provide stranded conductors for sizes No. 8 AWG and larger. Any deviation from this must be approved in writing by the Engineer.

C. Conductor Material: copper for all wires and cables.

D. Insulation: Provide THHN/THWN insulation for all conductors.

E. Color Coding for phase identification in accordance with Table 1 in Part 3 below.

F. Minimum size conductor shall be #12 AWG.

G. Conductors shall be stranded.

2.3 CONNECTORS FOR CONDUCTORS

A. Provide UL-listed factory-fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

PART 3 - EXECUTION

3.1 WIRING METHOD

A. Use the following wiring methods as indicated:

1. Wire: install all wire in raceway. No cables shall be used.

3.2 INSTALLATION OF WIRES

A. General: Install electrical wires, and connectors in compliance with CEC.

B. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound or lubricant, where necessary. Lubricant shall be the type that evaporates over time.

C. Use pulling means including, fish tape, cable, rope, and basket weave wire grips which will not damage cables or raceways. Do not use rope hitches for pulling attachment to wire or cable.

D. Keep conductor splices to A minimum.

E. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced.

F. Use splice and tap connectors which are compatible with conductor material.

G. Kearneys or split bolt connectors shall not be used. Lug kits shall be used.

H. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than No. 10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.

I. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A and UL 486B. Provide a letter certifying that all terminations have been properly torqued.

J. Conductors shall be continuous between outlets or junction boxes and no splices shall be made except in outlet boxes, pull boxes, panelboard gutters or handholes.

K. Joints, splices and taps No. l0 or smaller (including fixture pigtails) shall be connected with "floating spring" type connectors. No. 8 and larger shall be connected with solderless connectors of 100% electrolytic copper. Split-bolt connectors are not acceptable.

L. Tighten pressure type lugs on panels and equipment, and then retighten 24 hours or more later after energizing. Provide written report of torque values on lugs.

M. Oil or grease shall not be used when pulling conductors. Use U.L. approved cable lubrication only.

N. Lace or train conductors neatly in panels, cabinets and equipment. Use plastic wire ties to route conductors at edge of enclosure away from overcurrent devices.

O. Branch circuits shall be color coded in compliance with Section 210-5 of the California Electrical Code. Colored tape is not acceptable.

P. All wiring, both line and low voltage, shall be installed in conduit unless otherwise noted.

3.3 FIELD QUALITY CONTROL

A. Prior to energizing, test wires for electrical continuity and for short-circuits. Test each level of wiring for rated voltage. Meggar each feeder prior to energizing.

B. Tag:

1. Branch circuits shall be left tagged with circuit numbers in gutters and junction boxes where unused circuits terminate.
2. Feeder conductors shall be tagged as phase "A" or "B" or "C".
3. The method of tagging shall be with adhesive preprinted tape numbered or lettered wrap around tags. Colored tape is not acceptable.
4. Tagging shall be applied after wire is installed in conduit.
5. Feeders in panel or equipment shall be tagged by phase letter in each panel or equipment.
6. Where it is impractical to use printed markers on certain wires or cables, use blank tape with identification marked thereon with indelible pencil.

C. TABLE 1: Color Coding for Phase Identification:

1. Color code secondary service, feeder, and branch circuit conductors with factory applied color as follows:

208y/120Volts	Phase	480Y 277 VOLTS
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green
Green w/Orange stripe	Isolated	Ground

END OF SECTION

SECTION 26 1350 - ELECTRICAL BOXES AND FITTINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of electrical box and associated fitting work is indicated by drawings and schedules.

B. Types of electrical boxes and fittings specified in this section include the following:

Outlet boxes.
Junction boxes.
Pull boxes.
Floor boxes.
Bushings.
Locknuts.
Knock-out closures.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of electrical boxes and fittings, of types, sizes, and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects utilizing electrical boxes and fittings similar to those required for this project.

C. CEC Compliance: Comply with CEC as applicable to construction and installation of electrical wiring boxes and fittings.

D. UL Compliance: Comply with applicable requirements of UL 50, UL 514-Series, and UL 886 pertaining to electrical boxes and fittings. Provide electrical boxes and fittings which are UL- listed and labeled.

E. NEMA Compliance: Comply with applicable requirements of NEMA Stds/Pub No.'s OS1, OS2 and Pub 250 pertaining to outlet and device boxes, covers and box supports.

F. Federal Specification Compliance: Comply with applicable requirements of FS W-C-586, “Electrical Cast Metal Conduit Outlet Boxes, Bodies and Entrance Caps”.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer’s data on electrical boxes and fittings.

PART 2 – PRODUCTS

2.1 FABRICATED MATERIALS

A. Outlet Boxes: Provide galvanized coated flat rolled sheet-steel outlet wiring boxes, of shapes, cubic inch capacities, and sizes, including box depths as indicated, suitable for installation at respective locations. Construct outlet boxes with mounting holes, and with cable and conduit-size knockout openings in bottom and sides. Provide boxes with threaded screw holes, with corrosion-resistant cover and grounding screws for fastening surface and device type box covers, and for equipment type grounding.

1. Outlet Box Accessories: Provide outlet box accessories as required for each installation, including box supports, mounting ears and brackets, wallboard hangers, box extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used to fulfill installation requirements for individual wiring situations. Choice of accessories is Installer’s code-compliance option.

B. Device Boxes: Provide galvanized coated flat rolled sheet-steel non- gangable device boxes, of shapes, cubic inch capacities, and sizes, including box depths as indicated, suitable for installation at respective locations. Construct device boxes for flush mounting with mounting holes, and with cable-size knockout openings in bottom and ends, and with threaded screw holes in end plates for fastening devices. Provide cable clamps and corrosion-resistant screws for fastening cable clamps, and for equipment type grounding.

1. Device Box Accessories: Provide device box accessories as required for each installation, including mounting brackets, device box extensions, switch box supports, plaster ears, and plaster board expandable grip fasteners, which are compatible with device boxes being utilized to fulfill installation requirements for individual wiring situations. Choice of accessories is Installer’s code-compliance option.

C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering outlet boxes which may be incorporated in the work include, but are not limited to, the following:

Adalet-PLM Div., Scott Fetzer Co.
Appleton Electric; Emerson Electric Co.
Bell Electric; Square D Company.
Eagle Electric Mfg. Co., Inc.
Midland-Ross Corp.
OZ/Gedney; General Signal Co.
Pass and Seymour, Inc.
RACO Div.; Harvey Hubbell Inc.
Thomas & Betts Co.

D. Raintight Outlet Boxes: Provide corrosion-resistant cast-metal raintight outlet wiring boxes, of types, shapes and sizes, including depth of boxes, with threaded conduit holes for fastening electrical conduit, cast-metal face plates with spring- hinged watertight caps suitably configured for each application, including face plate gaskets and corrosion- resistant plugs and fasteners.

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering raintight outlet boxes which may be incorporated in the work include, but are not limited to, the following:

Appleton Electric; Emerson Electric Co.
Arrow-Hart Div; Crouse-Hinds Co.
Bell Electric; Square D Company
Eagle Electric Mfg. Co., Inc.
Gould, Inc.
Harvey Hubbell, Inc.
OZ/Gedney; General Signal Co.
Pass and Seymour, Inc.

F. Junction and Pull Boxes: Provide galvanized code-gage sheet steel junction and pull boxes, with screw-on covers; of types, shapes and sizes, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

G. Available Manufacturers: Subject to compliance with requirements, manufacturers offering junction and pull boxes which may be incorporated in the work include, but are not limited to, the following:

Adalet-PLM Div., Scott Fetzer Co.
Appleton Electric; Emerson Electric Co.
Arrow-Hart Div; Crouse-Hinds Co.
Bell Electric; Square D Company
GTE Corporation
Keystone Columbia, Inc.
OZ/Gedney Co.; General Signal Co.
Spring City Electrical Mfg. Co.

H. Floor Boxes: Provide adjustable floor boxes as indicated, with threaded-conduit-entrance ends, and vertical adjusting rings, gaskets, brass floor plates.

I. Available Manufacturers: Subject to compliance with requirements, manufacturers offering floor boxes which may be incorporated in the work include, but are not limited to, the following:

Arrow-Hart Div; Crouse-Hinds Co.
Harvey Hubbell, Inc.
Wiremold Company

J. Bushings, Knockout Closures and Locknuts: Provide corrosion- resistant box knockout closures, conduit locknuts and malleable iron conduit bushings, offset connectors, of types and sizes, to suit respective installation requirements and applications.

K. Available Manufacturers: Subject to compliance with requirements, manufacturers offering bushings, knockout closures, locknuts, and connectors which may be incorporated in the work include, but are not limited to, the following:

Adalet-PLM Div; Scott Fetzer Co.
AMP, Inc.
Arrow-Hart Div; Crouse-Hinds Co.
Appleton Electric Co.; Emerson Electric Co.
Bell Electric; Square D Co.
Midland-Ross Corp.
Midwest Electric; Cooper Industries Inc.
OZ/Gedney Co.; General Signal Co.
RACO Div.; Harvey Hubbell Inc.
Thomas & Betts Co., Inc.

PART 3 – EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS

A. General: Install electrical boxes and fittings as indicated, in accordance with manufacturer’s written instructions, applicable requirements of CEC and NECA’s “Standard of Installation”, and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate installation of electrical boxes and fittings with wire, wiring devices, and raceway installation work.

C. Provide weathertight outlets for interior and exterior locations exposed to weather or moisture.

D. Provide knockout closures to cap unused knockout holes where blanks have been removed.

E. Install electrical boxes in those locations which ensure ready accessibility to enclosed electrical wiring.

F. Avoid installing boxes back-to-back in walls. Provide separation of one stud wall section between outlet boxes in opposite sides of common wall. Provide resilient pads on outlet boxes in common walls of offices, classrooms, administration areas.

G. Do not install aluminum products in concrete.

H. Position recessed outlet boxes accurately to allow for surface finish thickness.

I. Set floor boxes level and flush with finish flooring material.

J. Do not use round boxes where conduit must enter box through side of box, which would result in difficult and insecure connections when fastened with locknut or bushing on rounded surfaces.

K. Fasten electrical boxes firmly and rigidly to substrates, or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry.

L. Provide electrical connections for installed boxes.

M. Subsequent to installation of boxes, protect boxes from construction debris and damage.

3.2 OUTLET, JUNCTION AND PULL BOXES

A. Outlet boxes and junction boxes shall be galvanized one-piece pressed steel, knockout type. The size of each box shall be determined by the number of wires or conduits or size of conduits entering the box, but shall not be less than 4" square and 1-1/2" deep unless otherwise noted. All boxes shall be UL listed.

B. Minimum box size for data and telephone outlets shall be 4" square and 2-1/8" deep.

C. Single gang boxes in concrete, for fixture outlets, shall be 4-3/8" octagonal concrete boxes, 2-1/2" deep minimum.

D. Single gang boxes in concrete, for wiring devices, shall be 3-1/2" deep, 3-3/4" long and 1-7/8" wide.

E. Single gang outlet boxes installed in concrete or masonry walls shall be a minimum of 3-1/2" deep, 4" long and 2" wide, set flush with the wall and provided with a single gang wall plate.

F. Install wood blocking for outlet boxes in a rigid, workmanlike manner using new material where wood studs are used. Provide rigid support to avoid twisting of outlet boxes where steel studs are used.

G. Locknuts shall be used on both sides of conduit connections to box or panel, in addition to bushing. Where a larger size opening occurs than size of conduit, use reducing washers.

H. Exposed boxes shall be weatherproof, threaded or hub condulet with gasketed condulet cover suitable for device installed or with blank cover plate when condulet is used as a junction box. Condulet wire fill capacity shall not be exceeded.

I. Recessed weatherproof outlets or junction boxes shall be equipped with neoprene gasketed covers.

J. Large size junction or pull boxes shall be fabricated from code gauge sheet steel. Where located indoors, finish shall be gray enamel and covers shall be secured with screws. Where exposed to weather, they shall be weatherproof, NEMA 3R, and rain-tight and hot-dip galvanized after fabrication; also, they shall have weatherproof gaskets, flat covers and galvanized iron screws. Provide knockouts and/or threaded hubs as required for the conduit used. Boxes in finished areas shall be prime painted.

K. Any unused, removed knockouts shall be filled with a K.O. cover.

L. Provide bonding or grounding from metal conduit terminating in J.B.S. with concentric KO’s.

3.3 GROUNDING

A. Upon completion of installation work, properly ground electrical boxes and demonstrate compliance with requirements.

END OF SECTION

SECTION 261420 - ELECTRICAL CONNECTIONS FOR EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 DESCRIPTION OF WORK:

A. Extent of electrical connections for equipment is indicated by drawings and schedules. Electrical connections are hereby defined to include connections used for providing electrical power to equipment.

B. Applications of electrical power connections specified in this section include the following:

1. From electrical source to motor starters.
2. From motor starters to motors.
3. To lighting fixtures.
4. To grounds including earthing connections.
5. To master units of communication, signal, fire alarm, clock and bell, sound, and video systems.

C. Electrical connections for equipment, not furnished as integral part of equipment, are specified in Division-15 and other Division-16 sections, and are work of this section.

D. Motor starters and controllers, not furnished as integral part of equipment, are specified in applicable Division-16 sections, and are work of this section.

E. Refer to Division-15 sections for motor starters and controllers furnished integrally with equipment; not work of this section.

F. Junction boxes and disconnect switches required for connecting motors and other electrical units of equipment are specified in applicable Division-16 sections, and are work of this section.

G. Electrical identification for conductors is specified in Division-16 section, "Electrical Identification", and is work of this section.

H. Raceways and wires required for connecting motors and other electrical units of equipment are specified in applicable Division-16 sections, and are work of this section.

I. Refer to other Division-16 sections for junction boxes and disconnect switches required for connecting motors and other electrical units of equipment; not work of this section.

J. Refer to Division-15 sections for control system wiring; not work of this section.

K. Refer to sections of other Divisions for specific individual equipment power requirements, not work of this section.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of electrical connectors and terminals, of types and ratings required, and ancillary connection materials, including electrical insulating tape, soldering fluxes, and cable ties, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firms with at least 2 years of successful installation experience with projects utilizing electrical connections for equipment similar to that required for this project.

C. CEC Compliance: Comply with applicable requirements of CEC as to type products used and installation of electrical power connections (terminals and splices), for junction boxes, motor starters, and disconnect switches.

D. IEEE Compliance: Comply with Std 241 "IEEE Recommended Practice for Electric Power Systems in Commercial Buildings" pertaining to connections and terminations.

E. ANSI Compliance: Comply with applicable requirements of ANSI/NEMA and ANSI/EIA standards pertaining to products and installation of electrical connections for equipment.

F. UL Compliance: Comply with UL Std 486A, "Wire Connectors and Soldering Lugs for Use With Copper Conductors" including, but not limited to, tightening of electrical connectors to torque values indicated. Provide electrical connection products and materials which are UL-listed and -labeled.

G. ETL Compliance: Provide electrical connection products and materials which are ETL-listed and -labeled.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's data on electrical connections for equipment products and materials.

1. 5 DELIVERY, STORAGE, AND HANDLING

A. Deliver electrical connection products wrapped in proper factory- fabricated type containers.

B. Store electrical connection products in original cartons and protect from weather, construction traffic and debris.

C. Handle electrical connection products carefully to prevent breakage, denting, and scoring finish.

PART 2 - PRODUCTS

2. 1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

Adalet-PLM Div, Scott and Fetzer Co.
Allen-Stevens Conduit Fittings Corp.
AMP Incorporated.
Appleton Electric Co.
Arrow-Hart Div, Crouse Hinds Co.
Burndy Corporation.
Eagle Electric Mfg. Co., Inc.
General Electric Co.
Gould, Inc.
Harvey Hubbell Inc.
Ideal Industries, Inc.
Pyle National Co.
Reliable Electric Co.
Square D Company.
Thomas and Betts Corp.

2. 2 MATERIALS AND COMPONENTS

A. General: For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, pressure connectors, terminals (lugs), electrical insulating tape, electrical solder, electrical soldering flux, heat-shrinkage insulating tubing, cable ties, solderless wirenuts, and other items and accessories as needed to complete splices and terminations of types indicated.

B. Metal Conduit, Tubing and Fittings:

1. Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) indicated for each type service. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements and comply with CEC requirements for raceways. Provide products complying with Division-16 basic electrical materials and methods section "Raceways", and in accordance with the following listing of metal conduit, tubing and fittings:

   Rigid steel conduit:
   Rigid metal conduit fittings.
   Electrical metallic tubing.
   EMT fittings.
   Flexible metal conduit.
   Flexible metal conduit fittings.
   Liquid-tight flexible metal conduit.
   Liquid-tight flexible metal conduit fittings.

2. Wires and Connectors:

   a. General: Provide wires and connectors complying with Division-16 section "Wires and Cables".

   b. Wires: Unless otherwise indicated, provide wires/cables (conductors) for electrical connections which match, including sizes and ratings, of wires which are supplying electrical power. Provide copper conductors with conductivity of not less than 98% at 20 deg. C (68 deg. F).

   c. Connectors and Terminals: Provide electrical connectors and terminals which mate and match, including sizes and ratings, with equipment terminals and are recommended by equipment manufacturer for intended applications.

   d. Electrical Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing and boots, electrical solder, electrical soldering flux, wirenuts and cable ties and recommended for use by accessories manufacturers for type services indicated.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect area and conditions under which electrical connections for equipment are to be installed and notify CONTRACTOR in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until satisfactory conditions have been corrected in a manner acceptable to Installer.

3. 2 INSTALLATION OF ELECTRICAL CONNECTIONS:

A. Install electrical connections as indicated; in accordance with equipment manufacturer's written instructions and with recognized industry practices, and complying with applicable requirements of UL, CEC and NECA's "Standard of Installation" to ensure that products fulfill requirements.

B. Coordinate with other work, including wires/cables, raceway and equipment installation, as necessary to properly interface installation of electrical connections for equipment with other work.

C. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagrams. Mate and match conductors of electrical connections for proper interface between electrical power supplies and installed equipment.

D. Cover splices with electrical insulating material equivalent to, or of greater insulation resistivity rating, than electrical insulation rating of those conductors being spliced.

E. Prepare cables and wires, by cutting and stripping covering armor, jacket, and insulation properly to ensure uniform and neat appearance where cables and wires are terminated. Exercise care to avoid cutting through tapes which will remain on conductors. Also avoid "ringing" copper conductors while skinning wire.

F. Trim cables and wires as short as practicable and arrange routing to facilitate inspection, testing and maintenance.

G. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturers published torque tightening values for equipment connectors. Accomplish tightening by utilizing proper torqueing tools, including torque screwdriver, beam-type torque wrench, and ratchet wrench with adjustable torque settings. Where manufacturer's torqueing requirements are not available,

tighten connectors and terminals to comply with torqueing values contained in UL's 486A.

H. Provide flexible conduit for motor connections, and other electrical equipment connections, where subject to movement and vibration.

I. Provide liquid-tight flexible conduit for connection of motors and other electrical equipment where subject to movement and vibration, and also where connections are subjected to one or more of the following conditions:

Exterior location.
Moist or humid atmosphere where condensate can be expected to accumulate.
Corrosive atmosphere.
Water spray.
Dripping oil, grease, or water.

J. Fasten identification markers to each electrical power supply wire conductors which indicates their voltage, phase and feeder number in accordance with Division-16 section "Electrical Identification". Affix markers on each terminal conductor, as close as possible to the point of connection.

3. 3 FIELD QUALITY CONTROL

A. Wire: install all wire in raceway.

3.4 INSTALLATION OF WIRES:

A. General: Install electrical wires and connectors in compliance with CEC.

B. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound or lubricant, where necessary.

C. Use pulling means including, fish tape, cable, rope, which will not damage wires or raceways. Do not use rope hitches for pulling attachment to wire or cable.

D. Keep conductor splices to minimum.

E. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced.

F. Use splice and tap connectors which are compatible with conductor material.

G. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with

conductors larger than No. 10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.

H. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A and UL 486B.

3. 5 FIELD QUALITY CONTROL

A. Upon completion of installation of electrical connections, and after circuitry has been energized with rated power source, test connections to demonstrate capability and compliance with requirements. Ensure that direction of rotation of each motor fulfills requirement. Correct malfunctioning units at site, then retest to demonstrate compliance.

END OF SECTION

SECTION 261430 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. Requirements of the following Division 16 sections apply to this section:

Basic Electrical Requirements.

1.2 SUMMARY

A. This Section includes the following:

1. Receptacles
2. Ground Fault Circuit Interrupter Receptacles
3. Isolated Ground Receptacles
4. Snap Switches
5. Wall Plates

B. Related Sections: The following sections contain requirements that relate to this section:

C. Division 16 Section "Circuit and Motor Disconnects" for devices other than snap switches and plug/receptacle sets used as disconnects for motors.

D. Division 16 Section "Electrical Identification" for requirements for legends to be engraved on wall plates.

1.03 SUBMITTALS

A. Product data for each type of product specified.

B. Samples of those products indicated for sample submission in OWNER’S Representative's comments on product data submittal. Include color and finish samples of device plates and other items per OWNER’S Representative's request.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with provisions of the following codes.

1. NFPA 70 "National Electrical Code".
2. UL and NEMA Compliance: Provide wiring devices which are listed and labeled by UL and comply with applicable UL and NEMA standards.

1.05 SEQUENCE AND SCHEDULING

A. Schedule installation of finish plates after the surface upon which they are installed has received final finish. Do not rely on painter to remove and reinstall plates.

PART 2 - PRODUCTS

2. 1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

Bryant Electric Co.
Crouse-Hinds Co.
Eagle Electric Mfg. Co., Inc.
General Electric Co.
Hubbell Inc.
Leviton, Inc.
Pass and Seymour Inc.
Slater Electric Co.
Steel City; Midland-Ross Corp.
Walker Division-Butler Mfg. Co.

2.2 WIRING DEVICES

A. General: Provide wiring devices, in types, characteristics, grades, colors, and electrical ratings for applications indicated which are UL listed and which comply with NEMA WD 1 and other applicable UL and NEMA standards. Provide white color devices and stainless steel plates except as otherwise indicated. Verify color selections with OWNER'S Representative.

B. Receptacles: All receptacles shall be NEMA 5-20R, specification grade, white, Decora Plus style, unless noted otherwise. No NEMA 5-15R receptacles shall be used.

C. Ground-Fault Interrupter (GFI) Receptacles: Provide "feed-thru" type ground-fault circuit interrupter, with integral heavy-duty NEMA 5-20R duplex receptacles arranged to protect connected downstream receptacles on same circuit. Provide unit designed for installation in a 2- 3/4 inch deep outlet box without adapter, grounding type, Class A, Group 1, per UL Standard 94.3.

D. Isolated Ground (IG) Receptacles: Provide NEMA 5-20R isolated ground receptacle with ground contacts separated from the mounting strap. Isolated ground receptacles shall comply with UL standard #498, ANSI #C73, and NEMA WD-6.

E. Snap Switches: quiet type AC switches, White, 20 amp, specification grade, Decora Plus style. Comply with UL 20 and NEMA WD1.

2. 3 WIRING DEVICE ACCESSORIES

A. Wall Plates: single and combination, of types, sizes, and with ganging and cutouts as indicated. Provide plates which mate and match with wiring devices to which attached. Provide metal screws for securing plates to. Provide stainless steel wall plates. Provide wall plates with engraved legend where indicated. Conform to requirements of Section "Electrical Identification". Provide plates possessing the following additional construction features:

1. Material and Finish: 0.04 inch thick, type 302 satin finished stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES AND ACCESSORIES

A. Install wiring devices and accessories as indicated, in accordance with manufacturer's written instructions, applicable requirements of CEC and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate with other work, including painting, electrical boxes and wiring installations, as necessary to interfere installation of wiring devices with other Work.

C. Install wiring devices only in electrical boxes which are clean; free from building materials, dirt, and debris.

D. Install galvanized steel wallplates in unfinished spaces.

E. Install wiring devices after wiring work is completed.

F. Install wall plates after painting work is completed.

G. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standard 486A. Use properly scaled torque indicating hand tool. Provide letter certifying that all connectors and terminals have been properly torqued.

3.2 PROTECTION

A. Protect installed components from damage. Replace damaged items prior to final acceptance.

3.3 FIELD QUALITY CONTROL

A. Testing: Prior to energizing circuits, test wiring for electrical continuity, and for short-circuits. Ensure proper polarity of connections is maintained. Subsequent to energizing, test wiring devices and demonstrate compliance with requirements, operating each operable device at least six times.

B. Test ground fault interrupter operation with both local and remote fault simulations in accordance with manufacturer recommendations.

C. Provide letter certifying that all wiring devices are operating properly.

END OF SECTION

SECTION 26 1700 - CIRCUIT AND MOTOR DISCONNECTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. Requirements of the following Division 16 sections apply to this section:

Basic Electrical Requirements.
Fuses

1.2 SUMMARY

A. This Section includes circuit and motor disconnects.

B. Related Sections: The following sections contain requirements that relate to this section:

C. Division 16 Section "Wiring Devices" for snap switches used as motor disconnects.

D. Division 16 Section "Motor Controllers" for combination type starters which incorporate disconnect switches in the same enclosure as the starter and manual motor starters which include the disconnect function as part of the starter switch assembly.

1.3 SUBMITTALS

A. Product data for each type of product specified.

1.4 QUALITY ASSURANCE

A. Electrical Component Standards: Provide components complying with NFPA 70 "National Electrical Code" and which are listed and labeled by UL. Comply with UL Standard 98 and NEMA Standard KS 1.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

Appleton
Challenger
Crouse-Hinds Co
Cutler-Hammer Inc.
General Electric Co.
General Switch Corp.
Square D Company.
Westinghouse Electric Corp.

2.2 CIRCUIT AND MOTOR DISCONNECT SWITCHES

A. General: Provide circuit and motor disconnect switches in types, sizes, duties, features, ratings, and enclosures as indicated. Provide NEMA 1 enclosure except for outdoor switches, and other indicated locations provide NEMA 3R enclosures with raintight hubs. For motor and motor starter disconnects, provide units with horsepower ratings suitable to the loads.

B. Fusible Switches: Heavy duty switches, with fuses of classes and current ratings indicated. See Section "FUSES" for specifications. Where current limiting fuses are indicated, provide switches with non-interchangeable feature suitable only for current limiting type fuses.

C. Non-Fusible Disconnects: Heavy duty switches of classes and current ratings as indicated.

2.3 ACCESSORIES

A. Electrical Interlocks: Provide number and arrangement of interlock contacts in switches as indicated.

PART 3 - EXECUTION

3.01 INSTALLATION OF CIRCUIT AND MOTOR DISCONNECTS

A. General: Provide circuit and motor disconnect switches as indicated and where required by the above Code. Comply with switch manufacturers' printed installation instructions.

3.02 FIELD QUALITY CONTROL

A. Testing: Subsequent to completion of installation of electrical disconnect switches, energize circuits and demonstrate capability and compliance with requirements. Except as otherwise indicated, do not test switches by operating them under load. However, demonstrate switch operation through six opening/closing cycles with circuit unloaded. Open each switch enclosure for inspection of interior, mechanical and electrical connections, fuse installation, and for verification of type and rating of fuses installed. Correct deficiencies then retest to demonstrate compliance. Remove and replace defective units with new units and retest.

END OF SECTION

SECTION 26 1900 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of supports, anchors, sleeves and seals is indicated by drawings and schedules and/or specified in other Division-16 sections.

B. Types of supports, anchors, sleeves and seals specified in this section include the following:

Clevis hangers.
I-beam clamps.
One-hole conduit straps.
Two-hole conduit straps.
Round steel rods.
Lead expansion anchors.
Toggle bolts.
Wall and floor seals.

C. Supports, anchors, sleeves and seals furnished as part of factory-fabricated equipment, are specified as part of that equipment assembly in other Division-16 sections.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of supporting devices, of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than 3 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience with projects utilizing electrical supporting device work similar to that required for this project.

C. CEC Compliance: Comply with CEC requirements as applicable to construction and installation of electrical supporting devices.

D. MSS Compliance: Comply with applicable MSS standard requirements pertaining to fabrication and installation practices for pipe hangers and supports.

E. NECA Compliance: Comply with National Electrical Contractors Association's "Standard of Installation" pertaining to anchors, fasteners, hangers, supports, and equipment mounting.

F. UL Compliance: Provide electrical components which are UL listed and labeled.

G. FS Compliance: Comply with Federal Specification FF-S-760 pertaining to retaining straps for conduit, pipe and cable.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's data on supporting devices including catalog cuts, specifications, and installation instructions, for each type of support, anchor, sleeve and seal.

B. Shop Drawings: Submit dimensioned drawings of fabricated products, indicating details of fabrication and materials.

PART 2 - PRODUCTS

2.1 MANUFACTURED SUPPORTING DEVICES

A. General: Provide supporting devices which comply with manufacturer's standard materials, design and construction in accordance with published product information, and as required for complete installation; and as herein specified. Where more than one type of supporting device meets indicated requirements, selection is Installer's option.

B. Supports: Provide supporting devices of types, sizes and materials indicated; and having the following construction features:

1. Clevis Hangers: For supporting 2" rigid metal conduit; galvanized steel; with 1/2" dia. hole for round steel rod; approximately 54 pounds per 100 units.
2. Reducing Couplings: Steel rod reducing coupling, 1/2" x 5/8"; black steel; approximately 16 pounds per 100 units.
3. I-Beam Clamps: Black steel, 1-1/4" x 3/16" stock; 3/8" cross bolt; flange width 2"; approximately 52 pounds per 100 units.

4. One-Hole Conduit Straps: For supporting 3/4" rigid metal conduit; galvanized steel; approximately 7 pounds per 100 units.
5. Two-Hole Conduit Straps: For supporting 3/4" rigid metal conduit, galvanized steel; 3/4" strap width; and 2-1/8" between center of screw holes.
6. Hexagon Nuts: For 1/2" rod size; galvanized steel; approximately 4 pounds per 100 units.
7. Round Steel Rod: Black steel; 1/2" dia.; approximately 67 pounds per 100 feet.
8. Offset Conduit Clamps: For supporting 2" rigid metal conduit; black steel; approximately 200 pounds per 100 units.

C. Anchors: Provide anchors of types, sizes and materials indicated, with the following construction features:

1. Lead Expansion Anchors: 1/2"; approximately 38 pounds per 100 units.
2. Toggle Bolts: Springhead; 3/16" x 4"; approximately 5 pounds per 100 units.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering anchors which may be incorporated in the work include, but are not limited to, the following:

   Abbeon Cal Inc.
   Ackerman Johnson Fastening Systems, Inc.
   Elcen Metal Products Co.
   Ideal Industries, Inc.
   Joslyn Mfg and Supply Co.
   McGraw Edison Co.
   Rawlplug Co. Inc.
   Star Expansion Co.
   U.S. Expansion Bolt Co.

D. Sleeves and Seals: Provide sleeves and seals, of types, sizes and materials indicated, with the following construction features:

1. Wall and Floor Seals: Provide factory-assembled watertight wall and floor seals, of types and sizes indicated; suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct seals with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws.

E. U-Channel Strut Systems: Provide U-channel strut system for supporting electrical equipment, 12-gage hot-dip galvanized steel, of types and sizes indicated; construct with 9/16" dia. holes, 8" o.c. on top surface, with standard green finish, and with the following fittings which mate and match with U-channel:

   Fixture hangers.

Channel hangers.
End caps.
Beam clamps.
Wiring studs.
Thinwall conduit clamps.
Rigid conduit clamps.
Conduit hangers.
U-bolts.

F. Available Manufacturers: Subject to compliance with requirements, manufacturers offering channel systems which may be incorporated in the work include, but are not limited to, the following:

Allied Tube and Conduit Corp.
B-Line Systems, Inc.
Elcen Metal Products Co.
Greenfield Mfg Co., Inc.
Midland-Ross Corp.
OZ/Gedney Div; General Signal Corp.
Power-Strut Div; Van Huffel Tube Corp.
Unistrut Div; GTE Products Corp.

2.2 FABRICATED SUPPORTING DEVICES

A. Pipe Sleeves: Provide pipe sleeves of one of the following:

1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal: 3" and smaller, 20-gage; 4" to 6", 16-gage; over 6", 14-gage.
2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.
3. Iron Pipe: Fabricate from cast-iron or ductile-iron pipe; remove burrs.
4. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe; remove burrs.

B. Sleeve Seals: Provide sleeves for piping which penetrates foundation walls below grade, or exterior walls. Calk between sleeve and pipe with non-toxic, UL-classified calking material to ensure watertight seal.

C. Sleeve Seals: Provide modular mechanical type seals, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

PART 3 - EXECUTION

3.1 INSTALLATION OF SUPPORTING DEVICES

A. Install hangers, anchors, sleeves and seals as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to insure supporting devices comply with requirements. Comply with requirements of NECA and CEC for installation of supporting devices.

B. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.

C. Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze type hangers where possible. Install supports with spacings indicated and in compliance with CEC requirements.

D. Torque sleeve seal nuts, complying with manufacturer's recommended values. Ensure that sealing grommets expand to form watertight seal.

END OF SECTION

SECTION 26 1950 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

B. Division-16 Basic Electrical Materials and Methods section apply to work specified in this section.

1.2 DESCRIPTION OF WORK

A. Extent of electrical identification work is indicated by drawings and schedules.

B. Types of electrical identification work specified in this section include the following:

1. Electrical power, control and communication conductors.
2. Equipment/system identification signs.

C. Refer to Division-1 general requirements section, "Identification Systems", for equipment and system nameplates, and performance data; not work of this section.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of electrical identification products of types required, whose products have been in satisfactory use in similar service for not less than 3 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience with projects utilizing electrical identification work similar to that required for this project.

C. CEC Compliance: Comply with CEC as applicable to installation of identifying labels and markers for wiring and equipment.

D. UL Compliance: Comply with applicable requirements of UL Std 696, "Marking and Labeling Systems", pertaining to electrical identification systems.

E. ANSI Compliance: Comply with applicable requirements of ANSI Std A13.1, "Scheme for the Identification of Piping Systems".

F. NEMA Compliance: Comply with applicable requirements of NEMA Std No's. WC-1 and WC-2 pertaining to identification of power and control conductors.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's data on electrical identification materials and products.

B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering electrical identification products which may be incorporated in the work include, but not limited to, the following:

Alarm Supply Co., Inc.
Brady, W.H. Co.
Calpico Inc.
Cole-Flex Corp.
Direct Safety Corp.
George-Ingraham Corp.
Griffolyn Company
Ideal Industries, Inc.
LEM Products, Inc.
Markal Company
National Band and Tag Co.
Panduit Corp.
Radar Engineers Div.; EPIC Corp.
Seton Name Plate Co.
Tesa Corp.

2.2 ELECTRICAL IDENTIFICATION MATERIALS

A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.

B. Color Coded Conduit Markers: Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, plastic-sheet conduit markers, extending 360 degrees around conduits; designed for attachment to conduit by adhesive, adhesive lap joint of marker, matching adhesive plastic tape at each end marker, or pretensioned snap- on. Except as otherwise indicated, provide lettering which indicates voltage of conductor(s) in conduit. Provide 8" minimum length for 2" and smaller conduit, 12" length for larger conduit.

1. Colors: Unless otherwise indicated or required by governing regulations, provide white markers with black letters.

C. Color-Coded Plastic Tape: Provide manufacturer's standard self-adhesive vinyl tape not less than 3 mils thick by 1-1/2" wide.

D. Conductor Identification Bands:

1. General: Provide manufacturer's standard aluminum wrap-around conductor markers, of size required for proper application, and numbered to show circuit identification.
2. General: Provide manufacturer's standard vinyl-cloth self-adhesive conductor markers of wrap-around type, either prenumbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show circuit identification.

E. Self-Adhesive Plastic Signs: Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings; of sizes suitable for application areas and adequate for visibility, with proper wording for each application, e.g., 208V, EXHAUST FAN, RECTIFIER.

1. Colors: Unless otherwise indicated, or required by governing regulations, provide white signs with black lettering.

F. Baked Enamel Danger Signs: Provide manufacturer's standard "DANGER" signs of baked enamel finish on 20-gage steel; of standard red, black and white graphics; 14" x 10" size except where 10" x 7" is the largest size which can be applied where needed, and except where larger size is needed for adequate vision; with recognized standard explanation wording, e.g., HIGH VOLTAGE, KEEP AWAY, DO NOT TOUCH SWITCH.

G. Engraved Plastic-Laminate Signs:

1. General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated, black face and white core plies (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

Thickness: 1/16", except as otherwise indicated.

2. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.

2.3 LETTERING AND GRAPHICS

A. General: Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturer or as required for proper identification and operation/maintenance of electrical systems and equipment. Comply with ANSI A13.1 pertaining to minimum sizes for letters and numbers.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. General Installation Requirements: Install electrical identification products as indicated, in accordance with manufacturer's written instructions, and requirements of CEC.

B. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.

C. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

D. Conductor Identification: Apply conductor identification, including voltage, phase and feeder number, on each conductor in each box/ enclosure/cabinet where wires of more than one circuit or communication/ signal system are present, except where another form of identification (such as color-coded conductors) is provided. Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for project's electrical work.

E. Equipment/Systems Identification: Install engraved plastic-laminate sign on each major unit of electrical equipment in building; including central or master unit of each electrical system including communication/ control/ signal systems, unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text, 1/2" high lettering on 1-1/2" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and

shop drawings. Provide signs for each unit of the following categories of electrical work:

1. Panelboards, electrical cabinets and enclosures.
2. Access panel/doors to electrical facilities.
3. Electrical switchboard.
4. Telephone switching equipment.
5. Integrated telecommunications system panels and cabinets equipment.
6. Fire alarm system equipment panels and cabinets.
7. Mechanical equipment disconnect switches.

F. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience or viewing without interference with operation and maintenance of equipment. Secure to substrate with fasteners, except use adhesive where fasteners should not or cannot penetrate substrate.

G. Device Installation: Provide engraved nameplates on all multi-gang switchbanks, special receptacles and where indicated on the drawings.

END OF SECTION

SECTION 264250 - SWITCHBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 SUMMARY

A. Extent of switchboard work is indicated by drawings and schedules.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data on switchboards including, but not limited to, voltages, number of phases, frequencies, and short-circuit and continuous current ratings. Provide application data for main and branch circuit-breakers, sections, main buses, and basic insulation levels.

B. Shop Drawings: Submit layout drawings of switchboards showing accurately scaled basic equipment sections including auxiliary compartments, section components, and combination sections.

C. Wiring Diagrams: Submit wiring diagrams for switchboards showing connections to electrical power feeders and distribution branches. Differentiate between portions of wiring that are manufacturer-installed and portions that are field-installed.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of switchboards, of types, sizes and capacities required, and whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firm with at least 5 years of successful installation experience on projects utilizing switchboards units similar to that required for this project.

C. Codes and Standards:

1. Electrical Code Compliance: Comply with applicable local code requirements of the authority having jurisdiction, and that portion of the CEC which pertains to installation and construction of switchboards.
2. UL Compliance: Comply with applicable requirements of UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors", UL 489, "Molded-Case Circuit Breakers and Circuit Breaker Enclosures," and UL 891, "Dead-Front Electrical Switchboards," pertaining to installation and construction of switchboards. Provide switchboards and components which are UL-listed and labeled.
3. IEEE Compliance: Comply with applicable requirements of IEEE Std 241, "Recommended Practice for Electric Power Systems in Commercial Building," pertaining to switchboards.
4. ANSI Compliance: Comply with applicable requirements of ANSI standards pertaining to switchboard assemblies.
5. NEMA Compliance: Comply with applicable portions of NEMA Stds Pub/No. PB 2, "Dead-front Distribution Switchboards"; PB 2.1, "General Instruction for Proper Handling, Installation, Operation and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less," and SG 3, "Low-Voltage Power Circuit Breakers," pertaining to switchboard assemblies.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver switchboards and components properly packaged and mounted on pallets, or skids to facilitate handling of heavy items. Utilize factory- fabricated type containers or wrappings for switchboards and components which protect equipment from damage. Install gravity measuring meters in containers which indicates whether container has been bumped or dropped. Return G-meters to manufacturer for reuse upon delivery of switchboards. Inspect equipment to ensure that no damage has occurred during shipment.

B. Store switchboard equipment in original packaging and protect from weather and construction traffic. Wherever possible, store indoors; where necessary to store outdoors, store above grade and enclose with watertight wrapping.

C. Handle switchboard equipment carefully to prevent physical damage to equipment and components. Remove packaging, including the opening of crates and containers, avoiding the use of excessive hammering and jarring which would damage the electrical equipment contained therein. Do not install damaged equipment; remove from site and replace damaged equipment with new.

1.6 SEQUENCING AND SCHEDULING

A. Schedule delivery of switchboard equipment which permits ready building ingress for large equipment components to their designated installation spaces. Coordinate delivery of equipment with the installation of other building components.

B. Coordinate the size and location of concrete equipment pads. Cast anchor bolt inserts into pad. Concrete, reinforcement, and formwork requirements are specified in Division 3.

C. Coordinate with other electrical work including raceways, electrical boxes and fittings, and wiring work, as necessary to interface installation of switchboards with other work.

1.7 MAINTENANCE

A. Maintenance Stock, Fuses: For types and ratings required, furnish additional fuses, amounting to one unit for every installed units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products from:

Square D Company.

2.2 ELECTRICAL SECTIONS AND COMPONENTS

A. General: Except as otherwise indicated, provide switchboards and ancillary components of types, sizes, characteristics, and ratings indicated, which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information, and as required for complete installation.

1. Installation: NEMA Type 3R for exterior.

B. Main Switchboard "MSB":

1. The main switchboard shall have a dead front, dead rear with floor standing standardized sections, including underground pull section, metering and distribution section. The bus size and circuit breaker trip settings shall be as indicated on the Drawings. Circuit breakers shall be provided with means for padlocking in the "Off" position. Sections shall be provided with full height

bussing. The switchboard shall have facilities for the power company's meters and test apparatus. Sequence of metering shall be as required by the serving utility company. All sections shall be finished in baked grey enamel. Bussing shall be copper. Ground bus and solid neutral shall be provided. Provide plastic laminated nameplate. Support switchboard in accordance with manufacturer's requirements. Provide all required seismic bracing.

2. Main circuit breaker shall be listed and marked for service entrance.

3. Circuit breakers shall be bolt-on type, plastic molded case, trip free with quick-make, quick break operating mechanism.

4. The switchboard sections shall be constructed to conform to the latest sections of applicable IEEE Standards and ANSI Standards. The circuit breakers shall have short-circuit AIC ratings as indicated on the Drawings.

5. Provide plastic, engraved, laminated nameplates for switchboard identification as well as each circuit breaker. Provide a separate plastic, engraved, laminated nameplate with the meter's address.

C. Enclosures: Construct dead-front switchboards, suitable for floor mounting, with front and rear cabling/wiring accessibility, and conduit accessibility as indicated. Provide welded steel channel framework; hinge wireway front covers to permit ready access to branch circuit-breaker load side terminals. Coat enclosures with manufacturer's standard corrosive-resistant finish.

E. Circuit Breakers: Except as otherwise indicated, provide circuit breakers and ancillary components, of types, sizes, ratings and electrical characteristics indicated, which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information, and as required for a complete installation. All circuit breakers 100 amp and larger shall be tested by an independent testing lab prior to arriving on site.

F. Molded-Case Circuit Breakers: Provide factory-assembled, molded- case circuit breakers of frame sizes indicated; with RMS symmetrical interrupting ratings indicated. Provide breakers with permanent thermal and instantaneous magnetic trips in each pole. Construct with overcenter, trip-free, toggle-type operating mechanisms with quick-make, quick-break action and positive handle trip indication. Construct breakers for mounting and operating in a physical position and operating in an ambient temperature of 40 deg C. Provide breakers with mechanical screw type removable connector lugs, AL/CU rated, and with NEMA Type 1 general purpose enclosures. Switchboards shall have provisions for mounting additional circuit breakers without adding mounting hardware. All molded case circuit breakers 100 amp and larger shall be tested by an independent lab prior to arriving on site.

G. Busing: Provide switchboard busing with sufficient cross-sectional area to fulfill UL 891 pertaining to temperature rise. Construct through-bus of tin-plated copper with ampacity rating and with short-circuit current rating as indicated.

H. Metering: Provide metering compartments for CT's, PT's and instrument transfer switches, and connect meters for sequence metering. Mount meters recessed in front doors and install meter wiring and lacing with sufficient flexibility at hinged edge of meter front mounting plates to prevent damage.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which switchboards and components are to be installed, and notify CONTRACTOR in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 INSTALLATION OF SWITCHBOARDS

A. Install switchboards as indicated, in accordance with manufacturer's written instructions, and with recognized industry practices; complying with applicable requirements of CEC, NEMA's Stds Pub/No. PB 2.1, and NECA's "Standard of Installation".

B. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486 A and B, and the National Electrical Code. Provide a letter certifying that all lugs have been properly torqued.

C. Support and brace switchboard in accordance with structural detail.

3.3 FIELD QUALITY CONTROL

A. Prior to energization of circuitry, check all accessible connections to manufacturer's torque tightening specifications.

B. Prior to energization of switchboards, check with ground resistance tester phase-to-phase and phase-to-ground insulation resistance levels to ensure requirements are fulfilled.

C. Prior to energization, check switchboards for electrical continuity of circuits, and for short-circuits, and verify rated voltage.

3. 4 ADJUSTING AND CLEANING

A. Adjust operating mechanisms for free mechanical movement.

B. Touch-up scratched or marred surfaces to match original finishes.

3. 5 GROUNDING

A. Provide equipment grounding connections for switchboards as indicated. Tighten connections to comply with tightening torques specified in UL Std 486A to assure permanent and effective grounds.

3. 6 DEMONSTRATION

A. Subsequent to wire hook-ups, energize switchboards and demonstrate functioning in accordance with requirements. Where necessary, correct malfunctioning units, and then retest to demonstrate compliance.

END OF SECTION

SECTION 26 4520 - GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

B. Requirements of this section apply to electrical grounding and bonding work specified elsewhere in these specifications.

1.2 SUMMARY

A. Extent of electrical grounding and bonding work is indicated by drawings and schedules and as specified herein. Grounding and bonding work is defined to encompass systems, circuits, and equipment.

B. Types of electrical grounding and bonding work specified in this section include the following:

Solidly grounded.

C. Applications of electrical grounding and bonding work in this section includes the following:

Underground metal piping.
Underground metal water piping.
Underground metal structures.
Metal building frames.
Electrical power systems.
Grounding electrodes.
Raceways.
Service equipment.
Enclosures.
Equipment.
Lighting standards.
Signs.

D. Refer to other Division-16 sections for wires/cables, electrical raceways, boxes and fittings, and wiring devices which are required in conjunction with electrical grounding and bonding work; not work of this section.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data on grounding and bonding products and associated accessories.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of grounding and bonding materials, including stranded cable, copper braid and bus, grounding electrodes and plate electrodes, and bonding jumpers whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with electrical grounding work similar to that required for project.

C. Codes and Standards:

1. Electrical Code Compliance: Comply with applicable local code requirements of the authority having jurisdiction, and CEC as applicable to electrical grounding and bonding, pertaining to systems, circuits and equipment.
2. UL Compliance: Comply with applicable requirements of UL Standards No.'s 467, "Electrical Grounding and Bonding Equipment", and 869, "Electrical Service Equipment", pertaining to grounding and bonding of systems, circuits and equipment. In addition, comply with UL Std 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors." Provide grounding and bonding products which are UL-listed and labeled for their intended usage.
3. IEEE Compliance: Comply with applicable requirements and recommended installation practices of IEEE Standards 80, 81, 141 and 142 pertaining to grounding and bonding of systems, circuits and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering grounding and bonding products which may be incorporated in the work include, but not limited to, the following:

Adalet-PLM Div; Scott Fetzer Co.
Burndy Corporation.
Cadweld Div; Erico Products Inc.
Crouse-Hinds Div; Cooper Industries.
Eagle Electric Mfg. Co.
Ideal Industries, Inc.
Joslyn Corporation.
Okonite Company.
OZ Gedney Div; General Signal Corp.
Thomas and Betts Corp.

2.2 GROUNDING AND BONDING

A. General: Except as otherwise indicated, provide electrical ground and bonding systems indicated; with assembly of materials, including, but not limited to, wires, connectors, solderless lug terminals, grounding electrodes, bonding jumper braid, and additional accessories needed for a complete installation. Where more than one type component product meets indicated requirements, selection is Installer's option. Where materials or components are not indicated, provide products which comply with CEC,UL, and IEEE requirements and with established industry standards for those applications indicated.

B. Conductors: Unless otherwise indicated, provide electrical grounding conductors for grounding system connections that match power supply wiring materials and are sized according to CEC.

C. Ground Rods: Copper-clad steel rod; 10' long, 5/8" diameter.

D. Bonding Jumper Braid: Copper braided tape, constructed of 30- gage bare copper wires and properly sized for indicated applications.

E. Ground Electrodes: Grounding Electrodes: Steel with copper welded exterior, 5/8" dia. by 10 feet.

F. Electrical Grounding Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing, welding materials, bonding straps, as recommended by accessories manufacturers for type service indicated.

G. Field Welding: Comply with AWS Code for procedures, appearance, and quality of welds; and for methods used in correcting welding work. Provide welded connections where grounding conductors connect to underground grounding and plate electrodes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which electrical grounding and bonding connections are to be made and notify CONTRACTOR in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3. 2 INSTALLATION OF ELECTRICAL GROUNDING AND BONDING SYSTEMS

A. General: Install electrical grounding and bonding systems as indicated, in accordance with manufacturer's instructions, and applicable portions of CEC, NECA's "Standard of Installation", and in accordance with recognized industry practices to ensure that products comply with requirements.

B. Coordinate with other electrical work as necessary to interface installation of electrical grounding and bonding system work with other work.

C. Weld grounding conductors to underground grounding electrodes.

D. Ground electrical service system neutral at service entrance equipment to grounding electrodes.

E. Ground each separately-derived system neutral to:

1. Effectively grounded metallic water pipe.
2. Effectively grounded structural steel member.
3. Separate grounding electrode.

F. Connect together system neutral, service equipment enclosures, exposed noncurrent carrying metal parts of electrical equipment, metal raceways systems, grounding conductors in raceways and cables, receptacle ground connectors, and plumbing systems.

G. Terminate feeder and branch circuit insulated equipment grounding conductors with grounding lug, bus, or bushing.

H. Connect grounding electrode conductors to 1-inch diameter, or greater, metallic cold water pipe using a suitably sized ground clamp. Provide connections to flanged piping at street side of flange.

I. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with tightening torque values specified in UL 486A to assure permanent and effective grounding.

J. Install braided type bonding jumpers with code-sized ground clamps on water meter piping to electrically bypass water meters.

K. Route grounding connections and conductors to ground and protective devices in shortest and straightest paths as possible to minimize transient voltage rises.

L. Apply corrosion-resistant finish to field-connections, buried metallic grounding and bonding products, and places where factory applied protective coatings have been destroyed, which are subjected to corrosive action.

M. Install clamp-on connectors on clean metal contact surfaces, to ensure electrical conductivity and circuit integrity.

3.3 FIELD QUALITY

A. Upon completion of installation of electrical grounding and bonding systems, test ground resistance with ground resistance tester. Where tests show resistance-to-ground is over 25 ohms, take appropriate action to reduce resistance to 25 ohms, or less, by driving additional ground rods; then retest to demonstrate compliance.

END OF SECTION

SECTION 264600 - TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

B. Division-16 Basic Electrical Materials and Methods section apply to work specified in this section.

1.2 DESCRIPTION OF WORK

A. Extent of transformer work is indicated by drawings and schedules.

B. Types of transformers specified in this section include the following:

Dry-type transformers.

C. Refer to other Division-16 sections for electrical wiring connections required in conjunction with transformers; not work of this section.

D. Electrical wiring connections for transformers are specified in applicable Division-16 sections.

E. Refer to Division-15 sections for vibration and sound isolation work required in connection with transformers; not work of this section.

1.3 QUALITY ASSURANCE

A. Manufacturer's firms regularly engaged in manufacture of power/ distribution transformers of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: A firm with at least 5 years of successful installation experience on projects utilizing electrical power and distribution transformers similar to those required for this project.

C. CEC Compliance: Comply with CEC as applicable to installation and construction of electrical power/ distribution transformers.

D. NEMA Compliance: Comply with NEMA as applicable portions of NEMA Std. Pub/No.'s TR 1 and TR 27 pertaining to power/distribution transformers.

E. ANSI Compliance: Comply with applicable requirements of ANSI Standards C57-Series pertaining to power/distribution transformers.

F. NEMA Compliance: Comply with requirements of NEMA Std. Pub/No.'s ST 20; "Dry-Type Transformers for General Applications", TR 1, and TR 27.

G. UL Compliance: Comply with applicable requirements of ANSI/UL 506; "Safety Standard for Specialty Transformers". Provide power/distribution transformers and components which are uL-listed and labeled.

H. NESC Compliance: Comply with applicable requirements of National Electrical Safety Code (ANSI Std C2) pertaining to indoor and outdoor installation of transformers.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data including rated kVA, frequency, primary and secondary voltages, percent taps, polarity, impedance and certification of transformer performance efficiency at indicated loads, percentage regulation at 100% and 80% power factor, no-load and full-load losses in watts, % impedance at 75 deg. C, hot-spot and average temperature rise above 40 deg. C ambient temperature, sound level in decibels, and standard published data.

B. Shop Drawings: Submit manufacturer's drawings indicating dimensions, and weight loadings for transformer installations, showing layouts, mountings and supports, spatial relationship to panelboards and associated equipment, include transformer connections to electrical equipment.

C. Wiring Diagrams: Submit wiring protection and control diagrams for power distribution transformers. Clearly differentiate between portions of wiring that are manufacturer-installed and portions to be field-installed.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products from:

Square D Company.

2.2 POWER/DISTRIBUTION TRANSFORMERS

A. General: Except as otherwise indicated, provide manufacturer's standard materials and components as indicated by published product information, designed and constructed as recommended by manufacturer, and as required for complete installation.

B. Dry-Type Distribution Transformers (above 45 kVA): Provide factory- assembled, general- purpose, ventilated, dry-type distribution transformers where shown; of sizes, characteristics, and rated capacities indicated; 3-phase, 60-hertz, 5.75% impedance; with 480 volt delta-connected, primaries; and 208/120 volt, 4 wires wye-connected, with grounded neutral. Provide primary windings with 6 taps; 2, 2-1/2% increments above full-rated voltage and 4, 2-1/2% increments below full-rated voltage for de-energized tap-changing operation. Insulate with Class 220 insulation. Rate transformer for continuous operation at rated kVA; limit transformer surface temperature rise to maximum of 65 deg. C. Provide terminal enclosure, with hinged cover, to accommodate primary and secondary coil wiring connections and electrical supply raceway terminal connector. Provide terminal board with clamp type connectors. Limit terminal compartment temperature to 75 deg. C when transformer is operating continuously at rated load with ambient temperature of 40 deg. C. Provide wiring connections suitable for copper or aluminum wiring. Integrally mount vibration isolation supports between core and coil assembly and transformer enclosure; electrically ground core and coils to transformer enclosure by means of flexible metal grounding strap. Do not exceed maximum sound-level rating of 50 db as determined in accordance with ANSI/NEMA standards. Provide transformers with fully-enclosed weather-resistant steel enclosures, and lifting lugs. Apply manufacturer's standard light gray outdoor enamel over cleaned and phosphatized steel enclosure. Provide transformers suitable for floor mounting.

C. Transformer windings shall be copper.

D. Equipment/System Identification: Provide equipment/system identification name-plates complying with Division-16 Basic Electrical Materials and Methods section "Electrical Identification" in accordance with the following listing:

E. Finishes: Coat interior and exterior surfaces of transformer, including bolted joints, with manufacturer's standard color baked-on enamel.

PART 3 - EXECUTION

3.1 INSPECTION

A. Installer must examine areas and conditions under which power- distribution transformers and ancillary equipment are to be installed, and notify CONTRACTOR in writing of conditions detrimental to proper completion of the work. Do not

proceed with the work until satisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 INSTALLATION OF TRANSFORMERS

A. Install transformers as indicated, complying with manufacturer's written instructions, applicable requirements of CEC, NESC, NEMA, ANSI and IEEE standards, and in accordance with recognized industry practices to ensure that products fulfill requirements.

B. Coordinate transformer installation work with electrical raceway and wire/cable work, as necessary for proper interface.

C. Install units on vibration mounts; comply with manufacturer's indicated installation method, if any.

D. Connect transformer units to electrical wiring system; comply with requirements of other Division-16 sections.

E. Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening valves for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A and B.

3. 3 GROUNDING

A. Provide equipment grounding connections for power-distribution transformers as indicated. Tighten connections to comply with tightening torques specified in UL Std 486A to assure permanent and effective grounds.

3. 4 TESTING

A. Prior to energization of transformers, check all accessible connections for compliance with manufacturer's torque tightening specifications.

B. Prior to energization, check circuitry for electrical continuity, and for short-circuits.

C. Upon completion of installation of transformers, energize primary circuitry at rated voltage and frequency from normal power source, and test transformers, including, but not limited to, audible sound levels, to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units or components, and proceed with retesting.

END OF SECTION

SECTION 264700 - PANELBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Power Distribution Panelboard: Furnish and install distribution panelboard(s) as specified herein and where shown on the associated schedules on Drawings.

B. Lighting and Appliance Panelboard: Furnish and install lighting and appliance panelboard(s) as specified herein and where shown on the associated schedules on Drawings.

1.2 REFERENCES:

The panelboard(s) and circuit breaker(s) referenced herein are designed and manufactured according to the latest revision of the following Specifications.

A. NEMA PB-1 - Panelboards.

B. NEMA PB-1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

C. NEMA AB 1 - Molded Case Circuit Breakers.

D. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

E. UL 50 - Enclosures for Electrical Equipment.

F. UL 67 - Panelboards.

G. UL 489 - Molded-Case Circuit Breakers and Circuit Breaker Enclosures.

ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products from:

Square D Company.

1.3 POWER DISTRIBUTION PANELBOARDS

A. Interior:

1. Shall be rated 600 VAC. Continuous main current ratings as indicated on associated schedules on Drawings not to exceed 1200 amperes maximum. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67.
2. Provide UL Listed short circuit current ratings (SCCR) as indicated on the associated schedules on Drawings not to exceed the lowest interrupting capacity rating of any circuit breaker installed with a maximum of 200,000 rms symmetrical amperes. Main lug and main breaker panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and CEC Articles 230-F and -G.
3. The panelboard interior shall have three flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded polyester insulators shall support and provide phase isolation to the entire length of bus.
4. The bussing shall be fully rated with sequentially phased branch distribution. Panelboard bussing shall be plated copper. The entire interleaved assembly shall be contained between two (2) U-shaped steel channels, permanently secured to a galvanized steel-mounting pan by fasteners employing the use of a tamper-resistant warning label.
5. Interior trim shall be of dead-front construction to shield user from all energized parts. Main circuit breakers through 800 amperes shall be vertically mounted. Main circuit breaker and main lug interiors shall be field convertible for top or bottom incoming feed.
6. Equipment ground bar shall be bonded per plan. Ground bar shall be copper. Solid neutral shall be equipped with a full capacity grounding strap for service entrance applications. Gutter-mounted neutral will not be acceptable.
7. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label, and Short Circuit Current Rating shall be provided. Leveling provisions shall be provided for flush mounted applications.

B. Molded Case Circuit Breakers - Mains and Branches:

1. Common Characteristics:

a. Circuit breakers shall be constructed in accordance with the following standards:
UL 489 Federal Specification W-C-375B/GEN
NEMA AB1 CSA 22.2, No. 5-M91
IEC 157-1 BS 4752
b. Circuit breakers shall be constructed using glass reinforced polyester insulating material providing superior dielectric strength.

Current-carrying components shall be completely isolated from the handle and the accessory mounting area.

c. Circuit breakers shall have an overcenter, trip-free, toggle operating mechanism which will provide quick-make, quick-break contact action. The circuit breaker shall have common tripping of all poles.

d. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

e. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.

f. Breaker faceplate shall indicate rated ampacity. Breaker faceplate shall indicate UL and IEC certification standards with applicable voltage systems and corresponding AIR ratings.

g. Circuit breakers shall be factory sealed and shall have a date code on the face of the circuit breaker. Poles shall be labeled with respective phase designations.

h. Lugs shall be UL Listed to accept solid or stranded [copper and aluminum conductors] [copper conductors only]. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per CEC Table 310-16]. Lug body shall be bolted in place; snap-in designs are not acceptable.

   1) Circuit breakers shall be UL Listed for use with the following accessories: Shunt Trip, Under Voltage Trip, Auxiliary Switch, Alarm Switch, Ground Fault Shunt Trip, Electrical Operators, Cylinder Locks, Mechanical Lugs Kits, Compression Lugs Kits, and Handle Accessories.

i. Two- and three-pole circuit breakers shall have an internal common trip crossbar to provide simultaneous tripping. Circuit breaker frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the breaker, which allows the user to simultaneously select the desired trip level of all poles.

j. Standard circuit breakers up to 250 amperes at 600 VAC shall be UL Listed with HACR ratings.

k. Enclosures:

   1) Type 1 Boxes:

      a) Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Zinc-coated galvannealed steel will not be acceptable.

      b) Boxes shall have removable blank endwalls and interior mounting studs. Interior support bracket shall be provided for ease of interior installation.

      c) Maximum enclosure dimensions shall be 42 in. wide and 9.5 in. deep.

   2) Type 1 Trim Fronts:

      a) Trim front steel shall meet strength and rigidity requirements per UL 50 standards. Shall have an

ANSI 49 medium gray enamel electro-deposited over cleaned phosphatized steel.

b) Trim front shall be [4-piece surface] [1- piece with door] [hinged 1-piece with door] available in [flush] [surface] mount. Trim front door shall have rounded corners and edges free of burrs. A clear plastic directory cardholder shall be mounted on the inside of the door.

c) Locks shall be cylindrical tumbler type with larger enclosures requiring sliding vault locks with 3-point latching. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock.

3) Type 3R, 3S, 5 and 12:

a) Enclosures shall be constructed in accordance with UL 50 requirements. Endwalls shall be welded and sealed. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.

b) All doors shall be gasketed and be equipped with a tumbler type vault lock and two (2) additional trunk type latches. A clear plastic directory cardholder shall be mounted on the inside of door. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock.

c) Maximum enclosure dimensions shall not exceed 42 in. wide and 12.95 in. deep.

1.4 LIGHTING AND APPLIANCE PANELBOARD

A. Interior:

1. Shall be rated for 240 VAC/48 VDC maximum. Continuous main current ratings, as indicated on associated schedules, not to exceed 600 amperes maximum.
2. Minimum short circuit current rating: As indicated on schedules in rms symmetrical amperes at 240 VAC.
3. Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors suitable for plug-on or bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be aluminum. Bussing rated for 600 amperes shall be copper as standard construction. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and CEC Articles 230-F and G.
4. All current-carrying parts shall be insulated from ground and phase-to-phase by Noryl high dielectric strength thermoplastic or equivalent.

5. Split solid neutral shall be plated and located in the mains compartment up to 225 amperes so all incoming neutral cable may be of the same length.
6. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twistouts covering unused mounting space.
7. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label and short circuit current rating shall be displayed on the interior or in a booklet format.
8. Interiors shall be field converted for top or bottom incoming feed. Main and sub-feed circuit breakers shall be vertically mounted. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.

B. Main Circuit Breaker:

1. Main circuit breakers shall have an overcenter, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40° C ambient environment. Thermal elements shall be ambient compensating above 40° C.
2. Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the circuit breaker, which allows the user to simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.
3. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.
4. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
5. Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per CEC Table 310-16. Lug body shall be bolted in place; snap-in designs are not acceptable.

C. Branch Circuit Breakers:

1. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panelboard schedules.
2. Molded case branch circuit breakers shall have bolt-on type bus connectors.

3. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
4. There shall be two forms of visible trip indication. The breaker handle shall reside in a position between ON and OFF.
5. The exposed faceplates of all branch circuit breakers shall be flush with one another.
6. Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per CEC Table 310-16.

D. Enclosures:

1. Type 1 Boxes:
   a. Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Galvanized steel will not be acceptable.
   b. Boxes shall have removable endwalls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
   c. Box width shall be [20 in wide] [14 in wide] [8.625 in wide - NQOB column width only].
2. Type 1 Fronts:
   a. Front shall meet strength and rigidity requirements per UL 50 standards. Fronts shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
   b. Fronts shall be hinged 1-piece with door. Mounting shall be as indicated on associated schedules.
3. Type 3R, 3S, 5, and 12:
   a. Enclosures shall be constructed in accordance with UL 50 requirements. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
   b. All doors shall be gasketed and equipped with a tumbler type vault lock and two (2) additional trunk type latches. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.
   c. Maximum enclosure dimensions shall not exceed 20 in. wide and 6.5 in. deep.

END OF SECTION

SECTION 264770 - FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 SUMMARY

A. Extent of fuse work required by this section is indicated by drawings, and by requirements of this section.

B. Refer to other Division-16 sections for the following items; not work of this section.

Motor disconnects.

1.3 SYSTEM DESCRIPTION

A. Types of fuses specified in this section include the following:

Class L time-delay.
Class RK1 time-delay.
Class RK1 and Class J current-limiting.
Class RK 5 time-delay.
Class T current-limiting.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data on fuses, including specifications, electrical characteristics, installation instructions, furnished specialties and accessories. In addition, include voltages and current ratings, interrupting ratings, current limitation ratings, time-current trip characteristic curves, and mounting requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of fuses of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Codes and Standards:

1. UL Compliance and Labeling: Comply with applicable provisions of UL 198D "High-Interrupting-Capacity Class K Fuses". Provide overcurrent protective devices which are UL-listed and labeled.
2. CEC Compliance: Comply with CEC as applicable to construction and installation of fuseable devices.
3. ANSI Compliance: Comply with applicable requirements of ANSI C97.1 "Low-Voltage Cartridge Fuses 600 Volts or Less".

1.6 MAINTENANCE

A. Extra Materials: Maintenance Stock, Fuses: For types and ratings required, furnish additional fuses, amounting to one unit for every 5 installed units, but not less than one set of 3 of each kind.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide fuses of one of the following:

Bussman Div; Cooper Industries.
Reliance Fuse Div; Federal Pacific Electric Co.
Shawmut Div; Gould Inc.

2. 2 FUSES

A. General: Except as otherwise indicated, provide fuses of types, sizes, ratings, and average time-current and peak let-through current characteristics as those indicated, which comply with manufacturer's standard design, materials, and constructed in accordance with published product information, and with industry standards and configurations.

B. Class L Time-Delay Fuses: Provide UL Class L time-delay fuses rated 600-volts, 60 Hz, with ampacity and symmetrical interrupting current rating as indicated for protecting transformers, motors, and circuit breakers.

C. Class RK1 Time-Delay Fuses: Provide UL Class RK1 time-delay fuses rated 600-volts, 60 Hz, with ampacity and symmetrical interrupting current rating as indicated for protecting motors and circuit-breakers.

D. Class RK1 Current-Limiting Fuses: Provide UL Class RK1 current- limiting fuses rated 250-volts, 60 Hz, with ampacity and symmetrical interrupting current rating indicated.

E. Class RK5 Time-Delay Fuses: Provide UL Class RK5 time-delay fuses rated 600-volts, 60 Hz, with ampacity and symmetrical interrupting current rating as indicated for protecting motors.

F. Class T Fuses: Provide UL Class T fuses rated 600-volts, 60 Hz, with ampacity and symmetrical interrupting current rating as indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which fuses are to be installed, and notify CONTRACTOR in writing of conditions detrimental to proper completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 INSTALLATION OF FUSES

A. Install fuses as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. Comply with CEC, and NEMA standards for installation of fuses.

B. Coordinate with other work, including electrical wiring, as necessary, to interface installation of fuses with other work.

C. Install fuses in fused switches as indicated.

D. Provide three (3) spare fuses of each type indicated.

3.3 FIELD QUALITY CONTROL

A. Prior to energization of fuseable devices, test devices for continuity of circuitry and for short-circuits. Replace malfunctioning units with new units, and then demonstrate compliance with requirements.

END OF SECTION

SECTION 265120 - EXTERIOR LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

B. Division-16 Basic Electrical Materials and Methods sections apply to work specified in this section.

1.2 SUMMARY

A. Extent of exterior lighting fixture work is shown on the Drawings and Fixture Schedule.

B. Types of exterior lighting:
Light Emitting Diode (LED).
Fluorescent.

C. Applications of exterior lighting fixtures required for this project include the following:

Outdoor area lighting.
Parking lot lighting.
Building exterior lighting.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions on each type exterior building lighting fixture and component.

B. Shop Drawings: Submit fixture shop drawings in booklet form with separate sheet for each fixture, assembled in "luminaire type" alphabetical or numerical order, with proposed fixture and accessories clearly indicated on each sheet.

C. Wiring Diagrams: Submit wiring diagrams for exterior lighting fixtures showing connections to electrical power panels, switches, dimmers, controllers, and feeders. Differentiate between portions of wiring which are manufacturer-installed and portions which are field-installed.

D. Illumination Data: Provide isofootcandle (isolux) plot diagram of footcandles on

horizontal pavement surface which shows composite values of illuminance projected from the arrangement of light sources from indicated fixture locations and heights. Show on the graphic plots the locations, spacings and heights of luminaires.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of exterior lighting fixtures of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firms with at least 3 years of successful installation experience on projects with exterior lighting fixture work similar to that required for this project.

C. Codes and Standards:

1. Electrical Code Compliance: Comply with applicable local code requirements of the authority having jurisdiction and CEC Article 225, 250, 410, and 501 as applicable to installation, and construction of exterior building lighting fixtures.
2. NEMA Compliance: Comply with applicable requirements of NEMA Stds Pub/No. LE 2 pertaining to lighting equipment.
3. IES Compliance: Comply with IES RP-8, 19, 20 and PB-15 pertaining to exterior, parking, and roadway lighting practices and fixtures.
4. UL Compliance: Comply with requirements of UL standards, including UL 486A and B, pertaining to exterior lighting fixtures. Provide exterior lighting fixtures and components which are UL-listed and labeled.
5. NFPA Compliance: Comply with applicable requirements of NFPA 78, "Lightning Protection Code," pertaining to installation of exterior lighting fixtures.
6. CBM Labels: Provide fluorescent lamp ballasts which comply with Certified Ballast Manufacturers Association and carry the CBM label.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver exterior lighting fixtures in factory-fabricated containers or wrappings, which properly protect fixtures from construction debris and physical damage.

B. Store exterior lighting fixtures in original wrappings in a clean dry space. Protect from weather, dirt, fumes, water, construction debris, and damage.

C. Handle exterior lighting fixtures carefully to prevent damage, breaking, and scoring. Do not install damaged fixtures or components; remove units from site and replace with new.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate with other electrical work including wires/cables, electrical boxes and fittings, and raceways, to properly interface installation of exterior lighting fixtures with other work.

B. Sequence exterior lighting installation with other work to reduce possibility of damage and soiling of fixtures during remainder of construction period.

1.7 MAINTENANCE

A. Maintenance Data: Submit maintenance data and parts list for each exterior lighting fixture and accessory; including "trouble- shooting" maintenance guide. Include that data, product data, and shop drawings in a maintenance manual; in accordance with requirements of Division 1.

B. Extra Stock: Furnish stock or replacement lamps amounting to 15 percent (but not less than one lamp in each case) of each type and size lamp used in each type fixture. Deliver replacement stock as directed to OWNER'S storage space, and obtain receipt.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to those shown on the fixture schedule on the drawings.

B. Fluorescent Ballasts:
Advance Transformer Co.
Lutron
General Electric
Universal/Magnatek

C. LED Drivers: Advance Transformer Co.

2.2 EXTERIOR LIGHTING FIXTURES

A. General: Provide lighting fixtures, of sizes, types and ratings indicated; complete with, but not limited to, housings, energy- efficient ballasts, lamps and wiring.

B. Wiring: Provide electrical wiring within fixture which are suitable for connection to branch circuit wiring as follows:

CEC Type AF for 120 volt, minimum No. 18 AWG.
CEC Type SF-2 for 277 volt, minimum No. 18 AWG.

C. Fluorescent Lamp Ballasts: Provide low-temperature, high power factor, low energy fluorescent lamp ballasts, capable of operating lamp types indicated.

D. LED Drivers: Provide drivers capable of operating LEDs with ratings indicated. Drivers shall be suitable for climate installed.

2.3 LIGHTING FIXTURES / LAMPS

A. Lighting fixtures shall be of manufacture and type as specified in the Fixture Schedule, and shall have all parts and fittings necessary to completely and properly install the fixture. Fixtures of the same type shall be of one manufacturer and of identical finish and material.

B. Lighting fixtures shall bear Underwriter's Laboratories labels.

C. Fixtures shall be furnished and installed as indicated on the Drawings, including hangars, glassware, auxiliary equipment, sockets, lamps, connectors for continuous installation, etc.

D. Each fixture shall be wired with conductors suitable for the voltage, current and temperature to which the conductors will be subjected.

E. If excessive ballast hum develops within 12 months after installation, the condition shall be corrected at no charge to the OWNER. Flickering of the lamps or blacking of the lamp ends within 12 months shall also be corrected at no charge to the OWNER.

F. Proper lamps of type, size, color temperature and wattage indicated shall be furnished and installed in each fixture and shall be manufactured by General Electric, Phillips, or Sylvania. The CONNTRACTOR shall replace lamps which have been burned out prior to final completion. Clean dust, dirt, fingerprints and grease from fixtures before final completion.

G. Install trims, reflectors and parabolic blades or diffusers with care. Wear surgical gloves when installing these to avoid leaving fingerprints.

H. Provide four (4) slack #12 safety wires at diagonal corners of fixtures as well as clamping to runners in T-bar ceiling installations.

I. Provide certified ballasts identified in fixture schedule.

J. Aim adjustable lighting fixtures and lamps in night test of system. Verify that measured illuminance values comply with isolux plot diagram values.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which lighting fixtures are to be installed, and substrate which will support lighting fixtures. Notify OWNER'S Representative in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF EXTERIOR LIGHTING FIXTURES

A. Install exterior lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of CEC, NECA's "Standard of Installation," NEMA standards, and with recognized industry practices to ensure that lighting fixtures fulfill requirements.

B. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486A and B, and the National Electrical Code.

C. Fasten electrical lighting fixtures and brackets securely to indicated structural supports, including poles/standards; and ensure that installed fixtures are plum and level.

D. All splices shall be made with silicone-filled wire connectors and wrapped with weatherproof tape.

3.3 GROUNDING

A. Provide equipment grounding connections for exterior lighting fixtures as indicated. Tighten connections to comply with tightening torques specified in UL Std. 486A to assure permanent and effective grounds.

3.4 FIELD QUALITY CONTROL

A. Replace defective and burned out lamps for a period of one year following the Date of Substantial Completion.

B. At Date of Substantial Completion, replace lamps in exterior lighting fixtures which are observed to be noticeably dimmed after CONTRACTOR'S use and testing, as judged by OWNER'S Representative.

C. Refer to Division-1 sections for the replacement/restoration of lamps in interior lighting fixtures, where used for temporary lighting prior to Date of Substantial Completion.

3.5 ADJUSTING AND CLEANING

A. Aim adjustable lighting fixtures and lamps in night test of system. Verify that measured illuminance values comply with isolux plot diagram values.

B. Clean lighting fixtures of dirt and debris upon completion of installation.

3.6 DEMONSTRATION

A. Upon completion of installation of exterior lighting fixtures, and associated electrical supply circuitry, apply electrical energy to circuitry to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

END OF SECTION

SECTION 26 5150 - INTERIOR LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 SUMMARY

A. Extent, location, and details of interior lighting fixture work are indicated on drawings and in schedules.

B. Types of interior lighting fixtures in this section include the following:

Fluorescent.
LED.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions on each type interior building lighting fixture and component.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of interior lighting fixtures of sizes, types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firms with at least 3 years of successful installation experience on projects with interior lighting fixtures work similar to that required for this project.

C. Codes and Standards:

1. Electrical Code Compliance: Comply with applicable local code requirements of the authority having jurisdiction and CEC Article 220, 410,

and 510 as applicable to installation, and construction of interior building lighting fixtures.

2. NEMA Compliance: Comply with applicable requirements of NEMA Stds Pub/No.'s LE 1 and LE 2 pertaining to lighting equipment.
3. IES Compliance: Comply with IES RP-1 pertaining to office lighting practices and RP-15, regarding selection of illuminance values for interior office lighting.
4. UL Compliance: Comply with UL standards, including UL 486A and B, pertaining to interior lighting fixtures. Provide interior lighting fixtures and components which are UL- listed and labeled.
5. CBM Labels: Provide fluorescent lamp ballasts which comply with Certified Ballast Manufacturers Association standards and carry the CMB label.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver interior lighting fixtures in factory-fabricated containers or wrappings, which properly protect fixtures from damage.

B. Store interior lighting fixtures in original packaging. Store inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity, laid flat and blocked off ground.

C. Handle interior lighting fixtures carefully to prevent damage, breaking, and scoring of finishes. Do not install damaged units or components; replace with new.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate with other work including wires, electrical boxes and fittings, and raceways, to properly interface installation of interior lighting fixtures with other work.

B. Sequence interior lighting installation with other work to minimize possibility of damage and soiling during remainder of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to those listed on the Fixture Schedule on the Drawings.

2.2 FIXTURES

A. General: Provide lighting fixtures, of sizes, types and ratings indicated on the Fixture Schedule. Ship fixtures factory-assembled, with those components required for a complete installation.

B. Wiring: Provide electrical wiring within fixture suitable for connecting to branch circuit wiring as follows:
CEC Type AF for 120 volt, minimum No. 18 AWG.

C. Fluorescent Lamp Ballasts: Provide low-energy, electronic fluorescent lamp ballasts, capable of operating lamp types indicated; with high power factor, rapid-start, and low-noise features; Type 1; Class P; sound-rated A.

D. LED Drivers: Provide electronic drivers.

E. Lamps:

1. Provide fluorescent lamps of color temperature, CRI, wattage, size and type as indicated.
2. Provide LEDs in type and wattage indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which lighting fixtures are to be installed, and substrate for supporting lighting fixtures. Notify CONTRACTOR in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF INTERIOR LIGHTING FIXTURES:

A. Install interior lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of CEC, NECA's "Standard of Installation," NEMA standards, and with recognized industry practices to ensure that lighting fixtures fulfill requirements.

B. Provide fixtures and/or fixture outlet boxes with hangers to properly support fixture weight. Submit design of hangers, method of fastening, other than indicated or specified herein, for review by OWNER’S Representative.

C. Install flush mounted fixtures properly to eliminate light leakage between fixture frame and finished surface.

D. Provide plaster frames for recessed fixtures installed in other than suspended grid type acoustical ceiling systems. Brace frames temporarily to prevent distortion during handling.

E. Fasten fixtures securely to indicated structural supports; and ensure that cable-hung fixtures are plumb and level.

F. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486A and B, and the National Electrical Code.

G. Support surface mounted fixtures greater than 2 feet in length at a point in addition to the outlet box fixture stud.

3.3 FIELD QUALITY CONTROL

A. Replace defective and burned out lamps for a period of one year following the Date of Substantial Completion.

B. At Date of Substantial Completion, replace lamps in interior lighting fixtures which are observed to be noticeably dimmed after CONTRACTOR’S use and testing, as judged by Engineer.

C. Furnish stock or replacement lamps amounting to 15%, but not less than 4 lamps in each case, of each type and size lamp used in each type fixture. Deliver replacement stock as directed to OWNER’S storage space.

3.4 ADJUSTING AND CLEANING

A. Clean interior lighting fixtures of dirt and construction debris upon completion of installation. Clean fingerprints and smudges from lenses.

B. Protect installed fixtures from damage during remainder of construction period.

C. Until site is cleaned up, protective plastic, shipped with light fixtures, should remain on fixtures.

3.05 GROUNDING

A. Provide equipment grounding connections for interior lighting fixtures as required by code. Tighten connections to comply with tightening torques specified in UL Std 486A to assure permanent and effective grounds.

3.6 DEMONSTRATION

A. Upon completion of installation of interior lighting fixtures, and after building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

END OF SECTION

SECTION 26 53 50 - EMERGENCY LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of emergency lighting work is indicated by drawings and schedules.

B. Types of emergency lighting fixtures in this section include the following:

1. Emergency battery ballasts.
2. Exit fixtures.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of emergency lighting fixtures of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firms with at least 3 years of successful installation experience on projects with emergency lighting work similar to that required for project.

C. Codes and Standards:

1. CEC Compliance: Comply with CEC as applicable to installation and construction of emergency lighting.
2. NEMA Compliance: Comply with applicable requirements of NEMA Std Pub No.'s 1B 4, 1B 5, and FA 1 pertaining to emergency lighting.
3. UL Compliance: Provide emergency lighting fixtures which are UL-listed and labeled and comply with UL 924.
4. NFPA Compliance: Comply with applicable requirements of and NFPA 101, "Life Safety Code".

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data on emergency lighting fixtures.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle lighting fixtures carefully to prevent damage, breaking, and scoring. Do not install damaged fixtures or components; replace with new.

B. Store lighting fixtures in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide emergency lighting of one of the following (for each type of emergency lighting fixture):

Bodine, Inc.
Iota Engineering, Inc.
Radiant, Inc.

B. Exit Fixtures:

LSI
Isolite
Conceal-Lite
Dual-Lite
Sure Lites, division of Cooper Lighting Inc.
Lithonia Lighting Inc.
Emergi-Lite

2.2 EMERGENCY LIGHTING BALLASTS

A. General: Provide battery ballasts of sizes, types and ratings indicated.

B. Wiring: Provide wiring within fixtures for connection to branch circuit wiring as follows:

CEC Type AF for 120 volt, minimum No. 18 AWG.

C. Battery: Provide sealed, maintenance-free, lead cadmium battery with a rated capacity of 24 watts. Battery shall recharge in 24 hours after a 90 minute

discharge. Battery shall have low voltage disconnect to prevent damage from over discharge.

2.3 EMERGENCY EXIT SIGN

A. Construction: Provide engineering-grade thermoplastic housing that is impact resistant with soft, rounded corners. Housing shall be ivory white. Unit shall have universal removable directional arrow inserts. Color panels shall be made of reinforced, impact-resistant fiberglass. Unit shall have LED lamps.

B. Battery: Provide sealed, maintenance-free, lead cadmium battery with a rated capacity of 24 watts. Battery shall recharge in 24 hours after a 90 minute discharge. Battery shall have low voltage disconnect to prevent damage from over discharge.

C. Electronics: Provide unit with integral self-diagnostic system which continually monitors lamps, battery and charger boards, signals failure with visual and audible alarms. Charger shall be current-limited to maximum battery life and maximize energy consumption. Charger circuitry shall have short circuit protection to protect circuitry. Thermal protection shall be provided to adjust charge current to prevent overheating. Thermal compensation shall be provided to adjust charger output to optimize ambient temperature charging. Charge voltage shall be regulated to maintain constant charge voltage at different line voltages to prevent over/under charging. Charger output shall be filtered to minimize charge voltage nipple. Unit shall have AC/LVD reset to permit unit testing at installation and to ensure full 90 minute discharge.

D. Mounting: Unit shall have universal mounting - top, end or back. Mounting canopy shall be provided for top or end mounting. Mounting and arrows shall be as indicated on drawings.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which emergency lighting is to be installed, and substrate which will support lighting fixtures. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF EMERGENCY LIGHTING FIXTURES

A. Install emergency lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of CEC, NECA's "Standard of Installation", NEMA standards, and

with recognized industry practices to ensure that lighting fixtures fulfill requirements.

B. Coordinate with other electrical work as appropriate to properly interface installation of emergency lighting fixtures with other work.

3.3 ADJUSTING AND CLEANING

A. Clean emergency lighting fixtures of dirt and debris upon completion of installation.

B. Protect installed fixtures from damage during remainder of construction period.

3.4 GROUNDING

A. Provide equipment grounding connections for emergency lighting fixtures as required by Code. Tighten connections to comply with tightening torques specified in UL Std 486A to assure permanent and effective grounds.

3.5 FIELD QUALITY CONTROL

A. Upon completion of installation of emergency lighting fixtures, and after building circuitry has been energized with normal power source, apply electrical energy to demonstrate capability and compliance with requirements. Test emergency lighting to demonstrate operation under emergency conditions. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

END OF SECTION

SECTION 266722 - COMMUNICATIONS

PART 1 - GENERAL

1.1 GENERAL

A. Provide all labor, materials, and equipment and perform all operations required for a complete communications distribution system as indicated on the drawings and specifications. A majority of the work will occur in occupied spaces, including labs, libraries, practice rooms, and offices.

1.2 TYPES OF WORK

A. Provide EMT conduits, junction boxes, cable tray system, j-hooks, raceways, and all supporting components as required to provide a complete cabling distribution system.

B. Provide proposed fire stopping systems and materials and install firestopping with staff trained and certified. Restore and/or replace any such materials that are removed during installation.

C. Provide sub-terminals with fire-rated backboards, relay racks, swing gates, ladder trays, cable routes, and other components as required.

D. Verify exact location and mounting height of cable tray, J-hooks, EMT conduits, J-boxes, and raceway with Owner’s Representative prior to installation.

E. Document and label all work per specifications.

F. Provide grounding and bonding as defined in ANSI-J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.

1.3 QUALITY ASSURANCE

A. Owner has established a standard for communication systems and this project will become a part of the overall embedded communication, data systems installation.

B. .Contractor installing all communication systems under this contract shall be listed and certified by Comscope as an approved contractor.

C. All communication, data and associated materials shall be Comscope products, and because of standards adopted by Owner, no substitutions of materials will be considered.

D. At completion of project Contractor shall deliver to Owner, a written twenty-five (25) year warranty from Comscope for entire installed system.

1.4 INTENT OF DOCUMENTS AND VERIFICATION OF DIMENSIONS

A. The provided drawings serve as proposed drawings only, indicating diagrammatically the general location and relationship of the communications sub-terminals and the conduit, cable tray and required cables between them, the backboards and general layout of the equipment and cables mounted thereon.

B. All scaled and figured dimensions are approximate and are given for estimate purposes only. Carefully check and verify all cable and duct dimensions and sizes in order to determine that the cables can be placed and that the placement and termination is compatible with the space provided. Where others furnish backboard and ducts, verify the dimensions and equipment mounting requirements before proceeding with the cable placement and termination. Field verification of locations shown on plans is necessary since actual locations, distances, mounting heights, etc., may be affected by field conditions. The Owner's Representative reserves the right to make any necessary change to the location of equipment or to other features shown on plans prior to the installation without additional cost to the Owner.

C. Where equipment has been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. Carefully check the drawings to verify that the required or recommended equipment will fit acceptably into the spaces provided.

D. No allowance shall be made subsequently for any extra expense due to failure or neglect to follow foregoing directives.

1.5 NATIONAL COMMUNICATIONS STANDARDS

A. All work shall be performed in accordance with all applicable code requirements and applicable requirements of all other regulatory agencies, including but not limited to the following:

1. California Electrical Code.
2. Testing California Code of Regulations.
3. California Health and Safety Code.
4. National Fire Protection Association (NFPA), "Life Safety Code", NFPA 101.
5. California/Federal Environmental Protection Agency.
6. Code of Federal Regulations.

1.6 SUBMITTALS

A. Submit a complete list of all materials to be installed including manufacturer cut sheets, performance data, and guarantees and warranties that relates either to applicable specific paragraphs or to item numbers as shown on plans, or both.

B. Submit sample or manufacturer system cut sheets for materials and manner of installation for all fire stop requirements including wall and floor penetrations for conduit and cable trays.

1.7 CUTTING AND REPAIRING

A. Restore and/or replace any fire stopping systems and materials per applicable code requirements. Such fire seal shall be reusable for future placement of cables.

1.8 SIMILARITY OF MATERIALS

A. Unless specified otherwise, all cables, wires, punch blocks, wall plates, patch panels, and respective type features and equipment, of a similar type or having similar operative or functional features shall be of the same manufacturer, model and color throughout the project.

1.9 MANUFACTURERS' DIRECTIONS

A. Follow manufacturers' directions and recommendations in all cases where the manufacturers, or articles used for this work, furnish directions covering points shown or specified.

1.10 GROUNDING AND BONDING

A. Grounding shall be executed in accordance with the National Electrical Code 800.100, as well as any additional provisions specified or shown on drawings.

B. Grounding and bonding shall further conform to the specifications defined in ANSI/EIA/TIA-STD-J-607-A.

1.11 MOUNTING

A. Contractor shall provide all materials and accessories necessary to properly mount and secure equipment furnished and/or installed under this work. This includes, but is not limited to concrete anchors, wood screws, cable straps, and hardware.

1.12 FIRE STOP PENETRATIONS

A. All pathways that penetrate fire rated barriers shall be firestopped in accordance with TIA/EIA 569-B, Annex A, per Owner's requirements and per Applicable Code Requirements.

B. All openings in and around conduits, cable trays, sleeves, and other openings that penetrate fire rated floors, walls, and partitions shall be sealed with material to at least equal in fire resistance to the construction being penetrated.

C. Any existing firestopping material that has been disturbed or removed during a cable installation shall be restored and/or replaced to meet requirements.

D. Do not cover up through-penetration firestop system installations that will become concealed behind other constructions until Owner's Inspector has examined each installation.

E. Any and all excess fill material adjacent to openings shall be cleaned with a cleaning material approved in writing by the firestop system manufacturer.

PART 2 - MATERIALS

2.1 SCOPE

A. Furnish and install all materials listed below for a complete and operative communications cable distribution system as indicated on the drawings, and as specified herein.

B. Unless specified otherwise, all conduit, metallic and non-metallic raceway and respective type features and equipment, of a similar type or having similar operative or functional features shall be of the same manufacturer, model and color throughout the project.

2.2 MATERIAL APPROVAL

A. The design, manufacturer and testing of all communications materials shall conform to, or exceed, the latest applicable standards.

2.3 SUPPORTING INFRASTRUCTURE FOR LOW VOLTAGE CABLING

A. EMT Conduits and Junction Boxes: New 2" and 3" EMT and junction boxes may be required to support distribution cables and workstation wiring.

1. Do not exceed more than 270 degrees of bends in any conduit segment. For additional information on conduit bend radius requirements and recommendations, see specifications in ANSI/NFPA 70 and ANSI/TIA/EIA-569-B.
2. No L conduits with opening to back (LB's) allowed.
3. Do not exceed the recommended cable fill ratio of 40%.

B. EMT Conduit Sleeve: Within identified areas in the building, one-inch (1.00") or a one and one-quarter inch (1.25") EMT conduit sleeve is required from the cable tray into offices. The 1.25" conduit sleeves must not extend more than 1/4" into the offices so that a deep 4S non-metallic box can be mounted over the threaded EMT conduit sleeve, and secured with a lock nut. A nylon bushing on the EMT conduit is required at the cable tray location.

Non-Metallic Box Materials are:
Carlon Deep Double Gang box
Or Equal.

C. Single-Drop EMT Conduits: Within identified areas in the building, a one inch (1.00") or one and one-quarter inch (1.25") EMT conduits may be required for this installation. Nylon bushings are required on both ends of the EMT conduits.

1. The one inch (1") EMT may not exceed 270 degrees of bend. No LB's may be used on communications conduit runs.
2. If cable to be installed comes close to or exceeds the recommended 40% fill ratio plus future growth, a larger conduit shall be installed.
3. Pull-line to be placed in all EMT conduits exceeding 15'.

D. Surface Mounted Box: The EMT conduit shall attach to a 5S box unless a finished box is called out.

E. Surface Mounted Raceway and Boxes:

1. Within identified areas of the building, surface mounted metallic and non-metallic raceway may be required to support communications wiring. Contractor shall check with the Owner's Representative to determine configuration of raceway to support communications wiring.

Metallic Raceway Materials are:
Wiremold V2100 BC Series, and supporting components.
Wiremold Two-Piece Aluminum Single Channel, AL5200 Series.
Or Equal.

Non-Metallic Raceway Materials are:
Leviton, in 6' sections, with supporting components.
Or Equal.

2. A double gang metallic or non-metallic finished box shall be installed at the end of the respective raceways.

   Metallic Box Material is:
   Wiremold Extra Deep Switch Receptacle, Cat # V2144-2
   Or Equal.

   Non-Metallic Box Material is:
   Carlon Double Gang box
   No Equal.

F. Power Poles: Power poles may not be used without specific, written approval from the Owner's Representative. If a power pole installation is required, the following material may be used.

   Materials are:
   Hubbell, Catalog # HSP12AB, wiremold
   Or Equal.

G. Flex Conduit: Flex conduit may not be used without specific, written approval from the Owner's Representative.

H. Infrastructure to Support Wireless Technology: Uni-strut or Power Strut, shall be attached to either cable tray or to a wall and shall be securely attached and anchored to a structural element. Typical diagram may be requested.

1. Drop shall route out of cable tray to location on uni-strut when landing drop on cable tray.
2. One-inch (1.00") EMT shall be used as a cable route from a cable tray or J-Box to a drop location, when the drop is to land on wall.

2.4 GROUND BLOCK FOR SUB-TERMINALS

Materials are:
General Electric Equipment Ground Kit, GEJ-4600 Rev. F, TGL Series.
Burndy Grounding Clamps.
Chatsworth Telecommunications Grounding Busbar-EIA Standard, 13622 and 11216 Series.
Or Equal.

PART 3 – INSTALLATION

3.1 SCOPE

A. Provide all labor, materials, and equipment, and perform all operations and quality assurances required for a complete and operative communications distribution and workstation cabling system as indicated on the drawings and as specified herein.

B. In order to meet the expectation of a quality installation, the Contractor is required to have regular project meetings with the Owner's Representative regarding all phases of the project to keep the project on schedule, on budget and to maintain conformance to the specifications and standards. The Contractor shall receive approval from the Owner's Representative during all phases of the project and especially during the sub-terminal layout phase to ensure a quality installation. The Owner's Representative shall present, in writing, the recommended changes to the Contractor during weekly meetings.

3.2 GENERAL

A. A site visit will be scheduled to review the project scope, including sub-terminal rooms, cable tray, raceway, and conduit routes.

B. Communications wiring system layouts indicated on the drawings are generally diagrammatic, but shall be followed as closely as actual construction permits.

C. Verify all scales and report any dimensional discrepancies or other conflicts to the Owner's Representative.

3.3 COORDINATION OF INSTALLATION

A. The Contractor shall coordinate all work with the Owner's Representative to provide correct placement of required material and equipment. The Owner's Representative will provide project information to, and coordinate work with, departmental personnel prior to Contractor performing work. The Contractor shall inform personnel of the required access to, and clearances around, communications equipment to maintain serviceability and code compliance. The Contractor shall verify equipment dimensions and requirements with provisions specified under Part 3.0 - Installation.

B. The Contractor shall be responsible for informing the Owner's Representative, with ample lead time, of any furniture and/or equipment that needs to be moved, in order to perform installation. The Owner's Representative will coordinate necessary furniture or equipment moves.

3.4 QUALITY ASSURANCE

A. Provide a meaningful Quality Assurance program. To assist the Contractor in this program, the requirements and specifications contained herein are set forth as the minimum acceptable requirements. This does not relieve the Contractor from executing other Quality Assurance measures to obtain a high quality installation and operational-ready distribution system within the scope of this work.

B. The Contractor shall ensure that all workmanship, all materials utilized, all required equipment, and the manner and method of installation, conforms to local building and fire codes and accepted construction and engineering practices, and that all material installed is in satisfactory working condition to perform its functional operation.

C. The Contractor shall receive approval from the Owner's Representative during all phases of the project.

D. In order to meet the Owner's expectation of a quality installation, the Contractor shall have regular meetings, with the Owner's Representative.

E. Any material, installation or workmanship that is found to be defective shall be replaced and/or corrected by the Contractor without additional cost to the Owner.

3.5 INFRASTRUCTURE INSTALLATION

A. All conduits installed to support workstation wiring shall be attached and braced to cable trays, cable runways, and/or junction boxes unless specified otherwise.

3.6 EQUIPMENT GROUNDING

A. Ground non-current carrying metal parts of electrical equipment enclosures, frames, conductor raceways, or cable trays to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Grounding should be continuous and connected to the main grounding electrode of the building. All systems installed shall conform to the California Electrical Code (CEC) for electrical bonding/grounding requirements in addition to those requirements in the ANSI/TIA/EIA-J-STD-607-A.

1. The Contractor shall provide and place a grounding wire between sub-terminals, which shall be attached to a grounding block mounted on the bottom of each sub-terminal backboard.
2. The Contractor shall provide and mount the grounding block on the bottom of each sub-terminal backboard.
3. The Contractor shall attach the grounding block to the building grounding element.

PART 4 – DOCUMENTATION

4.1 AS-BUILT DRAWINGS

A. Upon completion of the wiring and prior to final acceptance, Contractor shall provide the following documentation to the Owner's Representative:

B. A duplicated set of drawings which are marked, in red ink, with any changes or variations from the original drawings.

END OF SECTION

SECTION 26750 - COMMUNICATIONS CABLING

PART 1 - GENERAL

1.1 GENERAL

A. Provide all labor, materials, and equipment and perform all operations required for a complete communications workstation wiring system as indicated on the drawings and specifications. Work will occur in occupied spaces, including labs, libraries, practice rooms, and offices.

1.2 TYPES OF WORK

A. Provide, terminate and test enhanced Cat 6 workstation cabling per specifications.

B. Provide, terminate and test 25 PR Cat 6 distribution cabling per specifications.

C. Provide, terminate and test 100 PR Cat 6 telephone cabling per specifications.

D. Provide, terminate and test 12MM/12SM fiber optic cabling per specifications.

E. Provide sub-terminals with racks, patch panels, wireminders, cabling routes (ladder racks, ducting, Velcro straps, etc), and other components as indicated herein and on the plans provided.

F. Document and label all work per specifications.

G. Verify exact location and mounting height of equipment, drops and raceway with Owner’s Representative prior to installation.

H. Provide pull lines, with a minimum test rating of 200 lb, required in all conduits after use to facilitate future cable installation.

I. Provide grounding and bonding as required to support the communications infrastructure.

1.3 INTENT OF DOCUMENTS AND VERIFICATION OF DIMENSIONS

A. The provided drawings serve as proposed drawings only, indicating diagrammatically the general location and relationship of the communications sub-terminals and the conduit, cable tray and required cables between them, the backboards and general layout of the equipment and cables mounted thereon.

B. All scaled and figured dimensions are approximate and are given for estimate purposes only. Carefully check and verify all cable and duct dimensions and sizes in order to determine that the cables can be placed and that the placement and termination is compatible with the space provided. Where others furnish backboard and ducts, verify the dimensions and equipment mounting requirements before proceeding with the cable placement and termination. Field verification of locations shown on plans is necessary since actual locations, distances, mounting heights, etc., may be affected by field conditions. The Owner's Representative reserves the right to make any necessary change to the location of equipment or to other features shown on plans prior to the installation without additional cost to the Owner.

C. Where equipment has been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. Carefully check the drawings to verify that the required or recommended equipment will fit acceptably into the spaces provided.

D. No allowance shall be made subsequently for any extra expense due to failure or neglect to follow foregoing directives.

1.4 NATIONAL COMMUNICATIONS STANDARDS

A. All workstation labor and materials shall conform to specifications defined in TIA/EIA-568A-5 Commercial Telecommunications Wiring Standard. See Current TIA/EIA Document Release. These include TIA 568-B.1, TIA 568-B.2 and TIA 568-B.3.

1. Note that "568A" refers only to a jack configuration and that this is the second ("B") edition of the 568 Standard.

B. The Contractor shall perform tests in conformance with TIA 568-B.1, B.2, and B.3 specification.

C. All labor and materials shall conform to the grounding and bonding requirements defined in TIA/EIA -607. TIA 607 is now incorporated as J-STD-607-A.

D. All materials and installation practices shall further conform to the Additional Transmission Performance Guidelines for 4-Pair 100 ohm Cabling as defined in TIA-568-B.1, B.2, and B-3.

E. All fiber materials and installation labor provided shall conform to Centralized Fiber Optical Cable Guidelines as defined in the Optical Fiber Cabling Components Standards ANSI/TIA/EIA-568-B3 and in TIA-526-7 (SM Optical Power Measurements) and TIA-526-14-1 (MM Optical Power Measurements)

1.5 SUBMITTALS

A. Submit a complete list of all materials to be installed including manufacturer cut sheets, performance data, and guarantees and warranties that relates either to applicable specific paragraphs or to item numbers as shown on plans, or both.

1.6 CUTTING AND REPAIRING

A. Upon placement of all cables within the cable tray, which transverses through offices, labs and hallway, the cable tray shall be fire sealed as required by applicable code. Such fire seal shall meet the requirements of applicable code and shall be reusable for future placement of cables. Contractor shall provide specifications of material and fire stop system assembly for proposed fire stop solution. All fire stopping shall be performed by personnel certified to perform such work. All fire stop work will be reviewed, and must pass inspection by, the fire marshal.

1.7 SIMILARITY OF MATERIALS

A. Unless specified otherwise, all cables, wires, punch blocks, wall plates, patch panels, and respective type features and equipment, of a similar type or having similar operative or functional features shall be of the same manufacturer, model and color throughout the project.

1.8 MANUFACTURERS' DIRECTIONS

A. Follow manufacturers' directions and recommendations in all cases where the manufacturers, or articles used for this work, furnish directions covering points shown or specified.

1.9 LABELING

A. Contractor shall provide labels for wall plates, cables, backboards, and patch panels according to specifications.

B. All wires and cables shall be labeled within twenty-four inches (24") of each end of each wire. Each label shall include the room number in which the opposite end of the cable appears.

C. Each wall plate shall be labeled with a unique sequential number. Workstation cables at the patch panel should be terminated in numerical sequence lowest to highest, not randomly.

1. Each wall plate shall be labeled with the sub-terminal room number and port number from the patch panel. For example, if the sub-terminal room number is 1234 and the port number at the patch panel is 37, the wall plate label would read: 1234.37.
2. Each patch panel jack shall be labeled numerically in sequential order, lowest to highest, for each voice, data1, and data 2 patch panel.
3. If there are existing patch panels in a sub-terminal location where new patch panels are being installed, continue the numerical sequence from the existing patch panels. For example, if the last jack terminated on the existing patch panel is 52, then the new patch panel numbering would begin with 53. This is to avoid having duplicate jack numbers in the same location.

D. Each terminal backboard will be labeled with the terminal number and room number. Labeling shall be placed within the top six inches (6") of the backboard. The Owner's Representative shall provide labeling information.

1.10 GROUNDING

A. Grounding shall be executed in accordance with California Electrical Code (CEC) and regulations of the State of California, National Electrical Code 800.100, and authorities having jurisdictional as well as any additional provisions specified or shown on drawings.

B. Grounding and bonding shall further conform to the specifications defined in ANSI/EIA /TIA-STD-J-607-A.

1.11 MOUNTING

A. Contractor shall provide all materials and accessories necessary to properly mount and secure equipment furnished and/or installed under this work. This includes, but is not limited to concrete anchors, wood screws, cable straps, and hardware.

1.12 TESTS

A. Contractor shall perform all tests as defined in Section 4.0 of the specifications. Contractor shall provide all materials, labor, and equipment necessary for performance of these tests. Upon spot testing by the Owner's Representative, replace or correct any work showing faults under tests at no additional charge to the Owner.

B. Testing shall be made in conformance with TIA 568-B.1, B.2 and B.3.

C. Complete documentation of each test for each cable shall be provided to the Owner's Representative prior to acceptance testing by the Owner. The facilities (a workstation) to download test results directly into the Owner network will be provided by the Owner's Representative.

1.13 STAGE REVIEW

A. The Owner’s Representative will request quality reviews of all work at key points in the installation process according to a schedule proposed by the Owner’s Representative and agreed to by the Contractor.

B. The key points for review shall, as a minimum, include the following:

1. Placement of approximately ten percent (10%) of the "Voice", "Data 1" and "Data 2" workstation cable. Examination of cable pair attachment to workstation jacks shall be made to determine conformance to specifications.
2. Placement of approximately fifty percent (50%) of the "Voice", "Data 1" and "Data 2" workstation cable. Examination of cable pair attachment to workstation jacks shall be made to determine conformance to specifications.
3. Sub-terminal layout reviews will occur at regular intervals during installation, including but not limited to review of swing gate placement, patch panel placement, separate cable routing paths for data and voice, cable bundling, cable management (wire-minders) and equipment rack placement at each sub-terminal.
4. Attachment of approximately ten percent (10%) of the workstation's cables to the supporting patch panels. Examination of cable pair attachment to patch panel jacks and routing of cable within the sub-terminal shall be made to determine conformance to specifications.
5. Attachment of approximately fifty percent (50%) of the workstation's cables to the supporting patch panels. Examination of cable pair attachment to patch panel jacks and routing of cable within the sub-terminal shall be made to determine conformance to specifications.

C. Failure of any of the inspected work to conform to the drawings and specifications or to agreed upon changes, which were submitted in writing, shall be identified by the Owner’s Representative during stage reviews and the Contractor, at no additional cost to the Owner, shall immediately correct such failures.

PART 2 - MATERIALS

2.1 SCOPE

A. Provide and install all materials listed below for a complete and operative communications wiring system as indicated on the drawings, and as specified herein.

B. Unless specified otherwise, all raceway, cables, wires, punch blocks, wall plates, patch panels, and respective type features and equipment, of a similar type or having similar operative or functional features shall be of the same manufacturer, model and color throughout the project.

2.2 MATERIAL APPROVAL

A. The design, manufacturer and testing of all communications materials shall conform to, or exceed, the latest applicable NEMA, IEEE, ANSI, TIA and EIA standards and Technical Service Bulletins.

2.03 WIRE AND CABLE

A. Station Cabling Single Sheath Category 6 Plus:

1. Four (4) pair, unshielded twisted pair (UTP) cable shall meet or exceed the installation, testing and performance specifications of TIA 568-B.1, B.2 and B.3. Three such cables shall be placed to each workstation outlet. All cable sheaths must be imprinted with the Category 6 designation.
2. For identification during installation, it is required that each sheath be of a distinct color. The Owner currently uses white (for voice), blue (for data1) and gray (for data2) as its three colors.
3. All cables shall be placed within EMT conduit, J-hooks, raceway and/or cable tray system. Plenum-rated cable is required for all cable placed within the scope of this project.
   Materials are:
   ADC/Krone, TruNet Cat 6, Plenum-rated.
   Berk-Tek, LAN-Mark 350, Cat 6 Plus, Plenum-rated.
   Or Equal.

B. Twisted Pair Riser Cabling:

1. Twenty-five (25pr) and fifty pair (50pr) Category 6 cables for telephone shall be placed in the riser distribution routes. All cable sheaths must be imprinted with the EIA/TIA Category 6 specification.
   Materials are:
   Berk-Tek, 50 Pair Cat 6 and 25 Pair Cat 6, Plenum-rated.
   Hitachi, 50 Pair Cat 6 and 25 Pair Cat 6, Plenum-rated.
   Or Equal.
. Twenty-five (25pr) Category 6 cables for data shall be placed in the riser distribution routes. All cable sheaths must be imprinted with the EIA/TIA Category 6 specification.
   Materials are:
   Berk-Tek, 25 Pair Cat5e, CMP Plenum-rated.
   Superior Essex, 25 Pair Cat 6 Power Sum, CMP Plenum-rated.
   Or Equal.

C. Fiber Innerduct: Fiber innerduct shall be provided from the main terminal to each sub terminal within the conduit routes identified. Innerduct shall have measured pull lines supplied by manufacturer, or inserted by Contractor during placement.

Materials are:
Carlon "Flex-Plus" non-metallic tubing, three-quarter inch (3/4") diameter #12007AAY series.
Or equal.

1. All innerduct shall be provided with male end adapters for future attachment into fiber panel boxes.
   Materials are:
   Carlon "Flex-Plus" non-metallic tubing yellow three-quarter inch (3/4") diameter male adapters, #A243E series.
   Or Equal.

D. Fiber Components:

1. Fiber riser cable shall be placed in innerduct between the main terminal and each sub terminal.
2. Fiber cable provided and/or installed under this specification shall be in equal quantities for both multi-mode and single-mode fiber.
3. Provide single-sheath composite cable containing both multi-mode and single-mode fibers, each group with its own sub-sheath or wrap.
   Materials are:
   12 single-mode
   Berk-Tek
   Siecor
   Or Equal.
4. Fiber Buffer tube break out kits: Each inside fiber cable shall be prepared for termination using buffer fan-out kits appropriate for 6 or 12 fibers.
   Materials are:
   Siecor 6 or 12 Fiber Buffer Tube Fan-Out (BTF) Assembly
   Part Siecor or Corning equivalent.
   BICC General Splitter Break-Out for dual-tube multi-fiber cables 2 – 6 fibers (For non-Siecor cable).
5. ST-type connector shall be attached, in the field, to the multi-mode fiber cable.
   Materials are:
   Siecor field-installable ST Connector, part 95-200-42.
   Or Equal.
6. SC-type connectors shall be attached, in the field to the single-mode fiber cable.
   Materials are:
   Siecor field-installable SC Connector, part 95-100-01.
   Or Equal.
7. All terminated fibers shall be attached, and tested, to barrel connectors mounted within wall-mount or rack-mount termination panels. Reference shall be made to the sub-terminal drawing detail for use of wall-mount or rack-mount panels.
   Acceptable Rack-Mount materials are:
   AMP 24-position Fiber Patch Panel Rack-Mount part 559542-1.

Or Equal.
For ST connectors, use six-pak duplex plates, part 3060/5M (ST).
For SC connectors, use six-pak duplex plates, part ATT-2060-SCD-C (SC).
(Check Fiberdyne ST and SC connector six-pak duplex plates for improved spacing)

8. Spare fiber cable shall be protected at each termination location with a plexiglass sheet and stand-off bracket assembly.

2.4 STATION JACKS

A. Station Jacks: All modular jacks are RJ-45 jacks meeting or exceeding the testing and performance specifications of EIA/TIA-568A-5. All modular jacks at wall plates must be individually insertable and removable at the wall plate. The electrical contacts of the jack must be fully enclosed on the backside. Spring tension inserts may NOT be used to secure modular jacks to plate. The modular RJ45 jacks must be colored coded to match the Cat 6 station cables.

Materials are:
ADC/Krone K610 Series, White, Blue Grey.
Hubbell HXJ5E T568A Speedgain Series, White, Blue and Gray.
Or Equal.

2.5 WORKSTATION WALL PLATES

A. Wall Plates: Two-gang wall plates are required on all workstation drops.

Non-Metallic Materials are:
ADC/Krone 4 Port Dual-Gang, Flush Mount Cat # 6644 1 164-01 (WT) -02 (IV).
Hubbell, IFP Face Plate, Double Gang, Cat # IFP260W.
Or Equal.

Metallic Materials are:
AMP 4-Port Dual-Gang, Flush Mount Cat #.
Hubbell, SSF Stainless Steel Plate, Double Gang, Cat #SSF204.
Or Equal.

2.6 CONNECT/DISCONNECT BLOCK

A. For the 100 pair Category 6 telephone cable at the sub-terminal, terminate the Cat 6 cables onto the following Category 6 rated disconnect modules and mounts.

Materials are:
Krone ten (10) pair disconnect modules.
Krone ten (10) pair, 11 position module mount.
Krone ten (10) pair label strip.
No known equal.

B. For the 25 pair Cat 6 Data Cable at the sub-terminal:

Category 6 rated patch panels.

Acceptable materials are:
Hubbell Speedgain Cat 6 Series.
Wiremold Interlink Cat 6 modular IDC series, 12-port Universal.
Or Equal.

2.7 Sub-Terminal Backboard Cable Guide Materials

A. Cable Rings: Cable rings, preferably metallic D Rings or C Hooks, suitable for routing and grouping multiple cables on the backboards shall not exceed four inches (4") in height or four inches (4") in width. Mounting shall be by two screw holes only.

Materials are:

Hubbell, Cat # MCCPSRA4.
Panduit Cable Management D-Rings, CMD Series.
Or Equal.

B. Cable Tie-Down Velcro Straps:

Materials are:

Leviton.
Rip Tie Lite, 1", & 2" wide Velcro Straps.
Hubbell Basic Cable Straps, Cat # MCCMV9__10.
Or Equal.

C. Wiring Duct: Wiring slotted duct (with cover) is required in all sub-terminals to dress and route cable within the backboard area and to manage cable routes for voice and data patch cords. The wiring duct with a hinged or removable top shall be non-metallic. The duct width shall not be greater than four inches (4") and the duct height shall not be greater than four (4") inches.

Materials are:
Carlon Slotted Duct.
Wiremold SL100 Slotted Duct.
Or Equal.

2.8 RACKS & SWING GATES

A. Swing Gate: Wall-mounted swing gate shall be used within specified sub-terminal locations. The swing gate height depends upon the number and size of patch panels, wire minders, and other nineteen-inch (19") rack-mountable equipment to be supported.

Materials are:
Homaco Swing EZ Wall Racks, Series 19-35-T8, 19-21-T8.
Chatsworth Wall-Mount Racks, Series 11807 (49"H), 11791 (38.5"H).
Or Equal.

B. Wall Bracket: Wall-mounted equipment bracket shall be used within specified sub-terminal locations. The equipment bracket supports up to 6U of rack mounted equipment. The wall bracket may not be used without specific, written approval from the Owner's Representative.

Materials are:
Chatsworth Extra-Capacity, Flush-Mounted Wall Bracket, Cat # 11754-519.
No known equal.

Note: This rack is used to mount up to 6 RMU of rack mount equipment flush to the wall. Ideal for small or tight spaced installations. Supports 150 lb. Made of strong, lightweight aluminum.

C. Relay Rack: Floor-mounted equipment rack shall be used within specified sub-terminal locations. The equipment rack shall be UL rated and typically supports 42U of 19"W rack mounted equipment.

Materials are:
Chatsworth Two-Post Floor-Mounted Relay Rack, 7'Hx19"W, Cat # 55054-503.
Or Equal.

Note: This UL rated 2-post relay rack is used to mount up to 45U of rack mount equipment. It is made of strong lightweight aluminum.

2.9 SUB-TERMINAL PATCH PANELS

A. Forty-eight (48) Port Category 6 Panels: Patch panels will be forty-eight (48) port, nineteen-inch (19") panels meeting or exceeding the testing and performance specifications of EIA/TIA-568A-5.

Materials are:
ADC/Krone, 48 Port Cat 6.
Hubbell Speedgain Series, 48 Port Cat 6.
Or Equal.

B. Cable Management/Cord Organizers: Wire-minders or cord organizers are required in each sub-terminal location to support and organize the patch cables placed on the front of the patch panels. The number and capacity of wire minders, and the distribution within the swing gate should be sufficient to evenly support and distribute the full capacity of the patch panels.

1. One cable management panel is recommended for each patch panel.
2. The use of 1U wire-minders may be used after consultation and approval from the Owner's Representative.

Materials are:
Homaco Series Cable Manager, 2U.
Hubbell Cable Manager, 2U 3.5" Ring Depth.
Or Equal.

2.10 LABELS

A. Workstation Cable:
Materials are:
Thomas & Betts, WM Series.
Brady Worldwide, Porta-Pack Wire Marker Book, PWM Series.
Or Equal.

B. Inter-Terminal Cable:
Materials are:
Leviton Blank, self-laminating, write-on labels.
Hubbell XPERT Label System, XPL Series.
Or Equal.

C. Wall Plate Label:
Materials are: Contractor shall provide sample of proposed wall plate label.

D. Patch Panel Label:
Materials are: Contractor shall use labels as provided by patch panel manufacturer.

2.11 CABLE PULLING LUBRICANT

Materials are:
Aqua Gel II.
Yellow 77 Plus.
Or Equal.

PART 3 - INSTALLATION

3.1 GENERAL

A. Communications wiring system layouts indicated on the drawings are generally diagrammatic, but shall be followed as closely as actual construction and should be adhered to, unless recommended changes are presented during regular weekly meetings with the Owner's Representative. See the Owner's Representative for any exceptions to the drawings. Only Owner's Representative approves work.

B. Verify all scales and report any dimensional discrepancies or other conflicts to the Owner's Representative before commencing work.

C. No splicing of any kind is allowed in any cables placed. No connector or in-line junction of any kind is allowed between termination points.

3.2 COORDINATION OF INSTALLATION

A. The Contractor shall coordinate all work with the Owner's Representative. The Owner's Representative will provide project information to, and coordinate work with, departmental personnel prior to Contractor performing work. The Contractor shall verify equipment dimensions and requirements with provisions specified under PART 3 - INSTALLATION.

3.3 QUALITY ASSURANCE

A. Provide a meaningful Quality Assurance program. To assist the Contractor in this program, the requirements and specifications contained herein are set forth as the minimum acceptable requirements. This does not relieve the Contractor from executing other Quality Assurance measures to obtain a high quality installation and operational-ready wiring system within the scope of this work.

B. The Contractor shall ensure that all workmanship, all materials utilized, all required equipment, and the manner and method of installation, conforms to the Specifications and Drawings, and that all material installed is in satisfactory working condition to perform its functional operation.

C. The Contractor shall also ensure that each individual component of the wiring system, including but not limited to, the wall plate, modular jacks, station cable, patch panel, swing gates, equipment racks, and punch blocks is properly installed and properly wired according to the manufacturer's instructions and drawings provided.

D. Provide quality assurance tests and performance testing as specified herein.

3.4 ACCEPTANCE TESTING

A. Upon the completion of the work the Contractor shall perform wire testing on 100% of 4 pair Cat 6 workstation cables. Testing procedures are defined in Section 4.0.

B. Upon the completion of the work, the Contractor shall perform wire testing on 100% of the inter-terminal cable pairs. Testing procedures are defined in Section 4.0.

C. Upon the completion of the work, the Contractor shall perform continuity and signal level tests on 100% of inter-terminal fiber pairs. Testing procedures are defined in Section 4.0.

D. Any material, installation, or workmanship that is found to be defective on the basis of acceptance tests shall be replaced and/or corrected by the Contractor and the acceptance tests repeated until the tests provide satisfactory without additional cost to the Owner.

3.5 GENERAL INSTALLATION OF COPPER STATION PAIRS, RISER PAIRS, COAXIAL AND INNERDUCT:

A. Pull no cable into any portion of the conduit system until all construction work, which might damage the cable, has been completed.

B. All cables to be pulled into any conduit shall be pulled concurrently. Pull no cable into any portion of conduit that already has cable installed.

C. Place all cable continuously from outlet to patch panel. No splicing or junction of cables between designated termination points is permitted.

D. Cables shall be pulled with precautions to avoid damage, such as eliminating sharp edges along cable path, preventing kinks as cable is being pulled and not exceeding manufacturers' maximum bending radius.

E. Cable pulling tensions shall not exceed maximum values recommended by cable manufacturer. If the cable manufacturer does not recommend values, the following values shall be used:

    1. Eighteen (18) pounds for single four (4) pair station cable.

F. For work done under these specifications, the maximum bending radius of any cable is defined as ten (10) times the outside diameter of the cable unless manufacturer's specifications define a larger radius (more than ten times outside diameter). The Contractor at no additional expense to the Owner shall replace any cable damaged by exceeding the maximum bending radius.

G. Use Aqua Gel lubricant, or equal, as lubricants for cable pulling.

H. Use plain Manila rope or other non-abrasive material for pulling coaxial, one hundred pair (100pr) or fifty pair (50pr) Cat 6 cable, twenty-five pair (25pr) Cat 6 cable or fiber innerduct into conduit.

I. Provide and install Panduit Insta-Code cloth cable markers, Series PCM, or equal, identification labels to each end of cables, which connect to work station jacks.

J. Label each end of each cable with the room number in which the opposite end of the cable is located. Label should be placed within twenty-four inches (24”) of each cable.

K. Cables shall be bundled, with cable ties or Velcro straps, at a point where six (6) or more cables are routed parallel to each other and bundling shall continue as other cables join the route. When twelve (12) individual cables are placed in a common route, cable ties or rings shall be used to guide and secure cables.

3.6 INSTALLATION OF WORK STATION CABLE AT WALL PLATE

A. EIA/TIA-568A, Category 6 Station Cabling:

1. Each workstation drop is comprised of three (3) 4 pair Cat 6 cables. One Cat 6 cable is for voice and two Cat 6 cables are for data (Data 1 and Data 2). New cabling attached to the "Voice"(white cable), "Data 1"(blue cable) and "Data 2"(gray cable) jacks at each workstation shall use three (3) EIA/TIA-568A-5-rated, Category 6 cables. These cables shall terminate on the respective "Voice", "Data 1" and "Data 2" patch panel jacks in the serving sub-terminal room.
2. Cable configuration on Wall plate.
3. Each EIA/TIA-568A-5–rated cable shall be terminated on an individual RJ-45 modular connector located within the wall plate, using the slot/wire configuration for EIA/TIA-568A-5.
4. ach wire is attached to the appropriate modular connector terminal within the RJ45 jack. Contractor will ensure that each 24-gauge wire is placed to the full depth of the RJ45 jack and then firmly pull down to the bottom of the connector to secure. The correct punch tool shall be used to place and secure the wire.
5. Contractor shall observe and follow the EIA/TIA-568A-5 requirements of maintaining factory-constructed twists of the cable pair to within one-half inch (.500") of the punch down to the RJ45 jack.
6. Contractor shall install cable retainer or cap over pins of RJ45 jack connectors after cable is terminated.
7. Upon completion of attachment of all wires to the RJ45 jack connectors, Contractor shall check for uniform length of individual wires and dress wires to prevent pinching or interference with proper connection.
8. Contractor shall mount wall plate on a finished 2-gang deep box.

3.7 INSTALLATION OF WORK STATION CABLE AT PATCH PANEL

A. EIA/TIA-568A, Category 6 Station Cabling:

1. Each EIA/TIA-568 cable shall be terminated on an EIA/TIA-568A-rated patch panel assigned to the same function (e.g. "Voice", "Data 1", or "Data 2") as the workstation jack to which it is attached at the opposite end.

2. Each EIA/TIA-568 cable shall be terminated on an individual RJ45 modular connector located within a 48-port patch panel, using the slot/wire configuration for EIA/TIA-568A.
3. Each wire is attached to a modular connector terminal by a RJ45 modular connector. Contractor will ensure that each 24-gauge wire is placed to the full depth of the RJ45 modular connector and then firmly pushed down to the bottom of the connector to secure. The correct punch tool shall be used to place and secure the wire.
4. Contractor will observe and follow the requirement of maintaining factory-provided twists of the cable pair to within one-half inch (0.500") of the punch down in the RJ45 modular connector.
5. Contractor shall ensure a uniform length of individual wires and that wires are separated by color as they enter the sub-terminal room and are bundled and dressed neatly within cable routes as they enter the back of the patch panel.
6. Each cable or group of cables shall be secured to the patch panel back with cable Velcro straps or securing hardware provided by the patch panel manufacturer. Cables shall be dressed neatly and in a consistently organized manner. Cable routing shall be made in such a manner as to provide spare footage for future relocation of patch panels within the rack. Wrapping the bundled cable into a loop can create spare footage, while not exceeding the maximum bending radius allowed. Ensure that the path of the spare footage does not interfere with other cable routes, rack placement, or other equipment and/or does not crossover any cables, materials or equipment.
7. Cables shall leave the patch panel at the hinged side of swing gate and descend or ascend along the sides of the swing gate, and be neatly and properly secured with cable ties. Placement or attachment of cables shall not interfere with the proper opening or closing of the swing gate.
8. Cable routing within the sub-terminal shall be based upon conformance to BICSI and EIA/TIA standards. In addition, distinct and separate cable management routes shall be created for Voice, Data 1, and Data 2 patch cords.
9. Each cable shall be labeled at a point no further than twenty-four inches (24") from its termination jack on the patch panel.
10. Each modular jack on the patch panel shall be labeled with the number of the attached cable.
11. Each patch panel shall be labeled with “Voice”, “Data 1” or “Data 2”. Each port shall be labeled with a unique sequential number.

3.8 SUB-TERMINAL EQUIPMENT SPECIFICATION AND CONSTRUCTION

A. Sub-Terminal Backboard Layout: A proposed layout for sub-terminals shall be provided to the Contractor. This layout is a general layout. It may not include detailed cable management routes or paths for patch cords. Weekly pre-installation meetings with the Owner’s Representative shall be required to determine final layout details and cable routes and paths.

B. Swing Gate Placement: Swing gates shall be mounted on fire-rated backboards with appropriate hardware and placed within the specified area. Swing gates shall be installed 8” apart from each other, so that each swing gate can open a minimum of 90 degrees on a hinge from the backboard surface without obstruction from adjacent walls or other backboard-mounted equipment. Each swing gate shall have a means of securing the gate in the closed position.

C. Relay Rack Placement: Floor-mounted relay racks shall be secured to the floor of the sub-terminal room with appropriate anchor hardware. The Owner’s Representative shall approve the location and anchor hardware to be used prior to installation.

D. Cable Routing Equipment: Cable runway or ladder rack, D-rings, C-hooks, G-slot, Velcro and other equipment or materials used to create cable routing options may be required within the sub-terminal rooms.

E. Patch Panel Placement:

1. Voice circuit patch panels shall consist of forty-eight (48) RJ-45 jacks on a single nineteen-inch (19") panel. All jacks shall meet the specifications of TIA 568-B.1, B.2, and B.3 for Category 6 performance. These panels shall be designated "Voice". All "Voice" patch panels shall be located within the communications sub-terminals.
2. Data 1 circuit patch panels shall consist of forty-eight (48) RJ-45 jacks on a single nineteen-inch (19") panel. All jacks shall meet the specifications of TIA 568-B.1, B.2, and B.3 for Category 6 performance. These panels shall be designated "Data 1". All "Data 1" patch panels shall be located within the communications sub-terminals.
3. Data 2 circuit patch panels shall consist of forty-eight (48) RJ-45 jacks on a single nineteen-inch (19") panel. All jacks shall meet the specifications of TIA 568-B.1, B.2, and B.3 for Category 6 performance. These panels shall be designated "Data 2". All "Data 2" patch panels shall be located within the communications sub-terminals.

F. Twisted Pair Modules and Panels:

1. All PBX Category 6 twisted pair cables shall be terminated on ten (10) pair modules within a vertical mount. These cables shall be placed on separate ten (10) pair modules within the vertical mount. These modules shall meet specifications of TIA 568-B.1, B.2, and B.3 for Category 6 performance.
2. All sheaths of EIA/TIA 568A Category 6 cables shall be terminated on Cat 6 rated patch panels meeting specifications of TIA 568-B.1, B.2, and B.3 for Category 6 performance.

G. Fiber Panel Placement and Protection of Spare Fiber:

1. It is recommended that the Contractor pre-test all fiber to be placed in the project prior to placement within the innerduct to assure conformance to Owner and manufacturer specifications.
2. Multiple Fiber Riser Cable (MIC) shall be routed through flexible innerduct and Panduit tray sections from the entrance into the sub-terminal through termination.
3. A minimum of twenty feet (20') of spare fiber cable shall be provided at each end of a fiber riser cable, coiled and secured and protected by a raised plexiglass shield.
4. All multi-mode fibers shall be terminated on ST-type connectors with strain relief and entrance sleeve and attached to ST-barrel connectors in the termination cabinet.
5. All single-mode fibers shall be terminated on SC-type connectors with strain relief and entrance sleeve and attached to SC-barrel connectors in the termination cabinet.
6. All fiber termination panels for fiber shall be either 19" rack-mount or wall-mount secured boxes.

3.9 CABLE PLACEMENT AND ROUTING WITHIN A SUB-TERMINAL

A. Workstation Cat 6 Cabling: Contractor shall ensure a uniform length of individual cables and that cables are separated by color as they enter the sub-terminal room and are bundled and dressed neatly within cable routes as they enter the back of the patch panel.

1. Routing of Workstation Cables:
   a. Individual workstation four (4) pair cables shall be routed from their entering conduits or cable tray to a shared point of entrance to the swing gate frame or equipment rack supporting the appropriate patch panel. Cables shall be combed, separated by color, and bundled with Velcro, at a point where six (6) or more cables are routed parallel to each other and bundling shall continue as other workstation cables join the route. When twelve (12) or more individual four (4) pair cables are placed in a common route, Velcro straps, cable ties or D-rings shall be used to guide and secure cables.
   b. Cable routing shall be designed to avoid crossing over existing cable runs and in such a manner as to provide spare footage for future relocation of cable terminations within the backboard area. Wrapping the cable around the perimeter of the backboard area, and securing it with D-rings or C-hooks can create spare footage, providing that the cable route does not interfere with other planned or anticipated equipment or cable route.
   c. Any path intended to route cables, such as cable runway, cable tray, raceway or duct system, shall NOT be used to store cable slack. Cable slack shall be stored in its own defined area.
2. Securing of cables: Cable bundles as defined above shall be secured to the backboard at twelve-inch (12") intervals using cable rings.

3. Labeling of cables: All cables terminating in a sub-terminal shall be labeled at a point no more than twenty-four inches (24") and no less than twelve inches (12") from the terminal point on a patch panel.
4. Patch cord cable paths: All sub-terminals shall have defined, protected and separate Voice and Data (Data 1 and Data 2) patch cord routes for use by departmental network personnel. The unique and protected patch cord routes shall be designed so that Voice patch cords do not cross over or interfere with Data 1 and Data 2 patch cords.

B. Inter-terminal Copper Cabling:

1. Routing of cable: All inter-terminal Category 6 and EIA/TIA 568A-5 Category 6 cables shall be routed in their own defined path from the entering duct to the closest end of the terminating module mount.
2. Securing of cable: All inter-terminal Category 6 and EIA/TIA 568A-5 Category 6 cables shall be secured to the backboard at intervals of twelve inches (12") between the duct entrance or exit and the terminating module mount.
3. Attachment to Ten (10) Pair Modules
   a. Each ten (10) module set of ten (10) pair sub-terminal modules will terminate a single (1) one hundred (100) pair inter-terminal cable.
   b. Each single (1) ten (10) pair module will terminate a maximum of two (2) EIA/TIA 568 cables.
   c. Each five (5) module set of 10 pair sub-terminal modules will terminate one (1) fifty (50) pair inter-terminal cable.
4. Labeling of cable: All inter-terminal cables and EIA/TIA 568 Category 6 cables shall be labeled in the space between entrance or exit conduit and the terminating module frame. Label shall define cable number, sub-terminal and room number of opposite terminated end.

C. Inter-terminal Fiber Cabling:

1. Protection of fiber: Each fiber riser cable shall be contained within a three-quarter inch (.75") flexible innerduct that is secured to the backboard upon leaving the duct or cable tray. The innerduct shall be routed within the sub-terminal backboard with minimum twelve inch (12") radius curves and shall be secured to the backboard every fifteen inches (15").
2. Innerduct couplings: Innerduct male threaded couplings are required at each end of the three-quarter inch (.75") innerduct. These couplings shall be secured to duct sections, rack mounting plates or other secured mountings on the backboard or patch panel.
3. Fiber cable routing and spare footage: All fiber cables shall be routed in their own defined path from the entering duct to the closest end of the fiber termination panel. A minimum of twenty feet (20') of spare fiber cable shall be provided at each end of a fiber segment and secured behind a ;plexi-glass shield. This footage shall be in addition to any spare fiber provided beyond

the break-out kit. The spare footage coil shall not interfere with other backboard mounted equipment. Attempt to place spare coil high on the backboard to maintain as much open space as possible.

4. Labeling of cable: All inter-terminal fiber riser cable shall be identified by labels placed on the innerduct in the space between entrance or exit conduit or tray and the termination cabinet or patch panel. Label shall define cable number and sub-terminal and room number of opposite terminated end.
5. Fiber jumper cable path: All sub-terminals shall have defined, protected and separate fiber jumper routes for use by departmental network personnel. The unique and protected fiber jumper routes shall be designed so that no other cables cross over or interfere with the routing of fiber optic jumper cables.

3.10 INTER-TERMINAL CABLING TERMINATION SPECIFICATION

A. Cat 6 Cables between Sub-Terminals: All Cat 6 cables placed between sub-terminals shall be terminated on ten (10) pair modules within a vertical mount. Each ten (10) module set of ten (10) pair sub-terminal modules will terminate two fifty (50) pair inter-terminal cables. Each five (5) module set of 10 pair sub-terminal modules will terminate one (1) fifty (50) pair inter-terminal cable.

B. Cat 6 Cables between Sub-Terminals: All Cat 6 (25 pair) cables placed between sub-terminals shall be terminated on 19” rack mount RJ45 patch panels, Cat 6 rated.

C. One-half inch (0.50") or three-quarter inch (0.75") fiber innerduct as defined in the detail drawings shall be placed into the sub-terminal from the entering or exiting duct and extended within the sub-terminal backboard with radiuses not less than twelve inches (12"). Innerduct shall be clamped to the backboard at intervals not less than fifteen inches (15").

D. A common # 6 ground wire shall be provided in the riser and/or lateral distribution conduits or cable trays between sub-terminals and secured to a grounding block. The ground wires shall terminate on a common block within the sub-terminal. See section 3.13 below.

3.11 INSTALLATION OF FIBER OPTIC CABLE INNERDUCT

A. A minimum of two (2) innerducts shall be provided for each fiber cable route identified on the drawing.

B. Each innerduct with a segment distance of more than twenty-five feet (25‘) shall be provided with an internal pull tape having pre-printed footage markings.

C. No splices, couplings, or other joining of innerduct within the duct route or cable tray segments is permitted.

D. Sufficient additional, continuous innerduct footage shall be provided and routed within the sub-terminal backboard to allow placement, securing and termination of the innerduct without interference to any other cable, duct or device on the backboard.

E. All innerduct shall be secured at a minimum of fifteen inch (15") intervals to the sub-terminal backboard.

F. Where called for in the detailed drawings, innerduct coupling hardware shall be provided to attach the duct to the termination device (e.g. Fiber Termination Panel).

G. Each innerduct shall be clearly labeled at each end with a tag identifying the two distinct rooms and terminal numbers common to the innerduct segment.

3.12 INSTALLATION OF FIBER OPTIC CABLE

A. A continuous piece of fiber cable shall be placed within the innerduct from one termination point to the other. No splicing, coupling or other joining of fiber within ducts is permitted.

B. A minimum of twenty feet (20') of spare cable shall be placed at each end of the fiber segment and coiled with the minimum radius defined by the manufacturer.

C. Spare fiber cable footage shall be protected by plexi-glass panels on standoff brackets.

D. The strength member of any fiber cable shall be cleared and secured to either the patch panel or termination device in the manner provided for by the manufacturer of the device.

E. All multi-mode fiber cable specified for termination by the Owner shall be terminated on ST-type connectors using breakout tubing as required to protect the fiber strand.

F. All single-mode fiber cable specified for termination by the Owner shall be terminated on SC-type connectors using breakout tubing as required to protect the fiber strand.

G. Each fiber strand shall be labeled within six inches (6") of the ST-type or SC-type connector to provide a unique identifier within the cable.

H. Where multiple fiber groups exist within a fiber cable, the individual fibers shall be broken out with the correct “break-out’ kit specified for six (6) or twelve (12) fibers for that cable.

3.13 EQUIPMENT GROUNDING

A. Ground non-current carrying metal parts of electrical equipment enclosures, frames, conductor raceways, or cable trays to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Grounding shall be continuous and connected to the main grounding electrode of the building. Grounding must conform to requirements in ANSI/TIA/EIA-J-STD-607-A.

1. The Contractor shall place a grounding wire between sub-terminals, which shall be attached to a grounding block mounted on the bottom of each sub-terminal backboard.
2. The Contractor shall provide and mount the grounding block on the bottom of each sub-terminal backboard.
3. The Contractor shall attach the grounding block to the building grounding pole.

PART 4 - TESTING

4.1 COPPER RISER AND LATERAL CABLE TESTING

A. The Contractor shall conduct acceptance testing on 100% of the installed PBX Category 6 and Category 6 inter-sub-terminal wiring segments. This is to ensure that the materials and the installation practices were consistent with the test and performance requirements of meeting EIA/TIA specifications.

B. The following sequence may be used in part, or in its entirety, for testing twisted pair cabling installed under this proposal.

C. Correct Labeling: Verify that the identification number (label) is identical for both ends of the cable in the respective sub-terminals.

D. Continuity:

Check for:

Crossed - one or both wires in a pair cross, or short, with one or both wires in a second pair. Identify by use of third pair individual wire.

Ground fault - one or both wires in a pair read continuity with external ground or shield.

Intermittent - a break or "open" which appears and disappears as the wire or connector is flexed. Identify by same method as "open" pairs.

Open Pairs - a break or "open" fault appears. Use a split-pair loop-back plug or individually use one wire in each of two pairs to determine which individual wire is "open".

Reversed - the termination of a wire pair is reversed, e.g. a telephone circuit "tip" at one end appears as "ring" at the opposite end.

Short - continuity between two wires without an external jumper or loop-back plug in place.

Split - between two pairs, one wire of one pair is reversed with one wire of the second pair. Identify by use of third pair individual wire.

E. Cross-talk:

1. Near end Cross-talk (NEXT) is measured to determine a signal-to-noise ratio for a cable run and normally will be a measurement of the noise level in a receive pair generated by an adjacent transmit pair.
2. A common source of NEXT is the existence of a split pair in which one wire of a transmit pair is reversed with one wire of a receive pair.

4.2 WORKSTATION CABLE TESTING

A. The Contractor shall conduct acceptance testing on 100% of the installed enhanced Category 6 workstation wiring segments. This is to ensure that the materials and the installation practices were consistent with the test and performance requirements of meeting EIA/TIA specifications.

B. Testing shall be made in conformance with TIA 568-B.1, B.2, and B.3 specification.

C. The following sequence may be used in part, or in its entirety, for testing twisted pair cabling installed under this proposal.

D. Correct Terminations:

1. Verify that the identification number (label) is identical for both the jacks in the workstation wall plate and in the corresponding patch panel jacks to be tested.
2. Verify that a mechanically sound connection exists for each wire at each of the attached terminations on an RJ-45 jack.
3. Verify correct mapping of all eight (8) wires at each RJ-45 termination of the cable.
4. If a single-end test device is to be used, verify the pin-to-pin continuity of each pair within the loop-back plugs to be used at the opposite end.

E. Continuity:

Check for:

1. Crossed - one or both wires in a pair cross, or short, with one or both wires in a second pair. Identify by use of third pair individual wire.
2. Ground fault - one or both wires in a pair read continuity with external ground or shield.

3. Intermittent - a break or "open" which appears and disappears as the wire or connector is flexed. Identify by same method as "open" pairs.
4. Open Pairs - a break or "open" fault appears. Use a split-pair loop-back plug or individually use one wire in each of two pairs to determine which individual wire is "open".
5. Reversed - the termination of a wire pair is reversed, e.g. a telephone circuit "tip" at one end appears as "ring" at the opposite end.
6. Short - continuity between two wires without an external jumper or loop-back plug in place.
7. Split - between two pairs, one wire of one pair is reversed with one wire of the second pair. Identify by use of third pair individual wire.

F. Signal Loss:

1. This test measures attenuation of the wire by injecting a signal of known strength at one end and measuring the strength of the signal at the opposite end. This measurement over known distance is compared to the manufacturer's design specification for loss over distance.
2. Signal loss should be measured at multiple frequencies and compared with manufacturer's specifications for loss at each of those frequencies.

G. Cross-talk:

1. Near end Cross-talk (NEXT) is measured to determine a signal-to-noise ratio for a cable run and normally will be a measurement of the noise level in a receive pair generated by an adjacent transmit pair.
2. A common source of NEXT is the existence of a split pair in which one wire of a transmit pair is reversed with one wire of a receive pair.

H. Interference: Interference is measured, or identified, as a source of noise, external to the twisted pair structure of the cable under evaluation. Typical interference sources include electric motors and fluorescent lighting, as well as any high-voltage circuit running parallel to the signal cable path. Increasing the distance between the signal and the electric cables may be required. Shielding on the cable, or for the termination, may also be required.

I. Ground Loop:

1. In a large wiring system, with multiple sub-terminals and backboards, a ground loop may be formed by inadvertent use of two ground references for shielding or equipment. Such a ground loop may result in both a rise in cross-talk signals or loss of attenuation.
2. A single grounding system must be established for each building, using a single copper ground rod (8' earth driven) and running a bus circuit (#6 wire) to each closet with a mounted ground bar. All equipment and cable shielding should be grounded as required to this bar.

4.03 FIBER CABLE TESTING

A. Each fiber shall be tested for continuity and loss and the measurements made and recorded using equipment specifically designed for multi-mode and single-mode fiber testing.

B. All measurements shall be made on terminated fibers by attaching the testing cable to the opposite side of a bulkhead or barrel connector to which the fiber strand is terminated via an ST-style (MM) or SC-style (SM) connector.

C. Each multi-mode fiber shall be tested for loss at both 850 and 1300 nm windows.

D. Each single-mode fiber shall be tested for loss at both 1301 and 1550 nm windows.

E. Each fiber shall be tested in both directions and both windows and the measurements recorded for each direction.

F. Any fiber that measures loss in excess of manufacturer's specifications for the frequency measured shall be subject to re-termination by the Contractor and re-test by the Owner's Representative. If the fiber fails after re-termination and re-testing, the entire cable shall be removed and replaced at the sole judgment of the Owner and at the sole cost to the Contractor.

G. All measurements shall be recorded with within the testing instrument and downloaded directly into the Owner's fiber database. The Owner's Representative will coordinate the download for the test equipment used by the Contractor. NO HARDCOPY of the measurements will be accepted.

PART 5 - DOCUMENTATION

5.1 SCOPE

A. The Contractor shall supply As-Built documentation, which conforms to the Owner standards. All supporting documentation must be provided to the Owner's Representative.

5.2 DOCUMENTATION OF WORKSTATION WIRING

A. Upon complete installation of wired wall plate within wall box or surface box, Contractor shall assign and attach a unique cable number to the wall plate in the position indicated.

B. The number assigned to each wall plate shall be used to label the matching jack positions at each supported patch panel ("Voice", "Data 1", and "Data 2").

C. The wall plate label shall contain the sub-terminal room number and port number. Example: 1234.37

D. Identification labels to be printed for the cable numbers will be supplied by the Contractor. Examples of the proposed labels shall be supplied as part of the submittal and are subject to review and approval by the Owner's Representative.

E. Upon attachment of unique cable identification number to wall plate, Contractor will record this number in electronic form along with the termination test results.

F. Upon completion of wall plate to sub-terminal installation, termination and testing, the results will be transferred by the Contractor to the Owner's Representative. NO HARDCOPY record of cable identification numbers and test results will be accepted.

G. Receipt of the port identification number and 100% test results in electronic format shall be verified by the Owner's Representative. This is a requirement for acceptance of work by the Owner.

5.3 DOCUMENTATION OF INTER-TERMINAL WIRING

A. Upon placement of inter-terminal wiring, including CATV coax, twisted pair, and fiber innerduct, a unique cable number shall be placed at each end of cable or innerduct.

B. In addition to the unique cable numbers, a tag shall be placed at each end of the cable listing the sub-terminal and room number at which the opposite end of the cable is terminated.

C. A list of the cable numbers, sub-terminal ends, and room numbers shall be provided, to the Owner's Representative.

D. Upon completion of sub-terminal to sub-terminal installation, termination and testing, the results will be transferred by the Contractor to the Owner's Representative. NO HARDCOPY record of cable identification numbers and test results will be accepted.

E. Receipt of the 100% test results in electronic format shall be verified by the Owner's Representative. This is a requirement for acceptance of work by the Owner.

5.4 AS-BUILT DRAWINGS

A. Upon completion of the wiring and prior to final acceptance, Contractor shall provide the following documentation to the Owner's Representative:

B. A duplicated set of drawings, which are marked with any changes or variations from the original drawings.

C. A final marked-up drawing of each sub-terminal room showing the location of the racks or swing gates and patch panels installed and the location and path of the cables. The drawing shall include the quantity and manufacturer's part number of the rack(s), swing gate(s), patch panels and wire minders installed at each sub-terminal.

END OF SECTION

SECTION 27 41 00 - COMMON WORK RESULTS FOR AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes, but is not necessarily limited to:
   1. Common standards and procedures for Audiovisual Work.
   2. Design, engineer and provide complete, all means of support, suspension, attachment, fastening, bracing, and restraint (hereinafter "support") of the Audiovisual Systems. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction.

B. Provisions of this Section apply to AudioVisual Work, including the following Sections:
   1. Section 27 41 01 – Grounding and Bonding for Audiovisual Systems
   2. Section 27 41 02 – Hangers and Supports for Audiovisual Systems
   3. Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems
   4. Section 27 41 06 – Noise and Vibration Controls for Audiovisual Systems
   5. Section 27 41 07 – Identification for Audiovisual Systems
   6. Section 27 41 08 – Audiovisual Cabinets, Racks, Frames and Enclosures
   7. Section 27 41 09 – Audiovisual Cable Management
   8. Section 27 41 16 – Integrated Audio-Video Systems and Equipment

2.1 REFERENCES

A. Usage: In accordance with Section 01 41 00 - Regulatory Requirements

B. American National Standards Institute (ANSI)
   1. ANSI/TIA/EIA-568-B.1-2001, Commercial Building Telecommunications Cabling Standard – Part 1: General Requirements
   2. ANSI/TIA/EIA-568-B.2-2001, Commercial Building Telecommunications Cabling Standard – Part 2: Balanced Twisted Pair Cabling Components
   3. ANSI/TIA/EIA-568-B.3-2000, Optical Fiber Cabling Components Standard
   4. ANSI/TIA/EIA-606-A-2002, Administration Standard for Commercial Telecommunications Infrastructure

3.1 DEFINITIONS

A. General Abbreviations used in these specifications. Refer additionally to the abbreviations list appearing on the Drawings.

1.	ADA	Americans With Disabilities Act.
2.	AFC	Above Finished Ceiling.
3.	AFF	Above the Finished Floor.
4.	BLDG	Building
5.	CAT	Category
6.	CL	Centerline
7.	DIV	Division
8.	(E)	Existing
9.	FBU	Furnished By Owner
10.	HR	Home Run
11.	ID	Inside Diameter

12. LAN Local Area Network
13. MAX Maximum
14. NIC Not In Contract.
15. OD Outside Diameter
16. PSRH Project Standard Receptacle Height.
17. PSSH Project Standard Switch Height.
18. TYP Typical
19. UFE Owner Furnished Equipment.
20. UON Unless Otherwise Noted.

B. Electrical and electronics terms used in the AudioVisual Sections shall be as defined in:
1. ANSI/TIA/EIA-568-B.1
2. ANSI/TIA/EIA-568-B.2
3. ANSI/TIA/EIA-568-B.3
4. ANSI/TIA/EIA-569-B
5. ANSI/TIA/EIA-606-A
6. IEEE Std 100
7. This Section.

C. Open Cable - Cabling that is not run in a raceway as defined by NFPA 70. This refers to cabling that is open to the space in which the cable has been installed and is therefore exposed to the environmental conditions associated with that space.

D. Open Office - A floor space division provided by furniture, moveable partitions, or other means instead of by building walls.

E. Pathway - A physical infrastructure utilized for the placement and routing of AudioVisual cable.

4.1 SUBMITTALS

A. Within bidding documentation, Contractor to provide a room by room equipment list.

B. Comply with the following:
1. Submit all materials for review arranged in same order as Specifications, individually referenced to Specification Section, Paragraph and Contract Drawing number. Conform in every detail as applies to each referencing Section.
2. Submit 8 ½"x 11" items bound in volumes and drawings in edge bound sets. Submit all drawings on sheets of the same size.
3. Make each specified submittal as a coordinated package complete with all information specified herein. Incomplete or uncoordinated submittals will be returned with no review action.
4. Progress Schedule: Comply with Section 01 32 00 - Scheduling Requirements.

C. Contractor and Key Personnel Experience.
1. A minimum of 30 calendar days prior to installation, submit documentation of the experience of the low voltage systems, equipment and infrastructure contractor(s) and of their key personnel.
2. Qualifications shall be provided for:
a. the low voltage systems, equipment and infrastructure contractor(s),
b. the low voltage systems, equipment and infrastructure installers,
c. and the supervisor(s) (if different from the installers).

3. Refer to Quality Assurance paragraph in this section for complete requirements.

D. Manufacturer's Product Data:
   1. Manufacturer's Product Data Sheets. Collate in sequence of List of Materials:
   2. Data sheet for each item in each AudioVisual Section, including all accessories, clearly marked for proposed product.
   3. Material Safety Data Sheet, where applies.
   4. List of Materials Schedule. For each item, include:
      a. Referencing Specification Section
      b. Referencing Paragraph
      c. Referencing Drawing, if specified only on plans
      d. Manufacturer.
      e. Model number.
      f. Listing, including name of Nationally Recognized Testing Laboratory.
      g. Precede each submittal book with a summary schedule, with columns for each item above and rows for each item submitted.
         i. Example:

Specification Section	Paragraph	Contract Drawing Reference	Manufacturer	Model No.	UL/ CLA Listed
27 41 00	2.3 C.		XYZ	123	Y
27 41 03	2.7 A. 1.		AAA	34-56	Y
		TA7.02	ZZY	456	Y

E. Field (Installation) Drawings:
   1. General
      a. Drawings shall use the present the proposed installation using the makes and models of devices proposed for use this project; replace vendor neutral nomenclature used in bid set with.
      b. Where the existing systems and/or infrastructure are used and integrated into the work of the project, indicate them on drawings, including points of interface and demarcation of existing and new work.
      c. Collate, in sequence, at least the following minimum drawings, for each infrastructure and system to be installed under the work of this contract:
   2. Drawing index/symbol sheet.
   3. Site plans, floor plans and reflected ceiling plans.
      a. General
         i. The identifier for each termination and cable shall appear on the drawings, either directly on the floor plans, through an associated schedule or an unique identifier associated with a fully annotated single line diagram.
         ii. Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices.
         iii. At scale of Contract Documents, show:
            1. Device locations and type

2. Rough-in.
3. Mounting height.
4. Conduit size.
5. J-hook routes
6. Wire type.
7. Wire fill.

iv. On the floor plans, indicate floor and wall mounted devices and pathway below a height of 7 feet above finish floor. Indicate the locations of the Audiovisual Program and Control Rooms and provide reference to the enlarged Audiovisual Program and Control Rooms plans.

v. On the reflected ceiling plan, indicate ceiling and wall mounted devices and pathway above a height of 7 feet above finish floor. Indicate the locations of the Audiovisual Program and Control Rooms and provide reference to the enlarged Audiovisual Program and Control Rooms plans.

b. Audiovisual Systems, including CATV Systems

i. Indicate:

1. Device locations, orientation and depict integration of systems that need to be viewed from the complete building perspective.
2. For distributed speaker systems, indicate limits of zones of coverage.
3. Vertical and horizontal pathways
4. Equipment rooms and racks
5. Reference to enlarged plans and related details.

4. Enlarged Plans

a. General

i. Indicate at least as much information as is provided in the Contract Documents, supplemented by the dimensions and arrangement of the proposed equipment, trade coordination and field conditions.

b. Audiovisual Systems, including CATV Systems:

i. At equipment rooms

1. Rack elevations, showing

a) all equipment occupying the actual number of rack units required
b) blank panels
c) vent panels
d) aux panels
e) power strips
f) UPS
g) Reference mounting details.

5. System Conduit and Riser Diagrams,

a. General:

i. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment.
ii. Single line diagram of structured wiring
iii. Grounding and bonding scheme
iv. Terminal cabinets.
v. Coordination with floor plans.
vi. Wire runs not shown on floor plans.
vii. Wire type.

viii. Wire fill.
ix. Interface to work provided by work of other Sections, Owner Furnished Equipment, existing equipment and/or future equipment.
x. For Audiovisual Systems, including CATV Systems, indicate digital or analog signal type and voltage levels (dBmV, microphone, line level, speaker level) or optical signal levels.

6. Detail Drawings
   a. Mounting details:
      i. Specific details of restraints including anchor bolts submitted under the Section 27 41 02 – Hangers and Supports for Audiovisual Systems for mounting and maximum loading at each location, showing compliance and coordination with Code and the project Architectural, Structural and Mechanical Documents.
      ii. Stamped and signed by an Engineer licensed in the Project jurisdiction for work of this type.
         1. Submit an accompanying Engineering analysis stamped and signed by an Engineer licensed in California for work of this type, indicating that the Equipment Enclosure System will comply with California Building Code for the Project Seismic Zone when loaded with the weight of the equipment submitted.
         2. Show calculations on drawings or in bound volume for review by Authorities having jurisdiction.
      iii. Show loads, type and strength of connections, sizes, dimensions, materials, etc.
      iv. Provide details for:
         1. Equipment Rack anchorage.
         2. Wall and ceiling mounted projection screens.
         3. Wall and ceiling mounted projectors.
         4. Cameras and loudspeakers weighing 20 pounds or more.
         5. Wall and ceiling mounted flat panel displays.
   b. Faceplate and Receptacles
      i. Receptacle and jack arrangement for each condition.
      ii. Labeling of receptacle/jacks and plate
      iii. Plate material.
      iv. Plate finish.
      v. Connector types.
      vi. Connector dimensioned layout.
   c. Pathway
      i. Firestopping
      ii. Details of flexible raceway connections to be made to vibrating equipment
      iii. Details of J-Box and sealant application for the typical conditions listed in Section 27 41 06 – Noise and Vibration Controls for AudioVisual System, and a schedule of rooms to receive application of mastic and sealant at J-Boxes
      iv. An itemized list of all items of equipment to be fitted with flexible electrical connections.
      v. Conduit racking details.
   d. California Access Compliance Manual and Americans with Disabilities Act (ADA) compliance.

e. For systems with contractor or manufacturer programmed control and human interfaces submit at least:
   i. Narrative of the sequence of operation.
   ii. Color, full-size layouts of each touchpanel and/or computer screen (menu) image, cross-referenced to the sequence of operations.
   iii. Show chaining of sub-menus.
f. Terminal cabinets: Terminations.
g. Voice cable plant: Cut sheets for use by Owner's Telephone Systems Contractor

F. Samples: Samples for review by the Owner's Representative of all finishes/materials which will be visible to the public, including but not limited to:
   1. The Contractor shall submit a sample of each type of label to be used for labeling cables, patch panels, termination frames, and faceplates for the telephone and data systems.

G. Test Plan
   1. Submit complete documentation of the proposed test plan and equipment to be used to document that the performance of the cabling, equipment, sub-systems and complete systems installed under the work of this project conform with the performance standards outlined in each specification section.
   2. Submit not less than 45 calendar days prior to the proposed test date. Include procedures for certification, validation, and testing.

H. Test Reports
   1. Manufacturer's Field Reports
      a. Factory reel tests
   2. Project Site Test Reports:
      a. Submit following system completion and prior to and as condition precedent to Acceptance Review and Testing of the Work of this Section.
      b. Schedule: Submit test reports in timely manner relative to Project schedule such that the Owner's Representative may conduct verification of submitted test data without delay of scheduled progress.
      c. Project Site test report:
      d. Content: Include at least:
         i. Time and date of test.
         ii. Personnel conducting test.
         iii. Test equipment, including serial and date of calibration.
         iv. Test object.
         v. Procedure used.
         vi. Results of test
         vii. Numerical or graphical presentation.
      e. Submit copy of final results on paper and in electronic form, organized by circuit number, consistent with circuit numbering scheme used in preparing submittal drawings and in labeling receptacles and terminations.
         i. Submit machine-generated documentation and raw data of all test results in electronic form on CD-R media
         ii. Where the electronic documentation requires use of a proprietary computer program to view the data, provide the Owner with 1 licensed copy of the software.

5.1 QUALITY ASSURANCE

A. Contractor Firm and Personnel Qualifications:

B. Designated Supervisor: Provide a designated supervisor present and in responsible charge in the fabrication shop and on the Project Site during all phases of installation and testing of the Work of this Section. This supervisor shall be the same individual through the execution of the Work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene.

C. Reference Documents: At all times when the work is in progress, maintain at the workplace, fabrication shop or Project Site as applies.
   1. A complete set of the latest stamped, actioned submittals of record.
   2. A complete set of manufacturer's original operation, instruction and service manuals for each equipment item.

D. Standard Products
   1. Audiovisual Systems Equipment. Provide Audiovisual Systems materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for six months prior to bid opening. The six month period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the six month period.
      a. Alternative Qualifications. Products having less than a 1-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 2500 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.
   2. Material and Equipment Manufacturing Date
      a. Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

E. Test Equipment
   1. Requirements:
      a. Maintain and operate test equipment at the fabrication shop and the job site for both routine and Acceptance Testing of the Work of this Section.
      b. Maintain test equipment at the job site while work is in progress from installation of equipment racks until Owner Acceptance of this Work; thereafter remove all of this test equipment from the job site.
      c. Unless otherwise indicated, test equipment shall remain property of the Contractor.
      d. Provide all required test cables, jigs and adapters.
      e. Provide equipment with traceable calibration, with calibration date not greater than one year prior to the date of the use of the equipment to perform the specified testing.

F. Qualifications
   1. Audiovisual Qualifications
      a. Audiovisual Systems work shall be performed by and the equipment shall be provided by the Audiovisual Systems contractor and key personnel.

Qualifications shall be provided for:
i. the Audiovisual Systems contractor,
ii. the Audiovisual Systems installer,
iii. and the supervisor (if different from the installer).

b. A minimum of 30 calendar days prior to installation, submit documentation of the experience of the Audiovisual Systems and of the key personnel.

2. AudioVisual Systems Installer
   a. The installer of the audiovisual systems shall be a firm regularly and professionally engaged in the business of installation, configuration and testing of the specified audiovisual systems and equipment.
      i. Where the manufacturers of the specified and contractor proposed systems provide mandatory installer and programming training programs, the Contractor's programming and installation staff shall provide documentation to demonstrate their successful completion of the relevant training programs for the types and versions of equipment proposed for installation on this Project.
      ii. Where the manufacturer of the specified and contractor proposed systems and equipment lawfully restricts sales of their equipment to a network of dealers, the contractor shall provide documentation to their standing as such a dealer in good standing at the time of bid submittal.
      iii. The audiovisual systems contractor shall demonstrate experience in providing successful audiovisual systems of a similar scope and nature of those required by the work of this Project within the past 3 years.
      iv. Submit documentation for a minimum of three and a maximum of five successful audiovisual system installations for the audiovisual systems contractor.
   b. Key Personnel
      i. Provide key personnel who are regularly and professionally engaged in the business of the installing, programming, configuring and testing of the specified audiovisual systems and related presentations and equipment.
         1. There may be one key person or more key persons proposed for this project depending upon how many of the key roles each has successfully provided.
         2. Each of the key personnel shall demonstrate experience in providing successful audiovisual systems of a similar nature scope and extent to those required by the work of this Project within the past 3 years.

6.1 REGULATORY REQUIREMENTS

A. Regulations Applicable: Including but not limited to those defined in Section 01 41 00 - Regulatory Requirements.
   1. Nothing in the Contract Documents shall be construed to permit Work not conforming to applicable laws, ordinances, rules, or regulations.
   2. Safety Agency Listing: All devices provided under the Work of this Section which are connected to the Project electrical system shall be listed by a Nationally Recognized Testing Laboratory, and shall be so labeled.
   3. In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having

jurisdiction," or words of similar meaning, to mean the Owner's Representative. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

7.1 DELIVERY, STORAGE AND HANDLING

A. Procedures:
   1. As specified in the individual sections of Division 27 and the following.
      a. Provide protection from weather, moisture, extreme heat and cold, dirt, dust, and other contaminants for cabling and equipment placed in storage.

8.1 ENVIRONMENTAL REQUIREMENTS

A. Connecting hardware shall be rated for operation under ambient conditions of 32 to 140 degrees F and in the range of 0 to 95 percent relative humidity, non-condensing.

9.1 SEQUENCING

A. Not Used

10.1 OPERATING AND MAINTENANCE DATA

A. Commercial off the shelf manuals shall be furnished for operation, installation, configuration, and maintenance of products provided as a part of the low voltage systems, equipment and infrastructure work of this Project. Precede the manuals with a systems narrative specific to this Project, outlining the major systems functionality, the major systems components, and identifying which manuals document the performance of which subsystems.
   1. Submit operations and maintenance data in accordance with Section 01 78 39 – Record Documents and as specified herein not later than 2 months prior to the date of beneficial occupancy.

11.1 PROJECT RECORD DOCUMENTS

A. Comply with Section 01 78 39 – Record Documents, and the following. Include at least as much information as required for the submittal drawings.
   1. Record Drawings
      a. CAD.
         i. Use a computer aided drafting (CAD) system in the preparation of record drawings for this Project. CAD system shall produce files in AutoCAD® .DWG format, latest version at time of bid.
      b. Except where prohibited by Contract, Owner’s Representative will furnish CAD backgrounds in AutoCAD® .DWG format, for use by the Contractor in preparing Record Drawings.
      c. Contractor shall be responsible for updating building and AudioVisual plans to reflect as-built conditions.
         i. Indicate actual work on Drawings; indicate actual products used, replace vendor neutral nomenclature used in bid set with makes and models of actual installed devices.
      d. Disk copy of Record Drawings: Provide 2 separate copies of each drawing file in the format noted above. Submit on CD-R disk.
      e. Reproduceables: Provide 1 set of Mylars.

2. Software
    a. Controls and DSP Systems
        i. Provide licensing for project specific software programming at programmable devices.
        ii. Provide licensing and original software copies for each device provided that uses software for operation, configuration or control.
        iii. Provide licensing for required workstation operating systems, and required third party software.
        iv. For controls systems, provide a complete copy of the source code, including the device interface driver code modules.
        v. Upgrade each software package to the release in effect at the end of the Warranty Period.
    b. Provide at least a copy of software with at lease 1 user license if required to view submitted test data.
3. Spare Parts
    a. In addition to the requirements of Section 01 78 39 – Record Documents, provide a complete list of parts and supplies, with current unit prices and source of supply, and a list of spare parts recommended for stocking.

12.1 WARRANTY SERVICE

A. Provide the following.
    1. Response Time: Provide a qualified technician familiar with the work at the Project Site within 24 hours after receipt of a notice of malfunction. Provide the Owner's Representative with telephone number attended 8 hours a day, 5 days a week, to be called in the event of a malfunction.

B. Provide all additional Warranties as defined in each Audiovisual & Communications Systems Specification Section.

13.1 ACCEPTANCE REVIEW AND TESTING PROCEDURES

A. Complete all Work of this Section. Submit Test Report. Submit review copies of Operating and Maintenance Manuals, less reduced set of Record Drawings. Notify the Owner's Representative in writing that the Work of these Sections is complete and fully complies with the Contract Documents. Request Acceptance Review and Testing. The Owner's Representative will conduct Verification of Submitted Test Data, and otherwise direct testing and adjustment of this Work. These procedures may be performed at any hour of the day or night as required by the Owner's Representative to comply with the Project Schedule and avoid conflict with Residents. Provide all specified personnel and equipment at any time without claim for additional cost or time.

B. Personnel: Provide services of the designated supervisor and additional technicians familiar with work of this Section. Provide quantity of technicians as required to comply with Project Schedule.

C. In Addition, Provide:
    1. All tools appropriate for performance of adjustment of and corrections to this Work. Include spare wire and connectors and specified tooling for application.
    2. Ladders, scaffolding and/or lifts as required to access high devices.
    3. All test equipment.
    4. Complete set of latest stamped, actioned submittals of record for reference.

5. Complete set of Test Reports.
6. Complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.
7. Demonstrate: Complete operation of all systems and equipment, including Portable Equipment.
8. Adjust: As directed by the Owner’s Representative.
9. Correct: In timely manner, failure to comply with the Contract Documents, as reasonably determined by the Owner’s Representative.

D. Temporary Equipment: Provide and operate, without claim for additional cost or time, temporary equipment and/or systems to provide reasonably equivalent function, as determined by the Owner’s Representative, in place of the Work of this Section which is incomplete or found not in conformance with the Contract Documents as of seven (7) calendar days prior to the scheduled completion date. Provide such temporary equipment until Acceptance of the Work of this Section. Thereafter, remove such temporary equipment.

14.1 CLOSEOUT

A. Punch List: Perform any and all remedial work, at no claim for additional cost or time. Where required, retest and submit Test Report. Notify the Owner’s Representative of completion of Punch List.

B. Portable Equipment: Furnish all portable equipment and spares to the Owner’s Representative, along with complete documentation of the materials presented. Where applicable, furnish portable equipment in the original manufacturer's packing.

C. Operating and Maintenance Data: Install framed operating and maintenance instructions. Submit Manuals.

D. Project Record Documents: Submit print and digital copies. Digital files shall be in CAD system that shall produce files in AutoCAD® .DWG format, latest version at time of bid. (Owner Standard, no substitution permitted) as defined above.

E. Keys: If applicable, replace construction locks with permanent locks. Provide 5 sets of keys to the Owner’s Representative.

F. Instruction: Conduct specified instruction.

G. Warranty: Submit Warranty dated to run from date of Acceptance of the Work of this Section.

PART 2 - PRODUCTS

1.1 GENERAL

A. Where a particular material, device, piece of equipment or system is specified directly, the current manufacturer's specification for the same shall be considered to be a part of these specifications, as if completely contained herein in every detail.

B. Each material, device or piece of equipment shall comply with all of the manufacturer's current published specifications for that item.

C. Products shall be made by manufacturers regularly engaged in the production of such products.

D. Provide quantity as shown on Criteria Drawings, or as otherwise indicated.

E. Provide all auxiliary and incidental materials and equipment necessary for the operation and protection of the Work of this Section as if specified in full herein.

F. Unless recycled content is specified, provide new materials.

G. Provide the manufacturer's latest design/model, permanently labeled with the manufacturer's name, model number and serial number.

H. Where products are of similar type or use, provide products of the same manufacturer, unless otherwise indicated.

I. Components
   1. UL or third party certified. Cabling and interconnecting hardware and components for AudioVisual systems shall be UL listed or third party independent testing laboratory certified, and shall comply with NFPA 70 and conform to the requirements specified herein.
   2. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations, submit proof of such compliance.
      a. The label or listing by the specified organization will be acceptable evidence of compliance.
      b. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Owner's Representative.
      c. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

J. Enclosures:
   1. Provide steel frames and enclosures designed and wired to eliminate all induced currents.
   2. Make bolted connections with self-locking devices.

K. Finishes: Any item or component of the Work of this Section which is visible shall comply with the following.
   1. Finishes noted or scheduled on the Criteria Drawings take precedence.
   2. Where design location requires that products, materials or equipment are visible to the public, no manufacturer's logos larger than 1/2 inch shall be visible. Unless otherwise noted or directed, neatly remove or permanently paint out such logos.
   3. Where finishes are not noted or otherwise defined in the Contract Documents, submit manufacturer's standard finish samples for selection by the Owner’s Representative.

PART 3 - EXECUTION

1.1 EXAMINATION

A. Examine existing conditions before starting work. Submit conflicts in a timely manner for resolution

2.1 WIRING CLASSIFICATION AND RELATED

A. Audio Signal Wiring Classification:
   1. Type A-l: Microphone level wiring less than -30 dBu, 20 Hz to 20 kHz.
   2. Type A-2: Line level wiring -30 dBu to +24 dBu, 20 Hz to 20 kHz.
   3. Type A-3: Loudspeaker level or circuit wiring greater than +24 dBu, from 20 Hz to 20 kHz.

B. Video and Related Signal Wiring Classification:
   1. Type V-1: Baseband and composite video wiring 1 volt peak-to-peak into 75 ohms, 0 to 10.0 MHz.
   2. Type V-2: Synchronization and switching pulse wiring 4 volts peak-to-peak into 75 ohms, 15.62 to 15.75 kHz.
   3. Type V-3: Color subcarrier wiring 0 to 4 volts peak-to-peak into 75 ohms, 3.57 to 4.43 MHz.
   4. Type V-4: CATV system wiring 0.1 to 1000 microVolts peak-to-peak into 50 or 75 ohms, 47 to 890 MHz.

C. Control Signal Wiring Classifications:
   1. Type C-1: DC control wiring 0 to 50 volts.
   2. Type C-2: Synchronous control or data wiring 0 to 40 volts, peak-to-peak.
   3. Type C-3: AC control wiring 0 to 48 volts, 60 Hz.

D. Additional Wiring Classifications:
   1. Type M-1: DC power wiring 0 to 48 volts.
   2. Type M-2: AC power wiring greater than 50 volts, 60 Hz.
   3. Wiring Combinations:

E. Except as indicated herein, conduit, wireways and cable bundles shall contain only wiring of a single classification. The following combinations are acceptable in conduit, or cable harnesses. Additional acceptable combinations may be indicated on the Drawings.
   1. Types A-1, C-1, and M-1.
   2. Types A-2, C-l, C-2, and M-l, runs less than 20 feet.
   3. Types A-2, C-1, and M-1.
   4. Types A-3, C-1, C-2, and M-1.
   5. Types A-2, V-1, and V-3.
   6. Types V-1, V-2, V-3, and C-1.
   7. Types M-2 and C-3.

3.1 PREPARATION

A. Protection: Cover all computers, electronic equipment, desks, chairs, furniture and other articles when working at ceiling level and/or performing dust producing tasks.

4.1 REPAIR AND RESTORATION

A. Where working in spaces occupied by the Owner, return to their original positions any furniture or articles relocated to perform the work.

5.1 CLEANING

A. Where working in spaces occupied by the Owner:
   1. Immediately after completing work within each space, clean up and remove all materials, scrap and dust.
   2. All scrap material in work area shall be picked up and removed from the building at the end of each day. See also Section 01 78 39 – Record Documents for additional requirements.
   3. All dust resulting from work performed shall be vacuumed up daily.
   4. All scrap material shall be removed from project job site and disposed of in an authorized disposal site. Refer to Section 01 74 00 – Cleanup and Disposal for Project Procedures.

END OF SECTION 27 41 00

SECTION 27 41 01 - GROUNDING AND BONDING FOR AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Section includes grounding and bonding of AudioVisual Work, including but not limited to:
   1. Audiovisual Raceways
   2. Cable Runway
   3. Cable Shields
   4. Protector Fields
   5. Audiovisual Cabinets and enclosures.

B. Related Work Under Other Sections
   1. Section 26 05 60 – Grounding & Bonding
   2. Section 27 41 00 – Common Work Results for Audiovisual Systems
   3. Section 27 41 02 – Hangers and Supports for Audiovisual Systems
   4. Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems
   5. Section 27 41 08 – Audiovisual Cabinets, Racks, Frames and Enclosures
   6. Section 27 41 09 – Audiovisual Cable Management
   7. Section 27 41 16 – Integrated Audio-Video Systems and Equipment

2.1 SYSTEM DESCRIPTION

A. Provide Audiovisual system grounding conductor as described herein and indicate on drawings.

B. Except as otherwise indicated, the complete AudioVisual installation including the , metallic conduits and raceways, cable trays, boxes, cabinets and equipment shall be completely and effectively grounded in accordance with all code requirements, whether or not such connections are specifically shown or specified.

C. Resistance:
   1. Resistance from the farthest ground bus through the ground electrode to earth shall not exceed 5 Ohms or the requirements of ANSI-J-STD-607-A-2002, whichever is more restrictive.

3.1 REFERENCES

A. American National Standards Institute (ANSI)
   1. ANSI/TIA/EIA-606-A-2002 Administration Standard for Commercial Telecommunications Infrastructure
   2. ANSI-J-STD-607-A-2002 Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
   3. Underwriters Laboratories (UL)
   4. UL 467 (1993); R 2004 Grounding and Bonding Equipment

4.1 SUBMITTALS

A. Conform with Section 27 41 00 - Common Work Results for Audiovisual Systems.

PART 2 - PRODUCTS

1.1 MANUFACTURERS

A. Equal products by the following manufacturers will be considered providing that all features of the specified product are provided:
   1. Ground Rod:
      a. High strength high carbon steel, with electrolytically bonded jacket of copper on surface
      b. UL spec. 467
      c. ANSI C-33.8-1072.
      d. Manufacturer:
         i. Allied Bolt
         ii. Inwesco 12A60
         iii. Blackburn
         iv. Cooper Power Systems
         v. Weaver.
         vi. Erico "Cadweld" Products, Inc.
         vii. ITT Blackburn.
         viii. Or equal.
   2. Ground Wells:
      a. Christy Concrete Products, Inc.
      b. Forni Corp.
      c. Or equal.
   3. Ground Bushings, Connectors, Jumpers and Bus:
      a. O-Z/Gedney.
      b. Thomas & Betts Corp.
      c. Or equal.
   4. Compression Connector Lug
      a. Panduit
      b. B-Line SB-479 Series
      c. Thomas & Betts
      d. Or equal.
   5. AudioVisual Ground Bus Bar
      a. CPI
      b. B-Line
      c. Panduit
      d. or equal.
   6. Rack and Cabinet Grounding
      a. Panduit Structured Ground Kit
      b. Chatsworth Products Inc.
      c. or equal.
   7. Bonding Ribbon:
      a. Annealed solid copper 3/8 inch wide x 1/16 inch thick, tin plated.
      b. Manufacturer:
         i. Inwesco 12A55
         ii. Corning Cable Systems
         iii. Preformed Line Products.
         iv. or equal.

8. Bonding Ribbon Clamp:
    a. Soft lead
    b. 1/16 inch thick
    c. Bolt hole for attachment
    d. Manufacturer:
        i. Inwesco 12A56
        ii. Corning Cable Systems
        iii. Preformed Line Products.
        iv. Or equal.
9. Fargo Clamp:
    a. Cast copper, silver plated, furnished with copper bolt.
    b. RUS Listed
    c. Manufacturer:
        i. Allied Bolt
        ii. Inwesco 12A57
        iii. Corning Cable Systems
        iv. or equal.
10. Ground Inserts:
    a. Cast Bronze w 1/4 Copper Rod.
    b. Provide minimum one each maintenance hole or vault.
    c. Manufacturer:
        i. Inwesco 12H69
        ii. or equal by vault or manhole manufacturer.
        iii. or equal.

2.1 GROUND CONDUCTORS

A. General purpose insulated: UL listed and code sized copper conductor, with dual rated THHN/THWN insulation, color identified green. Where continuous color-coded conductors are not commercially available, provide a minimum 4" long color band with green, non-aging, plastic tape in accordance with NEC..

B. Bonding pigtails: Insulated copper conductor, identified green, sized per code, and provided with termination screw or lug. Provide solid conductors for #10 AWG or smaller and stranded conductors for #8 AWG or larger.

3.1 COMPRESSION CONNECTOR LUG

A. Description
    1. Connector lug with compression connection to conductor.
    2. Copper alloy body.
    3. Provide lug size to match conductor being terminated.
    4. Provide 2 hole pattern lugs.
    5. Provide each lug with silicon bronze hardware, including 2 bolts, 2 split lock washers and 2 nuts.

4.1 INSULATED GROUNDING BUSHINGS

A. Plated malleable iron or steel body with 150 degree Centigrade molded plastic insulating throat and lay-in grounding lug.

5.1 CONNECTIONS TO PIPE

A. For cable to pipe: UL listed bolted connection complying with CEC requirements.

6.1 CONNECTIONS TO STRUCTURAL STEEL, GROUND RODS, OR SPLICES

A. Where required by the Drawings or Specifications, grounding conductors shall be spliced together, connected to ground rods or connected to structural steel using exothermic welds or high pressure compression type connectors.
   1. Exothermic welds shall be used for cable-to-cable and cable-to-ground rod and for cable to structural steel surfaces. Exothermic weld kits shall be as manufactured by Cadweld, Thermoweld or equal. Each particular type of weld shall use a kit unique to that type of weld.
   2. High-pressure compression type connectors shall be used for cable-to-cable and cable-to-ground rod connections. Connections shall be as manufactured by Thomas & Betts #53000 series, Burndy “Hy-Ground” or equal.

7.1 EXTRA FLEXIBLE, FLAT BONDING JUMPERS

A. Where required by the drawing or specified herein.

PART 3 - EXECUTION

1.1 GENERAL

A. Provide Grounding and Bonding according to the most restrictive requirements of:
   1. ANSI-J-STD-607-A.
   2. California Electrical Code Article 250 and references therein.
   3. California Electrical Code Article 800.

B. In the event of conflicting requirements, National Electrical Code requirements shall prevail.

C. Point of Connection
   1. Under Work of this Section, make connections to AudioVisual Ground Busbars.
   2. Mechanical Connections

D. Make connections bare metal to bare metal.
   1. Where required, remove paint to bare metal, make grounding or bonding connection, and touch up paint.
   2. Torque threaded fasteners to manufacturer’s recommended values.

E. Compression Connections
   1. Make compression connections with the lug or fitting manufacturer’s recommended tooling, with the tooling set to the recommended force and stroke.

F. Audiovisual Raceways and Sleeves
   1. Bond metallic raceway and sleeves to the AudioVisual Ground Busbar at the AudioVisual Room that serves the related AudioVisual Receptacle.
   2. Where a metallic raceway connects two or more Audiovisual Rooms, bond to the AudioVisual Ground Busbar at each.

G. Cable Shields

1. Comply with California Electrical Code Article 800.

H. Protector Fields
1. Comply with California Electrical Code Article 800.

I. Audiovisual Cabinets and enclosures
1. Bond to the AudioVisual Ground Busbar at the AudioVisual Room.

2.1 LABELING

A. Provide labeling according to the requirements of:
1. ANSI/TIA/EIA-606-A.
2. Section 27 41 07 - Identification for Audiovisual Systems.

END OF SECTION 27 41 01

SECTION 27 41 02 - HANGERS AND SUPPORTS FOR AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the provision of AudioVisual supports and cable hook system as described in this specification, including but not limited to:
   1. Strut supports
   2. Cable Hooks (J-hooks)
   3. Beam clamps
   4. Concrete Fasteners
   5. Touch-Up Materials
   6. Conduit supports.
   7. Equipment supports.
   8. Fastening hardware.

B. Related work: Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.
   1. Division 5: Miscellaneous metals. Hangers for electrical equipment.
   2. Section 09 51 00 – Acoustical Ceilings. Slack fixture support wires.
   3. Section 27 41 00 – Common Work Results for Audiovisual Systems
   4. Section 27 41 01 – Grounding and Bonding for Audiovisual Systems
   5. Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems
   6. Section 27 41 06 – Noise and Vibration Controls for Audiovisual Systems
   7. Section 27 41 07 – Identification for Audiovisual Systems
   8. Section 27 41 08 – Audiovisual Cabinets, Racks, Frames and Enclosures
   9. Section 27 41 09 – Audiovisual Cable Management
   10. Section 27 41 16 – Integrated Audio-Video Systems and Equipment

2.1 SYSTEM DESCRIPTION

A. Provide devices specified in this Section and related Sections for support of AudioVisual equipment specified for this Project.

B. Provide support systems that are adequate for the weight of equipment, conduit and wiring to be supported.

3.1 REFERENCES

A. American Society For Testing and Materials (ASTM)
   1. ASTM A123/A123M-02 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
   2. ASTM A153/A153M-04 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   3. ASTM B633-98e1 Specification for Electro-deposited Coatings of Zinc on Iron and Steel.
   4. ASTM A653/A653M-04a Standard Specification for Steel Sheet, Zinc-Coated

(Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. American National Standards Institute (ANSI)
   1. ANSI/TIA/EIA-568-B.1-2001, Commercial Building Telecommunications Cabling Standard – Part1: General Requirements
   2. ANSI/TIA/EIA-568-B.2-2001, Commercial Building Telecommunications Cabling Standard – Part2: Balanced Twisted Pair Cabling Components
   3. ANSI/TIA/EIA-568-B.3-2000, Optical Fiber Cabling Components Standard
   4. ANSI/ TIA/ EIA 569-B Commercial Building Standard for Telecommunications Pathways and Spaces

C. National Fire Protection Association
   1. NFPA 70, National Electrical Code

4.1 SUBMITTALS

A. Conform with the requirements of Section 27 41 00 - Common Work Results for Audiovisual Systems and the following:
   1. As part of the project submittals, the contractor to provide engineered shop drawings indicating the proposed design for mounting all work of this Division weighing more than 20 pounds, inclusive of mounting systems, and for equipment mounted at the exterior, inclusive of its effective wind load under conditions the range of conditions experience
      a. Shop drawings to be accompanied by anchorage calculations indicating that it shall remain attached to the mounting surface after experiencing forces in conformance with CCR, Title 24, Table 23P, Part II and with Section 2312 "Earthquake Regulations" of the "Uniform Building Code" for Seismic Zone 4 Area, Importance Factor of 1.25.
      b. Structural Calculations shall be prepared and signed by a California Registered Structural Engineer. Specify proof loads for drilled-in anchors, if used.

5.1 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new and unused, and of current manufacturer.

B. Cable hooks shall be listed and labeled by Underwriters Laboratories (UL) as required.

C. Cable hooks shall have the manufacturers name and part number stamped in the part itself for identification.

PART 2 - PRODUCTS

1.1 SUPPORTING DEVICES

A. General
   1. Supports to be sized to suit load and selected to match mounting conditions

B. Manufacturers
   1. Equal products by the following manufacturers will be considered providing that all features of the specified product are provided:

a. Concrete fasteners:
   i. Phillips "Red-Head".
   ii. Remington.
   iii. Ramset.
   iv. Hilti
   v. Simpson Strong-Tie
   vi. or equal.
b. Concrete inserts and construction channel:
   i. Unistrut Corp.
   ii. GS Metals "Globe Strut."
   iii. Thomas & Betts "Kindorf" Corp.
   iv. Or equal.
c. Conduit straps:
   i. O-Z/Gedney.
   ii. Erico "Caddy" Fastening Products.
   iii. Thomas & Betts "Kindorf" Corp.
   iv. Or equal.
d. Beam Clamps
   i. Cooper B-Line
   ii. SuperStrut
   iii. Unistrut
   iv. or equal
e. Aircraft Cable Sway Braces
   i. Mason Industries
   ii. M.W. Sausse/Vibrex
   iii. Loos & Company, Inc.
   iv. or equal.

C. Concrete Fasteners
   1. Provide expansion-shield type concrete anchors.
   2. Provide powder driven concrete fasteners with washers. Obtain approval by Owner's Representative prior to use.

D. Concrete Inserts
   1. Provide pressed galvanized steel, concrete spot insert, with oval slot capable of accepting square or rectangular support nuts of ¼ inch to ½ inch diameter thread for rod support.

E. Aircraft cable sway braces
   1. Steel rope sized to meet load.

F. Construction Channel:
   1. Construction:
      a. 1-5/8" square galvanized channel formed from U.S.S.G No. 12 or 0.109 inch cold formed steel with 17/32-inch diameter bolt holes, and 1-1/2 inch on center in the base of the channel.
      b. 10 foot sections.
   2. All supporting materials by same manufacturer.

G. Beam Clamps
   1. Malleable iron electro-galvanized steel beam clamps selected to match building

structural steel members.

H. Conduit Straps
1. One hole strap, steel or malleable iron, with malleable iron clamp-back spacer for surface mounted wall and ceiling applications.
a. Use malleable strap with spacers for exterior and wet locations.
b. Use steel strap without spacers for interior locations.
2. Steel channel conduit strap for support from construction channel.
3. Steel conduit hanger for pendant support with threaded rod
4. Steel wire conduit support strap for support from independent #12 gauge hanger wires.

I. Threaded rods, couplings, screws and nuts:
1. Electrolytically coated with zinc, 2 oz. zinc per square foot of surface, ASTM A123 or A153.

J. Miscellaneous Parts
1. Hot dipped galvanized after fabrication; after cutting, de-burring and hole drilling. Coated with zinc, 2 oz. zinc per square foot of surface, ASTM A123 or A153.

K. Paint/Tape for Touch-up:
1. Zinc: CRC "Zinc-It", Glyptal, Enterprise Galvanizing “Galambra”, or equal.

2.1 CABLE HANGERS

A. Ceiling Hung J-Hooks
1. Drawing Reference(s):
a. WMJ
b. ACJ
2. Features/Functions/Construction
a. Specifically intended to carry the load of up to 50 AudioVisual cables without applying excess forces to cables at bottom of bundle.
b. Integral broad bottom edge to spread cable load with flat bottom and provide a minimum of 1-5/8 inch cable bearing surface.
c. Integral hanger rod attachment hardware at top.
d. Load rated for application.
e. Incorporates smooth 90-degree radiused edges to prevent snagging cable jackets on installation.
f. Designed so the mounting hardware is recessed to prevent cable damage.
g. Integral mechanical cable latch retainer to provide containment of cables within the hook. The retainer shall be removable and reusable.
h. Suitable for direct attachment to walls, hanger rods, beam flanges, purlins, strut, floor posts, etc. to meet job conditions.
i. Multi-tiered cable hooks to be used where required to provide separate cabling compartments, or where additional capacity is needed.
j. Finishes:
i. Cable hooks for non-corrosive areas shall be pre-galvanized steel, ASTM A653. Where additional strength is required, cable hooks shall be spring steel with a zinc-plated finish, ASTM B633, SC3.
ii. Cable hooks for corrosive areas shall be stainless steel, AISI Type 304.
3. Manufacturer

a. Cooper B-Line series BCH21, BCH32, BCH64
b. Caddy/Erico CableCat
c. or equal.

PART 3 - EXECUTION

1.1 GENERAL

A. The Owner's Representative reserves the right to request additional supports where in their sole opinion said supports are required. Any additional supports shall be installed at no additional cost to the Owner.

2.1 EXAMINATION

A. Thoroughly examine site conditions for acceptance of supporting device installation to verify conformance with manufacturer and specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.1 PREPARATION

A. Coordinate size, shape and location of concrete pads required for equipment installation with Base Building General Contractor.

B. Layout support devices to maintain headroom, neat mechanical appearance and to support the equipment loads.

C. Where shown on the Drawings or Specifications, install freestanding AudioVisual equipment on concrete pads.

4.1 INSTALLATION

A. Furnish and install supporting devices as noted throughout the AudioVisual Systems work.

B. AudioVisual device and conduit supports shall be independent of all other system supports that are not structural elements of the building, unless otherwise noted.

C. Fasten hanger rods, conduit clamps, outlet and junction boxes to building structure using precast inserts, expansion anchors, preset inserts or beam clamps.

D. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster or gypsum board partitions and walls.

E. Use expansion anchors or preset inserts in solid masonry walls.

F. Use self-drilling anchors, expansion anchor, or preset inserts on concrete surfaces.

G. Use sheet metal screws in sheet metal studs and wood screws in wood construction.

H. Do not fasten supports to piping, ductwork, mechanical equipment, conduit, or acoustical ceiling suspension wires.

I. Do not drill structural steel members unless first approved in writing by the Owner's Representative.

J. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

K. Install surface-mounted cabinets with minimum of four anchors. Provide additional support backing in stud walls prior to sheet rocking as required to adequately support cabinets and panels.

L. Bridge studs top and bottom with channels to support flush mounted cabinets and panelboards in stud walls.

5.1 ERECTION OF METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal fabrications accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS "Structural Welding Code."

6.1 WOOD SUPPORTS

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

7.1 DISTRIBUTION PATHWAY VIA CEILING HUNG CABLE HOOKS (J-HOOKS):

A. Void, Plenum or Suspended Ceiling Exposed Cable Installation. Where drawings specifically show or permit use of exposed cable installation in voids, conform to the most restrictive requirements of Code, TIA-569-B and this Section.

B. Provide support for all cabling. Do not place or attach directly to T-bar grid, concealed spline grid, flexible or rigid ductwork, HVAC registers, sprinkler piping or fixtures, light fixtures or building structure. Conform to the California Electric Code.

C. Placement:
   1. All pathways created by ceiling hung cable hooks shall be reviewed by the Owner’s Representative prior to installation.
   2. Ceiling hung cable hooks and cabling supported by same shall not obscure access to access doors, hatches, air dampers, valves, filter sections, VAV boxes, cable trays, junction boxes, pull boxes or similar areas of access required by other trades.
   3. All ceiling hung cable hooks shall be mounted close enough together such that upon completion of the station cable installation a minimum amount of cable droop occurs between adjacent rings. The distance between supporting rings shall not exceed 48 inches or as required by the current edition of TIA-569-B.

D. Follow manufacturer’s recommendations for allowable fill capacity for each size of cable hook.
   1. Cable hooks shall be capable of supporting a minimum of 30 pounds with a safety factor of 3.
   2. Spring steel cable hooks shall be capable of supporting a minimum of 100 pounds with a safety factor of 3 where extra strength is required.

END OF SECTION 27 41 02

SECTION 27 41 03 - CONDUITS AND BACKBOXES FOR AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Provide AudioVisual pathways in accordance with EIA TIA/EIA-569-B, as specified in this Section and as shown on the plans. Provide system furniture pathways in accordance with UL 1286. Provision of all low voltage AudioVisual Systems Pathway, including:
   1. Rigid steel conduit and fittings.
   2. PVC insulated rigid steel conduit and fittings.
   3. Intermediate metal conduit and fittings.
   4. Electrical metallic tubing and fittings.
   5. Flexible metallic conduit and fittings.
   6. Liquidtight flexible metallic conduit and fittings.
   7. Miscellaneous conduit fittings and products.
   8. Junction Boxes
   9. Floor Boxes
   10. Hinged cover enclosures.
   11. Pullboxes and Terminal Cabinets.

B. At Hazardous Occupancies, installation conforms to the requirements of California Electric Code for Class and Division rating of spaces.

2.1 RELATED WORK IN OTHER SECTIONS:

A. Related work: Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.
   1. Section 01 73 29 – Cutting and Patching.
   2. Section 27 41 00 – Common Work Results for Audiovisual Systems.
   3. Section 27 41 01 – Grounding and Bonding for Audiovisual Systems
   4. Section 27 41 02 – Hangers and Supports for Audiovisual Systems
   5. Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems
   6. Section 27 41 06 – Noise and Vibration Controls for Audiovisual Systems
   7. Section 27 41 16 – Integrated Audio-Video Systems and Equipment

3.1 REFERENCES

A. Usage: In accordance with Section 01 41 00 - Regulatory Requirements
   1. American National Standards Institute (ANSI)
      a. ANSI C80.1 1994 Rigid Steel Conduit - Zinc Coated
      b. ANSI C80.3 1991 Electrical Metallic Tubing - Zinc Coated
   2. National Electrical Manufacturers Association (NEMA)
      a. NEMA 250-2003 Enclosures for Electrical Equipment (1000 Volts Maximum)
      b. NEMA FB 1 (ANSI/NEMA FB 1-2003) Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable

c. FB 2.10 2000 Selection and Installation Guidelines For Fittings For Use With Non-Flexible Metallic Conduit Or Tubing (Rigid Metal Conduit, Intermediate Metal Conduit, And Electrical Metallic Tubing).
d. FB 2.20 2000 Selection and Installation Guidelines for Fittings for use with Flexible Electrical Conduit and Cable
e. NEMA ICS 6 1988 (Rev. 1) Enclosures for Industrial Control and Systems
f. NEMA OS 3-2002 Selection and Installation Guidelines for Electrical Outlet Boxes.
g. NEMA RN 1-1998 Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
h. NEMA TC 7 2000 Smooth Wall Coilable Polyethylene Electrical Plastic Duct
i. NEMA TC 13 2000 Electrical Nonmetallic Tubing (ENT).
j. NEMA TC 14 1984(R 1986) Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings

3. Underwriters Laboratories, Inc. (UL)
   a. UL 1 2000 Flexible Metal Conduit
   b. UL 6 2004 Electrical Rigid Metal Conduit - Steel
   c. UL 50 (1995; R 1999, Bul. 2001) Enclosures for Electrical Equipment
   d. UL 360 1986 (Bul. 1991) (R 1993) Liquid-Tight Flexible Steel Conduit
   e. UL 514A 1991 (R 2004) Metallic Outlet Boxes
   f. UL 514B 1989 (R 2004) Conduit, Tubing and Cable Fittings
   g. UL 514C 1996 (R 2000) Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers.
   h. UL 651 1989 (R 1989) (Bul. 1993) Schedule 40 and 80 Rigid PVC Conduit.
   i. UL 797 1993 (R 2004) Electrical Metallic Tubing - Steel
   j. UL 1242 1983 (R1993) (Bul. 1993) Intermediate Metal Conduit.
   k. UL 1286(1999; R 2001, Bul. 2002) Office Furnishings
   l. UL 1479 Fire Tests of Through Penetration Firestops
   m. UL Fire Resistance Directories

4.1 SUBMITTALS

A. Conform with the requirements of Section 27 41 00 - Common Work Results for Audiovisual Systems.

5.1 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new and unused, and of current manufacturer.

B. Only products and applications listed in this Section may be used on the project unless otherwise submitted and approved by the Owner’s Representative.

PART 2 - PRODUCTS

1.1 GENERAL

A. Provide the following types of conduit systems listed by their commonly used generic name.

2.1 RACEWAY

A. Manufacturers:
   1. Raceway:
      a. Allied Tube and Conduit Co.
      b. Triangle PWC, Inc.
      c. Western Tube and Conduit Corp.
      d. Spring City Electrical Manufacturing Co.
      e. Occidental Coating Co. (OCAL).
      f. Alflex Corp.
      g. American Flexible Metal Conduit Co.
      h. Anaconda.
      i. Or equal.
   2. Fittings:
      a. Appleton Electric Co.
      b. OZ/Gedney.
      c. Thomas & Betts Corp.
      d. Spring City Electrical Manufacturing Co.
      e. Occidental Coating Co. (OCAL).
      f. Carlon.
      g. or equal.

B. Rigid Steel Conduit.
   1. Drawing and Spec Reference: RSC.
   2. Construction:
      a. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and UL 6.
      b. Standard threaded couplings, locknuts, bushings, and elbows: Only materials of steel or malleable iron are acceptable. Locknuts shall be bonding type with sharp edges for digging into the metal wall of an enclosure.
      c. Three piece couplings: Electroplated, cast malleable iron.
      d. Insulating bushings: Threaded polypropylene or thermosetting phenolic rated 150 degree C minimum.
      e. Insulated grounding bushings: Threaded cast malleable iron body with insulated throat and steel "lay-in" ground lug with compression screw.
      f. Insulated metallic bushings: Threaded cast malleable iron body with plastic insulated throat rated 150 degrees C.
      g. All fittings and connectors shall be threaded.

C. Coated Rigid Steel Conduit:
   1. Drawing and Spec Reference: CRSC.
   2. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with nominal 40 mil thermoplastic vinyl coating, heat fused and bonded to the exterior of the conduit.
   3. Fittings:
      a. Conduit couplings and connectors shall be as specified for galvanized rigid steel conduit and shall be factory PVC coated with an insulating jacket equivalent to that of the coated material.
      b. Fittings over-sleeve to extend 1 conduit diameter or 1-1/2" beyond fitting, whichever is less.
   4. Performance:
      a. Tensile Strength: 3500 psi.

5. Approvals:
    a. NEMA RN1 (Type 40 - 40 mils thick)
    b. CalTrans Type 2
6. Manufacturers:
    a. Plastibond by RobRoy Industries.
    b. Occal-40 by Occidental Coating Company.
    c. KorKap by Plastic Applicators.
    d. Ocal-Blue
    e. or equal.

D. Intermediate Metal Conduit
1. Drawing Reference: IMC
2. Conduit: Hot dip galvanized steel meeting the requirements of CEC Article 345 and conforming to ANSI C80.6 and UL 1242.
3. Fittings: Conduit couplings, connector and bushing shall be as specified for galvanized rigid steel conduit. Integral retractable type IMC couplings are also acceptable.

E. Electrical Metallic Tubing.
1. Drawing and Spec Reference: EMT.
2. Conduit: Shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam and hot dip galvanized after fabrication. Conduit shall conform to ANSI C80.3 specifications and shall meet UL classifications.
3. Set screw type couplings: Electroplated, steel or cast malleable iron, UL listed concrete tight. Use set screw type couplings with four setscrews each of conduit sizes over 2 inches. Setscrews shall be of case hardened steel with hex head and cup point to firmly seat in wall of conduit for positive grounding.
4. Set screw type connectors: Electroplated steel or cast malleable iron UL listed concrete tight with male hub and insulated plastic throat, 150 degree C temperature rated. Setscrew shall be same as for couplings.
5. Raintight couplings: Electroplate steel or cast malleable iron; UL listed raintight and concrete tight, using gland and ring compression type construction.
6. Raintight connectors: Electroplated steel or cast malleable iron, UL listed raintight and concrete tight, with insulated throat, using gland and ring compression type construction.

F. Flexible Conduit:
1. Drawing Reference: FLEX
2. Construction:
    a. Flexible steel, zinc coated on both inside and outside by hot-dipping process.
    b. Interlocking spirally wound continuous steel strip.
    c. 3/4" minimum size.
3. Fittings: Connectors shall be of the single screw clamp variety with steel or cast malleable iron bodies and threaded male hubs with insulated throats. Exception: Pressure cast screw-in connectors shall be acceptable for fixture connection in suspended ceilings and cut-in outlet boxes within existing furred walls.
4. Approvals:
    a. UL 1

G. Liquidtight Flexible Metallic Conduit

1. Drawing Reference: Liquidtight
2. Conduit: Shall be fabricated in continuous lengths from galvanized steel strips, interlocking spirally wound, covered with extruded liquidtight jacket of polyvinyl chloride (PVC) and conforming to UL 360. Provide conduit with a continuous copper-bonding conductor wound spirally between the convolutions.
3. Fittings: Connector body and gland nut shall be of cadmium plated steel or cast malleable iron, with tapered, male, threaded hub; insulated throat and neoprene "O" ring gasket recessed into the face of the stop nut. The clamping gland shall be of molded nylon with an integral brass push-in ferrule.

3.1 MISCELLANEOUS CONDUIT FITTINGS AND PRODUCTS

A. General
   1. UL 514B.
   2. Listed in UL Electrical Construction Materials List.

B. Conduit Fittings, Insulated Throat Grounding Bushings
   1. Description
      a. Threaded for Rigid Steel Conduit and Intermediate Metal Conduit.
      b. UL Listed for use with copper conductors.
      c. Thermoplastic insulated liner for 105 degrees Celsius.
      d. Body of malleable iron, zinc plated; or die cast zinc.
   2. Manufacturer
      a. Thomas & Betts (Steel City) BG-801 Series
      b. O-Z/Gedney
      c. or equal.

C. Watertight conduit entrance seals: Steel or cast malleable iron bodies and pressure clamps with PVC sleeve, neoprene sealing grommets and PVC coated steel pressure rings. Fittings shall be supplied with neoprene sealing rings between the body and PVC sleeve.

D. Watertight cable sealing bushings: One piece, compression molded sealing ring with PVC coated steel pressure disks, stainless steel sealing screws and zinc plated cast malleable iron locking collar.

E. Expansion fittings: Multi-piece unit comprised of a hot dip galvanized malleable iron or steel body and outside pressure bussing designed to allow a maximum of 4" conduit movement (2" in either direction). Furnish with external braid tinned copper bonding jumper. Unit shall be UL listed for wet or dry locations.

F. Expansion/deflection couplings: Multi-piece unit comprised of a neoprene sleeve with internal flexible tinned copper braid attached to bronze end couplings with stainless steel bands. Coupling shall accommodate .75-inch deflection, expansion, or contraction in any direction, and allow 30-degree angular deflections. Flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber jacket and stainless steel jacket clamps. Unit shall comply with UL467 and UL514.
   1. Manufacturer:
      a. OZ/Gedney Type DX
      b. Steel City Type EDF
      c. or equal.

G. Fire rated penetration seals:

1. UL classified.
2. Conduit penetrations in fire rated separation shall be sealed with a UL classified assembly consisting of fill, void or cavity materials.
3. The fire rated sealant material shall be the product best suited for each type of penetration, and may be a caulk, putty, composite sheet or wrap/strip.
4. Penetrations of rated floors shall be sealed with an assembly having both F and T ratings at least equal to rating of the floor.
5. Penetrations of rated walls shall be sealed with an assembly having an F rating at least equal to the rating of the wall.

H. Standard products not herein specified:
1. Submit for review a listing of standard electrical conduit hardware and fittings not herein specified prior to use or installation, i.e. locknuts, bushings, etc.
2. Listing shall include manufacturers name, part numbers, and a written description of the item indicating type of material and construction.
3. Miscellaneous components shall be equal in quality, material, and construction to similar items herein specified.

I. Hazardous area fittings: UL listed for the application.

4.1 FLOOR BOXES

A. Floor Box High Capacity, 4 Compartment
1. Plan Reference: FC5/FC6
2. Features
a. UL Listed
b. Box
i. Size at least 13.5 inches by 12 inches by 6 inches deep.
ii. Four compartments, with voltage barriers, with standard electrical plate mounting brackets for at least:
iii. One 6 gang
iv. One 3 gang
v. Two single gang
c. Knockouts concentric, combination 1 inch and 1.25 inch.
d. Cover for carpet finish
e. Cover size approximately 14 inches by 12.5 inches.
f. At least 11 gauge steel.
g. Carpet flange of mitered brass or aluminum edging.
i. Option of brass or aluminum to be selected by the Owner's Representative.
ii. Option of 0.25 inch or 0.5 inch flange height to be selected by the Owner's Representative.
h. Within cover, provide a lift-off, full-access door, open area approximately 6.5 inches by 8 inches.
i. Within the lift-off, full-access door, provide a hinged, fold-back cable exit port.
j. Open area approximately 2 inches by 2 inches.
k. Flush in closed position.
l. Suitable for concrete embedment.
3. Approvals:
a. UL 514A scrub water
4. Manufacturers

a. FSR Inc. FL-600P-(cover flange code)-6. Provide manufacturer's “Pour Pan” FL-GRD2 or FL-GRD4 to protect from moisture at installations at grade level.
b. RCI Systems, Inc.
c. Wiremold/Walker
d. or equal.

5.1 JUNCTION AND DEVICE BOXES

A. Junction and Device Boxes
1. Drawing References: As shown on Symbol Schedule
2. Construction:
a. Concealed/Flush Mounted:
b. One or two piece welded knockout boxes.
c. UL 514A, cadmium or zinc-coated 1.25 oz/sq. ft., if ferrous metal.
d. Pressed sheet steel, for indoor locations.
e. UL 514C approved if non-metallic.
f. At hollow masonry, tile walls and plaster walls, provide with device rings as required.
g. Surface mounted:
i. Exterior - Conform to the Junction and/or PullBox construction scheduled on the Plans. Where construction not otherwise scheduled or noted on the plans, conform to the following.:
1. Cast iron or aluminum with threaded hubs and mounting lugs.
2. Gasketed cover with spring lid.
ii. Concrete floor embedded:
1. Cast iron concrete pour boxes with screwed brass cover, unless otherwise noted.
2. Cadmium plated screw cover attachment at least 6" on center.
h. If size not otherwise noted, at least 4S (4" square) by 2-1/8" deep, or Code minimum size, whichever is larger.
i. Wherever 4S is indicated, contractor may at their option substitute 4-11/16" square boxes while maintaining the minimum depth required by these specifications and the drawings.
ii. At recessed masonry wall installations, provide gangable masonry boxes.
i. Provide complete with approved type of connectors and required accessories, including attachment lugs or hangers. Provide raised device covers as required to accept scheduled device.
3. Approvals.
a. UL 514A
4. Manufacturers:
a. Interior:
i. Steel City.
ii. Bowers
iii. or equal.
b. Exterior, exposed with cover of same construction.
i. Appleton
ii. Pyle-National
iii. or equal.
c. Other conditions:

i. Any meeting approvals and requirements.

B. Flat-panel Wall Box
   1. Drawing reference: FPWB
   2. Features, functions and construction:
      a. Box provides means to install audiovisual, network and power receptacles flush in wall behind flat-panel display. With box cover installed, connectors are concealed and cables, both power and communications pass through slot at base of cover plate into connection points on back of flat-panel.
      b. Cover plate protrudes less than 1/2" from face of wall.
      c. 16 gauge box construction with 1/16" inch thick minimum cover plate, white finish baked enamel or powder coat, field paintable
      d. Box incorporates provisions to mount up to two electrical device boxes for provision of duplex power receptacles either from above or below.
      e. Additionally box mounts manufacturers low-voltage conduit entry box which accommodates manufacturer's line of audiovisual connector inserts. Design of FP WB permits installation of up to two low-voltage conduit entry boxes, which may be mounted either above or below the FPWB.
      f. Manufacturers audiovisual insert line shall support at least the following receptacles:
         i. BNC, in combinations of 1 to 5 BNC's, color-coded for composite, component analog and RGBHV video formats, as required.
         ii. RCA, in combinations of 1 to 3 RCA's color-coded for Composite and component analog video formats, as required.
         iii. S-Video.
         iv. XLR, 3 and 4 pin.
         v. DB-15
         vi. DB-9
         vii. Neutrik Speakon.
         viii. DVI
         ix. HDMI
         x. 1/4" and mini TRS.
      g. Provide with manufacturer's connector inserts as required to terminate cabling types and applications indicated on the single-line diagrams. Punch blank panel inserts and provide other receptacle types as required or indicated to fulfill the requirements of the contract documents. Fill remaining openings with blank inserts.
   3. Manufacturers:
      a. FSR Inc. PWB-100 with:
         i. (2) low voltage backboxes
         ii. (2) electrical gem boxes
         iii. Connectors and inserts from manufacturer's IPS series.
      b. Or equal (no known equal).

C. Flat Panel Wall Box (concrete/masonry wall condition)

   1. Drawing Reference: FPWB1

   2. Features, functions and construction:

a. Box provides means to install audiovisual, network and power receptacles flush in wall behind flat-panel display. With box cover installed, connectors are concealed and cables, both power and communications pass through slot in cover plate into connection points on back of flat-panel.

b. Cover plate protrudes less than 1/2 in. from face of wall.

c. 16 gauge box construction with 1/16 in. inch thick minimum cover plate, white finish baked enamel or powder coat, field paintable

d. Box incorporates provisions to mount up to two electrical device boxes for provision of duplex power receptacles.

e. Additionally box mounts manufacturers low-voltage conduit entry box which accommodates manufacturer's line of audiovisual connector inserts. Design of FPWB2 permits installation of up to two low-voltage conduit entry boxes, which may be mounted within the FPWB.

f. Manufacturers audiovisual insert line shall support at least the following receptacles:
   i. BNC, in combinations of 1 to 5 BNC's, color-coded for composite, component analog and RGBHV video formats, as required.
   ii. RCA, in combinations of 1 to 3 RCA's color-coded for Composite and component analog video formats, as required.
   iii. S-Video.
   iv. XLR, 3 and 4 pin.
   v. DB-15
   vi. DB-9
   vii. Neutrik Speakon.
   viii. DVI
   ix. HDMI
   x. 1/4 in. and mini TRS.

g. Provide with manufacturer's connector inserts as required to terminate cabling types and applications indicated on the single-line diagrams. Punch blank panel inserts and provide other receptacle types as required or indicated to fulfill the requirements of the contract documents. Fill remaining openings with blank inserts.

3. Manufacturers:

   a. FSR Inc. PWB-CMU8-B with PWB-CMU8-WHT-C cover

   b. Or equal (No known equal).

6.1 CABINETS AND ENCLOSURES

A. Terminal Cabinets:
   1. Drawing Reference: As Scheduled.
   2. Construction:
      a. Zinc Coated Sheet Steel, code gauge with standard concentric knockouts for conduit terminations.
      b. Interior dimensions not less than those scheduled.
      c. Finish: Manufacturer's standard gray baked enamel finish.

d. Covers: Trim fitted, continuous hinged steel door, flush catch – lockable and keyed to match. Screw fastened doors not acceptable.
   i. Door face to be not less than 95% of panel interior dimensions.
e. Provide with 3/4" fire retardant treated ply backboard.

3. Mounting:
   a. Flush cabinets shall be furnished with concealed trim clamps and shall be not less than 4 inches deep.
   b. Surface cabinets shall be furnished with screw cover trim, flush hinged door and shall not be less than 6 inches deep.
   c. Interior Applications:
      i. NEMA 250 Type 1, unless otherwise noted. Refer to plans and schedules.
   d. Exterior Applications:
      i. NEMA 250 Type - As Scheduled, not less than NEMA 3R.
4. Manufacturers:
   a. B-Line Electrical Enclosures
   b. Circle AW Products.
   c. Hammond
   d. Henessey.
   e. Hoffman.
   f. Myers Electric Products
   g. Rittal.
   h. or equal.

PART 3 - EXECUTION

1.1 CONDUIT APPLICATION

A. General: Install the following types of conduits and fittings in the locations listed, unless otherwise noted in the drawings:
   1. Exterior, Exposed:
      a. Type RSC for applications up to 8 feet AFF or to first pull box, whichever is first, applications subject to physical abuse or for applications greater than 4" diameter.
      b. EMT acceptable in all other applications not noted above up to 4", where used in conjunction with specified Raintight (compression) couplers.
   2. Interior, Exposed, Wet and Damp Locations:
      a. Type RSC.
      b. At interior locations over 8 feet above finished floor, EMT acceptable.
   3. Interior, Hazardous Locations
      a. Type RSC
      b. Type IMC, where permitted by the CEC.
   4. Interior, exposed or concealed, dry locations:
      a. RSC, if subject to physical abuse.
      b. EMT, if not subject to physical abuse.
   5. Interior, concealed, damp locations, including in masonry walls.
      a. RSC
   6. Embedded in Concrete
      a. RSC or rigid non-metallic conduit.

b. PVC Type DB-120.

7. Transition from walls to open plan furniture systems:
   a. Liquidtight

2.1 GENERAL REQUIREMENTS

A. Refer to the manufacturer's instructions and conform thereto.

B. Distribution Pathway via EMT Raceway:
   1. The EMT conduit is to be installed meeting the NEC handbook Article 348 Installation Specifications.
   2. Provide escutcheon plates for all through wall conduit stubs.
   3. All ends of conduits shall be cut square, reamed and fitted with insulated bushing.
   4. All conduit which passes through fire walls shall be sealed with fire stop putty after all station wire has been installed.

3.1 MOUNTING AND INSTALLATION – DEVICE BOXES

A. Conform to the more restrictive of NEMA OS 3-2002 and the following.

B. Provide backboxes at all AudioVisual systems devices. Installation of device plates directly to wall surface without use of a backbox, unless specifically directed on plans, is unacceptable.

C. The distance between pull boxes shall not exceed 150 feet or more than two 90 degree bends.

D. Align boxes plumb with floor and surrounding construction. At door frames, locate 4" from frame. Verify placement with Owner’s Representative details to ensure that box clears all trim, etc.

E. Support and fasten boxes securely. At stud walls use rigid bar hangers, attached to hanger with stud and nut.

F. At existing locations, provide cutting, patching and finishing as required to maintain or restore finishes so that resulting installation is integrated into the Architectural decor of the particular location.

G. Mounting Height: the mounting height of a wall-mounted outlet box is defined as the height from the finished floor to the horizontal center line of the cover plate.

H. Mount outlet boxes with the long axis vertical. Three or more gang boxes shall be mounted with the long axis horizontal.

I. Install wiring jacks and outlet devices only in boxes which are clean; free from excess building materials, dirt, and debris.

J. Install wiring jacks and outlet devices after wiring work is complete.

4.1 TERMINAL CABINETS, JUNCTION BOXES AND PULL BOXES

A. General

1. Thoroughly examine site conditions for acceptance of cabinets and enclosures installation to verify conformance with manufacturer and specification tolerances. Do not commence with installation until all conditions are made satisfactory.

B. Set cabinets and enclosures plumb and symmetrical with building lines. Furnish and install all construction channel bolts, angles, etc. required to mount all equipment furnished under this Section of the Specifications.

C. Cabinets and enclosures shall be anchored and braced to withstand seismic forces calculated in accordance with standards referenced in Section 27 41 02 – Hangers and Supports for Audiovisual Systems.

D. "Train" interior wiring, bundle and clamp using specified plastic wire wraps. Separate power and signal wiring.

E. Replace doors or trim exhibiting dents, bends, warps or poor fit that may impede ready access, security or integrity.

F. Terminate conduit in cabinet with lock nut and grounding bushing.

G. Cleaning
1. Touch-up paint any marks, blemishes or other finish damage suffered during installation.
2. Vacuum clean cabinet on completion of installation.

5.1 SUPPORT

A. Provide supports for raceways as specified in Section 27 41 02 – Hangers and Supports for Audiovisual Systems.

B. All raceways installed in exposed dry locations shall be grouped in a like arrangement and supported by means of conduit straps, wall brackets or trapeze hangers in accordance with Code and the requirements of the this Section and Section 27 41 02 – Hangers and Supports for Audiovisual Systems. Fasten all hangers from the building structural system.

C. Provide supports and mounting attachments per the most restrictive of Code and the following.

Raceway Size (inches)	No of cables in run	Location	Support Spacing (feet) RSC	EMT
Horizontal Runs				
½, 3/4	1-2	Flat Ceiling Wall Runs	5	5
½, 3/4	1-2	Where access limited to building structure	7	7
½, 3/4	3≥	Any location	7	7
1≥	1-2	Flat ceiling or wall	6	6
1≥	1-2	Where access limited to building structure	10	10
1≥	3≥	Any locations	10	10
Any	Any	Concealed	10	10
Vertical Runs				

½, 3/4	Any	Exposed	7	7
1, 1-1/4	Any	Exposed	8	8
1-1/2≥	Any	Exposed	10	10

D. Install no more than one coupling or device between supports.

E. Conduit support
   1. As specified in Section 27 41 02 – Hangers and Supports for Audiovisual Systems

F. The Owner's Representative reserves the right to request additional supports where in their sole opinion said supports are required. Any additional supports shall be installed at no additional cost to the Owner.

6.1 PENETRATIONS

A. Gypsum Wall Board Penetrations: Provide circular penetrations maximum 1/8" inch larger than outer diameter of conduit being used. On both sides of the wall fill space between conduit and wall with joint compound, depth to match gypsum board thickness.

B. Install UL listed fire-stop system whenever a raceway penetrates a firewall in conformance with the manufacturer's directions, the published systems assembly requirements, CBC Section 709 and 710 and CEC 300-21, whichever is the most restrictive. At cable tray penetrations, provide pillow type removable fire stop per CBC Section 709 and 710, the published systems assembly requirements and the manufacturer's directions, whichever is the most restrictive.

C. All AudioVisual systems conduit openings in walls and floors are the responsibility of the Contractor. Install sleeves shown on the drawings when the concrete is poured. Any openings required after the concrete has set maybe core drilled.

7.1 RACEWAY INSTALLATION, GENERAL

A. Raceway runs are shown schematically. Install concealed unless specifically shown otherwise. Supports, pull boxes, junction boxes and similar generally not indicated. Provide where designated.
   1. Install exposed conduit and raceway parallel and perpendicular to nearby surfaces or exposed structural members, and follow the surface contours. Level and square conduit and raceway runs.
   2. Raceway runs shall be mechanically and electrically continuous between all each equipment rack and utility demarcation point, receptacle and/or surface raceway strip, as applies.
   3. Each conduit shall enter and be securely connected to a cabinet, junction box, pull box, or outlet by means of a locknut on the outside and a bushing on the inside or by means of a liquid-tight, threaded, self-locking, cold-weld type wedge adapter.
   4. Bends
      a. All bends or elbows shall have a minimum radius as follows:

Conduit Size	Min. Radius (Inches)
3/4"	8
1"	12
1-1/4"	18
2"	24

2-1/2"	24
3"	30
3-1/2"	30
4"	30
5"	36
6"	42

b. Use factory elbows or machine bends for conduit bends 1-1/4" and larger.

5. Make bends and offsets so the inside diameter is not effectively reduced. Make bends in parallel or banked runs from the same center line so that the bends are parallel.
6. Install at least one (1) 3/8", 200 pound strength nylon pull cord in all empty raceways.
7. Raceways crossing building expansion joints or in straight runs exceeding 100 feet shall be provided with UL listed expansion fittings.
8. Install conduit seals and drains to prevent accumulated moisture in conduits from entering AudioVisual System enclosures.

B. Do not install conduit in concrete slabs unless specifically directed by Owner's Representative. Embedded conduits in concrete slab walls, and columns shall be installed in center third between upper and lower layers of reinforcing steel as directed by the Owner's Representative. Space conduits 8" on center except at cabinet locations where slab thickness shall be increased as directed by the Owner's Representative.

C. All conduits to be kept 12" away from steam or hot water lines. Install horizontal conduit and raceway runs below water and steam piping.

D. Conduit dropping down to equipment shall be as straight as possible without any offsets, parallel or perpendicular to walls, ceilings and other building features.

E. Conduit installed on any equipment shall be run symmetrical with the equipment and in such a manner as to:
1. not to be exposed to damage;
2. not interfere with access to components of the equipment that will interfere with maintenance operation or;
3. not to be in a manner that the Owner deems detrimental to its operation.

F. Whenever an installation such as that listed occurs, the Contractor shall make all necessary changes at no additional cost to the Owner.

G. All cut ends of conduit, scratches, tool marks, etc. on any metallic raceway installed in the ground or on the exterior of the building shall be treated with two coats of specified Touch Up Paint/Tape.

H. Exposed conduit and metallic surface raceway installed in finished spaces shall be painted to match surrounding surfaces using paint and methods directed by the Owner's Representative.

I. All raceways stubbing up into equipment or racks shall be sealed. Raceways with conductors shall be plugged with duct-seal. Spare raceways shall be capped. Prevent foreign matter from entering conduit and raceway; use temporary closure protection. Replace conduits containing concrete, varnish or other foreign material.

J. Complete installation of conduit and raceway runs before starting installation of cables/wires within conduit and raceway.

K. Use specified conduit and raceway fittings that are of types compatible with the associated conduit and raceway and suitable for the use and location. Join and terminate conduit and raceway with fittings designed and approved for the purpose of the conduit and raceway system and make up tight.

L. Where chase nipples are used, align the raceway and coupling square to the box and tighten the chase nipple so no threads are exposed.

M. Horizontal conduit or EMT runs, where required and permitted, shall be installed as close to ceiling or ceiling beams as practical.

N. Conduit and EMT connected to wall outlets shall be run in such a manner that they will not cross water, steam or waste pipes or radiator branches.

O. Conduit and EMT shall not be run through beams, purlins or columns except where permission is granted by Owner's Representative in writing.

P. Bond installed metallic raceway in accordance with the requirements of the CEC.

8.1 HAZARDOUS LOCATIONS

A. Use rigid steel conduit only.

B. Install UL listed sealing fittings that prevent passage of explosive vapors in accordance with the manufacturers written instructions. Locate fittings at suitable, accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank coverplate having a finish similar to that of adjacent plates or surfaces.

C. Install raceway sealing fittings at the following points and elsewhere as indicated:
   1. Where conduits enter or leave hazardous locations.

END OF SECTION 27 41 03

SECTION 27 41 06 - NOISE AND VIBRATION CONTROLS FOR AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Provisions of:
   1. Flexible AudioVisual raceway connections to vibrating machinery
   2. Sealing of AudioVisual device boxes related installed in sound rated walls.
   3. Coordination of airtight installation requirements at Mechanical and Electrical Rooms and/or duct enclosures.

2.1 RELATED WORK IN OTHER SECTIONS

A. Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.
   1. Division 27
      a. UPS equipment connected to the AudioVisual Work.
      b. Section 27 41 03 - Conduits and Backboxes for Audiovisual Systems

3.1 REFERENCES

A. American National Standards Institute (ANSI)
   1. ANSI/UL 1479-2003 Fire Tests of Through Penetration Firestops

B. American Society for Testing and Materials (ASTM)
   1. ASTM E814-02 Standard Test Method for Fire Tests of Through Penetration Fire Stops.

C. Underwriters Laboratories, Inc. (UL)
   1. UL Fire Resistance Directories

4.1 SUBMITTALS

A. Comply with the requirements of Section 27 41 00 – Common Work Results for Audiovisual Systems.

PART 2 - PRODUCTS

1.1 FLEXIBLE AUDIOVISUAL CONNECTIONS:

A. Make AudioVisual connections to vibrating equipment flexible as follows:
   1. For conduit over 1" O.D. make AudioVisual connections to vibrating equipment via a flexible expansion/deflection conduit coupling sized as required. Coupling shall have flexible and watertight outer jacket, internal grounding strap, plastic inner sleeve to maintain smooth wireway, and end hubs with threads to fit standard threaded metal conduit.
   2. Manufacturers:
      a. XD Xpansion Deflection Coupling by Crouse-Hinds of Syracuse, N.Y.
      b. Type DF Expansion and Deflection fitting by Spring City Electrical Mfg. Co.
      c. or equal.

3. For conduit under 1" O.D. utilize FLEX or LIQUIDTIGHT conduit as specified in Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems with slack at least 3' or 15 diameters long, whichever is the longer or provide a flexible coupling as defined above.

2.1 J-BOX MASTIC:

A. At all electrical boxes penetrating sound isolating partitions, utilize sheet form adhesive mastic as directed elsewhere herein

B. Manufacturers:
1. Insul-Pad by Dottie Corp.
2. Duct-Seal by Gardner Bender, Inc.
3. Duxseal by Manville
4. Outlet Pad by Lowry
5. or equal.

3.1 RESILIENT PENETRATIONS:

A. For conduit:
1. Sleeves: Sleeves of appropriate gage galvanized sheet metal shall be formed to at least the thickness of the penetrated construction and 3/4" to 1" larger in each cross-sectional dimension than the penetrating element.
a. Manufacturers:
i. Century-Line Sleeves by Thunderline Corporation
ii. Custom by Contractor
iii. or equal.
2. Batt: Glass fiber of batt or mineral wool, 1 to 3 lb./cu. ft. density.
a. Manufacturers
i. Certain-Teed
ii. Johns-Manville
iii. Owens-Corning
iv. or equal.
3. Acoustical Sealant:
a. Manufacturers
i. DAP
ii. Pecora
iii. Tremco
iv. U.S. Gypsum
v. or equal.
4. Firestop Sealant:
a. Where required, resilient firestop caulking may be used in lieu of Acoustical Sealant when installed in strict conformance with the manufacturer's directions. Fully hardened firestop caulk shall develop a Shore A hardness of no greater than 35. Refer to the requirements of Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems.

PART 3 - EXECUTION

1.1 GENERAL INSTALLATION REQUIREMENTS, CONNECTION TO VIBRATING EQUIPMENT

A. The Contractor shall not install any vibrating equipment or conduit attached thereto which makes rigid contact with the "building" unless it is approved in this specification or by the Owner's Representative. "Building" includes, but is not limited to slabs, beams, columns, walls, partitions, ceilings, studs, ceiling framing and suspension systems.

B. Prior to installation, the Contractor shall bring to the Owner' Representative's attention any conflicts between trades which will result in unavoidable rigid contact at equipment, conduit, piping, ducts, etc., as described herein, due to inadequate space or other unforeseen conditions. Corrective work necessitated by conflicts after installation shall be at the responsible contractor's expense.

C. The Contractor shall obtain inspection and approval from the Owner's Representative of any installation to be covered or enclosed, prior to such closure.

2.1 INSPECTION OF CONDITIONS:

A. Examine related Work and surfaces before starting Work of this Section. Report to the Owner's Representative, in writing, conditions which will prevent proper provision of this work. Beginning the Work of this Section without reporting unsuitable conditions to the Owner's Representative constitutes acceptance of such conditions by Contractor. Perform any required removal, repair, or replacement of this Work caused by unsuitable conditions at no additional cost to the Owner.

B. Coordination
1. Coordinate with the work of the Base Building Construction Contract. Coordinate Work of this Section with all other impacted trades.

3.1 INSTALLATION REQUIREMENTS, FLEXIBLE ELECTRICAL CONNECTIONS

A. The installation of flexible electrical connections to vibration isolated equipment shall in no way impair or restrain the function of the vibration isolation installed by the work by Others.
1. Using gross slack. Install flexible conduit in a grossly slack loop form or shallow "U" form. Install stranded conductors with sufficient slack to accommodate maximum possible movement.
2. Using flexible coupling. The flexible coupling shall be free and not in contact with any nearby building construction and shall be installed slack, and free of strain in any direction. Install stranded conductors as above

4.1 INSTALLATION REQUIREMENTS, J-BOX MASTIC

A. Application: All AudioVisual Systems work in sound isolating assemblies, including but not limited to residential rooms, offices, mechanical rooms, electrical rooms and related to utilize backboxes for all services, including but not limited to low voltage communication. Installation of backboxes to conform with following:
1. Space outlet boxes on opposite faces of the wall by more than 24" o.c. Where daisy chainned conduits indicated on the plans, connect such boxes by slack flexible conduit (2 times longer than distance between outlets).
2. Cutouts for electrical boxes and penetrating piping/conduit shall be no more than 1/4" oversize.
3. Caulk gap between drywall and electrical boxes and/or piping/conduit airtight with Acoustical Sealant. Apply J-Box mastic to back of all penetrating electrical boxes and press firmly at joint to wallboard to provide an airtight seal.

5.1 INSTALLATION REQUIREMENTS, RESILIENT PENETRATIONS

A. Penetrations included in this Section of the Specifications include all AudioVisual conduit connected to vibrating equipment within 30 feet of such equipment

B. Method for round or rectangular penetrations.
   1. Cut a clean opening in the penetrated construction very nearly the size of the sleeve for each penetrating element. Provide lintels above, relief structure below and vertical framing between and to the sides, as required. Provide the above, escutcheon plates and such related construction as is necessary to make the penetrated structure as solid and massive near the penetrations as the surrounding construction.
   2. Set the metal sleeve into the penetrated construction in an airtight manner around its outer periphery, using grout, dry packing, plaster or drywall compound full depth and all around - but only to a maximum width of ½" - or the requirements of the above paragraph shall not have been satisfied.
   3. Pack annular opening with glass fiber between metal sleeve and penetrating element full depth, all around to a firm degree of compaction. Leave a ½" deep annular opening free at each end of the metal sleeve; fill this fully with sealant.

6.1 MECHANICAL AND ELECTRICAL ROOMS REQUIREMENTS

A. All mechanical and electrical rooms, plenums, duct shafts and drywall duct enclosures and other enclosures of high noise sources shall be constructed airtight. This means that every precaution shall be taken to maintain construction completely airtight around a room so designated. Construction joints, duct penetrations, electrical boxes, frames, supports, cabinets, doors, access panels, fixtures, etc., all shall be built or installed in such a manner as to prevent sound transmission through any construction enclosing a room horizontally or vertically. Appropriate lintels, frames, blocking, escutcheons, grouting, gaskets, packing, caulking, taping, filling, etc., all shall be employed to prevent sound transmission. Refer to requirements of this Section for Resilient Penetrations.

B. All work under this section is to comply with the above. Contractor to report to Owner's Representative any construction conditions which arise which might compromise compliance with this requirement.

END OF SECTION 27 41 06

SECTION 27 41 07 - IDENTIFICATION FOR AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY:

A. Provide all labor, materials, tools, and equipment required for permanent intelligible labeling on, or adjacent to, all cabling, connectors, innerduct, faceplates, jacks, receptacles, controls, fuses, circuit breakers, patching jacks, and racks.

B. This section includes minimum requirements for the following:
   1. Labeling AudioVisual Cabling
   2. Labeling Closet Hardware
   3. Labeling Work Stations
   4. Labeling Pathways, Spaces, Grounding and Bonding.

C. Refer to detailed plans for additional requirements.

D. Clearly and distinctly indicate the function of the item.

E. Coordinate with Record Drawings

2.1 REFERENCES:

A. Usage: In accordance with Section 01 41 00 - Regulatory Requirements

B. American Society for Testing and Materials (ASTM)
   1. ASTM D 709(2001) Laminated Thermosetting Materials

C. Electronic Industries Alliance (EIA)
   1. EIA TIA/EIA-606-A(2002) Administration Standard for Commercial Telecommunications Infrastructure (ANSI/TIA/EIA-606)

D. Underwriters Laboratories (UL)
   1. UL 969 (1995; R 2001) Marking and Labeling Systems

3.1 QUALITY ASSURANCE

A. Identification and administration work specified herein shall comply with the applicable requirements of:
   1. ANSI/TIA/EIA – 606-A Administration Standards.
   2. ANSI/TIA/EIA – 569B Pathway and Spaces
   3. ANSI/TIA/EIA – 568B Telecommunications Cabling Standard.
   4. BICSI Telecommunications Distribution Methods Manual.
   5. UL 969 (1995; R 2001) Marking and Labeling Systems.

4.1 SUBMITTALS

A. Conform with the requirements of Section 27 41 00 - Common Work Results for Audiovisual Systems.

5.1 DELIVERY, STORAGE AND HANDLING

A. Procedures: In accordance with Section 01 11 00 - Summary of Work.

6.1 SEQUENCING

A. Not Used.

PART 2 - PRODUCTS

1.1 COMMUNICATION CABLING LABELS, INTERIOR

A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.

B. Shall be preprinted or computer printed type. Hand written labels are not acceptable.

C. Provide vinyl substrate with a white printing area and black print. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.

D. Shall be flexible vinyl or other substrates to apply easy and flex as cables are bent.

E. Shall use aggressive adhesives that stay attached even to the most difficult to adhere to jacketing.

F. Manufacturers:
   1. Cable Type – Audiovisual Cabling, General Purpose
      a. Brady TLS2200 labels – PTL-31-427,PTL-32-427
      b. Brady Laser tab labels – LAT-18-361, LAT-53-361
      c. Hubbell
      d. Leviton
      e. Panduit.
      f. or equal.
   2. Cable Type – RG-6 Coax
      a. Brady TLS2200 labels – PTL-31-427, PTL-32-427
      b. Brady Laser tab labels –LAT-18-361, LAT-53-361
      c. Panduit.
      d. or equal.
   3. Cable Type – RG-59 Coax
      a. Brady TLS2200 labels – PTL-31-427, PTL-32-427
      b. Brady Laser tab labels – LAT-18-361, LAT-53-361
      c. Panduit.
      d. or equal.
   4. Cable Bundles
      a. Brady TLS2200 labels – PTL-12-109
      b. Panduit.
      c. or equal.

2.1 GROUNDING AND BONDING, PATHWAY, AND SPACE LABELS

A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.

B. Shall be preprinted or computer printed type. Hand written labels are not acceptable.

C. Manufacturers:

1. Brady Corporation
    a. TLS2200 labels
        i. PTL-20-422, Size 2.0” x 1.0”
        ii. PTL-22-422, Size 3.0” x 1.0”
        iii. PTL-37-422, Size 3.0” x 1.9”
        iv. PTL-23-422, Size 4.0” x 1.0”
        v. PTL-38-422, Size 4.0” x 1.0”
    b. Laser tab labels
        i. LAT-13-747, Size 1.875” x 0.833”
        ii. LAT-24-747, Size 1.75” x 1.0”
        iii. LAT-32-747, Size 3.0” x 0.9 “
        iv. LAT-33-747, Size 2.0” x 1.437”
        v. LAT-34-747, Size 3.0” x 1.437”
    c. Continuous tape for TLS2200
        i. PTL-8-422, Size 0.5” white polyester
        ii. PTL-8-430, Size 0.5” clear polyester
        iii. PTL-8-439, Size 0.5” white vinyl
        iv. PTL-42-439, Size 1.0” white vinyl
        v. PTL-43-439, Size 1.9” white vinyl
2. Panduit.
3. or equal.

3.1 NAMEPLATES

A. Field Fabricated Nameplates
    1. Features/Function/Construction
        a. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device; as specified or as indicated on the drawings.
        b. Comply with ASTM D 709.
        c. Each nameplate inscription shall identify the function and, when applicable, the position.
        d. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core.
        e. Surface shall be matte finish.
        f. Corners shall be square.
        g. Accurately align lettering and engrave into the core.
        h. Minimum size of nameplates shall be one by 2.5 inches.
        i. Lettering shall be a minimum of 0.25 inch high normal block style

PART 3 - EXECUTION

1.1 GENERAL

A. Apply labeling to clean surfaces free of oil, dust, solvents or loose material.

B. Apply after Project painting in area of application is complete.

C. Apply to locations where labeling will not be damaged, covered over or in the way of the ordinary maintenance and operation of the installed AudioVisual infrastructure or system.

D. Apply labeling right side up, parallel to major edges of surfaces to which it is applied. When no line is evident, apply parallel to floor line. Correct conditions of labeling applied out of true.

E. Protect installed labeling from damage.

F. Replace labeling that is defaced, illegible or peeling off of the surface to which it is applied.

2.1 IDENTIFICATION & LABELING

A. Pathways
   1. Pathways shall be marked at each endpoint and at all intermediate pull or junction boxes. In the case of partitioned pathways (i.e. innerduct) each partition shall have a unique identifier.
   2. Label pathways using the appropriate abbreviation and a number.
   3. Use adhesive type labels.

B. Labels shall be affixed at the entry to all Audiovisual Control Rooms and spaces (Includes entrance facilities, communication equipment rooms, communication equipment spaces and work areas)
   1. Use adhesive type labels for all AudioVisual space labeling,
   2. Affix labels to entrance doors – coordinate location with Owner's Representative.

C. Cables
   1. Horizontal shall be marked within 12” of each endpoint or to innerduct in which the cable is installed.
   2. Except where installed in innerduct or conduit, all backbone fiber optic cable shall have affixed to the outer jacket, labels of a bright color that contain at least the legend "FIBER OPTIC CABLE." These labels must be affixed at separations no greater than 10 ft.
   3. Any cable installed in conduit shall be labeled at all intermediate pull or junction boxes.
   4. Label cables using the appropriate circuit ID.
   5. Use adhesive type labels for all AV cable labels.
   6. Affix labels to cables – marking cable is not permitted.
   7. Where cable is fully encased in innerduct label the outside of the innerduct with the cable label and, where the contents are fiber optic cabling, the "FIBER OPTIC CABLE" label.

D. Grounding and Bonding
   1. The AVGB(s) (AudioVisual main ground bar) shall be labeled as such with an adhesive type label(s) affix label(s) to TMGB.
   2. The conductor connecting the AVGB (AudioVisual main ground bar) to the building ground shall be labeled at each end with an affixed label in a visible location as close as practicable to the bonding point at each end of the conductor.

E. Firestopping
   1. Each firestopping location shall be labeled at each location where firestopping is installed, on each side of the penetrated fire barrier, within 12 in. of the firestopping material.

END OF SECTION 27 41 07

SECTION 27 41 08 - AUDIOVISUAL CABINETS, RACKS, FRAMES AND ENCLOSURES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Audiovisual racks and cabinets.

B. Production Desks and Mobile Production Racks .

2.1 RELATED WORK IN OTHER SECTIONS

A. Section 27 41 01 – Grounding and Bonding for Audiovisual Systems
   1. Bonds racks and cabinets.

B. Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems
   1. Signal systems raceways at Audiovisual Control Rooms

3.1 REFERENCES

A. American National Standards Institute (ANSI)
   1. EIA-310-D (1992) Cabinets, Racks, Panels, and Associated Equipment (ANSI/EIA/310-D)
   2. ANSI-J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications (ANSI/J-STD-607-A-2002)

B. International Conference of Building Officials (ICBO)
   1. AC156 ICBO ES Acceptance Criteria for Seismic Qualification Testing of Nonstructural Components (Jul. 2004)

C. Telecordia Technologies
   1. Network Equipment Building System (NEBS) GR-63-CORE (Seismic Zone 4)

4.1 SUBMITTALS

A. Conform with the requirements of Section 27 41 00 - Common Work Results for Audiovisual Systems.

5.1 DELIVERY, STORAGE AND HANDLING

A. Procedures: In accordance with Section 01 11 00 - Summary of Work.

PART 2 - PRODUCTS

1.1 GENERAL

A. KEYS
   1. Key all boxes, cabinets, enclosures, panels, controls, doors and related provided for similar usage within a system identically.

2.1 EQUIPMENT ENCLOSURE SYSTEMS

A. General:
1. Provide enclosure systems including, but not limited to enclosures, cabinets, cases and related panels and accessories as specified herein. Provide size and quantity as shown on drawings or scheduled.
2. Provide color as shown on drawings. If no color is shown on drawings, submit manufacturer's standard color chips for selection.
3. Provide enclosure systems conforming to the UBC/CBC, latest edition, for seismic design.
4. Equipment Enclosures: Each rack provided with frame angles tapped 10-32, ANSI/EIA 310-D Universal Spaced.

B. Equipment Rack, Undercounter, Pullout and Pivoting

1. Drawing Reference: R18

2. Features/Construction:

a. EIA compliant 19 in. rotating slide-out equipment rack intended for permanent installation and integration into a millwork or cabinet opening.

b. Overall dimensions of rack shall be not more than 19.25 in. wide x 20 in. deep

c. Rack shall support up to a 300 pound loading, in closed and pull-out operation.

d. Rack shall pull out 19 in. on integrated ball bearing slides and rotate 90º for equipment servicing. When rotating rack, locking detent shall allow rack to lock in place at 0, 60 and 90 degrees of rotation.

e. Rackrail shall be 11-gauge steel with tapped 10-32 holes in universal EIA spacing. Rackrail shall be finished in black e-coat with marked rackspaces.

f. Rough-in pan shall be 14-gauge steel.

g. Finish on assembly shall be durable flat black powder coat.

h. Trim/locking panel shall lock SRSR in closed position and be 11-gauge aluminum with brushed black anodized finish.

i. Unless otherwise noted, completely enclose interior of enclosure, or ensembles of enclosures with equipment, blank or vent panels

3. Manufacturers

a. Middle Atlantic SRSR–4-14

b. No Known Equal

3.1 RACK PANELS AND ACCESSORIES

A. Rack Mounting Screws:
1. Screws 10-32; length as required for at least 1/4" excess when fully seated; oval head with black plastic non marring cup washer or equivalent ornamental head; nickel, cadmium or black plated; Phillips, Allen Hex, Square-Tip or Torx drive. Slotted screws are not acceptable.

B. Sliding Shelf:
   1. Plan Reference: SLIDING SHELF
   2. Construction/Features:
      a. 16 gauge minimum cold rolled steel
      b. Powder coat finish to match rack color, unless otherwise noted
      c. 19" Wide Pull out with handhole or knob.
      d. Solid or perforated surface
      e. Depth: At least 20", u.o.n.
      f. 50 pound minimum load capacity
   3. Manufacturers:
      a. Atlas Sound
      b. BGW Systems, Inc. Sliding Shelves
      c. Chatsworth Products 32" Deep Megaframe Sliding Shelf.
      d. Elkay SLSH series
      e. Homaco Adjustable Pull-Out Equipment Shelves
      f. Hubbell MCCTELSHLF
      g. Middle Atlantic Heavy-Duty Sliding Shelf
      h. APW SSDC30.
      i. AFCO AS-SO-19-24.
      j. Or equal.

C. Fixed Shelf - 4 post rack applications
   1. Plan Reference(s):
      a. FIXED SHELF
      b. SHELF
   2. Construction:
      a. 16 gauge minimum cold rolled steel
      b. Powder coat finish to match rack color, unless otherwise noted
      c. Holds 100 lbs load
      d. Mounts to front and rear rails, U.O.N.
      e. Solid or Perforated bottom panel to suit equipment being mounted.
      f. Depth to equal not less than 75% of depth of equipment rack.
      g. Not more than 1 RU in height.
   3. Manufacturers:
      a. Atlas Sound Heavy Duty Shelves, SH series.
      b. BGW Systems, Inc. Rack Mount Trays
      c. Elkay SSH Series
      d. Homaco Adjustable Equipment Shelves and Fixed Dual Shelves
      e. Lowell Rack Mounted Utility Shelves
      f. Middle Atlantic Universal Rackshelves
      g. Rack Innovations, Inc.
      h. ZERO/Stantron Stationary Shelves
      i. AFCO AS-SF-19-24
      j. APW ESDC30.
      k. Hubbell MCCPSHLF
      l. Chatsworth Products 29" Deep Megaframe Fixed Shelves.
      m. or equal

D. Fixed Shelf - 2 post rack applications
   1. Plan Reference(s):

a. FIXED SHELF
b. SHELF

2. Construction:
   a. 18 gauge minimum cold rolled steel
   b. Powder coat finish to match rack color, unless otherwise noted
   c. Holds 25 lbs load
   d. Mounts to front rails, supports load to rear of frame. U.O.N., center support shelves not acceptable.
   e. Solid or Perforated bottom panel to suit equipment being mounted.
   f. Not more than 1 RU in height.
3. Manufacturers:
   a. Chatsworth Products, Inc.
   b. or equal

E. Keyboard/Mouse Shelf
1. Drawing Reference: Keyboard/Mouse Shelf
2. Stores fullsize keyboard and mouse inside rack.
3. Upon retraction to rack front, pivots 90 degrees for operator access.
4. Manufacturers
   a. APC 19" Rotating Keyboard Drawer.
   b. Middle Atlantic
   c. or equal.

F. Grommet Panel
1. Features/Functions/Construction
   a. 1 RU steel or aluminum panel with 18" wide x 1" tall smooth edged
   b. opening in face
   c. Cable management panel protrudes below opening perpendicular to rear face.
2. Manufacturers:
   a. Middle Atlantic BR1
   b. Custom by Contractor using Blank Panel
   c. or equal.

G. Blank Panels:
1. Construction
   a. 16 gauge minimum cold rolled steel
   b. Powder coat finish to match rack color, unless otherwise noted
2. Manufacturers
   a. Middle Atlantic Products SB Series.
   b. Atlas Sound S19 Series.
   c. BGW Systems Inc. Flanged Steel Blank Panels
   d. Dukane
   e. Elkay
   f. Lowell Series L3
   g. Zero ZP112000 Series.
   h. Hubbell
   i. or equal.

H. Vent Panels:
1. Construction

a. 20 gauge minimum cold rolled steel
b. 1/8" minimum holes, at least 70% open total panel cross-section.
c. Powder coat finish to match rack color, unless otherwise noted

2. Manufacturers
a. Atlas Sound SVP Series.
b. BGW Systems Inc. Perforated Vent Panels
c. House of Metal Enclosures (HOME) Series PRP.
d. Lowell Series L5
e. Middle Atlantic Products VT Series.
f. Zero.
g. or equal.

I. Drawers
1. Construction
a. 16 gauge minimum cold rolled steel
b. Powder coat finish to match rack color, unless otherwise noted
c. Suitable for mounting from face of 4 post rack
d. At least 14-1/2" deep.
e. Full extension ball bearing slides with trigger release disconnect.
f. Rated for at least 100 pound load.
g. Flush handle does not protrude from drawer face.
h. Provide key lock where indicated.
2. Manufacturers
a. BGW Systems Inc. Rack Mount Drawer Systems.
b. Middle Atlantic Heavy Duty D or TD series.
c. Atlas Sound SD*-165FP Series.
d. Elkay SSD Series.
e. or equal.

J. Vertical Lacer Strips
1. 44RU high vertical steel strips with points for attachment of velco cable ties at at least 6” o.c.
2. Manufacturers:
a. Middle Atlantic LACE-44LP
b. APW
c. or equal.

K. Horizontal Lacer Bars
1. EIA 19” Width steel strips or bars suitable to provide support to large cable dressed horizontally through racks
2. Size to suit load and mounting width.
3. Manufacturers:
a. Middle Atlantic LBP-1R4, LBP-1.5 and LBP-1S.
b. APW
c. or equal.

L. Seismic Hold-down Equipment Straps
1. Drawing Reference: None - Provide as required to secure equipment that can not be screw fastened to mounting shelves.
2. Manufacturers:

a. BGW Systems
b. Everest Electronic Equipment Lock Down Kit
c. Ergotron
d. Chatsworth Products
e. Middle Atlantic Products
f. Q-Safety, Inc.
g. or equal.

PART 3 - EXECUTION

1.1 MOUNTING

A. Unless otherwise noted, all floor supported equipment racks shall be bolted to the structure in accordance with the requirements of the CBC, the UBC and the contractors approved structural engineering submittal demonstrating the method to be used to conform to these requirements.

B. Rows of identical racks shall be bolted together, in addition to being bolted to the floor,and bonded to form a single electrical ground plane.

C. Wall mounted equipment racks and cabinets shall similarly be bolted to structural members in accordance with the requirements of the CBC, the UBC and the contractors approved structural engineering submittal demonstrating the method to be used to conform to these requirements.

D. Unless otherwise noted, ceiling mounted projectors in inmate accessible areas shall be installed with enclosure as specified in Part 2.

2.1 EQUIPMENT ENCLOSURE (RACK) AND EQUIPMENT BACKBOARD FABRICATION

A. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.

B. Provide permanent labels for all equipment and devices.

C. Floor racks to be bolted floor unless otherwise indicated.

D. Access shall not require demounting or de-energizing of equipment. Install access covers, hinged panels, or pull-out drawers to insure complete access to terminals and interior components.

E. Provide a permanent label on the front of each equipment rack including the rack designation, and the circuit breaker number and associated electrical distribution panel designation servicing same.

F. Where wiring of mixed types are called for on the plans, maintain separation of wiring classifications as specified in the individual sections of the AudioVisual Work. Separately dress, route and land microphone, audio line level and data cables and related on the right side of the equipment enclosure, as viewed from the rear; dress, route, and land loudspeaker level, data and control cables on the left side of the equipment enclosure, as viewed from the rear.

G. Provide vertical wire management of cabling within the rack independent of the adjustable EIA mounting rails. Vertical wiring management provided by the contractor within the rack shall not prevent such rails from being moved as required by the Owner.

H. Dress and support cabling at a minimum of 24 inch on center.

I. Access shall not require demounting or de-energizing of equipment or cabling. Install access covers, hinged panels, or pull-out drawers to insure complete access to terminals and interior components.

J. Fasten removable covers containing any wired component with a continuous hinge along one side, with associated wiring secured and dressed to provide an adequate service loop. Provide an appropriate stop locks to hold all hinged panels and drawers in a serviceable position.

K. Provide permanent labels for all equipment and devices. Where possible, fasten such labels to the rack frame or to blank or vent panels which will remain in place when active equipment is removed for possible service.

L. At audio and video jackfields, provide service loop to permit removal of jackfields from rack sufficient to conveniently access all jack contacts for routine cleaning and maintenance. Organize the service loop and harness such that reasonable reconnection of jacks and jack normals is possible without cutting apart the harness.

M. Coordinate the design and execution of wire harnessing of multi-bay audio and video rack ensembles with conditions of delivery to installation locations at Project Site, and with the requirement herein for test of the completely wired system in the shop prior to delivery to the Project Site. Organize the wiring harnesses such that they will fold within one shippable unit without risk of damage, or provide polarized multipin connectors and related interconnect systems as specified elsewhere herein.

3.1 SIGNAL GROUNDING & BONDING PROCEDURES

A. Comply with National Electrical Code and the California Electric Code. Bond equipment racks to ground in accordance with the California Electric Code and ANSI/ EIA/ TIA 607 and Section 27 41 01 – Grounding and Bonding for Audiovisual Systems.

B. Unless otherwise noted maintain a unipoint ground scheme.

C. Equipment enclosures shall not be permitted to touch each other unless bolted together and electrically bonded.

END OF SECTION 27 41 08

SECTION 27 41 09 - AUDIOVISUAL CABLE MANAGEMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Section includes provision of cable management for cabling installed under the work of this Project as well as for Owner furnished patch cords at equipment racks

B. Scope includes:
   1. Innerduct
   2. Cable End Spillway

C. Backboard Cable Management

D. Patch Panel Cable Management at racks and cabinets

2.1 RELATED WORK IN OTHER SECTIONS

1. Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems
2. Section 27 41 07 – Identification for Audiovisual Systems
3. Section 27 41 08 – Audiovisual Cabinets, Racks, Frames and Enclosures

3.1 REFERENCES

A. American Society For Testing and Materials (ASTM)
   1. ASTM D2239-03 Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter

B. Underwriters Laboratories (UL)
   1. UL 910 Test for Flame-Propagation and Smoke-Density Values for Electrical and Optical-Fiber Cables used in Spaces Transporting Environmental Air (Nov. 1998)

4.1 SUBMITTALS

A. Conform with the requirements of Section 27 41 00 - Common Work Results for Audiovisual Systems.

5.1 DELIVERY, STORAGE AND HANDLING

A. Procedures: In accordance with Section Section 01 11 00 - Summary of Work.

PART 2 - PRODUCTS

1.1 INNERDUCT

A. Innerduct, Single Chamber
   1. Drawing and spec reference(s):
      a. ID*, Innerduct ("*" denotes cross sectional area of innerduct referenced to standard conduit trade size).
      b. IDP*, Innerduct, Plenum ("*" denotes cross sectional area of innerduct referenced to standard conduit trade size).
   2. Construction:

a. Selected product suitable for:
   i. underground installation in ductbank,
   ii. plenum (IDP)
   iii. exposed, in interior utility rooms where indicated.
b. High density polyethylene.
c. Ribbed or similar exterior construction to resist crushing surface to promote fiber cable installation.
d. Provides an interior chamber with a capacity equal to a trade size conduit referenced above.

3. Approvals:
   a. ASTM D2239(1985) Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
   b. IDP - UL Standard Test Method 2024 of UL 910.
4. Manufacturers, ID in underground ductbanks:
   a. Carlon Optic-Gard/PE.
   b. Arnco.
   c. Vikimatic.
   d. or equal.
5. Manufacturers, ID in interior, non-plenum applications:
   a. Carlon Optic-Gard/PVC.
   b. Arnco.
   c. Vikimatic.
   d. or equal.
6. Manufacturers, IDP:
   a. Carlon Plenum-Gard.
   b. Arnco.
   c. Vikimatic.
   d. or equal.

B. Innerduct, Multi-Chamber:
1. Drawing and spec reference: #ID*, Innerduct ("#" denotes number of chambers, "*" denotes cross sectional area of each chamber referenced to standard conduit trade size).
2. Construction:
   a. Multi-Chamber Innerduct shall be installed within an outer diameter CRSC or PVC Conduit per manufacturer's recommendation, and as described elsewhere herein.
   b. Shall provide independent interior chambers each with a capacity equal to a trade size conduit referenced above.
3. Approvals:
   a. ASTM D2239(1985) Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
4. Manufacturers, MultiChamber Innerduct:
   a. AMP OptiDuct (Design Basis) Provide in combinations to meet scheduled requirement.
      i. 3ID1 - Provide one (1) Three Cell innerduct in one-half of a 4" diameter PVC conduit. Each cell to have 1” cross-sectional area.
      ii. 1ID3 - Provide one (1) Single Cell innerduct in one-half of a 4" diameter PVC conduit, with 3" cross-sectional area.

iii. 2ID1.25 - Provide one (1) Two cell innerduct in one-half of a 4" diameter PVC conduit. Each cell to have 1.25" cross-sectional area.

b. Carlon Multi-Gard
c. North Supply Multi-Guard Multi-Cell Conduit.
d. Tamaqua.
e. or equal

5. Manufacturers - Independent InnerDuct runs in overall PVC conduit - Multiple runs of single chamber inner duct may be provided in lieu of single, multiple chamber innerduct provided above. Contractor bears burden of selected innerduct quantity to provide an exact match of cross-sectional area of each chamber of multi-chamber assembly and to re-size overall PVC conduit to accommodate this use.
   a. Carlon.
   b. American Plastics
   c. Vikimatic
   d. Or equal
6. Manufacturers, for direct burial or boring:
   a. Tamaqua
   b. Carlon
   c. Or equal

C. Innerduct, UV Rated
   1. Drawing Reference: ID, UV Rated*, where"*" denotes cross sectional area of each chamber referenced to standard conduit trade size).
   2. Approvals:
      a. ASTM D2239(1985) Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
   3. Construction.
      a. Listed for UV exposure.
   4. Manufacturers:
      a. Tamaqua Plus II Series Telecom Duct.
      b. Allwire Black AllDuct.
      c. or equal.

D. Woven Mesh Innerduct
   1. Drawing Reference: MID, WMID
   2. Features/Functions
      a. Three inch wide woven mesh assembly contains at least three continuous pullable sleeves, each can accommodate a cable of at least 1” diameter.
      b. Systems providing fewer than 3 integrally woven sleeves per WMID assembly not acceptable.
      c. Includes color coded pull tape in each sleeve.
      d. Pre-Lubricated for cable pulling
      e. Non-Hydroscopic
      f. 2500 Pound Tensile Strength
      g. 480 degree F melting point.
      h. At least 5 years prior field use including at least 25 million feet of product in use.
      i. Provide plenum rated assembly at plenum locations as defined by the California Electric Code.
   3. Manufacturers:
      a. Maxcell/TVC 3” 3-cell in three unique colors per duct.

b. or equal (No known equal with identical 3 sleeves woven into a single assembly nor equal industry usage).

2.1 CONDUIT CABLE MANAGEMENT

A. Conduit End Waterfall Spillway
1. Drawing Reference: CEW
2. Features/Functions
a. Spillway fastens to end of EMT conduit, provides radius sweep, open on top, solid from below
b. Maintains proper bend radii for fiber/cable
c. Provides tie points for fire pillow retention
d. Supports up to 100 lbs. of hanging fiber/cable
e. Clamp for securing to EMT
f. Self-fastening tie down system for supporting cabling
3. Construction:
a. Fire Retardant ABS
4. Manufacturers:
a. Bejed BJ-2049 Spillway.
b. or equal (no known equal).

PART 3 - EXECUTION

1.1 INNERDUCT INSTALLATION

A. Schedule of Application
1. At plenum tray conditions, provide IDP.
2. At 4” and larger interior conduits, provide WMID. Provide plenum rated WMID at plenum ceiling conditions.

2.1 CONDUIT END WATERFALL

A. Fasten securely to conduit end wherever cabling will exit conduit 18" or more above the cable tray to prevent damage due to cabling due to weight of cable bearing on a conduit end.

B. Secure cabling with integral cable restraint system.

END OF SECTION 27 41 09

SECTION 27 41 16 - INTEGRATED AUDIOVISUAL SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide all labor, materials, transportation and equipment to complete the furnishing, installation, assembly, set up, and testing of the Sound and Audiovisual System work indicated on the Criteria Documents and specified herein. Notwithstanding any detailed information in this Section, provide complete, working systems.

B. Design, engineer and provide complete, all means of support, suspension, attachment, fastening, bracing, and restraint (hereinafter "support") of the Work of this Section. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction.

2.1 AUDIO-VISUAL PRESENTATION SYSTEM FUNCTIONS

A. Provide the following, in addition to work shown by the Criteria Documents and specified in Parts 2 and 3 below:

B. Loudspeaker Processing, typical
   1. Program audio content to output through flat panel or overhead loudspeakers.

C. Equipment Racks, typical
   1. Provide blank plates at all unused openings.
   2. Provide fans as required to keep the interior of each equipment rack at a temperature of at least 5-10 degrees cooler than equipment manufacturer's recommended operating temperature.
      a. Fans to not emit more noise than 30 dB.

D. Controls Systems, typical: The Contractor is to meet with the Owner's Representative to review the following and determine specific requirements prior to system programming:
   1. General Programming Requirements that the Contractor will need to conform with include the following:
      a. Organize user interface in terms of integrated scenes (“Project Computer Video”). It is not acceptable to expect the user to individually have to select screen lower, projector on, input select, dim lights, input select and similar. A single button should achieve all of these functions. A present one or more sub-menus providing the operator and/or instructor with relevant options related to the scene (i.e. Transport control, level set)
      b. Touchpanel systems: A single button should provide the means of returning the user to the master menu screen, and secondary “back” button to return to previous menu screen.
      c. Provide passcode authorization to access touchpanel functions as directed by Owner's Representative
      d. Review all push button and touchpanel button nomenclature with Owner's Representative prior to system programming.
   2. Minimum Control Functions (as applicable per space):

a. Independent presentation source selection
    i. Automation of system on with audio and video components
b. Audio-only mode
    i. Automation of system on with audio components
c. Independent program and microphone volume and mute control
d. Video mute
e. Source device transport controls
f. Lighting level and shade adjustments
g. Shutdown, with confirmation screen
h. Advanced Mode Features
    i. Independent source selections for spaces with multiple displays
    ii. Combine/Un-Combine Room Audio
    iii. Projection screen up/down control
    iv. Independent projector/display on/off control

3.1 REFERENCE STANDARDS

A. Conform to the applicable portions of the current standards published by these organizations:

1. SMPTE Society of Motion Picture and Television Engineers.
2. NAB National Association of Broadcasters.
3. EIA Electrical Industries Association of America.
4. UL Underwriters Laboratories.
5. AES Audio Engineering Society.
6. NEC National Electrical Code.
7. UBC Uniform Building Code.
8. NFPA National Fire Protection Association.
9. EIAJ Electrical Industries Association of Japan.
10. IEC International Electrotechnical Commission.
11. FCC Federal Communications Commission.
12. NTC Network Transmission Committee of the Video Transmission
    a) Engineering Advisory Committee.
13. NCTA National Cable Television Association.
14. BTSC Broadcast Television Stereo Committee.
15. TASO Television Allocation Study Organization.

B. Conform additionally to the following specific standards:

1. American National Standards Institute (ANSI)
    a. ANSI S1.4-1983 (R2001) American National Standard Specification for Sound Level Meters
    b. ANSI S1.11-1986 (R2001) American National Standard Specification for Octave-Band and Fractional Octave-Band Analog and Digital Filters
    c. ANSI S1.42-1986 (R2001) American National Standard Design Response of Weighting Networks for Acoustical Measurements
    d. ANSI IT 7.214-89 Audio-visual Systems - Front Projection Screens (Tripod/Free-Standing) - Methods for Testing and Reporting Performance Characteristics.
2. Audio Engineering Society Incorporated (AES)
    a. AES2-1984 (r1997) AES Recommended Practice Specification of Loudspeaker Components Used in Professional Audio and Sound Reinforcement

b. AES5-1998 (Revision of AES5-1984) AER recommended practice for professional digital audio – Preferred sampling frequencies for applications employing pulse-code modulation
c. AES14-1992 (r1998) AES standard for professional audio equipment – Application of connectors, part 1, XLR-type polarity and gender
d. AES20-1996 AES recommended practice for professional audio – Subjective evaluation of loudspeakers
e. AES26-2001 Revision of AES26-1995 AES recommended practice for professional audio interconnections – Conservation of the polarity of audio signals
f. AES-R2-1998 AES project report for articles on professional audio and for equipment specifications – Notations for expressing levels

3. Electronic Industries Association of America (EIA)
   a. EIA-160 Sound Systems
   b. EIA-310-E Racks, Panels and Associated Equipment
   c. EIA-101-A Amplifiers for Sound Equipment
   d. SE-103 Speakers for Sound Equipment
   e. SE-104 Engineering Specifications for Amplifiers for Sound Equipment
4. International Electrotechnical Commission (IEC)
   a. IEC 268-3 (1988) Sound system equipment – Part 3: Amplifiers
   b. IEC 268-5 (1989) Sound system equipment – Part 5: Loudspeakers
   c. IEC 268-12 (1987) Sound system equipment – Part 12: Application of Connectors for Broadcast and Similar Use
   d. IEC 651 (1979) Sound level meters
5. International Organization for Standardization (ISO)
   a. ISO 1996-1 Acoustics – Description and measurement of environmental noise – Part 1:Basic quantities and – Composite Analog Video Signal – NTSC for Studio Applications
6. Federal Specifications (FS)
   a. GG-S-00172D Screen, Projection. Federal Supply Classification (FSC) 670.
7. Federal Standards (Fed-Std)
   a. 191A Textile Test Methods.
      i. 5760 Mildew Resistance of Textile Materials; Mixed Culture Method.
      ii. 5903.1 Flame Resistance of Cloth; Vertical.
8. NFPA
   a. 255 Method of Testing Surface Burning Characteristics of Building Materials.
   b. 701 Methods of Fire Tests for Flame-Resistant Textiles and Films.
9. Society of Motion Picture Engineers (SMPTE).
   a. SMPTE 196M-86 Motion Picture - Screen Luminance and Viewing Conditions - Indoor Theater Projection Guide.
   b. SMPTE 202M-1998 Motion Pictures – B Chain Electroacoustic Response – Dubbing Theaters, Review Rooms and Indoor Theaters
   c. SMPTE RP167-1995 Alignment of NTSC Color Picture Monitors
   d. SMPTE EG1-1990 Alignment Color Bar Test Signal for Television Picture Monitors
   e. SMPTE EG27-1994 Supplemental Information for ANSI/SMPTE 170M and Background on the Development of NTSC Color Standards (R1999)

f. RP 94 Recommended Practice for Gain Determination of Front Projection Screens.
g. SMPTE RP 95 Recommended Practice for Installation of Gain Screens.
h. SMPTE RP 98 Recommended Practice for Measurement of Screen Luminance in Theatres.

10. Underwriters Laboratories Incorporated (UL)
    a. UL 813 Commercial Audio Equipment 1996
    b. UL 1419 Professional Video and Audio Equipment 1997
    c. UL 1492 Audio-Video products and Accessories 1996
    d. UL 6500 Audio/Video and Musical Instrument Apparatus for Household, Commercial and Similar General Use 1999

4.1 RELATED WORK IN OTHER SECTIONS

A. Division 26 - Power for all equipment

B. Section 27 41 01 – Grounding and Bonding for Audiovisual Systems

C. Section 27 41 02 – Hangers and Supports for Audiovisual Systems

D. Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems
   1. Raceway system for work of this Project, including floorboxes.

E. Section 27 41 06 – Noise and Vibration Controls for Audiovisual Systems
   1. Outlet box pads for the work of this Project.

F. Section 27 41 07 – Identification for Audiovisual Systems

G. Section 27 41 08 – Audiovisual Cabinets, Racks, Frames
   1. Floor Mounted and Casework Equipment Racks for the work of this Section.

H. Section 27 41 09 – Audiovisual Cable Management

5.1 QUALITY ASSURANCE

A. Test Equipment - Refer to 27 41 00:
   1. Sound Systems:
      a. Wide band oscilloscope, 50 MHz, analog. (Example: Tektronix TAS-250 or 2212).
      b. True RMS audio digital volt-ohm-millimeter (Example: Fluke 8060A).
      c. Integrated audio test set (Example: Audio Precision or Neutrik A1 or A2 System).
      d. Acoustic polarity tester (Example: BSS Audio Ltd. Phasecheck System AR 130).
      e. Pink Noise generator (Example: Ivie IE-20B).
      f. Calibrated microphone and pre-amplifier assembly (Example: Ivie IE-2P preamplifier/power supply with Ivie/ACCO, Bruel & Kjaer, or Larson-Davis microphone capsule).
      g. Real time audio spectrum analyzer, one-third octave (Example: Ivie IE-30A or JBL Smaart system).
      h. Frequency/time audio analyzer (Example: Crown TEF system or JBL Smaart system).

B. Baseband Video Systems:
   1. Wide band oscilloscope, 50 MHz, analog. (Example: Tektronix TAS-250 or 2212).
   2. Analog composite test generator (Example: Tektronix TSG 170A or TSG 100 Opt. 01).
   3. Analog composite waveform/vector monitor (Example: Tektronix 1740A or WFM 90.)

C. RGBHV Wideband Component Analog Video Systems:
   1. Wide band oscilloscope, 200 MHz, analog. (Example: Tektronix TAS-485).
   2. RGBHV test generator (Example: Extron VTG 100).

D. Projection Systems:
   1. Luminance meter. (Example: Tektronix J17/J18 with J1803 8 degree luminance head.).
   2. Grey scale chart.
   3. Precision optical comparator. (Example: Phillips or Tektronix J17/J18 with J1810/J1820 chromaticity head.).

E. High-bandwidth Digital Content Protection (HDCP) check
   1. Quantum Data 882E HDMI-HDCP Compliance Test Tool

F. Any other items of equipment or materials required to demonstrate conformance with the Contract Documents.

6.1 SUBMITTALS

A. Conform with Section 27 41 00 - Common Work Results for Audiovisual Systems

7.1 CONFLICTS

A. Present any conflicts between codes, regulations, specifications and/or requirements at least thirty (30) days prior to the commencement of the scheduled work.

8.1 SYSTEM PERFORMANCE REQUIREMENTS, AUDIO-VISUAL SYSTEM

A. Using the listed test equipment, document that the installed systems meet or exceed the performance standards below.

B. Audio Playback and Sound Reinforcement Systems:
   1. Electrical Performance; Source Input to Power Amplifier Output:
      a. Frequency Response (Equalizer flat): +0.5 dB 30 Hz to 15 kHz.
      b. Total Harmonic Distortion (THD): Less than 0.5%, 30 Hz to 15 kHz, +4 dBm line level.
      c. Signal to Noise: At least 70 dB, 30 Hz to 15 kHz, referenced to input of +4 dBm.
      d. Crosstalk: At least -60 dB, 30 Hz to 15 kHz.
   2. Electro/Acoustic Performance:
      a. Uniformity of Coverage: ±4 dBA, 5 feet above the floor.
      b. Minimum Sound Pressure Level at Center of Target - at indicated aiming point, down centerline of device. 83 dBA, 5 feet above the floor.
   3. Equipment: Specified individually.
   4. Audio Signal Path: Shall not degrade performance of connected equipment.

C. Video Systems:
1. Video Signal System: NTSC to EIA RS-170A, except as noted.
2. Video Signal Path: To EIA RS-250B short haul where equalized, otherwise to the performance limit of the specified video cable.

D. RGBS Video Systems:
1. Video Signal: Pass 300 Hz to 120 MHz sine wave from any input to any output with losses of less than 1 dB over cable loss at cable manufacturer specified performance points without amplification.

E. Projection and Display Systems:
1. Consistent with performance of specified displays, projectors and screens.
2. Brightness, convergence per ANSI standard procedures for device.

F. High-bandwidth Digital Content Protection (HDCP) check
1. At spaces with HDMI transmission:
a. Run HDCP check to ensure all devices are HDCP compliant.
b. Test with sample source device with quantity of HDCP keys as required to operate by the system.

9.1 TRAINING

A. Conduct training on completed system at reasonable convenience of the Owner during normal business hours.

B. Operator Training: Sixteen (16) hours.

C. Initial Use Support: Provide standby trainer/system engineer during two (2) system uses, each not to exceed four (4) hours each of additional training.

10.1 DEFINITIONS

A. Definitions of Terms: The following definitions and conditions apply to each of the respective parameters and the measurements of those parameters, unless specifically stated otherwise:
1. Frequency Response: The minimum acceptable frequency band over which the amplitude response is within 3 dB (or any specified range), or the specified limits of the response relative to the reference frequency (1 kHz for audio, 1.0 MHz for video) under design load conditions, at any operating level up to and including the specified maximum output while fully in compliance with all other performance specifications.
2. Maximum Output Level: The minimum acceptable maximum signal output level (voltage, current or power) attained under design load conditions attained while fully in compliance with all other performance specifications.
3. Harmonic Distortion: The maximum acceptable harmonic distortion measured at any operating level, up to and including the specified maximum output, with an applied sine wave signal of any frequency in the range of the specified frequency response.
4. Audio Intermodulation Distortion: The maximum acceptable intermodulation distortion resulting from the introduction of 60 Hz and 7 kHz signals in a ratio of 4:1 under design load conditions at any operating level up to and including the specified maximum output level.
5. Signal to Noise Ratio: The minimum acceptable ratio of signal to noise levels derived from broadband measurements under design load at maximum output over the entire range of the specified frequency response.

6. Clipping Level: The minimum acceptable maximum level of signal applied to the device under design load conditions while fully in compliance with all other performance specifications.
7. Sensitivity: The maximum acceptable level of input signal applied to the device that is necessary to provide the maximum output under design load conditions.
8. Design Load: The load (in ohms) specified by usage of the particular device input or output.
9. Composite Triple Beat Ratio: The ratio of visual carrier level to composite third order distortion products.
10. Cross Modulation Ratio: The ratio of visual carrier level to coherent spurious signal level (i.e. intermodulation products).
11. Carrier to Noise Ratio: The ratio of visual carrier to noise levels derived from broadband measurements under design load at maximum output over the entire range of the specified frequency response.

B. Signal Levels: The following voltage levels shall be considered the standard operating levels for the particular circuitry, unless specifically noted otherwise (0.775 Volt = 0 dBu = 0 dbm for a 600 ohms terminated circuit):

1. Microphone Circuits: -30 dBu or less.
2. Audio Line Level Circuits: -30 dBu to +24 dBu; equivalent to -30 dBm to +24 dBm for a 600 ohms terminated circuit.
3. Loudspeaker Level Circuits: More than +24 dBu.
4. Video Line Level Circuits: 1.0 Volt, peak to peak composite signal.
5. Radio Frequency (RF), Television (CATV) Circuits: +6 to +72 dBmV (0 dBmV = 1,000 microvolts).

C. Characteristic Impedances: The following operating impedances shall be considered to be the standard operating impedances for the particular circuitry, unless specifically noted otherwise:

1. Microphone Circuits: 50-250 ohms source, 150-1500 ohms terminating, electrostatically and electromagnetically balanced to ground.
2. Audio Line Level Circuits: 600 ohms maximum source, 600 ohms minimum terminating, line to line, electrostatically and electromagnetically balanced to ground.
3. Video Line Level Circuits: 75 ohms maximum source, 75 ohms minimum terminating to shield and signal ground, with Vertical Standing Wave Ratio (VSWR) not to exceed 1.2.
4. Radio Frequency (RF) Television Circuits: 75 ohms nominal to shield and signal ground, with Vertical Standing Wave Ratio (VSWR) not to exceed 1.2.

11.1 SOFTWARE LICENSING

A. Provide licensing for project specific software programming at programmable devices.

B. Provide licensing and original software copies for each device provided under Work of this Section that uses software for operation, configuration or control.

1. Provide licensing for required workstation operating systems, and required third party software.
2. For the Control System, provide a complete copy of the source code, including the device interface driver code modules.

C. Upgrade each software package to the release in effect at the end of the Warranty Period.

PART 2 - PRODUCTS

2.1 ASSISTIVE LISTENING SYSTEM (ALS):

A. General

1. Provide Radio Frequency Type, Frequency Modulated
2. 72 MHz Assistive Listening band.
3. Quantity of Devices: per TA0.1

B. ALS Transmitter

1. Drawing Symbol: ALS, ALS TX
2. Features
   a. Balanced bridging line input.
   b. Rack mounted.
   c. Connector for remote-mounted antenna.
   d. Selectable transmitting frequency.
3. Manufacturer
   a. Listen Technologies LT-800-072 Stationary Transmitter with LA-326 Rack Mounting Kit
   b. Phonic Ear
   c. Williams Sound Corp
   d. Or equal

C. ALS Remote Transmitting Antenna

1. Drawing Symbol: A
2. Features
   a. Antenna system with mounting hardware, matching specified ALS TX.
3. Manufacturer
   a. Listen Technologies LA-123
   b. Phonic Ear
   c. Williams Sound Corp
   d. Or equal

D. Receivers and Accessories

1. Receiver
   a. Battery powered, rechargeable.
   b. Volume control.
   c. Receptacle for earphone/accessory.
   d. Rechargeable battery.
   e. Tuneable to channel in use by the user.
   f. Quantity: As Scheduled on the plans
2. Earphone
   a. Ear hung, not inserted in the ear canal.

b. Hearing-Aid Compatible - For hearing-aid compatible receivers:
c. Wireless neck loop compatible with “T” coil hearing aids.
d. Built-in antenna
e. Operates with provided receivers

3. Manufacturer
   a. Listen Technologies LR-500-072-0-M-C, LA-164 earphones, and LA-166 neck loops
   b. Phonic Ear
   c. Williams Sound Corp
   d. Or equal

E. Battery Charger/Storage/Carry Case

1. Features
   a. Store and charge up to 16 Receivers and related accessories.
   b. Cover, latches and carrying handles.
   c. Removable lid.
2. Quantity: To simultaneously recharge each received as scheduled on the plans
3. Manufacturer
   a. Listen Technologies LA-325
   b. Phonic Ear
   c. Williams Sound Corp

2.2 CONTROL SYSTEM AND RELATED

A. General

1. Products provide under this Section shall be made by manufacturers regularly engaged in the production of programmable commercial audio-visual control systems. Such manufacturers shall have at least 5 years prior production experience in the manufacture of such goods.
2. Provide control system to perform functions described herein.
   a. System to be field programmable.
   b. Provide programming allowance to implement system as required to provide the functionality indicated herein and as defined by the Owner during design and construction phase meetings.
3. In addition to providing programming to meet the requirements outlined in part one of this specification section and as outlined by user-group during the preconstruction programming meetings, contractor to provide an allowance of up to $6000 to implement new functions in the audiovisual systems programming identified by the Owner after the substantial completion of this project. Allowance may not be expended by the Contractor in completing the base bid scope of work including warranty defect items.

B. Control Button Panel

1. Reference: CBP
2. Features:
   a. Wall mount push-button control panel

b. Programmable buttons to accommodate control of a device's:
   i. Power On and Off
   ii. Volume Up and Down
   iii. Source Select Toggle
      1. Multiple pushes of a single button switches between controlled device's input sources
c. Communication: RS232
d. 1-gang, Decora wall-mountable

3. Manufacturer:
   a. SP Controls PixiePlus PXE-DCM+
   b. Crestron BPC-8
   c. RTI
   d. or equal

2.3 VIDEO SOURCE AND TERMINAL EQUIPMENT

A. Multimedia Receiver w/ Scaler

1. Drawing Reference: DMRX

2. Features/Functions

   a. 4K60 4:4:4 HDR HDMI, HDR and HDCP2.2 compliant

   b. Deep Color

   c. 3D

   d. DVI

   e. Serial RS232 Communications

   f. Infrared Control

   g. VESA stream compression

   h. HDCP 2.2

   i. CEC

   j. EDID format management

   k. Enclosure

      i. Metal, black finish, vented sides and front

      ii. 8” x 8” x 2”

   l. Built-in video scaler: HD video scaler, motion-adaptive deinterlacer, interlacer, intelligent frame rate conversion, Deep Color support, 3D to 2D conversion, content-adaptive noise reduction

3. Manufacturers

a. Crestron DM-RMC-4KZ-100-C

b. Extron

c. Or equal

B. High Definition A/V Transmitter

1. Drawing Reference: DMTX

2. Functions/Features:

a. Provides HDMI, RGBHV and mini stereo audio inputs

b. Provides USB extension

c. Provides LAN connectivity

d. Transmits audio, video and control signaling to specified receiver over a single UTP6-4P cable.

e. HDCP compatible.

f. Can be remotely powered by specified control system.

g. Mounts to underside of table.

h. Nominal dimensions: 6.5” x 7” x 1.5”

3. Manufacturer

a. Crestron DM-TX-4KZ-202-C

b. Extron

c. Or equal

C. HDMI w/ Stereo Audio Input Plate

1. Reference: MP1
2. Features/Functions
   a. Inputs: HDMI
   b. Supports resolutions up to 2048x1080 @ 24Hz
   c. Analog-To-Digital Conversion 10-bit 165 MHz per each of 3 channels
   d. Communications
      i. Audio, video and control over a single UTP Cat 6 cable.
      ii. HDCP management, EDID format management, CEC
   e. USB Supports USB HID class devices
   f. Compatible with specified switcher.
   g. 2 gang, suitable for floor box and wall plate installations.
3. Manufacturers
   a. Crestron DM-TX-200-C-2G
   b. Or equal.

D. LCD Flat Panel 55”

1. Reference:FPNL55
2. Features:
    a. Aspect Ratio: 16 x 9.
    b. Optimal Resolution 1920 x 1080
    c. Edge-Lit LED
    d. Response Time 5ms
    e. Contrast Ratio 1000:1
    f. Viewing Angle 178 degrees
    g. Brightness 200-250 cd/m2
    h. USB in x 2.
    i. HDMI in x 2.
    j. Display Port
3. Manufacturer:
    a. Samsung s
    b. Or equal.

E. LCD Flat Panel 65”
1. Reference: FPNL65
2. Features:
    a. Aspect Ratio: 16 x 9.
    b. Optimal Resolution 1920 x 1080
    c. Edge-Lit LED
    d. Response Time 8ms
    e. Contrast Ratio 4000:1
    f. Viewing Angle 178 degrees
    g. Brightness 320-460 cd/m2
    h. OPS Form Factor IPTV Tuner Module with
        i. Format Decoding: H.264/AVC Main and high profile to level 4.1, MPEG-2.
        ii. IPTV RTP Streaming Protocol Support, IGMP v2/v3, Unicast/Muticast.
        iii. Network Protocol Support: TCP/IP, UDP/IP, IPv4, HTTP 1.1, DNSClient, DHCPClient.
        iv. Antenna Input: F-Type Connector.
        v. Channel Coverage: VHF: 2-13, UHF: 14-69, CATV 1-125, ATSC 2-69, Digital Cable 1-135.
    i. RS-232 in/out/pass-through.
    j. HDMI in x 2.
    k. Coax-in.
    l. Audio: Built-in Front-firing 10W speakers.
3. Manufacturer:
    a. NEC V652 with NEC MPD-DTi IPTV Tuner Module in OPS-Compliant Form-factor, tamper-proof fasteners and corrections-grade protective housing.
    b. Or equal.

F. Flat-Panel Display Wall Mount
1. Reference: None - provide at locations where wall mount of LCD* and FPNL* devices are indicated except as otherwise provided herein.
2. Functions:
    a. Can support the required LCD and Plasma Panels supplied by the work of this Project.

b. Holds rear of panel away from wall ~2" to permit A/V interface mounting behind display.
c. Permits display to be tilted in the vertical plane for optimum viewing as directed by the Owner's Representative.
d. Allows the complete mount and display assembly to not protrude more than 4" out from wall surface.
e. Designed to mount to 16", 20", 24" center stud systems
f. Panel can be securely fastened to mount using to prevent theft.
g. Where mounting fasteners are exposed during normal operations, secure mount with tamper-resistant fasteners.
h. Designed to accommodate panels from at least Pioneer, Panasonic, Sharp, Samsung, & LG Electronics
i. Heavy duty construction with steel components
j. UL or ETL listed
k. California OSHPD OPA (seismic restraint pre-approval). Installation to be accordance with OPA.

3. Manufacturers:
a. Chief Manufacturing, Inc. LTM Series, selected for display and mounting conditions, w/ tamper-proof fasteners and/or corrections-grade protective housing at population-accessible locations.
b. or equal.

2.4 SOUND CABLES AND RELATED

A. General
1. Provide cable with electrical conductors of soft drawn annealed copper, bare or tinned, solid or concentric stranded as applies, conductivity not less than 98 percent of pure copper.
2. Comply with applicable Code for insulation, jacket, marking and listing for applicable use.
a. Refer to California Electrical Code, Table 725-61. Cable Uses and Permitted Substitutions.
3. Manufacturer part number specified is for a Listed Type CM construction to indicate intended cable construction and quality.
a. Code requirements take precedence.
b. Provide type required by Code at no additional cost to the Owner.

B. Cable, Microphone and Line Level, General Purpose
1. Reference:(s): SP, 2A.
2. Description: Shielded, single twisted pair, with #20 AWG color coded stranded conductors and foil shield with drain wire.
3. Performance/Construction
a. Conductors AWG #20.
b. Conductors Stranding: 7 by 28.
c. D.C. Resistance Per 1000 feet 15 ohms maximum.
d. Shield: Aluminum polyester foil with #20 AWG stranded tinned copper drain wire.
e. Diameter 0.24 inch maximum.
4. Where 2A indicated, provide 2 each SP

5. Manufacturer
    a. Belden 8762
    b. West Penn.
    c. Or equal.

C. Cable, Microphone and Line Level, Miniature
1. Reference:: SP, 2A
2. Restriction: For use within fixed equipment racks only.
3. Description: Shielded, single twisted pair, with #22 AWG color coded stranded conductors and foil shield with drain wire.
4. Performance/Construction:
    a. Conductors AWG #22.
    b. Conductors Stranding: 7 by 30.
    c. D.C. Resistance Per 1000 feet: 20 ohms maximum.
    d. Shield: Aluminum polyester foil with #24 stranded tinned copper drain wire.
    e. Diameter 0.15 inch maximum.
5. Where 2A indicated, provide 2 each SP
6. Manufacturer
    a. Belden 8451, 9451, 1266A.
    b. Alpha.
    c. West Penn.
    d. Or equal.

D. Cable, Antenna, Assistive Listening System and Wireless Microphone System
1. Description
    a. Nominal 50 ohms (actual 51 or 52 ohms) coaxial cable.
2. Minimum 97 percent shield coverage.
3. Joint Army Navy (JAN) or Military (MIL) Construction
    a. RG-8/U to JAN-C-17A
    b. RG-8 A/U to MIL-C-17D
    c. RG-9/U to JAN-C-17A.
4. Manufacturer
    a. Belden 8237, 9251 or 8242.
    b. CommScope.
    c. Or equal.

E. Cable, Loudspeaker and D.C. Power
1. Reference:(s)
    a. #18TP
    b. #16TP
    c. #14TP
    d. #12TP
2. Description
    a. Twisted pair, jacketed, unshielded cables, #12, #14, #16, or #18, as shown on Criteria Documents.
3. Plenum rated where installed in open plenum return voids.
4. Performance/Construction
    a. Conductor, AWG: #12, #14, #16, and #18, as noted.
    b. Maximum diameter
        i. 0.384 inch (#12)

ii. 0.332 inch (#14)
iii. 0.256 inch (#16)
iv. 0.224 inch (#18).

5. Manufacturer
   a. Belden.
      i. #12TP, Belden 8477
      ii. #14TP, Belden 8473
      iii. #16TP, Belden 8471
      iv. #18TP, Belden 9740
      v. West Penn.
      vi. Or equal.

2.5 VIDEO CABLES, COPPER COAX AND RELATED

A. General
   1. Provide cable with electrical conductors of soft drawn annealed copper, bare or tinned, solid or concentric stranded as applies, conductivity not less than 98 percent of pure copper.
   2. Comply with applicable Code for insulation, jacket, marking and listing for applicable use.
      a. Refer to California Electrical Code, Table 725-61. Cable Uses and Permitted Substitutions.
      b. Manufacturer part number specified is for a Listed Type CM construction to indicate intended cable construction and quality.
   3. Code requirements take precedence.
      a. Provide type required by Code at no additional cost to the Owner.

B. Cable, Data Monitor Precision Video
   1. Plan Reference(s):
      a. D5
      b. 5DVideo
   2. Construction
      a. 5 miniature high resolution coax cables in an overall shielded overall jacket to transmit analog component video based on the Red-Green-Blue-Horizontal Sync-Vertical Sync (RGBHV) transmission method.
      b. Sub cables are color coded Red, Green, Blue, Black, Grey; or approved alternate color coding scheme.
      c. Jacket: Code approved equal for application.
      d. Overall five sub cable assembly diameter: 0.56" maximum in raceway applications.
      e. Center Conductor AWG: Twenty two (22) ga Silver Plated Copper.
      f. Insulation: Foamed Teflon.
      g. Shield:
         i. Each subcable is double shielded
         ii. Overall cable has 100% tape shield.
   3. Approval/Rating:
      a. UL: Recognized Type CL2P (Article 725 of NEC) for plenum application, riser rated elsewhere.
   4. Performance - each sub-cable:
      a. Resistance: 0.0162 ohms/ft nominal @ 20C

b. Impedance: 75 ohm nominal
c. Capacitance: 17.5 pf/ft nominal
d. Velocity of Propagation: 80% nominal
e. Time Delay: 1.19ns/ft nominal
f. Maximum Attenuation Per 100':
    i. 10 MHz: 0.8 dB/100 ft.
    ii. 50 MHz: 2.5 dB/100 ft.
    iii. 100 MHz: 3.5 dB/100 ft.
    iv. 200 MHz: 4.6 dB/100 ft.
    v. 300 MHz: 5.0 dB/100 ft.
    vi. 400 MHz: 7.2 dB/100 ft.
    vii. 1000 MHz: 14.6 dB/100 ft.

5. Manufacturers:
    a. Altinex CB5100PL in plenum spaces, riser rated elsewhere.
    b. Extron
    c. Belden
    d. Gepco.
    e. or equal.

C. HDMI/DVI Cabling
1. Reference: DVI/HDMI
2. Features/Functions
    a. The plans indicate the required distances for HDMI format transmission. Contractor to provide a transmission system appropriate to the indicated lengths. Contractor engineered solutions may consist of:
        i. Passive HDMI cabling, where the indicated length is within the service distance of such systems.
        ii. Copper HDMI cabling and active HMDI repeaters
        iii. Fiber Optic Cabling and HDMI transceivers.
    b. Contractor to select and provide the method of transmission appropriate to the length and operating parameters of the selected transmission system as defined by the manufacturers of the cabling systems, the repeaters and/or transceivers and the HDMI transmission standard as defined at www.hdmi.com.
3. Manufacturers, copper cabling and extenders:
    a. Extron
    b. Broadata
    c. Altinex
    d. Liberty Cable
    e. or equal.

2.6 CONTROL CABLING

A. General
1. Provide cable with electrical conductors of soft drawn annealed copper, bare or tinned, solid or concentric stranded as applies, conductivity not less than 98 percent of pure copper.
2. Comply with applicable Code for insulation, jacket, marking and listing for applicable use.
    a. Refer to California Electrical Code, Table 725-61. Cable Uses and Permitted Substitutions.

b. Manufacturer part number specified is for a Listed Type CM construction to indicate intended cable construction and quality.

3. Code requirements take precedence.
   a. Provide type required by Code at no additional cost to the Owner.

B. USB Cabling
1. Reference: USB
2. Features/Functions:
   a. Conforms with minimum USB 2.0 standard
   b. Provides USB input in a single gang wall plate
   c. Extends USB signal up to at least 200' or distance as required by project requirements.
3. Manufacturers:
   a. Extron
   b. Trulink
   c. or equal.

C. High Speed, TIA/TIA Category Cabling
1. Reference:** UTP6-4, where ** denotes cable count
2. Construction:
   a. Provide horizontal copper cable in accordance with:
      i. EIA ANSI/TIA/EIA-568-B.2
      ii. UL 444,
      iii. NEMA WC 66 (Performance Standard for Category 6 and Category 7 100 Ohm Shielded and Unshielded Twisted Pair)
      iv. ICEA S-90-661
   b. UTP (unshielded twisted pair),
   c. 100 ohm impedance
   d. Four each individually twisted pair, 22 or 24 AWG conductors,
      i. Color code
         1. Pair 1 White/Blue Blue
         2. Pair 2 White/Orange Orange
         3. Pair 3 White/Green Green
         4. Pair 4 White/Brown Brown
   e. No shield in the sheath.
   f. Jacket
      i. Thermoplastic jacket
      ii. Color: Blue unless otherwise indicated.
      iii. Cable imprinted with manufacturers name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) at regular intervals not to exceed 2 feet.
      iv. The word "FEET" or the abbreviation "FT" shall appear after each length marking.
      v. Provide communications general purpose (CM or CMG), communications plenum (CMP) or communications riser (CMR) rated cabling in accordance with NFPA 70.
      vi. Type CMP and CMR may be substituted for type CM or CMG and type CMP may be substituted for type CMR in accordance with NFPA 70.
3. Certification

a. Warrantied by the manufacturer to provide Category 6 performance when installed in accordance with applicable EIA/TIA standards and when terminated with the jacks supplied by the Contractor for this Project.

4. Performance
   a. Assembly electrically meets or exceeds EIA ANSI/TIA/EIA-568-B.2 Category 6 performance standards
5. Manufacturers:
   a. Berk-Tek LANmark-1000
   b. Belden/CDT
   c. Berk-Tek
   d. Commscope/Systimax
   e. Commscope/Uniprise
   f. General Cable
   g. Mohawk/CDT
   h. Superior/Essex
   i. or equal

D. High Speed, Category 6 Cabling, Plenum Rated
1. Reference:** UTP6-4P, where ** denotes cable count
2. 2.Construction:
   a. As for non-plenum, with fire retardant overall jacket construction.
   b. UL listed, NEC compliant for plenum installation.
   c. CSA Certified type PCC FT4 FT6.
3. Manufacturers
   a. As for non-plenum Cat. 6, plenum construction.

2.7 MISCELLANEOUS PRODUCTS

A. Audio and Control Connectors and Related:
1. Circular Audio Connector, Cord, 3 through 5 contacts, gold plated contacts, captive cable clamp strain relief, matte black chrome finish over nickel metal shell
   a. Neutrik C-Series, X-Series.
   b. Switchcraft.
   c. Or equal.
2. Circular Audio Connector, Panel mount, male and female devices to fit same panel cutout including fasteners, 3 through 5 contacts, gold plated contacts, matte black chrome finish over nickel metal shell, female receptacles locking type:
   a. Neutrik D Series Version L.
   b. Switchcraft
   c. Or equal.
3. Loudspeaker Connector, Panel mount, female devices to fit same panel cutout including fasteners as other panel mount receptacles, 4 contacts, matte black finish Polyamid/graphite shell, female receptacles locking type. UL Component Recognized:
   a. Neutrik NL4MP.
   b. Switchcraft
   c. Or equal.

B. Video Connectors and Related
1. Video Connector, BNC type, 75 ohms, Panel, recessed, flush with panel face, insulated from panel, double female

a. Manufacturer
    i. Canare BCJ-JRU.
    ii. Tec Nec
    iii. Liberty Wire & Cable/Panelcraft
    iv. or equal.

2. Video Connector, BNC type, 75 ohms, Panel, recessed, flush with panel face, insulated from panel, single female to solder pin
    a. Manufacturer
        i. Canare BCJ-RU.
        ii. Tec Nec
        iii. Liberty Wire & Cable/Panelcraft
        iv. or equal.
3. Video connector, BNC type, 75 ohms, cord, crimp applied. Coordinate with cable.
    a. Manufacturer
        i. Amp.
        ii. Amphenol.
        iii. Augat/LRC Products
        iv. Canare.
        v. Kings.
        vi. Liberty Wire & Cable/Panelcraft
        vii. RFI/Celltronics.
        viii. Trompeter.
        ix. or equal.
4. Video Precision 75 ohms Terminator, BNC:
    a. Manufacturer
        i. Canare BCP-TA
        ii. Trompeter TNAI-1-75.
        iii. or equal.
5. DB15 Connectors
    a. Reference HD15
    b. Manufacturer
        i. Amp.
        ii. Amphenol.
        iii. Canare.
        iv. Kings.
        v. Liberty Wire & Cable/Panelcraft
        vi. RFI/Celltronics.
        vii. or equal.

C. Custom Facility Panels and Rackmount Auxiliary Panels
1. Reference(s):
    a. MP* - Media Panels, where * is a number indicating the panel type.
    b. FP* - Facility Panels, where * is a number indicating the panel type.
    c. Aux Panel
2. Provide connector types and plate finish as shown. If none shown, provide:
    a. Rack mount panels:
        i. 16 gauge minimum, cold rolled steel or 1/8" minimum aluminum, finish to match rack finish.

ii. At contractor's option, fabricate using rack mount panels with Decora/Decorator openings and steel plates with specified connectors. Match insert color to panel color provided. Refer to Rack Panel with Decora Openings below.

b. Wall Panels: 16 gauge minimum cold rolled steel, finish to match surrounding electrical and other low voltage panels.

3. Manufacturers, Rack Mount Panels
   a. BGW Systems Inc.
   b. Conquest
   c. Middle Atlantic Products Universal Connector Panel
   d. Middle Atlantic Products Universal Connector Panel, Modular Custom Connector Panel Systems
   e. ProCo Sound, Inc.
   f. Ultimate Plates and Panels
   g. or equal.
4. Manufacturers, Wall Panels
   a. PanelCrafters Division of Liberty Wire & Cable, Classic Series
   b. FSR
   c. RCI Systems
   d. Middle Atlantic
   e. Ultimate Plates and Panels
   f. Whirlwind
   g. Or equal.
5. Manufacturers, Decora/Decorator connector inserts:
   a. Connector Plates by Radio Design Labs. Provide specified connectors rear mounted in D-Blank insert for connector combinations not available from RDL.
   b. Grey by Pathway Connectivity Solutions. Provide specified connectors rear mounted in 5100 insert for connector combinations not available from Pathway Connectivity Solutions.
   c. or equal.
6. Manufacturers, Rack Mount Decora Panel Openings
   a. Lowell Manufacturing LD8-RMP with Lowell DBB-4 blank Decora plates at openings not fitted with equipment.
   b. Middle Atlantic DECP Series
   c. or equal.

2.8 POWER DISTRIBUTION EQUIPMENT:

A. Power Panel:
1. Reference: POWER.
2. Functions/Features:
   a. Front face of panel shall provide two electrical power outlets and a switch. An indicator lamp shall show the presence of AC power when on. The front face of panel shall have a black finish. The rear face shall provide a minimum of at least four receptacles. The panel shall be racked mounted in a maximum of two rack units. The panel shall be Code approved and UL rated for this application.
3. Manufacturers:
   a. Hubbell MCCPSS19TS
   b. Geist SP124-1020

c. Or equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Perform the Work of this Section in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein.

B. Furnish and install (herein, "provide") all materials, devices, components, and equipment required for complete, operational systems.

3.2 PRECONSTRUCTION PROGRAMMING MEETING

A. Not less than 60 calendar days prior to the scheduled completion of the project, Contractor to initiate a request of the Owner's Representative to schedule an Audiovisual Systems programming meeting.

1. The Owner's Representative will schedule the meeting at the reasonable mutual convenience of the Contractor and the Owner's technical systems representatives.
2. The purpose of the meeting is for the Owner's Representative to indicate to the contractor how the programmable interfaces of the audiovisual systems are to be implemented, including:
   a. Button assignments and labels for physical button panels
   b. Touchscreen menu hierarchy, scene arrangement, button and background colors, text size, logos
   c. When multiple panels control the same systems, which screens appear on which touchpanels.
   d. Whether authorization codes or passwords will be required to access special functions/menus.
3. Contractor to document the information received from the Owner's Representatives at this meeting.
4. Contractor to submit the documentation of the requirements meeting, along with their proposed response to the Owner's programming requirements in the form of screen shots and system menu flow diagrams as required under Section 27 41 00 – Common Work Results for Audiovisual Systems, 1.4 D Submittals.

3.3 WIRING CLASSIFICATION AND RELATED

A. Audio Signal Wiring Classification:

1. Type A-l: Microphone level wiring less than -30 dBμ, 20 Hz to 20 kHz.
2. Type A-2: Line level wiring -30 dBμ to +24 dBμ, 20 Hz to 20 kHz.
3. Type A-3: Loudspeaker level or circuit wiring greater than +24 dBμ, from 20 Hz to 20 kHz.

B. Video and Related Signal Wiring Classification:

1. Type V-1: Baseband and composite video wiring 1 volt peak-to-peak into 75 ohms, 0 to 10.0 MHz.
2. Type V-2: Synchronization and switching pulse wiring 4 volts peak-to-peak into 75 ohms, 15.62 to 15.75 kHz.
3. Type V-3: Color subcarrier wiring 0 to 4 volts peak-to-peak into 75 ohms, 3.57 to 4.43 MHz.

4. Type V-4: CATV system wiring 0.1 to 1000 uV peak-to-peak into 50 or 75 ohms, 47 to 890 MHz.

C. Control Signal Wiring Classifications:
1. Type C-1: DC control wiring 0 to 50 volts.
2. Type C-2: Synchronous control or data wiring 0 to 40 volts, peak-to-peak.
3. Type C-3: AC control wiring 0 to 48 volts, 60 Hz.

D. Additional Wiring Classifications:
1. Type M-1: DC power wiring 0 to 48 volts.
2. Type M-2: AC power wiring greater than 50 volts, 60 Hz.

E. Wiring Combinations:
1. Except as indicated herein, conduit, wireways and cable bundles shall contain only wiring of a single classification. The following combinations are acceptable in conduit, or cable harnesses. Additional acceptable combinations may be indicated on the Criteria Documents.
a. Types A-1, C-1, and M-1.
b. Types A-2, C-l, C-2, and M-l, runs less than twenty (20) feet.
c. Types A-2, C-1, and M-1.
d. Types A-3, C-1, C-2, and M-1.
e. Types A-2, V-1, and V-3.
f. Types V-1, V-2, V-3, and C-1.
g. Types M-2 and C-3.

3.4 WIRE AND CABLE INSTALLATION

A. Provide permanent identification of run destination at all raceway terminations.

B. All wire and cable shall be continuous and splice-free for the entire length of run between designated connections or terminations.

C. All shielded cables shall be insulated. Do not permit shields to contact conduit, raceway, boxes, panels or equipment enclosures.

D. Within buildings, make splices only in designated terminal cabinets and/or on designated equipment backboards. Outside buildings, make splices only in designated manholes and/or handholes. Protect splices outside of buildings with splicing kits equivalent to Scotchcast Re-enterable. Make splices only with connectors or terminal devices specified herein. Document all splices on Record Drawings.

E. Verify that all raceway has been de-burred and properly joined, coupled, and terminated prior to installation of cables. Verify that all raceway is clear of foreign matter and substances prior to installation of wire or cable.

F. Inspect all conduit bends to verify proper radius. Comply with Code for minimum permissible radius and maximum permissible deformation.

G. Apply a chemically inert lubricant to all wire and cable prior to pulling in conduit. Do not subject wire and cable to tension greater than that recommended by the manufacturer. Use multi-spool rollers where cable is pulled in place around bends. Do not pull reverse bends.

H. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Provide tool formed thermal expansion loops at cable at manholes, handholes and at both sides of all fixed mounted equipment. Cable loops and bends shall not be bent at a radius greater than that recommended by the manufacturer.

I. Secure all wire and cable run vertically for continuous distances greater than thirty (30) feet. Secure robust non-coaxial cables with screw-flange nylon cable ties or similar devices appropriate to weight of cable. For all other cables, provide symmetrical conforming nonmetallic bushings or woven cable grips appropriate to weight of cable.

3.5 SIGNAL POLARITY CONVENTION

A. Maintain consistent absolute signal polarity at all connectors, patch points and connection points accessible in the system. Comply with AES26-2001.Where applicable, a positive polarity electrical signal shall yield positive acoustic pressure from the loudspeakers.

B. Audio signal connector convention: Comply with AES 14-1992 (r1998)

Signal	Connector	Wire
Signal Phase	Pin 2	Red or White
Signal Anti-Phase	Pin 3	Black
Signal Ground	Pin 1	Drain Wire

C. Video and RF/CATV Connector Convention:

Signal	Connector	Wire
Signal Phase	Center Pin	Center conductor
Signal Anti-Phase	Shell	Shield
Signal Ground	Shell	Shield

3.06 WIRING PRACTICE

A. Land all non-coaxial field wiring entering each equipment rack at specified terminal devices prior to connection to any equipment or devices within racks. At Contractor's option, such terminals may be located in the equipment racks or in the terminal cabinets provided. Coordinate such selection with Project construction sequence and test procedures specified herein.

B. Identify all wire and cable clearly with permanent labels wrapped about the full circumference within one (1) inch of each connection. Indicate the number designated on the associated field or shop drawing or run sheet, as applies. Assign wire or cable designations consistently throughout a given system. Each wire or cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations. Conform with the requirements of Section 27 41 00.

C. Apply all crimp connectors only with manufacturer's recommended ratchet type tooling and correct crimp dies for connector and wire size. Plier type crimp tooling shall not be acceptable.

D. Coordinate insulation displacement (quick connect) terminal devices with wire size and type. Comply with manufacturer's recommendations. Make connections with automatic impact type tooling set to recommended force.

E. Make all connections to screw-type barrier blocks with insulated crimp-type spade lugs. Lugs are not required at captive compression terminal type blocks. Provide permanent designation strips designed for use with the terminal blocks provided. Make neat, intelligible markings with indelible markers equivalent to "Sharpie".

F. Tin terminated shield drain wires and insulate with heat shrinkable tubing.

G. Use only rosin core 60/40 tin/lead solder for all solder connections.

H. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections. No wire or cable shall be supported by a connection point. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.

I. Termination and build-out resistors and related circuit correction components shall be visible. Do not install in connector shells or internally modify equipment. Show locations on Record Drawings.

J. Correct any and all of the following unacceptable wiring conditions:
1. Deformed, brittle or cracked insulation.
2. Insulation shrunken or stripped further than 1/8" away from the actual point of connection within a connector, or on a punch block.
3. Cold solder joints.
4. Flux joints.
5. Solder splatter.
6. Un-grommeted, un-bushed, or uninsulated wire or cable entries.
7. Deformation or improper radius of wire or cable.

3.07 SIGNAL GROUNDING PROCEDURES

A. Comply with National Electrical Code.

B. Unless otherwise noted maintain a unipoint ground scheme.

C. Signal and electrical system grounds shall be isolated except at the Project ground field connection.

D. Equipment enclosures shall not be permitted to touch each other unless bolted together and electrically bonded.

E. Ground and bond equipment racks and similar equipment enclosures containing powered equipment exclusively via the ground conductors provided under Division 27.

F. At each rack, provide a ground bus within the rack. At each rack, provide a lug bonded to the rack frame with a #12 TW stranded wire to the rack Ground bus.

G. At each ensemble of racks, provide a single labeled Ground tubular-clamp bus bar terminal strip to land the individual rack Isolated Ground bus ground conductors. Connect the main Isolated Ground conductor from the Technical Power panelboard at this point.

H. Equipment signal ground shall be to the Ground System via the green wire of the equipment power cord. Where equipment uses two (2) wire power cord, provide #12 green bond wire to rack ground bus bar. At equipment, provide crimp lug and suitable hardware for bonding.

I. Shielded cables of this section shall be grounded exclusively to Isolated Ground by a single path. Shield shall be tied to Ground at one end only, i.e., at the low potential (receiving) end of run, unless otherwise noted.

J. Unless otherwise noted, at audio jackfields, tie source shield at jackbay frame. Float shields at connections to output jacks. Bus each row of jack frames and run individual #12 green ground wire for each row to rack IG bus bar.

K. Signal Ground provisions shall realize less than 0.15 ohms to the primary ground connection.

3.08 FINISHES

A. Finishes and materials for contractor fabricated assemblies such as racks, custom control panels, brackets, blank panels, equipment mounting in furniture or casework, speaker baffles, speaker grille material and in general any item or component herein which is visible shall adhere to the following:
   1. Finish shall be as directed by the Owner's Representative.
   2. In the event that the Owner's Representative provides no direction as to finish, finish shall match exactly the surrounding and adjacent surfaces.
   3. Wooden speaker back boxes and baffles shall be painted flat black if not otherwise finished or stained.

3.09 EQUIPMENT ENCLOSURE (RACK) AND EQUIPMENT FABRICATION

A. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.

B. Within each equipment enclosure, provide a full-height multi-circuit ground outlet strip with branch circuit count as shown on Criteria Documents; locate on the left side of the equipment enclosure, as viewed from the rear. In each enclosure provide number of receptacles required by present and future equipment indicated on Criteria Documents, plus at least two spare receptacles. Provide flexible steel raceway and junction box for connection of power service. Bond internal raceway to rack frame.

C. Provide a permanent label on the front of each equipment rack including the rack designation, and the circuit breaker number and associated electrical distribution panel designation servicing same.

D. Maintain separation of wiring classifications as specified herein. Separately dress, route and land microphone and line level cables and related on the right side of the equipment enclosure, as viewed from the rear; dress, route, and land loudspeaker level and control cables on the left side of the equipment enclosure, as viewed from the rear.

E. Access shall not require demounting or de-energizing of equipment. Install access covers, hinged panels, or pull-out drawers to insure complete access to terminals and interior components.

F. Fasten removable covers containing any wired component with a continuous hinge along one side, with associated wiring secured and dressed to provide an adequate service loop. Provide an appropriate stop locks to hold all hinged panels and drawers in a serviceable position.

G. Provide permanent labels for all equipment and devices. Where possible, fasten such labels to the rack frame or to blank or vent panels which will remain in place when active equipment is removed for possible service.

H. At jackfields, provide service loop to permit removal of jackfields from rack sufficient to conveniently access all jack contacts for routine cleaning and maintenance. Organize the service loop and harness such that reasonable reconnection of jacks and jack normals is possible without cutting apart the harness.

I. Coordinate the design and execution of wire harnessing of multi-bay rack ensembles with conditions of delivery to installation locations at Project Site, and with the requirement herein for test of the completely wired system in the shop prior to delivery to the Project Site. Organize the wiring harnesses such that they will fold within one shippable unit without risk of damage, or provide polarized multipin connectors and related interconnect systems as specified elsewhere herein.

J. At each equipment backboard, provide UL Listed surge suppressing multioutlet assembly with at least six (6) receptacles.

3.10 EQUIPMENT RACK AND EQUIPMENT TESTING AND ADJUSTING PROCEDURES

A. Conduct procedures in fabrication shop. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report. Request and coordinate verification of submitted test data by the Owner's Representative. Correct all non-conforming conditions prior to shipment to Project Site. Perform at least the following procedures:

B. Preliminary: Verify:
   1. Grounding of devices and equipment. Integrity of signal and electrical system ground connections.
   2. Proper provision of power to devices and equipment.
   3. Integrity of all insulation, shield terminations and connections.
   4. Integrity of soldered connections. Absence of solder splatter, solder bridges.
   5. Absence of debris of any kind, tools, etc.
   6. Routing and dressing of wire and cable.
   7. All wiring, including polarity and continuity, including conformance with wire designations on running sheets, field and shop drawings.
   8. Mechanical integrity of all support provisions.

C. Rig temporary power and grounding. Comply with all applicable Codes, regulations and ordinances.

D. Determine the proper sequence of energizing systems to minimize the risk of damage. Energize. Burn in for at least 168 hours.

E. Sound Systems:

1. Gain control settings: Establish tentative normal settings for all gain controls. Set all equalizers flat. Set all automatic gain control devices to bypass. Terminate power amplifier outputs with power load resistors with resistance value within 10% the nominal output impedance of the respective amplifier. Adjust all gain controls on equipment for optimum signal-to-noise ratio and signal balance and, unless they are sub-panel mounted, cap them to prevent tampering. Unless specified or directed otherwise, adjust gains such that in a given system the "front end" operates at unity gain and maintains 10 dB of clip margin referenced to the first onset of clipping of the associated power amplifier(s). Measure and document system gains at 1 kHz. Settings may require further adjustment by the Contractor, a result of testing by the Owner's Representative.
2. Freedom from parasitic oscillation and radio frequency pickup: Maintain previous setup. Set up for each mode of operation specified in the functional requirements; verify that all systems are free from spurious oscillation and radio-frequency pickup using broadband oscilloscope. Correct any such defects.
3. Hum and noise level/signal to noise level/signal to crosstalk level: Maintain previous setup. Terminate microphone and line-level inputs with shielded resistors of 150 and 600 ohms, respectively. Set available variable gain controls such that full power amplifier output would be achieved with -40 dBm input level at a microphone input and +12 dBm at a line-level input. Measure and document the specified parameters of the system overall for each microphone input channel and line-level input channel. Compare with nominal signal level.
4. Total Harmonic Distortion: Maintain previous setup. Measure at reference operating level at least at 63 Hz, 125 Hz, 1 kHz, 10 kHz.

F. Baseband Video Systems:
   1. Picture Monitors:
      a. Apply crosshatch. Verify linearity.
      b. Apply red field. Adjust purity.
      c. Apply SMPTE bars and PLUGE. Adjust to standards.
   2. Video Path Test: Use manufacturer's procedures. Use full field or line signals.

G. Data/Graphics Systems:
   1. Projector:
      a. Apply crosshatch. Converge at design distance. Verify linearity.
      b. Apply red, green and blue field. Adjust purity.
   2. Wideband Component Analog Video Path Test: Use manufacturer's procedures.

H. Control System:
   1. Demonstrate complete operation.

3.11 SYSTEMS PERFORMANCE TESTING AND ADJUSTING PROCEDURES

A. Upon completion of the installation of all equipment in an area, perform the following tests and record results. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report. Correct all non-conforming conditions prior to requesting Acceptance Review and Testing. Perform at least the following procedures:

1. Mechanical: Verify:
   a. Integrity of all support provisions.
   b. Absence of debris of any kind, tools, etc.
2. Power and Isolated Ground: Verify:
   a. Isolation of Isolated Ground system from raceway and related ground.
   b. Grounding of devices and equipment. Integrity of signal and technical power system ground connections.
   c. Proper provision of power to devices and equipment.
3. Signal Wiring: Verify:
   a. Integrity of all insulation, shield terminations and connections.
   b. Integrity of soldered connections. Absence of solder splatter, solder bridges.
   c. Routing and dressing of wire and cable.
   d. Continuity, including conformance with wire designations on running sheets, field and shop drawings.
   e. Absence of ground faults.
   f. Polarity.
4. Use the proper sequence of energizing systems to minimize the risk of damage. Energize.
5. Sound Systems, Electronic Tests; confirm:
   a. Gain at 1 kHz.
   b. Maximum output.
   c. Input clipping level.
   d. Frequency response.
   e. Total harmonic distortion.
   f. Signal to noise ration.
   g. Signal to crosstalk ratio.
6. Electro/Acoustic Tests:
   a. Uniformity of coverage.
   b. Electronic and acoustic frequency response/one-third octave equalization. Measure at ear level. Comply with applicable portions of ANSI (SMPTE) PH22.202M-1984, "B chain electro-acoustic response - control rooms and indoor theaters." Adjust to "curve X of B chain characteristic". Owner's Representative will direct final adjustment.
   c. Maximum continuous sound pressure level (in the reverberant field). Drive systems with broadband pink noise. Sustain for at least five (5) minutes with no system damage. Measure for "A" and "C" weightings at ear level on loudspeaker axis. Turn off noise.
   d. Acoustic signal-to-noise ratio referenced to the specified maximum continuous sound pressure level in the reverberant field. Measure for "A" and "C" weightings at ear level on loudspeaker axis with mechanical systems operating. Present comparison with previous measurement.
7. Video Systems:
   a. Picture Monitors:
      i. Apply crosshatch. Verify linearity.
      ii. Apply red field. Adjust purity.
      iii. Apply SMPTE bars and PLUGE. Adjust to standards.
   b. Video Path Test: Use NTC Report No. 7 procedures. Use full field or line signals.
      i. Insertion Gain.

ii. Gain/Frequency Distortion.

8. Control System: Demonstrate complete operation.

3.12 LABELING

A. Conform with the requirements of Section 27 41 07 – Identification for Audiovisual Systems.

B. Provide permanent "wedge" type labels on all controls, as applies, to indicate correct settings after systems performance testing and adjustment procedures have been successfully completed.

END OF SECTION 27 41 16

SECTION 28 05 00 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Part 1 Includes:

1. Related Documents
2. Summary and related sections
3. References
4. Definitions
5. System Description and General Responsibilities
6. Coordination
7. Contractor Qualifications
8. Contractor’s Firm Profile, Experience and Staff
9. Regulatory Requirements and Standards
10. Submittals
11. Delivery, Storage, and Handling
12. Site Conditions
13. Sequencing and Scheduling
14. Warranty
15. Extra Materials

B. Part 2 Includes:

1. Product Options and Substitutions
2. Materials and Equipment
3. Equipment Modification
4. Fabrication
5. Source Quality Control
6. Firestopping/Sealant Materials

C. Part 3 Includes:

1. Examination
2. Installation
3. Field Quality Control
4. Cleaning
5. Training

1.3 REFERENCES

A. Codes compliance - Comply with the established project edition of the following codes as applicable:

1.	California Electrical Code (NFPA 70)	CEC
2.	National Fire Alarm Codes (NFPA 72)	NFAC
3.	California Building Code	CBC
4.	All State or County codes and ordinances	

B. Standards Compliance - Comply with the following standards as applicable:

1.	American National Standards Institute	ANSI
2.	American Society for Testing and Materials	ASTM
3.	Electronics Industry Association	EIA
4.	Electrical Testing Laboratories	ETL
5.	Factory Mutual	FM
6.	Federal Aviation Agency	FAA
7.	Federal Communications Commission	FCC
8.	Institute of Elect. and Electronics Engineers	IEEE
9.	National Electrical Contractors Association	NECA
10.	National Electrical Manufacturers Association	NEMA
11.	National Fire Protection Association	NFPA
12.	Occupational Safety Health Act	OSHA
13.	Underwriter's Laboratories	UL

1.4 DEFINITIONS

A. By Others or By Other Trades: By persons or parties other than the Division 28 Contractor. In this context the words “by others or by other trades” shall not be interpreted to mean “not in contract (NIC)”.

B. Certified: Equipment has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards and found to be safe for use in a specified manner; production is periodically inspected by a nationally recognized testing laboratory; and it bears a label, tag, or other record of certification.

C. Concealed: Not visible or readily accessible such as, embedded in masonry or other construction installed behind wall furring with double partitions or above hung ceilings, in crawl spaces, in shafts.

D. Conveniently Accessible: Capable of being serviced without climbing or crawling under or over obstacles, and with adequate working clearance both front and back.

E. Damage: Visible or invisible abuse that negatively affects performance or appearance and creates defective materials or workmanship.

F. Defective Materials or Workmanship: Operational failures, performance below minimum requirements, evidence that the system will not be reasonably maintainable, errors in

documentation, abnormal operations, unsafe conditions, or similar unsatisfactory performance.

G. Contractor: Company holding the contract or agreement with the Owner or its representative. The Contractor may, when permitted, sub-contract Work described in this Section to which the term contractor may apply.

H. Exposed: Not concealed.

I. Failure: Any deviation from intended system operation and performance, as determined by the Contract Documents and subsequent submittals and the Owner's Representative.

J. Furnish: Purchase and deliver to the Project site complete with every necessary appurtenance, support, and accessory required for operation.

K. Install: Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the Project.

L. Labeled: Equipment embodies a valid label, symbol, or other identifying maker of a nationally recognized testing laboratory such as Underwriters' Laboratories, Inc., the laboratory makes periodic inspections of the production of such equipment, and the labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.

M. Listed: Equipment is mentioned in a list which is published by a nationally recognized laboratory which makes periodic inspection of the production of such equipment or states that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.

N. Nationally Recognized Testing Laboratory: A testing laboratory which is approved, in accordance with OSHA regulations, by the Secretary of Labor.

O. Provide: Furnish and install, completely ready for use, including all accessories required for operation.

1.5 SYSTEM DESCRIPTION AND GENERAL RESPONSIBILITIES

A. The work to be performed under this contract includes the furnishing of all labor, materials, and equipment for the Security Electronics Controls Systems. Work shall include all provisions of new electronics controls systems, including all software development/programming.

B. Combined Prescriptive and Performance Design Requirements

1. Division 28 includes a combination of prescriptive and performance specifications. Compliance with the performance specifications, as well as coordination and integration of the prescription requirements, will require substantial design work on the part of the Contractor.

2. The performance requirements are intended to establish overall system performance requirements, satisfy the operational requirements, and establish the inter-coordination requirements for the Division 28 systems.
3. The prescriptive requirements establish the minimum quality, characteristics, and types of components, equipment, and materials to be used to achieve the stated system performance requirements. The Contractor is advised, however, that prescriptive specifications have not been provided to satisfy all of the specified performance requirements.
4. The Contractor shall carefully consider all of the requirements for each of the Division 28 systems when preparing its bid. Any questions regarding the intent of these requirements, the scope of the systems or their coordination requirements must be submitted in writing prior to bidding in accordance with the Instructions to Bidders. The Contractor shall have no claim for either extra compensation or extra time on the grounds that it did not understand the scope or the requirements of the Division 28 work, and/or the coordination requirements of the Division 28 work with the work of the other Divisions.
5. Compliance with the project requirements will be progressively monitored and adjusted through the submittal process, Shop Test, Performance Test and Continuous Operational Test.

C. Drawing Interpretation

1. The Drawings are diagrammatic and indicate the general arrangement of systems and equipment unless indicated otherwise by dimensions or detail drawings. The Drawings utilize riser, block, installation and schematic diagrams and symbols to outline the Work to be provided. These drawings do not have any dimensional significance nor do they delineate every item required for the intended Work. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete Work are excluded.
2. The Work shall be provided in accordance with the intent expressed on the Drawings and Specifications, and in conformance with the actual building architectural and structural conditions. When in conflict, field conditions take precedence over the Contract Documents.
3. The meaning of abbreviations shall be the same whether in lower case letters or without periods.
4. The use of words in the singular shall not be considered as singular where other indications denote that more than one item is referred to.
5. Details that appear on the Contract Documents which are specific with regard to the dimensioning and positioning of the Work, are intended only for the purpose of establishing general feasibility. They do not replace engineering or field coordination by the contractor for the Work.

D. Provide all parts and equipment for a complete and operational system for the Work of Division 28 as described herein and shown on the drawings.

E. Furnish and install all trenching and backfill, duct banks, conduits, raceways, sleeves, boxes, gutters, shelves, enclosures, shelf and enclosure supports, backboards, pull ropes (in unused or spare conduits) required to make all systems fully operational, including components not shown on the Drawings, but necessary for fully operational systems.

F. Furnish, install, terminate, test, dress, and identify all wire and cable required to make systems fully operational, including all wire and cabling not shown on the Drawings, but necessary for fully operational systems.

G. Recognize that the Work entails a considerable amount of custom integration between individual systems, as well as the design and implementation of many system and component interfaces. Take full responsibility for the complete design, installation, and performance of the total integrated system, including integration between systems and various interfaces, in order to achieve the specified operational features and system performance requirements.

H. Recognize that the Work entails a considerable amount of custom-written and custom-tailored software, both high-level language applications and hardware-specific drivers. Take full responsibility for the performance of the total software suite, including the software embedded in manufactured equipment, in order to achieve the specified operational features and system performance requirements.

I. Fully test the systems, demonstrate their satisfactory operation, and train maintenance and operating personnel, as specified in this Section and the Sections governed by this Section.

1.6 COORDINATION

A. Coordinate with the Owner and all other trades as required to ensure that the entire Work of this Project will be carried out in an orderly, complete, and coordinated fashion.

B. Coordinate installation of lighting and ventilation in all equipment rooms and control stations to avoid any possible interference and to enhance system function.

C. Coordinate with the Work of all applicable Divisions and Drawings for the required electrical and mechanical control interfaces to the work of this section.

D. If applicable, provide coordination drawings of security device plate mounting templates and internal frame conduits to the hollow metal frame manufacturer/supplier to facilitate frame preparation for electronic devices. Rework all frames for which device mounting has not been coordinated at Contractor’s expenses.

E. If applicable, obtain product data and wiring schematic information from the Division 8 and 11 Contractors/manufacturers for all approved locking and door monitoring hardware. Coordinate with the Contractors to properly wire, terminate and test all electrically controlled and monitored door/gate hardware.

1.7 CONTRACTOR QUALIFICATIONS

A. Division 28 requires contractors to provide the following evidence and history of proper licensing to perform the work:

1. The contractor must possess a valid and active California State Contractors “C10”

or “C7” License at the time of bid and must have held it for a minimum of 10 years prior to the performance of this work.

2. Required license(s) shall be submitted within 3 days of being selected as the apparent low bidder.
3. The California State License Board (CSLB) License held by the firm, or its Responsible Manager Employee (RME) or Responsible Manager Officer (RMO), should be clear of any suspensions, revocations, or being guilty of a violation constituting cause for disciplinary action during the past five years.

B. Division 28 requires contractors to provide history and current ability to secure Liability and Worker’s compensation Insurance, as well as ability to secure proper bonding.

1. Contractor must provide notarized statement from its surety company (not an agent or a broker) identifying the following:

    a. Name of bonding company/surety.
    b. NAIC#.
    c. Name of surety agent, address and telephone number.
    d. Statement that the surety is a California admitted surety and authorized to issue surety bonds in the State of California.
    e. Statement that the contractor’s current bonding capacity is sufficient to satisfy the bonding requirements for the contracted work.

2. Contractor must indicate the highest premium paid for a performance and payment bond on any of the projects performed in the last 5 years.
3. Contractor must show a minimum average of 1.00 or less of Experience Modification Rate (EMR) (California Worker’s Compensation insurance) in the most recent 5 year period.
4. Indicate that the contractor’s current Worker’s compensation insurance policy meets the requirements to the Labor Code or is legally self-insured pursuant to Labor Code section 3700 et. seq.
5. Contractor must list all sureties (name, full address, contact name, and contact information) that have written bonds for the firm during the last five (5) years, including the dates during which each surety wrote the bonds.

C. Division 28 requires contractors to provide a clear history of claims and litigations, or other adverse actions during the past five (5) years:

1. Contractor must demonstrate that the firm is not a debtor in a bankruptcy case, nor has been part of a bankruptcy case in the past five (5) years.
2. Contractor must demonstrate that the firm has not been disbarred, disqualified, removed or otherwise prevented from bidding on, or completing any government agency project.
3. Contractor must demonstrate that surety companies have not been obligated to complete a contract on its behalf, paid for completion of a project due to a default termination by the owner, satisfy any claims made against a performance or payment bond issued on the firm’s behalf in connection with a construction project either public or private, or advanced funds in the firm’s behalf in order to reach completion.
4. Contractor must demonstrate that the firm has not been denied an award of a

contract based on a finding by a public agency showing that the firm was not a responsible Proposer.

5. Contractor shall indicate that the firm has paid no more than 1.0% for a performance and payment bond on any project.
6. Contractor shall be in good standing with surety/insurance companies, and have not been denied renewal of an insurance policy by any insurance carrier, bond credit by a surety company, or had a period of time when the firm had no surety bond in place during a public construction project when one was required.
7. Contractor must provide a five (5) year clearance on any of the following:

    a. Claims filed in court or arbitration against the firm concerning the work performed on a construction project.
    b. Claims filed in court or arbitration against a project owner concerning work on a project or payment of a contract.
    c. Assessment or payments on liquidated damages pursuant to a construction contract with either a public or private owner.

8. Contractor must provide clearance on any of its current (or previously associated with other construction firms in similar positions), owners, officers or partners of any claims and litigations as follows:

    a. Liability in a civil suit, or found guilty in a criminal action, for making false claims or material misrepresentation to any public agency or entity.
    b. Conviction of a crime involving any federal, state or local law related to construction.
    c. Conviction of a federal or state crime of fraud, theft, or any other act of dishonesty.
    d. Being debarred, disqualified, removed or otherwise prevented for from bidding on, or completing any government agency project.

D. Division 28 requires contractors to show compliance with Occupational Safety, Health Laws, and with other Labor Legislation safety during the past five (5) years as follows:

1. Contractor shall be clear from any CAL OSHA cited or assessed penalties for any “serious”, “willful”, or “repeat” violations of its safety or health regulations.
2. Contractor shall be clear from any Federal Occupational Safety and Health Administration cited and assessed penalties.
3. Contractor must provide proof that firm holds and documents safety meetings for construction employees and field supervisors at least once a week.
4. Contractor shall have programs in place to meet the requirements of the Drug Free Workplace Act of 1990.
5. Contractor must have an average of 9.5 or less Experience Modification Rate (California’s Workers’ Compensation insurance) for the past 3 years.
6. Contractor must prove continuous coverage for worker’s compensation insurance or continuous state-approved self-insurance.
7. Contractor must be clear of any history in paying back wages or penalties for failure to comply with the state’s prevailing wages, or the Federal Davis-Bacon prevailing wage requirements.
8. Contractor shall prove that the firm has not been found in violation of any provision of California apprenticeship laws or regulations, or the laws pertaining to the use of

apprentices on government works.

9. If contractor operates its own State-approved apprenticeship program, provide the following:

    a. The crafts in which the firm provided apprenticeship programs in the past year.
    b. State the year in which each such apprenticeship program was approved, and attach evidence of the most recent California Apprenticeship Council approval(s) of your apprenticeship program(s).
    c. State the number of individuals who were employed by the firm as apprentices at any time during the past three years in each apprenticeship and the number of persons who, during the past three years, completed apprenticeships in each craft while employed by the firm.

10. If contractor intends to request the dispatch of apprentices from a program approved by the California Apprenticeship Program Council, to participate in the performance of the awarded work, contractor shall provide the name, address, and telephone number of such program(s).

E. Division 28 requires contractors to prove financial ability to perform the work.

1. Contractor shall provide a complete reviewed or audited financial statement indicating the organization's financial condition.
2. Contractor shall provide a Certified Public Accountant (CPA) certificate stating the qualifications as may be necessary in view of the scope of the project. The certificate shall indicate the CPA's license number.
3. Contractor shall be qualified to bid on projects up to a maximum dollar amount based on the lesser of ten times working capital (current assets less current liabilities) or four times net worth (assets less liabilities) subject to adjustment upon consideration of experience and performance factors.
4. Contractor must state the firm's gross revenues for each of the last three (3) years.
5. Working capital may be augmented by submission of a Letter of Bank Credit.
6. Contractor must show an average monthly cash balance for the last twelve months of not less than 10% of the construction cost.

1.8 CONTRACTOR'S FIRM PROFILE, EXPERIENCE AND STAFF

A. Division 28 requires contractors to provide the firm's organization and history with the following information:

1. Firm's legal name
2. Legal structure description (e.g.: corporation, partnership, sole proprietorship, joint-venture)
3. Date of establishment / commencement of business
4. Address
5. Owner/ Point of Contact.
6. Telephone Number.
7. Email address.
8. Website address.

9. Provide information if there has been any change in ownership in the past five (5) years.
10. Provide information if there has been any name changes in the past five (5) years.
11. Include information that identifies if the firm is a subsidiary, parent, holding company or affiliate of another construction firm. If that is the case, include information for more than 50% ownership on any other construction.
12. Include information that identifies if any of the firm's corporate officers, partners or owners holds a similar position in another construction firm. If that is the case, provide information about those firms.
13. List all license numbers, classifications, and expiration dates of the California contractor licenses held by the firm. If any of the firm's contractor's license(s) are held in the name of the legal entity's name, list the names of the qualifying individual(s) listed on the California State License Board (CSLB) records.
14. List all the officer's names including President and/or CEO, Vice President and Division Head.
15. List the names of the project managers/engineers, field superintendents, field technicians/Installers, who will be participating in the project.
16. Provide the number of years for which the contractor has provided system installations for the specific field of security electronics systems.
17. Provide average annual construction revenue during the last five (5) years.
18. Provide annual correctional building systems construction revenue during the last five (5) years.

B. Division 28 contractor shall demonstrate experience with respect to the specific trade required to perform the work.

1. The contractor shall provide information a minimum of four (4) of its government most recently completed projects with the following characteristics:

    a. All projects must be Detention and/or Correctional type projects.
    b. All projects must be projects on which the contractor was selected by a competitive bid, lump sum process
    c. At least two (2) projects must be an upgrade, retrofit, addition or expansion.
    d. At least two (2) projects must be high-rise building and/or campus style.
    e. At least two (2) projects must have had work performed while facility was occupied.
    f. Projects must be similar in size to proposed work.
    g. Projects must show similar level of security to proposed work.
    h. Projects must show similar construction cost to proposed work.
    i. Work performed must have involved integrated security systems.
    j. Work performed must show use of detention grade components including, at minimum, detention cells.

2. The contractor must provide the following current and verifiable information for each of the projects submitted:

    a. Project name
    b. Project address
    c. Scope of work performed listing major systems and subsystems.
    d. Square footage

e. Number of cells
f. Original contract value
g. Final contract value
h. Reason for contract value adjustments
i. Total construction cost (including change orders)
j. Changer Orders Cost & Percentage of Contract
k. Stop Notices Cost & Percentage of Contract
l. Contract award date
m. Originally scheduled completion date
n. Time extensions granted (number of days)
o. Actual day of completion. Explain any delays.
p. Owner current contact information: name, address, phone number, email address.

C. The Division 28 contractor shall maintain a local service center with qualified service technicians for the duration of the Warranty and be able to provide the following:

1. Provide a service and preventive maintenance work plan based on the project scope of work.
2. Name a location of service outlet/agent within 100 miles from the project site.
3. Provide number of service personnel at the site and their experience with integrated security, communications and control systems.
4. Provide inventory and equipment available at site to service electronic security, and communications systems.
5. Provide a work plan proposal indicating the emergency maintenance/service request response time.

D. The Division 28 contractor must provide adequate management and engineering personnel on the project in order to insure timely preparation of submittals and change order documentation, and to effectively manage all aspects of the construction work.

1. The Contractor shall be responsible for all costs incurred including costs incurred by the Owner and its representatives for failure to provide the experience and key personnel as specified.
2. Deductive change orders may be issued as a result of the failure to properly engineer the work prior to construction or improperly installed work that results in costs incurred to the Owner. Examples of incurred costs are rejection of submittals for failure to follow specifications or failure to properly engineer the work; re-inspection of rejected work.
3. Key Project Personnel must have work experience with projects of similar size and complexity. Systems experience shall be demonstrated for the Key Project Personnel. Résumés of prospective key personal shall be submitted within 30 days of contract award. Consider all qualification and experience materials submitted as binding. Obtain the Owner’s approval in writing prior to any deviations from the minimum requirements in organization, personnel, work plan, quality control plan, procurement plan or other declaration within the qualification submittal. Key project personnel substituted prior to or during the Work must meet the specification requirements and obtain the Owner’s approval.

a. Project Manager Qualifications

1) Bachelors of Science Degree from ABET accredited college in Construction Management or related engineering, or
2) A minimum of five (5) full calendar years of experience in the management and supervision of electronic security system installation for correctional or detention facilities of similar size and complexity.
3) The Project Manager must have been a full-time and direct employee of the firm for a minimum of one (1) year.
4) The approved Project Manager shall represent the Contractor at all times in all project matters and shall be responsible for the administrative work including but not limited to, the following:

    a) Representation at all project meetings.
    b) Progress schedule and progress reporting.
    c) Payment schedule of values and pay requests.
    d) Representation and management of all employees and sub-contractors.
    e) Conduction of on-site performance and acceptance testing.

b. Project Engineer Qualifications

1) Licensed Professional Electrical Engineer or,
2) Bachelors of Science Degree from ABET accredited college in Electronics Engineering field and two years experience with systems to be provided, or
3) Technical Trade School Degree, Associate of Science Degree, or Bachelors Degree and a minimum of six years of demonstrated experience with the systems to be provided.
4) The approved Project Engineer shall be qualified and shall be responsible for technical work including but not limited to, the following:

    a) Preparation and signature of all engineering, shop drawings, and product data submittals.
    b) System fabrication, field installation work, and testing.

1.9 REGULATORY REQUIREMENTS AND STANDARDS

A. References to the California Electrical Code (CEC) and National Fire Alarm Code (NFAC) are a minimum installation requirement standard. Drawings and Specifications shall govern in those instances where requirements are greater than those specified in the CEC and NFAC.

B. Obtain and pay for all permits and inspections required by all legal authorities and agencies having jurisdiction for the Work. The certificates of all such permits and inspections shall be delivered to the Owner.

1.10 SUBMITTALS

A. Submit under provisions of Division 1, Submittals.

B. Contractor is advised that approval or acceptance of product data or shop drawing submittals does not release the contractor from providing all necessary documentation per submittal requirements, nor does it obviate contractor from additional design and coordination throughout the project.

C. Work Plan

1. Submit a work plan for all work to be performed in the existing facility within 15 days of the Notice to Proceed.

D. CPM Schedule

1. Submit a Critical Path Method Schedule within 30 days of the Notice to Proceed.
2. At a minimum show tasks by area such as by building, by floor or other appropriate designations.
3. Include tasks that are not part of the work of this section but that may affect this section such as work by other trades or contractors or Owner review time.
4. Include tasks that are not part of the work of this section but that may affect this section such as work by other trades or contractors or Owner review time.

E. Submittal Matrix

1. Prepare a matrix of submittals by type vs. section of all submittals to be made by the Division 28 contractor within 30 days of the Notice to Proceed.
2. Utilize the list of required submittals listed at the end of this section as a starting point. Add columns for expected delivery dates and each specification section. If a listed submittal is not required for a specific section, indicate such with an “N/A” or other means in the column and row cross point.

F. Schedule of Values

1. Submit a Schedule of Values (SOV) based on the CPM schedule and Submittal Matrix that reflect the value of the systems and installation of work for this Division.
2. That approved SOV will be used as a basis for progress payments.

G. Product Data:

1. Product data is required for all materials and equipment. Include complete bill of materials for each section with the product data submittal.
2. Cross-reference submitted items to the Specifications using their related sections and paragraph numbers.
3. Submit complete product data for the all system components in a single, bound submittal of one or more volumes. Provide a table of contents and labeled divider tabs for each section. Partial submittals for individual sections will be returned without review.
4. Include descriptive literature, catalog cuts, illustrations, schematics, technical data

sheets, and test data necessary for the Owner's Representative to ascertain that proposed equipment and materials comply with specification requirements. Include manufacturer's name, model, catalog or part numbers. Catalog cuts shall be legible and shall clearly identify equipment being submitted.

5. Include required calculations, I/O points lists, system zone schedules, and other tabular data as necessary to clarify system sizing and configuration. Do not, however, consider such submittals as a substitute for complete shop drawings.
6. Disclosure of Product Deviations: Specifically identify and tabulate any and all deviations from the contract documents including all system functions and features. Reference the corresponding specification sections and paragraph/article numbers. All variances and deviations will be reviewed for acceptance or rejection. It will be the Contractor's sole responsibilities to comply with all other contract requirements not revealed in the disclosure of product deviations.

H. Shop Drawings:

1. Shop drawings are required for all systems and component assemblies.
2. AutoCAD ".dwg" files of the Contract Drawings may be made available upon request. These files may be used as a first step in the preparation of shop drawings. Do not consider the drawing plots from such files as a substitute for the shop drawings that are to be prepared by the contractor.
3. Shop drawings will not be accepted or considered unless they are submitted as a complete package for each specification section. Partial submittals covering less than a whole system or with incomplete interfaces to other systems will be rejected.
4. Standard manufacturer's drawings may not be used as shop drawings unless specifically modified for use on this project.
5. Each drawing requires a unique drawing number and revision level. Revisions shall per be dated and referenced per submittal number. Delta numbers and clouds on the drawings shall be used in all instances where changes have been made to the pervious submittal.
6. At a minimum, include the following shop drawings:

    a. Floor Plans: Scaled drawings showing equipment and device locations in plan view. Include wire and cable types and quantities, raceway sizing and routing. Routing information shall indicate where rated assemblies are penetrated. Separate into as many plan series as needed to prevent overlapping information. These drawings shall be fully coordinated with other trades prior to submittal. Show relationships to adjacent surrounding structures.
    b. Equipment and Control Room Plans and Elevations: Scaled, dimensioned drawings showing security equipment layouts in security equipment rooms, electrical/security closets, and control rooms. Include electrical J-boxes and receptacles, power, conduit sizing and routing, metal gutters, wiring ducts, cable trays, and supports. Indicate all other non-security cabinets, enclosures, and equipment within the room.
    c. Cabinet, Enclosure, and Rack Elevations: Scaled, dimensioned drawings for each system equipment cabinet, enclosure, and rack showing component and equipment mounting, wire and cable routing and separation, connector

and terminal block locations and labeling, and all necessary fabrication details.

d. System Block Diagrams: Single line block diagrams showing the general relationship between system components and the interconnection between systems. Use these drawings as a reference for the Single line diagrams and point-to-point diagrams by cross-referencing the shop drawing number of those diagrams on these drawings.
e. Single Line Diagrams: Interconnection diagrams for the riser and trunk wiring between equipment cabinets, enclosures racks and major components. Use the same equipment designations as the floor plans and block diagrams.
f. Point-to-Point Diagrams: Drawings which show the wiring of each component or device of each individual system. Include details of power supply, grounding, shielding, shield grounding, surge protection, fusing, connector pin-outs, terminal assignments, and similar wiring and connection details. Use the same component and device designations as the floor plans and other shop drawings.
g. Schematic Diagrams: Drawings which show the component wiring of a system to include but not limited to resistors, diodes, transistors, relays, etc. Required for all custom systems and modified commercial products.
h. Device Installation Diagrams: Details which show the installation and wiring termination of each field device in each individual system. Include settings for dipswitches, jumpers, addresses, port assignments, etc. of all devices.
i. All other shop drawings necessary to install, fabricate, locate, identify, test, service, and repair the systems provided.

7. Shop drawings approved by the Owner's Representative OR by the Consultant Engineer is not a release from Contract requirements as defined by the Drawings, Specifications, and governing codes and regulations.

I. Samples:

1. Field Samples:

a. Wires and Cables: Submit a one (1) foot sample length of each wire and cable type to be used with the cable identification clearly shown.
b. Submit all required samples along with the product data submittal for review and approval prior to installation.
c. If all wire samples can not be submitted at the same time, submit samples with a complete list of all cables to be used noting samples which have been submitted. Update the list with each subsequent sample submittal.

2. Devices/Equipment:

a. Submit sample assemblies of each of the following devices or equipment along with the product data submittal for review and approval by the Owner's Representative:

1) Substituted products if requested by Owner.
2) Custom component, board, equipment or assembly.

3. Disposition: Submitted samples become property of the Owner and will not be returned.
4. Approval of any custom or modified assemblies shall be required. Submit technical information with samples.

J. Test Procedures:

1. Initial Performance Testing: Submit test procedures, forms, and checklists for point-by-point testing. Include a listing for each individual system, each control station and control panel, each equipment room, and each major system component. At a minimum, forms shall include columns for operational/non-operational status, remarks, workmanship, and date corrected. Submit a sample format for approval by the Owner's Representative a minimum of 20 days prior to testing.
2. Performance Testing: Submit test forms which are identical to or similar to the accepted Initial Performance Testing forms. Obtain approval from the Owner's Representative for any changes in test procedure or forms.
3. Continuous Operational/Functional Testing: Submit a detailed test procedure for the continuous functional testing described generally in this Section. Submit for approval by the Owner's Representative a minimum of 15 days prior to testing.

K. Test Results:

1. Initial Performance Testing: Submit completed test results for point-by-point testing to the Owner's Representative five days prior to schedule Performance Testing.
2. Performance Testing: Submit completed test results prior to or with the request to begin the Continuous Operational Test.
3. Continuous Operational Test: Submit completed test results prior to or with the request for Substantial Completion.

L. Record (As-Built) Documents:

1. Maintain a current record set of as-built drawings on the job and as construction and installation progress, show the actual installed location of all items, material, and equipment.
2. Accurately record actual routing of all conduits including sizes and types.
3. The as-built drawings shall be available to the Owner's Representative for review and will be required for evaluation of progress payments.
4. Submit as-built shop drawings created from the approved shop drawings and updated from the site as-built drawing set and any other drawings required to depict the as-built conditions of the installed work.

M. Operational Manuals:

1. Submit the required quantity of identical manuals, which shall contain the Theory of Operation, start up, shut down and emergency procedures, and the manufacturer's operating instructions.
2. Subdivide the manual by section with tab dividers. Provide a table of contents which identifies each section and the contents therein.

3. Submit an electronic copy.

N. Maintenance Manuals:

1. Submit a complete set of maintenance documents as described in this Section. For documents of sizes greater than 11 x 17 inches, prints and electronic copy shall be furnished.
2. Manuals shall include the following as a minimum requirement:

a. Technical system description.
b. System schematics.
c. Detailed wiring diagrams to identify cabling, termination, and routing.
d. Panel assembly drawings to identify location of components, terminal strips, and equipment as required to correlate with system drawings.
e. Descriptions and drawings as required to maintain equipment from the board to the component level.
f. Description of software and user programmable functions. Procedures for user programmable functions shall be included.
g. A complete printout of each unique system program.

3. For systems where the program resides on electronic media or other similar storage medium, furnish a copy of the media, or similar medium, to the Owner's Representative.
4. Where multiple systems are combined into a single integrated system, documentation shall include a description of the integrated system and the details of the interfaces between systems.
5. Provide a list of current telephone numbers and addresses of all material vendors and equipment manufacturers who have supplied components in this Project. Include separate service telephone list and purchasing telephone list cross-referencing with each component.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Protect all materials and equipment from damage during storage at the site and throughout the construction period. Protect equipment and materials during shipment and storage against physical damage, dirt, dust, moisture, cold, rain, and any foreign substances that may damage the equipment.

B. Prevent damage from rain, dirt, sun and ground water by storing the equipment on elevated supports and covering them on all sides with securely fastened protective rigid or flexible waterproof coverings.

C. Protect conduit by storing it on elevated supports and capping the ends with suitable closure material to prevent dirt accumulation.

D. Protect all fabricated and/or installed materials and equipment against dust, dirt, moisture, physical damage, metal debris, and any foreign substances that may damage the equipment.

E. Protect painted surfaces with removable heavy Kraft paper, sheet vinyl or equal, installed at the factory and removed prior to final inspection.

1. Replace equipment determined by the Owner's Representative to be damaged. Repaint and finish damaged paint on equipment and materials with the same quality of paint and workmanship used by manufacturer so that repaired areas are not obvious.

1.12 SITE CONDITIONS

A. Site Investigation

1. Prior to submitting a bid, the Contractor shall perform a site survey of all related existing systems and submit any potential problems of the design documents that may increase the installation cost of the project.
2. Survey all locations where work is to be performed and verify existing conditions prior to shop drawing submittals.

B. Coordination with Security Personnel

1. This is an existing detention facility with controlled access and movement 24 hours a day, 7 days a week. Expect delays due to facility events. The owner will assign a contact person for the contractor to coordinate day to day activities and access into areas. Coordinate all system interruptions and scheduled down time with the contact person. The contractor shall include in his bid all premium time to which it may be subjected to working.
2. Contractor shall abide by all facility rules.

C. Security Requirements

1. Special security requirements will be provided by the facility. See Division 1.
2. Special requirements may include limited access to the work area by area or time, background checks of on-site personnel, restrictions of equipment and tools to include tool counts.

1.13 SEQUENCING AND SCHEDULING

A. General Requirements:

1. Do not begin the project without the Owner's acceptance of proposed key project personnel for the Division 28 Work.
2. Prepare, review, and coordinate with the Owner's Representative an approved construction (CPM) work schedule. Schedule work in areas and at times that will not interfere with scheduled activities as defined by the Owner's Representative.
3. Do not procure any equipment without accepted product data submittals. Do not perform any field installation without accepted shop drawings. Do not begin any extensive software development or programming without accepted system, operational narratives, the required Owner's coordination, and user's

requirements.

4. Pre-assemble control electronics, control panels, racks, and cabinets off-site as most practical.
5. Install system control equipment, control panels, cabinets, racks, and consoles only after major construction in the area in which they are to be installed has been completed and areas have been cleaned, painted, and sealed.
6. After systems installation and prior to point-by-point performance testing, thoroughly pre-test all devices and device wiring for proper performance. Then, thoroughly pre-test each system function in each state or condition under every operating mode.

B. Coordinate all work in the existing facility with the facility contact person.

1.14 WARRANTY

A. The Contractor is to provide a warranty of the work provided under this contract (including, but not limited to, software, hardware, and peripheral equipment) as a system, including interfaces to work by others for one year from the date of Acceptance of the Work. Specific Division 28 sections may require longer warranty periods. Divisions of work among various suppliers, vendors, installers, subcontractors, and other parties will not be recognized or accepted.

B. Extended Warranty: Provide itemized pricing for an Extended Service and Warranty for each year after the initial warranty period up to five (5) years. Describe whether all parts and labor are included in this offering.

C. Guarantee to repair and replace defective materials or workmanship during the warranty period including labor and materials.

D. An emergency maintenance (Warranty) request shall be defined as a system or portion of a system failure that affects building safety, security, and operation of critical components. Failure of a single component (i.e., smoke detector, intercom station, camera, or monitor) is not considered an emergency maintenance request.

E. Respond within four hours to an emergency maintenance request. Provide a twenty-four hour telephone contact number (24 hours per day, 365 days per year). Service response time is defined as the period between the placing of a service request and the arrival of a qualified technician capable servicing the problem on-site.

F. Maintain a sufficient parts inventory at the project during the warranty period to meet the guaranteed system repair times.

G. Repair and make operational any defective materials or workmanship resulting from an emergency maintenance request within an 8-hour period from the time of the initial arrival of service personnel at the site. Correct non-emergency defective materials or workmanship within four (4) calendar days of receiving notice of the defect.

H. Where the equipment manufacturer's warranty covers a longer time period than that required by these Specifications, the manufacturer's warranty shall govern.

1.15 EXTRA MATERIALS

A. Prior to Acceptance of the Work, deliver to the Owner all spare parts and extra materials required in each Section. All spare parts and extra materials shall be brand new in their original shipping boxes or packages and shall have one year material warranty remaining at the time of delivery. Extra materials shall be available to the Contractor to use as immediate replacements during the warranty period. All extra materials used for the warranty requirements shall be replaced by the Contractor.

B. Special Tools:

1. Provide three of each type of security screw bits used.
2. Provide minimum of one of any specialty tools used.

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Comply with the General and Supplementary Conditions and Division 1 Specifications.

B. The products named in this section and the sections governed by this section establish minimum qualities that substitutions must meet to be considered acceptable. The specified products have also been used in preparing the drawings and specifications, and therefore establish the basis for equipment sizing, wire and cable design, power consumption, and other design parameters.

C. Substitution requests, if permitted, will be considered only if submitted in strict accordance with the followings:

1. Cross-reference submitted items to the Specifications using their related Section and paragraph number.
2. Submit complete product data, descriptive literature, catalog cuts, illustrations, schematics, technical data sheets, and test data necessary for the Owner’s Representative to ascertain that proposed equipment and materials comply with specification requirements. Include manufacturer’s name, model, catalog or part numbers. Catalog cuts shall be legible and shall clearly identify equipment being submitted.
3. Disclosure of Product Deviations: Specifically identify and tabulate any and all deviations from the contract documents including all system functions and features. Reference the corresponding specification sections and paragraph/article numbers. All variances and deviations will be reviewed for acceptance or rejection. It will be the Contractor’s sole responsibilities to comply with all other contract requirements not revealed in the disclosure of product deviations.

D. The Contractor shall take full responsibility for all design, coordination, and cost associated with substitutions including, but not limited to:

1. Its integration into the total system including physical mounting space, electrical interconnection, signal wiring, power, quality, electromagnetic interference, communication protocols, and similar design considerations.
2. Any additional materials, equipment, components, accessories, items required for equivalent system operation and performance.
3. Any necessary changes to branch power circuits, circuit protective devices, and the Work of other trades.
4. Any modifications to wire, cable, and raceway design.

2.2 MATERIALS AND EQUIPMENT

A. All equipment and materials required for installation under these Specifications shall be new and without blemish or defect.

B. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacturing of such items, for which replacement parts are available. Specifications are prepared long in advance of project construction; the contractor is to use the newest model of the specified products available at bid time.

C. All material and equipment shall be listed, labeled, or certified by Underwriters' Laboratories, Inc., where such standards have been established. Equipment and material which are not covered by UL Standard will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe will be considered, if inspected or tested in accordance with national industrial standards such as NEMA or ANSI.

D. All parts of a system shall be the product of one manufacturer. When more than one unit of the same class of equipment or material is required, such units shall be the products of a single manufacturer. Constituent parts which are similar shall be the product of a single manufacturer.

E. All components of an assembled unit need not be products of the same manufacturer; however, all components must be acceptable to the Owner's Representative. Components shall be compatible with each other and with the total assembly for the intended service.

2.3 EQUIPMENT MODIFICATIONS:

A. When standard manufactured equipment is modified from its original condition or factory options have been exercised identify the changes as noted below.

1. Clearly identify the modifications on the shop drawings.
2. Clearly identify each piece of modified equipment with a label, which states, "This unit has been modified..." and identify the modification or reference. Locate the label so that a service technician or factory service personal will be able to determine the equipment in use is non-standard and that modifications are

required for service, testing and replacement.

3. Identify and describe the modifications on the Record Documents.

B. Equipment modification labels are not required for jumper or switch settings.

2.4 FABRICATION

A. Fabricate enclosures to easily accommodate interconnecting cables entering from above or below through the use of auxiliary gutters, cable trays, and conduits. Protect all metal cabinet edges where conductors cross and conduit ends with protective covering or bushing.

B. Group wires and cables by types, boards and modules, and maintain National Electrical Code clearances throughout the installation, including Class 1, Class 2, communications, and branch circuit power separations. Maintain sufficient and proper separation between microphone-level audio, line-level audio, high-level audio, and video cables.

C. Uniformly organize equipment and cable routing throughout all enclosures, racks, and cabinets. Provide wiring ducts, wireways, wire posts, D rings, wire saddles to route and secure factory and field wiring. Provide routing for all wiring from point of entry to point of termination to maintain required separation, access to all components, and general organization to the wiring. Neatly dress, route and secure wiring.

D. Mechanically fasten cabinet raceways and cable clamps to enclosure rear panels, rack members, console members, or to other system components. The use of adhesive fasteners (without mechanical fastener) is not permitted. Furnish and install cable support posts where necessary to properly support cables.

E. No splices are permitted in cabinet raceways. Exception: Splice to cable shield when within two inches of cable termination is permitted.

F. Furnish and install metal grounding type outlet strips in each equipment cabinet, enclosure, and rack. Leave a minimum of two unused receptacles at each location for future expansion. Neatly shorten and dress power cords from individual equipment to the outlet strips.

G. Provide protection from accidental contact of all terminals or exposed conductors over 25 volts within enclosures that contain Class 2 wiring. Use non-conductive barriers, heat shrink or other acceptable methods. Tape of any kind is not permitted.

H. Provide an isolated ground bus within each equipment cabinet, enclosure, and rack for single point termination of audio and data shields and grounds.

2.5 SOURCE QUALITY CONTROL

A. Shop Inspections:

1. The Owner's Representative shall have the right at all times to inspect or otherwise evaluate the Work performed or being performed and shall have access to the premises in which the Work is being performed.
2. The Owner's Representative may verify the inspections or re-inspect any item. The Owner reserves the right to reject materials and workmanship found unacceptable during inspections.

B. Shop Test and Demonstration

1. Shop Test and Demonstration shall be a major milestone that shall commence only after all shop assembly, system integration, and software development and programming is complete. Owner's approval of the integrated shop test shall be obtained before any system components are shipped to the site for installation.
2. Perform a point-by-point system demonstration of the Integrated Security System including CCTV system, Duress Alarm System, Integrated Sequences of Operation, PLC system, control panels, Intercom, and Public Address system to show all systems functioning and communicating as a single integrated system.
3. Each input and output point, operational sequence, control panel, and PLC network will be tested. Provide sample field devices, approved mock up devices and jumpers to simulate actual field operation conditions. In addition, simulated system failure, response time, reset and boot up time, and other tests will be conducted as directed by the Owner.
4. Sample field devices including, but not limited to are, intercom stations, paging speakers, microphones, cameras, CCTV monitors, locks, and door position monitoring devices.
5. Notify the Owner a minimum of 15 working days prior to demonstration so that the Owner may witness the demonstration.
6. Conduct the demonstration in strict accordance with the test procedure accepted by the Owner. Demonstrate full compliance with the required operating modes and sequences of operation under all operating modes. Record demonstration/ test results on a report which shall include a list of all personnel witnessing the demonstration, test methods used, and a record of each specific test made.
7. If demonstration results are not in compliance with requirements, make necessary hardware and software changes, corrections, repairs, or adjustments at no additional cost to the Owner. If corrections cannot be made during the scheduled Shop Test and another shop test is required, the Contractor shall pay for all transportation, lodging and expenses of the Owner's representatives' (maximum seven people) attending the additional tests. This process shall continue until the systems are acceptable to the Owner.

2.6 FIRESTOPPING/SEALANT MATERIALS

A. Firestop and seal all penetrations of fire walls with minimum three hour sealant or Fire Stop Putty(FSP). This includes but is not limited to all raceway, conductor, sleeve and cable tray penetrations where penetrating device does not completely seal the hole.

B. Accepted Products: International Protective Coatings Corp. FlameSafe® FSP 1100, Nelson FSP, Domtar Fire-Halt® or approved equal from other manufacturers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Carefully inspect the installed Work by other trades and verify that all such Work is complete to the point where installation of the Work of this division may properly commence.

B. In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

C. Install all equipment in accordance with all pertinent codes and regulations, the accepted design, and the referenced standards.

3.2 INSTALLATION

A. Equipment Identification:

1. Install a nameplate on each individual equipment rack, enclosure, boxes, cabinet, and significant equipment item.
2. Use identifiers and abbreviations defined in the Drawings whenever possible. Use plan designation for labeling, unless indicated otherwise.
3. Nameplates shall be laminated black phonemic resin with a white core and engraved lettering, a minimum of 1/4" high. Use fasteners to install nameplates. Do not fasten with adhesives.
4. Engrave using upper case letters of uniform height; centered on device, cover plate, or enclosure; with all characters made clearly and distinctly.
5. All equipment shall have the manufacturer's name, address, model number and rating on a name plate securely affixed in a conspicuous place. All equipment shall bear labels attesting to Underwriters Laboratories approval where subject to Underwriters Laboratories label service.
6. Identify all field terminals and relays with device identification. Lettering shall be 3/16" high minimum.

B. Equipment Installation:

1. Install all equipment in accordance with the manufacturer's recommendations, and accepted shop drawings.
2. Install all equipment in compliance with CEC requirements, NECA's "Standard of Installation", and recognized industry practices.
3. If requested, submit structural and seismic mounting load calculations demonstrating adequate support and bracing for seismic zone 4.
4. Do not attach electrical materials to roof decking, removable or knockout panels, or temporary walls and partitions unless indicated otherwise. Use hangers and other supports to support the equipment and materials, intended for this purpose.
5. Locate equipment as close as practical to the locations shown on the Drawings.
6. Maintain minimum 3-foot working clearances on each side of equipment or

equipment racks where access is required to inspect, service or adjust.

7. Check equipment against available mounting space indicated on the drawings. Coordinate location of equipment with existing devices to minimize interference. Bring all conflicts or clearance problems to the attention of the Owner's Representative during the preparation of shop drawings.
8. Where the Owner's Representative determines that equipment installation is not conveniently accessible for operation and maintenance, remove and reinstall equipment in a conveniently accessible manner at no extra cost.

C. Grounding and Shielding:

1. Comply with Section 28 05 26.

D. Surge Suppression:

1. Comply with Section 28 05 26.

3.3 FIELD QUALITY CONTROL

A. Initial Performance Testing:

1. Initial Performance Testing is to be conducted by the Contractor.
2. Point-by-point testing shall include the sequential operation of each system and control function in each of its operating modes. All tests are to be conducted and recorded per the accepted procedure and test forms.
3. Notify the Owner's Representative five days in advance that this activity will be occurring.

B. Performance Testing:

1. Performance Testing is to be conducted by the Contractor and witnessed by the Owner's Representative.
2. Schedule point-by-point performance testing only after Initial Testing has been satisfactorily completed and all necessary corrections have been made. Provide the Owner's Representative with a minimum of 5 working days notice with a request to schedule Performance Testing. Submit Initial Performance Test records prior to the scheduled Performance Test. Failure to submit test results as specified shall be cause to re-schedule testing.
3. Point-by-point testing shall include the sequential operation of each function in each of its operating modes, in addition to completion of all required performance testing and measurement.
4. Conduct point-by-point testing in the presence of Owner's Representative. Record test results on the accepted test checklist which shall include a list of all personnel witnessing the tests. If test results are not in compliance with requirements, make necessary changes or adjustments at no additional cost, and arrange for another test. This process shall continue until the systems are acceptable to the Owner's Representative.
5. Failure of any part of the system which precludes completion of system testing, which cannot be repaired in four (4) hours, shall be cause for terminating the test.

Repeated failures which result in a cumulative time of eight (8) hours to effect repairs, shall cause the system test to be declared unacceptable. Retesting of the entire system shall be rescheduled at the convenience of the Owner.

6. Performance Testing will also include inspections for contract document compliance, codes and standards compliance, and workmanship.

C. Continuous Functional/Operational Testing:

1. After completion and Owner Representative's approval of the Performance Testing, conduct a 14-day operational test in order to demonstrate continuous system performance. The systems will not be accepted until they operate for 15 continuous days without a system failure. Restart the test period from the beginning after every confirmed system failure.
2. The Owner will provide staff to man and operate all control points during continuous operational testing. The Owner's test personnel will simulate staff movement, generate alarms, and otherwise randomly operate as many functions as practical on a nearly continuous, 8-hour-shift basis. Provide jumpers and simulation programs to test alarms and other conditions that cannot be readily performed by test personnel. The test staff will record all suspected problems and provide these reports to the test committee.
3. The Owner's Representative will make the final determination for all disputed problems.
4. System failure is defined as any portion of the system that fails to operate as intended and can not be corrected within 24 hours of the failure. Individual device failure such as a single camera or a single intercom station will not be a cause for system failure.

3.4 CLEANING

A. Comply with Division 1 requirements.

B. Protect equipment during installation against entry of foreign matter on the inside. Vacuum clean all equipment both inside and outside before testing, operating and painting. Clean electrical connections with a suitable solvent prior to assembly.

C. Remove from the premises and dispose of all packing material and debris on a daily basis.

D. Upon completion of the Work, remove excess debris, materials, equipment, apparatus, tools and the like and leave the premises clean, neat and orderly.

E. Thoroughly polish all bright metal or plated Work and remove any pasted labels, dirt or stains from the equipment.

3.5 TRAINING

A. Provide on-site, project-specific training sessions for system operations, maintenance, and programming with designated total hours as follows:

		Operational	Maintenance	Programming
1.	Electronic Components	1	1	0
2.	PLC Integrated Control System	1	1	1
3.	HMI Control Stations	1	1	1
4.	Intercom System	1	1	1
5.	Video Surveillance System	1	1	1

B. All training is to review the existing systems as they apply to the equipment and systems provided under this contract. All personnel being trained are expected to have basic experience for the existing systems.

C. Operational Training:

1. Train security staff in the operation of the System. Operational training shall include how to monitor and control the systems provided under this contract and how to respond to system events.

D. Maintenance Training:

1. Train Owner's personnel in the basic user level maintenance and trouble shooting of the System. Structure training to identify the equipment and systems that can be serviced or reset by the on duty building engineer, how to identify systems that have failed or not working, and emergency shutdown procedures.
2. Provide a combination of classroom sessions supported by audio/visual aids, and field sessions with personnel participating in hands-on preventative, corrective maintenance and reactive maintenance.

E. Programming Training:

1. Train Owner's personnel in the site-specific programming and software trouble shooting of the System. Training will also include all user programmable features. Conduct training sessions using instructors who have been actively involved throughout construction and who are certified in writing by the manufacturers of the specific systems.
2. Provide a combination of classroom sessions supported by audio/visual aids, and field sessions with personnel participating in hands-on for programming changes, software uploading/downloading, trouble shooting, etc.

F. Submit an estimated training schedule 15 days prior to training for approval by the Owner's Representative. Estimate classroom and hands-on hours required for all three types of training (operational, maintenance, and programming). Include a syllabus for each class session.

G. All training materials including Operational and Maintenance (O&M) Manuals shall be reviewed and approved prior to conducting the specific training.

3.6 SCHEDULE 28 05 00 A - SAMPLE LIST OF DIVISION 28 SUBMITTALS

A. CPM Schedule

B. Submittal Matrix

C. Schedule of Values (SOV)

D. Licenses and certifications

E. Key Project Personnel

F. Product Data

G. Shop Drawings

1. Floor Plans
2. Enlarged Control / Equipment Rooms and Elevations
3. Rack and Cabinet Elevations
4. Block Diagrams
5. Single Line Diagrams
6. Point- to-Point Diagrams
7. Schematic Diagrams
8. Installation Diagrams and Details

H. Calculations; UPS, Data

I. Sequence of Operations

J. Samples

K. Test Procedures

L. Test Results

M. Record Documents

1. Drawings
2. O&M Manuals
3. Warranty

N. Extra Materials

3.7 SCHEDULE 28 05 00 B - SUMMARY OF REQUIRED LICENSES AND CERTIFICATIONS

A. This list is provided for the convenience of the Contractor only.

B. Section 28 05 00 Integrated Systems Contractors

1. California State Contractor's License C-10 (high voltage) or
2. California State Contractor's License C-7 (low voltage)
3. Key Personnel Degree or equal

END OF SECTION

SECTION 28 05 13 – CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Building wire and cable.
2. Wiring connectors and connections.

1.3 SYSTEM DESCRIPTION

A. Provide wiring and cables as described herein, shown on the drawings or as recommended by the manufacturer. When in conflict, the more stringent or greater requirements will take precedence as determined by the Engineer-of-Record.

B. Wires, cables, harnesses and connectors specifically described in another section or provided by or manufactured by a manufacturer in that section shall be provided by that section.

C. Wire size and features are minimum requirements, specific applications or manufacturers may have more stringent requirements which are to be provided at no additional cost to Owner.

1.4 SUBMITTALS

A. Comply with Section 28 05 00.

1.5 QUALITY ASSURANCE

A. Comply with Section 28 05 00.

B. NEC Compliance: Comply with Article 725 (Class 2 Power-limited Circuits).

C. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years documented experience.

1.6 PROJECT CONDITIONS

A. Conductor sizes are based on copper.

B. Aluminum conductors shall not be used.

C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.

D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.7 COORDINATION

A. Coordinate Work with other trades.

B. Determine required separation between cable and other work.

C. Determine cable routing to avoid interference with other work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide materials from listed manufacturers or approved equal.

1. Approved cable manufactures:
2. Belden
3. Berk-tek
4. Commscope/General Instrument
5. General Cable
6. Mohawk
7. Optical Cable Corporation.
8. VersaLAN
9. West Penn

2.2 CONNECTORS

A. Terminal Blocks:

1. Type: DIN-rail-mounted, modular, screw terminals.
2. Provide fused terminals where required or indicated.
3. Accepted Manufacturers: Entrelec, Phoenix Contact, Weidmueller, or approved equal.

B. CCTV Video Connectors:

1. Type: 75-ohm, commercial crimp-on, 3-piece BNC connectors.
2. Body: Zinc outer piece and nickel center.
3. Contacts: Nickel/gold plating.
4. Accepted Products: Cambridge CPMC-78 series, AMP or approved equal from other manufacturers.

C. Data Connectors:

1. Type: Deluxe plastic, 9-pin, D sub-miniature hoods
2. Accepted Products: Cambridge HX series, AMP or approved equal from other manufacturers.

2.3 WIRES AND CABLES

A. Cables installed below grade (even in conduit) shall be rated for use in wet locations.

B. Listings and Markings: UL listed and marked for flame resistance as follows:

1. General purpose: CEC Type CM
2. Riser: CEC Type CMR
3. Plenum: CEC Type CMP

C. Communication and Control Cables:

1. Conductors: Stranded bare copper, size as indicated.
2. Insulation level: 300 VRMS.
3. Temperature level: 75° C.
4. Paired cables shall be twisted.
5. Shield: 100% coverage aluminum polyester foil with drain wire.

D. Coaxial Cables:

1. Nominal impedance: 75 ohms.
2. Conductor: Stranded bare copper.
3. Dual shield: 100% coverage aluminum polyester tape with 95% coverage tinned copper braid.
4. Maximum attenuation at 10 MHz: 0.87 dB per 100 feet.
5. Insulation: Foam polyethylene, 300 VRMS.
6. Minimum temperature level: 75° C

E. Data Grade Cables:

1. Type: Twisted individually shielded pairs, quantity and size as indicated.
2. Conductors: Stranded bare copper.
3. Insulation level: 300 VRMS.
4. Minimum temperature level: 75° C
5. Maximum capacitance between conductors: 25 pf per foot.
6. Shield: 100% coverage aluminum polyester foil with drain wire.

F. Category 6 UTP

1. UL listed NEC type CM as defined in NEC Article 800
2. Complies with UL 1581 Test
3. Meets and Exceeds TIA/EIA 568-B.2 Specifications

G. Category 3 UTP

1. High pair count unshielded 24-AWG solid conductor twisted-pair core with a metallic sheath ARMM riser rated shall meet or exceed the TIA/EIA-568B Commercial Building Standards for CAT3. The cable will be riser or plenum rated as dictated by National, State and Local Electrical and Building Codes.

H. Optical Fiber Cable – Multimode

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Berk-Tek; a Nexans company.
   b. Belden CDT Inc.; Electronics Division.
   c. CommScope, Inc.
   d. Corning Cable Systems.
   e. General Cable Technologies Corporation.
   f. Mohawk; a division of Belden CDT.
   g. Superior Essex Inc.
   h. SYSTIMAX Solutions; a CommScope Inc. brand.

2. Description: Multimode, 50/125 micrometer, 24 fiber, nonconductive, tight buffer, optical fiber cable.

   a. Comply with ICEA S-83-596 for mechanical properties.
   b. Comply with TIA/EIA-568-B.3 for performance specifications.
   c. Comply with TIA/EIA-492AAAA-B for detailed specifications.
   d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

      1) General Purpose, Nonconductive: Type OFN or OFNG.
      2) Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
      3) Riser Rated, Nonconductive: Type OFNR or OFNP, complying with UL 1666.
      4) General Purpose, Conductive: Type OFC or OFCG.
      5) Plenum Rated, Conductive: Type OFCP, complying with NFPA 262.
      6) Riser Rated, Conductive: Type OFCR or OFCP, complying with UL 1666.

   e. Conductive cable shall be aluminum armored type.
   f. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
   g. Minimum Modal Bandwidth: 2000 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

3. Jacket:

   a. Jacket Color: Aqua for 50/125-micrometer cable.
   b. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
   c. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

I. Optical Fiber Cable – Single Mode

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Berk-Tek; a Nexans company.
   b. Belden CDT Inc.; Electronics Division.
   c. CommScope, Inc.
   d. Corning Cable Systems.
   e. General Cable Technologies Corporation.
   f. Mohawk; a division of Belden CDT.
   g. Superior Essex Inc.
   h. SYSTIMAX Solutions; a CommScope Inc. brand.

2. Description: Single-mode, 12 fiber, nonconductive, tight buffer, optical fiber cable.

   a. Comply with ICEA S-83-596 for mechanical properties.
   b. Comply with TIA/EIA-568-B for performance specifications.
   c. Comply with IEC 60793-2-50 Type B.1.1.
   d. Comply with TIA/EIA-492CAAA for detailed specifications.
   e. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

      1) General Purpose, Nonconductive: Type OFN or OFNG.
      2) Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
      3) Riser Rated, Nonconductive: Type OFNR or OFNP, complying with UL 1666.
      4) General Purpose, Conductive: Type OFC or OFCG.
      5) Plenum Rated, Conductive: Type OFCP, complying with NFPA 262.
      6) Riser Rated, Conductive: Type OFCR or OFCP, complying with UL 1666.

   f. Conductive cable shall be aluminum armored type.
   g. Maximum Attenuation: 0.7 dB/km at 1310 nm; 0370 dB/km at 1550 nm.

3. Jacket:

   a. Jacket Color: Yellow for all Single-mode cable.
   b. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
   c. Imprinted with fiber count, fiber type, and aggregate length at regular

intervals not to exceed 40 inches (1000 mm).

J. Optical Fiber Cable Hardware

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. ADC.
   b. Belden CDT Inc.; Electronics Division.
   c. CommScope, Inc.
   d. Corning Cable Systems.
   e. Hubbell Premise Wiring.
   f. Leviton Voice & Data Division.
   g. Panduit Corp.
   h. Siemon Co. (The).
   i. SYSTIMAX Solutions; a CommScope Inc. brand.

2. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

   a. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

3. Patch Cords: Factory-made, duplex-fiber cables in 36-inch (900-mm) lengths.
4. Cable Connecting Hardware:

   a. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
   b. Quick-connect, simplex and duplex, Type LC connectors. Insertion loss not more than 0.75 dB.
   c. Type SFF connectors may be used in termination racks, panels, and equipment packages.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with Section 28 05 00.

B. Comply with manufacturer's recommendations, procedures, and standards for the assembly, programming, and operation of the alarm system.

C. Coordinate closely with the door and frame contractor for proper installation of all door position sensors per manufacturer’s recommendations.

D. Mount individual components to removable rear panels in wall-mounted cabinets using

DIN rails, snap track or stand off-mounted PC boards, or properly sized mounting hardware.

E. Fuses: Provide over-current protection for control relay outputs and associated wiring.

F. Power Distribution:

1. Hardwire each system power supply circuit to a line voltage transient voltage surge suppresser at its point of supply.
2. Coordinate with the electrical contractor for power capacities and circuit assignments in the electrical panel schedules and drawings for the alarm systems. Notify the Owner if additional power or circuits may be required.

3.2 WIRE TERMINATION, DRESSING, AND IDENTIFICATION:

A. Terminate or join all wires and cables with specified terminal blocks or connectors submitted and accepted for the specific termination. Acceptable termination and junction methods include:

1. Equipment or device terminal blocks (provided with equipment or device): Direct connection with stripped conductors.
2. Equipment or device screw terminals (provided with equipment or device): Two-crimp, spade lug on stripped conductors.
3. Device lead wires (provided with device): Two-crimp, insulated wire nut over conductors.
4. Equipment or device connector (provided with equipment or device): Provide mating connector.
5. Junctions and/or splices where indicated: Provide terminal blocks for control and communication cables and specified connector types for others.

B. Use the specific cable stripper for each cable and wire type. Use a 3-step-cut coax cable stripper on coaxial cables, a jacket stripper on jacketed cables, and the proper size stripper for individual conductors. Do not strip with a knife, scissors or other improper tool.

C. Use the proper crimping tool for each cable / connector combination. For example, crimp coaxial cables using a full-cycle ratchet crimp tool with the specific size hexagonal steel die for the cable type. Crimp D-subminiature connectors using a specific D-sub crimp tool, and so on.

D. For multi-pin connectors use the appropriate pin insertion and extraction tool.

E. Dress wires and cables to provide a neat and orderly appearance within all enclosures, equipment racks, cabinets, consoles by routing in snap-cover, plastic wiring duct or other acceptable method. In locations where wiring duct is not feasible, organize by cable clamping, dressing and tie-wrapping.

F. Relieve strain on all loose wire bundles using tie-wrap supports fastened with machine screws or bolts. Do not use self-adhesive type supports.

G. Neatly form cable ends and apply shrinkable tubing to shielded cables or where necessary to secure the insulation against fraying or raveling.

H. Individually identify all conductors with a unique number located within 1-1/2-inch from its termination at both ends. Impress the number on a fixed length of white shrinkable tubing with a heat impression stamping machine, or other acceptable method.

I. Cross reference the interconnection diagrams of the record drawings with the installed cable identification numbers.

J. Route from source to termination in a uniform manner through raceways, cabinets, and equipment housings without breaking the insulation or deforming the cables. "Flying splices", meaning splices in wire bundles, raceways, or pull boxes are specifically prohibited. Splice only at junction box locations shown on the Drawings.

K. Obtain Owner’s pre-approval for all exposed cable runs.

L. Maintain separation between Class 1, Class 2, communications, and branch circuit power wire and cable in accordance with the CEC. Do not route microphone-level audio, line-level audio, or high-level audio in the same conduit or cable group.

M. Do not exceed the following cable pulling tensions:

1. 24 AWG conductors: 4 lbs. per conductor.
2. 22 AWG conductors: 7 lbs. per conductor.
3. 20 AWG conductors: 12 lbs. per conductor.
4. 18 AWG conductors: 19 lbs. per conductor.
5. 16 AWG conductors: 30 lbs. per conductor.
6. 14 AWG conductors: 48 lbs. per conductor.

N. Use a scale to measure tensions for typical cable pulls. If tensions are exceeded even momentarily or if cables are damaged, remove the cables. Install new cables either using an acceptable anti-friction agent or adding pull boxes to the run.

O. Install edge protection materials ("cat track") on the edges of holes, lips of ducts of any other point where wires or cables cross sharp metallic edges.

3.3 FIELD QUALITY CONTROL

A. Performance Testing:

1. Comply with Section 28 05 00, Performance Testing for:

a. Initial Performance Testing.
b. Performance Testing.

3.4 TESTING

A. Testing of all newly installed cable channels shall be performed prior to system cutover.

B. All category 6 field-testing shall be performed with an approved level III balanced twisted-pair field test device.

C. All installed category 6 channels shall perform equal to or better than the minimum requirements as specified by the table below:

1.

Parameter	Performance @ 100MHz	Performance @ 200MHz	Performance @ 250MHz
Insertion Loss	20.3 dB	29.7 dB	33.7 dB
NEXT Loss	42.1 dB	37.5 dB	36.1 dB
PS NEXT Loss	40.6 dB	36.1 dB	34.6 dB
ACR	21.8 dB	7.8 dB	2.4 dB
PS ACR	20.3 dB	6.4 dB	0.9 dB
ACR-F	23.9 dB	17.9 dB	15.9 dB
PS ACR-F	20.9 dB	14.9 dB	12.9 dB
Return Loss	14.0 dB	11.0 dB	10.0 dB
Propagation Delay	528 ns	527 ns	526 ns
Delay Skew	40 ns	40 ns	40 ns

D. Category 3, balanced twisted-pair horizontal and backbone cables, whose length does not exceed 90 m (295 ft) for the permanent link, and 100 m (328 ft) for the channel shall be 100 percent tested according to ANSI/TIA/EIA-568-B.1. Test parameters include wire map plus ScTP shield continuity (when present), insertion loss, length and NEXT loss (pair-to-pair). NEXT testing shall be done in both directions.

E. All balanced twisted-pair backbone cables exceeding 90 m (295 ft) or 100 m (328 ft) shall be 100% tested for continuity if applications assurance is not required.

F. Category 6 balanced twisted-pair horizontal and backbone cables, whose length does not exceed 90 m (295 ft) for the permanent link, and 100 m (328 ft) for the channel shall be 100 percent tested according to ANSI/TIA/EIA-568-B.1. Test parameters include wire map plus ScTP shield continuity (when present), length, NEXT loss (pair-to-pair), NEXT loss (power sum), ELFEXT loss (pair-to-pair), ELFEXT loss (power sum), return loss, insertion loss, propagation delay, and delay skew.

G. Test Equipment Criteria

1. All balanced twisted-pair field testers shall be factory calibrated each calendar year by the field test equipment manufacturer as stipulated by the manuals provided with the field test unit. The calibration certificate shall be provided for review prior to the start of testing.
2. Autotest settings provided in the field tester for testing the installed cabling shall be set to the default parameters
3. Test settings selected from options provided in the field testers shall be compatible

with the installed cable under test.

3.5 TRAINING

A. Provide training in accordance with Section 28 05 00, Demonstration.

END OF SECTION

SECTION 28 05 14 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Rigid Galvanized Steel Conduit (RGS).
2. Electrical Metallic Tubing (EMT).
3. Rigid Non-metallic Conduit (PVC).
4. Flexible Metal Electrical Conduit.
5. Liquid-tight Flexible Metal Conduit.
6. Gutters, Wireways and Troughs.
7. Cable Trays
8. Fittings, Couplings, and Connectors.
9. Supporting Devices.
10. Sealant.
11. Outdoor Outlet Boxes.
12. Indoor Outlet Boxes and Small Junction and Pull Boxes.

B. REFERENCES

1.	ANSI C80.2	Rigid and Steel Conduit.
2.	ANSI C80.3	Electrical Metallic Tubing - Zinc Coated.
3.	ANSI 870	Wireways, Auxiliary Gutters, and Associated Fittings.
4.	NECA	Standard of Installation.
5.	NEMA FB 1	Fittings, Cast Metal Boxes and Conduit Bodies for Conduit
6.	NEMA OS 1	Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
7.	CEC	California Electrical Code
8.	UL 1	Flexible Metal Conduit.
9.	UL 5	Surface Metal Raceways and Fittings.
10.	UL 50	Cabinets and Boxes.
11.	UL 360	Liquid-Tight Flexible Conduit.
12.	UL 514A	Metallic Outlet Boxes.
13.	UL 514B	Fittings for Conduit and Outlet Boxes.

1.3 SYSTEM DESCRIPTION

A. Design Requirements:

1. Raceway Size: Use a minimum conduit inside diameter of 3/4-inch. Size conduit and raceway for a maximum cross-sectional fill area of 40%.
2. Gutter, Wireway and Trough Size: Size for a maximum cross sectional fill area of 20%.
3. Raceway Support: For each support and group of fasteners provide strength equal to the maximum weight of the present load plus all future raceways for which the support provides space, times a safety factor. Except as otherwise indicated, use a safety factor greater than four where necessary to provide a minimum safety allowance of 200 lbs. Provide additional support strength where required to prevent distortion of raceway during wire pulling.
4. Equipment Ground Conductor (Green): Where indicated, shown or required, raceway sizes shall be adequate to include the circuit conductors, an equipment ground conductor and a neutral conductor in accordance with percentage of fill requirements as specified.

1.4 SUBMITTALS

A. Conform to the requirements of Section 28 05 00.

B. Product Data: Submit manufacturer's technical data for all items to be used including specifications, installation instructions and general recommendations.

C. Shop Drawings: Submit scale plan and elevation drawings of raceway systems showing layout and size of raceways, pull boxes and junction boxes within three feet of equipment to be installed by this contract.

D. Record Drawings: Provide shop drawings showing as-built conditions of all raceways, termination boxes, junction boxes, pull boxes and installed equipment.

1.5 SITE CONDITIONS

A. Conduit routing shown on the Drawings is approximate, actual routing will depend on site conditions and code requirements.

B. Coordinate with the Owner for approved locations of conduit and equipment installation is the existing facility.

PART 2 - PRODUCTS

2.1 RACEWAY (FOR INDOOR USE ON EXPOSED SURFACES)

A. Acceptable Product: Wiremold (Steel Surface Raceway System): V500, V700, & 700WH

B. Wiremold (Steel Surface Raceway System): 3000

2.2 RIGID GALVANIZED STEEL CONDUIT (RGS)

A. Rigid steel conduit zinc coated shall conform to ANSI C80.2.

2.3 ELECTRICAL METALLIC TUBING (EMT)

A. EMT, zinc coated shall conform to ANSI C80.3.

2.4 RIGID NON-METALLIC CONDUIT (PVC)

A. Rigid non-metallic conduit shall be Schedule 40 PVC conduit manufactured in compliance with NEMA TC-2. PVC conduit shall be U.L. listed. Joints shall be solvent cement type.

B. Provide PVC elbows, bends, fittings and adapters as required for a complete installation. Provide solvent cement as recommended by the conduit manufacturer.

2.5 FLEXIBLE METAL ELECTRICAL CONDUIT (GREENFIELD)

A. Flexible metal electrical conduit shall conform to UL 1.

2.6 LIQUID-TIGHT FLEXIBLE STEEL CONDUIT

A. Liquid-tight flexible steel conduit shall conform to UL 360.

B. Sizes 1.25 inches and smaller: Provide with a continuous copper bonding conductor wound spirally between convolutions.

C. Sizes 1.5 inches and larger: Provide with an internal grounding conductor and grounding bushings.

D. Also known as Seal Tight flexible conduit.

2.7 GUTTERS, WIREWAYS AND TROUGHS

A. Use NEMA Type 12.

B. Use 14 gauge bodies and covers.

C. Use above and below wall-mounted enclosures and cabinets for the collection of field device conduits, wires, and cables.

D. Do not use in inaccessible locations.

2.8 FITTINGS, COUPLINGS AND CONNECTORS

A. Fittings for conduit and outlet boxes shall conform to UL 514B.

B. Surface metal electrical raceways and fittings shall conform to UL 5.

C. Use fittings listed and equally acceptable for specific conduit or raceway system used; e.g.: Use PVC coated fittings with PVC coated conduit.

D. For threaded rigid steel conduit, do not use threadless or compression type fittings.

E. For EMT, provide steel or malleable iron "concrete-tight" or "rain-tight" couplings and connectors. Use compression, set screw or stainless steel multiple locking type bodies. Do not use indentation type fittings.

F. Bushing and connectors shall be insulated type which maintain continuity of conduit grounding system. Insulating material shall be molded or locked into metallic body of the fitting. Bushings made entirely of nonmetallic material will not be allowed.

G. Set screw connectors and couplings body shall have wall thickness at least equal to wall thickness of conduit used. Couplings or conduit trade size ¾-inch through 2 inch shall have two set screws per fitting and 2.5-inch through 4-inch shall have four set screws per fitting. Set screws shall be case hardened steel with hex head and cup point.

H. Provide flexible metal conduit fittings made of steel or malleable iron. Insulate with one of the following types:

1. Wedge and screw type having an angular wedge fitting between the convolutions of the conduit.
2. Squeeze or clamp type having a bearing surface contoured to wrap around the conduit and clamped by one or more screws.
3. Steel, multiple point type, for threading into internal wall of the conduit convolutions.

I. Liquid-tight flexible metal conduit shall incorporate a threaded grounding cone, a steel, nylon or equal plastic compression ring and a gland for tightening. Fitting shall be steel, or malleable iron with insulated throat, with male thread and locknut or male bushing with or without "O" ring seal.

J. Expansion fittings shall be hot-dipped galvanized malleable iron with a packing ring to prevent entrance of water, a pressure ring, a grounding ring and a separate external copper bonding jumper.

K. Inferior material such as "pot metal" shall not be used for any type of fitting.

L. All locknuts shall be the bonding type with sharp edges for digging into the metal wall of an enclosure.

2.9 SUPPORTING DEVICES

A. General: Provide supporting devices with manufacturers standard materials, designed and constructed in accordance with published product information, for a complete installation.

B. Raceway Supports: Provide manufacturer's standard supports including clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze, wall brackets and spring steel clamps.

C. Corrosion Resistance: Provide all supports, support hardware and fasteners hot-dipped galvanized or cadmium plated.

D. Fasteners: Provide fasteners as required by the type of wall or ceiling construction and the equipment to be supported by the fastener.

E. U-Channel Strut Systems: Provide minimum 12 gauge U-channel strut system for mounting and supporting electrical equipment. Fittings shall mate with the U-channel.

F. Fittings for Strut System: Galvanized steel end caps, conduit clamps, conduit hangers, U-bolts.

2.10 OUTDOOR OUTLET BOXES

A. Conform to NEMA FB 1, for fittings, cast metal boxes and conduit bodies.

B. Provide electrical boxes and fittings which are UL-listed and labeled, and conform to UL 50, UL 514A, UL 514B, and UL 514C.

C. Select covers for boxes of types appropriate for each use and location.

D. Provide gaskets for covers of boxes in damp locations.

E. Corrosion resistance: Provide galvanized or other equally acceptable corrosion resistant finish for all boxes, accessories and fittings.

2.11 INDOOR OUTLET BOXES AND SMALL JUNCTION- AND PULL-BOXES

A. Conform to NEMA OS 1 for sheet-steel outlet boxes, device boxes, covers and box supports. Provide minimum 4-inch square by 1.5-inch deep, one piece, deep-drawn, galvanized steel, outlet boxes for general use. Provide square cornered, straight sided gang boxes wherever required by CEC or more than two wiring devices are indicated in the same location. Provide boxes of increased depth where required by the project conditions.

B. Furnish with stamped knockouts in the back and sides.

C. Provide threaded screw holes with corrosion-resistant screws for securing box covers

and wiring devices.

D. Accessories: Provide outlet box accessories as required for each installation, including plaster covers, mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and fulfilling requirements of individual wiring situations.

2.12 FIRESTOPPING/SEALANT MATERIALS

A. Accepted Products: International Protective Coatings Corp. FlameSafe® FSP 1100, Nelson FSP, Domtar Fire-Halt® or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Penetrations:

1. Firestop and seal all penetrations of fire walls and floors with minimum three hour sealant or Fire Stop Putty(FSP). This includes but is not limited to all raceway, conductor, sleeve and cable tray penetrations where penetrating device does not completely seal the hole.
2. Provide a suitable caulk for purposes of speech privacy and air flow restriction where a fire rated seal is not required.

B. Raceways and Fittings:

1. Comply with CEC, for application, size, location and installation of each type of raceway.
2. Where not specifically shown on the drawings or specified, use the following guidelines for the selection of raceway types:

    a. RGS – Exposed exterior and wet locations. Areas subject to physical damage or vandalism.
    b. EMT – Concrete encased. Interior dry exposed locations.
    c. PVC –. Below grade or under concrete slab. Use metal risers.
    d. Flexible Metal – Use to connect to equipment that must be mechanically isolated or shifted to final position in indoor dry locations only. Use where conduit must be fished in building voids. Do not use in corrosive atmosphere.
    e. Liquid-Tight Flexible Metal – Use when flexible metal is required in wet or outdoor locations.

3. Install no more than the equivalent of three 90-degree bends between boxes.
4. Conduit and EMT runs shall be mechanically and electrically continuous from service entrance to all outlets. Each conduit shall enter and be securely connected to a cabinet, junction box, pull box or outlet by means of a locknut on

the outside and a bushing on the inside or by means of a liquid-tight, threaded, self-locking, cold-weld type wedge adapter.

5. Keep conduit at least 6 inches away from parallel runs of steam and hot-water pipes.
6. Level and square raceway runs.
7. Complete installation of electrical raceways before starting installation of cables/wires within raceways.
8. Provide supports for raceways as specified.
9. Prevent foreign matter from entering raceways; use temporary closure protection.
10. Make bends and offsets so the inside diameter is not effectively reduced.
11. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.
12. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location.
13. Run raceways with a minimum number of bends. All bends shall have the longest possible radii.
14. Install exposed raceways parallel and perpendicular to nearby surfaces or exposed structural members, and follow the surface contours.
15. Run exposed, parallel or banked raceways together.
16. Make bends in parallel or banked runs from the same center line so that the bends are parallel. Factory elbows may be used in banked runs where they can be installed parallel.
17. Join and terminate raceways with fittings designed and equally acceptable for the purpose of the raceway system and make up tight.
18. Where the installation is such that joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system.
19. Make the set screws of threadless fittings up tight; do not use pliers. Compression fittings shall be tightened with two wrenches.
20. Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts so that the dished part is against the box.
21. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder.
22. Where chase nipples are used, align the raceway and coupling square to the box and tighten the chase nipple so no threads are exposed. Running threads are not allowed.
23. Install nylon pull strings in empty raceways. Leave not less than 12 inches of slack at each end of the conduit.
24. Horizontal cross runs of conduit or EMT may be installed in partitions only where explicitly permitted. Exposed horizontal runs, where permitted, shall be installed close to ceiling or ceiling beams.
25. Conduits and EMT connected to wall outlets shall be run in such a manner that they will not cross water, steam or waste pipes or radiator branches.
26. Conduits and EMT shall not be run through beams, except where clearly indicated on drawings or where permitted.
27. Conduits and raceways above suspended ceilings may be supported from the floor construction above or from the main ceiling support members, however, the finished installation shall not interfere with the removability of ceiling panels.
28. At building expansion joints, provide expansion fittings and cross at right angles to joint.

29. Provide conduits stubbed up through or from concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs, set flush with the finished floor. Where no equipment connections are made, install screwdriver-operated threaded flush brass plugs in conduit end.
30. Provide expansion fittings for all rigidly fastened conduits spanning a building expansion joint and if not otherwise provided, for all runs 1.5 inches or larger, exceeding 150 feet in length.

C. Cable Tray Installation

1. Comply with recommendations in NEMA VE 2. Install as a complete system, including all necessary fasteners, hold-down clips, splice-plate support systems, barrier strips, hinged horizontal and vertical splice plates, elbows, reducers, tees, and crosses.
2. Remove burrs and sharp edges from cable trays.
3. Fasten cable tray supports to building structure and install seismic restraints.

    a. Design each fastener and support to carry load indicated by seismic requirements.
    b. Construct supports from channel members, threaded rods, and other appurtenances furnished by cable tray manufacturer. Arrange supports in trapeze or wall-bracket form as required by application.
    c. Support bus assembly to prevent twisting from eccentric loading.
    d. Manufacture center-hung support, designed for 60 percent versus 40 percent eccentric loading condition, with a safety factor of 3.
    e. Locate and install supports according to NEMA FG 1.

4. Make connections to equipment with flanged fittings fastened to cable tray and to equipment. Support cable tray independent of fittings. Do not carry weight of cable tray on equipment enclosure.
5. Make cable tray connections using standard fittings.
6. Workspace: Install cable trays with enough space to permit access for installing cables.
7. Install barriers to separate cables of different systems, such as power, communications, and data processing.
8. After installation of cable trays is completed, install warning signs in visible locations on or near cable trays.

D. Boxes and Fittings:

1. Coordination: Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work, and with general construction work.
2. Weatherproof: Provide weatherproof outlets for all interior and exterior locations exposed to weather or moisture.
3. Knockout Caps: Provide knockout closures to cap unused knockout holes where blanks have been removed.
4. Anchoring: Support and fasten boxes securely per CEC.
5. Sizes: Provide boxes of sizes adequate to meet CEC volume requirements, but in no case smaller than sizes indicated.
6. Do not use sectional (gangable) boxes.

7. Do not use device plates as covers for boxes in exposed locations.
8. Do not use round boxes where conduit must enter box through side of box, which would result in difficult and insecure connections when fastened with locknut or bushing on rounded surface.
9. Threaded Hubs: Use threaded hub type boxes with gasketed weatherproof covers in all exterior locations; where installed on unfinished walls, columns or plasters; where exposed to moisture laden atmosphere; or where indicated.
10. Extension Rings: Where extension rings are required on existing outlet boxes, drill new mounting holes in the rings to align with the mounting holes on the existing boxes.

E. Pull and Junction Boxes:

1. Conform to CEC.
2. Locate junction and pull boxes in accessible locations.
3. Do not locate boxes in finished areas UON.
4. Supports: Provide in each box sufficient clamps, grids, or devices to which cables are secured in neat and orderly fashion permitting ready identification and so that no cable will have an unsupported length of more than 30 inches.

F. Raceway Supports:

1. Compliance: Install hangers, sleeves, seals, U-channel supports and fasteners as indicated and in accordance with manufacturer's written instructions. Comply with requirements of CEC and American National Standards Institute (ANSI)/National Electrical Manufacturers Association (NEMA) for installation of supporting devices.
2. Provide individual and multiple (trapeze) raceway hangers, and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly, and for securing hanger rods and conduits.
3. Arrange for grouping of parallel runs of horizontal raceways to be supported together on trapeze type hangers where possible.
4. Support individual horizontal conduits and EMT 1.5 inches in size and smaller by either one-hole pipe straps or separate pipe hangers. Use separate pipe hangers for larger sizes. Spring steel fasteners may be used in lieu of pipe straps or hangers for sizes 1.5-inch and smaller in dry locations. For hanger rods with spring steel fasteners, use 0.3-inch diameter or larger threaded steel. Use steel fasteners that are specifically designed for supporting single conduits or EMT. Unless otherwise indicated, do not use wire as a means of support. Use spring steel conduit supports only for lighting system branch circuit raceway in suspended ceilings in dry locations.
5. Except as otherwise indicated, space supports for metallic and non-metallic raceways in accordance with the requirements of this Section and the requirements of the CEC.
6. Provide support for exposed or concealed raceway as close as practical to and not exceeding 12 inches from an unsupported box or access fitting. In horizontal runs a support at a box or access fitting may be omitted when the box or access fitting is independently supported and the raceway termination is not made with a chase nipple or threadless box connector.
7. In vertical runs provide such support that the load produced by the weight of the

raceway and the enclosed conductors is carried entirely by the conduit supports, with no weight load on raceway termination's or conductor terminals.

G. Miscellaneous Supports:

1. Provide supports for all miscellaneous electrical components as required to produce the same safety allowances as specified for raceway supports above. Provide metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes etc.
2. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an equally acceptable type fastener not more than 24 inches from the box. When penetrating reinforced-concrete members, avoid cutting any reinforcing steel.
3. Wood backing shall not be used for mounting any equipment except as required for temporary power or telephone terminal strips or unless noted otherwise on drawings. Only steel frame work or strut type channels shall be used for equipment mounting.
4. In hollow masonry, tile, plaster or gypsum board, use toggle type bolts to secure equipment, conduit runs and outlet boxes in place.

H. Fasteners:

1. Unless otherwise indicated securely fasten all electrical items and their supporting hardware including, but not limited to, conduits, raceways, cables, busways, cabinets, panelboards, wall-mounted transformers, boxes, disconnect switches and control components to the building structure.
2. Fasten by means of wood screws or screw-type nails on wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; by machine screws; welded threaded studs, or spring-tension clamps on steel work. Do not weld conduits or pipe straps to steel structures. In partitions of light steel construction use sheet metal screws.
3. Do not use powder charged devices or Ramsets to attach fasteners (unless otherwise approved by the Owner).
4. Holes cut to a depth of more than 1.5 inches in reinforced concrete beams or to a depth of more than 3/4 inches in concrete joints shall not be allowed. Notify the District if such penetration is needed.
5. Loads applied to any fastener shall not exceed one-fifth of the proof test load. Use vibration and shock-resistant fasteners.

3.2 ADJUSTING AND CLEANING

A. Upon completion of installation of raceways, inspect interiors of raceways at all outlet, junction and pull boxes, remove burrs and obstructions.

B. Run a swab or mandrel to remove dirt and blockages. Raceways which are deformed and prevent the passage of a mandrel shall be replaced.

C. Remove dirt and construction debris from all outlet, junction and pull boxes.

END OF SECTION

SECTION 28 05 26 - SYSTEM SIGNAL GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Provide a separate signal and communications grounding system. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

B. Provide an isolated ground bus within each equipment cabinet, enclosure, and rack for single point termination of audio and data shields and grounds. Do not loop or series each ground bus.

1.3 SUBMITTALS

A. Comply with Section 28 05 00.

1.4 QUALITY ASSURANCE

A. Comply with Section 28 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:

1. Grounding Conductors, Cables, Connectors, and Rods:

a. Apache Grounding/Erico Inc.
b. Boggs, Inc.
c. Chance/Hubbell.
d. Copperweld Corp.
e. Dossert Corp.
f. Erico Inc.; Electrical Products Group.

g. Framatome Connectors/Burndy Electrical.
h. Galvan Industries, Inc.
i. Harger Lightning Protection, Inc.
j. Hastings Fiber Glass Products, Inc.
k. Heary Brothers Lightning Protection Co.
l. Ideal Industries, Inc.
m. ILSCO.
n. Kearney/Cooper Power Systems.
o. Korns: C. C. Korns Co.; Division of Robroy Industries.
p. Lightning Master Corp.
q. Lyncole XIT Grounding.
r. O-Z/Gedney Co.; a business of the EGS Electrical Group.
s. Raco, Inc.; Division of Hubbell.
t. Robbins Lightning, Inc.
u. Salisbury: W. H. Salisbury & Co.
v. Superior Grounding Systems, Inc.
w. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 16 Section "Conductors and Cables."

B. Material: copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Grounding Electrode Conductors: Stranded cable.

E. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B 3.
2. Assembly of Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

F. Copper Bonding Conductors: As follows:

1. Bonding Cable: 16 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.
2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

G. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

PART 3 - EXECUTION

3.1 APPLICATION

A. Install a 1/0 AWG, THWN, stranded copper bonding jumper from each equipment cabinet ground bus to the single-point ground bus in the security equipment room and elsewhere as indicated. Do not loop or series each ground bus.

B. Use the signal grounding system as the system signal reference voltage by connecting the isolated secondary common of each low-voltage power supply and equipment item to the system at only one point. Also use the system as the shield ground by connecting the source side of all shields to the system at only one point. Ground all other equipment per manufacturer's recommendation.

C. Other than its single connection to site ground, isolate this signal grounding system from all other metallic objects. Maintain complete isolation from the safety grounding system which shall be used to ground all equipment cabinets, enclosures, racks, conduits, equipment chassis, and other metallic objects from hazardous line voltages. If 60 Hz hum is found in the system add circuits or transformers within equipment to provide positive isolation between signal and safety/chassis ground, thereby eliminating all ground loops.

D. Grounding Bus

1. Use insulated spacer; space 1 inch from wall and support from wall 6 inches above finished floor, unless otherwise indicated.
2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.

3.2 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations

accessible for maintenance.

3.3 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

C. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

D. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

3.4 FIELD QUALITY CONTROL

A. Comply with Section 28 05 00.

END OF SECTION

SECTION 28 05 27 - CABINETS, ENCLOSURES, AND RACKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Free-standing Equipment Cabinets, Enclosures or Racks.
2. Wall-mounted Equipment Cabinets or Enclosures.
3. Wall-mounted Equipment Racks.

1.3 EFERENCES

A.	ANSI/EIA RS-310-C	Rack mounting standards.
B.	NEMA 250	Enclosures for Electrical Equipment 1000 V Max.
C.	NFPA 70	National Electrical Code - application, and installation of electrical cabinets and enclosures.
D.	UL 50	Cabinets and Boxes.

1.4 SUBMITTALS

A. Conform to the requirements of section 28 05 00, General Requirements.

B. Product Data: Submit manufacturer's technical data for all items to be used including specifications, installation instructions and general recommendations.

1.5 SITE CONDITIONS

A. Cabinets shown on the Drawings are in approximate locations, actual location within the same room may depend on site conditions and Facility approval.

PART 2 - PRODUCTS

2.1 GENERAL

A. Types: Provide NEMA type 12 cabinets and enclosures.

B. Materials: Provide cabinets and enclosures as follows:

1. Provide electrical cabinets and enclosures which are UL listed and labeled, and constructed in conformance with UL 50 "Cabinets and Boxes."
2. In normally dry interior locations, provide sheet steel with corrosion resistant fasteners.
3. Outdoors and in damp interior locations, provide galvanized sheet steel with stainless steel fasteners.
4. At constantly wet locations or corrosive atmospheres, provide stainless sheet steel with stainless steel fasteners

C. Rail Mounts: Full enclosure length rack angles shall be installed and have ANSI/EIA RS-310-C mounting standards with 10-32 tapped mounting holes in each enclosure

D. Shelf: Provide a shelf or other suitable mounting plate for all non rack mountable equipment

E. Painting: In addition to galvanizing or priming coat, all inside and outside surfaces of trim and doors shall be given a factory finish coat of paint.

F. Grounding:

1. Comply with Section 28 05 26.
2. Provide cabinets and enclosures with provision for cabinet grounding without penetrating exterior wall of the enclosure.

2.2 SLIDE OUT RACKS

A. Provide slide out 19” racks to provide rear access to wiring and components. Custom build unistrut support to accommodate slide out rack. Provide the following or approved equal from other manufacturers.

1. Middle Atlantic Products……SRS Series

B. Provide key-locking latches for doors.

2.3 FREE-STANDING EQUIPMENT CABINETS, ENCLOSURES OR RACKS

A. Provide free standing enclosures/racks. Racks in Security Electronics Room need not be fully enclosed or lockable. Provide the following or approved equal from other manufacturers:

1. Hoffman……Proline Series

B. Modular free standing equipment racks, overall size shall be 78x23x23 inches.

C. Provide modular enclosure components including, but not limited to, the following:

1. Solid lockable front and rear solid doors, all keyed alike.
2. Solid sides on all enclosure sides not directly joined to another enclosure.
3. Rack joining kits.
4. Cover and fan.
5. Filtered air inlet.
6. Keyboard slide tray for each keyboard.
7. Base for each enclosure with wire management provisions.

2.4 WALL-MOUNTED EQUIPMENT CABINETS OR ENCLOSURES

A. Provide wall-mounted cabinets/enclosures from the following or approved equal from other manufacturers:

1. Hoffman……Concept Wall-Mount Series

B. Provide removable doors.

C. Provide removable internal mounting panel for component installation.

D. Provide handle operated, key-locking latches for doors.

E. Provide multiple doors where required. Individual door width shall be no greater than 24 inches.

2.5 WALL-MOUNTED EQUIPMENT RACKS

A. Provide wall-mounted, double-hinged racks, racks in Security Electronics Room need not be fully enclosed or lockable. Provide the following or approved equal from other manufacturers:

1. Hoffman……Industrial E-DH Series

B. Provide key-locking latches for doors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mounting: Mount cabinets at a uniform height, nominally 6 feet to the top of the enclosure above finished floor, except as otherwise noted or physically not practical. Mount cabinets with fronts straight and plumb.

B. Bracing: Brace or anchor all free-standing/wall-mounted cabinets using Uni-strut or other approved method to building structure.

C. Flush Cabinets: Set flush cabinets in finished spaces flush with adjacent walls. Mount cabinets with fronts straight and plumb.

D. Painting: Touch up all welds, scrapes and other mars in the enclosure finish with a rust inhibiting paint.

E. Front Access: Locate with minimum of 36 inches clear space in front of each cabinet or rack.

F. Other Access: Provide minimum 36 inches clear space to each side of enclosure which requires access for inspection or service.

END OF SECTION

SECTION 28 09 00 - ELECTRONIC COMPONENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Power Supplies (24 VDC, UPS)
2. Terminal Blocks, Fuses, and Snubbers
3. Security Screws
4. Connectors

1.3 SYSTEM DESCRIPTION

A. Power Supplies

a. Provide power supplies as required for the Security Electronics systems.
b. Low voltage systems shall operate on 24 VDC or 24 VAC or as determined by each section. Size all power supplies to maintain Class 2 ratings and operation of each system at 150% of the maximum loaded condition.
c. Acceptable products: Power One, Lambda, or approved equal from other manufacturers.

B. Uninterruptible Power Supplies (UPS)

1. Provide UPS back up for the entire Security Electronics System, including PLCs, Access Control, Intercom, Door locks, network switches, computers, servers, and other electronics.
2. Size the security equipment UPS with sufficient capacity to support and maintain all Security Electronics equipment and devices for a minimum of 15 minutes after the loss of power. Provide 50% spare load capacity. Provide (1) UPS per HMI station and per Security Electronics closet/room/space.
3. Submit UPS power calculations indicating power consumption by each major equipment component.

C. Terminal blocks, Fuses and Snubbers

1. Provide DIN mounted terminal blocks for field and miscellaneous wiring.
2. Provide fused terminal blocks for power distribution circuit protection.

D. Security Screws:

1. Submit various types of security screws for approval.
2. Screws shall be suitable for outdoor locations.

E. Provide all necessary interconnecting wiring and terminations including, but not limited to, junction boxes, terminal strips, lead wires, internal contacts, connectors, etc., from new or existing terminations to the new terminations in equipment rooms.

1.4 SUBMITTALS

A. Comply with Section 28 05 00, General Requirements.

B. Calculations

1. DC power supply sizing.
2. AC power supply sizing.
3. UPS system load and battery sizing.

C. UPS installation drawings: Show UPS size and physical mounting. Design and show power source, and branch circuit and load wiring to/from UPS units.

1.5 QUALITY ASSURANCE

A. Comply with Section 28 05 00, General Requirements.

1.6 EXTRA MATERIALS

A. Deliver the following spare parts:

1.	DC power supply	1 each size used.
2.	AC power supply	1 each size used.

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCTS

A. Provide equipment and components including but not limited to the following or approved equal from other manufactures. All products shall have the features described herein. The materials listed below establish the minimum quality and standards that are to be met:

1.	Power Supplies	Altronix, Axis, Bosch, Pelco
2.	Uninterruptible Power Supplies	APC, Best, TOPAZ, Exide
3.	Terminal Blocks	Phoenix, Entrelec

2.2 POWER SUPPLIES

A. DC and AC Power Supplies

1. Power supply outputs to integrated circuit devices shall be regulated to within +/- one percent of the rated voltage output
2. Size as required for each location with a capacity of 150 percent of the intended maximum load.
3. Class 2 power supplies shall be power limited to 100 watts with over-voltage and short circuit protection.
4. Where required provide power supply with battery backup. The power supply shall include battery-charging circuit, power loss switching circuit, low battery, trouble and power loss output contact. Size battery to accommodate calculated load for the specified time period.

2.3 UNINTERRUPTIBLE POWER SUPPLIES (UPS)

A. All equipment must be on UPS power and connected to emergency circuits.

B. Provide solid state inverter/charger and static bypass switch with less than 1/4 cycle, static transfer time, and frequency stability of 60 Hz + 1 Hz, voltage regulation of +8%, total harmonic distortion less than 5% and minimum output capacity and voltage.

C. Provide rack mounted UPS except in locations for monitoring stations.

D. Provide front loaded batteries.

E. Provide sealed lead/acid type batteries.

2.4 SOURCE QUALITY CONTROL

A. Comply with Section 28 05 00, General Requirements.

B. Provide components as required for Shop Testing and Demonstration

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with Section 28 05 00, General Requirements.

B. Comply with manufacturer's recommendations, procedures, and standards for each product.

C. All Class-1 wiring, and their conduits shall only be routed to the designated Class-1 gutter or duct. All Class-2 wiring, unless otherwise noted, and their conduits shall only

be routed to the designated Class-2 gutter or duct.

D. Provide sufficient quantity of power supplies of CEC Article 725, Class 2 capacity, to power the associated equipment. Furnish power supplies with over voltage and short circuit protection.

E. Mount individual components to removable rear panels in wall-mounted cabinets using DIN rails, snap track or stand off-mounted PC boards, or properly sized mounting hardware.

F. Fuses: Provide over-current protection for control relay outputs and associated wiring.

3.2 WIRE AND CABLE INSTALLATION:

A. Comply with Section 28 05 13.

3.3 WIRE TERMINATION, DRESSING, AND IDENTIFICATION:

A. Comply with Section 28 05 13 and Section 28 05 00.

3.4 FIELD QUALITY CONTROL

A. Comply with Section 28 05 00.

3.5 TRAINING

A. Comply with Section 28 05 00.

END OF SECTION

SECTION 28 15 00 – INTERCOM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Intercom Stations
2. Paging Speakers
3. Master Intercom Stations
4. Intercom Server
5. Power Supplies

1.3 INTEGRATED SEQUENCES OF OPERATION SYSTEM DESCRIPTION

A. Scope of Work Summary:

1. A digital intercom system with adjustable talk and listen modes will be provided. The digital intercom system will be server based, and be networked via TCP/IP communication to the existing Security PLC/door control network. All intercom stations must be detention grade use.
2. The headend equipment must have DSP for auto adjustment of ambient noise. The audio path connection must automatically and actively perform noise cancellation during a call.
3. The existing intercom system is integrated with the PLC touchscreen system for two-way communication controls via icons on the touchscreen and a gooseneck microphone.
4. Intercom Master Stations shall be gooseneck type. Call controls for the Master Station will be performed via the Touchscreen HMI.
5. The existing Touchscreen HMI will require reprogramming to incorporate added devices.

1.4 SUBMITTALS

A. Comply with Section 28 05 00.

1.5 QUALITY ASSURANCE

A. Comply with Section 28 05 00.

1.6 COORDINATION

A. Coordinate with the Owner for all programmable system functions and features using matrix forms to gather user's inputs. Make all necessary program changes at no additional cost prior to final acceptance.

1.7 EXTRA MATERIALS

A. Deliver the following spare parts to the Owner at a location to be designated (quantities to be determined):

1. (1) Master Intercom Station
2. (2) Intercom Station
3. (2) Power Supplies

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide equipment and components including, but not limited to, the following without substitution. The below equipment has been recently installed in adjacent Jail and must be integrated with. The Contractor will be responsible for the design and operability of all system components of the final approved system. If any of the below components are no longer in production by the manufacturer, replace with an equivalent or better component. If any of the components cannot be found or are in question, provide and submit for approval a component of equal or better quality.

1. Intercom Digital Controller……..Harding DCC-S100-0000-E100-MDIP
2. Intercom Digital Expander……..Harding DCE-S100-4040-E1
3. Terminal Boards……..……..Harding
4. Communication Cables……Harding
5. MTA Connectors……...Harding
6. Administrative Software……..DXL-SOF-ADM
7. Master Intercom Station……..……..……Harding TMM-640
8. IP Intercom Station (match existing Jail's model)…..Harding ICE-620-CUS Series
9. PoE+ Network Switch……..……..Cisco Catalyst 9300 series

2.2 SOURCE QUALITY CONTROL

A. Comply with Section 28 05 00, General Requirements Shop Test and Demonstration.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with Section 28 05 00, General Requirements.

B. Comply with manufacturer's recommendations, procedures and standards for the installation and operation of the equipment.

C. All microphone and line level audio signals shall be shielded, balanced lines. Matching transformers and pads shall be provided as required to ensure balancing and proper levels. Normal line operating levels shall be 0 dBm.

3.2 ADJUSTMENTS

A. After installation of the Intercommunication and Public Address Systems, and prior to performance testing, functionally test all system devices and other audio components, and all interfaces to other systems, including control panels. In addition, perform the following adjustments and measurements.

B. Make all intercom speaker tap and amplifier gain adjustments prior performance testing as follows:

1. Intercom Speaker Tap Adjustments: Select intercom taps for 75 dBA at 4 feet on-axis with power input equal to tap setting (for example, at 1/2-watt input).
2. System Amplifier Gain Adjustments: Adjust intercom amplifier gain controls in both the monitor and talk direction to provide unity gain (to produce the same level in the control room as the person talking at the intercom station, and vice versa) with speaker volume controls at mid-range. Adjust amplifiers for either unity gain, or for feedback stability, if unity gain cannot be achieved.

C. Once all volume levels have been accepted by the County, permanently mark or identify all adjustment settings on the amplifiers and accessories.

3.3 FIELD QUALITY CONTROL

A. Performance Measurements: Use a one-third-octave spectrum analyzer and pink-noise generator, or other test equipment pre-approved by the County, to measure system performance. Make the following audio performance measurements for the longest and the shortest intercom runs, and for a minimum of three different intercom stations with the longest and shortest runs:

B. Signal-to-Noise Ratio: Minimum of 40 dB below standard signal levels from 32 Hz to 16 kHz on an “A” weighing scale.

C. Signal-to-Crosstalk Ratio: Minimum of 40 dB below standard signal levels when measured on any other intercom or audio line.

D. Signal-to-Transient Ratio: 30 dB or better, measured as the signal-to-noise during any transient caused by the operations of (a) any piece of equipment associated with that program path, or (b) any other electrical, lighting, ventilation equipment and etc.

E. Intercom Level Uniformity: Less than +/- 2 dB difference in dBA between any two intercom stations.

F. Testing: Comply with Section 28 05 00, General Requirements.

3.4 TRAINING

A. Provide training in accordance with Section 28 05 00.

END OF SECTION

SECTION 28 23 00 - VIDEO SURVEILLANCE (CCTV) SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cameras, Lenses and Enclosures
2. Programming Server
3. Programmable Keyboard Controller
4. Network Video Recording System
5. Camera Power Supply

1.3 REFERENCES

A. ANSI/EIA-170, Electrical Performance Standards - Monochrome Television Studio Facilities A (“RS-170”): Standards for picture quality.

B. ANSI/EIA-330, Electrical Performance Standards for Closed Circuit Television Camera 525/60 Interlaced 2:1 (“RS-330”): Standards for Picture quality.

1.4 SYSTEM DESCRIPTION

A. Scope of Work Summary:

1. The facility’s existing camera system will expanded with new IP cameras to provide coverage for the areas as shown on the drawings. All new cameras will be integrated into the existing BVMS system. Existing monitoring stations are located in IRC Control to display all cameras via split screen and automatic sequencing. Main Control Room in Main Jail also has the ability to view the cameras via the security network. Specific camera call up and alarm event monitoring of cameras are programmed to integrate with the display monitors and HMI touchscreen interface. Update existing camera monitoring and HMI system to incorporate the added cameras.
2. All cameras will be mounted in appropriate detention grade security enclosures and placed for viewing movement doors and critical areas as denoted on the drawings. Only fixed cameras will be used.
3. Cameras will be provided to match existing camera manufacturer and models.

4. The existing BVMS system will be expanded with additional storage space to account for the added cameras.

B. Sequence of Operation:

1. Indoor Fixed Cameras: Provide low light, wide dynamic range, high resolution, color cameras with vari-focal, auto-iris lenses for general video surveillance coverage and continuous digital video recording. Cameras will have sufficient wide angle lenses to provide wall to wall (minimum 100 degrees horizontal) coverage. The cameras and lenses will be installed in security smoked dome housings so that the direction of camera is concealed. Mounting types shall include ceiling, corner and wall as specified on the drawings.

C. Monitoring and Display System

1. Cameras are displayed on existing control room monitors ergonomically placed for maximum view capability and operator attention.
2. Camera display functions are programmably controlled by keyboard and mouse, and HMI touchscreen.

D. Network Video Recording System

1. Integrate with existing digital video management recording system. The existing system is the Bosch BVMS with DIP7000 (all-in-one) server located in Elec & Tele Rm 238.
2. Provide additional storage for the new cameras. Calculate storage capacity based on 13 months, full resolution, 24 hours a day.

1.5 SUBMITTALS

A. Comply with Section 28 05 00.

B. Performance Measurements: Record and submit all performance measurements in a complete test report.

1.6 COORDINATION

A. Coordinate with the County exact mounting location of all cameras prior to installation.

B. Demonstrate to the County camera field of views using variable focal lens at each camera location prior to installation. Select and obtain approval of proper lens size or focal setting at each camera location to provide the required video coverage. If the desired view or coverage is unobtainable due to physical obstructions or limitation of lens, perform minor adjustment of the camera physical location at no additional cost to the County.

1.7 EXTRA MATERIALS

A. Deliver the following spare parts to the Owner at a location to be designated:

1. (1) Fixed Cameras

1.8 QUALITY ASSURANCE

A. Comply with Section 28 05 00.

B. CEC Compliance: Comply with applicable requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide video surveillance system equipment and components including, but not limited to, the following, without substitution. The below equipment (or similar line) has been recently installed in the Jail and must be integrated with. The Contractor will be responsible for the design and operability of all system components of the final approved system. If any of the below components are no longer in production by the manufacturer, replace with an equivalent or better component. If any of the components cannot be found or are in question, provide and submit for approval a component of equal or better quality.

1. IP Camera……..…….……..……..…….. Bosch NDV-8502-R
2. Camera Power Supply……..……..…..…….….Bosch
3. Additional Storage…..Compatible with existing Bosch BVMS with DIP7000 server

2.2 CAMERA POWER SUPPLY

A. Per manufacturer recommendation.

2.3 SOURCE QUALITY CONTROL

A. Comply with Section 28 05 00.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with Section 28 05 00.

B. Comply with manufacturer's recommendations, procedures and standards for the

assembly and operation of the CCTV cameras.

C. Use screw type terminals and crimped lugs for camera power cable terminations.

D. Install all exterior camera enclosures, conduits, and fittings to meet NEMA-4X and IP66 rating.

E. Coordinate with signage, lighting fixtures, etc. to install all cameras as close to the indicated locations on plans as physically possible. Notify the County immediately upon discovering any potential interference that may obstruct the video pictures or reduce the video quality of the devices. Ensure that the minimum distance from any lighting fixture in front of a camera is four (4) feet.

F. Provide video surge protection on all non fiber optic outdoor cameras at the nearest point of entry into the building.

3.2 FIELD QUALITY CONTROL

A. After installation of the video surveillance system, and prior to performance testing, functionally test all cameras, video equipment, and other hardware interconnections, and all interfaces to other systems. In addition, conduct the following adjustments and measurements:

1. Field-of-View Testing: After camera and lens installation, and with CCTV monitoring equipment installed, demonstrate the field-of-view of each camera/lens combination to the County. Adjust camera positioning and angle as needed to obtain the County's desired field-of-view at no additional cost.

B. Performance Testing

1. Comply with Section 28 05 00, Performance Testing for:

a. Initial Performance Testing
b. Performance Testing.

1) Demonstrate proper alignment, adjustment, and switching, sequencing, auto-positioning and system performance for all camera locations with all required sequences of operation under all operating modes. Demonstrate proper interface with all other security electronic systems.

c. Continuous Operational/Functional Testing

3.3 TRAINNING

A. Provide training in accordance with Section 28 05 00.

B. Provide qualified technicians certified by the product manufacturers to perform the

training. Submit evidence of qualifications for County's approval prior to training.

END OF SECTION

SECTION 283111 – DIGITAL, ADDRESSABLE FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Provide a 24 VDC automatic addressable fire alarm system per Santa Barbara County Fire Department standards and communication with a central monitoring station via connection point indicated on the Drawings. Contractor to provide all hardware, software, and labor to connect monitoring capability to the central monitoring station via primary and secondary receiver.

B. System Description and Function

1. The system shall consist of a fire alarm control unit, remote power supply, annunciator unit, smoke detection, audio alarms, manual pull stations and accessories including wire and conduit. The entire system shall be equipped with a secondary source of power meeting the requirements of NFPA 72.

2. The system shall be installed to be capable of being expanded at any time up to 25% of initial capacity.

3. The system wiring shall be a Class B Pathway as acceptable to the (AHJ).

4. In buildings provided with automatic fire sprinklers activation of any fire sprinkler valve tamper switch shall cause a supervisory signal.

5. Fire Alarm Sequence: The system alarm operation subsequent to the alarm activation of any area or duct detector, or waterflow switch shall be as follows (Reference SOO On Sheet FA-0.0 for applicable input/output):

   a. Cause audio signals to alarm throughout the building.

   b. Automatically notify the central station.

   c. Display individual address at fire alarm control unit and annunciator with AHJ defined message.

   d. Light an LED on the smoke detector initiating the alarm.

6. The control unit shall provide power, annunciation, supervision and control for the fire detection and alarm system. The control unit shall be modular in construction, and contain all equipment necessary to operate according to the schedule in the following paragraphs of this Specification and the Drawings. The system shall be designed so that alarm indications override trouble conditions. The unit shall be capable of measuring the sensitivity of the addressable photoelectric detectors connected to it. The control unit shall allow 25% of growth as part of the system.

C. There shall be no limit, other than maximum system capacity, as to the number of addressable devices that may be in alarm simultaneously.

1.2 QUALITY ASSURANCE

A. Codes and Standards: Comply with the codes and standards as indicated in Section 1.4 of this Section.

B. Tests: The Contractor shall provide all meters, smoke generating equipment and test equipment and test the system in the presence of AHJ. The tests shall include the following:

1. Each resettable initiating device for alarm including smoke test of all smoke detectors with smoke generating equipment.

2. The audio system for sound level (dBa meter) if requested by AHJ.

3. Verify Class B Pathway of each signaling line circuit and notification appliance circuit.

4. System supervisory reporting.

5. Operation of system under stand-by power conditions (24 hours/5 minutes of alarm, see battery calculations).

6. Provide a test plan prior to the AHJ prior to requesting final acceptance test.

7. All input and output items listed in the Sequence of Operations Matrix on Sheet FA-0.0.

8. Reporting to the central monitoring station.

9. Certified test report to verify that the system and all components functioned properly and as intended, signed by both the Contractor and equipment supplier. Provide written certification per NFPA 72 from the fire alarm system installer that the system is in compliance with all applicable code requirements.

C. Contractor qualifications: The Contractor shall hold a current California C-10 contractor's license.

D. Contractor shall demonstrate satisfactory installations of comparable systems within the preceding five years, including references.

E. Ability to provide emergency response to effect repair within 4 hours by factory certified personnel during the warranty period.

F. Contractor shall provide proof that the fire alarm contractor is Underwriters Laboratories, Inc. (UL) listed under the classification of "PROTECTIVE SIGNALING SERVICES-LOCAL, AUXILIARY, REMOTE STATION AND PROPRIETARY (UUJS).

G. Final connections and system programming shall be performed only by NICET II or higher Technician. Name of Technician and certification number shall be recorded on the form titled; ‘CONTRACTOR’S STATEMENT OF COMPLAINT INSTALLATION AND AFFIDAVIT OF PERSONNEL QUALIFICATIONS’ (see attached form).

H. Contractor shall provide a copy of the following (NICET) Certificates. Proof that the certificate holders are a part of the fire alarm contractor's local facility servicing this project and will be actively involved in this project.

1. State of California certification for fire alarm system installations.

2. Technician Level 2.

3. Technician Level 3.

I. Documentation that the fire alarm contractor has on staff personnel factory-trained and certified for the equipment proposed for this project. Also, a statement that personnel meeting these qualifications are in the local facility, and will be maintained at that facility throughout the project and the warranty period.

1.3 SUBMITTALS

A. The following list includes but does not limit the required shop drawing and product data information that shall be submitted:

1. Collings & Associates, LLC AHJ Approved Drawings Shall Be Submitted with Contractor Information in Title Block. No changes to approved drawings shall be made without approval by AHJ or Collings & Associates, LLC. DWG Files will be provided to be used by C-10 Contractor.

2. Catalogue sheets of all components indicating technical data, size, and capacities. Reference catalogue sheets to specification paragraphs.

3. Submit parts list of all equipment with manufacturer's data sheets, the location of each piece and device (i.e. elevation of alarm units and cabinets), battery calculations, and proposed conduit layout diagram for both vertical and horizontal runs. Identify location and sizes of terminal cabinets.

4. Submittals shall include State Fire Marshal LISTING SHEETS, including LISTING NUMBER with ANNUAL UPDATE and EXPIRATION DATE, for ALL SYSTEM COMPONENTS. SUBMITTALS WILL BE AUTOMATICALLY REJECTED IF COMPLETE LISTING INFORMATION DOES NOT ACCOMPANY SUBMITTAL. Complete point-to-point wiring diagram of the entire system showing interconnection of identified devices, and controls shall be submitted to, and approved by, the AHJ before installation. Complete conduit layouts at each floor and conduit riser diagrams.

5. UL listing of all components for their intended use. Data sheets are required for all system components. Including but not limited to, control units, batteries. Battery chargers, signal initiating devices, audible alarms, visual alarms, annunciators, terminals, cabinets, wiring conductors and relays. All equipment drawing alarm or supervisory current shall have documentation of the current draw highlighted in the submittal information.

6. Enclosures indicating:

   a. Metal and gage.

   b. Finish.

7. Output rating of all alarm system components, point-to-point Ohm's law voltage drop calculations not to exceed 10% or the maximum the equipment manufacturer allows battery calculations.

8. An index and title sheet shall be put at the front of the product data submittal to organize and speed review.

B. Operation and Maintenance Manuals: Submit shop drawings and operation and maintenance manuals. Submit manuals, each of which shall include all instructions necessary for proper operation and maintenance of the system, complete circuit diagrams, wiring and termination schedule for each circuit entering and or leaving each piece of equipment, schematic diagrams of each major component, including a replacement parts list with part numbers, name, and telephone number of local supplier. Include any portions of the material list and shop drawings that are not included in the foregoing.

C. Santa Barbara County Fire Department approval of the installed system. Submit fire alarm system plans to AHJ for approval prior to installation. Plan Submittal shall include all applicable information as indicated in the California Fire Code Section 907.1.2. Mounting details shall be shown for pull stations, audio devices, annunciator units, and fire alarm control units.

D. Furnish a letter from the manufacturer stating that the manufacturer has a factory warehouse at which spare parts are stocked and where a field service engineer permanently resides, located within 150 miles of the Job Site, factory trained and one whose primary duty is field service.

E. As-built Drawings shall be submitted in Auto CAD Format.

F. Two full days (16 hours) of training shall be provided by a field engineer employed by the equipment manufacturer. Training shall be provided at the job site after completion of the Fire Alarm System installation.

G. NFPA 72 Record of Completion shall be completed by installing contractor at the end of the project and provided to AHJ.

H. Written operating procedures shall be provided at a location approved by the AHJ.

1.4 REFERENCES

A. Fire alarm system, equipment, installation, and wiring materials and methods used shall comply with the following codes and standards:

1. 2020 National Electrical Code.
2. 2022 NFPA 72, including appendices.
3. Title 19, California Administrative Code.
4. Title 24, California Administrative Code.
5. 2022 California Building Code.
6. 2022 California Mechanical Code.
7. 2022 California Fire Code.
8. California State Fire Marshal's requirement.
9. UL 38, 217, 228, 268, 268A, 346, 464, 521, 864, 1481, 1638, 1730, 1971.
10. American Disabilities Act.
11. NFPA 90A

12. National Electrical Manufacturers Association (NEMA)

    a. Guide for the proper use of Smoke Detectors.

    b. Guide for the proper use of Duct Smoke Detectors.

B. Materials and/or installation shall meet or exceed the above referenced standards.

C. The system including all components shall be listed by the State Fire Marshal and Underwriters Laboratories Inc. for use as a fire protective signaling system.

D. The system must have proper listing and / or approval from the following nationally recognized agencies:

1.	UL	Underwriters Laboratories, Inc.
2.	UL categories	UUKL, PAZX, UDTZ, QVAX as well as the requirements of NFPA 90A, HVAC, and NFPA 92A & 92B, Smoke Control.
3.	CSFM	California State Fire Marshal
4.	FM	Factory Mutual
5.	ISO	International Standards Organization

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. All materials, equipment, accessories, devices and other facilities and appurtenances covered by these specifications or noted on the Drawings shall be new, best suited for the intended use and shall conform to applicable and recognized standards for their use. The use of obsolete or discontinued equipment shall not be allowed. The system shall be from one of the following acceptable manufacturers:

1. Honeywell

2. Or Approved Equal

B. This specification document provides the requirements for an analog addressable, multiprocessor-based fire alarm control unit. This system shall include, but not be limited to, system cabinets, control and communication equipment, Switching Power Supply Unit, System Control Unit, Analog Loop Unit with Keyboard Display Unit or Quad/Eight Zone Unit, audible and visual notification appliances, together with associated peripheral devices, programming, wiring and other relevant components to provide a complete and operable system.

2.2 CONTROL EQUIPMENT

A. The control unit shall provide power, annunciation, supervision, and control for the fire alarm system. The control unit shall be modular in construction, and contain all modules necessary to operate in compliance with the schedule in the "System Description and Function" paragraph of this Specification and applicable Drawings. The system shall be capable of reading and displaying at the control unit the sensitivity of remote addressable ionization and photoelectric detection devices. Individual, addressable detection device alarm threshold shall be adjustable from the control unit. The detection system shall remain 100 percent operational and capable of responding to an alarm condition while in the routine maintenance mode. Addressable detection devices shall be individually identified by the system, and any quantity of addressable detection devices shall be in alarm at any time up to the total number connected to the system.

B. The annunciator unit shall be a min. 80 character alpha-numeric display, which shall provide an optional definable message associated with each detection device or zone as approved by AHJ.

C. The Dynamic supervision of the system electronics, wiring, detection devices and software shall be provided by the control system. Failure of the system hardware or wiring shall be indicated by type and location on the alphanumeric annunciator. Software and processor operation shall be monitored by an independent hardware watchdog, which will indicate their failure. The system will provide failsafe operation, i.e. incoming alarms shall automatically override all other modes of operation, and the unit shall automatically return to normal operating mode from any operator initiated mode.

D. Ground fault detection shall be provided for all initiating and audible circuits. All system modules shall be capable of operation in any unused unit location. Lamp test capability shall be provided to test all visual unit indicators and associated software. Provisions shall be made for remote trouble and remote alarm silencing switches. The control unit shall be equipped with a silence before reset feature, designed to prevent accidental system reset during an alarm condition. The system alarm lamp shall flash upon receipt of any alarm condition. Acknowledgment of the alarm by operation of the silence switch shall silence the audible alarm and cause the alarm lamp to light steadily. Receipt of subsequent alarms shall cause the audible devices to resound and the alarm lamp to flash.

E. The system trouble lamp shall flash and an integral trouble buzzer shall sound upon the occurrence of any trouble condition. Acknowledgment of the trouble condition by operation of the silence switch shall silence the audible alarm and cause the trouble alarm to light steadily. Receipt of subsequent troubles shall cause the trouble buzzer to resound and the trouble lamp to flash.

F. Individual input and output device addressability as well as remote sensitivity measurement shall all be performed on the same pair of wires. Wiring shall be Class B Pathway and no special wiring sequence shall be required on addressable device circuits. An unlimited number of wiring branches shall be permitted with no loss of supervision. The system shall be capable of having all addressable devices in alarm simultaneously.

G. The service mode shall permit the arming and disarming of individual detection or output devices as well as manually operating output devices. Status of these devices shall be displayed upon command from the control unit. The unit shall automatically return to the normal mode in the event the unit remains unattended in the service mode.

H. The unit shall be capable of receiving and processing alarms even when in the service mode.

I. The fire alarm control unit shall operate from a three wire 120 VAC power supply and internal 24V back-up battery. All power connections, both AC and DC, shall be separately fused within the control unit. Light emitting diodes (LED's) shall be included to indicate (green) system power, (yellow) trouble, and (red) alarm; trouble and alarm shall also be annunciated on an alpha-numeric display that will give device number and location plus diagnosis of trouble. An audible device shall sound within the control unit for alarm or trouble. This device shall have two distinct sounds and shall be silenceable by the acknowledge/silence switch. Alarms shall override any trouble condition.

J. The control unit power supply shall be capable of powering up to 159 addressable detectors, 159 modules and four Class B built in notification appliance circuits. All system expansion modules shall interconnect through a card edge connector and shall require no inter-module wiring.

K. The control unit shall be capable of measuring and adjusting the sensitivity of detectors. An alpha-numeric display shall be provided to display custom messages and give readings of the detector sensitivity, detector by detector. Each device on an addressable signaling line circuit shall be polled continuously to include the following: sensitivity, response, opens, shorts, ground faults, functionality, and status.

L. The control unit shall report the failure of a device's transmitting component(s) failure, open, or shorted, on an addressable signaling line circuit. The device shall be recognized and identified by location within the circuit to the specific device, and all other devices on the circuit shall continue to function.

M. The control unit shall report, by specific device number, any device removed from an addressable signaling line circuit and all other devices shall continue to function.

N. The control unit shall allow changing the status of configured circuits (arming and disarming and changing status of relays). If any change in status degrades system operation as configured, a trouble condition shall be reported and remain until system operation again meets configured status.

O. The control unit shall have the ability to perform multiple operations at the same time. These operations shall include, but not be limited to, timed functions and multiple configured sequences.

P. The control unit shall have the ability to support a printer and CRT serial port (EIA-232C). This terminal shall be used for permanent records of the system's status and detector chamber voltages, and shall also be capable of system control as configured.

Q. The control unit shall allow for expansion and shall also be configurable without system interwiring.

R. The system shall provide a printer interface for 80-column printers and a history file with 800-event capacity in nonvolatile memory with separate 200-event alarm only file.

S. New unacknowledged alarms and troubles shall be distinctively displayed on both the visual display and the printer and differentiated from previous alarms and troubles.

T. The system shall automatically indicate the total quantity of alarms and of troubles that have occurred prior to reset at the control unit.

U. No alarm or trouble indication shall be resettable until it has been acknowledged. It shall not be possible to reset the system until all alarms have been acknowledged.

V. Control functions shall be assigned on the basis of Boolean Logic Equations.

W. Control functions shall be assigned on the basis of time of day, day of week, and with a holiday schedule of up to thirty holidays per year. Each addressable detection device shall report its condition to the system control unit every four seconds in a manner such that failure of the

connections to or internal electronics of the device will result in a trouble signal which identifies the specific device involved.

X. Addressable photoelectric type smoke detector sensitivity shall be reported at the control unit when requested. The electronic readout of detector sensitivity shall be equivalent to sensitivity readings made with a meter for non-addressable detector, but shall be read at the control unit digital annunciator. It shall be possible to change the detector sensitivity from the control unit within maximum and minimum values as defined by the UL listing of the detectors.

Y. Water-flow switches, tamper switches, and OS&Y valves shall be equipped with an addressable monitor module which shall be supervised identically as addressable detectors.

Z. Water-flow switch alarm operation and automatic sprinkler system supervisory switches shall be wired and annunciated in conformance with the National Fire Codes.

AA. A trouble signal shall be initiated for each addressable device for which the automatic sensitivity measurement is too insensitive.

BB. The supervised and powered parallel output circuits shall be capable of use as audible signal circuits, fire extinguishing release circuits, municipal tie, remote station connection or general alarm release service. They shall be capable of providing 1.5 amp at 24 VDC.

CC. Provision for control relays in the firm alarm control unit shall be included for relays having dry contacts rated 120 VAC 3 amp inductive.

DD. Remote relays located on detector bases or double gang outlets throughout the building shall be controlled in the same manner as unit mounted relays.

EE. The control unit enclosure shall be suitable for surface mounting. A locked door shall be provided to limit access to individuals authorized access to the unit. The enclosure shall be marine grade as well as the battery box if required.

FF. All panel components shall be plug-in, dynamically supervised and easily replaceable. Field wiring shall be connected to the unit with removable multi-conductor connectors to facilitate rapid removal and replacement of both the module and wiring for ease of servicing the unit.

GG. Visual indicators shall be long life LED's. Modules capable of initiating a system trouble shall display individual trouble indications on the alpha-numeric annunciator.

HH. Batteries

1. Battery shall be Sealed lead acid type and accommodate the voltage determined by calculation.

2. Battery shall have sufficient capacity to power the fire alarm system for not less than 24 hours plus 5 minutes of alarm upon a normal AC power failure.

3. The batteries are to be completely maintenance free. All system batteries shall have manufacture date and be labeled with the installation dates.

2.3 SIGNALING LINE CIRCUITS

A. Signaling line circuits shall be provided by a loop control module.

B. Each signaling line circuit shall consist of a two wire circuit, allowing multiple taps. Each initiating circuit shall accommodate up to 318 addressable/programmable initiating devices. Each circuit shall be a Class B Pathway.

C. Upon activation of any addressable/programmable device installed in the circuit, the system shall automatically report the status of the device and initiate the sequence of operations specified for that device, e.g., alarm, local, general, reporting, trouble reporting only, etc. Alarm shall have priority over trouble. Trouble conditions shall be reported to include the device number, location, and type of trouble.

D. The signaling line circuits shall maintain complete reporting of device status while in trouble, due to any addressable device having its active transmitting component fail, open or shorted. The initiating circuits shall detect a line break and provide information to the control unit allowing the user to determine between which two devices the break has occurred.

2.4 OUTPUT CIRCUIT

A. An output circuit for operation of notification appliances shall be provided by a programmable module. This module shall be operable by the control unit.

B. Upon command by the control unit, the output circuits shall power tie circuits, which shall be limited energy outputs.

C. The module shall be supervised by the control unit for open and shorted circuits. Open circuits shall respond in similar manner. Each output circuit shall be individually fused.

D. Output circuits may be user controlled. If such control degrades system configuration, a trouble condition shall be reported.

2.5 RELAY MODULE

A. A programmable relay module shall be provided for control of fans supplying more than 2,000 cfm.

B. The module shall be system interconnected and shall be operable by the control unit or manually.

C. The module shall be Underwriters' Laboratories, Inc. and California State Fire Marshal listed.

2.6 ALARM INITIATING DEVICES

A. The addressable photoelectric smoke detector shall be listed by Underwriters Laboratories, Inc. and California State Fire Marshal. The detector shall contain a long life light-emitting diode (LED) as its light source, and a photo diode as a light receiver. An automatic gain control circuit shall be provided to maintain correct sensitivity by compensating for detector aging and dirt accumulation. The detector shall be a plug-in twist/lock unit that allows for each connection to its mounting base.

1. It shall be possible to adjust and/or electronically measure the sensitivity of each individual addressable detector from the control unit. Relative sensitivity or manual methods that check the detector at the maximum allowable obscuration will not be considered as being equivalent.

2. The addressable photoelectric detector shall provide complete supervision of the detector optics. The detector shall be supervised for complete failure of the LED light source or a critical reduction in the light output of the automatic gain control circuit.

3. The detector mounting base shall be of the twist/lock type with screw terminals for field wiring. Pig-tails or in line connectors will not be permitted.

B. The addressable programmable interface module shall provide an interface for direct shorting contact devices to the Addressable Input. This unit is used with water-flow switch, tamper switch and OS & Y valves.

C. The air duct detector shall operate on a cross-sectional air sampling principle to overcome stratification and the skin effect. The air duct detector shall consist of an addressable photoelectric detector mounted in an air duct sampling assembly and sampling tube that protrudes across the duct of the ventilating system.

2.7 AUDIO NOTIFICATION APPLIANCES

A. Audio alarm shall be synchronized per ADA requirements and have a minimum 15 candela intensity flashing light and alarm as an integral unit. Visual components shall operate from the 24V DC polarized notification appliance circuits. All devices shall mount on 4- x 4-inch electrical boxes. Light will flash at the rate of one flash per second, minimum and two flash per second maximum.

B. The minimum sound level shall be not less than 15 dB above ambient noise for the preceding tone of all fire alarm conditions. Horn shall be capable of producing a synchronized temporal code 3 pattern preceding tone at a minimum dBA level of 89 dBA at 10'. Audio alarm shall be semi-flush mounted and located not more than 80 inches to the bottom of the lens above finished floor for wall mounted appliances and center of ceiling for ceiling mount appliances. All visual appliances shall be mounted in strict accordance with NFPA 72.

2.8 TRANSMITTERS

A. Digital alarm communications transmitter capable of communicating with central station monitoring via cellular communicator shall be provided. Coordinate with AHJ to insure compliance with reporting requirements and to insure compatibility with central station monitoring receiving equipment.

2.9 CONDUCTORS

A. All conductors shall be solid or stranded copper with UL THHN 600 volt, insulation, minimum size #18 AWG or larger. All conductors shall be run in conduit as indicated on the drawings. Two conductor cables shall be used with two wire devices and four conductor cables shall be used for four wire devices. Two conductor cables shall consist of one red and one black wire. Four conductor cables shall have an additional yellow and blue wire. All conduit in unfinished areas shall be provided with red bands every 10-feet to identify the raceway as fire alarm.

2.10 SPARE PARTS

A. Spares of all devices shall be provided to the AHJ for maintenance or expansion of the system. This shall include all equipment listed on the fire alarm equipment schedule that may not be readily available to AHJ 5% of total quantity or 10 each whichever is less.

PART 3 - EXECUTION

3.1 GENERAL

A. Control and other units shall be mounted with clearances for observation and testing. All fire alarm junction boxes shall be marked for identification. All fire alarm terminal cabinets shall be labeled with the following “FIRE ALARM TERMINAL CABINET.” Flexible connectors shall be used for all devices mounted in suspended lay-in units. All conduits, mounting boxes and units shall be hung and fastened with fittings to insure positive grounding throughout the entire system.

B. No wiring other than that directly associated with fire alarm detection, alarm or auxiliary fire protection functions shall be permitted in fire alarm conduits. Wiring splices shall be avoided. If needed, they shall be made only in junction boxes. Transposing or changing color coding of wires will not be permitted. All conductors in conduit containing more than one wire shall be labeled on each end with "E-Z markers." Conductors in cabinets shall be formed and harnessed so that each drops off directly opposite to its terminal. F.A. terminals shall be labeled. All controls, function switches, etc., shall be labeled on all equipment panels. All wiring shall be checked and tested to insure that there are no grounds, opens or shorts.

C. Paint all Fire Alarm boxes red and identify F.A. conduits with red bands every 10’-0” on center in all unfinished areas. Consult with AHJ for all finished areas.

3.2 INSTALLATION

A. Locate and install equipment and accessories as shown on the approved drawings.

B. Mount control units and terminal cabinets such that terminals are located between 42 and 66 inches above the finished floor. The text from all displays of control units or annunciator panels should be within the average site line.

C. Minimum wire size shall be No. 18 AWG at 25 volts, type THHN, 600 volt, stranded copper, installed in metallic conduit as indicated on the drawings. Wire size shall be increased appropriately to maintain voltage and current capacity. All wires shall be identified with substantial markers. Spare conductors are to be provided on a ten percent (minimum two conductors) schedule per riser; annunciator units shall be wired for full capacity. No splicing will be allowed in terminal or device boxes. All connections shall be made on terminals. There shall be no below-grade splicing. Below grade wiring shall be listed for that intended use.

D. Supervised wiring shall be continuous, parallel branches ("T" taps) are not permitted regardless of the method of supervision employed.

E. Conduit shall be EMT above grade and in buildings; schedule 40 PVC to be used underground. All concealed fire alarm system conduit shall be externally identified at 10 foot intervals in each space, and at "J" box covers by permanent red paint suitable for the purpose. All fire alarm system wiring shall be installed in conduit unless otherwise noted on the drawings independent of all other electrical circuits. Magnetic door holding circuits and other non-power limited circuits shall be in separate raceways.

F. Exposed flexible conduit as used for attachment to water-flow and valve tamper switched or similar application shall be liquid-tight and shall be minimum length required for neat and secure installation. Flexible conduit lengths shall not exceed three feet. Flexible conduit shall not be buried nor located closer than 12 inches to grade.

G. Where smoke detectors are shown, smoke detector quantity and spacing shall be as recommended by the manufacturer and NFPA. Detectors are not allowed within 3-feet of air diffusers.

H. All fire alarm system equipment shall be installed in NEMA 1 enclosures for interior locations. Equipment shall include proper mounting boxes, hardware, and fittings for the respective building surfaces and finishes.

I. All equipment and devices installed in exterior and in wet locations shall be installed in NEMA 4 enclosures or otherwise approved for weatherproof use.

J. Breaker units shall be provided with lockdown clips for circuit breakers supplying fire protection circuits. Circuit breakers shall be permanently and clearly identified by painting it red.

K. All Duct Mounted Smoke Detectors shall be mounted and weatherproofed to the ductwork, as required, by the Mechanical Contractor. They shall be furnished and wired by the Fire Alarm Contractor. Access panels shall be provided for all duct mounted detectors per NFPA 90A. Sampling tubes shall be accessible via AHJ approved access panels.

3.3 TESTS AND REPORTS

A. In addition to tests required in this Section, the Contractor shall perform all electrical and mechanical tests required by the equipment manufacturer, and AHJ. In addition, via the printer terminal, provide a printout of the sensitivity readings of each addressable ionization or photoelectric detector connected to the control unit. The sensitivity readings shall be for each detector at its operational location under environmental conditions.

B. A final test report shall be prepared by the Contractor. Submit one (1) copy to the AHJ. The report shall include, but not be limited to:

1. A complete list of equipment installed and wired.

2. Certify that all equipment is properly installed and functions and conforms to these specifications.

3. A print out of all devices connected to the system.

4. Sensitivity settings for each photoelectric detector as measured in place with the HVAC system operating.

5. Technician's name, certificate number and date.

C. After completion of all the tests and adjustments listed above, and review and approval by the Santa Barbara County Fire Department of data and test report, the Contractor shall submit the following information to AHJ.

1. "As-built" conduit layout diagrams including installed wiring, color coding, wire tag notations for exact locations of all installed equipment, internal wiring of equipment and battery calculations of the installed system (on permanent reproducible mylar originals). Provide AutoCAD files to AHJ.

2. Complete "as-built" CAD Files shall be provided to AHJ.

3. Detailed catalog data on all installed systems components (three (3) copies).

4. A final copy of the test report described in paragraph 3.3 B above (three (3) copies).

D. Prior to calling for final test, the contractor shall conduct a 100% pre-test of all system components to insure complete operation. Once the pre-test is complete, the contractor shall sign a verification sheet that states a 100% functional test of the fire alarm system has been conducted and provide it to the AHJ.

E. Final tests and inspections shall be held in the presence of the Santa Barbara County Fire Department and AHJ. The Contractor shall supply personnel and required auxiliary equipment (smoke generator, decibel meter for this test without additional cost to AHJ. The completed fire alarm system shall be tested to ensure that it is operating properly. This test will consist of:

1. Activation of all detection devices. All devices of each type, photoelectric detector, duct detector, water flow and tamper switches, shall be activated, and verified for proper function per the specification and custom message location at the control unit alpha-numeric display and remote annunciator and the printer.

2. Smoke detectors shall be tested using a smoke generator or a smoke detector testing tool. Magnets are not an acceptable means of testing.

3. Verification that all audible-visual devices operate and that the audibility of the devices is at the proper sound level (per manufacturer's specifications) throughout the building using a decibel meter and intelligibility meter.

4. Transmit alarm and trouble signal to central monitoring station and confirm receipt of alarms with dispatcher.

F. If the system does not perform to the above criteria it will not be accepted and the Contractor shall correct all deficiencies and shall re-test the system at Contractor's expense in the presence of the Santa Barbara County Fire Department and AHJ using the same test criteria.

G. Before final acceptance of the work, the Contractor shall deliver to AHJ three (3) bound copies of a composite "Operating and Shop Maintenance Manual." Each manual shall contain the following:

1. A statement of guarantee including date of termination.

2. Name and twenty-four hour telephone number of the repair facility to call in the event of equipment failure.

3. Individual factory issued manuals containing all technical information on each specific piece of equipment installed ("typical" data sheets on manuals covering various items are not acceptable).

4. Copy of the system program and installed software.

5. Provide as-built drawings in auto cad format.

H. It shall be the responsibility of the Contractor to obtain the above items, from factory, or elsewhere. Advertising brochures or operational instructions shall not be used in lieu of the required technical manuals. All information shall be for the specific installation for the current project.

3.4 IDENTIFICATION

A. Provide identification of equipment and materials.

3.5 GROUNDING

A. All metallic conduit, cabinets, junction boxes, and exposed non-current-carrying metal parts shall be permanently grounded. A separate No. 10 AWG conductor shall connect a grounding bus bar located in each main terminal cabinet to building ground. The bus bar shall be provided with a minimum of five tubular, pressure type screw terminals sized for no. 18 AWG through no. 10 AWG wire. The ground wire for the fire alarm control unit and the main terminal cabinet shall be grounded via the bus bar.

3.6 DOCUMENTATION

A. Copies of complete as-built installation wiring documentation, internal fire alarm control unit schematics, and NFPA 72 Record of Completion and maintenance manuals are to be submitted to AHJ prior to final acceptance.

B. A copy of the completed NFPA 72 Record of Completion and final acceptance test printout, final as-built drawings, final program software, shall be provided in a separate documentation cabinet adjacent to the main fire alarm control unit.

3.7 SYSTEM TESTING AND INSTRUCTION

A. The entire fire alarm system shall be tested and adjusted by the contractor under the supervision of a factory-trained representative of the manufacturer.

B. Contractor shall furnish necessary equipment and personnel to perform required tests for approval. Performance tests shall be made in the presence of the AHJ. Inspection and testing shall be at the direction of the AHJ. The test is to ensure that all equipment and devices are installed in an approved manner and are performing properly. The completion test report prepared by the contractor, shall be submitted for approval by AHJ. Rectify any deficiencies found and retest.

3.8 INSTRUCTION

A. Contractor shall ensure that manufacturer’s representative instruct AHJ for a minimum of (16) Hours in the operation, maintenance, and testing of the system. Factory Maintenance Manuals shall be provided to the AHJ upon completion of testing. Provide software of the same version as installed on original disks. No copies of disks will be accepted unless authorized by the manufacturer in writing.

3.9 WARRANTY

A. The Contractor shall provide a 1-year warranty for all equipment and wiring free from inherent mechanical and electrical defects per the project's warranty requirements.
B. The contractor shall conduct the first annual test during the warranty period in order that any discrepancies noted during the testing can be corrected as a part of the system warranty. This testing shall be included as part of the initial system installation costs.

CONTRACTOR'S STATEMENT OF COMPLIANT INSTALLATION AND AFFIDAVIT OF PERSONNEL QUALIFICATIONS

PROJECT NAME: _____

PROJECT NUMBER: _____

I, the undersigned California Contractor's License C-10 licensee or agent, attest under penalty of perjury that the following information s true and correct:

1) The fire alarm system shall be installed in the project noted above and meets the requirements of the approved design documentation of the 1999 edition of the National Fire Alarm Code (NFPA 72), and shall be fully tested in accordance with Chapter 7 of NFPA 72 – 2002.

2) That the following personnel shall participate in the installation of the fire alarm system as described above:

Name	Level of Qualification *	Certificate/License #

**** Level of Qualification: AB931 Journeyman Electrician, AB931 Fire/Life Safety Technician, AB931 Apprentice, NICET II or higher, other. If other, please specify qualifications level.***

Use additional sheets if necessary.

Date:_____ Signature: _____

C-10 License #:_____ Print Name:_____

END OF SECTION 283111

SECTION 28 46 13 - INTEGRATED SEQUENCES OF OPERATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Software Development.
2. Control Electronic System Software
3. Sequences of Operation

1.3 DEFINITIONS

A. Control System Software: A software application program that performs logic and control functions based on programmable criteria.

B. Programming Workstation: Graphic icon display that allows the operator to monitor system activity and alarm conditions on a real-time basis, and presents the operator with a selection of functions. Typically this portion of the screen/graphics is displayed in all operating modes allowing alarms to be monitored while using other system features.

C. Icon: Pictorial graphic display of a symbol or devices such as doors, locks, buttons

D. Operator Interface (OI): Used to generally define computer monitor, mouse, audio, button, or any other devices used for Human-Machine Interfacing.

1.4 SYSTEM DESCRIPTION

A. Provide software development and programming for workstations, control panels, and each system as defined in each respective Section and described in this Section. Sample sequences of operations have been established to provide a base understanding of the project requirements.

B. Provide separate screens that are graphical based (using customized building/site maps) to indicate respective controlled areas for each control station. Sample screen layouts are provided in the Drawings to indicate the level of complexity and minimum functions.

1.5 SUBMITTALS

A. Comply with Section 28 05 00.

B. Theory of Operation: Develop and submit functional narratives supported by full-size, color state diagrams for the various combinations of icons and buttons in each operational state. Submit 14 calendar days prior to Review Meeting.

C. Review Workshop: Attend a review workshop to receive Owner comments on the theory of operation and preliminary development submittal.

D. Full Development: Incorporate all Owner review comments and resubmit the theory of operation submittal along with full-size, graphic layouts panel. Submit 14 calendar days prior to Owner Workshop and Demonstration.

E. Control Electronics Software: Develop and submit control electronics software (logic) for each typical function. Submit 14 calendar days prior to Owner Workshop and Demonstration.

F. Owner Workshop and Demonstration: Attend submittal review meeting along with a complete HMI training/demonstration. After demonstrating the HMI touchscreen and functions and recording all Owner comments, incorporate as many Owner review comments as possible before re-demonstrating the following day.

G. Record Documents

1. Compile a list giving each PLC program name, its installed version number, the number of copies installed, the serial number of each copy, the publisher’s name and address, and the publisher’s customer support telephone number.
2. Prepare and submit complete documentation of the final installed runtime versions of the operator interface software, including a diagram of its component modules, subroutines, ladder logic, databases, libraries, drivers, and other parts. Narrative descriptions shall accompany the diagram, giving basic descriptions of each component and describing the interaction between components. Provide complete, annotated program listings of all custom scripts, macros, and subroutines.
3. Provide the Owner with all original installation DVDs or CD-ROMs and all software manuals for every software program installed on the system. Provide one complete copy of the full development environment for the operator interface software installed on the programming laptop (refer to Section 28 23 00).

1.6 QUALITY ASSURANCE

A. Comply with Section 28 05 00.

B. Have the Project Manager support all specified submittal reviews and demonstrations, and all software-related project meetings. Have the Software Engineer support-related project meetings on an as needed basis, or at the Project Inspector’s request.

1.7 SEQUENCING AND SCHEDULING

A. Comply with requirements of Section 28 05 00.

B. Submit submittals described in this section in the order they are listed.

1.8 WARRANTY

A. Comply with Section 28 05 00.

B. Warrant all software development and programming to be free of defects for a period of one-year from the date of final acceptance. For warranty purposes, consider a defect to be any programming error or errant software behavior not explicitly agreed upon by the Owner, either intermittent or continuous, and all unincorporated Owner comments.

C. Respond to reported defects with on-site personnel within the response times specified in Section 28 05 00.

PART 2 - PRODUCTS

2.1 SOURCE QUALITY CONTROL

A. Factory Test:

1. Comply with the requirements of Section 28 05 00.
2. Functional Testing:
   a. Thoroughly test every function under all operating sequences and operating modes. Activate system outputs in response operations and test reactions to test inputs.

PART 3 - EXECUTION

3.1 CUSTOMIZABILITY OF THE TOUCHSCREEN CONTROL SYSTEM

A. The sequence of operations presented in this Specification shall be open to customization by the County. Shapes of icons, size, arrangement, color, and even functionality shall be changeable as required by the County at no additional cost. Contractor shall submit a proposed design, including sample colored screen layouts, of how he/she intends on installing the Touchscreen controls interface. The included sequence of operations herein shall serve only as a basis of design, and does not exclude further development and customization required by the County.

B. ALL EXISTING FUNCTIONS MUST BE PRESERVED (from existing control panels/touchscreens) unless permitted by the County. Note that not all functions are sampled in the following sequence of operation description. Contractor is responsible

for testing each control panel button/LED/switch and note any functions that are inconsistent with the operations as described in this section.

3.2 TOUCH SCREEN OPERATIONAL THEORY

A. The touchscreen Operator Interface Controller (OIC) provides the integration to control and monitor devices such as:

B. Below is the existing theory of operation. Contractor is responsible for developing the HMI station for the Pre-Booking area to match the look and feel of existing as much as possible. Contractor shall also update IRC and MCR control to reflect the added devices and changes as part of this project.

Sequences of Operation

A. TOUCHSCREENS
GENERAL OPERATION

The Officers interface with the Electronic Control System with the Touch screen computers and software. The touch interface works with the computer like a mouse to select and activate icons on the screen. A single touch of the icon will activate the corresponding function. A "click" sound will be heard from the console speaker when a controllable icon is touched on the touch screen. A controllable icon is one which performs a function when touched, such as an intercom or door icon. The mouse can be used to control the touch screen if so desired. It is not as fast as using the touch screen interface, but it requires less effort on the part of the operator to work the system.

The Touch screen Windows consist of base maps or "main maps", and several "Zoom" windows. The base maps represent the overhead view of the facility. The base maps have small round dots in the location of controlled doors in the system. The dot will change color to represent the current status of the door. The dot will show green when the door is secure, and red when the corresponding door is un-secure.

When a panic alarm occurs, there will be a small red rectangular icon which will flash on the base map in the location of the alarm. The only icons which have control properties on the base maps are the large square icons along the bottom of the screen. These will be discussed in the next section.

The majority of control is done on the zoom windows. Each of the zoom windows has a blue icon on one of the base maps which opens it. When opened, the zoom windows represent an enlarged version of a particular area of the facility. These windows also open automatically when a call is taken using the "Next Call" method, or a Panic Alarm occurs in the area of the zoom window. On each of the zoom windows are the control icons for the doors, and intercoms and other miscellaneous controls in that area. Zoom windows must be closed by the operator by activating the small Blue "Close" icon located at the top of the zoom window.

Multiple zoom windows can be open at the same time, and when this is the case, the windows follow standard Microsoft Windows conventions with regard to activating windows to get the desired one on top, and dragging to a new location using the mouse or trackball in this case. When a window is on top of another window or icon, only the visible icon (the top one) will be activated. When using the touch screen interface, care must be taken to avoid double touching the screen. A double touch can be detected by the distinct second "Beep" sound heard after the second touch.

Double touching would be a problem when there is a control icon directly below the close icon for a top window. On the first touch, the top window would close, and on the second touch, the newly exposed icon would be activated. This is also less likely to occur using the mouse.
The NEXT CALL Icon has been programmed to prevent most accidental double touches in order to prevent "losing" a call. For this reason, the NEXT CALL cannot be activated more than about once per second, which is much faster than normal operation would require.

ICONS AT BOTTOM OF BASEMAP SCREEN

Along the bottom of the Base map screens are square touch control icons which are used to perform various functions for the touch screen control of system devices. The bottom of the base map screen with the control icons is shown in figure 1.
Figure 1. Control Icons
Table 1 lists the icons at the bottom of the screens, and their functions.
Table 1 Control Icons at Bottom of Touch screens (MCR)

Icon Text Function

RESET Resets any reset-able alarm in the alarm queue, one at a time.
SILENCE Silences the audible annunciation, and visual flashing of associated alarms.
NEXT CALL Selects the next intercom call in the queue, brings up the associated window, and CCTV images.
CLOSE ALL Closes all open zoom windows
INTERLOCK OVERRIDE Enables Interlock Override functions.
MISC FUNCTION WINDOW Opens a menu window which allows selection of other miscellaneous functions such as Lighting Controls, Visitor Phones, Clean Screen, Doomsday, and Login.

CALL WINDOW

At the top left of the touch screen is a window with a light gray background. This window is used to display the status of the intercom call queue. The currently connected call is displayed at the top of the window. Below that are the next four calls waiting in the queue for service in the order received from top to bottom. At the right side of the call window is a current count of the number of calls waiting in the queue. As calls are handled, they work their way to the top of the call window.

ALARM WINDOW

At the top right side of the touch screen is a window which is used to display the current alarms in the system.

The alarms appear from top to bottom in the order received. The color of the alarm indicates whether it is re-settable or not. Green indicates re-settable, and Red indicates that the alarm is not re-settable. Regardless of the status of an alarm, it must be one of the five visible alarms in order to be reset. Only one alarm will reset each time the RESET icon is touched. (Assuming there are re-settable alarms visible). The first re-settable

alarm will reset. (The one closest to the top of the window.)

WINDOW HANDLING
Windows are opened by touching the light blue icon on the base map which describes the area. Once the window opens, the same blue icon will show on the window. Touching it with the window open will close the window. When multiple windows are open, the last window opened will be shown completely. It is the "Front" window. Any open window can be brought to the front by touching any visible part of the window.

MOVING WINDOWS
In some cases, it is necessary to simultaneously view two windows which share the same area of the screen. The windows can be moved temporarily to a new location on the touch screen by touching the "Title Bar" of the window to move, and dragging it to the new location. The Title Bar is the narrow horizontal bar across the top of the window. This bar will be white when the window is not the selected window, and blue when the window is selected. A selected window is the last one which was touched on the screen. It is best to move windows using the mouse instead of the touch interface. It is not necessary to move the window back to its' original location because it will always come up in the programmed position.

CLEANING
The touchscreen surface should be cleaned with a soft cotton cloth and glass cleaner. Do not spray the cleaner directly on the touch screen or erratic operation will result. In order to prevent accidental activation of doors while cleaning, and to allow better visibility of smudges while cleaning, there is a special black window which is opened by touching the "Clean Screen" icon located on the Miscellaneous Functions Menu Window. Lightly spray the cleaner onto the cloth, open the special "Clean Screen" window, and wipe the surface clean. Use care not to activate the "Resume Operation" icon located at the top right of the screen while wiping the surface. That area can be cleaned after the Clean Screen window is closed.

B. DOOR CONTROL
One of the primary functions of the touch screen control system is to give the Control Officer the ability to unlock and open doors with the touch of an icon on the touch screen, and to monitor the status of doors through the visual characteristics of touch screen icons.

CONTROLLED DOORS
The controlled doors have motorized or solenoid locking mechanisms which can be unlocked with the touch of an icon on one of the Central touch screens. When the door is closed, the lock will automatically relock,

and the Door position indicator will show the status of the door as described above.
The types of doors controlled and monitored include Swing Doors and Sliding Doors. In order to be opened, a door must first be enabled.
There are two ways to accomplish this:
1 Intercom Enable
2 Door Control Enable
The Intercom enable will normally be the method used to enable a door for control. This method ensures that the operator is looking at the correct CCTV monitors, and talking on the intercom channel for the door which is to be opened. The other way to enable a door is the Door Control Enable. This is used by first pressing the "door control enable" icon which will flash orange when activated, the desired door can then be operated by pressing the door icon.

SWING DOORS

These doors all have door position indicators which, depending on the position of the door, and Enable Status, will change the visual characteristics of the door status icon. For swinging doors, when the door is secure and not enabled, the icon will appear as a purple rectangle in the location of the door. In this state the door cannot be opened by activating the icon. After the door has been enabled, and is still in a secure state, the icon will be displayed as a green rectangular icon parallel to the wall in which the door is located. When the door is in an un-secure state the icon will be shown as a "Red Diagonal". If the door is interlocked with another door, it will be shown as a yellow rectangle in the location of the door if the door is secure, and a door with which it is interlocked is not secure. If more than one door in an interlocked group is open, an interlock breach alarm will be activated. This will be discussed in the following section.

INTERLOCK OVERRIDE OF SWING DOORS

When it is necessary to open a second door in an interlock group, the Interlock Override icon at the bottom of the touch screen is used. The procedure for interlock override of a swing door is as follows:
1. Open the window which contains the desired swing door.
2. Touch the green Interlock Override icon at the bottom of the screen.
T*he Interlock Override icon will flash with an amber color, and all (secure) door icons will turn green.*
3. Touch the door control icon for the chosen door.
The door status icon will change to red when the door is un-secure.

SLIDING DOORS

The status icon for this door is the rectangular icon parallel to the wall where the door is located. The status icon will be red if the door is not fully closed, and green or purple if it is fully closed. It will be green if it is

enabled, and purple if not. This door is controlled with the OPEN, STOP, and CLOSE icons located near each door status icon.
The status and control icons will show purple when the gate is secure, and not enabled. When the associated intercom is activated, the control icons will turn green to indicate that the sliding door can be controlled. When the OPEN icon is touched with the door in a secure position, the door will begin opening. The door will fully open, and then stop automatically when it reaches the fully open position. If desired, the Officer can stop the door at any time by touching the STOP icon. The door can then be restarted in either direction by activating the open or close icon. The direction of travel can be reversed without touching the stop icon by simply activating the icon which represents the opposite direction of current travel. If the intercom is deactivated while the gate is moving, it will maintain its current direction of travel until it reaches the fully open, or closed position.
Sliding Door Status and Control Icon Characteristics are as follows:

DOOR POSITION Enable Status Control Icons Status Icon

Door position =Fully Closed, Enabled = No, Control Icon = Purple, Status Icon = Steady Purple
Door position =Not Closed, Enabled = No, Control Icon = Purple, Status Icon = Steady Red
Door position =Fully Closed, Enabled = Yes, Control Icon = Green, Status Icon = Steady Green
Door Position =Not Closed, Enabled = Yes, Control Icon = Green, Status Icon = Steady Red

INCORRECT DPI OVERRIDE

It is possible that a door position indicator (DPI) could fail. In the case should fail showing the door open, when it is actually closed, it would not be possible to open the door unless there were also control properties associated with the red diagonal door un-secure icon. For this reason, doors that report to the system as opened can be operated without interlock override conditions.

TIME MONITORED DOORS

Selected controlled doors in the system with the exception of the cell doors have a Door Timeout alarm which will activate if the door is left open for a period longer than the preset time in the software. This time can be adjusted through programming for each door individually.
When this alarm is activated, the tone will sound on the panel, the alarm text will be displayed in the alarm window.
The alarm can be silenced with the Silence icon on the touch screen.
In order to reset the alarm, the door must be closed. Then the text will turn to green. The alarm can then be reset using the “Reset” icon.

MANUALLY OPENED DOORS

Selected controlled doors in the system with the exception of the cell doors have a door manually opened alarm which will activate if a door is opened by any other way than from the touch screen. The exceptions are any doors that are equipped with a local pushbutton release which cause the door to open through the control system.
When this alarm is activated, the alarm tone will sound on the panel, the alarm text will be displayed in the alarm window.

The alarm can be silenced with the Silence icon on the touch screen. In order to reset the alarm, the door must be closed, then the text will turn to green. The alarm can then be reset using the "Reset" icon.

ENABLE DOOR CONTROL

Several controlled doors have a separate button which is used to enable the doors which is labeled Enable Door Control.

The operation is similar to interlock override but it only affects the doors on the associated zoom map. The process is as follows:

1. Touch the green Enable Door Control icon at the bottom of the screen.

The Enable Door Control icon will flash with an amber color, and all (secure) door icons will turn green.

2. Touch the door control icon for the chosen door.

The door will open and the Enable Door Control icon will return to the green color. Only one door can be opened when the Enable Door Control icon has been pressed. It must be pressed again to open other doors.

C. INTERCOM CONTROL

The intercom control system consists of the switching equipment located in the Electrical Room, the Touch screen and Software, and the microphone/speaker and push-to-talk switch.

CALL-INS - STAFF STATIONS

When one of the Staff Station call-in switches is pressed, the electronic system stores the request in the waiting queue in order for the Control Officer to answer the call requests in the order in which they were placed. Only one call per station is allowed in the waiting queue at any one time, so further presses of the call-in switch have no effect once the call is placed. On the touch screen monitor at the top left is the Intercom Call Message and Status window. This window displays from top to bottom the current call (if one is connected), and then the next four calls waiting in the queue.

At the right of the call window is an area which displays the total number of calls waiting in the queue. This number does not include calls currently being serviced.

Each staff station has been assigned a unique ID number. When the staff station does not have a call waiting, or is not currently the connected call, the color of the icon will normally be peach colored. When a call comes into the waiting queue for an intercom, the associated icon will flash green, and a chime tone will sound every 20 seconds. This flashing will continue until the call is handled for that intercom. The chime every 20 seconds will continue as long as calls are waiting in the queue. When the call is connected, the intercom will change to solid green in color, and the tone will stop if there are no other calls waiting. Any associated CCTV cameras will automatically be displayed on the assigned monitors as soon

as the call is connected. When the call is disconnected, the intercom icon will change back to peach, and the CCTV images will be cleared from the monitors. Calls can be taken by two different methods. The normal mode of operation will be to service the calls in the order that their requests came in. This is called the "Next Call" method. The other method of taking calls is to select an intercom by touching its icon (Call Select). These methods are covered in the following sections.

NEXT CALL

At the bottom of the touch screen is a square green NEXT CALL icon. Touching this icon causes the intercom system to disconnect any current calls if connected, and to immediately connect the first call waiting in the intercom call queue. The window containing the intercom icon for that call will automatically pop open for ease of door control in the associated area. The cameras programmed to come on with the connected intercom will automatically be displayed on the monitors.

The Control Officer will now be listening to the intercom station selected. In order for the person at the intercom speaker to hear the Control Officer, the officer must press the push to talk switch. The audio signal will only be from the remote speaker to the control room unless the switch is pressed in which case it is only from the control room to the remote speaker.

When the call is complete, if the associated window is not required to be open, it may be closed by the Control Officer. The NEXT CALL icon can be touched again to bring up the next call. The current call will be disconnected, its cameras cleared from the monitors, and the next intercom in the queue will be connected, and its' associated cameras will be displayed on the monitors. This process can be repeated until all calls are handled. When there are no more calls in the queue, touching the NEXT CALL icon again will disconnect the last call, and remove its' cameras from the monitors.

CALL SELECT

The other mode of call handling allows calls to be taken out of order if necessary. At any time desired, any intercom can be called up. Touching any intercom icon (which is not currently connected to a call) will cause that intercom to be immediately connected, and any associated CCTV images to be displayed on the assigned monitors. If the intercom had a request for service in the queue, that request will be removed, and the number of calls waiting will be updated. The call window will display the assigned text message for the chosen intercom, at the top of the window.

Calls can be disconnected by touching the current intercom icon which will be steady green. This will disconnect the current call, and remove the assigned CCTV images from the monitors. If the deselected intercom were the only one previously selected, no intercoms would be connected at this time, and calls in the queue will not be affected. Call servicing could then be resumed at any time using either the NEXT CALL process

or individual selecting.

INTERCOM CAMERA CALL-UP

If an intercom has associated cameras, they will automatically be called up whenever the intercom is on. As soon as the intercom is turned off, the camera image will be removed from the monitor.
Cameras are assigned to the monitors above the workstation for which the intercom is on. Some intercoms have two cameras assigned to them while others may only have one.

D. MUSIC AND TELEPHONE CONTROL

MUSIC CONTROL

All cells and some holding areas have music which can be piped in through the intercom speaker. Inside each cell is a small icon which looks like a musical note. Music can be enabled to each cell by pressing this icon. The icon will change from dark blue to green when the music is enabled. In the event the intercom to the cell must be turned on for voice communication, the music will be bypassed until the voice communication is ceased and the intercom is turned off. Music volume and station selection can only be controlled by the receiver located in the electrical room.

PHONE CONTROL

A phone exists in some cells, holding areas as well as the dayroom. The icon for telephone control looks like a telephone. The phones can be enabled to each cell by pressing this icon. When the call is enabled, the icon will change from sky blue to bright green.

E. MISCELLANEOUS CONTROLS

LIGHTING

All lighting in the cells and other specific areas can be controlled through the touch screen. Under the Misc. Function Window is a button labeled “Lighting”. When the light turns on, the lighting status indicator will change from green to light blue.

TV AND OUTLETS

All TV’s and outlets in the dayrooms can be controlled through the touch screen. Under the Misc. Function Window is a button labeled Lighting TV and Outlets. When the TV or outlet is on, the icon status will change from green to light blue.

LOGIN, LOGOUT, CHANGE PASSWORD

When no operator is logged onto the touch screen system, control is not possible. Login status is shown in the Misc. Function Window after the current user text. When an operator is logged in, they will be shown as the current user. Logging in can be accomplished with the following steps:
1. Press the icon labeled Login located in the Misc. Function Window.

A pop-up window with a keyboard will appear. The keyboard will have a box for login and password.

2. Use the touch screen or the mouse to type the login and password. ***THE PASSWORD WILL BE SHOWN AS *******.***

3. Press the ok. If there are problems, an error message will pop-up. Otherwise, the current user will show the login name.

Logging out can be accomplished by pressing the icon labeled Logout located in the Misc. Functions Window. After the icon is pressed, a box will verify. Press Yes to confirm**.** Upon finishing a shift, it is recommended that the officer log out. The next officer can login using their user name and password.

Change Password will only work if the current user has access to this function. If so, a box will appear after the current user presses the Change Password Icon in the Misc. Functions Window asking the user if the change is certain. If yes is pressed, a window similar to the login window will appear. The user must enter the old password, new password, confirm the new password and press ok to complete the change.

END OF SECTION

SECTION 28 46 19 – PLC INTEGRATED CONTROL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Software Development.
2. Control Electronic System Software
3. Sequences of Operation

1.3 DEFINITIONS

A. Control System Software: A software application program that performs logic and control functions based on programmable criteria.

B. Programming Workstation: Graphic icon display that allows the operator to monitor system activity and alarm conditions on a real-time basis, and presents the operator with a selection of functions. Typically this portion of the screen/graphics is displayed in all operating modes allowing alarms to be monitored while using other system features.

C. Icon: Pictorial graphic display of a symbol or devices such as doors, locks, buttons

D. Operator Interface (OI): Used to generally define computer monitor, mouse, audio, button, or any other devices used for Human-Machine Interfacing.

1.4 System Description

A. Provide software redevelopment and programming for existing workstations, touchscreen panels, and each system as defined in each respective Section and described in this Section.

1.5 Submittals

A. Comply with Section 28 05 00.

B. Theory of Operation: Develop and submit functional narratives supported by full-size,

color state diagrams for the various combinations of icons and buttons in each operational state. Submit 14 calendar days prior to Review Meeting.

C. Review Workshop: Attend a review workshop to receive Owner comments on the theory of operation and preliminary development submittal.

D. Full Development: Incorporate all Owner review comments and resubmit the theory of operation submittal along with full-size, graphic layouts panel. Submit 14 calendar days prior to Owner Workshop and Demonstration.

E. Control Electronics Software: Develop and submit control electronics software (logic) for each typical function. Submit 14 calendar days prior to Owner Workshop and Demonstration.

F. Owner Workshop and Demonstration: Attend submittal review meeting along with a complete HMI training/demonstration. After demonstrating the HMI touchscreen and functions and recording all Owner comments, incorporate as many Owner review comments as possible before re-demonstrating the following day.

G. Record Documents

1. Compile a list giving each PLC program name, its installed version number, the number of copies installed, the serial number of each copy, the publisher's name and address, and the publisher's customer support telephone number.
2. Prepare and submit complete documentation of the final installed runtime versions of the operator interface software, including a diagram of its component modules, subroutines, ladder logic, databases, libraries, drivers, and other parts. Narrative descriptions shall accompany the diagram, giving basic descriptions of each component and describing the interaction between components. Provide complete, annotated program listings of all custom scripts, macros, and subroutines.
3. Provide the Owner with all original installation DVDs or CD-ROMs and all software manuals for every software program installed on the system. Provide one complete copy of the full development environment for the operator interface software installed on the programming laptop (refer to Section 28 23 00).

1.6 Quality Assurance

A. Comply with Section 28 05 00.

B. Have the Project Manager support all specified submittal reviews and demonstrations, and all software-related project meetings. Have the Software Engineer support-related project meetings on an as needed basis, or at the Project Inspector's request.

1.7 Sequencing and scheduling

A. Comply with requirements of Section 28 05 00.

B. Submit submittals described in this section in the order they are listed.

1.8 WARRANTY

A. Comply with Section 28 05 00.

B. Warrant all software development and programming to be free of defects for a period of one-year from the date of final acceptance. For warranty purposes, consider a defect to be any programming error or errant software behavior not explicitly agreed upon by the Owner, either intermittent or continuous, and all unincorporated Owner comments.

C. Respond to reported defects with on-site personnel within the response times specified in Section 28 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURES

A. The following components are existing. Contractor shall expand on existing or provide new models that are equivalent or better, but integrate with existing. If any of the below components are no longer in production by the manufacturer, replace with an equivalent or better component. If any of the components cannot be found or are in question, provide and submit for approval a component of equal or better quality. The components listed below are not inclusive of all requirements. Contractor is required to provide all other components necessary for a fully functional system.

1. PLC CPU and Controller…… Modicon TSX P57 Series
2. PLC Input/Output Modules……... Modicon TSX DEY/DSY
3. PLC Network Module……..…… Modicon TSXETY4103
4. HMI Solution…….…….. Rockwell Automation
5. PLC Power Supply……..…….. Modicon
6. Touchscreen PC*……...…….… ……Elo 2402L and Dell 7040

(* Touchscreen PC is not matched with existing. See below minimum requirements)

B. Touchscreen PC

1. Each Touchscreen PC shall function as the primary means of overall system control and monitoring. The computer equipment shall be arranged to present an efficient and organized appearance.
2. The computer equipment shall be arranged to present an efficient and organized appearance. The following components shall be located with the workstation:

   a. PC based computer (with mouse and keyboard).
   b. 24” Touchscreen Panel.
   c. Speakers.

3. Provide computer equipment that meets the following minimum specification requirements

   a. Windows 10 Professional 64bit

b. Intel® Core™ i7-6700 Processor (Quad Core, 8MB, 3.4GHz)
c. Windows 10 Professional 64bit.
d. 16GB (2X8GB) 2133MHz DDR4 Memory.
e. M.2 512GB PCIe NVMe Class 40 Solid State Drive
f. Graphics – 512MB PCIe 2x16 nVidia Quadro NVS 310, Dual DVI-D Capable
g. 48X CD-RW and 8x DVD+/-RW 9.5mm Optical Disk Drive and fifty (50) CD's.
h. Harman/Kardon HK-206 speakers, 3 watts each, 3 in. full range driver, 90 Hz-20Hz frequency response.
i. Tower type chassis including high capacity power supply with surge suppressor.
j. 101 key keyboard.
k. Microsoft mouse.
l. Communications – Integrated Gigabit Ethernet
m. 3 PCI Expansion Slots
n. (4) USB ports
o. Parallel Printer Port

4. Audio tone generator to activate on reception of an alarm. Audio tone shall be capable of being enabled or disabled on operator command.
5. A touchscreen panel (monitor) shall be the primary means of operator access to the system. They shall provide the operator interface for control of the entire system. The touchscreen panel may be an "off-the-shelf" consumer grade panel, but must be secured using custom mounting for adjustable (horizontal, vertical, tilt, with lockable position) movement and minimize shake/torque while in normal operation.
6. A keyboard and mouse are the secondary means of operator access to the system. To communicate with the direct digital control system, the operator shall input via the keyboard or mouse a command along with a proper alphanumeric identification of the system. Keyboard shall have standard ASCII coded logic outputs, providing full International English language displays and printouts. Auxiliary function keys shall be provided for various functions. These keys shall allow common operations to be performed by punching a single key instead of having to type out the command on the keyboard.
7. A digital display clock shall display on the monitor at all times. Provision for manually resetting it shall be provided. It shall be a 24 hour real-time clock and seven-day calendar to provide data for logging.
8. A network control key or software passwords shall allow automatic functions of the system to continue, but prevent unauthorized tampering with any computer pushbuttons or controls while the computer is unattended. This shall not disable the scanning or alarming functions.

2.2 Source Quality Control

A. Factory Test:

1. Comply with the requirements of Section 28 05 00.
2. Functional Testing:

a. Thoroughly test every function under all operating sequences and operating

modes. Activate system outputs in response operations and test reactions to test inputs.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with Section 280500.

B. Comply with manufacturer's recommendations, procedures and standards for the assembly and operation of the Control Electronics.

C. Common functions such as sallyport interlocks shall be wired to a single system. This type of function shall not be networked.

3.2 TRAINNING

A. Comply with Section 280500, TRAINING.

3.3 FIELD QUALITY CONTROL

A. Testing: Comply with Section 280500.

END OF SECTION

SECTION 321120 - SUBBASE AND AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course.

1.2 RELATED REQUIREMENTS

A. Section 321216 - Asphalt Paving

B. Section 321623 - Sidewalks.

1.3 PRICE AND PAYMENT PROCEDURES

A. Unit Prices:

1. See Section 012200 - Unit Prices for additional requirements.

2. Basis of Measurement for Aggregate Base Course: By square foot (square meter).

1.4 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; 2022, with Errata .

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012 (Reapproved 2021).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)); 2012 (Reapproved 2021).

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017, with Editorial Revision (2020).

G. ASTM D3665 - Standard Pratice for Random Sampling of Construction Materials; 2012 (Reapproved 2017).

H. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2023.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Test Reports:

1. Aggregate Composition: Results of laboratory tests on proposed and actual materials used.
2. Compaction Density: Results of laboratory tests on compacted course.

C. Source Quality Control Submittals: Submit name of imported materials source.

D. Field Quality Control Submittals: Submit compaction density testing results.

E. Testing agency's qualification statement.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.

B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Aggregate Storage: Prevent material intermixing, contamination, and deterioration.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate Base Course:

1. Comply with Standard Plans for Public Works Construction, Current Edition Table 200-2.2.2.

2.2 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. If tests indicate materials do not meet specified requirements, change material and retest.

C. Provide materials of each type from same source throughout the Work.

D. For aggregate materials using classification complying with ASTM D2487, provide testing before delivery to site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, and gradients and elevations are correct and dry.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and recompacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.3 PLACEMENT

A. Under Bituminous Concrete Paving:

1. Aggregate Base Compacted Thickness: According to design drawings.

2. Compact to 95 percent of maximum dry density.

B. Place course in maximum 4 inch (100 mm) layers and roller compact to specified density.

C. Level and contour surfaces to elevations and gradients indicated.

D. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

A. Variation From Design Elevation: Within 1/2 inch (12.8 mm).

B. Flatness: Maximum variation of 1/2 inch (12.8 mm) measured with 10 foot (3 m) straight edge.

3.5 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Aggregate Base Compaction Density Testing: In accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").

D. Frequency of Tests: In accordance with ASTM D3665.

E. Remove, replace, and retest work that does not meet specified requirements.

3.6 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Stockpile unused materials neat and compact.

END OF SECTION 321120

SECTION 321216 - ASPHALT PAVING

PART 1- GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course.

B. Single course bituminous concrete paving.

C. Double course bituminous concrete paving.

1.2 RELATED REQUIREMENTS

A. Section 321120 - Subbase and Aggregate Base Courses.

B. Section 321313 - Concrete Paving: Concrete curbs.

C. Section 321713 - Parking Bumpers: Concrete bumpers.

D. Section 321723 - Pavement Markings.

1.3 PRICE AND PAYMENT PROCEDURES

A. See Section 012200 - Unit Prices for requirements applicable to this section. Measurement and payment will be as follows:

B. Asphalt Pavement Mix (Base Course): By the ton (metric ton). Includes preparing base, grading, tack coating surfaces, placing, compacting and rolling, testing. Includes mix design, supplying to site, testing.

C. Asphalt Pavement Mix (Wearing Course): By the ton (metric ton). Includes preparing base, tack coating surfaces, placing, compacting and rolling, testing. Includes mix design, supplying to site, testing.

D. Adjusting Utilities to Grade: By the each. Includes labor, materials, tools, equipment, and incidentals to complete the specifed work.

1.4 REFERENCE STANDARDS

A. AI MS-2 - Asphalt Mix Design Methods; 2015.

B. AI MS-19 - Basic Asphalt Emulsion Manual; 2008.

C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2019.

D. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with Standard Plans for Public Works Construction, Current Edition.

B. Mixing Plant: Complying with Standard Plans for Public Works Construction, Current Edition.

C. Obtain materials from same source throughout.

1.6 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.

B. Place bitumen mixture when temperature is not more than 15 F degrees (8 C degrees) below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Comply with applicable code for paving work on public property.

2.2 MATERIALS

A. Asphalt Cement: ASTM D946.

B. Aggregate for Base Course: B Gradation in accordance with Standard Plans for Public Works Construction, Current Edition.

C. Aggregate for Wearing Course: C2 Gradation in accordance with Standard Plans for Public Works Construction, Current Edition

D. Tack Coat: SS-1h "No Track Tack" or approved equal per Standard Plans for Public Works Construction, Current Edition Section 203-3.4.2.

2.3 ASPHALT PAVING MIXES AND MIX DESIGN

A. Asphalt Base Course: 3.0 to 6 percent of asphalt cement by weight in mixture in accordance with AI MS-2.

B. Asphalt Wearing Course: 5 to 7 percent of asphalt cement by weight in mixture in accordance with AI MS-2.

C. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.4 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 AGGREGATE BASE COURSE

A. See Section 321120.

3.3 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of .15 gal/sq yd (0.68 L/sq m).

C. Apply tack coat on vertical joins at a uniform rate of [.20] gal/sq yd ([0.91] L/sq m).

D. Apply tack coat to contact surfaces of curbs and gutters.

E. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.4 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install Work in accordance with Standard Plans for Public Works Construction, Current Edition.

B. Place asphalt within 24 hours of tack coat.

C. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

D. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.5 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Install Work in accordance with Standard Plans for Public Works Construction, Current Edition.

B. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

C. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.6 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch (6 mm) measured with 10 foot (3 m) straight edge.

B. Compacted Thickness: Within 1/4 inch (6 mm) of specified or indicated thickness.

C. Variation from True Elevation: Within 1/2 inch (12 mm).

3.7 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for quality control.

B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.8 SCHEDULE

A. Pavement at Parking Areas: Two courses; base course of 6-inch compacted thickness and wearing course of 2-inch compacted thickness, fog seal coat.

END OF SECTION 321216

SECTION 321623 - SIDEWALKS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete sidewalks.

B. Concrete wheelchair ramps.

C. Concrete curb and gutters.

1.1 RELATED REQUIREMENTS

A. Section 321120 - Subbase and Aggregate Base Courses.

B. Section 321726 - Tactile Warning Surfacing.

1.2 PRICE AND PAYMENT PROCEDURES

A. Provide concrete sidewalk paving by the unit price method.

B. See Section 012200 - Unit Prices, for additional unit price requirements.

C. Concrete for Sidewalks: Measurement by the square feet (sq ft). Includes mix design, supplying to site, preparing base, labor, materials, tools, equipment, saw cutting, placing, floating, finishing, verification, hauling, disposing, and incidentals.

D. Concrete for Wheelchair Ramps: Measurement by each. Includes mix design, supplying to site, preparing base, labor, materials, detectable warning surfaces, tools, equipment, saw cutting, placing, floating, finishing, verification, hauling, disposing, and incidentals.

E. Concrete for Curb and Gutter: Measurement by [linear feet] (ft). Includes mix design, supplying to site, preparing base, labor, materials, tools, equipment, saw cutting, placing, floating, finishing, verification, positive flow test, hauling, disposing, and incidentals.

1.3 REFERENCE STANDARDS

A. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.

B. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.

C. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.

D. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

E. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2024.

F. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data:

1. Concrete: Provide data on admixtures.

C. Weather Data: Records during placement of asphalt or concrete, including date, location of placement, quantity, and air temperature.

1.5 FIELD CONDITIONS

A. Temperature Requirements: Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.

B. Follow recommendations of ACI PRC-305 and ACI PRC-306 when concreting during hot and cold weather, respectively.

C. Follow recommendations of polymeric sand manufacturer.

PART 2 - PRODUCTS

2.1 CONCRETE SIDEWALKS, WHEELCHAIR RAMPS, AND CURB & GUTTER

A. Concrete Forms: Wood.

B. Concrete Materials: Comply with ASTM C94/C94M.

C. Aggregate: Pit Run, washed, 3/8 inch (1 cm) stone; free of shale, clay, friable material and debris.

D. Waterproofing Admixture: Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties.

E. Joint Filler: Preformed expansion, with a thickness of 1/2 inch (13 mm). Type "A" Sealant (Two Part Polymethane Sealant) in accordance with Specifications for "Two Component, Machine Mixed, Type A Sealant"

F. Curing Compound: Synthetic, Type 1, Class A, according to ASTM C309.

G. Tactile Warning Surfaces: See Section 321726.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify gradients and elevations of the subgrade are correct as shown on drawings. Where poor subgrade material is encountered, remove and replace with suitable material.

B. Verify compacted subgrade is acceptable, ready to support imposed loads and paving, and ready to receive work.

3.2 SUBBASE PREPARATION

A. Maintain subgrade in a smooth, compacted condition with required section and established grade until concrete is placed.

B. See Section 321120 for aggregate subbase.

C. Apply primer on aggregate subbase at uniform rate of 1/3 gallon per square yard (1.5 L/sq m).

3.3 CONCRETE SIDEWALK, WHEELCHAIR RAMP, AND CURB & GUTTER INSTALLATION

A. Mixing:

1. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.
2. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended by manufacturer.

B. Forming:

1. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
2. Sidewalk Forms: Place and secure forms to location, dimension, profile, and gradient shown on drawings. Height equal to the full depth of the finished sidewalk.
3. Wheelchair Ramps: Place and secure forms to location, dimension, profile, and gradient shown on drawings. Comply with ADA Standards.

C. Placement:

1. Place concrete in a single lift.
2. Consolidate concrete by tamping and spading.
3. Install work in accordance with Standard Plans for Public Works Construction, Current Edition.

D. Joints:

1. Spacing: Provide scored joints every 10 feet (3 m).
2. Filler height equal to the full depth of the finished concrete.

E. Finishing:

1. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge, 1/4 inch radius (6 mm radius).
2. Wheelchair Ramps: Broomed perpendicular to slope.
3. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

F. Record weather information for placement.

3.4 TOLERANCES

A. Surface Flatness: 1/4 inch (6 mm), maximum, measured with 10 foot (3 m) straight edge.

B. Positive flow tests required for curb and gutter.

C. Variation from True Position: 1/4 inch (6 mm), maximum.

D. Compacted Thickness: Within 1/4 inch (6 mm) of specified or indicated thickness.

3.5 PROTECTION

A. Immediately after placement, protect sidewalk from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian traffic over sidewalk for 7 days minimum after finishing.

END OF SECTION 321623

SECTION 321713 - PARKING BUMPERS

PART 1- GENERAL

1.1 SECTION INCLUDES

A. Precast concrete parking bumpers and anchorage.

1.2 RELATED REQUIREMENTS

A. Section 321723 - Pavement Markings.

1.3 PRICE AND PAYMENT PROCEDURES

A. See Section 012200 - Unit Prices, for additional unit price requirements.

B. Parking Bumpers:

1. Basis of Measurement: By the unit.
2. Basis of Payment: Includes bumper unit, installed.

1.4 REFERENCE STANDARDS

A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.

B. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.

C. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

D. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2023.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Submit shop drawings of stops, including installation details and attachment details to at-grade asphalt pavement and epoxy adhesive for approval

PART 2 - PRODUCTS

2.1 MATERIALS

A. Parking Bumpers: Precast concrete, complying with the following:

1. Nominal Size: Half octagonal configuration and 48-inch length. Provide chamfered corners and drainage slots on underside, and provide holes for dowel-anchoring to substrate
2. Cement: ASTM C150/C150M, Portland Type II - Sulfate Resistant; white color.
3. Concrete Materials: ASTM C330/C330M aggregate, water, and sand.
4. Reinforcing Steel: ASTM A615/A615M, deformed steel bars; unfinished, strength and size commensurate with precast unit design.
5. Air Entrainment Admixture: ASTM C260/C260M.
6. Concrete Mix: Minimum 4000 psi (27.58 MPa) compressive strength after 28 days, air entrained to minimum 3.5 percent.
7. Use rigid molds, constructed to maintain precast units uniform in shape, size and finish. Maintain consistent quality during manufacture.
8. Embed reinforcing steel, and drill or sleeve for two 5/8" diameter steel dowels or galvanized No. 5 steel reinforcing bars.
9. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
10. Minor patching in plant is acceptable, providing appearance of units is not impaired.

B. Adhesive: Epoxy.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units without damage to shape or finish. Replace or repair damaged units.

B. Install units in alignment with adjacent work.

C. Fasten units in place with 2 dowels per unit.

D. Paint parking bumpers for ADA stalls blue to match ADA stall stripes

END OF SECTION 321713

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Painted pavement markings.

1.2 RELATED REQUIREMENTS

A. Section 321216 - Asphalt Paving.

B. Section 321713 - Parking Bumpers.

1.3 PRICE AND PAYMENT PROCEDURES

A. Unit Prices:

1. See Section 012200 - Unit Prices for additional requirements.
2. Basis of Measurement for striping details, pavement markings, and curb markings: By Lump Sum.

1.4 REFERENCE STANDARDS

A. AASHTO M 247 - Standard Specification for Glass Beads Used in Pavement Markings; 2013 (Reapproved 2018).

B. AASHTO MP 24 - Standard Specification for Waterborne White and Yellow Traffic Paints; 2015 (Reapproved 2020).

C. FHWA MUTCD - Manual on Uniform Traffic Control Devices; 2023.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment, accompanied by batch certificate.

B. Store products in manufacturer's unopened packaging until ready for installation.

1.8 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F (10 degrees C) or more than 95 degrees F (35 degrees C).

1.9 SEQUENCING

A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of markings.

PART 2 - PRODUCTS

2.1 PAINTED PAVEMENT MARKINGS

A. Comply with 2018 Caltrans Standards.

B. Painted Pavement Markings: As indicated on drawings.

1. Marking Paint: In accordance with AASHTO MP 24.

a. Symbols and Text: White.

b. Wheelchair Symbols: Provide blue and white.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Identify existing markings for removal.

B. Verification of Conditions: Verify that pavement is dry and ready for installation.

C. Notify Architect of unsatisfactory conditions before proceeding.

3.2 PREPARATION

A. Establish survey control points for locating and dimensioning of markings.

B. Clean surfaces prior to installation.

1. Remove dust, dirt, and other debris.
2. Remove rubber deposits, existing paint markings, and other coatings.

C. Apply paint stencils by type and color at necessary intervals.

3.3 INSTALLATION

A. General:

1. Position pavement markings as indicated on drawings.
2. Field location adjustments require approval of Architect.

B. Painted Pavement Markings:

1. Apply in accordance with manufacturer's instructions.
2. Apply in accordance with 2018 Caltrans Standards.
3. Marking Paint: Apply uniformly, with sharp edges.
    a. Applications: Two coats.
    b. Wet Film Thickness: 0.015 inch (0.4 mm), minimum.
    c. Stencils: Lay flat against pavement, align with striping, remove after application.

d. Glass Beads: Apply directly to paint, 10 second lag time, 6 lbs/gal (720 g/L) of paint, uniform thickness and coverage.

e. Length Tolerance: Plus or minus 3 inches (75 mm).

f. Width Tolerance: Plus or minus 1/8 inch (3 mm).

3.4 TOLERANCES

A. Maximum Variation From True Position: 3 inches (76 mm).

B. Maximum Offset From True Alignment: 3 inches (76 mm).

3.5 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Perform field inspection for deviations from true alignment or material irregularities.

C. If inspections indicate work does not meet specified requirements, rework and reinspect at no cost to Owner.

3.6 PROTECTION

A. Replace damaged or removed markings at no additional cost to Owner.

B. Preserve survey control points until pavement marking acceptance.

END OF SECTION 321723

SECTION 321726 - TACTILE WARNING SURFACING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Tactile warning surfacing for pedestrian walking surfaces.

1.2 RELATED REQUIREMENTS

A. Section 321623 - Sidewalks

1.3 REFERENCE STANDARDS

A. AASHTO LRFD - Bridge Design Specifications; 2020, with Errata (2021).

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2019.

D. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser; 2021.

E. ASTM C903 - Standard Practice for Preparing Refractory Specimens by Cold Gunning; 2015 (Reapproved 2020).

F. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine; 2017.

G. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.

H. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.

I. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2022.

J. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2023.

K. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.

L. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Coating Systems; 2020.

M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

N. ASTM G155 - Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials; 2021.

O. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way; 2011.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.

C. Shop Drawings: Submit plan and detail drawings. Indicate:

1. Locations on project site. Demonstrate compliance with referenced accessibility standards.
2. Sizes and layout.
3. Pattern spacing and orientation.
4. Attachment and fastener details, if applicable

D. Manufacturer's Qualification Statement.

E. Warranty: Submit manufacturer warranty; complete forms in Owner's name and register with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver to project site in manufacturer's protective wrapping and in manufacturer's unopened packaging.

B. Store covered and elevated above grade and in manufacturer's unopened packaging until ready for installation. Maintain at ambient temperature between 40 and 90 degrees F (4 and 32 degrees C).

1.7 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Plastic Tiles: Provide manufacturer's standard five year warranty against manufacturing defects, breakage or deformation.

PART 2PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Plastic Tactile and Detectable Warning Surface Tiles:

1. Armor-Tile, a brand of Engineered Plastics, Inc; ADA-C-3648

: www.armortiletransit.com/#sle.

2.2 TACTILE AND DETECTABLE WARNING DEVICES

A. Plastic Tactile and Detectable Warning Tiles: Comply with ADA Standards, glass fiber and carbon fiber reinforced, exterior grade, matte finish polyester sheet with truncated dome

pattern, solid color throughout, internal reinforcing of sheet and of truncated domes, integral radius cut lines on back face of tile; with factory-applied removable protective sheeting.

1. Material Properties:
    a. Water Absorption: 0.20 percent, maximum, when tested in accordance with ASTM D570.
    b. Slip Resistance: 0.50 minimum dry static coefficient of friction, when tested in accordance with ASTM D2047.
    c. Compressive Strength: 25,000 pounds per square inch (172 MPa), minimum, when tested in accordance with ASTM D695.
    d. Tensile Strength: 10,000 pounds per square inch (69 MPa), minimum, when tested in accordance with ASTM D638.
    e. Flexural Strength: 25,000 pounds per square inch (172 MPa) minimum, when tested in accordance with ASTM D790.
    f. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D543.
    g. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D1308.
    h. Abrasion Resistance: 300, minimum, when tested in accordance with ASTM C501.
    i. Flame Spread Index: 25, maximum, when tested in accordance with ASTM E84.
    j. Accelerated Weathering: Delta-E of less than 5.0 at 2,000 hours exposure, when tested in accordance with ASTM G155.

k. Adhesion: No delamination of tile prior to board failure in a temperature range of 20 to 180 degrees F (minus 7 to 82 degrees C), when tested in accordance with ASTM C903.

l. Loading: No damage when tested according to AASHTO LRFD test method HS20.

m. Salt and Spray Performance: No deterioration or other defect after 200 hours of exposure, when tested in accordance with ASTM B117.

2. Installation Method: Cast in place.

3. Shape: Rectangular.

4. Dimensions: 36 inches by 48 inches (914 mm by 1220 mm).

5. Pattern: In-line pattern of truncated domes complying with ADA Standards.

6. Edge: Square.

7. Joint: Butt.

8. Products:

a. Access Tile, a brand of Access Products, Inc; Cast in Place Replaceable Tactile Warning Tile: www.accesstile.com/#sle.

PART 3PART 3 - EXECUTION

3.1 EXAMINATION

A. When installation location is near site boundary or property line, verify required location using property survey.

B. Verify that work area is ready to receive work:

1. Examine work area with installer present.

2. If existing conditions are not as required to properly complete the work of this section, notify Architect.

3. Do not proceed with installation until deficiencies in existing conditions have been corrected.

C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.2 INSTALLATION, GENERAL

A. Install in accordance with manufacturer's written instructions.

1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
2. Do not install when ambient or substrate temperature has been below 40 degrees F (4 degrees C) during the preceding 8 daylight hours.

B. Field Adjustment:

1. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
2. Orient so dome pattern is aligned with the direction of ramp.
3. Align truncated dome pattern between adjacent units.

C. Install units fully seated to substrate, square to straight edges and flat to required slope.

D. Align units so that tops of adjacent units are flush and joints between units are uniform in width.

3.3 INSTALLATION, CAST IN PLACE PLASTIC TILES

A. When installing multiple adjacent units, leave a 3/16 inch (5 mm) gap between units to allow for expansion.

B. Tamp and vibrate units as recommended by manufacturer.

C. Place and position weights on units while concrete cures as recommended by manufacturer. Ensure no voids or air pockets exist between top surface of concrete and underside of units.

3.4 CLEANING PLASTIC UNITS

A. Remove protective plastic sheeting within 24 hours of installation.

B. Remove excess sealant or adhesive from joints and edges.

C. Clean four days prior to date of scheduled inspection.

3.5 PROTECTION

A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.

B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

END OF SECTION 321726

SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE CODES, REGULATIONS AND AGENCIES.
2. DO NOT SCALE DRAWINGS, WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALE. SHOULD ANY DISCREPANCIES OCCUR, NOTIFY ARCHITECT BEFORE PROCEEDING WITH WORK.
3. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AT THE SITE AND SHALL REPORT ANY DISCREPANCIES IN WRITING TO THE ARCHITECT PRIOR TO SUBMITTALS.
4. SPECIFIC ITEMS NOTED TO BE VERIFIED OR FIELD VERIFIED ARE REQUIRED TO BE VERIFIED PRIOR TO ORDERING MATERIALS OR PROCEEDING WITH THE WORK.
5. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ASSURING THAT ALL NECESSARY PERMITS AND APPROVALS WITH THE CITY, COUNTY AND/OR OTHER AUTHORITIES WITH JURISDICTION ON THE PROJECT, ARE OBTAINED AND PAID FOR PRIOR TO BEGINNING WORK OR ORDERING MATERIALS.
6. ANY CONFLICT WITH THESE PLANS AND EXISTING CONDITIONS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT.
7. ALL WORK SHALL BE IN COMPLETE CONFORMANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS OR AS OTHERWISE OUTLINED IN THE SPECIFICATIONS.
8. CONTRACTOR SHALL COORDINATE WITH EQUIPMENT SUPPLIERS FOR POWER REQUIREMENTS, BLOCKING LOCATIONS, SUPPORT FOR EQUIPMENT, PLUMBING REQUIREMENTS AND ROUGH-IN LOCATIONS.
9. USE OF ANY NEW MATERIAL CONTAINING ASBESTOS IS PROHIBITED.
10. DETAILS, MATERIALS, AND FINISHES ARE TYPICAL FOR ALL SIMILAR CONDITIONS UNLESS NOTED OTHERWISE.
11. THE TERM "TYPICAL" (TYP) SHALL BE CONSTRUED TO MEAN APPLYING TO ALL LIKE OR SIMILAR CONDITIONS IN THE AREAS DESIGNATED FOR WORK SCOPE (I.E. WITHIN THE BOUNDARIES OF THIS PROJECT).
12. ALL PRODUCTS AND/OR MANUFACTURERS INDICATED ON DRAWINGS SHALL COMPLY WITH SPECIFICATIONS AND/OR BE APPROVED IN WRITING BY ARCHITECT PRIOR TO ORDERING OR INSTALLATION OF MATERIAL.
13. ALL DOORS NOT LOCATED BY DIMENSIONS ON PLANS OR DETAILS SHALL BE 4" FROM FINISH WALL TO DOOR BUCK.
14. ALL DIMENSIONS ARE GIVEN FROM FACE OF CONCRETE, BLOCK, STUD, OR CENTERLINE OF PARTITION UNLESS OTHERWISE NOTED.
16. WORK SHOWN IN THESE DRAWINGS SHALL ALSO COMPLY WITH THE PROJECT SPECIFICATIONS. IN THE EVENT THERE IS A CONFLICT BETWEEN THESE DRAWINGS AND THE SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL TAKE PRECEDENCE.

PROJECT DESCRIPTION

THE SOUTH COUNTY MAIN JAIL WILL EVENTUALLY BE CLOSED WITH THE EXCEPTION OF THE EXISTING INTAKE AND RECEPTION CENTER (IRC). THE NORTH BRANCH JAIL WILL BECOME SANTA BARBARA COUNTY'S MAIN JAIL FACILITY. THE IRC WILL REMAIN FOR SOUTH COUNTY INTAKE, BOOKING, TEMPORARY CLASSIFICATION HOUSING (UP TO 3 DAYS) AND TEMPORARY OVERNIGHT HOUSING FOR DETAINEES ATTENDING COURT IN SANTA BARBARA.

WORK IN THIS PROJECT INCLUDES RENOVATION OF THE EXISTING IRC AND AN ADDITION UNDER THE EXISTING CANOPY.

THE PROJECT INCLUDES:
- ADDING A FIRE WALL AND FIRE DOORS TO SEPARATE THIS PROJECT PROPERLY FROM THE REMAINING FACILITY
- ACCESS COMPLIANCE IMPROVEMENTS THROUGHOUT (HOLDING, DETOX, OBSERVATION, CHANGING, VISITING, BOOKING, HOUSING CELLS, SHOWERS, TOILETS, ETC.)
- CLINICAL INTERVIEW SPACE IN PRE-BOOKING AND BOOKING AREA
- CLINICIAN SPACE
- TOILETS FOR OFFICERS AND PRE-BOOK DETAINEES (ALSO USED FOR STRIP SEARCH)
- FULL HEIGHT FALL PROTECTION AT TIER LEVELS

ADD ALTERNATES:*
- NO CLIMB FENCING AT HOUSING UNITS

1

APPLICABLE CODES

AUTHORITY HAVING JURISDICTION: COUNTY OF SANTA BARBARA

ALL WORK SHALL CONFORM TO THE FOLLOWING AND ALL OTHER APPLICABLE CODES AND ORDINANCES.

2022 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1, TITLE 24, C.C.R.
2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24, C.C.R.
2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24, C.C.R.
2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24, C.C.R.
2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24, C.C.R.
2022 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24, C.C.R.
2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24, C.C.R.
2022 CALIFORNIA GREEN CODE, PART 11, TITLE 24, C.C.R.
2022 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24, C.C.R.
2022 CAL/OSHA ELEVATOR SAFETY ORDERS, TITLE 8, DIVISION 1, CHAPTER 4, SUBCHAPTER 6, C.C.R.
2022 TITLE 19 C.C.R., PUBLIC SAFETY, DIVISION 1 STATE FIRE MARSHAL REGULATIONS
2022 NFPA 13, THE INSTALLATION OF AUTOMATIC SPRINKLER SYSTEMS, AS AMENDED
2019 NFPA 14, INSTALLATION OF STANDPIPE, PRIVATE HYDRANT, AND HOSE SYSTEMS
2022 NFPA 24, INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES
2023 NFPA 25, CALIFORNIA EDITION, INSPECTION, TESTING & MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS
2022 NFPA 72, NATIONAL FIRE ALARM CODE, AS AMENDED
2010 AMERICANS WITH DISABILITIES ACT STANDARDS FOR ACCESSIBLE DESIGN

1

NOTE:

THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NONCOMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS, A CHANGE ORDER, OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED REPAIR WORK SHALL BE SUBMITTED TO AND APPROVED BY AHJ BEFORE PROCEEDING WITH THE REPAIR WORK.

VICINITY MAP



PARCEL # 059-140-029

CODE ANALYSIS SUMMARY

CODE DESCRIPTION	BUILDING A
1. OCCUPANCY CLASSIFICATION AND USE	I-3 CONDITION 5
2. BUILDING CONSTRUCTION TYPE	IA
3. NUMBER OF STORIES	1 STORY WITH A TIER
4. ACTUAL BUILDING HEIGHT	28'-8.5"
5. BUILDING AREA IN SQUARE FEET	24,714
6. AREA OF PROJECT IN SQUARE FEET (T.I.S)	4,392
7. SEPARATED OR NON-SEPARATED USE	NON-SEPARATED (ONE USE)
8. ALLOWABLE AREA PER 2022 CBC	UNLIMITED
9. AREA INCREASE	NA
10. HEIGHT INCREASE	NA
11A. FIRE SPRINKLERS (Y/N)	YES
11B. FIRE SPRINKER TYPE (WET, DRY, PRE-ACTION, DELUGE)	WET
12A. FIRE ALARM (Y/N)	YES
12B. FIRE ALARM TYPE (MANUAL, AUTOMATIC, ETC)	AUTOMATIC
13. OTHER FIRE PROTECTION SYSTEM (Y/N)	NO
14. SMOKE CONTROL SYSTEM	YES
15. OCCUPANT LOAD OF ENTIRE BUILDING	305 1
16. YEAR BUILDING WAS CONSTRUCTED	1990
17. IS BUILDING IN HIGH FIRE HAZARD SEVERITY ZONE	NO

DEFERRED APPROVAL ITEMS

INSTALLATION OF DEFERRED APPROVAL ITEMS SHALL NOT BE STARTED UNTIL CONTRACTOR'S DRAWINGS, SPECIFICATIONS AND ENGINEERING CALCULATIONS FOR THE ACTUAL SYSTEMS TO BE INSTALLED HAVE BEEN ACCEPTED AND SIGNED BY THE ARCHITECT OR ENGINEER, AND APPROVED BY THE APPROPRIATE APPROVING JURISDICTION.

1. NONE

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G141	CODE ANALYSIS - EXITING	
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G153	CAL GREEN CHECKLIST	
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G163	UL ASSEMBLY DETAILS	
CIVIL		
C101	ADA PARKING PLAN	
C102	ERISION AND SEDIMENT CONTROL PLAN	
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A000	ARCHITECTURAL SYMBOLS, LEGENDS AND NOTES	
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A101	ENLARGED SITE PLAN - DEMO AND PROPOSED	
A111D	DEMOLITION FLOOR PLAN - GROUND LEVEL	
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A112D	DEMOLITION FLOOR PLAN - TIER LEVEL	
A112	FLOOR PLAN - TIER LEVEL	
A121	ROOF PLAN	
A211	REFLECTED CEILING PLAN - GROUND LEVEL	
A212	REFLECTED CEILING PLAN - TIER LEVEL	
A300	BUILDING ELEVATIONS	
A400	BUILDING SECTIONS	
A410	WALL SECTIONS	
A420	STAIR SECTIONS AND PLANS - ADD ALTERNATE ONLY	
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A511	ENLARGED FLOOR PLANS - WEST AND EAST	
A512	ENLARGED FLOOR PLANS & INTERIOR ELEVATIONS - HOUSING POD, TYP.	
A520	ENLARGED TOILET/HOLDING ROOM PLANS & ELEVATIONS	
A521	ENLARGED TOILET/HOLDING ROOM PLANS & ELEVATIONS - GROUND LEVEL	
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A551	INTERIOR ELEVATIONS	
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TA901	DETAILS - FPWB AND FLAT PANEL MOUNT ASSEMBLY	

PROJECT TEAM

OWNER:
COUNTY OF SANTA BARBARA, GENERAL SERVICES
912 W. FOSTER ROAD
SANTA MARIA, CA 93455
PHONE:(805) 440-2278
CONTACT: TULLY WYATT

ARCHITECT:
NACHT & LEWIS
600 Q STREET, SUITE 100
SACRAMENTO, CA 95811
PHONE: (916) 329-4000
CONTACT: ERIC FADNESS

CIVIL ENGINEER:
WILLDAN
2401 EAST KATELLA AVE, SUITE 300
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PHONE: (657) 223-8557
CONTACT: TYRONE PETER

STRUCTURAL ENGINEER:
CYS STRUCTURAL ENGINEERS, INC.
2495 NATOMAS PARK DRIVE, SUITE 650
SACRAMENTO, CA 95833
PHONE:(916) 920-2020
CONTACT: ART ROSS

MECHANICAL ENGINEER:
CAPITAL ENGINEERING CONSULTANTS, INC.
11020 SUN CENTER DRIVE, SUITE 100
RANCHO CORDOVA, CA 95670
PHONE: (916) 851-3500
CONTACT: ANTHONY COLACCHIA

ELECTRICAL ENGINEER:
JMPE ELECTRICAL ENGINEERING & LIGHTING DESIGN
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CONTACT: JOHN MALONEY

SECURITY
AVS SECURITY AND ELECTRICAL
842 BOGGS AVE, SUITE H.
FREMONT, CA 94539
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CONTACT: BRYAN JUNG

ACOUSTICAL/AV
SMITH, FAUSE & MCDONALD INC.
351 8TH STREET
SAN FRANCISCO, CA 94103
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CONTACT: THEO HARTMAN

FIRE PROTECTION
COLLINGS & ASSOCIATES, LLC
260 MAPLE COURT, SUITE 241
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PHONE: (805) 658-8003
CONTACT: AL YAKEL

1

GEOTECHNICAL
KLEINFELDER
2001 ARCH AIRPORT RD, SUITE 100
STOCKTON, CA 95206
PHONE: (209) 948-1345
CONTACT: NATHAN DAHLEN

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS
4436 Calle Real, Santa Barbara, CA 93110
SANTA BARBARA COUNTY

CONSULTANT

nacht&lewis
600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

REGISTERED ARCHITECT — STATE OF CALIFORNIA — No. C-25272 — Exp. May 31, 2027

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

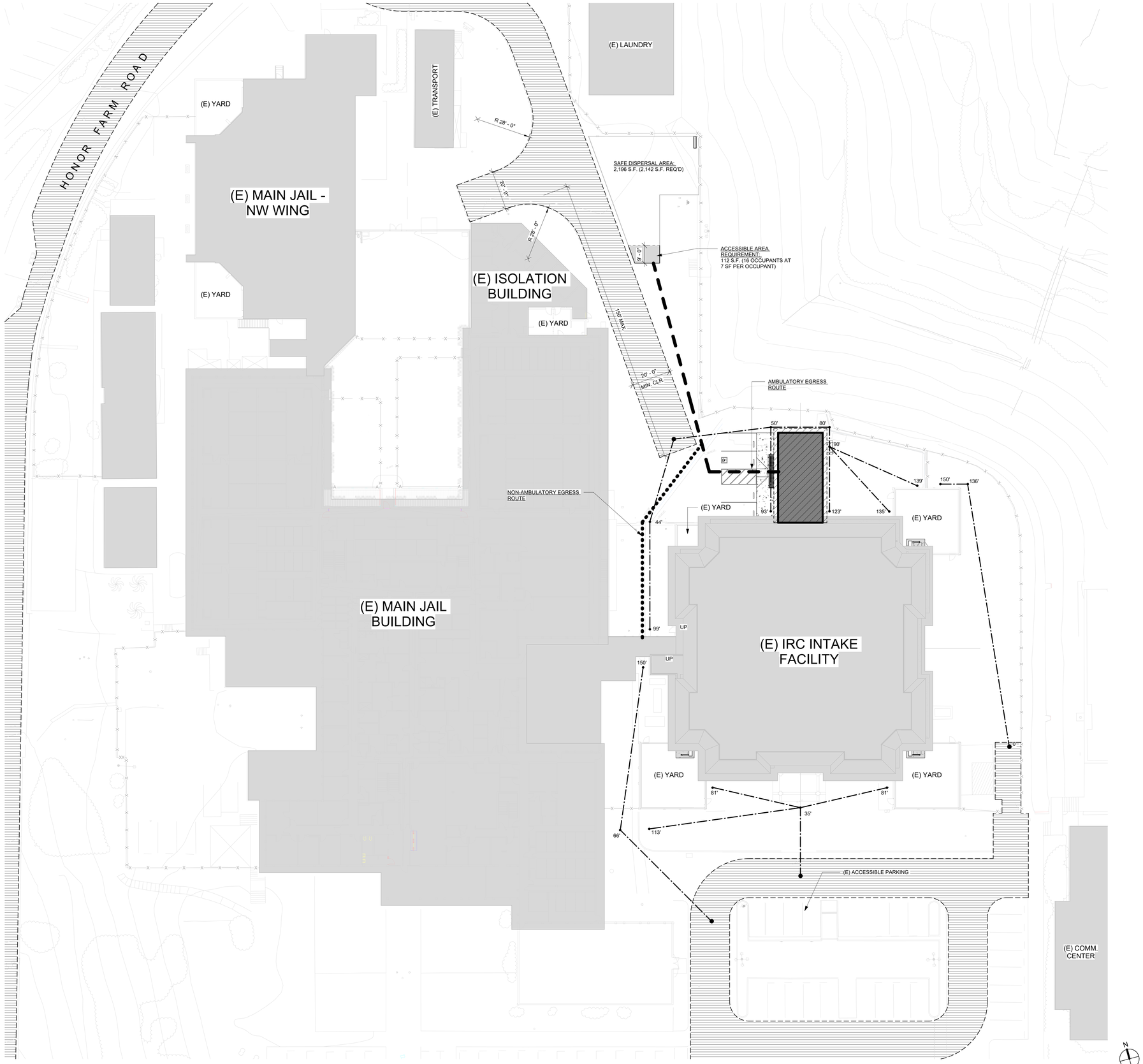
SHEET TITLE

COVER SHEET

SHEET NO.

G000

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



1 CODE ANALYSIS - SITE PLAN

1" = 20'-0"

LEGEND:

- EXISITING BUILDING FOOT PRINT
- EXISTING ROOF CANOPY TO REMAIN
- AREA OF BUILDING ADDITION BELOW EXISTING ROOF CANOPY
- SAFE DISPERSAL AREA
- EMERGENCY VEHICLE ACCESS ROUTE WITH TURN AROUND
- CONCRETE WALK - SEE CIVIL DRAWINGS FOR SLOPES
- EXITING PATH OF TRAVEL - PATH SHALL BE ACCESSIBLE; SEE CIVIL DWGS. F.A.I.
- EXITING PATH OF TRAVEL - PATH IS NOT ACCESSIBLE; SEE CIVIL DWGS. F.A.I.
- HOSE WRAP PATH - 150' MAXIMUM DISTANCE FIRE HOSE FROM TRUCK
- FIRE TRUCK LOCATION
- EXISTING FENCING

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

CONSULTANT

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916.329.4000

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

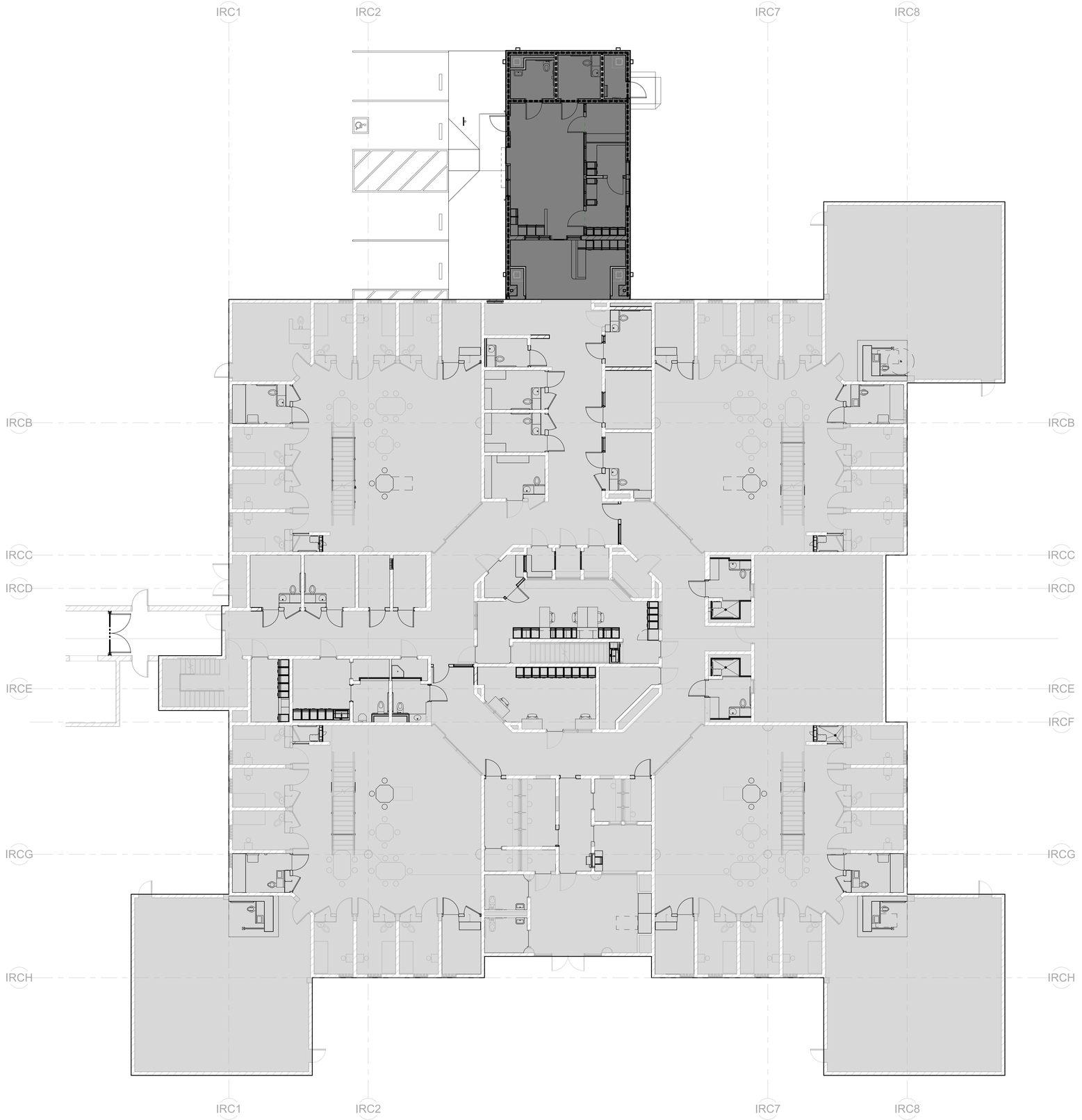
SHEET TITLE

CODE ANALYSIS - SITE

SHEET NO.

G121

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



1 CODE ANALYSIS - CONSTRUCTION
1/8" = 1'-0"

NOTES:

BUILDING DATA

ACTUAL AREA (GROSS BUILDING):

FIRST FLOOR - EXISTING:	18,845 S.F.
FIRST FLOOR - ADDITION:	1,066 S.F.
SECOND FLOOR - EXISTING:	8,170 S.F.
TOTAL	28,081 S.F.

ACTUAL HEIGHT: 28'-9"

BUILDING CLASSIFICATION

CONSTRUCTION TYPE: (PER CBC SECTION 602.2, SECTION 705.1 & TABLE 601))

IRC ADDITION - TYPE I-A

(E) IRC FACILITY - TYPE I PER 1988 UBC WHICH = TYPE I-A*

**PER THE 1988 UBC, THE FIRE RESISTANCE RATING OF BUILDING COMPONENTS IS:*

-EXTERIOR BEARING WALLS – 4 HRS.	*(VERIFIED AS 8 INCH CONCRETE)*
-INTERIOR BEARING WALLS - 3 HRS.	*(VERIFIED AS 8 INCH CONCRETE)*
-STRUCTURAL FRAME - 3 HRS.	*(VERIFIED AS CONCRETE - NO STEEL)*
-FLOORS - 2 HRS.	*(VERIFIED AS 6-8 INCH CONCRETE)*
-ROOFS - 2 HRS.	*(VERIFIED AS CONCRETE WAFFLE SLAB)*

THESE COMPONENT RATINGS EXCEED THE REQUIREMENTS OF 2022 CBC TYPE I-A.

OCCUPANCY TYPE: (PER CBC CHAPTER 3)

IRC ADDITION: I-3 OCCUPANCY

(E) IRC FACILITY: I-3 OCCUPANCY

FIRE LIFE SAFETY SYSTEMS (CBC CHAPTER 9)

AUTOMATIC SPRINKLER SYSTEM: YES
ALTERNATIVE AUTOMATIC FIRE EXTINGUISHING SYSTEMS: YES
STANDPIPE SYSTEM: YES
PORTABLE FIRE EXTINGUISHERS: YES
FIRE ALARM SYSTEM: YES

ALLOWABLE FLOOR AREA (CBC CHAPTER 5)

UNLIMITED AREA AND HEIGHT

BUILDING ELEMENT RATING REQUIREMENTS (CBC TABLE 601)

BUILDING ELEMENT	REQ. RTNG./ASSEMBLY	LEGEND
PRIMARY STRUCTURAL FRAME:	3 HR.	
EXTERIOR BEARING WALLS:	3 HR./U901	
INTERIOR BEARING WALLS:	3 HR.	
FLOOR CONSTRUCTION & SECONDARY MEMBERS:	2 HR.	
ROOF CONSTRUCTION & SECONDARY MEMBERS:	1.5 H.	

LEGEND:

- 3-HR FIRE WALL PER UL. U419
- 3-HR BEARING WALL PER UL. U901
- (E) TYPE 1 BUILDING PER 1988 UBC - SEE NOTES FOR ADDITIONAL INFORMATION
- TYPE I-A BUILDING ADDITION

1

AGENCY APPROVAL

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ACCESSIBILITY IMPROVEMENTS

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REGISTERED ARCHITECT — No. C-25272 — Exp. 01-31-2027 — STATE OF CALIFORNIA

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

CODE ANALYSIS - CONSTRUCTION

SHEET NO.

G131

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

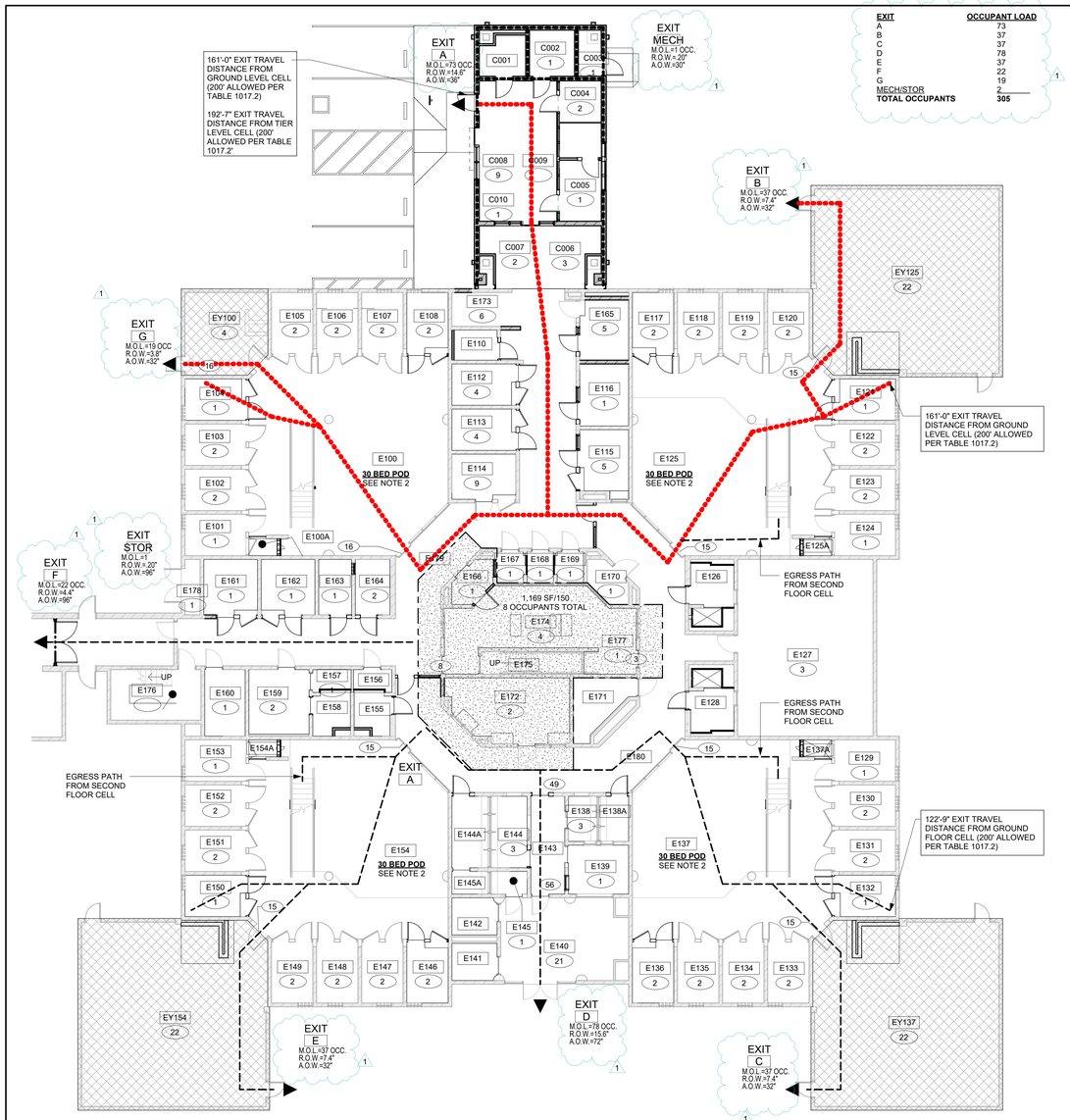
ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

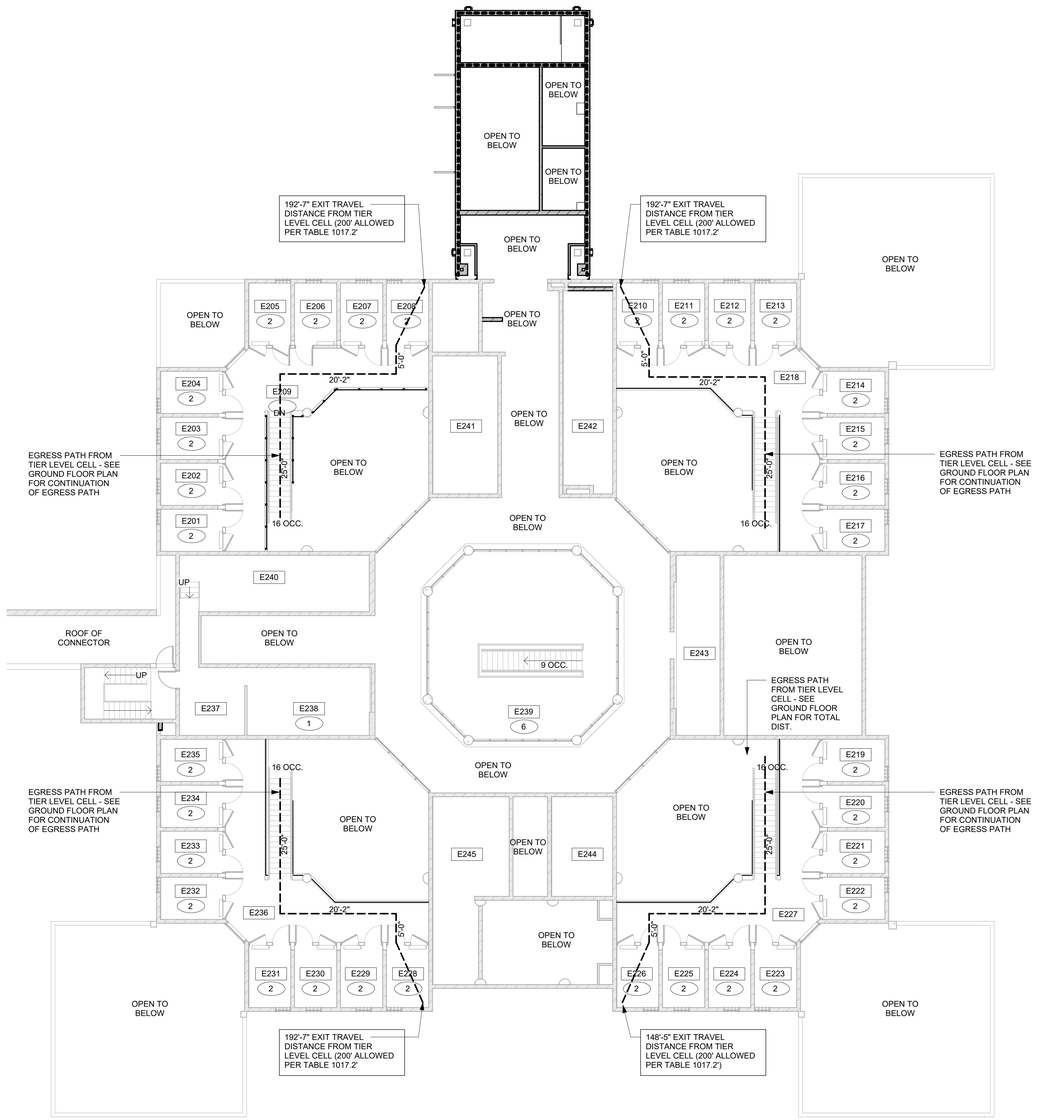
ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET



26 CODE ANALYSIS - EXITING - FIRST FL.

3/32" = 1'-0"



1 CODE ANALYSIS - EXITING - TIER LEVEL

3/32" = 1'-0"

OCCUPANT LOAD CALCULATIONS (FIRST FLOOR) PER CBC TABLE 1004.5

ROOM NO.	ROOM NAME	USE	FLOOR AREA (SF UON)	OCC. LOAD FACTOR	MAX. OCC.	CBC REF. SEC.
C001	OFFICER TOILET	NON-OCCUPIED SPACE	55	0		
C002	INMATE TOILET & STRIP SEARCH	SINGLE CELL	66	75	1	1231.2.2
C003	MECH	EQUIPMENT	28	300	1	
C004	ASSESSMENT	TREATMENT	101	100	2	
C005	CLINICIAN OFFICE	OFFICE	80	150	1	
C006	CUSTODY	OTHER	106	50	3	
C007	BODY SCAN	OTHER	100	50	2	
C008	PRE-BOOKING	ASSEMBLY (UNCONCENTRATED)	135	15	9	
C009	REPORT	CIRCULATION	170	0		
C010	SEARCH CASH & WRAP	OTHER	37	50	1	
C201	MECH PLATFORM		177			
E100	DAYROOM (COURT HOLDING)	DAYROOM	1176	0		1231.2.9
E100A	ADA SHOWER	NON-OCCUPIED SPACE	17	0		
E101	CELL	SINGLE CELL	79	80	1	1231.2.7
E102	CELL	DOUBLE CELL	79	40	2	1231.2.7
E103	CELL	DOUBLE CELL	79	40	2	1231.2.7
E104	ADA CELL	SINGLE CELL	79	80	1	1231.2.7
E105	CELL	DOUBLE CELL	79	40	2	1231.2.7
E106	CELL	DOUBLE CELL	79	40	2	1231.2.7
E107	CELL	DOUBLE CELL	79	40	2	1231.2.7
E108	VISITATION	DOUBLE CELL	79	40	2	1231.2.7
E110	INMATE TOILET	NON-OCCUPIED SPACE	41	0		
E112	4-PERSON ADA CELL	GROUP HOLDING	83	25	4	1231.2.2
E113	4-PERSON ADA CELL	GROUP HOLDING	83	25	4	1231.2.2
E114	9-PERSON GROUP CELL	GROUP HOLDING	91	11	9	1231.2.2
E115	DETOX ADA CELL	SOBERING CELL	99	20	5	1231.2.4
E116	INTERVIEW OR OFFICE	OFFICE	95	150	1	
E117	VISITATION	DOUBLE CELL	79	40	2	1231.2.7
E118	CELL	DOUBLE CELL	79	40	2	1231.2.7
E119	CELL	DOUBLE CELL	79	40	2	1231.2.7
E120	CELL	DOUBLE CELL	79	40	2	1231.2.7
E121	ADA CELL	SINGLE CELL	79	80	1	1231.2.7
E122	CELL	DOUBLE CELL	79	40	2	1231.2.7
E123	CELL	DOUBLE CELL	79	40	2	1231.2.7
E124	CELL	SINGLE CELL	79	80	1	1231.2.7
E125	DAYROOM (CLASSIFICATION)	DAYROOM	1176	0		1231.2.9
E125A	ADA SHOWER	NON-OCCUPIED SPACE	17	0		
E126	CHANGE IN	NON-OCCUPIED SPACE	75	0		
E127	PROPERTY STORAGE	STORAGE	752	300	3	
E128	CHANGE OUT	NON-OCCUPIED SPACE	75	0		
E129	CELL	SINGLE' CELL	79	80	1	1231.2.7
E130	CELL	DOUBLE CELL	79	40	2	1231.2.7
E131	CELL	DOUBLE CELL	79	40	2	1231.2.7

OCCUPANT LOAD CALCULATIONS (FIRST FLOOR) PER CBC TABLE 1004.5

ROOM NO.	ROOM NAME	USE	FLOOR AREA (SF UON)	OCC. LOAD FACTOR	MAX. OCC.	CBC REF. SEC.
E132	ADA CELL	SINGLE CELL	79	80	1	1231.2.7
E133	CELL	DOUBLE CELL	79	40	2	1231.2.7
E134	CELL	DOUBLE CELL	79	40	2	1231.2.7
E135	CELL	DOUBLE CELL	79	40	2	1231.2.7
E136	VISITATION	DOUBLE CELL	79	40	2	1231.2.7
E137	DAYROOM (CLASSIFICATION)	DAYROOM	1176	0		1231.2.9
E137A	ADA SHOWER	NON-OCCUPIED SPACE	17	0		
E138	ADA N.C. VISIT	ASSEMBLY W/ FIXED SEATING	40	15	3	
E138A	INMATE VISIT.	NON-OCCUPIED SPACE	40	0		
E139	OFFICE	OFFICE	92	100	1	
E140	PUBLIC LOBBY	ASSEMBLY (UNCONCENTRATED)	313	15	21	
E141	PUBLIC TOILET	NON-OCCUPIED SPACE	53	0		
E142	PUBLIC TOILET	NON-OCCUPIED SPACE	53	0		
E143	SALLYPORT	CIRCULATION	104	0		
E144	N.C. VISIT.	ASSEMBLY W/ FIXED SEATING	80	40	3	
E144A	INMATE VISIT.	NON-OCCUPIED SPACE	80	0		
E145	N.C. VISIT.	ASSEMBLY W/ FIXED SEATING	25	26	1	
E145A	VISIT.	NON-OCCUPIED SPACE	25	0		
E146	VISITATION	DOUBLE CELL	79	40	2	1231.2.7
E147	CELL	DOUBLE CELL	79	40	2	1231.2.7
E148	CELL	DOUBLE CELL	79	40	2	1231.2.7
E149	CELL	DOUBLE CELL	79	40	2	1231.2.7
E150	ADA CELL	SINGLE CELL	79	80	1	1231.2.7
E151	CELL	DOUBLE CELL	79	40	2	1231.2.7
E152	CELL	SINGLE CELL	79	40	2	1231.2.7
E153	CELL	SINGLE CELL	79	80	1	1231.2.7
E154	DAYROOM (CLASSIFICATION)	DAYROOM	1176	0		1231.2.9
E154A	ADA SHOWER	NON-OCCUPIED SPACE	17	0		
E155	STAFF TOILET	NON-OCCUPIED SPACE	47	0		
E156	JANITOR	NON-OCCUPIED SPACE	24	0		
E157	STORAGE	STORAGE	24	300	1	
E158	EXAM TOILET	NON-OCCUPIED SPACE	48	0		
E159	MEDICAL EXAM	TREATMENT	122	100	2	1231.2.12
E160	CLINICIAN	OFFICE	85	100	1	
E161	ADA HOLD/ OBSERVATION	SINGLE CELL	94	100	1	1231.2.6
E162	ADA HOLD/ OBSERVATION	SINGLE CELL	94	100	1	1231.2.6
E163	SAFETY CELL	SINGLE CELL	57	100	1	1231.2.5
E164	INTERVIEW	OTHER	60	50	2	
E165	DETOX ADA CELL	SOBERING CELL	93	20	5	1231.2.4

OCCUPANT LOAD CALCULATIONS (FIRST FLOOR) PER CBC TABLE 1004.5

ROOM NO.	ROOM NAME	USE	FLOOR AREA (SF UON)	OCC. LOAD FACTOR	MAX. OCC.	CBC REF. SEC.
E166	N.C. INTERVIEW	BUSINESS	43	150	1	SEE NOTE 3
E167	N.C. INTERVIEW	OTHER	30	50	1	
E168	BOOK	OTHER	26	50	1	
E169	ADA BOOK	OTHER	27	50	1	
E170	LIVE SCAN	OTHER	42	50	1	
E171	VIDEO ARRAIGNMENT	NON-OCCUPIED SPACE	85	0		
E172	PRE-TRIAL /DISCHARGE PLANNING	BUSINESS	230	150	2	SEE NOTE 3
E173	DOCILE WAIT	ASSEMBLY W/ FIXED SEATING	64	11	6	
E174	ORBR	BUSINESS	314	100	4	SEE NOTE 3
E175	STAIR	NON-OCCUPIED SPACE	71	0		
E176	STAIR	NON-OCCUPIED SPACE	143	0		
E177	KITCHENETTE	BUSINESS	75	150	1	SEE NOTE 3
E178	STOR	STORAGE	26	300	1	
E179	NORTH CORRIDOR	CIRCULATION	1165	0		
E180	SOUTH CORRIDOR	CIRCULATION	907	0		
E181	CORRIDOR		174			
EY100	EXERCISE YARD	EXERCISE	196	50	4	408.3.13
EY125	EXERCISE YARD	EXERCISE	1052	50	22	408.3.13
EY137	EXERCISE YARD	EXERCISE	1052	50	22	408.3.13
EY154	EXERCISE YARD	EXERCISE	1052	50	22	408.3.13
					234	

OCCUPANT LOAD CALCULATIONS (TIER) PER CBC TABLE 1004.5

ROOM NO.	ROOM NAME	USE	FLOOR AREA (SF UON)	OCC. LOAD FACTOR	MAX. OCC.	CBC REF. SEC.
E201	CELL	DOUBLE CELL	79	40	2	1231.2.7
E202	CELL	DOUBLE CELL	79	40	2	1231.2.7
E203	CELL	DOUBLE CELL	79	40	2	1231.2.7
E204	CELL	DOUBLE CELL	79	40	2	1231.2.7
E205	CELL	DOUBLE CELL	79	40	2	1231.2.7
E206	CELL	DOUBLE CELL	79	40	2	1231.2.7
E207	CELL	DOUBLE CELL	79	40	2	1231.2.7
E208	CELL	DOUBLE CELL	79	40	2	1231.2.7
E209	DAYROOM TIER	DAYROOM	492	0		408.3.13
E210	CELL	DOUBLE CELL	79	40	2	1231.2.7
E211	CELL	DOUBLE CELL	79	40	2	1231.2.7
E212	CELL	DOUBLE CELL	79	40	2	1231.2.7
E213	CELL	DOUBLE CELL	79	40	2	1231.2.7
E214	CELL	DOUBLE CELL	79	40	2	1231.2.7
E215	CELL	DOUBLE CELL	79	40	2	1231.2.7
E216	CELL	DOUBLE CELL	79	40	2	1231.2.7
E217	CELL	DOUBLE CELL	79	40	2	1231.2.7
E218	DAYROOM TIER	NON-OCCUPIED SPACE	483	0		408.3.13
E219	CELL	DOUBLE CELL	79	40	2	1231.2.7

OCCUPANT LOAD CALCULATIONS (TIER) PER CBC TABLE 1004.5

ROOM NO.	ROOM NAME	USE	FLOOR AREA (SF UON)	OCC. LOAD FACTOR	MAX. OCC.	CBC REF. SEC.
E220	CELL	DOUBLE CELL	79	40	2	1231.2.7
E221	CELL	DOUBLE CELL	79	40	2	1231.2.7
E222	CELL	DOUBLE CELL	79	40	2	1231.2.7
E223	CELL	DOUBLE CELL	79	40	2	1231.2.7
E224	CELL	DOUBLE CELL	79	40	2	1231.2.7
E225	CELL	DOUBLE CELL	79	40	2	1231.2.7
E226	CELL	DOUBLE CELL	79	40	2	1231.2.7
E227	DAYROOM TIER	NON-OCCUPIED SPACE	483	0		408.3.13
E228	CELL	DOUBLE CELL	79	40	2	1231.2.7
E229	CELL	DOUBLE CELL	79	40	2	1231.2.7
E230	CELL	DOUBLE CELL	79	40	2	1231.2.7
E231	CELL	DOUBLE CELL	79	40	2	1231.2.7
E232	CELL	DOUBLE CELL	79	40	2	1231.2.7
E233	CELL	DOUBLE CELL	79	40	2	1231.2.7
E234	CELL	DOUBLE CELL	79	40	2	1231.2.7
E235	CELL	DOUBLE CELL	79	40	2	1231.2.7
E236	DAYROOM TIER	NON-OCCUPIED SPACE	483	0		408.3.13
E237	STAIR	NON-OCCUPIED SPACE	134	0		
E238	ELEC. & TEL. RM.	EQUIPMENT	254	300	1	
E239	CONTROL	BUSINESS	887	150	6	
E240	ATTIC	NON-OCCUPIED SPACE	325	0		
E241	ATTIC	NON-OCCUPIED SPACE	272	0		
E242	ATTIC	NON-OCCUPIED SPACE	298	0		
E243	ATTIC	NON-OCCUPIED SPACE	251	0		
E244	ATTIC	NON-OCCUPIED SPACE	185	0		
E245	ATTIC	NON-OCCUPIED SPACE	353	0		
					71	

TOTAL OCCUPANTS: 305 ACTUAL OCCUPANTS TOTAL

FIRST FLOOR: 234

TIER: 71

NOTES:

1. REGARDING ROOMS WITH AN "OCCUPANCY LOAD FACTOR" OF "0" AND WITH NO "MAX. OCC." NUMBER: THE AREAS SHOWN FOR DAYROOM, SHOWERS, WHICH COMBINED MAKE UP THE DAYROOM AREA, ARE BASED ON THE 2022 CBC SECTION 1231.
2. THE OCCUPANCY CALCULATIONS FOR THESE AREAS ARE DRIVEN BY THE NUMBER OF OCCUPANTS IN CELLS OR SLEEPING AREAS THEY SERVE, I.E. ONLY THE OCCUPANT LOAD FACTOR FOR CELLS AND SLEEPING AREAS ARE SHOWN, AS ALLOWED FOR UNDER THE 2022 CBC 1004.1.2 EXCEPTION " . . . THE ACTUAL NUMBER OF OCCUPANTS FOR WHOM EACH OCCUPIED SPACE, FLOOR OR BUILDING IS DESIGNED, . . ."
3. OCCUPANT LOAD FOR THIS AREA IS PART OF A GROSS AREA CALCULATION WITH A LOAD FACTOR OF 150SF GROSS PER OCCUPANT.

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. XXX
2. XXX

LEGEND:

- EXIT / A — EXTERIOR EXIT OPENING
- M.O.L. / R.O.W. / A.O.W. — MAXIMUM OCCUPANCY LOAD AT EXTERIOR EXIT; REQUIRED OPENING WIDTH (.2" x OCCUPANT LOAD OR 36" MIN.); ACTUAL OPENING WIDTH PROVIDED
- COMMON PATH OF EGRESS TRAVEL, LESS THAN CODE REQUIRED MAXIMUM DISTANCE. (CBC TABLE 1006.2.1)
- ACCESSIBLE PATH OF TRAVEL
- 1-HR FIRE BARRIER
- 2-HR FIRE BARRIER
- 3-HR FIRE BARRIER
- 3-HR FIRE WALL
- EXIT TO EXTERIOR
- (#) — NUMBER OF OCCUPANTS IN SUBJECT SPACE PER OCCUPANT LOAD CALCULATION
- CR — CREDENTIALED ENTRANCE
- FEC — FIRE EXTINGUISHER CABINET

AGENCY APPROVAL

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ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

CODE ANALYSIS - EXITING

SHEET NO.

G141

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

AIA California

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE
NONRESIDENTIAL MANDATORY MEASURES, SHEET 1 (July 2024 Supplement)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

Y	N/A	RESPON. PARTY

CHAPTER 3
GREEN BUILDING
SECTION 301 GENERAL

301.1 SCOPE. Buildings shall be designed to include the green building measures specified as mandatory in the application checklists contained in this code. Voluntary green building measures are also included in the application checklists and may be included in the design and construction of structures covered by this code, but are not required unless adopted by a city, county, or city and county as specified in Section 101.7.

301.3 NONRESIDENTIAL ADDITIONS AND ALTERATIONS. [BSC-CG] The provisions of individual sections of Chapter 5 apply to newly constructed buildings, building additions of 1,000 square feet or greater, and/or building alterations with a permit valuation of $200,000 or above (for occupancies within the authority of California Building Standards Commission). Code sections relevant to additions and alterations shall only apply to the portions of the building being added or altered within the scope of the permitted work.

A code section will be designated by a banner to indicate where the code section only applies to newly constructed buildings [N] or to additions and/or alterations [A]. When the code section applies to both, no banner will be used.

301.3.1 Nonresidential additions and alterations that cause updates to plumbing fixtures only:

Note: On and after January 1, 2014, certain commercial real property, as defined in Civil Code Section 1101.3, shall have its noncompliant plumbing fixtures replaced with appropriate water-conserving plumbing fixtures under specific circumstances. See Civil Code Section 1101.1 *et seq.* for definitions, types of commercial real property affected, effective dates, circumstances necessitating replacement of noncompliant plumbing fixtures, and duties and responsibilities for ensuring compliance.

301.3.2 Waste Diversion. The requirements of Section 5.408 shall be required for additions and alterations whenever a permit is required for work.

301.4 PUBLIC SCHOOLS AND COMMUNITY COLLEGES. (see GBSC)
301.5 HEALTH FACILITIES. (see GBSC)

SECTION 302 MIXED OCCUPANCY BUILDINGS

302.1 MIXED OCCUPANCY BUILDINGS. In mixed occupancy buildings, each portion of a building shall comply with the specific green building measures applicable to each specific occupancy.

SECTION 303 PHASED PROJECTS

303.1 PHASED PROJECTS. For shell buildings and others constructed for future tenant improvements, only those code measures relevant to the building components and systems considered to be new construction (or newly constructed) shall apply.

303.1.1 Initial Tenant improvements. The provisions of this code shall apply only to the initial tenant improvements to a project. Subsequent tenant improvements shall comply with the scoping provisions in Section 301.3 non-residential additions and alterations.

ABBREVIATION DEFINITIONS:

HCD	Department of Housing and Community Development
BSC	California Building Standards Commission
DSA-SS	Division of the State Architect, Structural Safety
OSHPD	Office of Statewide Health Planning and Development
LR	Low Rise
HR	High Rise
AA	Additions and Alterations
N	New

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

DIVISION 5.1 PLANNING AND DESIGN

SECTION 5.101 GENERAL

5.101.1 SCOPE
The provisions of this chapter outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

SECTION 5.102 DEFINITIONS

5.102.1 DEFINITIONS
The following terms are defined in Chapter 2 *(and are included here for reference)*

CUTOFF LUMINAIRES. Luminaires whose light distribution is such that the candela per 1000 lamp lumens does not numerically exceed 25 (2.5 percent) at an angle of 90 degrees above nadir, and 100 (10 percent) at a vertical angle of 80 degrees above nadir. This applies to all lateral angles around the luminaire.

ELECTRIC VEHICLE (EV). [BSC-CG, HCD] An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are considered electric vehicles. For purposes of the California Electrical Code, off-road, self-propelled electric vehicles, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats and the like, are not included.

ELECTRIC VEHICLE (EV) CAPABLE SPACE. [BSC-CG, DSA-SS and HCD] A vehicle space with electrical panel space and load capacity to support a branch circuit and necessary raceways, both underground and/or surface mounted, to support EV charging.

ELECTRIC VEHICLE (EV) CHARGER. [BSC-CG, HCD] Off-board charging equipment used to charge an electric vehicle.

ELECTRIC VEHICLE CHARGING SPACE (EV SPACE). [HCD] A space intended for future installation of EV charging equipment and charging of electric vehicles.

ELECTRIC VEHICLE CHARGING STATION (EVCS). [BSC-CG, DSA-SS, HCD] One or more electric vehicle charging spaces served by EVSE or receptacle(s).

ELECTRIC VEHICLE (EV) READY SPACE. [HCD] A vehicle space which is provided with a branch circuit; any necessary raceways, both underground and/or surface mounted; to accommodate EV charging, terminating in a receptacle or a charger.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE).[BSC-CG, DSA-SS and HCD] The conductors, including the ungrounded, grounded and equipment grounding conductors and the electric vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

SECTION 5.105 DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES

5.105.1 Scope. [BSC-CG] Effective July 1, 2024, alteration(s) to existing building(s) where the combined altered floor area is 100,000 square feet or greater shall comply with either Section 5.105.2, 5.409.2, or 5.409.3. Addition(s) to existing building(s) where the total floor area combined with the existing building(s) is 100,000 square feet or greater shall comply with either Section 5.105.2, Section 5.409.2, or Section 5.409.3. Effective January 1, 2026, the combined floor area shall be 50,000 square feet or greater.

[DSA-SS] Alteration(s) to existing building(s) where the combined altered floor area is 50,000 square feet or greater shall comply with either Section 5.105.2, 5.409.2, or 5.409.3. Addition(s) to existing building(s) where the total floor area combined with the existing building(s) is 50,000 square feet or greater shall comply with either Section 5.105.2, Section 5.409.2, or Section 5.409.3.

Exception [BSC-CG, DSA-SS]: Combined addition(s) to existing building(s) of two times the area or more of the existing building(s) is not eligible to meet compliance with Section 5.105.2.

5.105.2 Reuse of existing building. An alteration or addition to an existing building shall maintain at a minimum 45 percent combined of the existing building's primary structural elements (foundations; columns, beams, walls, and floors; and lateral elements) and existing building enclosure (roof framing, wall framing and exterior finishes). Window assemblies, insulation, portions of buildings deemed structurally unsound or hazardous, and hazardous materials that are remediated as part of the project shall not be included in the calculation.

5.105.2.1 Verification of compliance. Documentation shall be provided in the construction documents to demonstrate compliance with Section 5.105.2.

Note: Sample Worksheet WS-3 in Chapter 8 may be used to assist in documenting compliance with this section.

5.105.3 Deconstruction (Reserved).

Y	N/A	RESPON. PARTY
X		CIVIL

SECTION 5.106 SITE DEVELOPMENT

5.106.1 STORM WATER POLLUTION PREVENTION FOR PROJECTS THAT DISTURB LESS THAN ONE ACRE OF LAND. Newly constructed projects and additions which disturb less than one acre of land, and are not part of a larger common plan of development or sale, shall prevent the pollution of storm water runoff from the construction activities through one or more of the following measures:

5.106.1.1 Local ordinance. Comply with a lawfully enacted storm water management and/or erosion control ordinance.

5.106.1.2 Best Management Practices (BMPs). Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMPs.

1. Soil loss BMPs that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
   a. Scheduling construction activity during dry weather, when possible.
   b. Preservation of natural features, vegetation, soil, and buffers around surface waters.
   c. Drainage swales or lined ditches to control stormwater flow.
   d. Mulching or hydroseeding to stabilize disturbed soils.
   e. Erosion control to protect slopes.
   f. Protection of storm drain inlets (gravel bags or catch basin inserts).
   g. Perimeter sediment control (perimeter silt fence, fiber rolls).
   h. Sediment trap or sediment basin to retain sediment on site.
   i. Stabilized construction exits.
   j. Wind erosion control.
   k. Other soil loss BMPs acceptable to the enforcing agency.
2. Good housekeeping BMPs to manage construction equipment, materials, non-stormwater discharges and wastes that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
   a. Dewatering activities.
   b. Material handling and waste management.
   c. Building materials stockpile management.
   d. Management of washout areas (concrete, paints, stucco, etc.).
   e. Control of vehicle/equipment fueling to contractor's staging area.
   f. Vehicle and equipment cleaning performed off site.
   g. Spill prevention and control.
   h. Other housekeeping BMPs acceptable to the enforcing agency.

Y	N/A	RESPON. PARTY
X		

5.106.2 STORMWATER POLLUTION PREVENTION FOR PROJECTS THAT DISTURB ONE OR MORE ACRES OF LAND. Comply with all lawfully enacted stormwater discharge regulations for projects that (1) disturb one acre or more of land, or (2) disturb less than one acre of land but are part of a larger common plan of development sale.

Note: Projects that (1) disturb one acre or more of land, or (2) disturb less than one acre of land but are part of the larger common plan of development or sale must comply with the post-construction requirements detailed in the applicable National Pollutant Discharge Elimination System (NPDES) General permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities issued by the State Water Resources Control Board or the Lahontan Regional Water Quality Control Board (for projects in the Lake Tahoe Hydrologic Unit).

The NPDES permits require postconstruction runoff (post-project hydrology) to match the preconstruction runoff (pre-project hydrology) with the installation of postconstruction stormwater management measures. The NPDES permits emphasize runoff reduction through on-site stormwater use, interception, evapotranspiration, and infiltration through nonstructural controls, such as Low Impact Development (LID) practices, and conversation design measures. Stormwater volume that cannot be addressed using nonstructural practices is required to be captured in structural practices and be approved by the enforcing agency.

Refer to the current applicable permits on the State Water Resources Control Board website at: www.waterboards.ca.gov/constructionstormwater. Consideration to the stormwater runoff management measures should be given during the initial design process for appropriate integration into site development.

5.106.4 BICYCLE PARKING. For buildings within the authority of California Building Standards Commission as specified in Section 103, comply with Section 5.106.4.1. For buildings within the authority of the Division of the State Architect pursuant to Section 105, comply with Section 5.106.4.2

Y	N/A	RESPON. PARTY
X		

5.106.4.1 Bicycle parking. [BSC-CG] Comply with Sections 5.106.4.1.1 and 5.106.4.1.2; or meet the applicable local ordinance, whichever is stricter.

5.106.4.1.1 Short-term bicycle parking. If the new project or an addition or alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack.
Exception: Additions or alterations which add nine or less visitor vehicular parking spaces.

5.106.4.1.2 Long-term bicycle parking. For new buildings with tenant spaces that have 10 or more tenant-occupants, provide secure bicycle parking for 5 percent of the tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility.

5.106.4.1.3 For additions or alterations that add 10 or more tenant-occupant vehicular parking spaces, provide secure bicycle parking for 5 percent of the tenant vehicular parking spaces being added, with a minimum of one bicycle parking facility.

5.106.4.1.4 For new shell buildings in phased projects provide secure bicycle parking for 5 percent of the anticipated tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility.

5.106.4.1.5 Acceptable bicycle parking facility for Sections 5.106.4.1.2, 5.106.4.1.3, and 5.106.4.1.4 shall be convenient from the street and shall meet one of the following:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; or
3. Lockable, permanently anchored bicycle lockers.

Note: Additional information on recommended bicycle accommodations may be obtained from Sacramento Area Bicycle Advocates.

Y	N/A	RESPON. PARTY
	X	

5.106.4.2 Bicycle parking. [DSA-SS] For public schools and community colleges, comply with Sections 5.106.4.2.1 and 5.106.4.2.2

5.106.4.2.1 Student bicycle parking. Provide permanently anchored bicycle racks conveniently accessed with a minimum of four two-bike capacity racks per new building.
5.106.4.2.2 Staff bicycle parking. Provide permanent, secure bicycle parking conveniently accessed with a minimum of two staff bicycle parking spaces per new building. Acceptable bicycle parking facilities shall be convenient from the street or staff parking area and shall meet one of the following:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; or
3. Lockable, permanently anchored bicycle lockers.

Y	N/A	RESPON. PARTY
X		

5.106.5.3 Electric vehicle (EV) charging. [N] [BSC-CG] Construction to provide electric vehicle infrastructure and facilitate electric vehicle charging shall comply with Section 5.106.5.3.1 EV capable spaces, Section 5.106.5.3.2 Electric vehicle charging stations and associated Table 5.106.5.3.1, or Section 5.106.5.3.6 Electric vehicle charging stations (EVCS)—Power allocation method and associated Table 5.106.5.3.6 and shall be provided in accordance with regulations in the *California Building Code* and the *California Electrical Code*.

Exceptions:
1. On a case-by-case basis where the local enforcing agency has determined compliance with this section is not feasible based upon one of the following conditions:
   a. Where there is no local utility power supply
   b. Where the local utility is unable to supply adequate power.
   c. Where there is evidence suitable to the local enforcement agency substantiating the local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project.
2. Parking spaces accessible only by automated mechanical car parking systems are not required to comply with this code section.

5.106.5.3.1 EV capable spaces. [N] EV capable spaces shall be provided in accordance with Table 5.106.5.3.1 and the following requirements:
1. Raceways complying with the California Electrical Code and no less that 1-inch (25 mm) diameter shall be provided and shall originate at a service panel or a subpanel(s) serving the area, and shall terminate in close proximity to the proposed location of the EV capable and into a suitable listed cabinet, box,enclosure or equivalent. A common raceway may be used to serve multiple EV charging spaces.
2. A service panel or subpanel (s) shall be provided with panel space and electrical load capacity for a dedicated 208/240 volt, 40-ampere minimum branch circuit for each EV capable space, with delivery of 30-ampere minimum to an installed EVSE at each EVCS.
3. The electrical system and any on-site distribution transformers shall have sufficient capacity to supply full rated amperage at each EV capable space.
4. The service panel or subpanel circuit directory shall identify the reserved overcurrent protective devices space(s) as "EV CAPABLE". The raceway termination location shall be permanently and visibly marked as "EV CAPABLE."

Note: A parking space served by electric vehicle supply equipment or designed as a future EV charging space shall count as at least one standard automobile parking space only for the purpose of complying with any applicable minimum parking space requirements established by an enforcement agency. See vehicle Code Section 22511.2 for further details.

TABLE 5.106.5.3.1		
TOTAL NUMBER OF ACTUAL PARKING SPACES	**NUMBER OF REQUIRED EV CAPABLE SPACES**	**NUMBER OF EVCS (EV CAPABLE SPACES PROVIDED WITH EVSE)[4,2]**
0-9	0	0
10-25	2	0
26-50	8	2
51-75	13	3
76-100	17	4
101-150	25	6
151-200	35	9
201 AND OVER	20 percent of actual parking spaces[1]	25 percent of EV capable spaces[1]

1. Calculation for spaces shall be rounded up to the nearest whole number.
2. The number of required EVCS (EV capable spaces provided with EVSE) in column 3 count toward the total number of required EV capable spaces shown in column 2.
3. At least one Level 2 EVSE shall be provided.

5.106.5.3.2 Electric vehicle charging stations (EVCS) EV capable spaces shall be provided with electric vehicle supply equipment (EVSE) to create EVCS in the number indicated in Table 5.106.5.3.1. The EVCS required by Table 5.106.5.3.1 shall be provided with Level 2 EVSE or DCFC as permitted in Section 5.106.5.3.2.1. At least one Level 2 EVSE shall be provided.

One EV charger with multiple connectors capable of charging multiple EVs simultaneously shall be permitted if the electrical load capacity required by Section 5.106.5.3.1 for each EV capable space is accumulatively supplied to the EV charger.

The installation of each DCFC EVSE shall be permitted to reduce the minimum number of required EV capable spaces without EVSE by five and reduce proportionally the required electrical load capacity to the service panel or subpanel.

5.106.5.3.2.1 The installation of each DCFC EVSE shall be permitted to reduce the minimum number of required EV capable spaces without EVSE or EVCS with Level 2 EVSE by five and reduce proportionally the required electrical load capacity to the service panel or subpanel.

5.106.5.3.2.2 The installation of two low power Level 2 EV charging receptacles shall be permitted to reduce the minimum number of required EV capable spaces without EVSE in Table 5.106.5.3.1 by one.

5.106.5.3.3 Use of automatic load management systems (ALMS).
ALMS shall be permitted for EVCS. When ALMS is installed, the required electrical load capacity specified in Section 5.106.5.3.1 for each EVCS may be reduced when serviced by an EVSE controlled by an ALMS. Each EVSE controlled by an ALMS shall deliver a minimum 30 amperes to an EV when charging one vehicle and shall deliver a minimum 3.3 kW while simultaneously charging multiple EVs.

5.106.5.3.4 Accessible EVCS.
When EVSE is installed, accessible EVSC shall be provided in accordance with the *California Building Code*, Chapter 11B, Section 11B-228.3.

Note: For EVCS signs, refer to Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Markings) or its successor(s).

5.106.5.3.4 Accessible electric vehicle charging station (EVCS). When EVSE is installed, accessible EVCS shall be provided in accordance with the *California Building Code*, Chapter 11B, Section 11B-228.3.

5.106.5.3.5 Electric vehicle charging station signage. Electric vehicle charging stations shall be identified by signage or pavement markings in compliance with Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Markings) or its successor(s).

Power allocation method shall include the following:
1. Use any kVA combination of EV capable spaces, low power Level 2, Level 2 or DCFC EVSEs.
2. At least one Level 2 EVSE shall be provided.

5.106.5.3.6 Electric vehicle charging stations (EVCS)—power allocation method. The power allocation method may be used as an alternative to the requirements in Section 5.106.5.3.1, Section 5.106.5.3.2 and associated Table 5.106.5.3.1. Use Table 5.106.5.3.6 to determine the total power in kVA required based on the total number of actual parking spaces.

TABLE 5.106.5.3.6		
TOTAL NUMBER OF ACTUAL PARKING SPACES	**MINIMUM TOTAL kVA @ 6.6 kVA**	**TOTAL kVA REQUIRED IN ANY COMBINATION OF EV CAPABLE,3,4 LOW POWER LEVEL 2, LEVEL 2, 1, 2 OR DCFC**
0-9	0	0
10-25	26.4	26.4
26-50	52.8	52.8
51-75	85.8	85.8
76-100	112.2	112.2
101-150	165	165
151-200	231	231
201 AND OVER	20 percent of actual parking spaces x 6.6	Total required kVA = P × .20 × 6.6 Where P = Parking spaces in facility

1. Level 2 EVSE @ 6.6 kVA minimum.
2. At least one Level 2 EVSE shall be provided.
3. Maximum allowed kVA to be utilized for EV capable spaces is 75 percent.
4. If EV capable spaces are utilized, they shall meet the requirements of Section 5.106.5.3.1 EV capable spaces.

Y	N/A	RESPON. PARTY
X		

5.106.5.4 Additions or alterations to existing buildings or parking facilities [A]. [BSC-CG] Existing buildings or parking facilities being modified by one of the following shall comply with Section 5.106.5.4.1 or 5.106.5.4.2. When EVSE is installed, accessible EVCS shall be provided in accordance with the *California Building Code*, Chapter 11B, Section 11B-228.3.

1. When the scope of construction work includes an increase in power supply to an electric service panel as part of a parking facility addition or alteration.
2. When a new photovoltaic system is installed covering existing parking spaces.
3. When additions or alterations to existing buildings are triggered pursuant to code Section 301.3 and the scope of work includes an increase in power supply to an electric service panel.

Exceptions:
1. On a case-by-case basis where the local enforcing agency has determined compliance with this section is not feasible based upon one of the following conditions:
   a. Where there is no local utility power supply.
   b. Where the local utility is unable to supply adequate power.
   c. Where there is evidence suitable to the local enforcement agency substantiating that additional local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project.
   d. Where demonstrated as impracticable excluding local utility service or utility infrastructure issues.
2. Remote parking facilities that do not have access to the building service panel.
3. Parking area lighting upgrades where no trenching is part of the scope of work.
4. Emergency repairs, including but not limited to water line break in parking facilities, natural disaster repairs, etc.

5.106.5.4.1 Existing buildings or parking areas without previously installed EV capable infrastructure [A]. When EV capable infrastructure does not exist at an existing parking facility or building, and the parking facility or building undergoes an addition or alteration listed in Section 5.106.5.4, construction shall include electric vehicle charging in compliance with either Section 5.106.5.3 and associated Table 5.106.5.3.1, or Section 5.106.5.3.6 and associated Table 5.106.5.3.6 for the total number of actual parking spaces being added or altered.

5.106.5.4.2 Existing buildings or parking areas with previously installed EV capable infrastructure [A]. When EV capable infrastructure is available at an existing parking facility or building, and the parking facility or building is undergoing an addition or alteration listed in Section 5.106.5.4, construction shall include electric vehicle charging in compliance with either Section 5.106.5.3 and associated Table 5.106.5.3.1, or Section 5.106.5.3.6 and associated Table 5.106.5.3.6 utilizing the existing EV capable allocated power and infrastructure for the total number of actual parking spaces being added or altered. If the area being added or altered exceeds the existing EV capable capacity, allocated power and infrastructure, provide additional EV charging as needed to comply with this section.

Y	N/A	RESPON. PARTY
X		

5.106.5.5 Electric vehicle (EV) charging: medium-duty and heavy-duty. [N] [BSG-CG] Construction shall comply with Section 5.106.5.5.1 to facilitate future installation of electric vehicle supply equipment (EVSE). Construction for warehouses, grocery stores and retail stores, office buildings, and manufacturing facilities with planned off-street loading spaces shall also comply with Section 5.106.5.5.1 for future installation of medium- and heavy-duty EVSE.

Exceptions:
1. On a case-by-case basis where the local enforcing agency has determined compliance with this section is not feasible based upon one of the following conditions:
   a. Where there is no local utility power supply.
   b. Where the local utility is unable to supply adequate power.
   c. Where there is evidence suitable to the local enforcing agency substantiating that additional local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project.

When EVSE(s) is/are installed, it shall be in accordance with the *California Building Code*, the *California Electrical Code* and as follows:

5.106.5.5.1 Electric vehicle charging readiness requirements for warehouses, grocery stores, office buildings, and manufacturing facilities and retail stores with planned off-street loading spaces. [N]

In order to avoid future demolition when adding EV supply and distribution equipment, spare raceway(s) or busway(s) and adequate capacity for transformer(s), service panel(s) or subpanel(s) shall be installed at the time of construction in accordance with the *California Electrical Code*. Construction plans and specifications shall include, but are not limited to, the following:

1. The transformer, main service equipment and subpanels shall meet the minimum power requirement in Table 5.106.5.5.1 to accommodate the dedicated branch circuits for the future installation of EVSE.

2. The construction documents shall indicate one or more location(s) convenient to the planned off-street loading space(s) reserved for medium- and heavy-duty ZEV charging cabinets and charging dispensers, and a pathway reserved for routing of conduit from the termination of the raceway(s) or busway(s) to the charging cabinet(s) and dispenser(s), as shown in Table 5.106.5.5.1.

3. Raceway(s) or busway(s) originating at a main service panel or a subpanel(s) serving the area where potential future medium- and heavy-duty EVSE will be located and shall terminate in close proximity to the potential future location of the charging equipment for medium- and heavy-duty vehicles.

4. The raceway(s) or busway(s) shall be of sufficient size to carry the minimum additional system load to the future location of the charging for medium- and heavy-duty ZEVs as shown in Table 5.106.5.5.1.

TABLE 5.106.5.5.1 RACEWAY CONDUIT AND PANEL POWER REQUIREMENTS FOR MEDIUM- AND HEAVY-DUTY EVSE [N]

BUILDING TYPE	BUILDING SIZE (SQ. FT.)	NUMBER OF OFF-STREET LOADING SPACES	ADDITIONAL CAPACITY REQUIRED (KVA) FOR RACEWAY & BUSWAY AND TRANSFORMER & PANEL
Grocery	10,000 to 90,000	1 or 2	200
		3 or Greater	400
	Greater than 90,000	1 or Greater	400
Manufacturing Facilities	10,000 to 50,000	1 or 2	200
	10,000 to 50,000	3 or Greater	400
	Greater than 50,000	1 or Greater	400
Office Buildings	10,000 to 135,000	1 or 2	200
	10,000 to 135,000	3 or Greater	400
	Greater than 135,000	1 or Greater	400
Retail	10,000 to 135,000	1 or 2	200
		3 or Greater	400
	Greater than 135,000	1 or Greater	400
Warehouse	20,000 to 256,000	1 or 2	200
		3 or Greater	400
	Greater than 256,000	1 or Greater	400

Y	N/A	RESPON. PARTY
X		

5.106.5.6 Electric vehicle (EV) charging at public schools and community colleges. [DSA-SS] Electric vehicle infrastructure and electric vehicle charging stations shall comply with Section 5.106.5.6 and shall be provided in accordance with regulations in the California Building Code and the California Electrical Code.

Exceptions:
1. On a case-by-case basis where compliance with this section has been demonstrated to be not feasible based upon one of the following conditions,and with concurrence by the Division of the State Architect (DSA), compliance with Section 5.106.5.6 shall not be required.
   a. Where there is no local utility power supply.
   b. Where the local utility is unable to supply adequate power.
   c. The installation of EVCS is impracticable.
2. Parking spaces accessible only by automated mechanical car parking systems are not required to comply with Section 5.106.5.6.

5.106.5.6.1 EV capable spaces. EV capable spaces shall be provided in accordance with Table 5.106.5.6.1 and the following requirements:

1. Raceways complying with the California Electrical Code and no less than 1-inch (25 mm) diameter shall be provided and shall originate at a service panel or a subpanel(s) serving the area and shall terminate in close proximity to the proposed location of the EV capable space and into a suitable listed cabinet, box, enclosure or equivalent. A common raceway may be used to serve multiple EV capable spaces.

2. A service panel or subpanel(s) shall be provided with panel space and electrical load capacity for a dedicated 208/240 volt, 40-ampere minimum branch circuit for each EV capable space, with delivery of 30-ampere minimum to an installed EVSE at each EVCS.

3. The electrical system and any on-site distribution transformers shall have sufficient capacity to supply full rated amperage at each EV capable space.

4. The service panel or subpanel circuit directory shall identify the reserved overcurrent protective device space(s) as "EV CAPABLE." The raceway termination location shall be permanently and visibly marked as "EV CAPABLE."

TABLE 5.106.5.6.1

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	NUMBER OF REQUIRED EVCS[2]
0-9	0	0
10-25	4	1
26-50	8	2
51-75	13	3
76-100	17	4
101-150	25	6
151-200	35	9
201 AND OVER	20 percent of total spaces[1]	25 percent of EV capable spaces[1]

1. Calculation for spaces shall be rounded up to the nearest whole number.
2. Each EVCS shall reduce the number of required EV capable spaces by the same number.

5.106.5.6.2 Electric vehicle charging stations (EVCS), EV capable spaces shall be provided with EVSE to create EVCS in the number indicated in Table 5.106.5.6.1 and shall comply with Section 5.106.5.6.2. EVCS shall be serviced by Level 2 or Direct Current Fast Charging (DCFC) EVSE, or with EVSE in any combination of Level 2 and DCFC. Accessible EVCS shall be provided in accordance with *California Building Code* Chapter 11B.

DISCLAIMER: *THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.*

AGENCY APPROVAL

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ARCHITECT
No. C-25272
May 31, 2027

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25
JOB NO. Y2213.00
SHEET TITLE
CAL GREEN CHECKLIST
SHEET NO.
G151

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

AIA California

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 2 (July 2024 Supplement)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

5.106.5.6.2.1 Reduced number of EV capable spaces. The installation of each DCFC EVSE shall be permitted to reduce the minimum number of required EV capable spaces indicated in Table 5.106.5.6.1 by five and reduce proportionally the required electrical load capacity to the service panel or subpanel.

5.106.5.6.2.2 Multiple connectors. EVSE with multiple vehicle connectors capable of charging multiple EVs simultaneously shall be permitted if the electrical load capacity required by Section 5.106.5.6.1 for each EV capable space is accumulatively supplied to the EVSE.

5.106.5.6.2.3 Use of automatic load management systems (ALMS). ALMS shall be permitted for EVCS installed in accordance with Section 5.105.5.6.2. When ALMS is installed, the required electrical load capacity specified in Section 5.106.5.6.1 for each EVCS may be reduced when serviced by an EVSE controlled by an ALMS. Each EVSE controlled by an ALMS shall deliver a minimum 30 amperes to an EV when charging one vehicle and shall deliver a minimum 3.3 kW while simultaneously charging multiple EVs.

5.106.5.6.3 EVCS alternative compliance. In lieu of compliance with Section 5.106.5.6.2, EVCS shall be provided with Level 1, low power Level 2, or Level 2, or any combination of Level 1, low power Level 2 or Level 2 EVSE such that the total power supplied by the combination of EVSE meets the minimum power indicated in Table 5.106.5.6.3, based on the total number of actual parking spaces in each parking facility.

TABLE 5.106.5.6.3	
NUMBER OF PARKING SPACES IN A PARKING FACILITY	**MINIMUM TOTAL POWER (KVA) REQUIRED FOR EVCS**
0-9	0
10-25	7
26-50	14
51-75	20
76-100	27
101-150	40
151-200	60
201 AND OVER	Total required KVA = P × .05 × 6.6 Where P = Parking spaces in facility

5.106.5.6.4 EVCS for alterations of or additions to parking facilities. Alterations of or additions to parking facilities shall provide EVCS in compliance with Section 5.106.5.6.4. The installation of infrastructure for EV capable spaces required to be provided without EVSE shall not be required.

5.106.5.6.4.1 Alterations of and additions to parking facilities. EVCS shall be provided in accordance with the number indicated in Table 5.106.5.6.1 or minimum power indicated in Table 5.106.5.6.3 when the scope of work includes an increase in power supply to an electric panel serving light fixtures illuminating the parking area or when area containing parking spaces is added to a parking facility. The number of required EVCS shall be based on the total number of existing and new parking spaces in the parking facility.

5.106.5.6.4.2 Alterations consisting of the installation of photovoltaic systems. EVCS shall be provided in accordance with the number indicated in Table 5.106.5.6.1 or maximum power indicated in Table 5.106.5.6.3 when a new photovoltaic system is installed in an existing parking facility.

5.106.5.6.5 Requirement to install EVSE. Level 2 EVSE shall be provided in all existing EV capable spaces to create EVCS when a project is required by California Administrative Code Section 4-309 to be submitted for plan approval to the Division of the State Architect. When EVSE is installed in existing EV capable spaces, accessible EVCS shall be provided in accordance with *California Building Code* Chapter 11B.

Exception: Projects in which improvements in parking areas consist only of accessibility improvements are not required to comply with Section 5.106.5.6.5.

X ☐ **5.106.8 LIGHT POLLUTION REDUCTION. [N].** I Outdoor lighting systems shall be designed and installed to comply with the following:

1. The minimum requirements in the California Energy Code for Lighting Zones 0-4 as defined in Chapter 10, Section 10-114 of the California Administrative Code; and
2. Backlight (B) ratings as defined in IES TM-15-11 (shown in Table A-1 in Chapter 8);
3. Uplight and Glare ratings as defined in California Energy Code (shown in Tables 130.2-A and 130.2-B in Chapter 8) and
4. Allowable BUG ratings not exceeding those shown in Table 5.106.8, [N] or Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.

Exceptions: [N]

1. Luminaires that qualify as exceptions in Sections 130.2 (b) and 140.7 of the California Energy Code.
2. Emergency lighting.
3. Building facade meeting the requirements in Table 140.7-B of the California Energy Code, Part 6.
4. Custom lighting features as allowed by the local enforcing agency, as permitted by Section 101.8 Alternate materials, designs and methods of construction.
5. Luminaires with less than 6,200 initial luminaire lumens.

TABLE 5.106.8 [N] MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS 1,2					
ALLOWABLE RATING	**LIGHTING ZONE LZ0**	**LIGHTING ZONE LZ1**	**LIGHTING ZONE LZ2**	**LIGHTING ZONE LZ3**	**LIGHTING ZONE LZ4**
MAXIMUM ALLOWABLE BACKLIGHT RATING					
Luminaire greater than 2 mounting heights (MH) from property line	N/A	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1-2 MH from property line	N/A	B2	B3	B4	B4
Luminaire back hemisphere is 0.5-1 MH from property line	N/A	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	N/A	B0	B0	B1	B2
MAXIMUM ALLOWABLE UPLIGHT RATING (U)					
For area lighting 3	N/A	U0	U0	U0	U0
For all other outdoor lighting,including decorative luminaires	N/A	U1	U2	U3	UR
MAXIMUM ALLOWABLE GLARE RATING 3 (G)					
MAXIMUM ALLOWABLE GLARE RATING 3 (G)	N/A	G1	G2	G3	G4
MAXIMUM ALLOWABLE GLARE RATING 3 (G)	N/A	G0	G1	G1	G2
MAXIMUM ALLOWABLE GLARE RATING 3 (G)	N/A	G0	G0	G1	G1
MAXIMUM ALLOWABLE GLARE RATING 3 (G)	N/A	G0	G0	G0	G1

1. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the *California Energy Code* and Chapter 10 of the *California Administrative Code*.

2. For property lines that abut public walkways, bikeways, plazas and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.

3. General lighting luminaires in areas such as outdoor parking, sales or storage lots shall meet these reduced ratings. Decorative luminaries located in these areas shall meet *U*-value limits for "all other outdoor lighting"

Y N/A RESPON. PARTY

X ☐ ELEC. ENG.

5.106.8.1 Facing- Backlight
Luminaries within 2MH of a property line shall be oriented so that the nearest property line is behind the fixture, and shall comply with the backlight rating specified in Table 5.106.8 based on the lighting zone and distance to the nearest point of that property line.

Exception: Corners. If two property lines (or two segments of the same property line) have equidistant point to the luminaire, then the luminaire may be oriented so that the intersection of the two lines (the corner) is directly behind the luminaire. The luminaire shall still use the distance to the nearest points(s) on the property lines to determine the required backlight rating.

5.106.8.2 Facing-Glare.
For luminaires covered by 5.106.8.1, if a property line also exists within or extends into the front hemisphere within 2MH of the luminaire then the luminaire shall comply with the more stringent glare rating specified in Table 5.106.8 based on the lighting zone and distance to the nearest point on the nearest property line within the front hemisphere.

Note: [N]
1.See also *California Building Code*, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.
2.Refer to Chapter 8 (Compliance Forms, Worksheets and Reference Material) for IES TM-15-11 Table A-1, *California Energy Code* Tables 130.2-A and 130.2-B.
3. Refer to the *California Building Code* for requirements for additions and alterations.

5.106.10 GRADING AND PAVING. Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales.
2. Water collection and disposal systems.
3. French drains.
4. Water retention gardens.
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.
   Exception: Additions and alterations not altering the drainage path.

☐ X **5.106.12 SHADE TREES [DSA-SS].** Shade Trees shall be planted to comply with Sections 5.106.12.1, 5.106.12.2, and 5.106.12.3. Percentages shown shall be measured at noon on the summer solstice. Landscape irrigation necessary to establish and maintain tree health shall comply with Section 5.304.6.

5.106.12.1 Surface parking areas. Shade tree plantings, minimum #10 container size or equal, shall be installed to provide shade over 50 percent of the parking area within 15 years.

Exceptions: Surface parking area covered by solar photovoltaic shade structures with roofing materials that comply with Table A5.106.11.2.2 in Appendix A5 shall be permitted in whole or in part in lieu of shade tree planting.

5.106.12.2 Landscape areas. Shade tress plantings, minimum #10 container size or equal shall be installed to provide shade of 20% of the landscape area within 15 years.

Exceptions: Playfields for organized sport activity are not included in the total area calculation.

5.106.12.3. Hardscape areas. Shade tree plantings, minimum #10 container size or equal shall be installed to provide shade over 20 percent of the hardscape area within 15 years.

Exceptions:
1. Walks, hardscape areas covered by solar photovoltaic shade structures or shade structures with roofing materials that comply with Table A5.106.11.2.2 in Appendix A5 shall be permitted in whole or in part in lieu of shade tree planting.
2. Designated and marked play areas of organized sport activity are not included in the total area calculation.

DIVISION 5.2 ENERGY EFFICIENCY

SECTION 5.201 GENERAL

5.201.1 Scope [BSC-CG]. ***California Energy Code [DSA-SS].*** For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory building standards.

DIVISION 5.3 WATER EFFICIENCY AND CONSERVATION

SECTION 5.301 GENERAL

5.301.1 Scope. The provisions of this chapter shall establish the means of conserving water use indoors, outdoors and in wastewater conveyance.

SECTION 5.302 DEFINITIONS

5.302.1 Definitions. The following terms are defined in Chapter 2 *(and are included here for reference)*

EVAPOTRANSPIRATION ADJUSTMENT FACTOR (ETAF) [DSA-SS). An adjustment factor when applied to reference evapotranspiration that adjusts for plant factors and irrigation efficiency, which ae two major influences on the amount of water that needs to be applied to the landscape.

FOOTPRINT AREA [DSA-SS]. The total area of the furthest exterior wall of the structure projected to natural grade, not including exterior areas such as stairs, covered walkways, patios and decks.

METERING FAUCET. A self-closing faucet that dispenses a specific volume of water for each actuation cycle. The volume or cycle duration can be fixed or adjustable.

GRAYWATER. Pursuant to Health and Safety Code Section 17922.12, "graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines and laundry tubs, but does not include waste water from kitchen sinks or dishwashers.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). The California ordinance regulating landscape design, installation and maintenance practices that will ensure commercial, multifamily and other developer installed landscapes greater than 2500 square feet meet an irrigation water budget developed based on landscaped area and climatological parameters.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). [HCD] The California model ordinance (California Code of Regulations, Title 23, Division 2, Chapter 2.7), regulating landscape design, installation and maintenance practices. Local agencies are required to adopt the updated MWELO, or adopt a local ordinance at least as effective as the MWELO.

POTABLE WATER. Water that is drinkable and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards. See definition in the California Plumbing Code, Part 5.

POTABLE WATER. [HCD] Water that is satisfactory for drinking, culinary, and domestic purposes, and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards and the requirements of the Health Authority Having Jurisdiction.

RECYCLED WATER. Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur [Water Code Section 13050 (n)]. Simply put, recycled water is water treated to remove waste matter attaining a quality that is suitable to use the water again.

SUBMETER. [HCD 1] A secondary device beyond a meter that measures water consumption of an individual rental unit within a multiunit residential structure or mixed-use residential and commercial structure. (See Civic Code Section 1954.202 (g) and Water code Section 517 for additional details.)

WATER BUDGET. Is the estimated total landscape irrigation water use which shall not exceed the maximum applied water allowance calculated in accordance with the Department of Water Resources Model Efficient Landscape Ordinance (MWELO).

SECTION 5.303 INDOOR WATER USE

5.303.1 METERS. Separate submeters or metering devices shall be installed for the uses described in Sections 503.1.1 and 503.1.2.

5.303.1.1 Buildings in excess of 50,000 square feet. Separate submeters shall be installed as follows:

1. For each individual leased, rented or other tenant space within the building projected to consume more than 100 gal/day (380 L/day), including, but not limited to, spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop.
2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:
   a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s).
   b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s).
   c. Steam and hot water boilers with energy input more than 500,000 Btu/h (147 kW).

5.303.1.2 Excess consumption. A separate submeter or metering device shall be provided for any tenant within a new building or within an addition that is projected to consume more than 1,000 gal/day.

Y N/A RESPON. PARTY

X ☐ MECH. ENG.

5.303.3 WATER CONSERVING PLUMBING FIXTURES AND FITTINGS. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:

5.303.3.1 Water Closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-Type toilets.

Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

5.303.3.2 Urinals.
5.303.3.2.1 Wall-mounted Urinals. The effective flush volume of wall-mounted urinals shall not exceed 0.125 gallons per flush.

5.303.3.2.2 Floor-mounted Urinals. The effective flush volume of floor-mounted or other urinals shall not exceed 0.5 gallons per flush.

5.303.3.3 Showerheads. [BSC-CG]
5.303.3.3.1 Single showerhead. Showerheads shall have a maximum flow rate of not more than 1.8 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

5.303.3.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all the showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time.
Note: A hand-held shower shall be considered a showerhead.

5.303.3.3 Showerheads. [BSC-CG]
5.303.3.3.1 Single showerhead. Showerheads shall have a maximum flow rate of not more than 1.8 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

5.303.3.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all the showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time.
Note: A hand-held shower shall be considered a showerhead.

5.303.3.4 Faucets and fountains.
5.303.3.4.1 Nonresidential Lavatory faucets. Lavatory faucets shall have a maximum flow rate of not more than 0.5 gallons per minute at 60 psi.

5.303.3.4.2 Kitchen faucets. Kitchen faucets shall have a maximum flow rate of not more than 1.8 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons per minute at 60 psi.

5.303.3.4.3 Wash fountains. Wash fountains shall have a maximum flow rate of not more than1.8 gallons per minute/20 [rim space (inches) at 60 psi].

5.303.3.4.4 Metering faucets. Metering faucets shall not deliver more than 0.20 gallons per cycle.

5.303.3.4.5 Metering faucets for wash fountains. Metering faucets for wash fountains shall have a maximum flow rate of not more than 0.20 gallons per minute/20 [rim space (inches) at 60 psi].

Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.

5.303.3.4.6 Pre-rinse spray value
When installed, shall meet the requirements in the *California Code of Regulations*, Title 20 (Appliance Efficiency Regulations), Section 1605.1 (h)(4) Table H-2, Section 1605.3 (h)(4)(A), and Section 1607 (d)(7), and shall be equipped with an integral automatic shutoff.

FOR REFERENCE ONLY: The following table and code section have been reprinted from the *California Code of Regulations*, Title 20 (Appliance Efficiency Regulations), Section 1605.1 (h)(4) and Section 1605.3 (h)(4)(A).

TABLE H-2	
STANDARDS FOR COMMERCIAL PRE-RINSE SPRAY VALVES MANUFACTURED ON OR AFTER JANUARY 28, 2019	
PRODUCT CLASS [spray force in ounce force (ozf)]	**MAXIMUM FLOW RATE (gpm)**
Product Class 1 (≤ 5.0 ozf)	1.00
Product Class 2 (> 5.0 ozf and ≤ 8.0 ozf)	1.20
Product Class 3 (> 8.0 ozf)	1.28

X ☐ **5.303.4 COMMERCIAL KITCHEN EQUIPMENT.**

5.303.4.1 Food Waste Disposers. Disposers shall either modulate the use of water to no more than 1 gpm when the disposer is not in use (not actively grinding food waste/no-load) or shall automatically shut off after no more than 10 minutes of inactivity. Disposers shall use no more than 8 gpm of water.
Note: This code section does not affect local jurisdiction authority to prohibit or require disposer installation.

5.303.5 AREAS OF ADDITION OR ALTERATION. For those occupancies within the authority of the California Building Standards Commission as specified in Section 103, the provisions of Section 5.303.3 and 5.303.4 shall apply to new fixtures in additions or areas of alteration to the building.

5.303.6 STANDARDS FOR PLUMBING FIXTURES AND FITTINGS. Plumbing fixtures and fittings shall be installed in accordance with the *California Plumbing Code*, and shall meet the applicable standards referenced in Table 1701.1 of the *California Plumbing Code* and in Chapter 6 of this code.

SECTION 5.304 OUTDOOR WATER USE

X ☐ **5.304.1 OUTDOOR POTABLE WATER USE IN LANDSCAPE AREAS.** Nonresidential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), whichever is more stringent.

Notes:
1. The Model Water Efficient Landscape Ordinance (MWELO) is located in the California Code of Regulations, Title 23, Chapter 2.7, Division 2.
2. MWELO and supporting documents, including a water budget calculator, are available at: https://www.water.ca.gov/.

X ☐ **5.304.6 OUTDOOR POTABLE WATER USE IN LANDSCAPE AREAS.** For public schools and community colleges, landscape projects as described in Sections 5.304.6.1 and 5.304.6.2 shall comply with the California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO) commencing with Section 490 of Chapter 2.7, Division 2, Title 23, *California Code of Regulations*, except that the evapotranspiration adjustment factor (ETAF) shall be 0.65 with an additional water allowance for special landscape areas (SLA) of 0.35.

Exception: Any project with an aggregate landscape area of 2,500 square feet or less may comply with the prescriptive measures contained in Appendix D of the MWELO.

5.304.6.1 Newly constructed landscapes. New construction projects with an aggregate landscape area equal to or greater than 500 square feet.

5.304.6.2 Rehabilitated landscapes. Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 1,200 square feet.

DIVISION 5.4 MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION 5.401 GENERAL

5.401.1 SCOPE. The provisions of this chapter specify the requirements of achieving material conservation, resource efficiency, and greenhouse gas (GHG) emission reduction through protection of buildings from exterior moisture, construction waste diversion, employment of techniques to reduce pollution through recycling of materials, the installation of products with lower GHG emissions and building commissioning or testing and adjusting.

SECTION 5.402 DEFINITIONS

5.402.1 DEFINITIONS. The following terms are defined in Chapter 2 *(and are included here for reference)*

ADJUST. To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

Y N/A RESPON. PARTY

X ☐ ARCH.

BALANCE. To proportion flows within the distribution system, including sub-mains, branches and terminals, according to design quantities.

BUILDING COMMISSIONING. A systematic quality assurance process that spans the entire design and construction process, including verifying and documenting that building systems and components are planned, designed, installed, tested, operated and maintained to meet the owner's project requirements.

BUY CLEAN CALIFORNIA ACT (BCCA). The Buy Clean California Act (BCCA) (Public Contract Code Sections 3500-3505) targets carbon emissions associated with the production of structural steel (hot-rolled sections, hollow structural sections, and plate), concrete reinforcing steel, flat glass, and mineral wool board insulation. The maximum acceptable global warming potential (GWP) limits are established by the Department of General Services (DGS), in consultation with the California Air Resources Board (CARB).

CRADLE-TO-GRAVE. Activities associated with a product or building's life cycle from the extraction stage through disposal stage, and covering modules A1 through C4 in accordance with ISO Standards 14025 and 21930.

ORGANIC WASTE. Food waste, green waste, landscape and pruning wste, nonhazardous wood waste, and food soiled paper waste that is mixed in with food waste.

REFERENCE STUDY PERIOD. The period of use for the building, in years, that will be assumed for life cycle assessment.

TEST. A procedure to determine quantitative performance of a system or equipment

TYPE III ENVIRONMENTAL PRODUCT DECLARATION (EPD). A third-party verified report that summarizes how a product impacts the environment. Type III EPDs can be either product-specific, factory-specific, or industry-wide EPDs. See "Cradle-to-Gate."

FACTORY-SPECIFIC EPD. A product-specific Type III EPD in which the environmental impacts can be attributed to a single manufacturer and manufacturing facility.

INDUSTRY-WIDE EPD (IW-EPD). A Type III EPD in which the environmental impacts are an average of the typical manufacturing impacts for a range of products within the same product category for a group of manufacturers.

PRODUCT-SPECIFIC EPD. A Type III EPD in which the environmental impacts can be attributed to a product design and manufacturer across multiple facilities.

SECTION 5.407 WATER RESISTANCE AND MOISTURE MANAGEMENT

5.407.1 WEATHER PROTECTION. Provide a weather-resistant exterior wall and foundation envelope as required by California Building Code Section 1402.2 (Weather Protection), manufacturer's installation instructions or local ordinance, whichever is more stringent.

5.407.2 MOISTURE CONTROL. Employ moisture control measures by the following methods.

5.407.2.1 Sprinklers. Design and maintain landscape irrigation systems to prevent spray on structures.

5.407.2.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings as follows:

5.407.2.2.1 Exterior door protection. Primary exterior entries shall be covered to prevent water intrusion by using nonabsorbent floor and wall finishes within at least 2 feet around and perpendicular to such openings plus at least one of the following:

1. An installed awning at least 4 feet in depth.
2. The door is protected by a roof overhang at least 4 feet in depth.
3. The door is recessed at least 4 feet.
4. Other methods which provide equivalent protection.

5.407.2.2.2 Flashing. Install flashings integrated with a drainage plane.

SECTION 5.408 CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

5.408.1 CONSTRUCTION WASTE MANAGEMENT. Recycle and/or salvage for reuse a minimum of 65% of the non-hazardous construction and demolition waste in accordance with Section 5.408.1.1, 5.408.1.2 or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.

5.408.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance, submit a construction waste management plan that:

1. Identifies the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale.
2. Determines if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identifies diversion facilities where construction and demolition waste material collected will be taken.
4. Specifies that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

5.408.1.2 Waste Management Company. Utilize a waste management company that can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with this section.

Note: The owner or contractor shall make the determination if the construction and demolition waste material will be diverted by a waste management company.

Exceptions to Sections 5.408.1.1 and 5.408.1.2:

1. Excavated soil and land-clearing debris.
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.

5.408.1.3 Waste stream reduction alternative. The combined weight of new construction disposal that does not exceed two pounds per square foot of building area may be deemed to meet the 65% minimum requirement as approved by the enforcing agency.

5.408.1.4 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with Sections 5.408.1.1, through 5.408.1.3. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

Notes:

1. Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen may be used to assist in documenting compliance with the waste management plan.
2. Mixed construction and demolition debris processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

5.408.2 UNIVERSAL WASTE. [A] Additions and alterations to a building or tenant space that meet the scoping provisions in Section 301.3 for nonresidential additions and alterations, shall require verification that Universal Waste items such as fluorescent lamps and ballast and mercury containing thermostats as well as other California prohibited Universal Waste materials are disposed of properly and are diverted from landfills. A list of prohibited Universal Waste materials shall be included in the construction documents.

Note: Refer to the Universal Waste Rule link at: http://www.dtsc.ca.gov/universalwaste/

X ☐ CIVIL **5.408.3 EXCAVATED SOIL AND LAND CLEARING DEBRIS.** 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

Exception: Reuse, either on or off-site, of vegetation or soil contaminated by disease or pest infestation.

Notes:

1. If contamination by disease or pest infestation is suspected, contact the County Agricultural Commissioner and follow its direction for recycling or disposal of the material.
2. For a map of know pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture. (www.cdfa.ca.gov)

SECTION 5.409 LIFE CYCLE ASSESSMENT

5.409.1 SCOPE. [BSC-CG] Effective July 1, 2024, projects consisting of newly constructed building(s) with a combined floor area of 100,000 square feet or greater shall comply with either Section 5.409.2 or Section 5.409.3. Alteration(s) to existing building(s) where the combined altered floor area is 100,000 square feet or greater shall comply with either Section 5.105.2, 5.409.2, or 5.409.3. Addition(s) to existing building(s) where the total floor area combined with the existing building(s) is 100,000 square feet or greater shall comply with either Section 5.105.2, Section 5.409.2, or Section 5.409.3. Effective January 1, 2026, the combined floor area shall be 50,000 square feet or greater.

[DSA-SS] Projects consisting of newly constructed building(s) with a combined floor area of 50,000 square feet or greater shall comply with either Section 5.409.2 or Section 5.409.3. Alteration(s) to existing building(s) where the combined altered floor area is 50,000 square feet or greater shall comply with either Section 5.105.2, 5.409.2, or 5.409.3. Addition(s) to existing building(s) where the total floor area combined with the existing building(s) is 50,000 square feet or greater shall comply with either Section 5.105.2, Section 5.409.2, or Section 5.409.3.

DISCLAIMER:*THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.*

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS
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ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

CAL GREEN CHECKLIST

SHEET NO.

G152

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

AIA California

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 3 (July 2024 Supplement)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

Y | N/A | RESPON. PARTY

☐ **5.409.2 Whole building life cycle assessment.** Projects shall conduct a cradle-to-grave whole building life cycle assessment performed in accordance with ISO 14040 and ISO 14044, excluding operating energy, and demonstrating a minimum 10-percent reduction in global warming potential (GWP) as compared to a reference baseline building of similar size, function, complexity, type of construction, material specification, and location that meets the requirements of the California Energy Code currently in effect. Software used to conduct the whole building life cycle assessment, including reference baseline building, shall have a data set compliant with ISO 14044, and ISO 21930 or EN 15804, and the software shall conform to ISO 21931 and/or EN 15978. The software tools and data sets shall be the same for evaluation of both the baseline building and the proposed building.

Notes:
1. Software for calculating whole building life cycle assessment is available for free at Athena Sustainable Materials Institute (https://calculatelca.com/software/impact-estimator/) and OneClick LCA-Planetary (www.oneclicklca.com/planetary). Paid versions include, but are not limited to, Sphera GaBi Solutions (gabi.sphera.com), SimaPro (simapro.com), One-Click LCA (www.oneclicklca.com) and Tally for Revit (apps.autodesk.com).

2. ASTM E2921-22 "Standard Practice for Minimum Criteria for Comparing Whole Building Life Cycle Assessments for Use with Building Codes, Standards, and Rating Systems" may be consulted for the assessment.

3. In addition to the required documentation specified in Section 5.409.2.3, Worksheet WS-9 may be required by the enforcing entity to demonstrate compliance with the requirements.

5.409.2.1 Building components. Building enclosure components included in the assessment shall be limited to glazing assemblies, insulation, and exterior finishes. Primary and secondary structural members included in the assessment shall be limited to footings and foundations, and structural columns, beams, walls, roofs, and floors.

5.409.2.2 Reference study period. The reference study period of the proposed building shall be equal to the reference baseline building and shall be 60 years.

5.409.2.3 Verification of compliance. A summary of the GWP analysis produced by the software and Worksheet WS-4 signed by the design professional of record shall be provided in the construction documents as documentation of compliance. A copy of the whole building life cycle assessment which includes the GWP analysis produced by the software, in addition to maintenance and training information, shall be included in the operation and maintenance manual and shall be provided to the owner at the close of construction. The enforcing agency may require inspection and inspection reports in accordance with Sections 702.2 and 703.1 during and at completion of construction to demonstrate substantial conformance. Inspection shall be performed by the design professional of record or third party acceptable to the enforcing agency.

☐ **5.409.3 Product GWP compliance—prescriptive path.** Each product that is permanently installed and listed in Table 5.409.3 shall have a Type III environmental product declaration (EPD), either product-specific or factory-specific.

TABLE 5.409.3
PRODUCT GWP LIMITS

BUY CLEAN CALIFORNIA MATERIALS PRODUCT CATEGORY[1]	MAXIMUM ACCEPTABLE GWP VALUE (unfabricated) ($GWP_{allowed}$)	UNIT OF MEASUREMENT
Hot-rolled structural steel sections	1.77	MT CO_2e/MT
Hollow structural sections	3.00	MT CO_2e/MT
Steel plate	2.61	MT CO_2e/MT
Concrete reinforcing steel	1.56	MT CO_2e/MT
Flat glass	2.50	kg CO_2e/MT
Light-density mineral wool board insulation	5.83	kg CO_2e/MT
Heavy-density mineral wool board insulation	14.28	kg CO_2e/MT
Concrete, Ready-Mixed[2, 3]		
CONCRETE PRODUCT CATEGORY	**MAXIMUM GWP ALLOWED VALUE ($GWP_{allowed}$)**	**UNIT OF MEASUREMENT**
up to 2499 psi	450	kg CO_2e/m^3
2500−3499 psi	489	kg CO_2e/m^3
3500−4499 psi	566	kg CO_2e/m^3
4500−5499 psi	661	kg CO_2e/m^3
5500−6499 psi	701	kg CO_2e/m^3
6500 psi and greater	799	kg CO_2e/m^3
Concrete, Lightweight Ready-Mixed[2]		
CONCRETE PRODUCT CATEGORY	**MAXIMUM GWP ALLOWED VALUE ($GWP_{allowed}$)**	**UNIT OF MEASUREMENT**
up to 2499 psi	875	kg CO_2e/m^3
2500−3499 psi	956	kg CO_2e/m^3
3500−4499 psi	1039	kg CO_2e/m^3

1. The GWP values of the products listed in Table 5.409.3 are based on 175 percent of Buy Clean California Act (BCCA) GWP values, except for concrete products which are not included in the BCCA.
2. For concrete, 175 percent of the National Ready Mixed Concrete Association (NRMCA) 2022 version 3 Pacific Southwest regional benchmark values are used for the GWP allowed, except for High Early Strength.
3. Concrete High Early Strength ready-mixed shall be calculated at 130 percent of the ready-mixed concrete GWP allowed values for each product category.

5.409.3.1 Products shall not exceed the maximum GWP value specified in Table 5.409.3.

Exception: Concrete may be considered one product category to meet compliance with this section. A weighted average of the maximum GWP for all concrete mixes installed in the project shall be less than the weighted average maximum GWP allowed per Table 5.409.3 using Exception Equation 5.409.3.1. Calculations shall be performed with consistent units of measurement for the material quantity and the GWP value.

For the purposes of this exception, industry-wide EPDs are acceptable.

Exception EQUATION 5.409.3.1

$GWP_S < GWP_{allowed}$
where
$GWP_S = \Sigma\ (GWP_n)(v_n)$
and
$GWP_{allowed} = \Sigma\ (GWP_{allowed})(v_n)$
and
$_n$ = each concrete mix installed in the project
GWP_n = the GWP for concrete mix $_n$ per concrete mix EPD, in kg CO2e/m3
$GWP_{allowed}$ = the GWP potential allowed for concrete mix $_n$ per Table 5.409.3
v_n = the volume of concrete mix $_n$ installed in the project, in m3

Y | N/A | RESPON. PARTY

5.409.3.2 Verification of compliance. Calculations to demonstrate compliance, Type III EPDs for products required to comply, if included in the project, and Worksheet WS-5 signed by the design professional of record shall be provided on the construction documents. Updated EPDs for products used in construction shall be provided to the owner at the close of construction and to the enforcement entity upon request. The enforcing agency may require inspection and inspection reports in accordance with Sections 702.2 and 703.1 during and at completion of construction to demonstrate substantial conformance. Inspection shall be performed by the design professional of record or third party acceptable to the enforcing agency.

SECTION 5.410 BUILDING MAINTENANCE AND OPERATIONS

☐ OWNER **5.410.1 RECYCLING BY OCCUPANTS.** Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive.

Exception: Rural jurisdictions that meet and apply for the exemption in Public Resources Code 42649.82 (a)(2)(A) et seq. shall also be exempt from the organic waste portion of this section.

5.410.1.1 Additions. All additions conducted within a 12-month period under single or multiple permits, resulting in an increase of 30% or more in floor area, shall provide recycling areas on site.

Exception: Additions within a tenant space resulting in less than a 30% increase in the tenant space floor area.

5.410.1.2 Sample ordinance. Space allocation for recycling areas shall comply with Chapter 18, Part 3, Division 30 of the *Public Resources Code*. Chapter 18 is known as the California Solid Waste Reuse and Recycling Access Act of 1991 (Act).

Note: A sample ordinance for use by local agencies may be found in Appendix A of the document at the CalRecycle's web site.

☐ **5.410.2 COMMISSIONING. [N] New buildings 10,000 square feet and over.** For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. For I-occupancies that are not regulated by OSHPD or for I-occupancies and L-occupancies that are not regulated y the California Energy Code Section 100.0 Scope, all requirements in Sections 5.410.2 through 5.410.2.6 shall apply.

Note: For energy-related systems under the scope (Section 100) of the California Energy Code, including heating, ventilation, air conditioning (HVAC) systems and controls, indoor lighting systems and controls, as well as water heating systems and controls, refer to California Energy Code Section 120.8 for commissioning requirements

Commissioning requirements shall include:

1. Owner's or Owner representative's project requirements.
2. Basis of design.
3. Commissioning measures shown in the construction documents.
4. Commissioning plan.
5. Functional performance testing.
6. Documentation and training.
7. Commissioning report.

Exceptions:

1. Unconditioned warehouses of any size.
2. Areas less than 10,000 square feet used for offices or other conditioned accessory spaces within unconditioned warehouses.
3. Tenant improvements less than 10,000 square feet as described in Section 303.1.1.
4. Open parking garages of any size, or open parking garage areas, of any size, within a structure.

Note: For the purposes of this section, unconditioned shall mean a building, area or room which does not provide heating and/or air conditioning.

Informational Notes:

1. . Functional performance testing for heating, ventilation, air conditioning systems and lighting controls must be performed in compliance with the *California Energy Code*.

5.410.2.1 Owner's or Owner Representative's Project Requirements (OPR). [N] The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. This documentation shall include the following:
1. Environmental and sustainability goals.
2. Building sustainable goals.
3. Indoor environmental quality requirements.
4. Project program, including facility functions and hours of operation, and need for after hours operation.
5. Equipment and systems expectations.
6. Building occupant and operation and maintenance (O&M) personnel expectations.

5.410.2.2 Basis of Design (BOD). [N] A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project. The Basis of Design document shall cover the following systems:

1. Renewable energy systems.
2. Landscape irrigation systems.
3. Water reuse system.

5.410.2.3 Commissioning plan. [N] Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned. The commissioning plan shall include the following:
1. General project information.
2. Comissioning goals.
3. Systems to be commissioned. Plans to test systems and components shall include:
   a. An explanation of the original design intent.
   b. Equipment and systems to be tested, including the extent of tests.
   c. Functions to be tested.
   d. Conditions under which the test shall be performed.
   e. Measurable criteria for acceptable performance.
4. Commissioning team information.
5. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning shall be included.

5.410.2.4 Functional performance testing. [N] Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made.

5.410.2.5 Documentation and training. [N] A Systems Manual and Systems Operations Training are required, including Occupational Safety and Health Act (OSHA) requirements in *California Code of Regulations* (CCR), Title 8, Section 5142, and other related regulations.

5.410.2.5.1 Systems manual. [N] Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner or representative. The systems manual shall include the following:
1. Site information, including facility description, history and current requirements.
2. Site contact information.
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log.
4. Major systems.
5. Site equipment inventory and maintenance notes.
6. A copy of verifications required by the enforcing agency or this code.
7. Other resources and documentation, if applicable.

5.410.2.5.2 Systems operations training. [N] A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:
1. System/equipment overview (what it is, what it does and with what other systems and/or equipment it interfaces).
2. Review and demonstration of servicing/preventive maintenance.
3. Review of the information in the Systems Manual.
4. Review of the record drawings on the system/equipment.

5.410.2.6 Commissioning report. [N] A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.

☐ MEP **5.410.4 TESTING AND ADJUSTING. New buildings less than 10,000 square feet.** Testing and adjusting of systems shall be required for new buildings less than 10,000 square feet or new systems to serve an addition or alteration subject to Section 303.1.

Y | N/A | RESPON. PARTY

5.410.4.2 (Reserved)

Note: For energy-related systems under the scope (Section 100) of the California Energy Code, including heating, ventilation, air conditioning (HVAC) systems and controls, indoor lighting system and controls, as well as water heating systems and controls, refer to California Energy Code Section 120.8 for commissioning requirements and Sections 120.5, 120.6, 130.4, and 140.9(b)3 for additional testing requirements of specific systems.

5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include at a minimum, as applicable to the project:

1. Renewable energy systems.
2. Landscape irrigation systems.
3. Water reuse systems.

5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable standards on each system.

5.410.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, the system shall be balanced in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards; the National Environmental Balancing Bureau Procedural Standards; Associated Air Balance Council National Standards or as approved by the enforcing agency.

5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

5.410.4.5 Operation and maintenance (O & M) manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142, and other related regulations.

5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.

DIVISION 5.5 ENVIRONMENTAL QUALITY

SECTION 5.501 GENERAL

5.501.1 SCOPE. The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating, and/or harmful to the comfort and well-being of a building's installers, occupants and neighbors.

SECTION 5.502 DEFINITIONS

5.502.1 DEFINITIONS. The following terms are defined in Chapter 2 *(and are included here for reference)*

ARTERIAL HIGHWAY. A general term denoting a highway primarily for through traffic usually on a continuous route.

A-WEIGHTED SOUND LEVEL (dBA). The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made.

1 BTU/HOUR. British thermal units per hour, also referred to as Btu. The amount of heat required to raise one pound of water one degree Fahrenheit per hour, a common measure of heat transfer rate. A ton of refrigeration is 12,000 Btu, the amount of heat required to melt a ton (2,000 pounds) of ice at 32° Fahrenheit.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL). A metric similar to the day-night average sound level (Ldn), except that a 5 decibel adjustment is added to the equivalent continuous sound exposure level for evening hours (7pm to 10pm) in addition to the 10 dB nighttime adjustment used in the Ldn.

COMPOSITE WOOD PRODUCTS. Composite wood products include hardwood plywood, particleboard and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, timber, prefabricated wood I–joists or finger–jointed lumber, all as specified in California Code of Regulations (CCR), Title 17, Section 93120.1(a).

Note: See CCR, Title 17, Section 93120.1.

DAY-NIGHT AVERAGE SOUND LEVEL (Ldn). The A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10p.m. to 7 a.m.).

DECIBEL (db). A measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a reference quantity.

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are considered electric vehicles. For purposes of the *California Electrical Code*, off-road, self-propelled electric vehicles, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like, are not included.

ELECTRIC VEHICLE CHARGING STATION(S) (EVCS). One or more spaces intended for charging electric vehicles.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

ENERGY EQUIVALENT (NOISE) LEVEL (Leq). The level of a steady noise which would have the same energy as the fluctuating noise level integrated over the time of period of interest.

EXPRESSWAY. An arterial highway for through traffic which may have partial control of access, but which may or may not be divided or have grade separations at intersections.

FREEWAY. A divided arterial highway with full control of access and with grade separations at intersections.

GLOBAL WARMING POTENTIAL (GWP). The radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time. Carbon dioxide is the reference compound with a GWP of one.

GLOBAL WARMING POTENTIAL VALUE (GWP VALUE). A 100-year GWP value published by the Intergovernmental Panel on Climate Change (IPCC) in either its Second Assessment Report (SAR) (IPCC, 1995); or its Fourth Assessment A-3 Report (AR4) (IPCC, 2007). The SAR GWP values are found in column "SAR (100-yr)" of Table 2.14.; the AR4 GWP values are found in column "100 yr" of Table 2.14.

HIGH-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that is: (a) a chlorofluorocarbon, a hdrochlorofluorocarbon, a hydrofluorocarbon, a perfluorocarbon, or any compound or blend of compounds, with a GWP value equal to or greater than 150, or (B) any ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, sec.82.3 (as amended March 10, 2009).

LONG RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction, with a radius 1.5 times the pipe diameter.

LOW-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that: (A) has a GWP value less than 150, and (B) is not an ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, sec.82.3 (as amended March 10, 2009).

MERV. Filter minimum efficiency reporting value, based on ASHRAE 52.2–1999.

MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "Base REactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundreths of a gram (g O^3/g ROC).

PRODUCT-WEIGHTED MIR (PWMIR). The sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).

PSIG. Pounds per square inch, guage.

REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.

SCHRADER ACCESS VALVES. Access fittings with a valve core installed.

SHORT RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction, with a radius 1.0 times the pipe diameter.

SUPERMARKET. For the purposes of Section 5.508.2, a supermarket is any retail food facility with 8,000 square feet or more conditioned area, and that utilizes either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units.

VOC. A volatile organic compound broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a).

Note: Where specific regulations are cited from different agencies such as SCAQMD, ARB, etc., the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

Y | N/A | RESPON. PARTY

☐ G.C. ☐ G.C. ☐ G.C.

SECTION 5.503 FIREPLACES

5.503.1 FIREPLACES. Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the California Energy Code, Title 24, Part 6, Subchapter 7, Section 150. Woodstoves, pellet stoves and fireplaces shall comply with applicable local ordinances.

5.503.1.1 Woodstoves. Woodstoves and pellet stoves shall comply with U.S. EPA New Source Performance Standards (NSPS) emission limits as applicable, and shall have a permanent label indicating they are certified to meet the emission limits.

SECTION 5.504 POLLUTANT CONTROL

5.504.1 TEMPORARY VENTILATION. The permanent HVAC system shall only be used during construction if necessary to condition the building or areas of addition or alteration within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy, or, if the building is occupied during alteration, at the conclusion of construction.

5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilation equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.

5.504.4 FINISH MATERIAL POLLUTANT CONTROL. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.6.

5.504.4.1 Adhesives, sealants and caulks. Adhesives, sealants, and caulks used on the project shall meet the requirements of the following standards:
1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified in subsection 2, below.

2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.

TABLE 5.504.4.1 - ADHESIVE VOC LIMIT[1,2]
Less Water and Less Exempt Compounds in Grams per Liter

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
INDOOR CARPET ADHESIVES	50
CARPET PAD ADHESIVES	50
OUTDOOR CARPET ADHESIVES	150
WOOD FLOORING ADHESIVES	100
RUBBER FLOOR ADHESIVES	60
SUBFLOOR ADHESIVES	50
CERAMIC TILE ADHESIVES	65
VCT & ASPHALT TILE ADHESIVES	50
DRYWALL & PANEL ADHESIVES	50
COVE BASE ADHESIVES	50
MULTIPURPOSE CONSTRUCTION ADHESIVES	70
STRUCTURAL GLAZING ADHESIVES	100
SINGLE-PLY ROOF MEMBRANE ADHESIVES	250
OTHER ADHESIVES NOT SPECIFICALLY LISTED	50
SPECIALTY APPLICATIONS	
PVC WELDING	510
CPVC WELDING	490
ABS WELDING	325
PLASTIC CEMENT WELDING	250
ADHESIVE PRIMER FOR PLASTIC	550
CONTACT ADHESIVE	80
SPECIAL PURPOSE CONTACT ADHESIVE	250
STRUCTURAL WOOD MEMBER ADHESIVE	140
TOP & TRIM ADHESIVE	250
SUBSTRATE SPECIFIC APPLICATIONS	
METAL TO METAL	30
PLASTIC FOAMS	50
POROUS MATERIAL (EXCEPT WOOD)	50
WOOD	30
FIBERGLASS	80

1. IF AN ADHESIVE IS USED TO BOND DISSIMILAR SUBSTRATES TOGETHER, THE ADHESIVE WITH THE HIGHEST VOC CONTENT SHALL BE ALLOWED.

2. FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THIS TABLE, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168, www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF

TABLE 5.504.4.2 - SEALANT VOC LIMIT
Less Water and Less Exempt Compounds in Grams per Liter

SEALANTS	CURRENT VOC LIMIT
ARCHITECTURAL	250
MARINE DECK	760
NONMEMBRANE ROOF	300
ROADWAY	250
SINGLE-PLY ROOF MEMBRANE	450
OTHER	420
SEALANT PRIMERS	
ARCHITECTURAL	
NONPOROUS	250
POROUS	775
MODIFIED BITUMINOUS	500
MARINE DECK	760
OTHER	750

NOTE: FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THESE TABLES, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168.

DISCLAIMER: THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.

AGENCY APPROVAL

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REGISTERED ASSOCIATE ARCHITECT — CALIFORNIA — No. C-25272 — May 31, 2027

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

CAL GREEN CHECKLIST

SHEET NO.

G153

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

AIA California

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 4 (July 2024 Supplement)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

5.504.4.3 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table 5.504.4.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 5.504.4.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table 5.504.4.3 shall apply.

5.504.4.3.1 Aerosol Paints and coatings. Aerosol paints and coatings shall meet the PWMIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

TABLE 5.504.4.3 - VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2,3]

GRAMS OF VOC PER LITER OF COATING, LESS WATER & LESS EXEMPT COMPOUNDS

COATING CATEGORY	CURRENT VOC LIMIT
FLAT COATINGS	50
NONFLAT COATINGS	100
NONFLAT HIGH GLOSS COATINGS	150
SPECIALTY COATINGS	
ALUMINUM ROOF COATINGS	400
BASEMENT SPECIALTY COATINGS	400
BITUMINOUS ROOF COATINGS	50
BITUMINOUS ROOF PRIMERS	350
BOND BREAKERS	350
CONCRETE CURING COMPOUNDS	350
CONCRETE/MASONRY SEALERS	100
DRIVEWAY SEALERS	50
DRY FOG COATINGS	150
FAUX FINISHING COATINGS	350
FIRE RESISTIVE COATINGS	350
FLOOR COATINGS	100
FORM-RELEASE COMPOUNDS	250
GRAPHIC ARTS COATINGS (SIGN PAINTS)	500
HIGH-TEMPERATURE COATINGS	420
INDUSTRIAL MAINTENANCE COATINGS	250
LOW SOLIDS COATINGS[1]	120
MAGNESITE CEMENT COATINGS	450
MASTIC TEXTURE COATINGS	100
METALLIC PIGMENTED COATINGS	500
MULTICOLOR COATINGS	250
PRETREATMENT WASH PRIMERS	420
PRIMERS, SEALERS, & UNDERCOATERS	100
REACTIVE PENETRATING SEALERS	350
RECYCLED COATINGS	250
ROOF COATINGS	50
RUST PREVENTATIVE COATINGS	250
SHELLACS:	
CLEAR	730
OPAQUE	550
SPECIALTY PRIMERS, SEALERS & UNDERCOATERS	100
STAINS	250
STONE CONSOLIDANTS	450
SWIMMING POOL COATINGS	340
TRAFFIC MARKING COATINGS	100
TUB & TILE REFINISH COATINGS	420
WATERPROOFING MEMBRANES	250
WOOD COATINGS	275
WOOD PRESERVATIVES	350
ZINC-RICH PRIMERS	340

1. GRAMS OF VOC PER LITER OF COATING, INCLUDING WATER & EXEMPT COMPOUNDS
2. THE SPECIFIED LIMITS REMAIN IN EFFECT UNLESS REVISED LIMITS ARE LISTED IN SUBSEQUENT COLUMNS IN THE TABLE.
3. VALUES IN THIS TABLE ARE DERIVED FROM THOSE SPECIFIED BY THE CALIFORNIA AIR RESOURCES BOARD, ARCHITECTURAL COATINGS SUGGESTED CONTROL MEASURE, FEB. 1, 2008. MORE INFORMATION IS AVAILABLE FROM THE AIR RESOURCES BOARD.

5.504.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:
1. Manufacturer's product specification
2. Field verification of on-site product containers

5.504.4.4 Carpet Systems.
All carpet installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Version 1.2, January 2017 (Emission testing method for California Specifications 01350).

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the California Department of Public Health,"Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers,"Version 1.2, January 2017 (Emission testing method for California Specifications 01350).

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.

5.504.4.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the buildings shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood (17 CCR 93120 et seq.). Those materials not exempted under the ATCM must meet the specified emission limits, as shown in Table 5.504.4.5.

5.504.4.5.3 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:
1. Product certifications and specifications.
2. Chain of custody certifications.
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.).
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.
5. Other methods acceptable to the enforcing agency.

TABLE 5.504.4.5 - FORMALDEHYDE LIMITS[1]

MAXIMUM FORMALDEHYDE EMISSIONS IN PARTS PER MILLION

PRODUCT	CURRENT LIMIT
HARDWOOD PLYWOOD VENEER CORE	0.05
HARDWOOD PLYWOOD COMPOSITE CORE	0.05
PARTICLE BOARD	0.09
MEDIUM DENSITY FIBERBOARD	0.11
THIN MEDIUM DENSITY FIBERBOARD[2]	0.13

1. VALUES IN THIS TABLE ARE DERIVED FROM THOSE SPECIFIED BY THE CALIFORNIA AIR RESOURCES BOARD, AIR TOXICS CONTROL MEASURE FOR COMPOSITE WOOD AS TESTED IN ACCORDANCE WITH ASTM E 1333. FOR ADDITIONAL INFORMATION, SEE CALIFORNIA CODE OF REGULATIONS, TITLE 17, SECTIONS 93120 THROUGH 93120.12.
2. THIN MEDIUM DENSITY FIBERBOARD HAS A MAXIMUM THICKNESS OF 5/16 INCHES (8 MM).

5.504.4.6 Resilient flooring systems. Where resilient flooring is installed, at least 80 percent of floor area receiving resilient flooring shall meet the requirements of the California Department of Public Health,"Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specifications 01350)

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.6.1 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

5.504.4.7 Thermal insulation
Comply with the requirements of the California Department of Public Health, "Standard Method of the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, "Version 1.2, January 1.2, January 2017 (Emission testing method for California Specification 01350).
See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.7.1 Verification of compliance.
Documentation shall be provided verifying that thermal insulation materials meet the pollutant emission limits.

5.504.4.8 Acoustical ceiling and wall panels.
Comply with the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, " Version 1.2, January 2017 (Emission testing method for California Specification 01350).
See California Department of Public Health's website for certification programs and testing labs.

5.504.4.8.1 Verification of compliance. Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.

5.504.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a Minimum Efficiency Reporting Value (MERV) of 13. MERV 13 filters shall be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.

Exceptions: Existing mechanical equipment.

5.504.5.3.1 Labeling. Installed filters shall be clearly labeled by the manufacturer indicating the MERV rating.

5.504.7 ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL. Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University, or campus of the University of California, whichever are more stringent. When ordinances, regulations or policies are not in place, post signage to inform building occupants of the prohibitions.

SECTION 5.505 INDOOR MOISTURE CONTROL

5.505.1 INDOOR MOISTURE CONTROL. Buildings shall meet or exceed the provisions of California Building Code, CCR, Title 24, Part 2, Sections 1202 (Ventilation) and Chapter 14 (Exterior Walls). For additional measures, see Section 5.407.2 of this code.

SECTION 5.506 INDOOR AIR QUALITY

5.506.1 OUTSIDE AIR DELIVERY. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 120.1 (Requirements For Ventilation) of the *California Energy Code*, or the applicable local code, whichever is more stringent, and Division 1, Chapter 4 of CCR, Title 8.

5.506.2 CARBON DIOXIDE (CO_2) MONITORING. For buildings or additions equipped with demand control ventilation, CO_2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the California Energy Code, Section 120(c)(4).

5.506.3 Carbon dioxide (CO2) monitoring in classrooms.
(DSA-SS) Each public K-12 school classroom, as listed in Table 120.1-A of the *California Energy Code,* shall be equipped with a carbon dioxide monitor or sensor that meets the following requirements:
1. The monitor or sensor shall be permanently affixed in a tamper-proof manner in each classroom between 3 and 6 feet (914 mm and 1829 mm) above the floor and at least 5 feet (1524 mm) away from door and operable windows.
2. When the monitor or sensor is not integral to an Energy Management Control System (EMCS), the monitor or sensor shall display the carbon dioxide readings on the device. When the sensor is integral to an EMCS, the carbon dioxide readings shall be available to and regularly monitored by facility personnel.
3. A monitor shall provide notification though a visual indicator on the monitor when the carbon dioxide levels in the classroom have exceeded 1,100ppm. A sensor integral to an EMCS shall provide notification to facility personnel through a visual and/or audible indicator when the carbon dioxide levels in the classroom have exceeded 1,100ppm.
4. The monitor or sensor shall measure carbon dioxide levels at minimum 15- minute intervals and shall maintain a record of previous carbon dioxide measurements of not less than 30 days duration.
5. The monitor or sensor used to measure carbon dioxide levels shall have the capacity to measure carbon dioxide levels with a range of 400ppm to 2000ppm or greater.
6. The monitor or sensor shall be certified by the manufacturer to be accurate within 75ppm at 1,000ppm carbon dioxide concentration and shall be certified by the manufacturer to require calibration no more frequently than once every 5 years.

SECTION 5.507 ENVIRONMENTAL COMFORT

5.507.4 ACOUSTICAL CONTROL. Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E 90 and ASTM E 413, or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E 1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.

Exception: Buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures and utility buildings.

Exception: [DSA-SS] For public schools and community colleges, the requirements of this section and all subsections apply only to new construction.

5.507.4.1 Exterior noise transmission, prescriptive method. Wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 in the following locations:

1. Within the 65 CNEL noise contour of an airport.

   Exceptions:

   1. L_{dn} or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.
   2. L_{dn} or CNEL for other airports and heliports for which a land use plan has not been developed shall be determined by the local general plan noise element.

2. Within the 65 CNEL or L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway source as determined by the Noise Element of the General Plan.

5.507.4.1.1. Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB L_{eq} - 1-hr during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

5.507.4.2 Performance Method. For buildings located as defined in Section 5.507.4.1 or 5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (Leq-1Hr) of 50 dBA in occupied areas during any hour of operation.

5.507.4.2.1 Site Features. Exterior features such as sound walls or earth berms may be utilized as appropriate to the building, addition or alteration project to mitigate sound migration to the interior.

5.507.4.2.2 Documentation of Compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.

5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.

Note: Examples of assemblies and their various STC ratings may be found at the California Office of Noise Control: www.toolbase.org/PDF/CaseStudies/stc_icc_ratings.pdf.

SECTION 5.508 OUTDOOR AIR QUALITY

5.508.1 Ozone depletion and greenhouse gas reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2.

5.508.1.1 Chlorofluorocarbons (CFCs). Install HVAC, refrigeration and fire suppression equipment that do not contain CFCs.

5.508.1.2 Halons. Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.

5.508.2 Supermarket refrigerant leak reduction. New commercial refrigeration systems shall comply with the provisions of this section when installed in retail food stores 8,000 square feet or more conditioned area, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units. The leak reduction measures apply to refrigeration systems containing high-global-warming potential (high-GWP) refrigerants with a GWP of 150 or greater. New refrigeration systems include both new facilities and the replacement of existing refrigeration systems in existing facilities.

Exception: Refrigeration systems containing low-global warming potential (low-GWP) refrigerant with a GWP value less than 150 are not subject to this section. Low-GWP refrigerants are nonozone-depleting refrigerants that include ammonia, carbon dioxide (CO_2), and potentially other refrigerants.

5.508.2.1 Refrigerant piping. Piping compliant with the California Mechanical Code shall be installed to be accessible for leak protection and repairs. Piping runs using threaded pipe, copper tubing with an outside diameter (OD) less than 1/4 inch, flared tubing connections and short radius elbows shall not be used in refrigerant systems except as noted below:

5.508.2.1.1 Threaded pipe. Threaded connections are permitted at the compressor rack.

5.508.2.1.2 Copper pipe. Copper tubing with an OD less than 1/4 inch may be used in systems with a refrigerant charge of 5 pounds or less.

5.508.2.1.2.1 Anchorage. One-fouth-inch OD tubing shall be securely clamped to a rigid base to keep vibration levels below 8 mils.

5.508.2.1.3 Flared tubing connections. Double-flared tubing connections may be used for pressure controls, valve pilot lines and oil.

Exception: Single-flared tubing connections may be used with a multiring seal coated with industrial sealant suitable for use with refrigerants and tightened in accordance with manufacturer's recommendations.

5.508.2.1.4 Elbows. Short radius elbows are only permitted where space limitations prohibit use of long radius elbows.

5.508.2.2 Valves. Valves Valves and fittings shall comply with the *California Mechanical Code* and as follows.

5.508.2.2.1 Pressure relief valves. For vessels containing high-GWP refrigerant, a rupture disc shall be installed between the outlet of the vessel and the inlet of the pressure relief valve.

5.508.2.2.1.1 Pressure detection. A pressure gauge, pressure transducer or other device shall be installed in the space between the rupture disc and the relief valve inlet to indicate a disc rupture or discharge of the relief valve.

5.508.2.2.2 Access valves. Only Schrader access valves with a brass or steel body are permitted for use.

5.508.2.2.2.1 Valve caps. For systems with a refrigerant charge of 5 pounds or more, valve caps shall be brass or steel and not plastic.

5.508.2.2.2.2 Seal caps. If designed for it, the cap shall have a neoprene O-ring in place.

5.508.2.2.2.2.1 Chain tethers. Chain tethers to fit ovr the stem are required for valves designed to have seal caps.

Exception: Valves with seal caps that are not removed from the valve during stem operation.

5.508.2.3 Refrigerated service cases. Refrigerated service cases holding food products containing vinegar and salt shall have evaporator coils of corrosion-resistant material, such as stainless steel; or be coated to prevent corrosion from these substances.

5.508.2.3.1 Coil coating. Consideration shall be given to the heat transfer efficiency of coil coating to maximize energy efficiency.

5.508.2.4 Refrigerant receivers. Refrigerant receivers with capacities greater than 200 pounds shall be fitted with a device tha indicates the level of refrigerant in the receiver.

5.508.2.5 Pressure testing. The system shall be pressure tested during installation prior to evacuation and charging.

5.508.2.5.1 Minimum pressure. The system shall be charged with regulated dry nitrogen and appropriate tracer gas to bring system pressure up to 300 psig minimum.

5.508.2.5.2 Leaks. Check the system for leaks, repair any leaks, and retest for pressure using the same gauge.

5.508.2.5.3 Allowable pressure change. The system shall stand, unaltered, for 24 hours with no more than a +/- one pound pressure change from 300 psig, measured with the same gauge.

5.508.2.6 Evacuation. The system shall be evacuated after pressure testing and prior to charging.

5.508.2.6.1 First vacuum. Pull a system vacuum down to at least 1000 microns (+/- 50 microns), and hold for 30 minutes.

5.508.2.6.2 Second vacuum. Pull a second system vacuum to a minimum of 500 microns and hold for 30 minutes.

5.508.2.6.3 Third vacuum. Pull a third vacuum down to a minimum of 300 microns, and hold for 24 hours with a maximum drift of 100 microns over a 24-hour period.

CHAPTER 7
INSTALLER & SPECIAL INSPECTOR QUALIFICATIONS

702 QUALIFICATIONS

702.1 INSTALLER TRAINING. HVAC system installers shall be trained and certified in the proper installation of HVAC systems including ducts and equipment by a nationally or regionally recognized training or certification program. Uncertified persons may perform HVAC installations when under the direct supervision and responsibility of a person trained and certified to install HVAC systems or contractor licensed to install HVAC systems. Examples of acceptable HVAC training and certification programs include but are not limited to the following:

1. State certified apprenticeship programs.
2. Public utility training programs.
3. Training programs sponsored by trade, labor or statewide energy consulting or verification organizations.
4. Programs sponsored by manufacturing organizations.
5. Other programs acceptable to the enforcing agency.

702.2 SPECIAL INSPECTION [HCD]. When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition to other certifications or qualifications acceptable to the enforcing agency, the following certifications or education may be considered by the enforcing agency when evaluating the qualifications of a special inspector:

1. Certification by a national or regional green building program or standard publisher.
2. Certification by a statewide energy consulting or verification organization, such as HERS raters, building performance contractors, and home energy auditors.
3. Successful completion of a third party apprentice training program in the appropriate trade.
4. Other programs acceptable to the enforcing agency.

Notes:

1. Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.
2. HERS raters are special inspectors certified by the California Energy Commission (CEC) to rate homes in California according to the Home Energy Rating System (HERS).

[BSC-CG] When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition, the special inspector shall have a certification from a recognized state, national or international association, as determined by the local agency. The area of certification shall be closely related to the primary job function, as determined by the local agency.

Note: Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.

703 VERIFICATIONS

703.1 DOCUMENTATION. Documentation used to show compliance with this code shall include but is not limited to, construction documents, plans, specifications, builder or installer certification, inspection reports, or other methods acceptable to the enforcing agency which demonstrate substantial conformance. When specific documentation or special inspection is necessary to verify compliance, that method of compliance will be specified in the appropriate section or identified applicable checklist.

DISCLAIMER: THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

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SANTA BARBARA COUNTY

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REGISTERED ARCHITECT — PAUL RAPHAEL — No. C-25272 — May 31, 2027 — STATE OF CALIFORNIA

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

CAL GREEN CHECKLIST

SHEET NO.

G154

UL Product iQ®

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States
BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

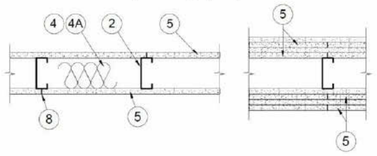
See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

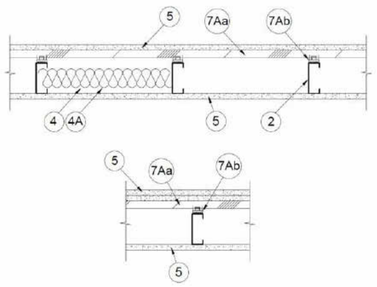
See General Information for Fire-Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. U419

February 13, 2025

Nonbearing Wall Ratings — 1, 2, 3 or 4 Hr (See Items 4 & 5 through 5J)
*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**





1. **Floor and Ceiling Runners —** (Not Shown) — For use with Item 2 — Channel shaped, fabricated from min 25 MSG corrosion-protected steel, min depth to accommodate stud size, with min 1-1/4 in. long legs, attached to floor and ceiling with fasteners 24 in. OC max.

1A. **Framing Members* — Floor and Ceiling Runner —** Not Shown — In lieu of Item 1 — For use with Item 2B, proprietary channel shaped runners, 3-5/8 in. deep attached to floor and ceiling with fasteners 24 in. OC max.
CEMCO, LLC — Viper25™ Track

CRACO MFG INC — SmartTrack25™

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper25™ Track

IMPERIAL MANUFACTURING GROUP INC — Viper25™ Track

1B. **Framing Members* — Floor and Ceiling Runner —** Not Shown — In lieu of Item 1 — For use with Item 2C, proprietary channel shaped runners, 1-1/4 in. wide by 3-5/8 in. deep fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
CEMCO, LLC — Viper20™ Track

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™ Track

IMPERIAL MANUFACTURING GROUP INC — Viper20™ Track

1C. **Framing Members* — Floor and Ceiling Runners —** (Not Shown) — In lieu of Item 1 — Channel shaped, attached to floor and ceiling with fasteners 24 in. OC. max.
ALLSTEEL & GYPSUM PRODUCTS INC — Type SUPREME D24/30EQD and Type SUPREME D20

CONSOLIDATED FABRICATORS CORP, BUILDING PRODUCTS DIV — Type SUPREME D24/30EQD and Type SUPREME D20

QUAIL RUN BUILDING MATERIALS INC — Type SUPREME D24/30EQD and Type SUPREME D20

SCAFCO STEEL STUD MANUFACTURING CO — Type SUPREME D24/30EQD and Type SUPREME D20

STEEL CONSTRUCTION SYSTEMS INC — Type SUPREME D24/30EQD and Type SUPREME D20

TELLING INDUSTRIES L L C — Type SUPREME D24/30EQD and Type SUPREME D20

UNITED METAL PRODUCTS INC — Type SUPREME D24/30EQD and Type SUPREME D20

1D. **Floor and Ceiling Runners —** (Not Shown) — For use with Item 2A — Channel shaped, fabricated from min 20 MSG corrosion-protected or galv steel, min depth to accommodate stud size, with min 1 in. long legs, attached to floor and ceiling with fasteners spaced max 24 in. OC.

1E. **Framing Members* — Floor and Ceiling Runners —** (Not Shown, As an alternate to Item 1) — For use with Items 2E, 5F or 5G or SI only, channel shaped, fabricated from min. 0.015 in. (min bare metal thickness) galvanized steel, attached to floor and ceiling with fasteners 24 in. OC. max.
CLARKDIETRICH BUILDING SYSTEMS — CD ProTRAK

DMFCWBS L L C — ProTRAK

MBA METAL FRAMING — ProTRAK

RAM SALES L L C — Ram ProTRAK

STEEL STRUCTURAL PRODUCTS L L C — Té-S ProTRAK

1F. **Framing Members* — Floor and Ceiling Runner —** Not Shown — In lieu of Item 1 — For use with Item 2F, proprietary channel shaped runners, minimum width to accommodate stud size, with 1- 1/8 in. long legs fabricated from min 0.015 in. (min bare metal thickness) galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
SUPER STUD BUILDING PRODUCTS — The Edge

1G. **Framing Members* — Floor and Ceiling Runner —** For use with Item 2G, proprietary channel shaped runners, minimum width to accommodate stud size attached to floor and ceiling with fasteners 24 in. OC max.
STUDCO BUILDING SYSTEMS — CROCSTUD Track

1H. **Floor and Ceiling Runners —** (Not Shown) — Channel shaped, fabricated from min 0.02 in. galv steel, min width to accommodate stud size, with min 1 in. long legs, for use with studs specified below and fabricated from min 0.018 in. galv steel or thicker, attached to floor and ceiling with fasteners spaced max 24 in. OC.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™ Track VT100

IMPERIAL MANUFACTURING GROUP INC — Viper20™ Track VT100

1I. **Framing Members* — Floor and Ceiling Runners —** (Not Shown, As an alternate to Item 1) — For use with Items 2H, channel shaped, fabricated from min. 0.015 in. (min bare metal thickness) galvanized steel, attached to floor and ceiling with fasteners 24 in. OC. max.
TELLING INDUSTRIES L L C — TRUE-TRACK™

1J. **Framing Members* — Floor and Ceiling Runner —** Not Shown — In lieu of Item 1 — For use with Item 2I, proprietary channel shaped runners, 3-5/8 in. deep attached to floor and ceiling with fasteners 24 in. OC max.

1K. **Framing Members* — Floor and Ceiling Runner —** Not Shown — In lieu of Item 1 — For use with Item 2J, proprietary channel shaped runners, 1-1/4 in. wide by 3-5/8 in. deep fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.

1L. **Framing Members* — Floor and Ceiling Runner —** Not Shown — In lieu of Item 1 — For use with Item 2N, proprietary channel shaped runners, 1-1/4 in. wide by min. 3-1/2 in. deep fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
RESCUE METAL FRAMING, L L C — AlphaTRAK

1M. **Framing Members* — Floor and Ceiling Runners —** Not Shown — As an alternate to Item 1 — For use with Item 2O, proprietary channel shaped runners, min width to accommodate stud size, galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
RONDO BUILDING SERVICES PTY LTD — Rondo Wall Track

1N. **Framing Members* — Floor and Ceiling Runners —** Not Shown — As an alternate to Item 1 — For use with Item 2P, proprietary channel shaped runners, min width to accommodate stud size, galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
OSG BUILDING MATERIALS — OSG Track

1O. **Framing Members* — Floor and Ceiling Runner —** Not Shown — In lieu of Item 1 — For use with Item 2Q, proprietary channel shaped runners, min width to accommodate stud size, fabricated from min. 25 MSG (0.018 in. min. bare metal thickness), attached to floor and ceiling with fasteners spaced 24 in. OC max.
CEMCO, LLC — Viper X Track

1P. **Framing Members* — Floor and Ceiling Runner** — (Not Shown — Alternate to Item 1) — For use with Item 2R, channel shaped runners pre-equipped with proprietary attachment clips. Min. 3-5/8 in wide. Legs of top runners minimum 3-1/4 in wide. Legs of bottom runners minimum 1-1/2 in. wide. Runners attached to floor and ceiling with fasteners 24 in. OC max
HYPERFRAME INC - Hypertrack

1Q. **Framing Members* — Floor and Ceiling Runner** — Not Shown — In lieu of Item 1 — For use with Item 2S , proprietary channel shaped runners, min width to accommodate stud size, fabricated from min. 20 EQ/22 mils. (min. 0.0221 in. thick) galvanized steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
JJC INTERNATIONAL DISTRIBUTORS — Non-structural Tracks 3-5/8" and 6".

1R. **Framing Members* — Floor and Ceiling Runner** — Not Shown — In lieu of Item 1 — For use with Item 2T, proprietary channel shaped runners ,min width to accommodate stud size, fabricated from min. 25 MSG (0.018 in. min. bare metal thickness), attached to floor and ceiling with fasteners spaced 24 in. OC max
IRONLINE METALS LLC — Bantam Track.

2. **Steel Studs —** Channel shaped, fabricated from min 25 MSG corrosion-protected steel, min depth as indicated under Item 5, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.

2A. **Steel Studs —** (As an alternate to Item 2, For use with Items 5B, 5E, 5H, 5I or Type ULIX) — Channel shaped, fabricated from min 20 MSG corrosion-protected or galv steel, 3-1/2 in. min depth, spaced a max of 16 in. OC. Studs friction-fit into floor and ceiling runners. Studs to be cut 5/8 to 3/4 in. less than assembly height.

2B. **Framing Members* - Steel Studs —** (As an alternate to Item 2, For use with Items 5C, 5I or Type ULIX) — Proprietary channel shaped studs, 3-5/8 in. deep spaced a max of 24 in. OC. Studs to be cut 3/4 in less than the assembly height and installed with a 1/2 in. gap between the end of the stud and track at the bottom of the wall. For direct attachment of gypsum board only.

CEMCO, LLC — Viper25™

CRACO MFG INC — SmartStud25™

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper25™

IMPERIAL MANUFACTURING GROUP INC — Viper25™

2C. **Framing Members* — Steel Studs —** Not Shown — In lieu of Item 2 — proprietary channel shaped steel studs, min depth as indicated under Item 5, spaced a max if 24 in. OC, fabricated from min 0.018 in. thick galv steel. Studs cut 3/8 in. to 3/4 in. less in lengths than assembly heights.
CEMCO, LLC — Viper20™

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™

IMPERIAL MANUFACTURING GROUP INC — Viper20™

2D. **Framing Members* — Steel Studs —** In lieu of Item 2 — Channel shaped studs, min depth as indicated under Item 5, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.
ALLSTEEL & GYPSUM PRODUCTS INC — Type SUPREME D24/30EQD and Type SUPREME D20

CONSOLIDATED FABRICATORS CORP, BUILDING PRODUCTS DIV — Type SUPREME D24/30EQD and Type SUPREME D20

QUAIL RUN BUILDING MATERIALS INC — Type SUPREME D24/30EQD and Type SUPREME D20

SCAFCO STEEL STUD MANUFACTURING CO — Type SUPREME D24/30EQD and Type SUPREME D20

STEEL CONSTRUCTION SYSTEMS INC — Type SUPREME D24/30EQD and Type SUPREME D20

TELLING INDUSTRIES L L C — Type SUPREME D24/30EQD and Type SUPREME D20

UNITED METAL PRODUCTS INC — Type SUPREME D24/30EQD and Type SUPREME D20

2E. **Framing Members* — Steel Studs —** (Not Shown, As an alternate to Item 2) — For use with Items 5F or 5G or SI or Type ULIX only, channel shaped studs, min depth as indicated under Item 5F, 5G or SI, fabricated from min. 0.015 in. (min bare metal thickness) galvanized steel, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.
CLARKDIETRICH BUILDING SYSTEMS — CD ProSTUD

DMFCWBS L L C — ProSTUD

MBA METAL FRAMING — ProSTUD

RAM SALES L L C — Ram ProSTUD

STEEL STRUCTURAL PRODUCTS L L C — Té-S ProSTUD

2F. **Framing Members* — Steel Studs —** Not Shown — In lieu of Item 2 — proprietary channel shaped steel studs, minimum width indicated under Item 5, 1-1/4 in. deep fabricated from min 0.015 in. (min bare metal thickness) galvanized steel. Studs 3/8 in. to 3/4 in. less in lengths than assembly heights.
SUPER STUD BUILDING PRODUCTS — The Edge

2G. **Framing Members* — Steel Studs —** Not Shown — In lieu of Item 2 — proprietary channel shaped studs, minimum width indicated under Item 5, Studs to be cut 3/8 to 3/4 in less than the assembly height.
STUDCO BUILDING SYSTEMS — CROCSTUD

2H. **Framing Members* — Steel Studs —** (Not Shown, As an alternate to Item 2) — Fabricated from min. 0.015 in. (min bare metal thickness) galvanized steel, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.
TELLING INDUSTRIES L L C — TRUE-STUD™

2I. **Framing Members* — Steel Studs —**

2J. **Framing Members* — Metal Studs —** Not Shown — In lieu of Item 2 — proprietary channel shaped steel studs, min depth as indicated under Item 5, spaced a max if 24 in. OC, fabricated from min 0.018 in. thick galv steel. Studs cut 3/8 in. to 3/4 in. less in lengths than assembly heights

2K. **Framing Members* — Steel Studs —** As an alternate to Item 2 — For use with Item 1, channel shaped studs, fabricated from min 25 MSG corrosion-protected steel, min depth as indicated under Item 5, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.
EB METAL INC — NITROSTUD

2L. **Framing Members* — Steel Studs —** As an alternate to Item 2 — For use with Item 1, channel shaped studs, fabricated from min 25 MSG corrosion-protected steel, min depth as indicated under Item 5, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.
OLIMAR SUPPLY INC — PRIMESTUD

2M. **Framing Members* — Steel Studs —** As an alternate to Item 2 — For use with Item 1, channel shaped studs, fabricated from min 25 MSG corrosion-protected steel, min depth as indicated under Item 5, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — StudRite™

2N. **Framing Members*—Steel Studs —** As an alternate to Item 2 — proprietary channel shaped steel studs, min depth 3-1/2 in. and as indicated under Item 5, spaced a max of 24 in. OC, fabricated from min 0.018 in. thick galv steel. Studs cut 3/8 in. to 3/4 in. less in length than assembly height.
RESCUE METAL FRAMING, L L C — AlphaSTUD

2O. **Framing Members* — Steel Studs —** As an alternate to Item 2 — proprietary channel shaped steel studs, min width as indicated under Item 5, galv steel. Studs to be cut 3/8 to 3/4 in. less in lengths than assembly height. Spaced 24 in. OC max.
RONDO BUILDING SERVICES PTY LTD — Rondo Lipped Wall Stud

2P. **Framing Members* — Steel Studs —** As an alternate to Item 2 — proprietary channel shaped steel studs, min width as indicated under Item 5, min 25 MSG galv steel. Studs to be cut 3/8 to 3/4 in. less in lengths than assembly height. Spaced 24 in. OC max.
OSG BUILDING MATERIALS — OSG Stud

2Q. **Framing Members* — Steel Studs —** Not Shown — In lieu of Item 2 — For use with Item 1O, proprietary channel shaped steel studs, min depth as indicated under Item 5, spaced a max of 24 in. OC, fabricated from min 25 MSG (0.018 in. min. bare metal thickness). Studs cut 3/8 in. to 3/4 in. less in lengths than assembly heights.
CEMCO, LLC — Viper X

2R. **Framing Members* — Steel Studs** — (Not Shown — Alternate to Item 2, For use with Item 1P) — Channel shaped steel studs with attachment clips at top and bottom, min 3-5/8 in. depth, spaced a max of 24 in. OC. Studs clipped into floor and ceiling runners (Item 1P). Max 2-3/8 in. extension reveal from top of stud to inside of ceiling runner.

HYPERFRAME INC— Hyperstud

2S. **Framing Members* — Steel Studs** — Not Shown — In lieu of Item 2 — For use with Item 1Q, proprietary channel shaped steel studs, min depth as indicated under Item 5, spaced a max of 24 in. OC, fabricated from min. 20 EQ/22 mils. (min. 0.0221 in. thick) galvanized steel. Studs cut 3/8 in. to 3/4 in. less in lengths than assembly heights.
JJC INTERNATIONAL DISTRIBUTORS — Non-structural Studs 3-5/8" and 6".

2T. **Framing Members* — Steel Studs** — Not Shown — In lieu of Item 2 — For use with Item 1R, proprietary channel shaped steelstuds, min depth as indicated under Item 5, spaced a max of 24 in. OC, fabricated from min 25 MSG (0.018 in. min. bare metal thickness). Studs cut 3/8 in. to 3/4 in. less in lengths than assembly heights.
IRONLINE METALS LLC — Bantam Stud.

3. **Wood Structural Panel Sheathing —** (Optional, For use with Item 5 Only) — (Not Shown) — 4 ft wide, 7/16 in. thick oriented strand board (OSB) or 15/32 in. thick structural 1 sheathing (plywood) complying with DOC PS1 or PS2, or APA Standard PRP-108, manufactured with exterior glue, applied horizontally or vertically to the steel studs. Vertical joints centered on studs, and staggered one stud space from wallboard joints. Attached to studs with flat-head self-drilling tapping screws with a min. head diam. of 0.292 in. at maximum 6 in. OC. in the perimeter and 12 in. OC. in the field. When used, gypsum panels attached over OSB or plywood panels and fastener lengths for gypsum panels increased by min. 1/2 in.

4. **Batts and Blankets* —** (Required as indicated under Item 5) — Mineral wool batts, friction fitted between studs and runners. Min nom thickness as indicated under Item 5.
See **Batts and Blankets** (BKNV or BZJZ) Categories for names of Classified companies.

4A. **Batts and Blankets* —** (Optional – as an alternate to Item 4) — Placed in stud cavities, any glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance.
See **Batts and Blankets** (BKNV or BZJZ) Categories for names of Classified companies.

4B. **Fiber, Sprayed* —** (Optional – as an alternate for items 4 or 4A, for use with Type ULIX) Where insulation is required - Spray applied granulated mineral fiber material. The fiber is applied with adhesive at a minimum density of 4.0 pcf to completely fill the wall cavity in accordance with the application instructions supplied with the product. See **Fiber, Sprayed** (CKAZ).
AMERICAN ROCKWOOL MANUFACTURING, LLC — Type Rockwool Premium Plus

4C. **Foamed Plastic* —** (As an alternate for items 4, 4A or 4B, for use with Item 5K) — Spray applied, foamed plastic insulation, at any thickness from partial fill to completely filling stud cavity, for 2 hour rated assemblies only. When foamed plastic is used, minimum stud depth shall be 3-1/2 in. with minimum 20 MSG steel thickness.
CARLISLE SPRAY FOAM INSULATION — Types SealTite ONE, SealTite Pro Closed Cell (CC), SealTite Pro Open Cell (OC), SealTite Pro OCX, SealTite Pro No Trim 21, SealTite Pro One Zero, Foamsulate Closed Cell, Foamsulate OCX, Foamsulate 70, and Foamsulate HFO.

4D. **Foamed Plastic* —** (As an alternate for items 4, 4A or 4B, for use with Item 5K) — Spray applied, foamed plastic insulation, at any thickness from partial fill to completely filling stud cavity, for up to 2 hour rated assemblies only. When foamed plastic is used, minimum stud depth shall be 3-1/2 in. with minimum 20 MSG steel thickness.
BASF CORP - Enertite® NM, Enertite® G, FE178®, Spraytite® 178, Spraytite® 81206, Walltite® 200, Wallitie® US, Wallitie® US-N, Wallitie HP+, FE137®, FE158®, Spraytite® 158, Spraytite® SP, Spraytite® 81205, Spraytite® Comfort XL, Wallitie® XL, Wallitie® MAX, Wallitie® LWP, Wallitie® Plus and Enertite® Max

5. **Gypsum Board* —** Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer systems) staggered one stud cavity. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal butt joints on opposite

sides of studs need not be staggered. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) staggered a min of 12 in. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) with Type ULIX need not be staggered. The thickness and number of layers for the 1 hr, 2 hr, 3 hr and 4 hr ratings are as follows:

Rating, Hr	Gypsum Board Protection on Each Side of Wall: Min Stud Depth, in. Items 2, 2C, 2D, 2F, 2G, 2O	No. of Layers & Thkns of Panel	Min Thkns of Insulation (Item 4)
1	3-1/2	1 layer, 5/8 in. thick	Optional
1	2-1/2	1 layer, 1/2 in. thick	1-1/2 in.
1	1-5/8	1 layer, 3/4 in. thick	Optional
2	1-5/8	2 layers, 1/2 in. thick	Optional
2	1-5/8	2 layers, 5/8 in. thick	Optional
2	3-1/2	1 layer, 3/4 in. thick	3 in.
3	1-5/8	3 layers, 1/2 in. thick	Optional
3	1-5/8	2 layers, 3/4 in. thick	Optional
3	1-5/8	3 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 1/2 in. thick	Optional
4	2-1/2	2 layers, 3/4 in. thick	2 in.

CGC INC — 1/2 in. thick Type C, IP-X2 or IPC-AR; WRC, 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHK, ULIX, WRX or WRC; 3/4 in. thick Types IP-X3 or ULTRACODE

THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — 1/2 in. thick Type C and 5/8 in. thick Type SCX

UNITED STATES GYPSUM CO — 1/2 in. thick Type C, IP-X2, IPC-AR or WRC; 5/8 in. thick Type SCX, SGK, SHX, ULIX, WRX, IP-X1, AR, C, WRC, FRX-G, IP-AR, IP-X2, IPC-AR; 3/4 in. thick Types IP-X3 or ULTRACODE

USG BORAL DRYWALL SPZ LLC — 1/2 in. Type C; 5/8 in. Types C, SCX, SGK, ULTRACODE

USG MEXICO S A DE C V — 1/2 in. thick Type C, IP-X2, IPC-AR or WRC; 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHK, WRX, WRC or; 3/4 in. thick Types IP-X3 or ULTRACODE

When Item 7B, **Steel Framing Members***, is used, Nonbearing Wall Rating is limited to 1 Hr. Min. stud depth is 3-1/2 in., min. thickness of insulation (Item 4) is 3 in., and two layers of gypsum board panels (1/2 in. or 5/8 in. thick) shall be attached to furring channels as described in Item 6. One layer of gypsum board panels (1/2 in. or 5/8 in. thick) attached to opposite side of stud without furring channels as described in Item 6.

5A. **Gypsum Board* —** (As an alternate to Item 5) — 5/8 in. thick, 24 to 54 in. wide, applied horizontally as the outer layer to one side of the assembly. Secured as described in Item 6.
CGC INC — Type SHX.

UNITED STATES GYPSUM CO — Type FRX-G, SHK.

USG MEXICO S A DE C V — Type SHX.

5B. **Gypsum Board* —** (Not Shown) — As an alternate to Item 5 when used as the base layer on one or both sides of wall when 5/8 in or 3/4 in. thick products are specified. For direct attachment only to steel studs Item 2A, (not to be used with Item 3) — Nom 5/8 in. or

RATED WALL ASSEMBLY (UL U419)

NOT TO SCALE

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

CONSULTANT

nacht&lewis
600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

REGISTERED PROFESSIONAL ENGINEER — No. GP25272 — May 31, 2027

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

UL ASSEMBLY DETAILS

SHEET NO.

G161

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

3/4 in. may be used as alternate to all 5/8 in. or 3/4 in. shown in Item 5, Wallboard Protection on Each Side of Wall table. Nom 5/8 in. or 3/4 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Gypsum board secured to 20 MSG steel studs Item 2A with 1-1/4 in. long Type S-12 steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field. To be used with Lead Batten Strips (see Item 11) or Lead Discs or Tabs (see Item 12).
RAY-BAR ENGINEERING CORP — Type RB-LBG

5C. **Gypsum Board*** — (For Use With Item 2B) — Rating Limited to 1 Hour. 5/8 in. thick, 48 in. wide, Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. (Vertical Application) - The gypsum board is to be installed on each side of the studs with 1 in. long Type S coated steel screws spaced 8 in. OC starting 4 in. from the edge of the board at the vertical edges and 12 in. OC starting 6 in. from the edge of the board at the center of each board. Gypsum boards are to be secured to the top and bottom track with screws spaced 8 in. OC starting 4 in. from the board edge. Fasteners shall not penetrate through both the stud and the track at the same time. Vertical joints are to be centered over studs and staggered one stud cavity on opposite sides of studs. (Horizontal Application) - The gypsum board is to be installed on each side of the studs with 1 in. long Type S coated steel screws spaced 8 in. OC starting 4 in. from the edge of the board at the vertical edges and 12 in. OC starting 6 in. from the edge of the board at the center of each board. Gypsum boards are to be secured to the top and bottom track with screws spaced 8 in. OC starting 4 in. from the board edge. Fasteners shall not penetrate through both the stud and the track at the same time. All horizontal joints are to be backed as outlined under section VI of Volume 1 in the Fire Resistive Directory.
CGC INC — Type SCX, ULIX.

THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — Type SCX

UNITED STATES GYPSUM CO — Type SCX, SGX, ULIX.

USG BORAL DRYWALL SFZ LLC — Type SCX

USG MEXICO S A DE C V — Type SCX

5D. **Gypsum Board*** — (As an alternate to Item 5) — 5/8 in. thick, 48 in. wide, applied vertically or horizontally. Secured as described in Item 6. For use with Items 1 and 2 only.
CGC INC — Type USGX

UNITED STATES GYPSUM CO — Type USGX

USG BORAL DRYWALL SFZ LLC — Type USGX

USG MEXICO S A DE C V — Type USGX

5E. **Gypsum Board*** — (Not Shown) — (As an alternate to Item 5 when used as the base layer on one or both sides of wall when 1/2 in. or 5/8 in thick products are specified. For direct attachment only to steel studs Item 2A, not to be used with Item 3). Nominal 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Wallboard secured to studs with 1-1/4 in. long Type S-12 (or No. 6 by 1-1/4 in. long bugle head fine driller) steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field.
NEW ENGLAND LEAD BURNING CO INC, DBA NELCO — Nelco

5F. **Gypsum Board*** — (As an alternate to Item 5) — For use with Items 1E and 2E and limited to 1 Hour Rating only. Gypsum panels with beveled, square or tapered edges, applied vertically, and fastened to the steel studs with 1 in. long Type S screws spaced 8 in. OC along vertical and bottom edges and 12 in. OC in the field. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Steel stud depth shall be a minimum 3-5/8 in.
THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — Type SCX

UNITED STATES GYPSUM CO — 5/8 in. thick Type SCX, SGX, ULIX

USG BORAL DRYWALL SFZ LLC — 5/8 in. thick Type SCX, SGX

5G. **Gypsum Board*** — (As an alternate to Item 5) — For use with Items 1E and 2E only, Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally, as specified in the table below and fastened to the steel studs as described in Item 6. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer systems) staggered one stud cavity. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) staggered a min of 12 in. The thickness and number of layers for the 2 hr, 3 hr and 4 hr ratings are as follows:

Gypsum Board Protection on Each Side of Wall

Rating, Hr	Min Stud Depth, in. Item 2E	No. of Layers & Thickness of Panel	Min Thkns of Insulation (Item 4)
2	1-5/8	2 layers, 1/2 in. thick	Optional
2	1-5/8	2 layers, 5/8 in. thick	Optional
3	1-5/8	3 layers, 1/2 in. thick	Optional
3	1-5/8	3 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 1/2 in. thick	Optional

CGC INC — 1/2 in. thick Type C, IP-X2 or IPC-AR; 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULIX or 3/4 in. thick Types IP-X3 or ULTRACODE

THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — 1/2 in. thick Types C and 5/8 in. thick SCX

UNITED STATES GYPSUM CO — 1/2 in. thick Type C, IP-X2, IPC-AR or; 5/8 in. thick Type SCX, SGX, SHX, IP-X1, AR, C, , FRX-G, IP-AR, IP-X2, IPC-AR, ULIX; 3/4 in. thick Types IP-X3 or ULTRACODE

USG BORAL DRYWALL SFZ LLC — 1/2 in. Type C, 5/8 in. Types C, SCX, SGX, ULTRACODE

USG MEXICO S A DE C V — 1/2 in. thick Type C, IP-X2, IPC-AR or; 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX or; 3/4 in. thick Types IP-X3 or ULTRACODE

5H. **Gypsum Board*** — (Not Shown) — (As an alternate to Item 5 when used as the base layer on one or both sides of wall when 5/8 or 3/4 in thick products are specified. For direct attachment only to steel studs Item 2A, (not to be used with Item 3) - Nom 5/8 or 3/4 in. may be used as alternate to all 5/8 or 3/4 in. shown in Item 5, Wallboard Protection on Each Side of Wall table. Nom 5/8 or 3/4 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over 20 MSG steel studs and staggered min 1 stud cavity on opposite sides of studs. Wallboard secured to studs with 1-1/4 in. long Type S-12 steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field. Gypsum board secured to 20 MSG steel studs Item 2B with 1-1/4 in. long Type S-12 steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field. For Joint Compound see Item 5. To be used with Lead Batten Strips (see Item 11A) or Lead Discs (see Item 12A).
MAYCO INDUSTRIES INC — Type X-Ray Shielded Gypsum

5I. **Gypsum Board*** — (As an alternate to Item 5) — Nom. 5/8 in. thick gypsum panels with beveled, square or tapered edges installed as described in Item 5. Steel stud minimum depth shall be as indicated in Item 5.
CGC INC — Type ULIX, ULX

UNITED STATES GYPSUM CO — Type ULIX, ULX

USG MEXICO S A DE C V — Type UIX

5J. **Gypsum Board*** — (Not Shown) — (As an alternate to Item 5 when used as the base layer on one or both sides of wall when 1/2 in. or 5/8 in thick products are specified. For direct attachment only to steel studs Item 2A, not to be used with Item 3). Nom 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Wallboard secured to studs with 1-1/4 in. long Type S-12 steel screws gypsum panel steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field. Lead batten strips required behind vertical joints of lead backed gypsum wallboard and optional at remaining stud locations. Lead batten strips, min 2 in. wide, max 8 ft long with a max thickness of 0.14 in. placed on the face of studs and attached to the stud with construction adhesive and two 1 in. long Type S-12 pan head steel screws, one at the top of the strip and one at the bottom of the strip. Lead discs, nominal 3/8 in. diam by max 0.085 in. thick. Compression fitted or adhered over the screw heads. Lead batten strips and discs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C".
RADIATION PROTECTION PRODUCTS INC — Type RPP - Lead Lined Drywall

5K. **Gypsum Board*** — (As an alternate to Item 5 when Foam Plastic insulation (Items 4C or 4D) is used) — Any 5/8 in. thick, 4 ft. wide, Gypsum Board listed in Item 5 above. Applied vertically with vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Gypsum panels secured to studs with 1-1/4 in. long Type S steel screws spaced 8 in. OC at perimeter and in the field. For 2 layer assemblies outer layer will be attached to studs over inner layer with the 1-7/8 in. long steel screws spaced 8 in. OC.

6. **Fasteners** — (Not Shown) — For use with Items 2 and 2F - Type S or S-12 steel screws used to attach panels to studs (Item 2) or furring channels (Item 7). **Single layer systems:** 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 8 in. OC when panels are applied horizontally, or 8 in. OC along vertical and bottom edges and 12 in. OC in the field when panels are applied vertically. **Single layer system with Type ULIX:** 1 in. long, spaced 12 in. OC in the field and perimeter, when panels are applied horizontally or vertically. **Two layer systems:** First layer- 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels or 2-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC with screws offset 8 in. from first layer. **Three-layer systems:** First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in., 5/8 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below. **Four-layer systems:** First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 24 in. OC. Fourth layer- 2-5/8 in. long for 1/2 in. thick panels or 3 in. long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below.

7. **Furring Channels** — (Optional, Not Shown, for single or double layer systems) — Resilient furring channels fabricated from min 25 MSG corrosion-protected steel, spaced vertically a max of 24 in. OC. Flange portion attached to each intersecting stud with 1/2 in. long Type S-12 steel screws. Not for use with Items 5B, 5E, 5H, or 5J.

7A. **Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 7, furring channels and Steel Framing Members as described below:
a. **Furring Channels** — Formed of No. 25 MSG galv steel. 2-9/16 in. or 2-23/32 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board attached to furring channels as described in Item 6. Not for use with Items 5B, 5E, 5H, or 5J.

b. **Steel Framing Members*** — Used to attach furring channels (Item 7Aa) to studs (Item 2). Clips spaced max. 48 in. OC. RSIC-1 and RSIC-1 (2.75) clips secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. RSIC-V and RSIC-V (2.75) clips secured to studs with No. 8 x 9/16 in. minimum self-drilling, S-12 steel screw through the center hole. Furring channels are friction fitted into clips. RSIC-1 and RSIC-V clips for use with 2-9/16 in. wide furring channels. RSIC-1 (2.75) and RSIC-V (2.75) clips for use with 2-23/32 in. wide furring channels.
PAC INTERNATIONAL L L C — Types RSIC-1, RSIC-V, RSIC-1 (2.75), RSIC-V (2.75).

7B. **Framing Members*** — (Optional, Not Shown) — As an alternate to Item 7, for single or double layer systems, furring channels and Steel Framing Members on only one side of studs as described below:
a. **Furring Channels** — Formed of No. 25 MSG galv steel, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Batts and Blankets placed in stud cavity as described in Item 5. Two layers of gypsum board attached to furring

7G. **Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 7, furring channels and Steel Framing Members as described below:
a. **Furring Channels** — Formed of No. 25 MSG galv steel. 2-23/32 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board attached to furring channels as described in Item 6. Not for use with Items 5B, 5E, 5H, or 5J.

b. **Steel Framing Members*** — Used to attach furring channels (Item 7Ga) to studs (Item 2). Clips spaced max. 48 in. OC. Clips secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center hole. Furring channels are friction fitted into clips.
CLARKDIETRICH BUILDING SYSTEMS — Type ClarkDietrich Sound Clip

7H. **Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 7, furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel. 2-23/32 in. wide by 7/8 in. deep, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels are overlapped 6 in. and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap. As an alternate, ends of adjoining channels may be overlapped 6 in. and secured together with two self-tapping #6 framing screws, min. 7/16 in. long at the midpoint of the overlap, with one screw on each flange of the channel. Gypsum board attached to furring channels as described in Item 6. Not for use with Items 5B, 5C, 5H, or 5J.

b. **Steel Framing Members*** — Used to attach furring channels (Item 7Ha) to studs. Clips spaced 48 in. OC staggered on adjacent furring channels and secured to studs with one No. 8 x 2-1/2 in. screw and washer through the center hole. Furring channels are friction fitted into clips.
ISOTECH INDUSTRIES INC. — Type ISOSTUD

8. **Joint Tape and Compound** — Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw heads of outer layers. Paper tape, nom 2 in. wide, embedded in first layer of compound over all joints of outer layer panels. Paper tape and joint compound may be omitted when gypsum panels are supplied with a square edge.

9. **Siding, Brick or Stucco** — (Optional, Not Shown) — Aluminum, vinyl or steel siding, brick veneer or stucco, meeting the requirements of local code agencies, installed over gypsum panels. Brick veneer attached to studs with corrugated metal wall ties attached to each stud with steel screws, not more than each sixth course of brick.

10. **Caulking and Sealants*** — (Optional, Not Shown) — A bead of acoustical sealant applied around the partition perimeter for sound control.
UNITED STATES GYPSUM CO — Type AS

11. **Lead Batten Strips** — (Not Shown, For Use With Item 5B) — Lead batten strips, min 1-1/2 in. wide, max 10 ft long with a max thickness of 0.125 in. Strips placed on the interior face of studs and attached from the exterior face of the stud with two 1 in. long Type S-12 pan head steel screws, one at the top of the strip and one at the bottom of the strip. Lead batten strips to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C". Lead batten strips required behind vertical joints of lead backed gypsum wallboard (Item 5B) and optional at remaining stud locations. Required behind vertical joints.

11A. **Lead Batten Strips** — (Not Shown, For Use With Item 5H) — Lead batten strips, 2 in. wide, max 10 ft long with a max thickness of 0.140 in. Strips placed on the face of studs and attached to the stud with two min. 1 in. long min. Type S-8 pan head steel screws, one at the top of the strip and one at the bottom of the strip or with one min. 1 in. long min. Type S-8 pan head steel screw at the top of the strip. Lead batten strips to have a purity of 99.5% meeting the Federal specification QQ-L-201f, Grades "B, C or D". Lead batten strips required behind vertical joints of lead backed gypsum wallboard and optional at remaining stud locations.

12. **Lead Discs or Tabs** — (Not Shown, For Use With Item 5B) — Used in lieu of or in addition to the lead batten strips (Item 11) or optional at other locations - Max 3/4 in. diam by max 0.125 in. thick lead discs compression fitted or adhered over steel screw heads

or max 1/2 in. by 1-1/4 in. by max 0.125 in. thick lead tabs placed on gypsum boards (Item 5B) underneath screw locations prior to the installation of the screws. Lead discs or tabs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C".

12A. **Lead Discs** — (Not Shown, for use with Item 5H) — Max 5/16 in. diam by max 0.140 in. thick lead discs compression fitted or adhered over steel screw heads. Lead discs to have a purity of 99.5% meeting the Federal Specification QQ-L-201f, Grades "B, C or D".

13. **Lead Batten Strips** — (Not Shown, For Use With Item 5E) — Lead batten strips, 2 in. wide, max 10 ft long with a max thickness of 0.142 in. Strips placed on the face of studs and attached to the stud with two min. 1 in. long min. Type S-8 pan head steel screws, one at the top of the strip and one at the bottom of the strip or with one min. 1 in. long min. Type S-8 pan head steel screw at the top of the strip. Lead batten strips to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C". Lead batten strips required behind vertical joints of lead backed gypsum wallboard (Item 5E) and optional at remaining stud locations.

14. **Lead Tabs** — (Not Shown, For Use With Item 5E) — 2 in. wide, 5 in. long with a max thickness of 0.142 in. Tabs friction-fit around front face of stud, the stud folded back flange, and the back face of the stud. Tabs required at each location where a screw (that secures the gypsum boards, Item 5E) will penetrate the steel stud. Lead tabs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C". Lead tabs may be held in place with standard adhesive tape if necessary.

15. **Barrier Mesh** — (Optional, Not Shown) - Attached to steel studs on one or both sides of the wall using Barrier Mesh Clips spaced at maximum 12 inches on center vertically, using a flat head type screw penetrating through the steel at least 3/8 of an inch. For Steel Studs less than 0.033 inches in thickness, use self-piercing screws. For Steel Studs equal to or greater than 0.033 inches in thickness, use steel drill screws (self-tapping). Gypsum Board (Item 5) to be installed directly over the Barrier Mesh using prescribed screw patterns with lengths increased by a minimum 1/8 in. Barrier Mesh may be installed with the long dimension of the diamond pattern positioned vertically or horizontally. Barrier Mesh joints may occur as butt joints at the framing members and secured using the Barrier Mesh Clips or occur in between framing members as overlapping joints secured using 18 SWG wire ties spaced a maximum 12 in. on center.
CLARKDIETRICH BUILDING SYSTEMS — Barrier Mesh, Barrier Mesh Clips

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2025-02-13

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channels as described in Item 5. Not for use with Item 6. Not for use with Items 5B, 5E, 5H, or 5J.

b. **Steel Framing Members*** — Used to attach furring channels (Item 7Ba) to one side of studs (Item 2) only. Clips spaced 48 in. OC., and secured to studs with two No. 8 x 2-1/2 in. coarse drywall screws, one through the hole at each end of the clip. Furring channels are friction fitted into clips.
KINETICS NOISE CONTROL INC — Type Isomax

7C. **Framing Members*** — (Not Shown) — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 7, furring channels and Steel Framing Members as described below:
a. **Furring Channels** — Formed of No. 25 MSG galv steel. 2-3/8 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board attached to furring channels as described in Item 6. Not for use with Items 5B, 5E, 5H, or 5J.

b. **Steel Framing Members*** — Used to attach furring channels (Item 7Ca) to studs (Item 2). Clips spaced max. 48 in. OC. GENIECLIPS secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring channels are friction fitted into clips.
PLITEQ INC — Type GENIECLIP

7D. **Steel Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems) — Furring channels and Steel Framing Members as described below:
a. **Furring Channels** — Formed of No. 25 MSG galv steel. Spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel wire.. Gypsum board attached to furring channels as described in Item 6. Not for use with Items 5B, 5E, 5H, or 5J.

b. **Steel Framing Members*** — Used to attach furring channels (Item 7Da) to studs. Clips spaced 48 in. OC., and secured to studs with 2 in. coarse drywall screw with 1 in. diam washer through the center hole. Furring channels are friction fitted into clips
STUDCO BUILDING SYSTEMS — RESILMOUNT Sound Isolation Clips - Type A237 or A237R

7E. **Steel Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems) — Furring channels and Steel Framing Members as described below:
a. **Furring Channels** — Formed of No. 25 MSG galv steel. Spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item 7Eb. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel wire.. Gypsum board attached to furring channels as described in Item 6. Not for use with Items 5B, 5E, 5H, or 5J.

b. **Steel Framing Members*** — Used to attach furring channels (Item 7Ea) to studs. Clips spaced 48 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Furring channels are friction fitted into clips.
REGUPOL AMERICA — Type SonusClip

7F. **Steel Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems) — Resilient channels and Steel Framing Members as described below:
a. **Resilient Channels** — Formed of No. 25 MSG galv steel, spaced 24 in. OC, and perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and secured in place with two No. 8 15 x 1/2 in. Philips Modified Truss screws spaced 2-1/2 in. from the center of the overlap. Gypsum board attached to resilient channels as described in Item 6. Not for use with Items 5B, 5E, 5H, or 5J.

b. **Steel Framing Members*** — Used to attach resilient channels (Item 7Fa) to studs. Clips spaced 48 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Resilient channels are secured to clips with one No. 10 x 1/2 in. pan-head self-drilling screw.
KEENE BUILDING PRODUCTS CO INC — Type RC + Assurance Clip

RATED WALL ASSEMBLY (UL U419)

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UL Product iQ®

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- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
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- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States
BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Vidances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Vidances

Design No. U901

January 11, 2022

Bearing Wall Rating — 4 HR.
Nonbearing Wall Rating — 4 HR.
This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Concrete Blocks*** — Various designs. Classification B-4 (4 hr).
See Concrete Blocks category for lists of eligible manufacturers.

2. **Mortar** — Blocks laid in full bed of mortar, nom. 3/8 in. thick, of not less than 2-1/4 and not more than 3-1/2 parts of clean sharp sand to 1 part Portland cement (proportioned by volume) and not more than 50 percent hydrated lime (by cement volume). Vertical joints staggered.

3. **Portland Cement Stucco or Gypsum Plaster** — If used, add 1/2 hr. to Classification.

4. **Loose Masonry Fill** — If all core spaces are filled with loose dry expanded slag, burned clay or shale (rotary kiln process), water repellant vermiculite masonry fill insulation, or silicone treated perlite loose fill insulation, Class D-2 (2 hr) or C-3 (3 hr) concrete blocks will provide a 4 hr fire resistance rating.

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Last Updated on 2022-01-11

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RATED WALL ASSEMBLY (UL U901)

NOT TO SCALE

AGENCY APPROVAL

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Sacramento, CA 95811
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NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

UL ASSEMBLY DETAILS

SHEET NO.

G162

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- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

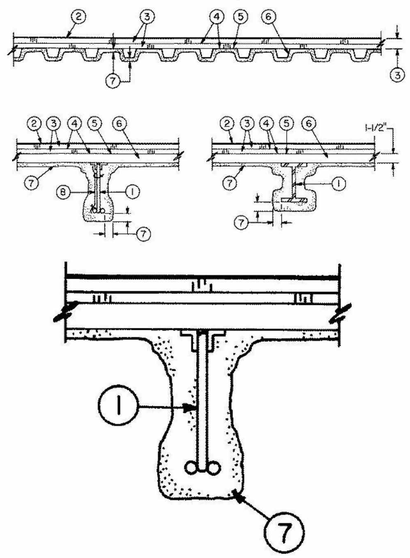
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

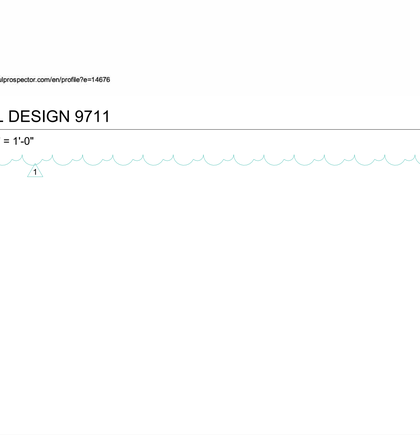
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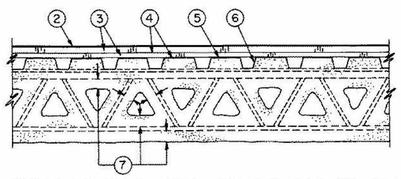
June 18, 2025

Restrained Assembly Ratings — 1, 1-1/2 or 2 Hr. (See Items 3, 7 and 8A)
Unrestrained Assembly Ratings — 1, 1-1/2 or 2 Hr. (See Items 3, 7 and 8A)
Unrestrained Beam Rating — 1, 1-1/2 or 2 Hr. (See Items 7 and 8A)
Restricted Load Condition — See Item 1A
This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**







1. **Beam —** W6x16 min size. As alternate to steel beams, Joist girders — (Not shown)— 20 in. min depth and 13 lb per lin ft min weight.

1A. **Steel Joists —** Types 10J4, 10H4, 12J4, 14J7 or 14K4 min size.
NOTE: Design load shall stress 10H4 joist to a max tensile stress of 22 KSI.

2. **Roof Covering* —** Consisting of hot mopped or cold application materials compatible with insulation(s) described herein which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials(TEVT).

2A. **In lieu of Item 2, roof covering consisting of single-ply Roofing Membrane* —** that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification. See Fire Resistance Directory-Roofing Membranes (CHCI).

2B. **Metal Roof Deck Panels —** (Not shown) — In addition to or in lieu of Items 2 or 2A, the roof covering may consist of a mechanically fastened metal roof deck panel assembly. See Fire Resistance Directory-Metal Roof Deck Panels (CETW).

3. **Roof Insulation —** May consist of the following:
A. **Mineral and Fiber Boards* —** Min thickness 3/4 in. for the 1 and 1-1/2 hr. assembly ratings and 1-3/4 in. for the 2 hr. assembly rating. Min thickness is 1-3/4 in. when Item 2A or 2B are used. Min thickness is 3/4 in. otherwise. Max thickness 4-7/8 in. To be applied in two or more layers with adhesive applied between layers of boards and to vapor retarder or roof deck if vapor retarder is not used. As an alternate, the first layer of insulation may be attached to the roof deck by self drilling, self tapping steel screws pierced through 3-1/4 in. hexagonal steel plates spaced min. 15 in. O.C. The min cover of Spray-Applied Fire Resistive Materials to the end of the screw shall be 1/2 in. The second layer of insulation may be secured to the first layer with 30 lb of hot mopping asphalt per 100 sq. ft. Each layer of board to be offset in both directions from layer below a min of 6 in. A secondary membrane consisting of Type G1 or G2 mats or Type 15 felt may be used between layers of roof insulation. Secondary membrane secured in place with 25 lb. of hot mopping asphalt per 100 sq ft. Insulation may be installed in a single layer if the Restrained and Unrestrained Assembly Ratings are limited to 1 hr or if a 5/8 in. thick layer of gypsum sheathing is placed on the steel roof deck units. Joints between insulation and sheathing shall be staggered.
ROCKWOOL — MonoBoard™, MonoBoard™ Plus, TopRock®DD or TopRock® DD Plus.

SOPREMA INC — SopraRock®DD and SopraRock®DD Plus.

B. **Gypsum Board —** (Classified or Unclassified, not shown) — 5/8 in. thick gypsum wallboard, min weight 2.0 psf, may be used with the above insulation to obtain various Unrestrained and Restrained Assembly Ratings as described in Item 7. Installed perpendicular to the steel roof deck with joints staggered and occurring over the crests of the roof deck. Secured to the roof deck with adhesive (Item 4) or with asphalt applied to a min of 50 percent of the crest surface at a rate of 12 to 15 lbs per 100 sq ft or with mechanical fasteners. If mechanical fasteners are used, the end of the fastener shall be covered with a min 1/2 in. of Spray-Applied Fire Resistive Materials.

4. **Adhesive* —** Optional — Adhesive may be used to attach each layer of roof insulation. The adhesive may be applied in 1/2 in. wide ribbons approx. 6 in. OC at 0.4 gal/100 sq ft. In lieu of adhesive, the first layer of roof insulation may be secured with asphalt applied to a min of 50 percent of the crests surface at a rate of 12 to 15 lbs. per 100 sq ft or with mechanical fasteners. If mechanical fasteners are used, the fastener shall not penetrate through the Spray-Applied Fire Resistive Materials.
See Adhesives (BYWR) category for names of Classified companies

5. **Sheathing Material* —** Optional. Vinyl film or paper scrim vapor barrier applied with adhesive or laid loosely on the steel roof deck, overlapped approx 2 in. at sides.
See Sheathing Material (CHIZ) category for names of Classified companies.

5A. **Sheathing Material* —** (Optional) — A self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of the gypsum wallboard (Item 3B) or on the roof insulation (Item 3A).
GCP APPLIED TECHNOLOGIES INC — Grace Ice and Water Shield, Grace VYCOR Ice & Water Shield, Grace Ice and Water Shield-HT®, Grace VYCOR Ice and Water Shield-HT®, Grace Select, Grace Select Grace VYCOR Select, Grace Ultra, Grace VYCOR Ultra, and Grace Basik

5B. **Sheathing Material* —** (Optional) — in lieu of items 5 and 5A, A self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of the gypsum wallboard (Item 3B) or on the roof insulation (Item 3A).

CERTAINTEED LLC — WinterGuard Pro

6. **Steel Roof Deck —** Unclassified - Min 1-1/2 in. deep and 18 in. wide, galv fluted steel deck. Min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports min 12 in. OC. Adjacent units button-punched or welded together at midspan along side joints; or **Classified Steel Floor and Form Units*** — Noncomposite 1-1/2 in. deep, min. 24 in. wide, galv fluted steel deck. Min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports a max 12 in. OC. Adjacent units button-punched or welded together at midspan along side joints.
ASC STEEL DECK, DIV OF ASC PROFILES L L C — Types BH-36, BHN-36, BHN-35-1/4, DGB-36, B-36, BN-36, BN-35-1/4, NH-32, NHN-32, DGN-32, N-32, and NN-32. All units may be galvanized or Prime Shield™. Non-cellular decks may be vented designated with a "V" suffix to the product name.

CANAM GROUP INC — Type P-3606 or P-3615; 36 in. wide Types 1.5B, 1.5Bi; 24 in. wide Types 3N, 3Ni, 3NW, 3NWI.

CANAM STEEL CORP — Types B, BI, F, NS, NI, NS32, NI32, NS32-XS and NI32-XS . Units may be ptd/ptd.

INTSEL STEEL EAST LLC — 36 in. wide Type 1.5" B-DECK/ROOF, 24 in. wide Type N-DECK/ROOF.

MARLYN STEEL DECKS INC — Types B, F, N, NV .

NEW MILLENNIUM BUILDING SYSTEMS L L C — Type B, BD, BI, F, FD, N, ND, NW32 and NW32I. Units may be phos/painted or galvanized.

ROOF DECK INC — Type A, B-1, B-2 or F.

VERCO DECKING INC - A NUCOR CO — Deck types PLB, HSB, PLN3, HSN3, PLN, N; FORMLOK™ deck types PLB, B, PLN3, N3, PLN, N. Units may be galvanized or phos./ptd. Deck may be vented or non-vented.

VULCRAFT, DIV OF NUCOR CORP — Types 1.5B, 1.5Bi, 1.5PLB, 1.5F, 3N, 3Ni, 3.0PLN, 3NL-32, 3NI-32, 3PLN-32. Units may be ptd/ptd; Types BW, B High Strength, BW High Strength, N. Units may be phd/ptd.

7. **Spray-Applied Fire Resistive Materials* —** Applied by mixing with water and spraying in more than one coat to a final thickness as shown above and in the table below, to steel surfaces which must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 15/14 pcf respectively. Min avg and min ind density of 19/18 pcf respectively for Types 7GP and 7HD.
For method of density determination, refer to Design Information Section.

For the W6x16 wide flange beams, the thickness of Spray-Applied Fire Resistive Materials shall be 7/8 in. for the 1 hr Unrestrained Beam Rating, 1-3/8 in. for the 1-1/2 hr Unrestrained Beam Rating, and 1-1/2 in. for the 2 hr Unrestrained Beam Rating.

The joist protection shall be applied in the manner and at the thicknesses shown below:

Note: When metal lath is required, as indicated below, full thickness of Spray-Applied Fire Resistive Materials is to be applied over the entire support including lath.

Min Joist Size	Type of Application	Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Thkns of Spray Applied Fire Resistive Mtl In.
14J7	Direct	1	1	1	1-1/2
10J4, 10H4	Direct	1	1	1	1-3/4
10J4, 10H4	Direct	1-1/2	1-1/2	1-1/2	2-1/4
10J4, 10H4	Direct	2	2	2	2-7/16
12J4, 14K4	Direct	1	1	1	2
12J4, 14K4	Direct	1-1/2	1-1/2	1-1/2	2-1/4
12J4, 14K4	Direct	2	2	2	2-7/16
12J4, 14K4	Lath	1-1/2	1 1/2	1-1/2	1-3/4
12J4, 14K4	Lath	2	2	2	1-7/8

When W6x16 beams and min size 12J4, 14J7 or 14K4 joists are used, thickness of the spray-applied resistive material applied to the roof deck units shall be:

Restrained or Unrestrained Assembly Rating Hr	Thk of Spray Applied Fire Resistive Mtl Applied to Deck w/Gypsum Sheathing	w/o Gypsum Sheathing
1	1-3/16	1-1/4
1-1/2	1-3/16	1-1/2
2	1-7/16	1-3/4

When min size 10J4 or 10H4 joists are used, thickness of spray-applied resistive material applied to the roof deck units, with or without gypsum sheathing, shall be:

Restrained or Unrestrained Assembly Rating Hr	Thkns of Spray Applied Fire Resistive Mtl on Steel Deck In.
1	1-3/8
1-1/2	1-5/8
2	1-7/8

GCP KOREA INC — Types MK-6/CBF, MK-6/ED, MK-6/HY, MK-6s, Monokote Acoustic 1.

PYROK INC — Type LD.

Carboline Global Inc. — Types 4, 5, 5EF, 5GP, 5MD, 7GP, 7HD, 8EF, 8GP, 8MD, 9EF, 9GP, 9MD.

GCP APPLIED TECHNOLOGIES INC — Types MK-6/HY, MK-6s, Monokote Acoustic 1, RG.

8. **Metal Lath —** (Optional) — Where required, the diamond mesh, 3/8 in. expanded steel lath, 1.7 to 3.4 lb/sq yd is secured to one side of each steel joist with No. 18 SWG galv steel wire at joist web and bottom chord members, spaced 15 in. OC max. Where not required, the optional use of metal lath described and fastened as above, may be used to facilitate the spray application of Spray-Applied Fire Resistive Materials on steel bar joists and trusses. In this application, the metal lath is to be fully covered with Spray-Applied Fire Resistive Materials with no minimum thickness required.

8A. **Nonmetallic fabric mesh —** (Optional, not shown) — As an alternate to metal lath, glass fiber fabric mesh weighing approximately 2.5 oz/sq yd, polypropylene fabric mesh weighing approximately 1.25 oz/sq yd or equivalent, may be used to facilitate the spray application. The mesh is secured to one side of each joist web member. The method of attaching the mesh must be sufficient to hold the mesh and the spray-applied resistive materials in place during application until it has cured. An acceptable method of attaching the mesh is by embedding the mesh in min 1/4 in. long beads of hot melted glue. The beads of glue shall be spaced a max of 12 in. O.C. along the top chord of the bar joist. Another method to secure the mesh is by 1-1/4 in. long by 1/2 in. wide hairpin clips formed from No. 18 SWG or heavier steel wire.

9. **Bridging —** (Not shown) — In accordance with AISC current specifications. Continuous steel angles, min. size 1-1/4 by 1-1/4 by 1/8 in. welded to top and bottom chords. Bridging coated with 2-1/4 in. thickness of spray-applied resistive materials for the 1 or 1-1/2 h Assembly and Beam Rating and 2-7/16 in. for the 2 h Assembly and Beam Ratings.

10. **Metal Lath —** (Not Shown) — Where Type 7HD is applied to steel deck, 3/8 in. metal ribbed lath weighing 3.4 lb/yd^2 shall be secured to the underside of the steel deck (ribs upward) with S-12 by 3/8 in. long pan head, self-tapping steel screws spaced 12 in. OC in all directions. Steel screws shall be fitted with 1/2 in. diameter steel washers. Adjacent pieces of lath shall be overlapped 1 in. min.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2025-07-28

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL Solutions' Follow - Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL Solutions' Follow - Up Service. Always look for the Mark on the product.

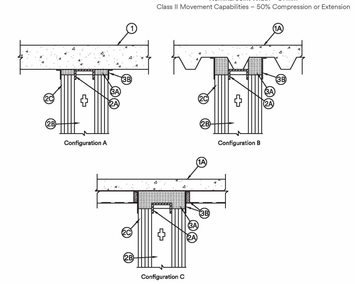
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UL System No. HW-D-0604

December 14, 2016

ANSI/UL2079
Assembly Ratings — 1, 2, 3 and 4 Hr (See Item 2)
Nominal Joint Width — 2 in.
Class II Movement Capabilities — 50% Compression or Extension

CAN/ULC S115
F Ratings — 1, 2, 3 and 4 Hr (See Item 2)
FT Ratings — 1, 2, 3 and 4 Hr (See Item 2)
FH Ratings — 1, 2, 3 and 4 Hr (See Item 2)
FTH Ratings — 1, 2, 3 and 4 Hr (See Item 2)
Nominal Joint Width — 51 mm
Class II Movement Capabilities — 50% Compression or Extension



1. **Floor Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) structural concrete. Floor may also be constructed of any UL Classified hollow-core **Precast Concrete Units***.
See **Precast Concrete Units** (CFTV) in Fire Resistance Directory for names of manufacturers.

1A. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:
A. **Steel Floor And Form Units*** – Max 3 in. (76 mm) deep galv steel fluted floor units.
B. **Concrete** – Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

2. **Wall Assembly** — The 1, 2, 3 or 4 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
A. **Steel Floor and Ceiling Runners** – Floor and ceiling runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner flange height to be min 1/2 in. (13 mm) greater than joint width at max anticipated extension. Ceiling runner secured with steel masonry anchors or welds spaced max 24 in. (610 mm) OC. Ceiling runner secured directly to bottom of floor for Configuration A. Ceiling runner secured parallel to and centered with flute as shown in Configuration B. For Configuration C, ceiling runner secured perpendicular to steel deck flutes.
B. **Studs** – Steel studs to be min 3-5/8 in. (92 mm) wide. Studs cut max 1-1/4 in. (32 mm) less in length than assembly height to accommodate max anticipated compression of joint width with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. Stud spacing not to exceed 24 in. (610 mm) OC.
C. **Gypsum Board*** – Gypsum board sheets installed to a min total thickness of 5/8 in., 1-1/4 in., 1-7/8 in., or 2-1/2 in. (16, 32, 48 or 64 mm) on each side of wall for 1, 2, 3 and 4 hr fire rated wall assemblies, respectively. Wall to be constructed as specified in the individual U400 Series Design in the UL Fire Resistance Directory, except that a max 2 in. (51 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the floor. The screws securing successive layers of gypsum board shall be staggered min 1 in. (25 mm) from screws in preceding layer(s). Top row of screws in face layer of gypsum board shall be installed into the studs 1-1/2 in. (38 mm) below flange of ceiling runner.
The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

UL System No. HW-D-0604 (cont.)

3. **Joint System** – Max separation between bottom of floor and top of gypsum board sheets at time of installation of joint system is 2 in. (51 mm). The joint system is designed to accommodate a maximum 50 percent compression or extension from its installed width. The joint system consists of the following:

Configurations A and B

A. **Forming Material*** – Min 4 pcf (64 kg/m^3) density mineral wool batt insulation cut to a width equal to the overall thickness of the gypsum board and with a thickness equal to twice the height of the gap between the top of the gypsum board and the bottom of the floor. Insulation compressed 50 percent in thickness and inserted between the top of the gypsum board and the bottom of the floor on both sides of the wall.
INDUSTRIAL INSULATION GROUP LLC – MinWool-1200 Safing
JOHNS MANVILLE – Safing
ROCK WOOL MANUFACTURING CO – Delta Board
ROCKWOOL MALAYSIA SDN BHD – Type Safe
ROXUL INC – Type Safe

B. **Fill, Void or Cavity Material*** – Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or brushed to completely cover forming material and to overlap a min of 1/2 in. (13 mm) on to gypsum board and concrete or steel floor deck on both sides of wall.
3M COMPANY
3M FIRE PROTECTION PRODUCTS – FireDam™ Spray 200

B1. **Fill, Void or Cavity Material* – Tape** – As an alternate to Item B, Tape cut to size and press applied over the mineral wool forming material and lapping min 1 in. (25 mm) onto the steel floor units or concrete floor and concrete wall. Tape applied in minimum 1 ft (305 mm) lengths along joint and adjoining lengths of Tape shall overlap min 1/2 in. (13 mm). Tape shall be applied at both sides of wall.
3M COMPANY – 3M Fire and Water Barrier Tape

Configuration C

A. **Forming Material*** – Nom 4 pcf (64 kg/m^3) mineral wool batt cut to the shape of the steel deck flute with a height 1 in. (25 mm) greater than the height of flutes and with a length equal to the overall thickness of the wall assembly. Mineral wool batt compressed and installed into each flute above the ceiling runner with its projecting ends flush with the wall surfaces. Additional pieces of min 4 pcf (64 kg/m^3) density mineral wool batt cut to a width equal to the overall thickness of the gypsum board and with a thickness equal to twice the height of the gap between the top of the gypsum board and the valleys of the steel deck floor. Insulation compressed 50 percent in thickness and inserted between the top of the gypsum board and the bottom of the floor on both sides of the wall.
INDUSTRIAL INSULATION GROUP LLC – MinWool-1200 Safing
JOHNS MANVILLE – Safing
ROCK WOOL MANUFACTURING CO – Delta Board
ROCKWOOL MALAYSIA SDN BHD – Type Safe
ROXUL INC – Type Safe

B. **Fill, Void or Cavity Material*** – Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or brushed to completely cover forming material and to overlap a min of 1/2 in. (13 mm) on to gypsum board and steel deck on both sides of wall.
3M COMPANY
3M FIRE PROTECTION PRODUCTS – FireDam™ Spray 200

B1. **Fill, Void or Cavity Material* – Tape** – As an alternate to Item B, Tape cut to size and press applied within fluted areas of joint to completely cover mineral wool lapping min 1 in. (25 mm) onto the steel floor units or concrete floor and extending to lap min 1 in. (25 mm) onto the gypsum wall. Adjoining lengths of Tape shall overlap min 1/2 in. (13 mm). Tape shall be applied at both sides of wall.
3M COMPANY – 3M Fire and Water Barrier Tape

*Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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Construction Joints | Head of Wall | HWD

2 UL DESIGN 9711
12" = 1'-0"

1 UL DESIGN HW-D-0604
N.T.S.

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS
4436 Calle Real, Santa Barbara, CA 93110
SANTA BARBARA COUNTY

CONSULTANT
nacht&lewis
600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

ARCHITECT
No. C-25272
May 31, 2027

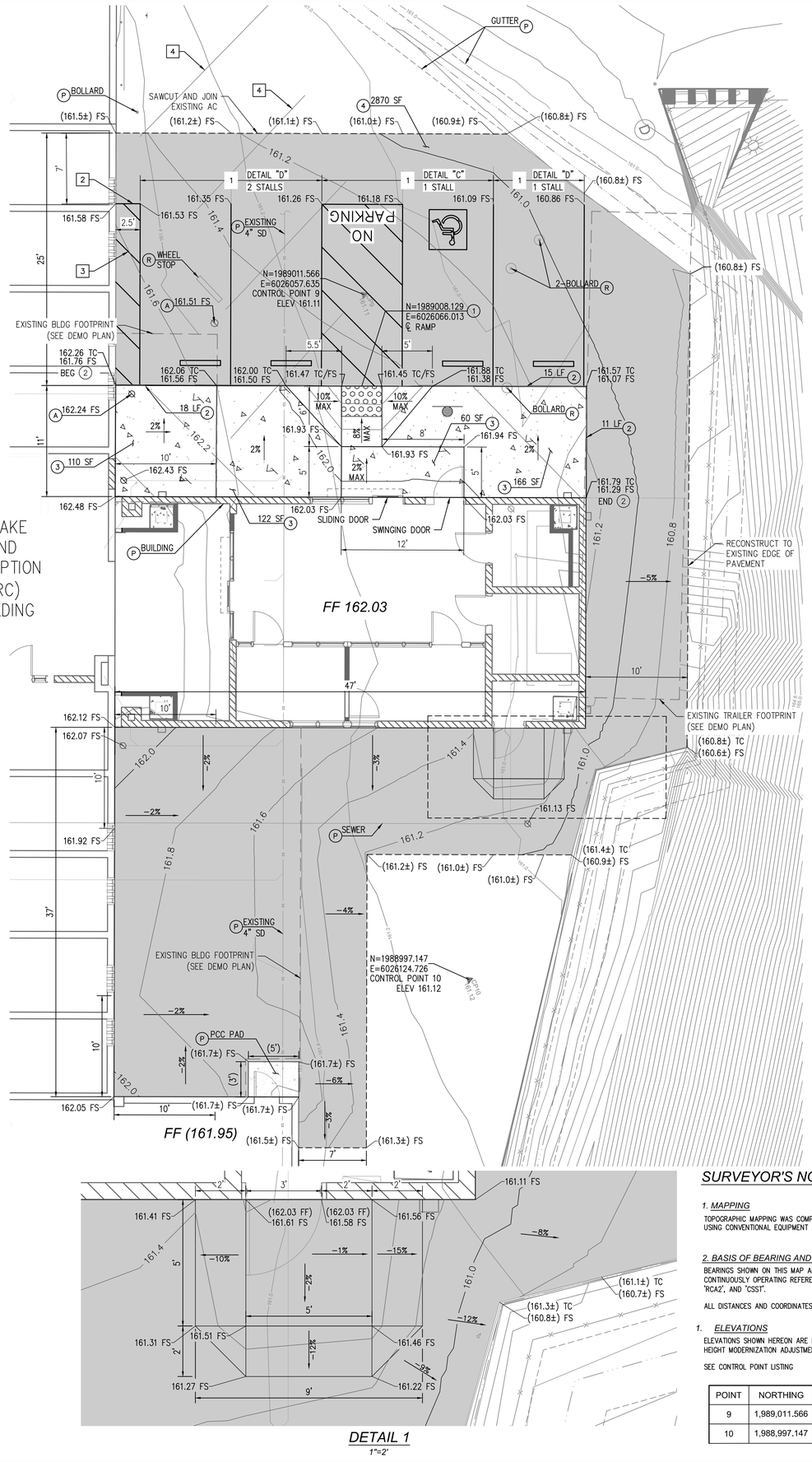
95% CONSTRUCTION DOCUMENTS

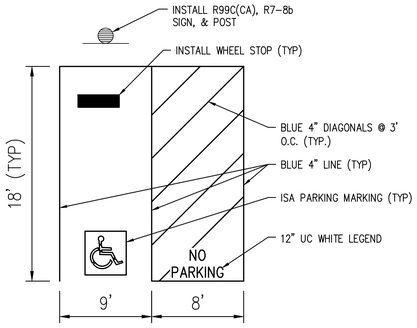
REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

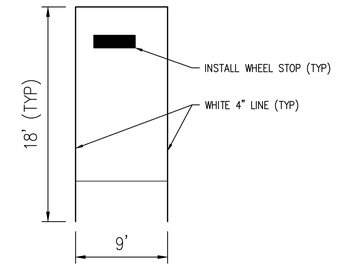
DATE 2/25/25
JOB NO. Y2213.00
SHEET TITLE
UL ASSEMBLY DETAILS
SHEET NO.
G163

ONE INCH = TWENTY FEET
ONE-SIXTEENTH INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE INCH = ONE FOOT
ONE AND ONE-HALF INCH = ONE FOOT

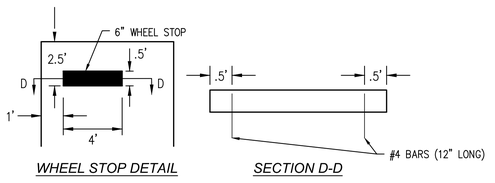




DETAIL "C"
N.T.S.

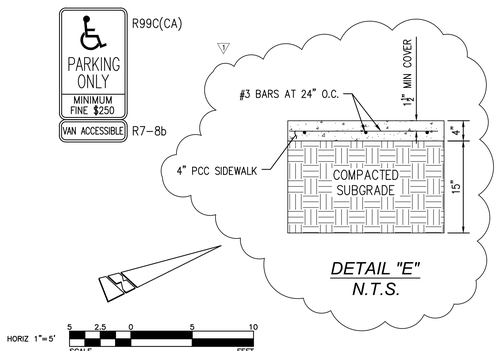


DETAIL "D"
N.T.S.



WHEEL STOP DETAIL

SECTION D-D



DETAIL "E"
N.T.S.

NOTE: ALL ELEVATIONS BASED ON FF 162.03

DETAIL 1
1"=2'

SURVEYOR'S NOTES

1. MAPPING

TOPOGRAPHIC MAPPING WAS COMPILED AT A SCALE OF 1"=10', WITH A 1-FOOT CONTOUR INTERVAL, FROM DATA COLLECTED IN A FIELD SURVEY PERFORMED USING CONVENTIONAL EQUIPMENT AND PROCEDURES ON AUGUST 29, 2023 AT THE REQUEST OF WILLDAN ENGINEERING.

2. BASIS OF BEARING AND COORDINATES

BEARINGS SHOWN ON THIS MAP ARE REFERENCED TO THE CALIFORNIA COORDINATE SYSTEM, NAD 83, ZONE 5 GRID (EPOCH 2017.50) DEFINED LOCALLY BY CONTINUOUSLY OPERATING REFERENCE STATIONS OPERATED BY THE CALIFORNIA SPATIAL REFERENCE CENTER (CSRC). THIS SURVEY TIED TO STATIONS 'COPR', 'RCA2', AND 'CSST'.

ALL DISTANCES AND COORDINATES ARE REFERENCED TO SAID CALIFORNIA COORDINATE SYSTEM AND ARE EXPRESSED IN US SURVEY FOOT UNITS.

1. ELEVATIONS

ELEVATIONS SHOWN HEREON ARE EXPRESSED IN U.S. SURVEY FEET AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), 2003 HEIGHT MODERNIZATION ADJUSTMENT. THIS SURVEY TIED TO CSRC STATION 'COPR', ELEVATION = 45.351 FEET.

SEE CONTROL POINT LISTING

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
9	1,989,011.566	6,026,057.635	161.110	CP MAG IN AC
10	1,988,997.147	6,026,124.726	161.118	CP MAG IN AC

CONSTRUCTION NOTES

1. REMOVE AND CONSTRUCT CURB RAMP PER SPPWC STD PLAN NO. 111-5, CASE A, TYPE 3 PER PLAN INCLUDING TRUNCATED DOMES
2. REMOVE AND CONSTRUCT A1-6 CURB PER SPPWC STD PLAN 120-3
3. REMOVE AND CONSTRUCT 4-INCH PCC SIDEWALK OVER COMPACTED SUBGRADE PER SPPWC STD PLAN 113-2 AND DETAIL "E"
4. REMOVE AND CONSTRUCT 3.5-INCH HMA OVER 8-INCH CLASS II AB

A. ADJUST TO GRADE

P. PROTECT IN PLACE

LEGEND

- PCC IMPROVEMENTS
- AC PAVEMENT
- CAST-IN-PLACE TRUNCATED DOMES
- SEWER CLEANOUT (SCO)

SIGNING AND STRIPING CONSTRUCTION NOTES

1. PAINT PARKING STALL STRIPING DETAIL AS NOTED.
2. PAINT 4" WHITE LINE.
3. PAINT 4" WHITE DIAGONALS @ 3' O.C.
4. REMOVE CONFLICTING STRIPING

SIGNING AND STRIPING GENERAL NOTES

1. SIGNING, STRIPING, AND THE INSTALLATION THEREOF SHALL CONFORM TO CALTRANS REVISED STANDARD PLANS AND SPECIFICATIONS, DATED 2018, THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CA MUTCD REVISION 7), DATED NOVEMBER 2014, THIS PLAN AND THE SPECIAL PROVISIONS.
2. ALL STRIPING AND PAVEMENT MARKINGS SHALL BE PAINT (2 COATS).
3. ALL STENCILS USED TO INSTALL PAVEMENT MARKINGS SHALL CONFORM TO THE LATEST CALTRANS STENCILING STANDARDS.
4. REMOVAL OF CONFLICTING STRIPING AND PAVEMENT MARKINGS SHALL BE BY GRINDING METHOD.
5. NEW WHEEL STOPS SHALL BE PRECAST CONCRETE AND 4' IN LENGTH. SEE DETAIL HERON.

GENERAL NOTES

1. ALL PCC SHALL BE 520-C-3250 UNLESS OTHERWISE STATED
2. THERE SHALL BE A SMOOTH TRANSITION AT GRADE BREAKS WITH NO LIPS OR OTHER CHANGES IN ELEVATION.
3. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION.
4. CONTRACTOR AGREES THAT THEY SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE CITY AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE COUNTY OR THE ENGINEER.
5. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITY LINES EXCEPT AS SHOWN ON THIS PLAN. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS PLAN.
6. THE CONTRACTOR SHALL MAKE A PHYSICAL INSPECTION OF THE PROJECT SITE AND REPORT ALL VARIATIONS, INCONSISTENCIES, OR CHANGED CONDITIONS TO THE ENGINEER PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ASSUMPTIONS, REMEDIAL ACTIONS, OR ADAPTATIONS MADE IN THE FIELD WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.
7. REPAIR OR REPLACE ALL DAMAGES OR ALTERATIONS TO EXISTING PUBLIC IMPROVEMENTS TO THE SATISFACTION OF THE CITY ENGINEER AT NO COST TO THE CITY.
8. ALL DIMENSIONS SHALL BE VERIFIED BY PLANS OR FIELD INSPECTION. AT NO TIME SHALL ANY DIMENSIONS BE SCALED FROM PLANS. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ALL VARIATIONS IN DIMENSIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
9. ALL JOINTS AND JOIN LOCATIONS AND UNDERGROUND UTILITY LOCATIONS SHALL BE FIELD VERIFIED.
10. AT ALL TIMES, CURB FACE DIMENSIONS AND GUTTER GRADES SHALL BE MAINTAINED, UNLESS OTHERWISE NOTED.
11. CONTRACTOR SHALL NOTIFY ALL AFFECTED UTILITY COMPANIES AND AFFECTED AGENCIES AT LEAST 72 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
12. ALL ASPHALT PAVEMENT IMPROVEMENTS INDICATED TO BE REMOVED SHALL BE SAWCUT AT THE LINE OF REMOVAL.
13. STOCKPILING OF EXCESS MATERIAL SHALL NOT BE ALLOWED.

SANTA BARBARA COUNTY BUILDING & SAFETY DIVISION GRADING NOTES

1. ALL GRADING SHALL CONFORM TO SANTA BARBARA COUNTY CODE CHAPTER 14 AND STANDARDS AND REQUIREMENTS PERTAINING THERETO, THESE CONSTRUCTION DRAWINGS AND THE RECOMMENDATIONS OF THE SOILS ENGINEER AND ENGINEERING GEOLOGIST.
2. CONTRACTOR TO NOTIFY THE COUNTY GRADING INSPECTOR AND SOILS LABORATORY AT LEAST 48 HOURS BEFORE START OF GRADING WORK OR ANY PRE-CONSTRUCTION MEETING.
3. CONTRACTOR SHALL EMPLOY ALL LABOR, EQUIPMENT AND METHODS REQUIRED TO PREVENT HIS OPERATIONS FROM PRODUCING DUST IN AMOUNTS DAMAGING TO ADJACENT PROPERTY, CULTIVATED VEGETATION AND DOMESTIC ANIMALS OR CAUSING A NUISANCE TO PERSONS OCCUPYING BUILDINGS IN THE VICINITY OF THE JOB SITE. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE CAUSED BY DUST FROM HIS GRADING OPERATION.
4. BEFORE BEGINNING WORK REQUIRING EXPORTING OR IMPORTING OF MATERIALS, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM PUBLIC WORKS ROAD DIVISION FOR HAUL ROUTES USED AND METHODS PROVIDED TO MINIMIZE THE DEPOSIT OF SOILS ON COUNTY ROADS. GRADING/ROAD INSPECTORS SHALL MONITOR THIS REQUIREMENT WITH THE CONTRACTOR.
5. THE GEOTECHNICAL ENGINEER SHALL PROVIDE OBSERVATION AND TESTING DURING GRADING OPERATIONS IN THE FIELD AND SHALL SUBMIT A FINAL REPORT STATING THAT ALL EARTH WORK WAS PROPERLY COMPLETED AND IS IN SUBSTANTIAL CONFORMANCE WITH THE REQUIREMENTS OF THE GRADING ORDINANCE.
6. AREAS TO BE GRADED SHALL BE CLEARED OF ALL VEGETATION INCLUDING ROOTS AND OTHER UNSUITABLE MATERIAL FOR A STRUCTURAL FILL, THEN SCARIFIED TO A DEPTH OF 6"PRIOR TO PLACING OF ANY FILL. CALL GRADING INSPECTOR FOR INITIAL INSPECTION.
7. A THOROUGH SEARCH SHALL BE MADE FOR ALL ABANDONED MAN-MADE FACILITIES SUCH AS SEPTIC TANK SYSTEMS, FUEL OR WATER STORAGE TANKS, AND PIPELINES OR CONDUITS. ANY SUCH FACILITIES ENCOUNTERED SHALL BE REMOVED AND THE DEPRESSION PROPERLY FILLED AND COMPACTED UNDER OBSERVATION OF THE GEOTECHNICAL ENGINEER.
8. AREAS WITH EXISTING SLOPES WHICH ARE TO RECEIVE FILL MATERIAL SHALL BE KEYED AND BENCHED. THE DESIGN AND INSTALLATION OF THE KEYWAY SHALL BE PER THE GEOTECHNICAL ENGINEER'S RECOMMENDATION OR PER COUNTY STANDARD DETAIL NO. G-13.
9. FILL MATERIAL SHALL BE SPREAD IN LIFTS NOT EXCEEDING 6"IN COMPACTED THICKNESS, MOISTENED OR DRIED AS NECESSARY TO NEAR OPTIMUM MOISTURE CONTENT AND COMPACTED BY AN APPROVED METHOD. FILL MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 90% MAXIMUM DENSITY AS DETERMINED BY 1957 ASTM D -1557 -91 MODIFIED PROCTOR (AASHO) TEST OR SIMILAR APPROVED METHODS. SOME FILL AREAS MAY REQUIRE COMPACTION TO A GREATER DENSITY IF CALLED FOR IN THE CONSTRUCTION DOCUMENTS. SOIL TESTS SHALL BE CONDUCTED AT NOT LESS THAN ONE TEST FOR EACH 18'OF FILL AND/OR FOR EACH 500 CUBIC YARDS OF FILL PLACED.
10. CUT SLOPES SHALL NOT EXCEED A GRADE OF 1 ½ HORIZONTAL TO 1 VERTICAL. FILL AND COMBINATION FILL AND CUT SLOPES SHALL NOT EXCEED 2 HORIZONTAL TO 1 VERTICAL. SLOPES OVER THREE FEET IN VERTICAL HEIGHT SHALL BE PLANTED WITH APPROVED PERENNIAL OR TREATED WITH EQUALLY APPROVED EROSION CONTROL MEASURES PRIOR TO FINAL INSPECTION.
11. SURFACE DRAINAGE SHALL BE PROVIDED AT A MINIMUM OF 2% FOR 5 FEET AWAY FROM THE FOUNDATION LINE OR ANY STRUCTURE.
12. ALL TREES THAT ARE TO REMAIN ON SITE SHALL BE TEMPORARILY FENCED AND PROTECTED AROUND THE DRIP LINE DURING GRADING.
13. AN EROSION AND SEDIMENT CONTROL PLAN SHALL BE REQUIRED AS PART OF THE GRADING PLAN AND PERMIT REQUIREMENTS.
14. 'BEST MANAGEMENT PRACTICES FOR CONSTRUCTION ACTIVITIES: ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ONSITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEET FLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES, OR WIND. STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM. EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO PUBLIC WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS MUST BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED AS A SOLID WASTE. TRASH AND CONSTRUCTION RELATED SOLID WASTE MUST BE DEPOSITED INTO A COVERED WASTE RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND. SEDIMENTS AND OTHER MATERIAL MAY NOT BE TRACKED FROM TO THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITION MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED SO AS TO MINIMIZE EROSION BY WIND AND WATER.'
15. IF GRADING OCCURS DURING NOV 1 THROUGH APR 15, NO GRADING SHALL OCCUR UNLESS APPROVED EROSION AND SEDIMENT CONTROL MEASURES ARE IN PLACE. DISCHARGES OF SEDIMENT FROM THE PROJECT SITE MAY RESULT IN A STOP WORK ORDER'
16. ALL EARTHWORK ON HILLSIDES, SLOPING OR MOUNTAINOUS TERRAIN SHALL BE STABILIZED TO PROTECT AND PREVENT LOSS OF SOILS, AS NECESSARY, YEAR-ROUND.

EARTHWORK ESTIMATES:
EXCAVATION: 172 CUBIC YARDS; IMPORT: 0 CUBIC YARDS; EXPORT: 172 CUBIC YARDS; FILL: 0 CUBIC YARDS

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL YARD DIVISION & IRC ADA PARKING PROJECT

4436 Calle Real
Santa Barbara, CA 93110

SANTA BARBARA COUNTY

WILLDAN
2374 Poli Street, Suite 101, Ventura, California 93001
805/653-6997 fax 805/754-2067

REGISTERED PROFESSIONAL ENGINEER TYRONE PETER NO. 81888 CIVIL ENGINEER STATE OF CALIFORNIA

CONSULTANT
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Sacramento, CA 95811
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916.329.4000

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

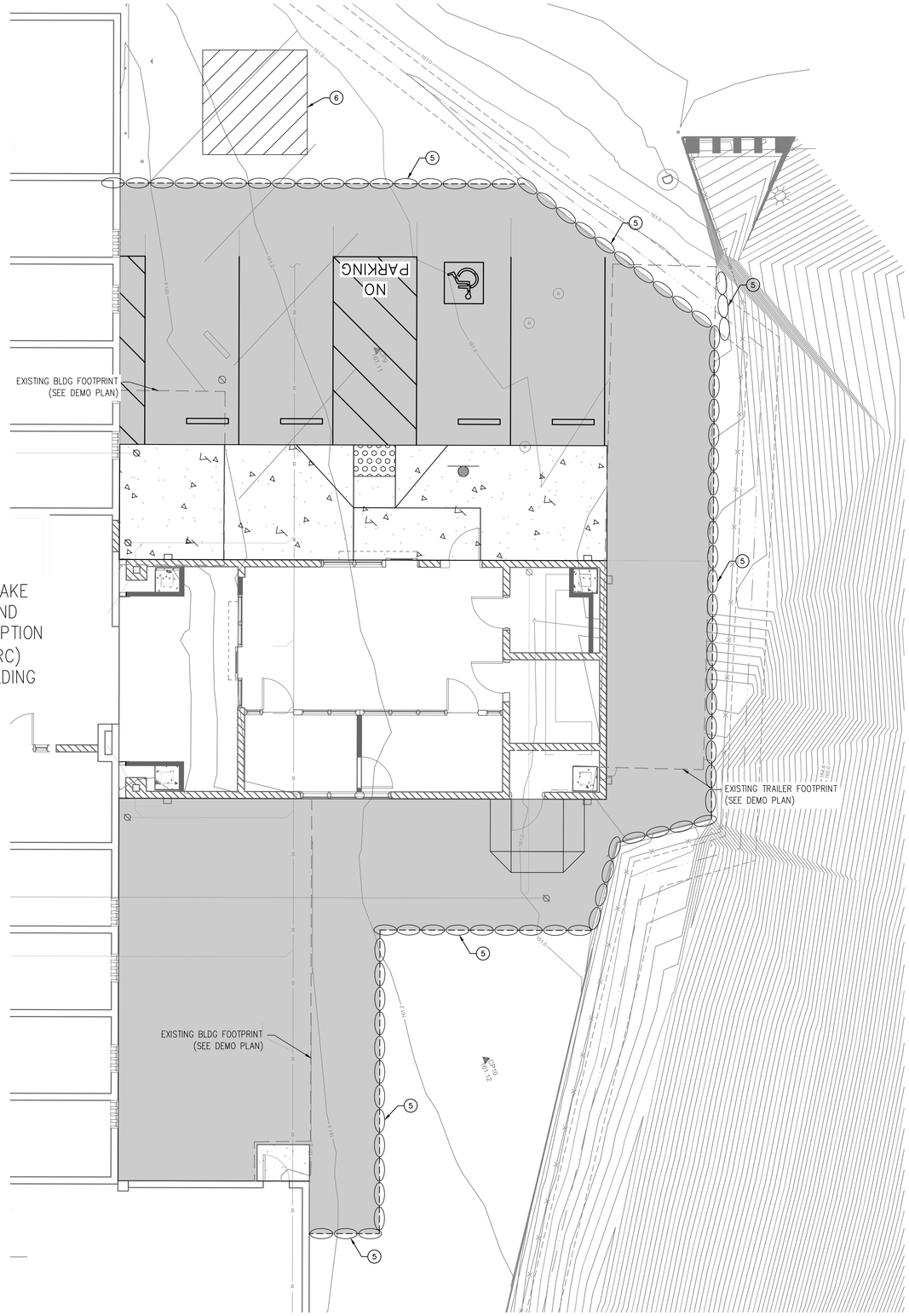
SHEET TITLE

ADA PARKING PLAN

SHEET NO.

C101

ONE INCH = ONE FOOT
ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



CONSTRUCTION NOTES

(5) INSTALL SAND BAGS PER CASQA BMP SE-8

(6) INSTALL CONCRETE WASTE MANAGEMENT PER CASQA BMP WM-8

(P) PROTECT IN PLACE

LEGEND

SAND BAG BARRIER

CONCRETE WASTE MANAGEMENT

EROSION AND SEDIMENT CONTROL NOTES

1. THE CONTRACTOR SHALL TAKE ALL NECESSARY AND PROPER PRECAUTIONS TO PROTECT ADJACENT PROPERTIES FROM ANY AND ALL DAMAGE THAT MAY OCCUR FROM STORM WATER RUNOFF AND/OR DEPOSITION OF DEBRIS RESULTING FROM ANY AND ALL WORK IN CONNECTION WITH CONSTRUCTION ACTIVITIES.
2. THE CONTRACTOR SHALL PREPARE A WET WEATHER EROSION CONTROL PLAN DELINEATING BMPS TO BE INSTALLED PER NPDES, SWPPP, SUSMP, AND LID LOCAL, STATE, AND FEDERAL REGULATIONS TO BE APPROVED BY THE COUNTY PRIOR TO THE START OF CONSTRUCTION.
3. ERODED SEDIMENTS AND OTHER POLLUTANTS SHALL BE RETAINED ON SITE AND SHALL NOT BE ALLOWED TO LEAVE THE SITE VIA SHEET FLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES, OR WIND.
4. STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIAL SHALL BE PROTECTED FROM LEAVING THE SITE BY THE FORCES OF WIND OR WATER.
5. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS SHALL BE STORED IN ACCORDANCE WITH THEIR LISTING AND SHALL NOT CONTAMINATE THE SOIL SURFACE WATERS.
6. SPILLS SHALL BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS SHALL NOT BE WASHED INTO THE DRAINAGE SYSTEM. EXCESS OR WASTE CONCRETE SHALL NOT BE WASHED INTO THE PUBLIC RIGHT OF WAY OR ANY OTHER DRAINAGE.
7. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE. TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND. SEDIMENTS AND OTHER MATERIALS SHALL NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC.
8. THE CONSTRUCTION ENTRANCE ROADWAYS SHALL BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS SHALL BE SWEPT UP IMMEDIATELY AND SHALL NOT BE WASHED DOWN BY RAIN OR OTHER MEANS. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED AS TO INHIBIT EROSION BY WIND AND WATER.
9. THE FOLLOWING BMP'S AS OUTLINED IN, BUT NOT LIMITED TO, THE CALIFORNIA STORM WATER BEST MANAGEMENT PRACTICE HANDBOOK, CALIFORNIA STORM WAGTER QUALITY TASK FORCE, SACRAMENTO, CALIFORNIA, THE LATEST REVISED EDITION MAY APPLY DURING CONSTRUCTION (ADDITIONAL MEASURES MAY BE REQUIRED IF DEEMED APPROPRIATE BY THE INSPECTOR):

SE-8: SANDBAG BARRIER
WM-1: MATERIAL DELIVERY
WM-2: MATERIAL USE
WM-3: STOCKPILE MANAGEMENT
WM-4: SPILL PREVENTION AND CONTROL
WM-5: SOLID WASTE MANAGEMENT
WM-8: CONCRETE WASTE MANAGEMENT
NS-9: VEHICLE AND EQUIPMENT FUELING
NS-10: VEHICLE AND EQUIPMENT MAINTENANCE
SS-1: SCHEDULING
SS-7: STREET SWEEPING
SS-7: TEMPORARY COVER (GEOTEXTILES AND MATS)
SS-10: STORM DRAIN INLET PROTECTION (COVER ALL DOWNSTREAM CATCH BASINS NOT SHOWN IN DRAWING)
NS-6: ILLICIT/ILLEGAL DISCHARGE CONNECTION
NS-12: CONCRETE CURING
NS-14: CONCRETE FINISHING

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
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ONE INCH = TWENTY FEET

AGENCY APPROVAL

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SHEET TITLE

EROSION AND SEDIMENT CONTROL PLAN

SHEET NO.

C102

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET

TYPICAL GRID CONFIGURATION FOR SHEETS WITH GRIDS

30	25	20	15	10	5
29	24	19	14	9	4
28	23	18	13	8	3
27	22	17	12	7	2
26	21	16	11	6	1

SYMBOLS LIST

SEE INDIVIDUAL SHEETS FOR ADDITIONAL SHEET SPECIFIC SYMBOLS/ LEGENDS NOW INDICATED HERE

ROOM IDENTIFICATION — ROOM NAME / 101 — ROOM NUMBER

COLUMN GRID — 1 / A

BUILDING SECTION — 1 / A400 — SECTION NUMBER / SHEET NUMBER

WALL SECTION — 1 / A410 — SECTION NUMBER / SHEET NUMBER

DETAIL — 1 / A101 — DETAIL NUMBER / SHEET NUMBER

CASEWORK REFERENCE — WI212 — WIC IDENTIFICATION; 2'-6" W — WIDTH; 30" D — DEPTH

INTERIOR ELEVATION — 1A / 1B / A550 / 1D / 1C — ELEVATION NUMBER / SHEET NUMBER

EXTERIOR BUILDING ELEVATION — 1A / A300 — ELEVATION NUMBER / SHEET NUMBER

OPENING INDICATION — 101 DOOR; W01 WINDOW; L01 LOUVER

MATCH LINE

DATUM WORK POINT OR CONTROL POINT

DIMENSION MARKS

REVISION — 1

NORTH INDICATION — N — TRUE NORTH

CEILING HEIGHTS — ROOM NAME / 101 / 10' - 0"

KEYNOTE — 1

EQUIPMENT — U*

C.F.C.I.

O.F.C.I.

O.F.O.I.

FIRE RESISTIVE RATING INDICATION

1-HR FIRE BARRIER

2-HR FIRE BARRIER

3-HR FIRE BARRIER

MATERIAL DESIGNATIONS

METAL

PLYWD

GYPSUM BOARD

EARTH

CONCRETE

CONCRETE BLOCK

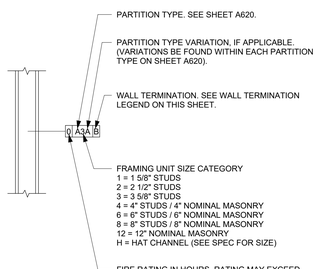
RIGID INSULATION

WOOD, FINISH

WOOD FRAMING, THROUGH MEMBER

WOOD FRAMING, INTERRUPTED MEMBER

WALL TAG SYMBOL LEGEND



PARTITION TYPE. SEE SHEET A620.

PARTITION TYPE VARIATION, IF APPLICABLE. (VARIATIONS BE FOUND WITHIN EACH PARTITION TYPE ON SHEET A620).

WALL TERMINATION. SEE WALL TERMINATION LEGEND ON THIS SHEET.

FRAMING UNIT SIZE CATEGORY
1 = 1 5/8" STUDS
2 = 2 1/2" STUDS
3 = 3 5/8" STUDS
4 = 4" STUDS / 4" NOMINAL MASONRY
6 = 6" STUDS / 6" NOMINAL MASONRY
8 = 8" STUDS / 8" NOMINAL MASONRY
12 = 12" NOMINAL MASONRY
H = HAT CHANNEL (SEE SPEC FOR SIZE)

FIRE RATING IN HOURS. RATING MAY EXCEED RATING REQUIRED BY CODE.

ABBREVIATIONS

&	AND
L	ANGLE
@	AT
DIA	DIAMETER
#	NUMBER
(E)	EXISTING
(N)	NEW
d	PENNY
PL	PLATE
AC	ASPHALT CONCRETE
A.D.	AREA DRAIN
ADJ.	ADJUSTABLE
A.F.F.	ABOVE FINISHED FLOOR
AGGR.	AGGREGATE
AHJ	AUTHORITY HAVING JURISDICTION
ALD	ASSISTIVE LISTENING DEVICE
ALUM.	ALUMINUM
APPROX.	APPROXIMATE
ARCH.	ARCHITECTURAL
ASCB	ACCESSIBLE
BD.	BOARD
BITUM.	BITUMINOUS
BLDG.	BUILDING
BLKG.	BLOCKING
BM.	BEAM
B.N.	BULLNOSE
BOTT.	BOTTOM
B.U.	BUILT-UP
C.B.	CATCH BASIN
CEM.	CEMENT
C.E.P.S.	CEMENTICIOUS EXTERIOR PLASTER SYSTEM
CER.	CERAMIC
C.F.C.I.	CONTRACTOR FURNISHED CONTRACTOR INSTALLED
C.I.	CAST IRON
C.J.	CONSTRUCTION JOINT
CLKG	CAULKING
CLNG.	CEILING
CLR.	CLEAR
C.M.T.	CERAMIC MOSAIC TILE
C.M.U.	CONCRETE MASONRY UNIT
CNTR.	COUNTER
C.O.	CLEAN OUT
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTOR
CONSTR.	CONSTRUCTION
CONT.	CONTINUOUS
C.T.	CERAMIC TILE
CTSK.	COUNTERSINK
D.A.	DISABLED ACCESSIBLE
DBL.	DOUBLE
DIM.	DIMENSION
DN.	DOWN
D.O.	DOOR OPENING
DR.	DOOR
DRW.	DRAWER
DS.	DOWNSPOUT
DTL.	DETAIL
DWG.	DRAWING
EA.	EACH
E.J.	EXPANSION JOINT
EL.	ELEVATION
ELEC.	ELECTRICAL
ENCL.	ENCLOSURE
E.O.	EDGE OF
E.P.S.	(CEMENTICIOUS) EXTERIOR PLASTER SYSTEM
EQ.	EQUAL
EXP.	EXPOSED
EXT.	EXTERIOR
F.A.I.	FOR ADDITIONAL INFORMATION
F.D.	FLOOR DRAIN
FF	FACTORY FINISH
FIN.	FINISH
FL.	FLOOR
FLASH.	FLASHING
FLUOR.	FLUORESCENT
F.O.	FACE OF
F.O.F.	FACE OF FINISH
F.O.S.	FACE OF STUDS
FT.	FOOT/FEET
FTG.	FOOTING
FURR.	FURRING
FUT.	FUTURE
GA.	GAUGE
GALV.	GALVANIZED
G.B.	GRAB BAR
G.I.	GALVANIZED IRON
GL.	GLASS
GND.	GROUND
GRD.	GRADE
GYP.	GYPSUM
H.	HEIGHT
H.C.	HOLLOW CORE
HDWD.	HARDWOOD
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
HR.	HOUR
I.D.	INSIDE DIAMETER
INSUL.	INSULATION
INT.	INTERIOR
JT.	JOINT
K.S.	KNEE SPACE
LAM.	LAMINATE
LAV.	LAVATORY
MAX.	MAXIMUM
M.B.	MACHINE BOLT
M.C.	MEDICINE CABINET
MECH.	MECHANICAL
MED.	MEDIUM
MEMB.	MEMBRANE
MFR.	MANUFACTURER
MIN.	MINIMUM
MIR.	MIRROR
MISC.	MISCELLANEOUS
M.O.	MASONRY OPENING
MTD.	MOUNTED
MTL.	METAL
MUL.	MULLION
N.	NORTH
N.I.C.	NOT INCLUDED IN CONTRACT
NLR.	NAILER
NO.	NUMBER
NOM.	NOMINAL
N.T.S.	NOT TO SCALE
OA.	OVERALL
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
OP. H.	OPPOSITE HANDED
O.F.C.I.	OWNER FURNISHED CONTRACTOR INSTALLED
O.F.O.I.	OWNER FURNISHED OWNER INSTALLED
OPNG.	OPENING
OPP.	OPPOSITE
PLAS.	PLASTIC
PLAM.	PLASTIC LAMINATE
PLYWD.	PLYWOOD
PM	PRESSED METAL
PNL	PANEL
PRECST.	PRECAST
P.T.	PRESSURE TREATED
PTN.	PARTITION
Q.T.	QUARRY TILE
R.A.	RETURN AIR
RCMD.	RECOMMENDATION
R.D.	ROOF DRAIN
REINF.	REINFORCING
REQ'D.	REQUIRED
REQ'S	REQUIREMENTS
RESIL.	RESILIENT
R.O.	ROUGH OPENING
RWD.	REDWOOD
RWL	RAIN WATER LEADER
S	SOUTH
SWR.	SHOWER
SHT.	SHEET
SIM.	SIMILAR
S.M.S.	SHEET METAL SCREW
SQ.	SQUARE
S.S.	STAINLESS STEEL
STD.	STANDARD
STL.	STEEL
STN	STAIN
STOR.	STORAGE
STRUCT.	STRUCTURAL
SUSP.	SUSPENDED
SYM.	SYMMETRICAL
T&G	TONGUE & GROOVE
TEL.	TELEPHONE
THK.	THICK
T.O.C.	TOP OF CURB
T.O.M.	TOP OF MASONRY
T.O.S.	TOP OF STEEL
TYP.	TYPICAL
U/C	UNDERCOUNTER
UNF.	UNFINISHED
U.N.O.	UNLESS NOTED OTHERWISE
U.S.	UNDERSIDE
VERT.	VERTICAL
V.I.F.	VERIFY IN FIELD
W/	WITH
W / E	WEST / EAST
W/O	WITHOUT
W.C.	WATER CLOSET
WD.	WOOD
W.O.	WHERE OCCURS
WP.	WATERPROOF
WR.	WATER RESISTANT
W.S.	WEATHER STRIP
W.W.F.	WELDED WIRE FABRIC

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

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SANTA BARBARA COUNTY

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CALIFORNIA BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS — No. 9/25272 — May 31, 2027

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

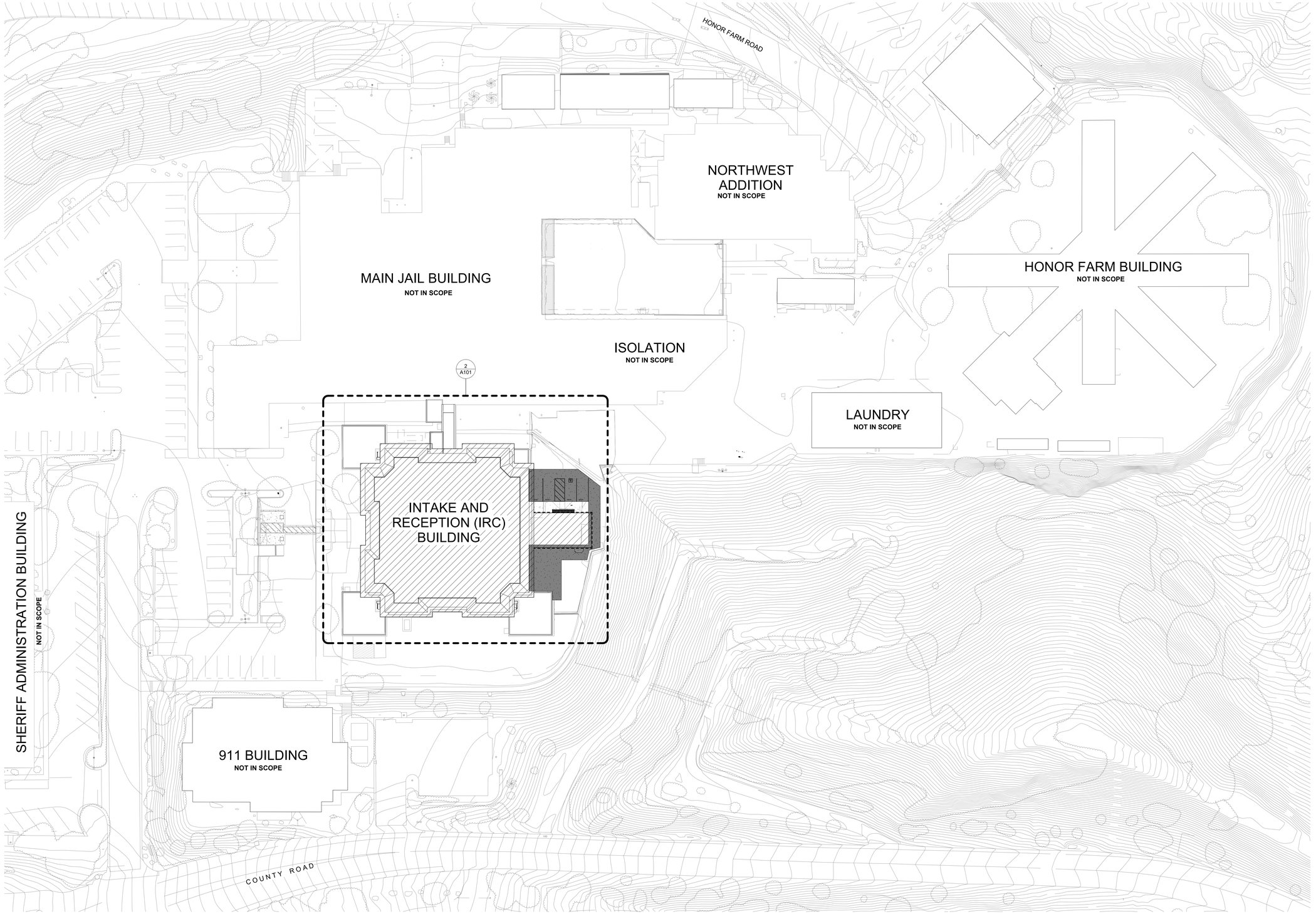
SHEET TITLE

ARCHITECTURAL SYMBOLS, LEGENDS AND NOTES

SHEET NO.

A000

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



26 SITE PLAN
1" = 30'-0"

N

LEGEND:

- AREA OF WORK
- NEW ASPHALT DRIVE, SEE CIVIL DRAWINGS
- CONCRETE WALK OR PLAZA, SEE CIVIL DRAWINGS FOR SLOPES

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REGISTERED ARCHITECT
No. C-25272
May 31, 2027

ARCHITECT

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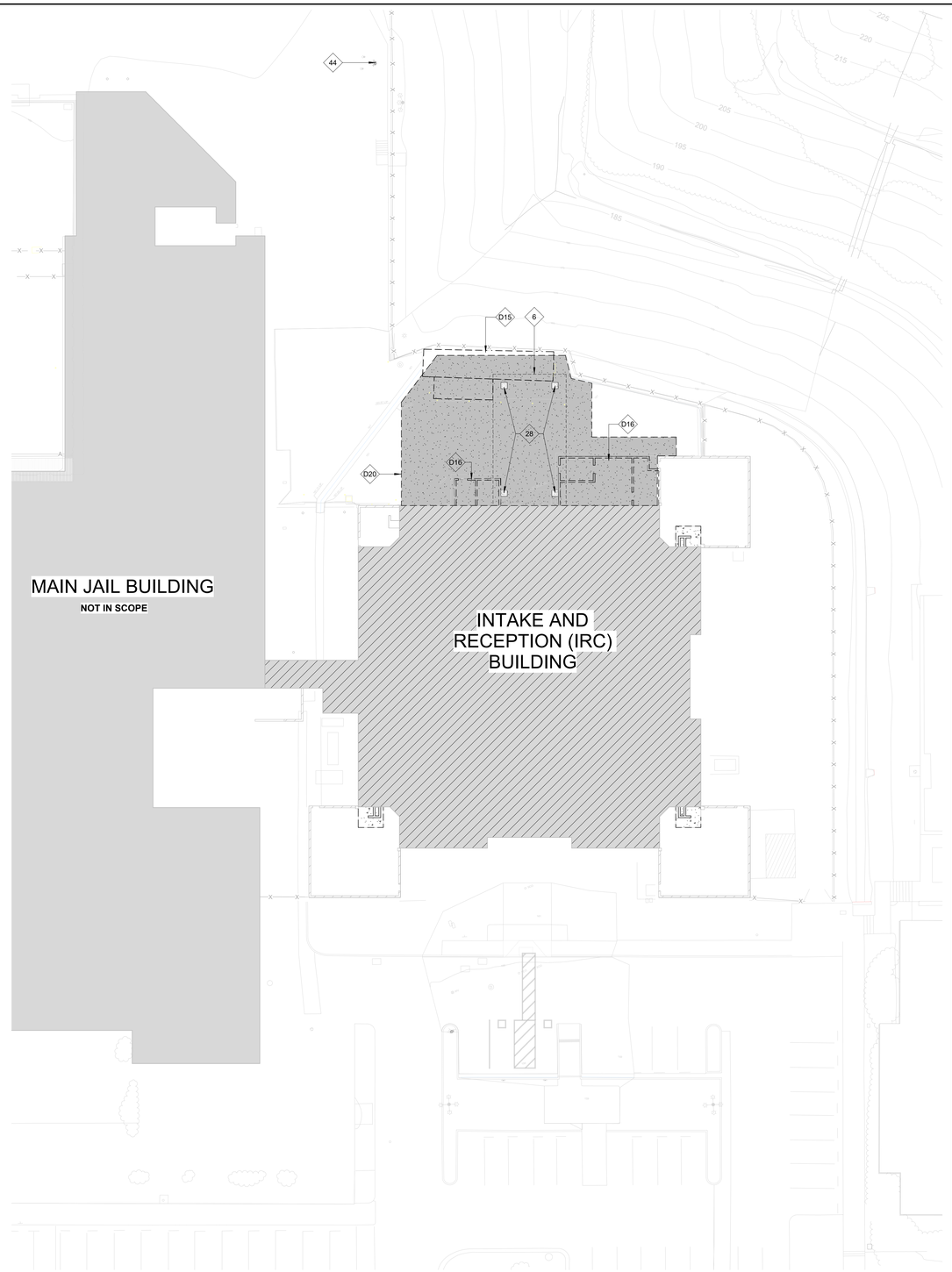
SHEET TITLE

OVERALL SITE PLAN

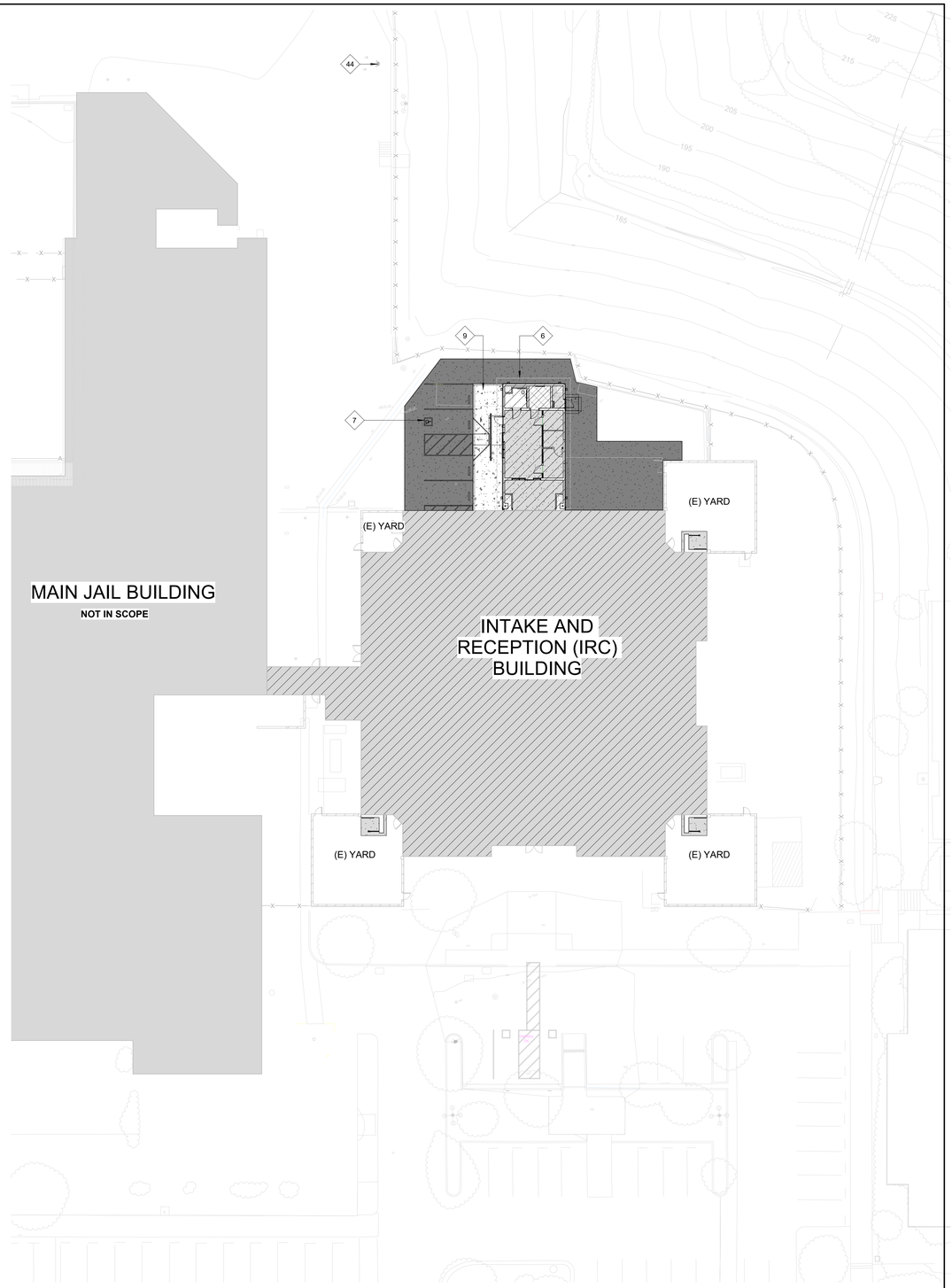
SHEET NO.

A100

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



1 DEMOLITION SITE PLAN
1" = 20'-0"



2 PROPOSED SITE PLAN
1" = 20'-0"

KEYNOTES:

THESE KEYNOTES APPLY TO THIS SHEET ONLY

DEMOLITION KEYNOTES

D15 DEMOLISH (E) TRAILER AND COVERED RAMP

D16 DEMOLISH (E) BUILDING - SEE DEMO PLAN F.A.I.

D20 DEMOLISH (E) ASPHALT PAVING, CONCRETE SLABS, CURBS AND FOOTINGS (WHERE OCCURS) - SEE CIVIL SHEETS F.A.I.

NEW CONSTRUCTION KEYNOTES

6 (E) ROOF ABOVE

7 NEW ACCESSIBLE PARKING AND ACCESS AISLE STRIPING - SEE CIVIL SHEETS F.A.I.

9 NEW CONCRETE FLATWORK WITH CURBCUT - SEE CIVIL SHEETS F.A.I.

28 (E) CONCRETE PEDESTAL TO REMAIN - PROTECT IN PLACE

44 (E) FIRE HYDRANT

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR BUILDING EXPANSION AND WORK WITHIN EXISTING IRC SEE FLOOR PLANS A111D AND A111.
2. SEE CIVIL DRAWINGS FOR SCOPE OF PAVING, T.O. CONCRETE ELEVATIONS, AND NEW PAVING ELEVATIONS.

LEGEND:

(N) BUILDING ADDITION UNDER (E) CANOPY

(E) BUILDING

(E) ASPHALT PAVING TO BE REMOVED - SEE CIVIL DWGS FOR FULL SCOPE OF PAVING DEMOLITION

(N) ASPHALT PAVING - SEE CIVIL DWGS FOR FULL SCOPE OF PAVING REPLACEMENT

(N) CONCRETE WALKWAY - SEE CIVIL DWGS FOR FULL SCOPE

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SHEET TITLE

ENLARGED SITE PLAN - DEMO AND PROPOSED

SHEET NO.

A101

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ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

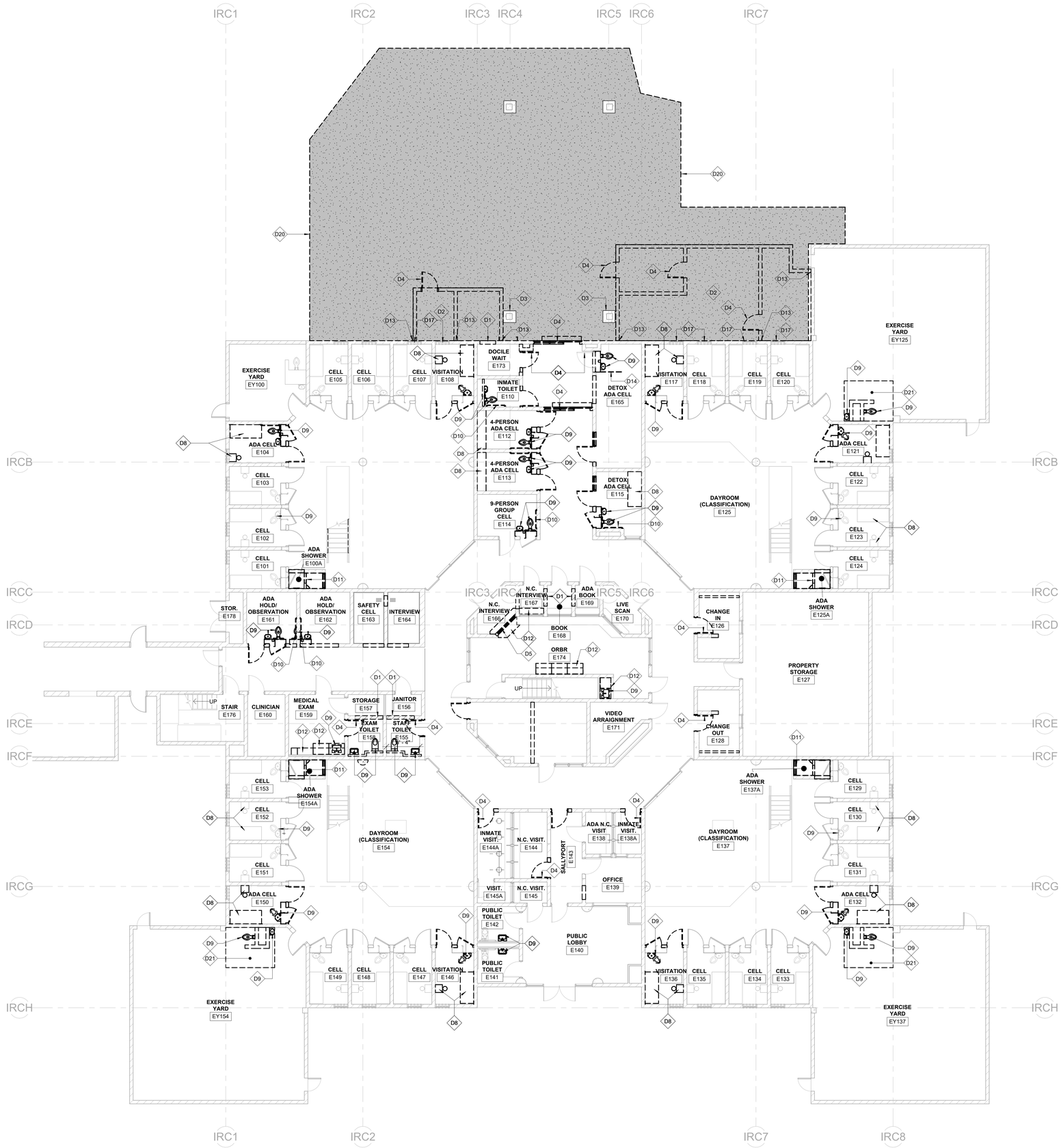
ONE-HALF INCH = ONE FOOT

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ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET



26 DEMOLITION FLOOR PLAN

1/8" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. WHERE DEMOLITION IS CALLED OUT FOR THE CREATION OF A NEW DOOR OR WINDOW OPENING - SEE FLOOR PLAN A111 FOR (N) OPENING CALLOUT

KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
D1	DEMOLISH PORTION OF (E) WALL TO CREATE OPENING FOR (N) DOOR/WINDOW - SEE PLAN F.A.I.
D2	DEMOLISH (E) FLOOR SLAB & PREPARE FOR (N) ASPHALT PAVING
D3	PROTECT AND PRESERVE (E) CONCRETE PILASTER
D4	DEMOLISH (E) DOOR ASSEMBLY
D5	DEMOLISH (E) WINDOW
D8	DEMOLISH (E) FURNITURE
D9	DEMOLISH (E) PLUMBING FIXTURE - SEE PLUMBING SHEETS F.A.I.
D10	DEMOLISH (E) GRAB BARS
D11	DEMOLISH (E) SHOWER ENCLOSURE AND CURB - SEE PLUMBING SHEETS F.A.I.
D12	DEMOLISH (E) CASEWORK
D13	PATCH AND REPAIR (E) WALL TO MATCH ADJACENT FINISH
D14	DEMOLISH (E) PRIVACY PARTITION
D17	REMOVE PAINT FROM GLAZING ON (E) WINDOWS AND PREP. EXTERIOR FRAMES FOR PAINT
D20	DEMOLISH (E) ASPHALT PAVING, CONCRETE SLABS, CURBS AND FOOTINGS (WHERE OCCURS) - SEE CIVIL SHEETS F.A.I.
D21	DEMOLISH (E) CONCRETE SLAB, CONTRACTOR TO VERIFY REQUIRED BOUNDARY

LEGEND:

PORTION OF WALL TO BE DEMOLISHED

(E) WALL TO REMAIN

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

CONSULTANT

nacht&lewis

600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

No. C-25272
May 31, 2027

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REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

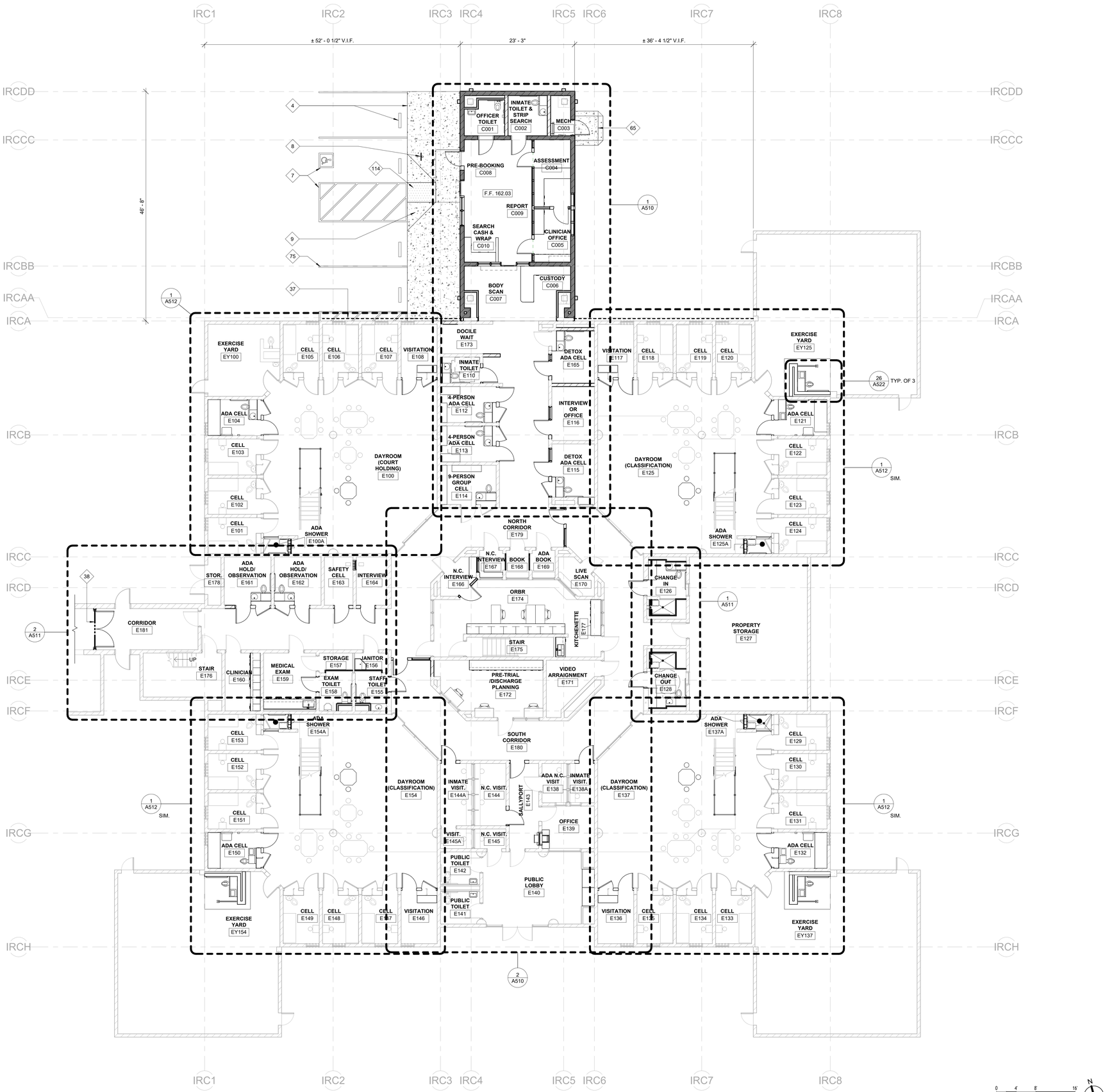
JOB NO. Y2213.00

SHEET TITLE

DEMOLITION FLOOR PLAN - GROUND LEVEL

SHEET NO.

A111D



26 INTAKE RECEPTION CENTER NEW WORK FLOOR PLAN

1/8" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. OVERALL DIMENSIONS PROVIDED TO LOCATE EXTERIOR ENVELOPE FOR BUILDING ADDITION. SEE ENLARGED PLANS FOR ADDITIONAL DIMENSIONS.
3. ALL DOORS NOT LOCATED BY DIMENSIONS ON PLANS OR DETAILS SHALL BE 4" FROM FINISH WALL TO DOOR BUCK.
4. ALL DIMENSIONS ARE GIVEN FROM FACE OF STRUCTURE (CONCRETE, BLOCK, STUD) OR CENTERLINE OF PARTITION UNLESS OTHERWISE NOTED.

KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
4	NEW STRIPING AND WHEEL STOPS - SEE CIVIL SHEETS F.A.I.
7	NEW ACCESSIBLE PARKING AND ACCESS AISLE STRIPING - SEE CIVIL SHEETS F.A.I.
8	NEW ACCESSIBLE PARKING SIGNAGE - SEE CIVIL SHEETS F.A.I.
9	NEW CONCRETE FLATWORK WITH CURBCUT - SEE CIVIL SHEETS F.A.I.
37	PATCH AND REPAIR FINISH TO MATCH EXISTING WALL
38	3-HR RATED FIRE WALL - SEE DETAIL 8/A640
65	NEW CONCRETE LANDING RAMP - SEE CIVIL SHEETS F.A.I.
75	CONCRETE FOOTING - SEE STRUCTURAL SHEETS F.A.I.
114	TRUNCATED DOMES

LEGEND:

(N) 10" CMU WALL - SEE STRUCTURAL F.A.I.

(N) 8" CMU WALL - SEE STRUCTURAL F.A.I.

(N) METAL STUD WALL - SEE STRUCTURAL F.A.I.

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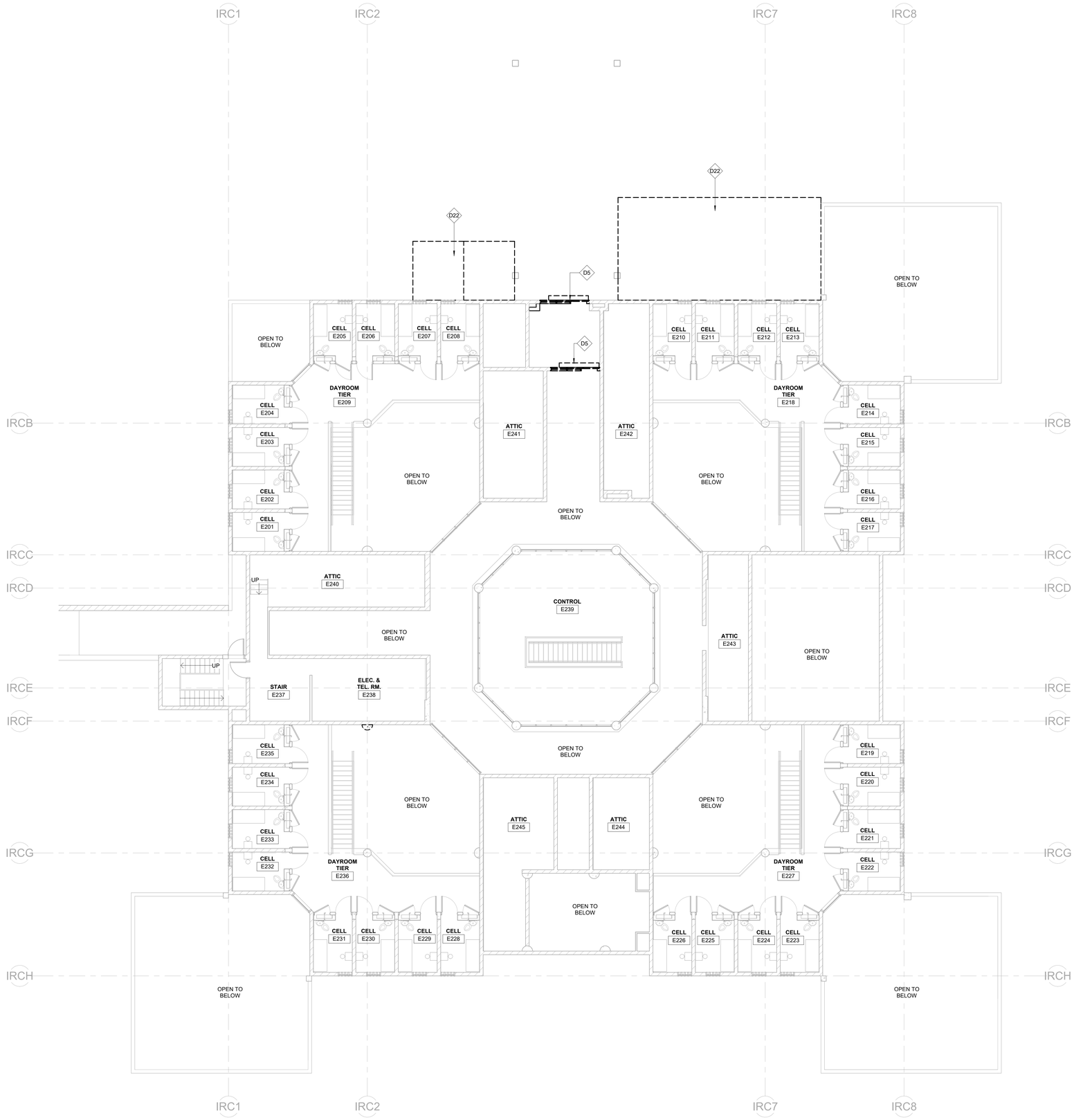
FLOOR PLAN - GROUND LEVEL

SHEET NO.

A111

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



26 DEMOLITION TIER LEVEL FLOOR PLAN

1/8" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. WHERE DEMOLITION IS CALLED OUT FOR THE CREATION OF A NEW DOOR OR WINDOW OPENING - SEE FLOOR PLAN A111 FOR (N) OPENING CALLOUT

KEYNOTES:

(#) THESE KEYNOTES APPLY TO THIS SHEET ONLY

D5 DEMOLISH (E) WINDOW

D22 DEMOLISH (E) BUILDING ROOF

LEGEND:

PORTION OF WALL TO BE DEMOLISHED

(E) WALL TO REMAIN

AGENCY APPROVAL

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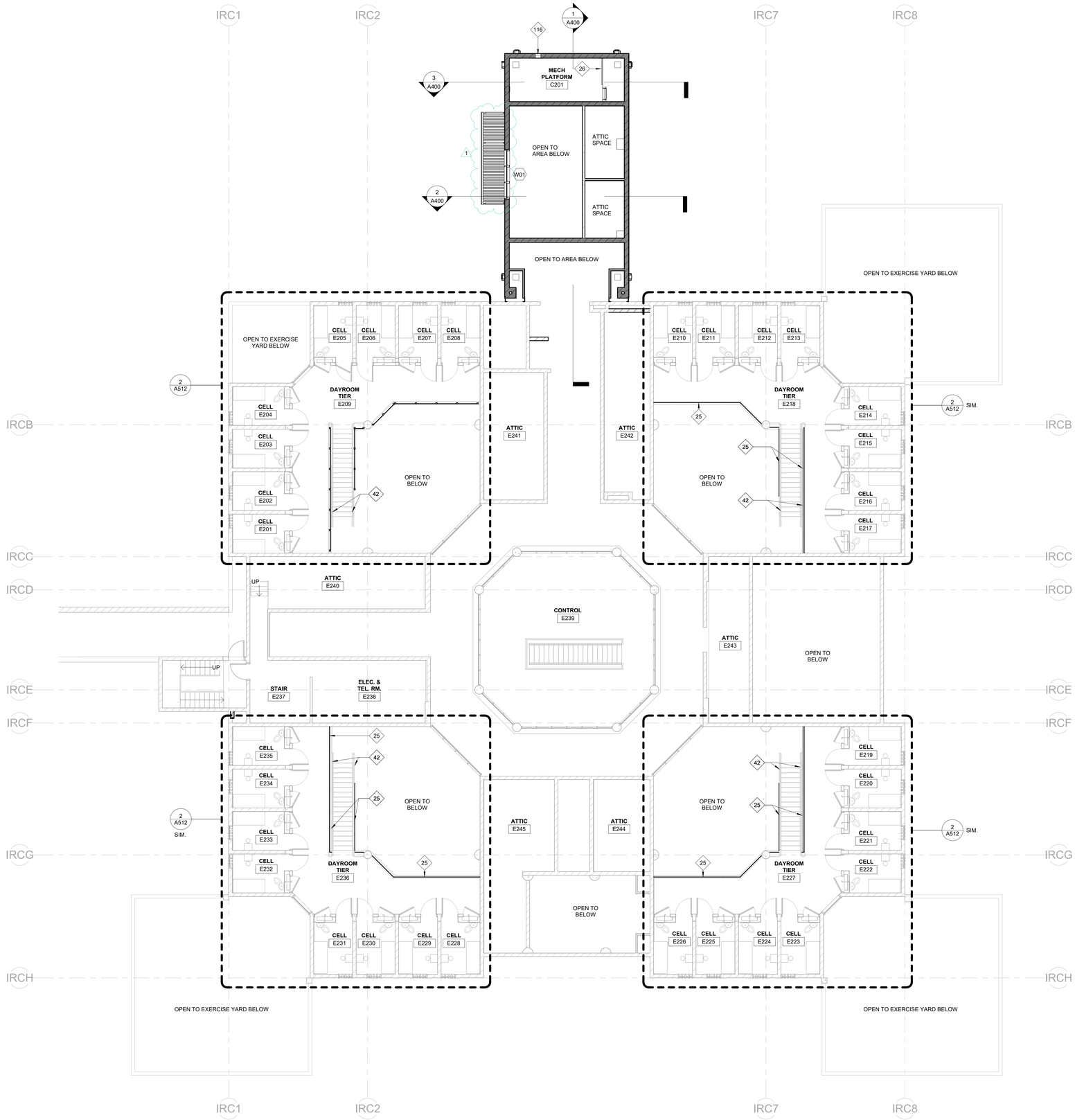
SHEET TITLE

DEMOLITION FLOOR PLAN - TIER LEVEL

SHEET NO.

A112D

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



26 TIER LEVEL FLOOR PLAN
1/8" = 1'-0"

0 4' 8' 16'
0 2'
1/8" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. OVERALL DIMENSIONS PROVIDED TO LOCATE EXTERIOR ENVELOPE FOR BUILDING ADDITION. SEE ENLARGED PLANS FOR ADDITIONAL DIMENSIONS.
3. ALL DOORS NOT LOCATED BY DIMENSIONS ON PLANS OR DETAILS SHALL BE 4" FROM FINISH WALL TO DOOR BUCK.
4. ALL DIMENSIONS ARE GIVEN FROM FACE OF STRUCTURE (CONCRETE, BLOCK, STUD) OR CENTERLINE OF PARTITION UNLESS OTHERWISE NOTED.

KEYNOTES:

THESE KEYNOTES APPLY TO THIS SHEET ONLY

25 SECURITY MESH PANELS (BID ALTERNATE 1) - SEE SHEET A420
26 DECK MOUNTED GUARDRAIL - SEE DETAILS 7 & 8/A641
42 (E) GUARDRAIL WITH HANDRAIL TO REMAIN - PROTECT IN PLACE
116 EXHAUST LOUVER, SEE ELEVATION

LEGEND:

(N) 10" CMU WALL - SEE STRUCTURAL F.A.I.
(N) 8" CMU WALL - SEE STRUCTURAL F.A.I.
(N) METAL STUD WALL - SEE STRUCTURAL F.A.I.

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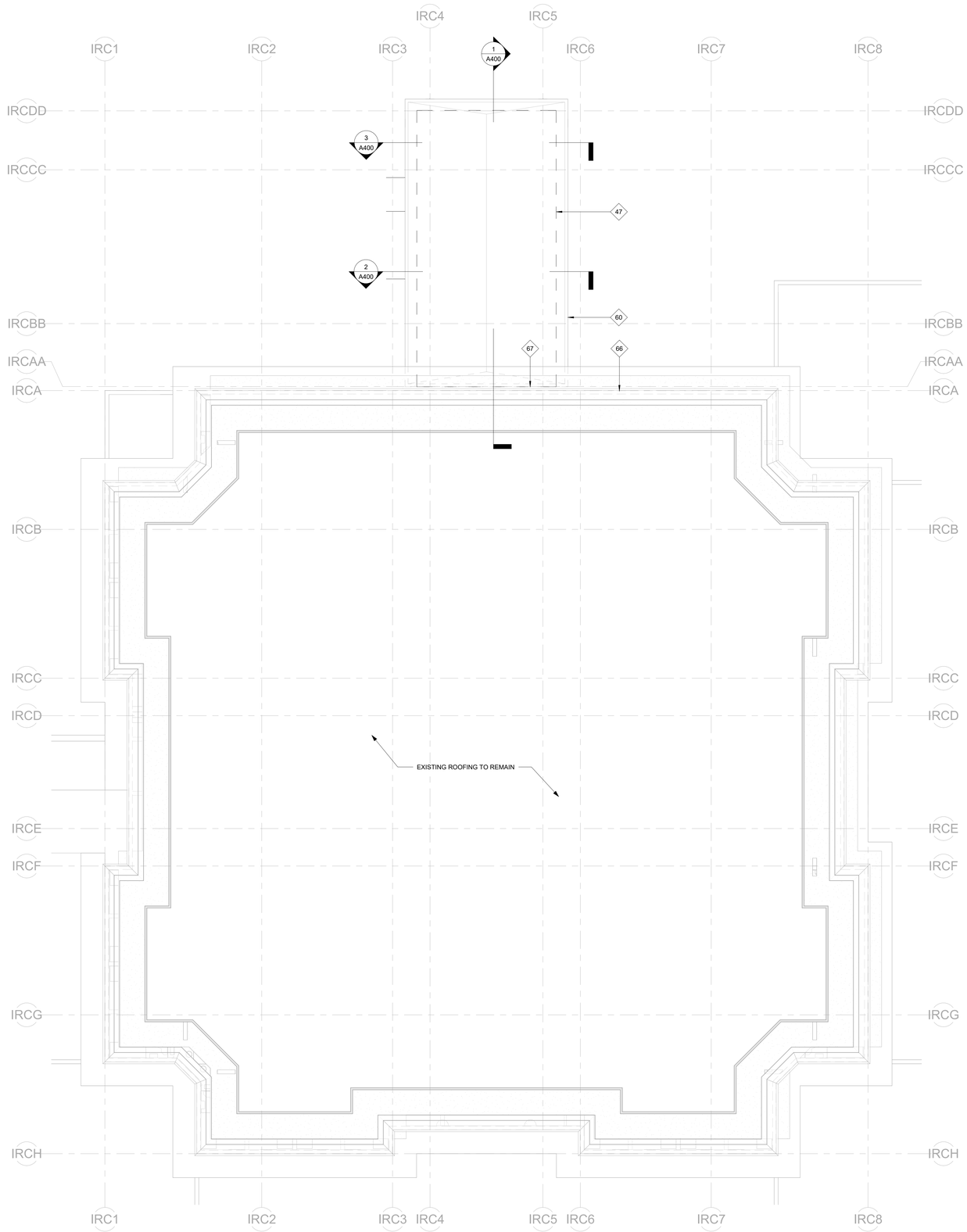
NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25
JOB NO. Y2213.00
SHEET TITLE

FLOOR PLAN - TIER LEVEL

SHEET NO.

A112



26 ROOF PLAN NEW WORK

1/8" = 1'-0"

0 4' 8' 16'
0 2'
1/8" = 1'-0"

N

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. EXISTING ROOF TO REMAIN AND IS SHOWN FOR REFERENCE PURPOSES ONLY. THERE IS NO ROOF SCOPE IN THIS PROJECT.

KEYNOTES:

(#) THESE KEYNOTES APPLY TO THIS SHEET ONLY

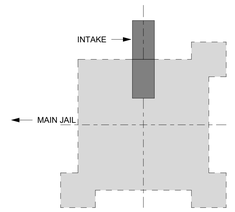
47 CONCRETE MASONRY UNIT WALL - SEE STRUCTURAL SHEETS F.A.I.

60 (E) ROOF CANOPY BELOW TO REMAIN - PROTECT IN PLACE

66 (E) WALL BELOW

67 (E) EXPANSION JOINT COVER AT CANOPY ROOF BELOW - PROTECT IN PLACE

KEYPLAN:



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No. C-25272 May 31, 2021

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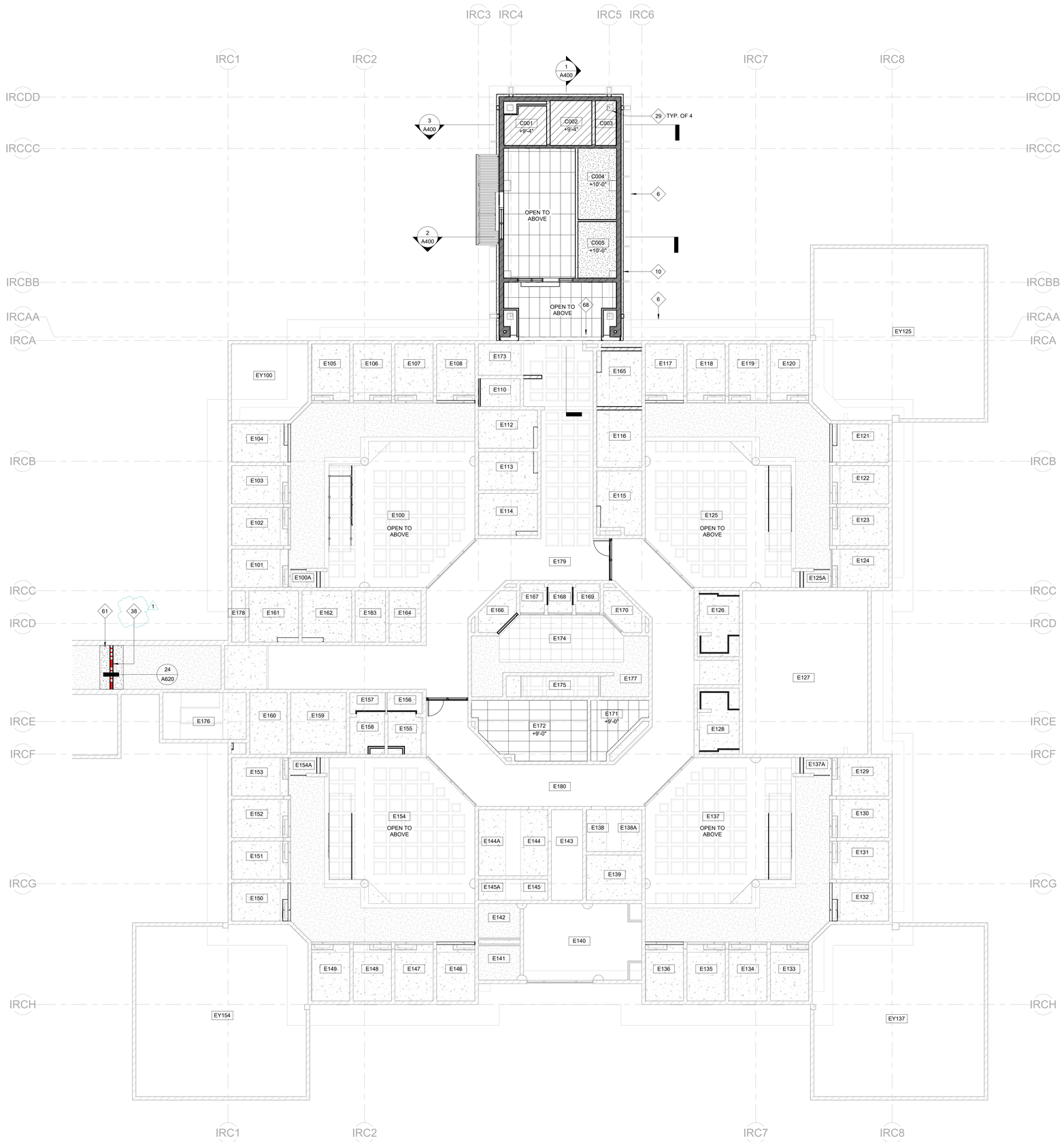
JOB NO. Y2213.00

SHEET TITLE

ROOF PLAN

SHEET NO.

A121



26 REFLECTED CEILING PLAN

1/8" = 1'-0"

0 4' 8' 16'
0 2'
1/8" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. SEE SHEET G111 FOR GENERAL NOTES AND SCOPE FO WORK THAT MAY NOT BE COMPLETELY IDENTIFIED ON THIS SHEET.
2. REFER TO FINISH SCHEDULE FOR ADDITIONAL FINISH INFORMATION
3. ALL CEILING GRIDS ARE CENTERED IN ROOM, U.O.N.
4. ALL CEILINGS TO BE AT +8'-0" A.F.F., TYP. U.O.N.
5. LIGHTS OR DIFFUSERS ARE DIMENSIONED TO CENTER OF FIXTURE U.O.N.
6. THE LOCATION OF AUTOMATIC FIRE SPRINKLERS AND ALL RELATED EQUIPMENT SHOWN ON THE PLAN IS FOR REFERENCE ONLY. ITEMS SHOWN DO NOT CONSTITUTE SCOPE DRAWINGS, WHICH ARE REQUIRED FOR REVIEW AND APPROVAL
7. SEE ELECTRICAL LIGHTING PLAN FOR LIGHTING DESIGNATIONS
8. ALL CEILING HT. DIMENSIONS ARE TAKEN FROM THE FINISH FLOOR U.O.N.
9. SPRAY APPLIED FIREPROOFING PER SPEC SECTION 07 81 00

KEYNOTES:

THESE KEYNOTES APPLY TO THIS SHEET ONLY

6 (E) ROOF ABOVE

10 CEMENT PLASTER FINISH - SEE SPEC 092400

29 (E) STEEL COLUMN TO REMAIN

38 3-HR RATED FIRE WALL - SEE DETAIL 8/A640

61 NEW SUSPENDED PLASTER CEILING TO MATCH (E)

68 NEW EXPANSION JOINT COVER AT CEILING - SEE SPEC SECTION 079513.13 AND DETAIL 18/A650.

LEGEND:

SUSPENDED CEILING W/ ACOUSTICAL LAY-IN PANELS - SEE SHEET A650 FOR SUSPENSION SYSTEM DETAILS. SEE FINISH SCHEDULE FOR ACOUSTICAL TILE TYPE.

EXPOSED TO STRUCTURE.

GYPSUM BOARD CEILING/SOFFIT (PAINTED).

(E) CEILINGS TO REMAIN

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ACCESSIBILITY IMPROVEMENTS

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DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

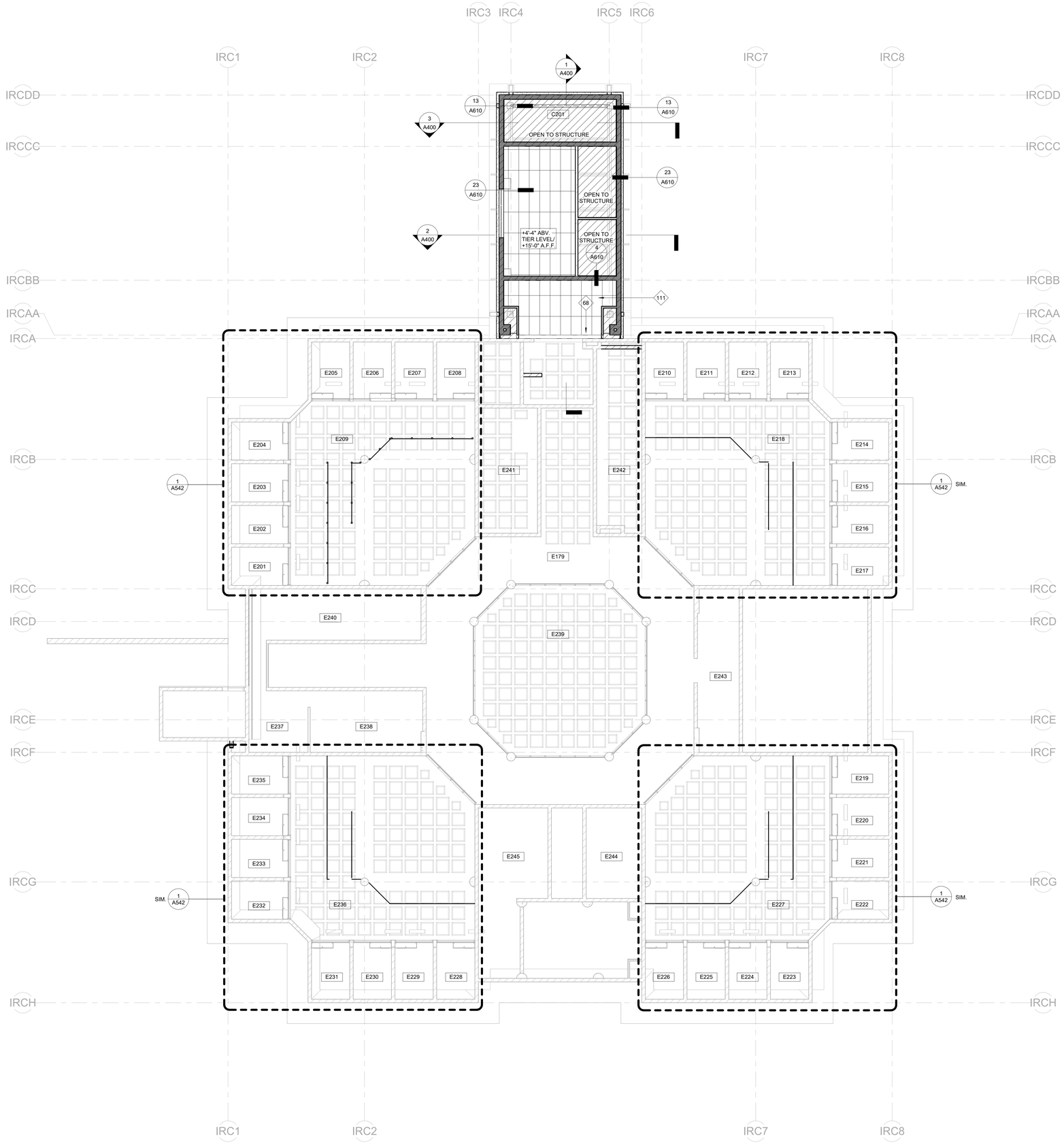
REFLECTED CEILING PLAN - GROUND LEVEL

SHEET NO.

A211

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



1 TIER LEVEL REFLECTED CEILING PLAN

1/8" = 1'-0"

0 4' 8' 16'
0 2'
1/8" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. SEE SHEET G111 FOR GENERAL NOTES AND SCOPE FO WORK THAT MAY NOT BE COMPLETELY IDENTIFIED ON THIS SHEET.
2. REFER TO FINISH SCHEDULE FOR ADDITIONAL FINISH INFORMATION
3. ALL CEILING GRIDS ARE CENTERED IN ROOM, U.O.N.
4. ALL CEILINGS TO BE AT +8'-0" A.F.F., TYP. U.O.N.
5. LIGHTS OR DIFFUSERS ARE DIMENSIONED TO CENTER OF FIXTURE U.O.N.
6. THE LOCATION OF AUTOMATIC FIRE SPRINKLERS AND ALL RELATED EQUIPMENT SHOWN ON THE PLAN IS FOR REFERENCE ONLY. ITEMS SHOWN DO NOT CONSTITUTE SCOPE DRAWINGS, WHICH ARE REQUIRED FOR REVIEW AND APPROVAL
7. SEE ELECTRICAL LIGHTING PLAN FOR LIGHTING DESIGNATIONS
8. ALL CEILING HT. DIMENSIONS ARE TAKEN FROM THE FINISH FLOOR U.O.N.
9. SPRAY APPLIED FIREPROOFING PER SPEC SECTION 07 81 00

KEYNOTES:

THESE KEYNOTES APPLY TO THIS SHEET ONLY

68 NEW EXPANSION JOINT COVER AT CEILING - SEE SPEC SECTION 079513.13 AND DETAIL 18/A650.

111 SPRAY APPLIED FIREPROOFING AT UNDERSIDE OF EXISTING METAL DECK. SEE SHEET NOTE 9 AND DETAIL 4/A610

LEGEND:

SUSPENDED CEILING W/ ACOUSTICAL LAY-IN PANELS - SEE SHEET A650 FOR SUSPENSION SYSTEM DETAILS. SEE FINISH SCHEDULE FOR ACOUSTICAL TILE TYPE.

EXPOSED TO STRUCTURE.

GYPSUM BOARD CEILING/SOFFIT (PAINTED).

(E) CEILINGS TO REMAIN

AGENCY APPROVAL

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REGISTERED ARCHITECT PAUL PHILLIPS No. C25272 Date May 31, 2025 STATE OF CALIFORNIA

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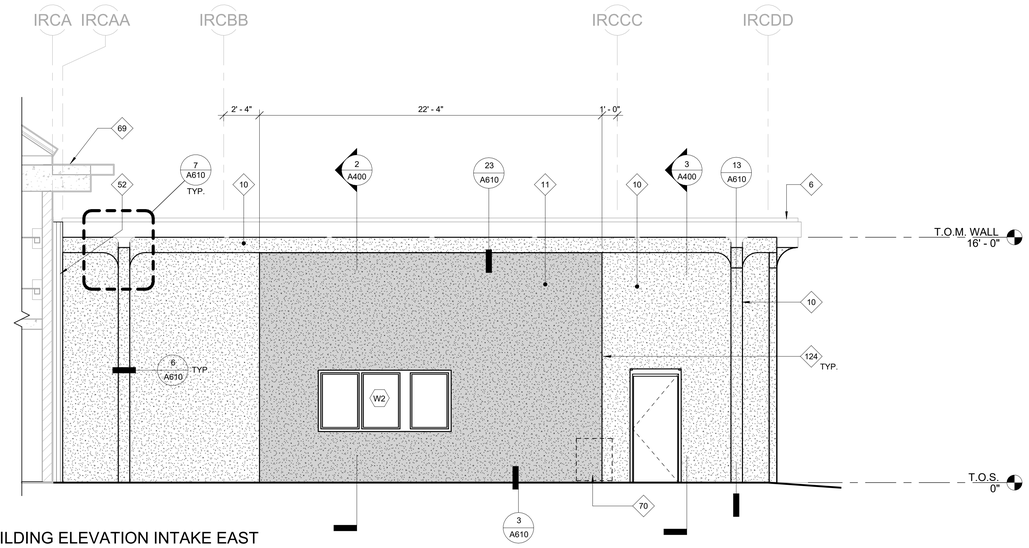
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SHEET TITLE

REFLECTED CEILING PLAN - TIER LEVEL

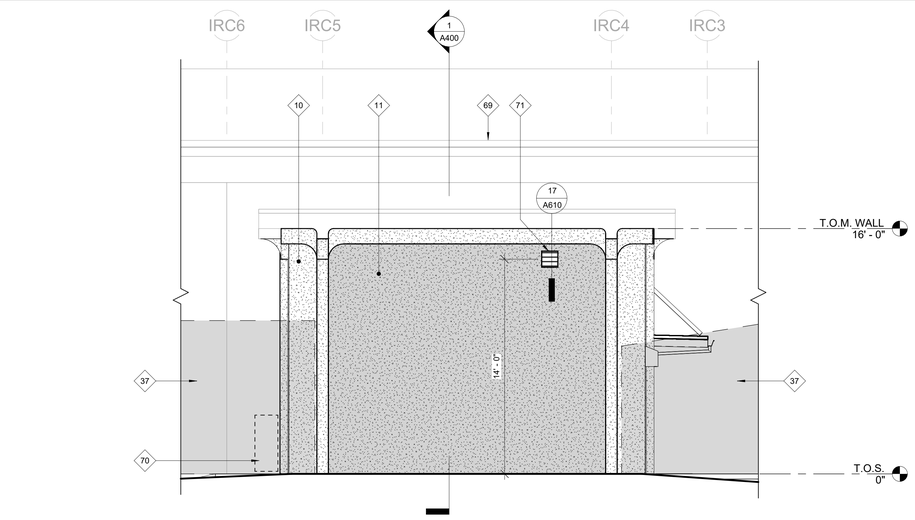
SHEET NO.

A212



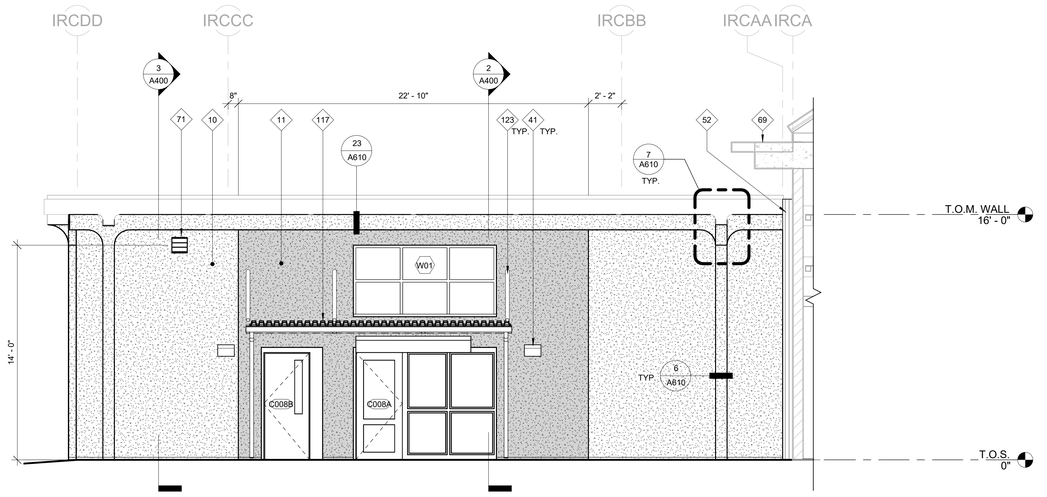
1 BUILDING ELEVATION INTAKE EAST

1/4" = 1'-0"



2 BUILDING ELEVATION INTAKE NORTH

1/4" = 1'-0"



3 BUILDING ELEVATION INTAKE WEST

1/4" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. REFER TO PARTITION TYPES ON SHEET A620.
2. REFER TO DOOR AND WINDOW SCHEDULE SHEET A710 FOR FRAME TYPES AND ELEVATIONS.

KEYNOTES:

THESE KEYNOTES APPLY TO THIS SHEET ONLY

6	(E) ROOF ABOVE
10	CEMENT PLASTER FINISH - SEE SPEC 092400
11	CEMENT PLASTER FINISH ACCENT. SEE DETAIL 6/A610
37	PATCH AND REPAIR FINISH TO MATCH EXISTING WALL
41	NEW WALL MOUNTED LIGHT FIXTURE - SEE ELECTRICAL SHEETS F.A.I.
52	WEATHERPROOF EXPANSION JOINT - SEE DETAIL 16/A610
69	(E) IRC BUILDING
70	NEW HEAT PUMP - SEE MECHANICAL FOR LOCATION AND MOUNTING
71	NEW LOUVER FOR MECHANICAL EQUIPMENT
117	HSS FRAMED METAL DECK CANOPY, SEE STRUCTURAL DRAWINGS F.A.I.
123	DIAGONAL STEEL CANOPY SUPPORT - SEE STRUCTURAL DWGS. F.A.I.
124	CEMENT PLASTER JOINT - SEE SPEC 092400

LEGEND:

CEMENT PLASTER FINISH WITH COLOR TO MATCH TRIM AND WALLS ON MAIN JAIL

CEMENT PLASTER FINISH WITH ACCENT COLOR TO MATCH ACCENT COLOR ON MAIN JAIL

PATCH AND REPAIR FINISH TO MATCH EXISTING WALL

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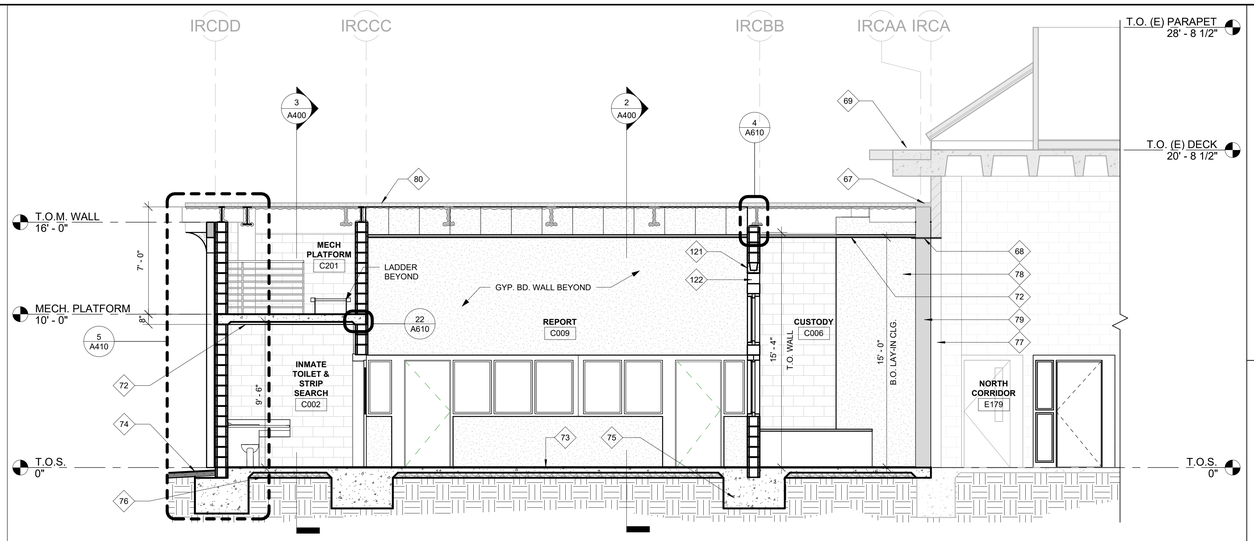
SHEET TITLE

BUILDING ELEVATIONS

SHEET NO.

A300

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



1 UNDER CANOPY & INTAKE PROCESS BUILDING SECTION

1/4" = 1'-0"

2 INTAKE BUILDING SECTION

1/4" = 1'-0"

3 INTAKE BUILDING SECTION

1/4" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
15	WALL MOUNTED ACCESS LADDER. SEE DETAILS 18/A641
26	DECK MOUNTED GUARDRAIL - SEE DETAILS 7 & 8/A641
27	ELECTRICAL PANEL - SEE ELECTRICAL SHEETS F.A.I.
67	(E) EXPANSION JOINT COVER AT CANOPY ROOF BELOW - PROTECT IN PLACE
68	NEW EXPANSION JOINT COVER AT CEILING - SEE SPEC SECTION 079513.13 AND DETAIL 18/A650.
69	(E) IRC BUILDING
72	GYP. BOARD CEILING - SEE DETAIL 10/A650.
73	NEW CONCRETE SLAB - SEE STRUCTURAL SHEETS F.A.I.
74	AC PAVING - SEE CIVIL SHEETS F.A.I.
75	CONCRETE FOOTING - SEE STRUCTURAL SHEETS F.A.I.
76	CRUSHED ROCK - SEE STRUCTURAL SHEETS F.A.I.
77	NEW MASONRY WALL BEYOND
78	NEW GYP. BOARD WALL BEYOND
79	NEW EXPANSION JOINT COVER
80	(E) ROOF SYSTEM TO REMAIN - PROTECT IN PLACE
81	NEW STUD WALL PER PLAN
82	CONCRETE WALK - SEE CIVIL SHEETS F.A.I.
83	NEW WINDOWS AND DOORS BEYOND
84	NEW LAY-IN CEILING
85	NEW BATT INSULATION
120	HSS 10X8 BEAM
121	CMU BOND BEAM COURSE ABOVE AIR FLOW OPENING, SEE STRUCTURAL
122	8"X128" AIR FLOW OPENING

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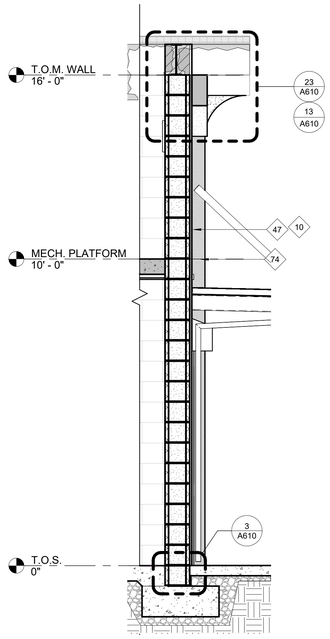
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BUILDING SECTIONS

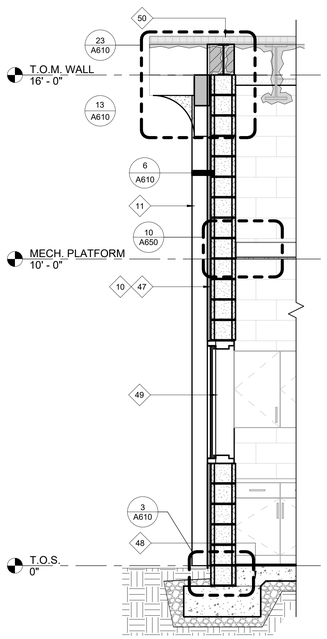
SHEET NO.

A400

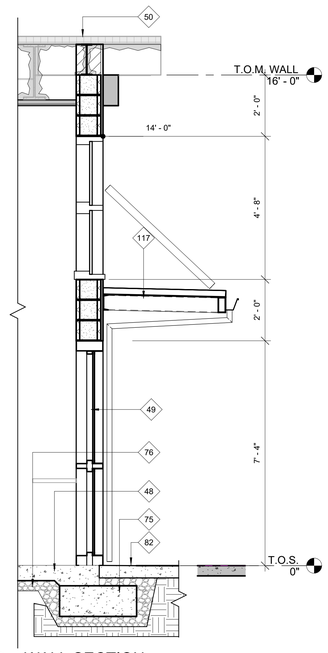
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ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



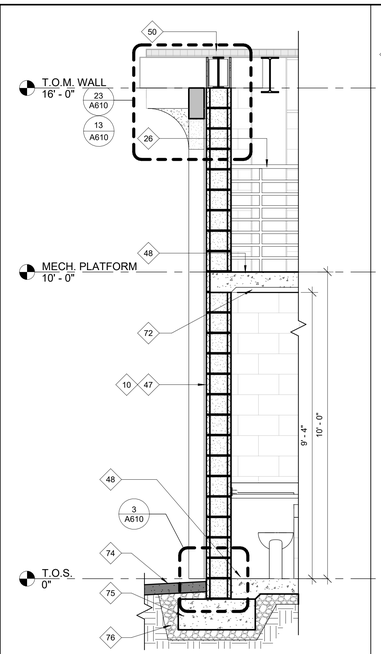
20 WALL SECTION
1/2" = 1'-0"



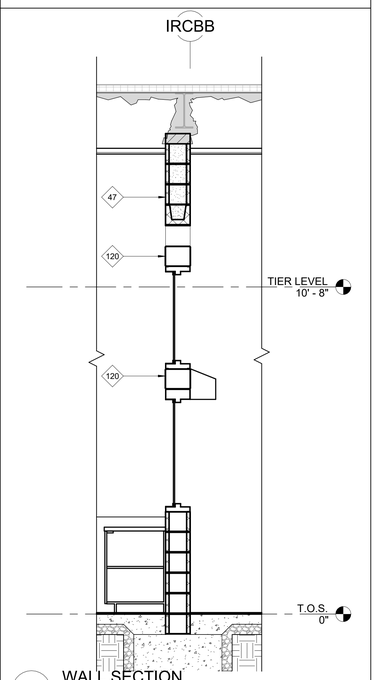
15 WALL SECTION
1/2" = 1'-0"



10 WALL SECTION
1/2" = 1'-0"



5 WALL SECTION
1/2" = 1'-0"



2 WALL SECTION
1/2" = 1'-0"

KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
10	CEMENT PLASTER FINISH - SEE SPEC 092400
11	CEMENT PLASTER FINISH ACCENT. SEE DETAIL 6/A610
26	DECK MOUNTED GUARDRAIL - SEE DETAILS 7 & 8/A641
47	CONCRETE MASONRY UNIT WALL - SEE STRUCTURAL SHEETS F.A.I.
48	CONCRETE SLAB - SEE STRUCTURAL SHEETS F.A.I.
49	WINDOW, HOLLOW METAL
50	(E) ROOF DECK TO REMAIN
72	GYP. BOARD CEILING - SEE DETAIL 10/A650.
74	AC PAVING - SEE CIVIL SHEETS F.A.I.
75	CONCRETE FOOTING - SEE STRUCTURAL SHEETS F.A.I.
76	CRUSHED ROCK - SEE STRUCTURAL SHEETS F.A.I.
82	CONCRETE WALK - SEE CIVIL SHEETS F.A.I.
117	HSS FRAMED METAL DECK CANOPY, SEE STRUCTURAL DRAWINGS F.A.I.
120	HSS 10X8 BEAM

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

CONSULTANT

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600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

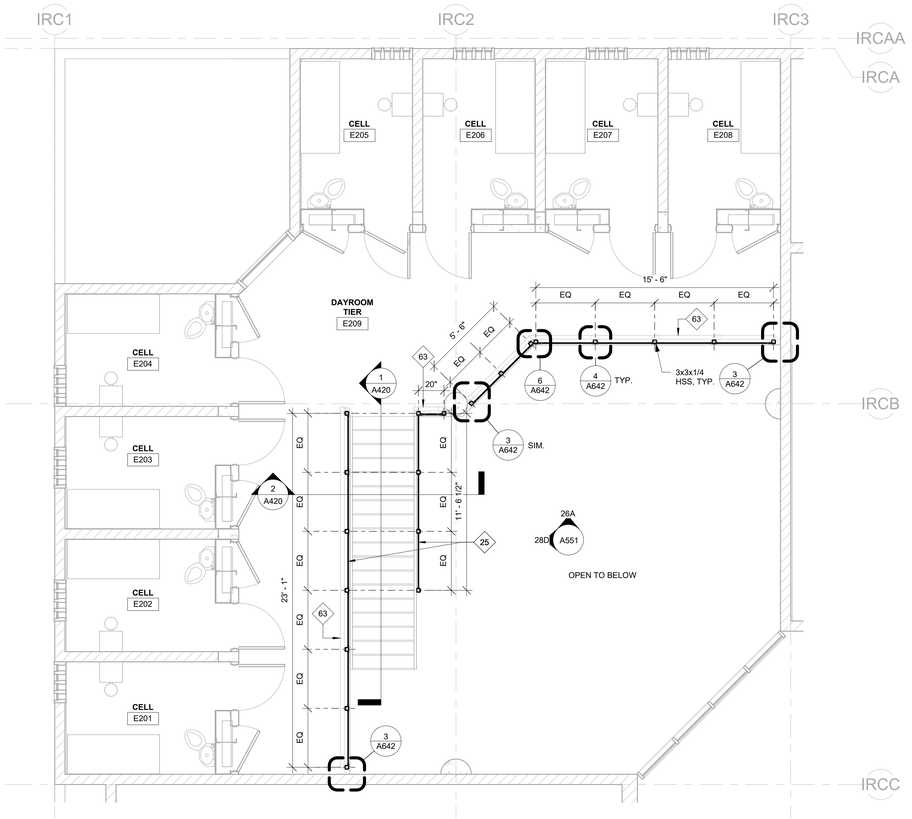
SHEET TITLE

WALL SECTIONS

SHEET NO.

A410

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



3 ENLARGED FLOOR PLAN - NO CLIMB MESH - TIER LEVEL - TYP. OF 4

1/4" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

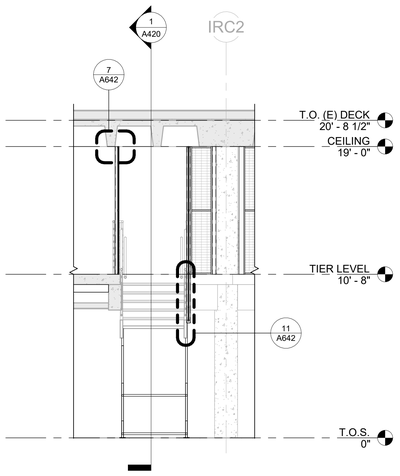
1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. ALL DIMENSIONS TO BE FIELD VERIFIED BY CONTRACTOR.

KEYNOTES:

◇ # THESE KEYNOTES APPLY TO THIS SHEET ONLY

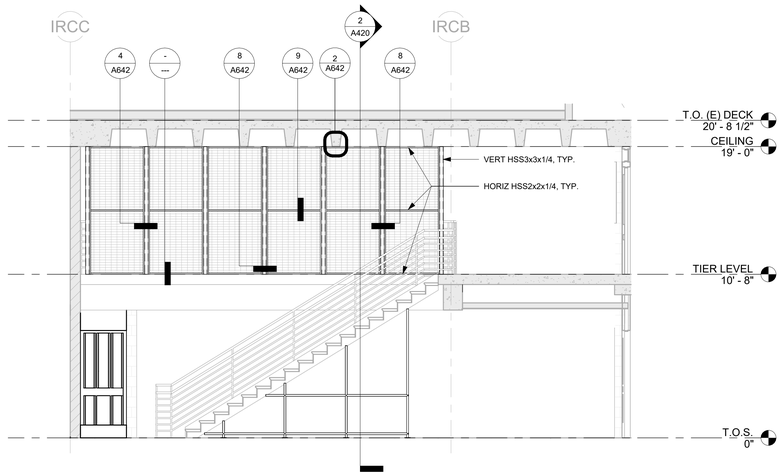
25 SECURITY MESH PANELS (BID ALTERNATE 1) - SEE SHEET A420

63 (E) STEEL PIPE GUARDRAIL TO REMAIN - PROTECT IN PLACE



2 HOUSING POD - STAIR SECTION - TYP. OF 4

1/4" = 1'-0"



1 HOUSING POD - STAIR SECTION - TYP. OF 4

1/4" = 1'-0"

AGENCY APPROVAL

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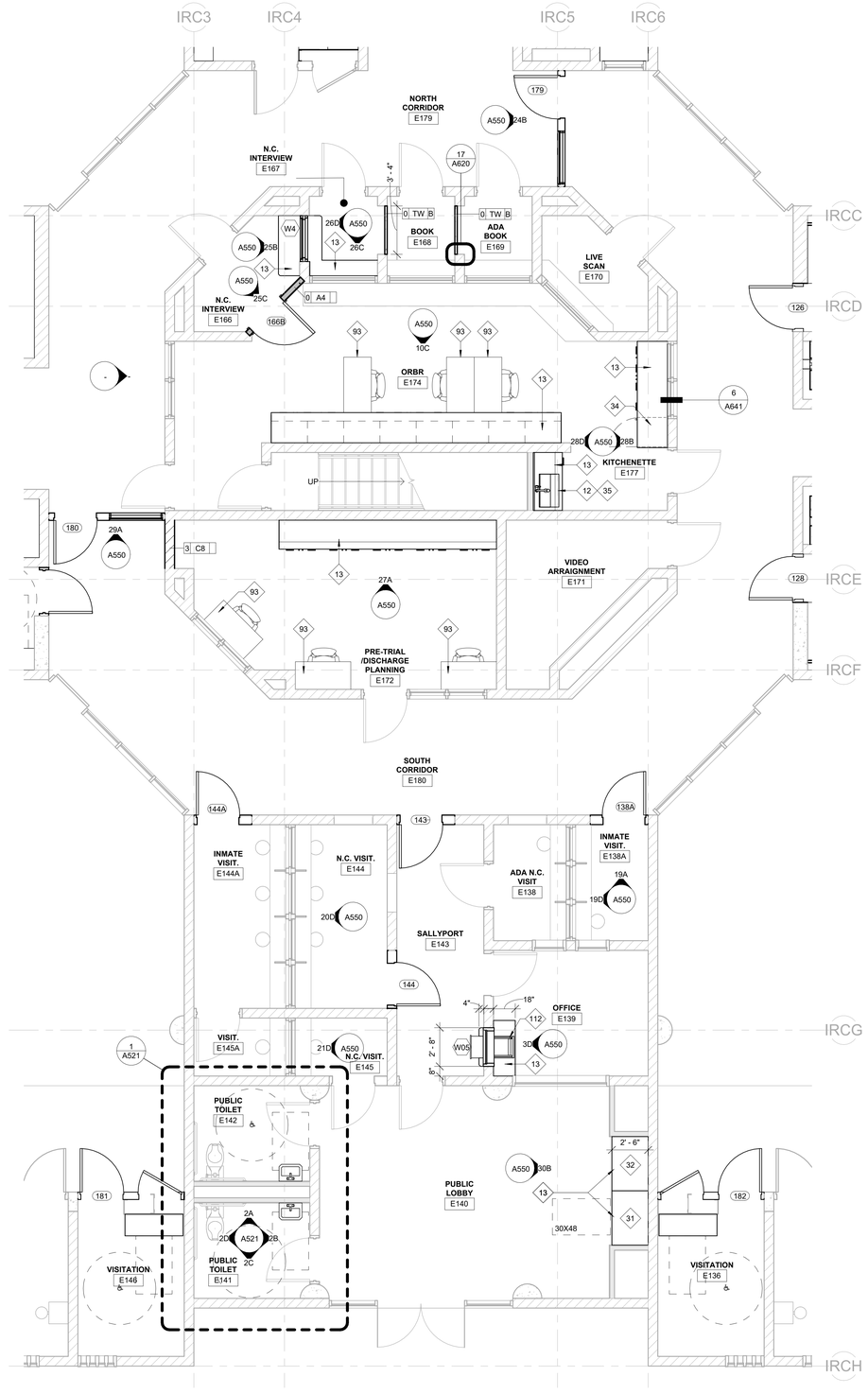
SHEET TITLE

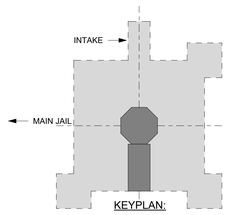
STAIR SECTIONS AND PLANS - ADD ALTERNATE ONLY

SHEET NO.

A420

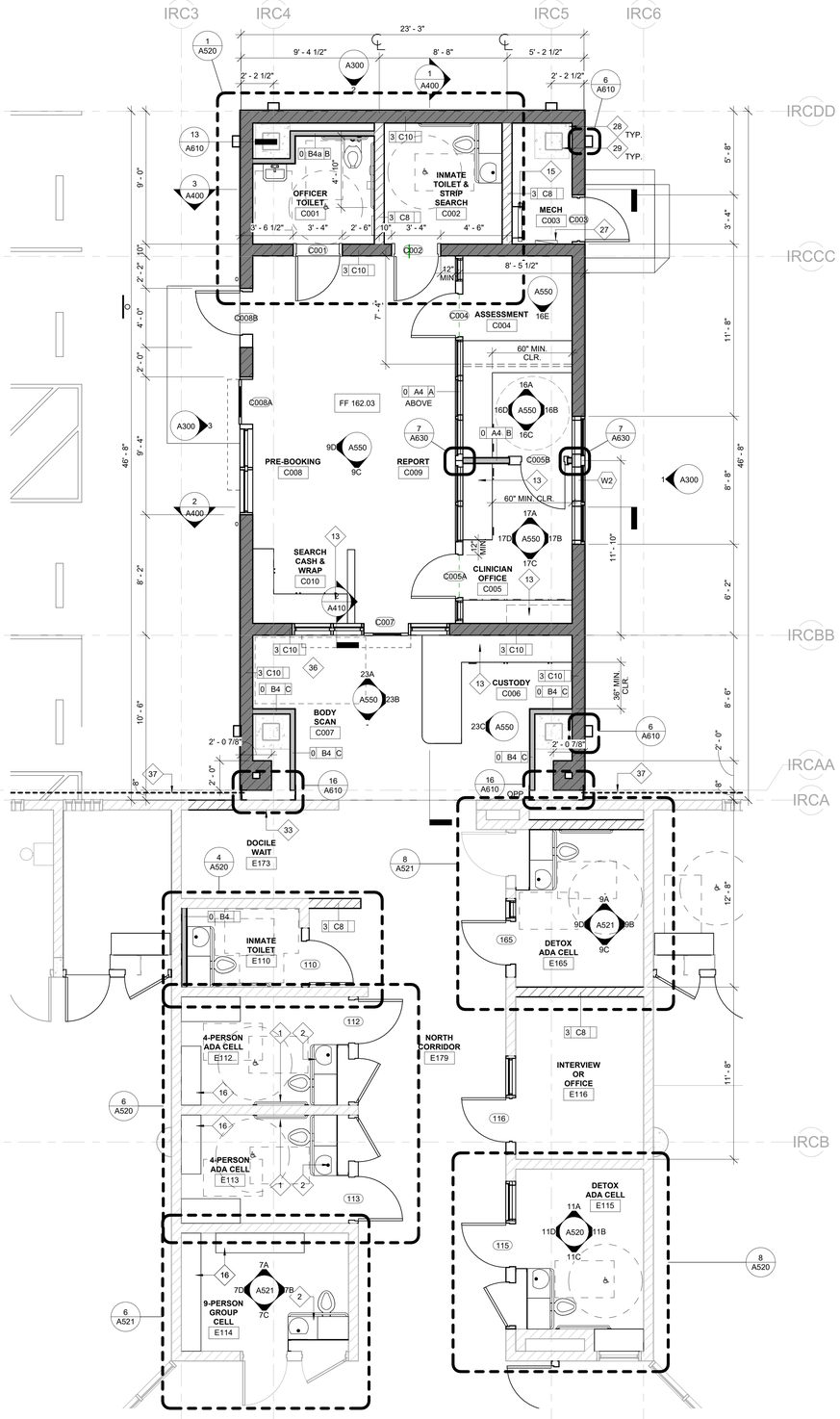
ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

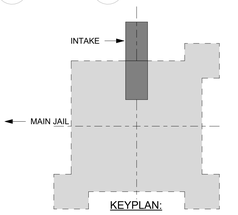




2 ENLARGED FLOOR PLAN - SOUTH

1/4" = 1'-0"





1 ENLARGED FLOOR PLAN - NORTH

1/4" = 1'-0"

SHEET NOTES:

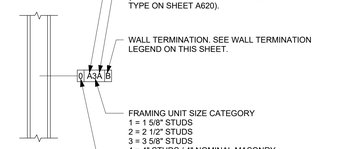
THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. OVERALL DIMENSIONS PROVIDED TO LOCATE EXTERIOR ENVELOPE FOR BUILDING ADDITION. SEE ENLARGED PLANS FOR ADDITIONAL DIMENSIONS.
3. SECURITY MESH PANELS AND INSTALLATION SHALL BE BID AS ALTERNATE 1.
4. ALL DOORS NOT LOCATED BY DIMENSIONS ON PLANS OR DETAILS SHALL BE 4" FROM FINISH WALL TO DOOR BUCK.
5. ALL DIMENSIONS ARE GIVEN FROM FACE OF STRUCTURE (CONCRETE, BLOCK, STUD) OR CENTERLINE OF PARTITION UNLESS OTHERWISE NOTED.

KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
1	ADA COMPLIANT GRAB BAR WITH CLOSURE PANEL
2	ADA COMBINATION TOILET - SEE PLUMBING SHEETS F.A.I.
12	SINK - SEE PLUMBING SHEETS F.A.I.
13	CASEWORK - SEE INTERIOR ELEVATIONS F.A.I.
15	WALL MOUNTED ACCESS LADDER. SEE DETAILS 18/A641
16	WALL MOUNTED BENCH
27	ELECTRICAL PANEL - SEE ELECTRICAL SHEETS F.A.I.
28	(E) CONCRETE PEDESTAL TO REMAIN - PROTECT IN PLACE
29	(E) STEEL COLUMN TO REMAIN
31	VIDEO VISITATION STATION - ACCESSIBLE
32	VIDEO VISITATION STATION
33	O.F.O.I WALL MOUNTED TV - SEE ELECTRICAL SHEETS FOR POWER
34	O.F.O.I. UNDERCOUNTER REFRIGERATOR - SEE ELECTRICAL SHEETS FOR POWER
35	GARBAGE DISPOSAL - SEE ELECTRICAL SHEETS FOR POWER
36	RELOCATE (E) BODY SCAN TO THIS LOCATION - SEE ELECTRICAL SHEETS FOR POWER
37	PATCH AND REPAIR FINISH TO MATCH EXISTING WALL
93	SYSTEMS FURNITURE SIT-STAND DESK & CHAIR, O.F.O.I.
112	COUNTER HEIGHT PASS THRU. SEE DETAILS 26 & 27/A630

WALL TAG SYMBOL LEGEND



LEGEND:

(N) 10" CMU WALL - SEE STRUCTURAL F.A.I.

(N) 8" CMU WALL - SEE STRUCTURAL F.A.I.

(N) METAL STUD WALL - SEE STRUCTURAL F.A.I.

AGENCY APPROVAL

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No. C-25272 May 31, 2027

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REVISIONS

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DATE 2/25/25

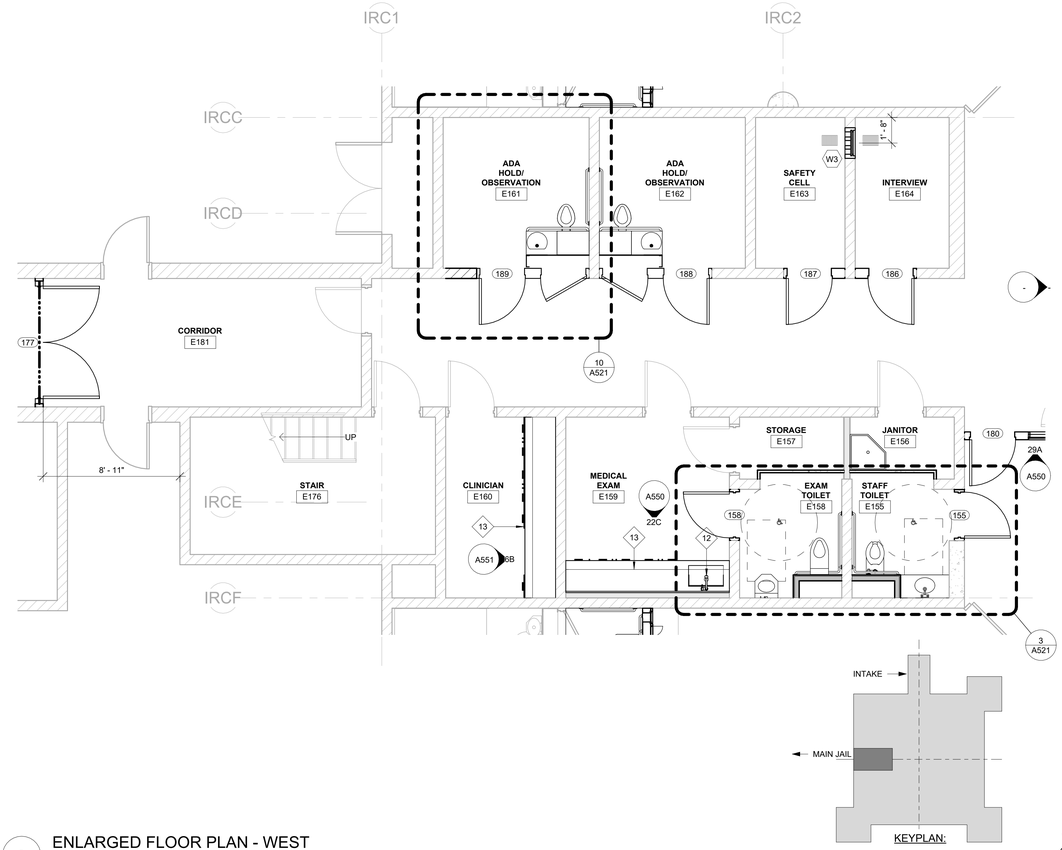
JOB NO. Y2213.00

SHEET TITLE

ENLARGED FLOOR PLANS - NORTH AND SOUTH - GROUND LEVEL

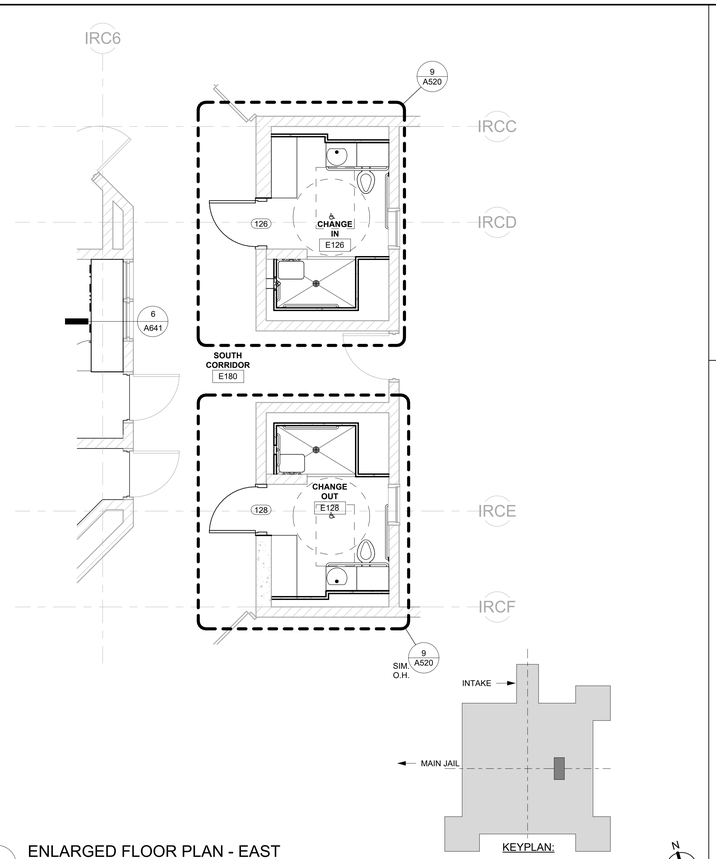
SHEET NO.

A510



2 ENLARGED FLOOR PLAN - WEST

1/4" = 1'-0"



1 ENLARGED FLOOR PLAN - EAST

1/4" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. OVERALL DIMENSIONS PROVIDED TO LOCATE EXTERIOR ENVELOPE FOR BUILDING ADDITION. SEE ENLARGED PLANS FOR ADDITIONAL DIMENSIONS.
3. SECURITY MESH PANELS AND INSTALLATION SHALL BE BID AS ALTERNATE 1.
4. ALL DOORS NOT LOCATED BY DIMENSIONS ON PLANS OR DETAILS SHALL BE 4" FROM FINISH WALL TO DOOR BUCK.
5. ALL DIMENSIONS ARE GIVEN FROM FACE OF STRUCTURE (CONCRETE, BLOCK, STUD) OR CENTERLINE OF PARTITION UNLESS OTHERWISE NOTED.

KEYNOTES:

THESE KEYNOTES APPLY TO THIS SHEET ONLY

12 SINK - SEE PLUMBING SHEETS F.A.I.

13 CASEWORK - SEE INTERIOR ELEVATIONS F.A.I.

LEGEND:

(N) 10" CMU WALL - SEE STRUCTURAL F.A.I.

(N) 8" CMU WALL - SEE STRUCTURAL F.A.I.

(N) METAL STUD WALL - SEE STRUCTURAL F.A.I.

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NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

ENLARGED FLOOR PLANS - WEST AND EAST

SHEET NO.

A511

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

ONE-HALF INCH = ONE FOOT

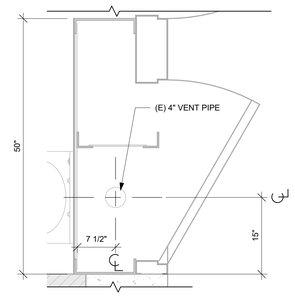
ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET

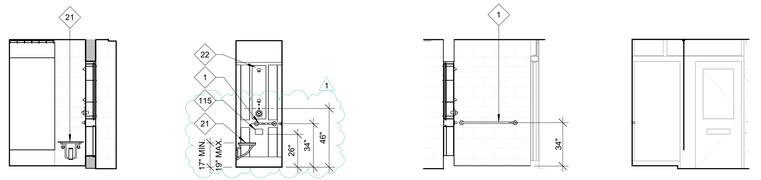
ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



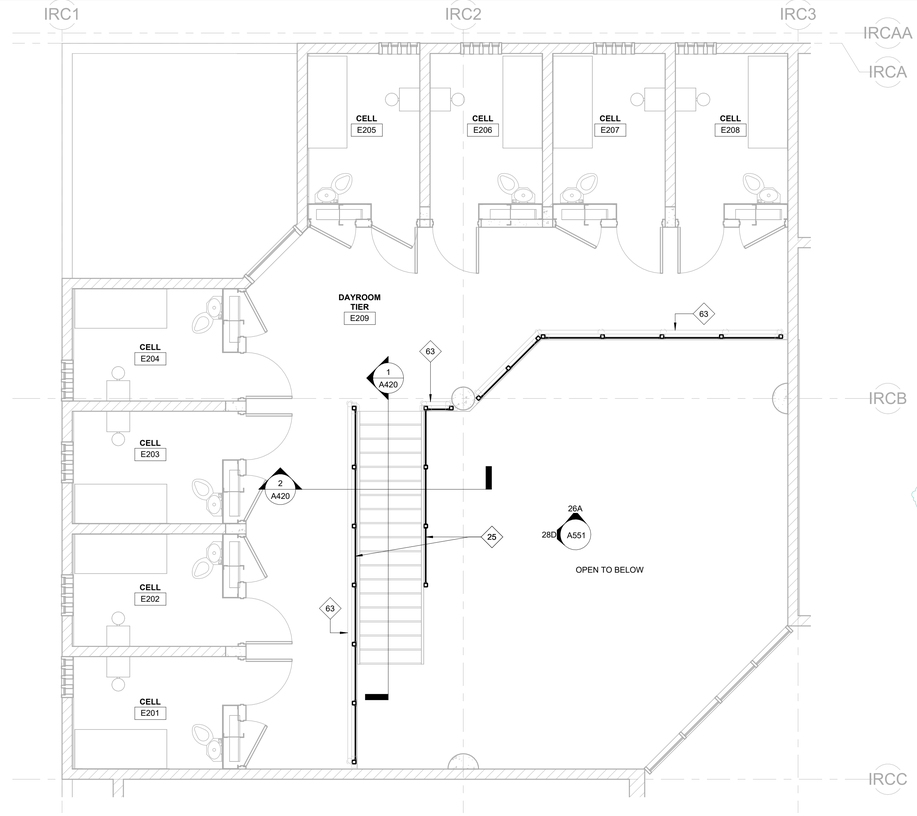
7 CHASE AT CELL, TYP.
1" = 1'-0"



6A E102 - NORTH 1/4" = 1'-0"
6B E102 - EAST 1/4" = 1'-0"
6C E102 - SOUTH 1/4" = 1'-0"
6D E102 - WEST 1/4" = 1'-0"



5A E100A - NORTH 1/4" = 1'-0"
5B E100A - EAST 1/4" = 1'-0"
5C E100A - SOUTH 1/4" = 1'-0"
5D E100A - WEST 1/4" = 1'-0"



2 ENLARGED FLOOR PLAN - HOUSING POD - TIER LEVEL - TYP. OF 4
1/4" = 1'-0"

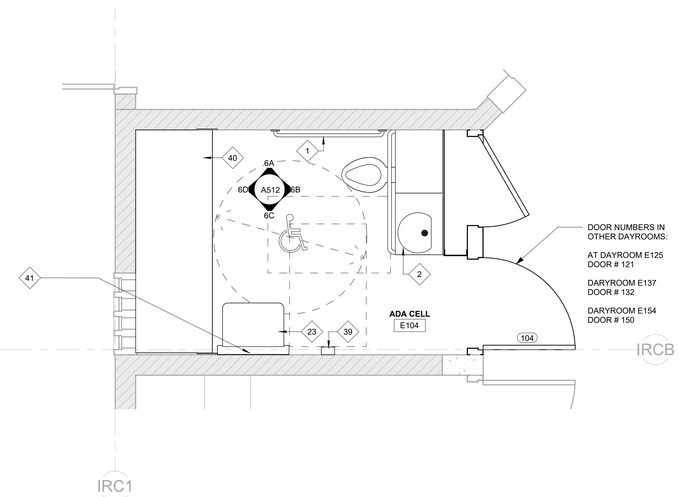
SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

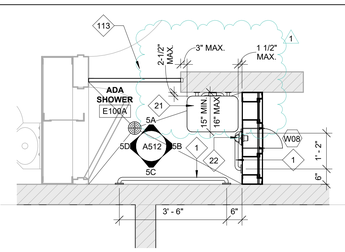
1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. OVERALL DIMENSIONS PROVIDED TO LOCATE EXTERIOR ENVELOPE FOR BUILDING ADDITION. SEE ENLARGED PLANS FOR ADDITIONAL DIMENSIONS.
3. SECURITY MESH PANELS AND INSTALLATION SHALL BE BID AS ALTERNATE 1.
4. ALL DOORS NOT LOCATED BY DIMENSIONS ON PLANS OR DETAILS SHALL BE 4" FROM FINISH WALL TO DOOR BUCK.
5. ALL DIMENSIONS ARE GIVEN FROM FACE OF STRUCTURE (CONCRETE, BLOCK, STUD) OR CENTERLINE OF PARTITION UNLESS OTHERWISE NOTED.

KEYNOTES:

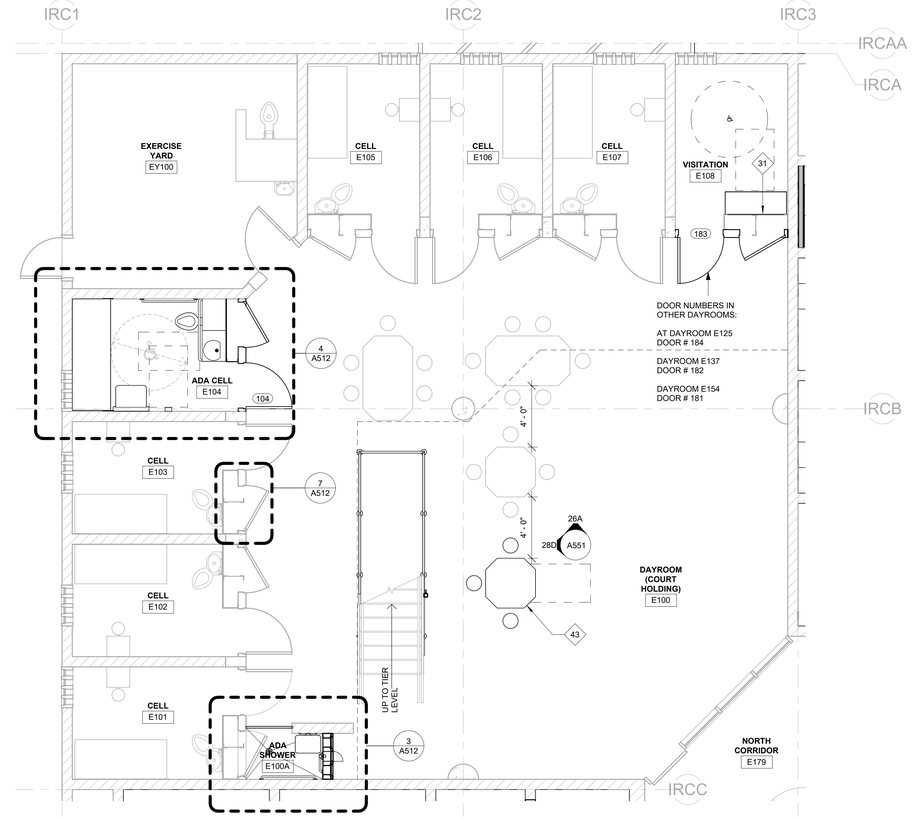
#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
1	ADA COMPLIANT GRAB BAR WITH CLOSURE PANEL
2	ADA COMBINATION TOILET - SEE PLUMBING SHEETS F.A.I.
18	PRE-FABRICATED, PLATE STEEL PLUMBING CHASE
21	ACCESSIBLE SHOWER BENCH - SEE DTL 28/A641
22	SHOWER FIXTURE
23	DESK, FOLDING, WALL MOUNTED
24	BUNK BED
25	SECURITY MESH PANELS (BID ALTERNATE 1) - SEE SHEET A420
31	VIDEO VISITATION STATION - ACCESSIBLE
39	NEW ACCESSIBLE, WALL MOUNTED PHONE
40	NEW ACCESSIBLE SINGLE BUNK BED
41	NEW WALL MOUNTED LIGHT FIXTURE - SEE ELECTRICAL SHEETS F.A.I.
43	NEW FLOOR MOUNTED, 3 STOOL TABLE WITH ACCESSIBLE CLEAR SPACE
49	WINDOW, HOLLOW METAL
63	(E) STEEL PIPE GUARDRAIL TO REMAIN - PROTECT IN PLACE
113	PRIVACY CURTAIN AND TRACK
115	ANTI-LIGATURE RECESSED SOAP DISH



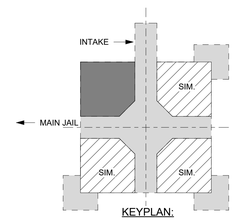
4 ENLARGED FLOOR PLAN - ROOMS E104, E125, E132 & E150 - GROUND LEVEL
1/2" = 1'-0"



3 ENLARGED FLOOR PLAN - ROOMS E100A, E125A, E132A & E150A - GROUND LEVEL
1/2" = 1'-0"



1 ENLARGED FLOOR PLAN - HOUSING POD - GROUND LEVEL - TYP. OF 4
1/4" = 1'-0"



KEYPLAN:

AGENCY APPROVAL

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ARCHITECT
No. C-25272 May 31, 2027

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REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

ENLARGED FLOOR PLANS & INTERIOR ELEVATIONS - HOUSING POD, TYP.

SHEET NO.

A512

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

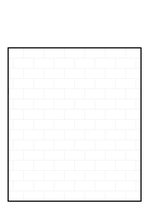
ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

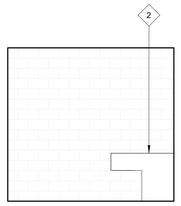
ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

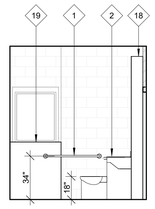
ONE INCH = TWENTY FEET



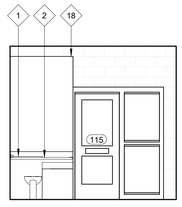
11A E115 - NORTH
1/4" = 1'-0"



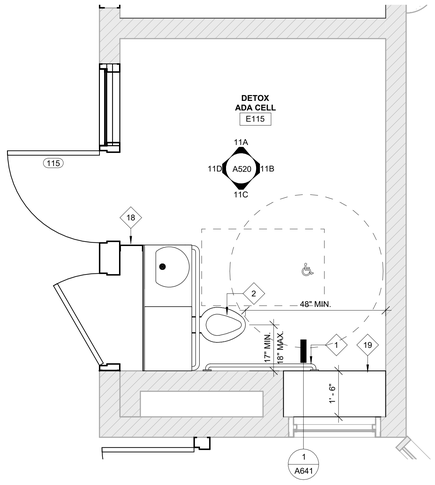
11B E115 - EAST
1/4" = 1'-0"



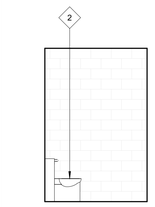
11C E115 - SOUTH
1/4" = 1'-0"



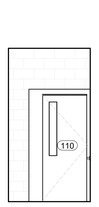
11D E115 - WEST
1/4" = 1'-0"



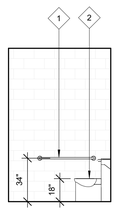
8 ENLARGED FLOOR PLAN - ROOM E115
1/2" = 1'-0"



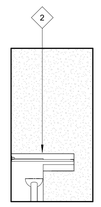
5A E110 - NORTH
1/4" = 1'-0"



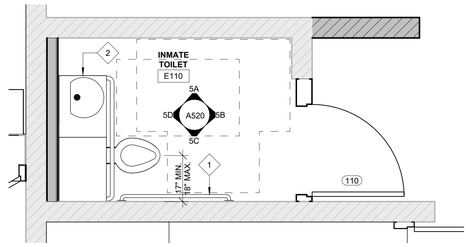
5B E110 - EAST
1/4" = 1'-0"



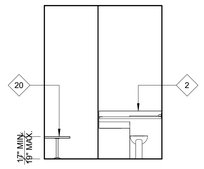
5C E110 - SOUTH
1/4" = 1'-0"



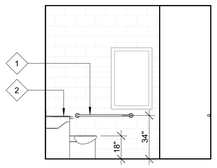
5D E110 - WEST
1/4" = 1'-0"



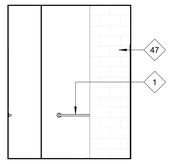
4 ENLARGED FLOOR PLAN - ROOM E110
1/2" = 1'-0"



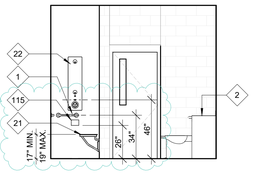
10A E126 - NORTH
1/4" = 1'-0"



10B E126 - EAST
1/4" = 1'-0"

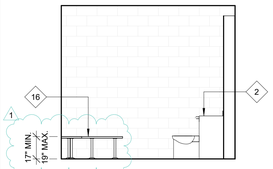


10C E126 - SOUTH
1/4" = 1'-0"

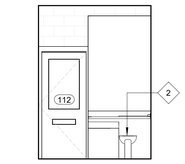


10D E126 -WEST
1/4" = 1'-0"

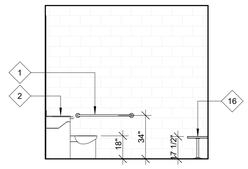
ROOM E128 SIM. O.H.



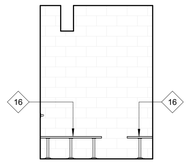
7A E112 - NORTH
1/4" = 1'-0"



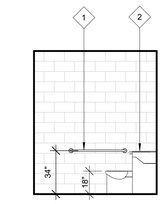
7B E112 - EAST
1/4" = 1'-0"



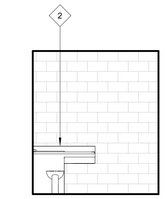
7C E112 - SOUTH
1/4" = 1'-0"



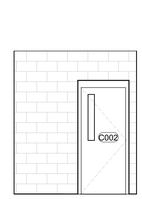
7D E112 - WEST
1/4" = 1'-0"



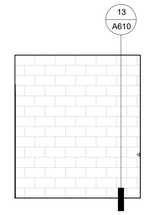
3A C002 - NORTH
1/4" = 1'-0"



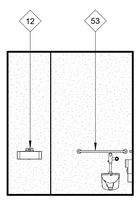
3B COO2 - EAST
1/4" = 1'-0"



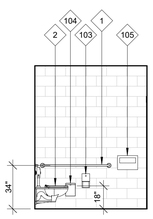
3C C002- SOUTH
1/4" = 1'-0"



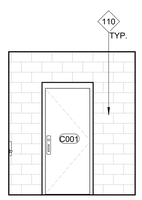
3D C002 - WEST
1/4" = 1'-0"



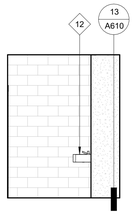
2A C001-NORTH
1/4" = 1'-0"



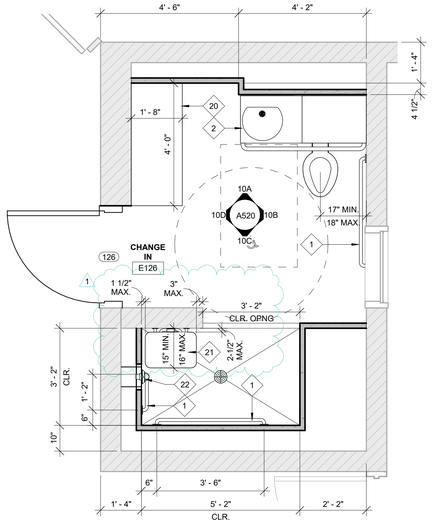
2B C001 - EAST
1/4" = 1'-0"



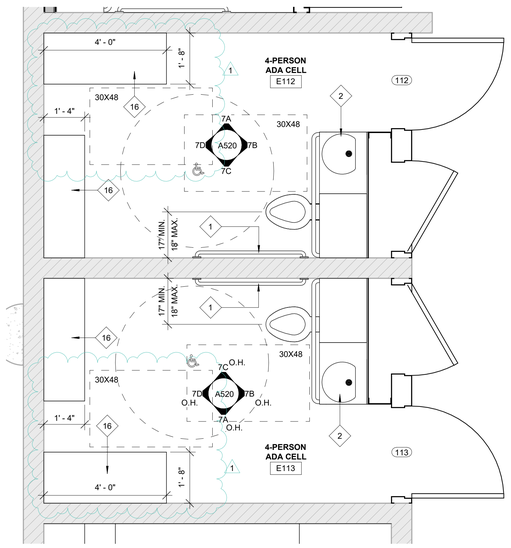
2C C001 - SOUTH
1/4" = 1'-0"



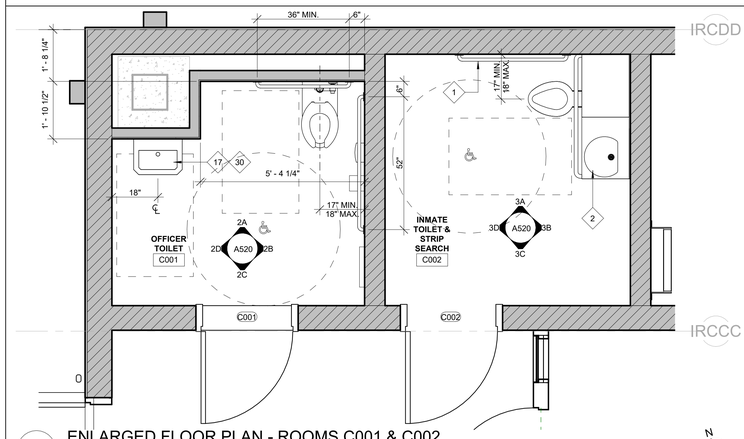
2D C001 - WEST
1/4" = 1'-0"



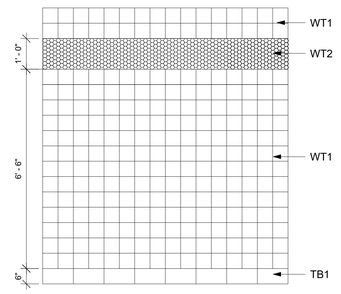
9 ENLARGED FLOOR PLAN - ROOM 126 (128 SIM. O.H.)
1/2" = 1'-0"



6 ENLARGED FLOOR PLAN - ROOMS E112 & E113
1/2" = 1'-0"



1 ENLARGED FLOOR PLAN - ROOMS C001 & C002
1/2" = 1'-0"



5 TOILET TILE PATTERN
1/2" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. OVERALL DIMENSIONS PROVIDED TO LOCATE EXTERIOR ENVELOPE FOR BUILDING ADDITION. SEE ENLARGED PLANS FOR ADDITIONAL DIMENSIONS.
3. SECURITY MESH PANELS AND INSTALLATION SHALL BE BID AS ALTERNATE 1.
4. ALL DOORS NOT LOCATED BY DIMENSIONS ON PLANS OR DETAILS SHALL BE 4" FROM FINISH WALL TO DOOR BUCK.
5. ALL DIMENSIONS ARE GIVEN FROM FACE OF STRUCTURE (CONCRETE, BLOCK, STUD) OR CENTERLINE OF PARTITION UNLESS OTHERWISE NOTED.

KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
1	ADA COMPLIANT GRAB BAR WITH CLOSURE PANEL
2	ADA COMBINATION TOILET - SEE PLUMBING SHEETS F.A.I.
12	SINK - SEE PLUMBING SHEETS F.A.I.
16	WALL MOUNTED BENCH
17	LAVATORY - SEE PLUMBING SHEETS F.A.I.
18	PRE-FABRICATED, PLATE STEEL PLUMBING CHASE
19	HOLLOW METAL WINDOW SILL
20	FLOOR MOUNTED BENCH
21	ACCESSIBLE SHOWER BENCH - SEE DTL 28/A641
22	SHOWER FIXTURE
30	POINT OF USE W.H. - SEE PLUMBING SHEETS F.A.I.
47	CONCRETE MASONRY UNIT WALL - SEE STRUCTURAL SHEETS F.A.I.
53	NEW ADA COMPLIANT GRAB BAR
103	TOILET PAPER DISPENSER - SEE SPEC SECTION 102800
104	SANITARY NAPKIN DISPOSAL - SEE SPEC SECTION 102800
105	TOILET PAPER SEAT DISPENSER - SEE SPEC SECTION 1002800
110	TILE WALL(S). SEE DETAIL 5/A520 AND A800 FINISH LEGEND FOR PATTERN AND MATERIAL INFORMATION.
115	ANTI-LIGATURE RECESSED SOAP DISH

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

CONSULTANT

nacht&lewis
600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000



ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

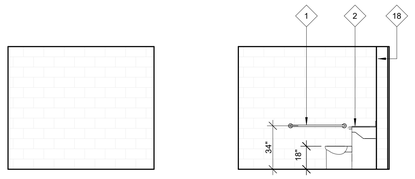
SHEET TITLE

ENLARGED
TOILET/HOLDING ROOM
PLANS & ELEVATIONS

SHEET NO.

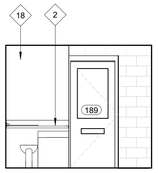
A520





11A E161 - NORTH
1/4" = 1'-0"

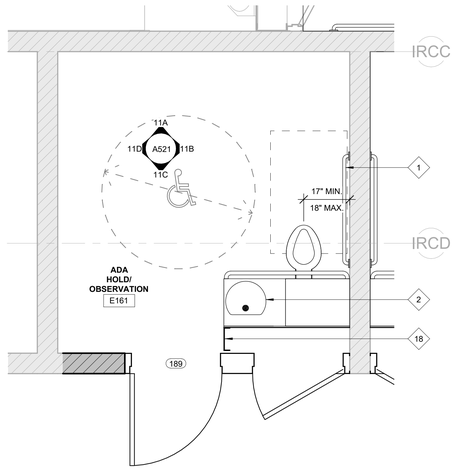
11B E161 - EAST
1/4" = 1'-0"



11C E161 - SOUTH
1/4" = 1'-0"

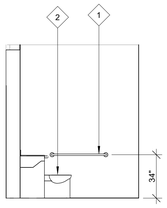


11D E161 - WEST
1/4" = 1'-0"



ROOM E162 SIM. O.H.

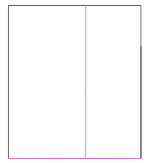
10 ENLARGED FLOOR PLAN - ROOM E161
1/2" = 1'-0"



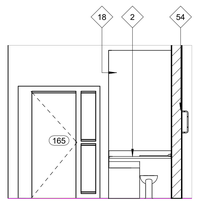
9A E165 - NORTH
1/4" = 1'-0"



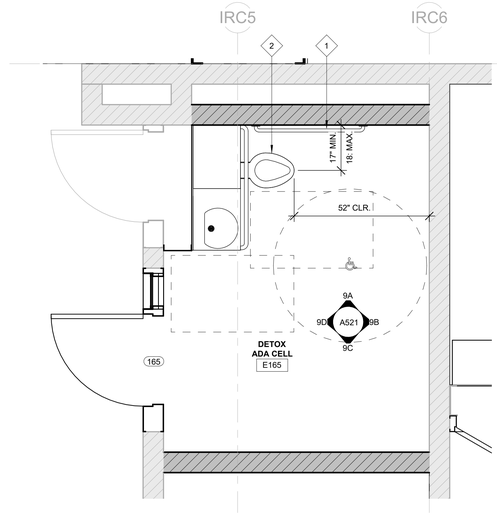
9B E165 - EAST
1/4" = 1'-0"



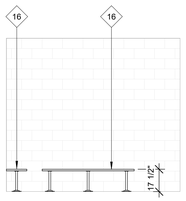
9C E165 - SOUTH
1/4" = 1'-0"



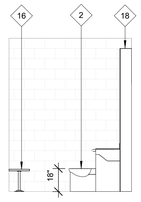
9D E165 - WEST
1/4" = 1'-0"



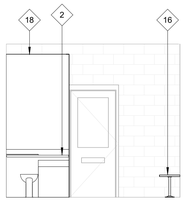
8 ENLARGED FLOOR PLAN - ROOM E165
1/2" = 1'-0"



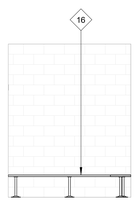
7A E114 - NORTH
1/4" = 1'-0"



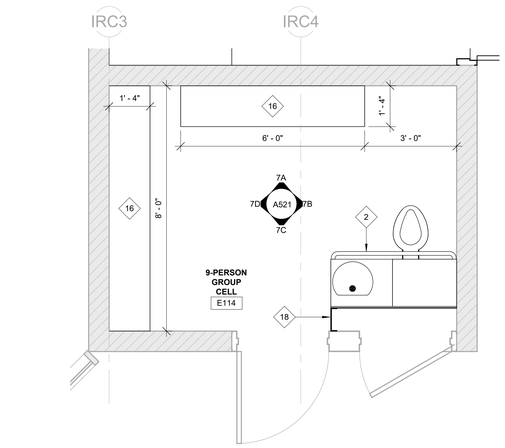
7B E114 - EAST
1/4" = 1'-0"



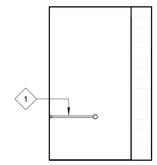
7C E114 -SOUTH
1/4" = 1'-0"



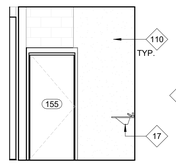
7D E114 - WEST
1/4" = 1'-0"



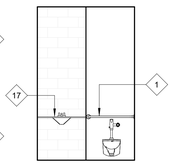
6 ENLARGED FLOOR PLAN - ROOM -109
1/2" = 1'-0"



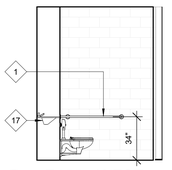
5A E155 - NORTH
1/4" = 1'-0"



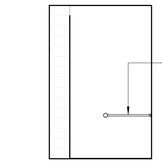
5B E155 - EAST
1/4" = 1'-0"



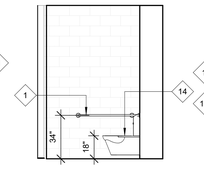
5C E155 - SOUTH
1/4" = 1'-0"



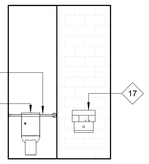
5D E155 - WEST
1/4" = 1'-0"



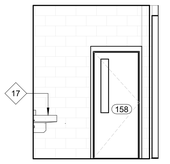
4A E158 - NORTH
1/4" = 1'-0"



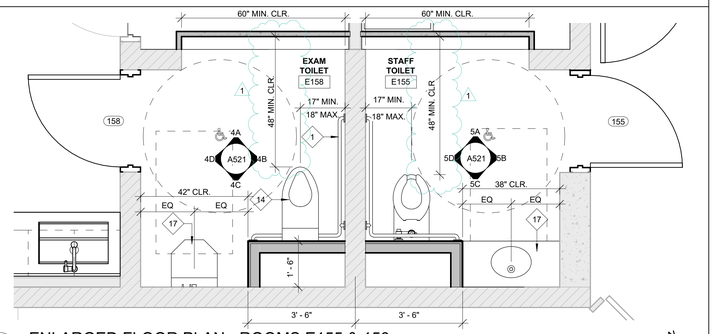
4B E158 - EAST
1/4" = 1'-0"



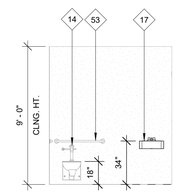
4C E158 - SOUTH
1/4" = 1'-0"



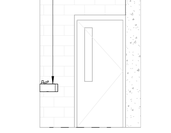
4D E158 - WEST
1/4" = 1'-0"



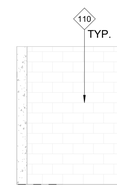
3 ENLARGED FLOOR PLAN - ROOMS E155 & 158
1/2" = 1'-0"



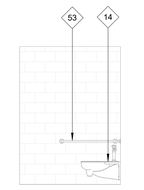
2A E141 - NORTH
1/4" = 1'-0"



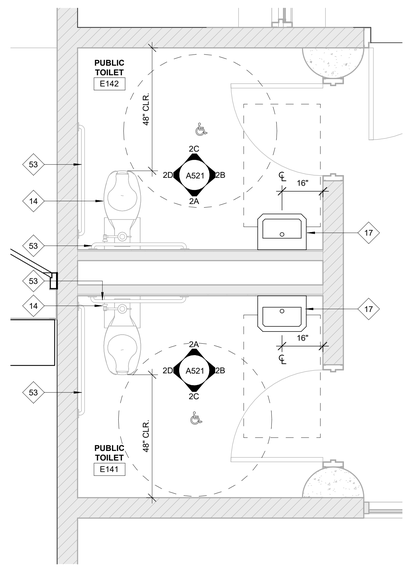
2B E141 - EAST
1/4" = 1'-0"



2C E141 - SOUTH
1/4" = 1'-0"



2D E141 - WEST
1/4" = 1'-0"



1 ENLARGED FLOOR PLAN - ROOMS E141 & E142
1/2" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. OVERALL DIMENSIONS PROVIDED TO LOCATE EXTERIOR ENVELOPE FOR BUILDING ADDITION. SEE ENLARGED PLANS FOR ADDITIONAL DIMENSIONS.
3. SECURITY MESH PANELS AND INSTALLATION SHALL BE BID AS ALTERNATE 1.
4. ALL DOORS NOT LOCATED BY DIMENSIONS ON PLANS OR DETAILS SHALL BE 4" FROM FINISH WALL TO DOOR BUCK.
5. ALL DIMENSIONS ARE GIVEN FROM FACE OF STRUCTURE (CONCRETE, BLOCK, STUD) OR CENTERLINE OF PARTITION UNLESS OTHERWISE NOTED.

KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
1	ADA COMPLIANT GRAB BAR WITH CLOSURE PANEL
2	ADA COMBINATION TOILET - SEE PLUMBING SHEETS F.A.I.
14	WALL MOUNTED W.C. - SEE PLUMBING SHEETS F.A.I.
16	WALL MOUNTED BENCH
17	LAVATORY - SEE PLUMBING SHEETS F.A.I.
18	PRE-FABRICATED, PLATE STEEL PLUMBING CHASE
53	NEW ADA COMPLIANT GRAB BAR
54	NEW MIRROR
110	TILE WALL(S), SEE DETAIL 5/A520 AND A800 FINISH LEGEND FOR PATTERN AND MATERIAL INFORMATION.

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

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ARCHITECT

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REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

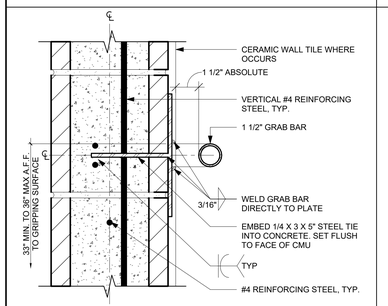
SHEET TITLE

ENLARGED TOILET/HOLDING ROOM PLANS & ELEVATIONS - GROUND LEVEL

SHEET NO.

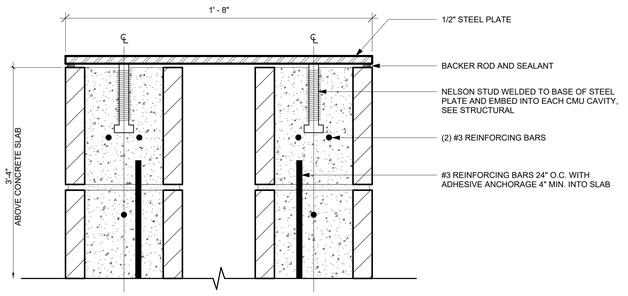
A521

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



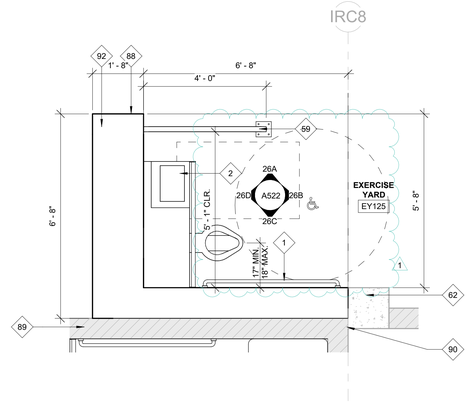
28 GRAB BAR MOUNTING AT CMU

3" = 1'-0"



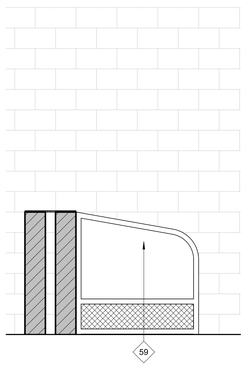
23 CMU STEEL CAP AT YARD TOILET, TYP.

3" = 1'-0"



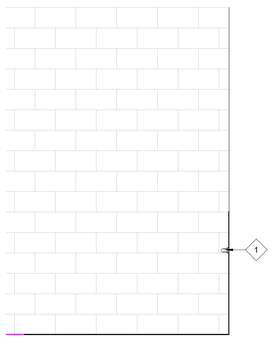
26 TYPICAL YARD TOILET - EY125, EY137 & EY154

1/2" = 1'-0"



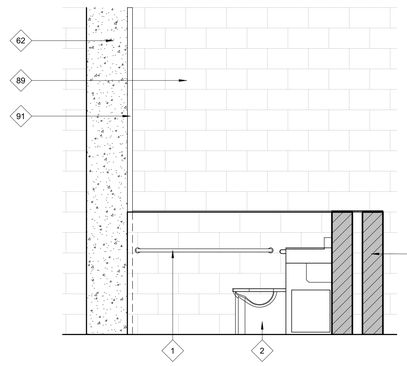
26A TYP. REC YARD TOILET - NORTH

1/2" = 1'-0"



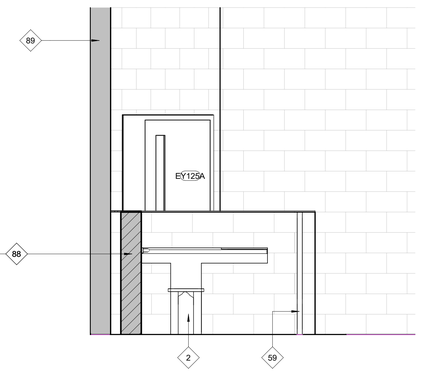
26B TYP. REC YARD TOILET - EAST

1/2" = 1'-0"



26C TYP. REC YARD TOILET - SOUTH

1/2" = 1'-0"



26D TYP. REC YARD TOILET - WEST

1/2" = 1'-0"

SHEET NOTES:

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1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. OVERALL DIMENSIONS PROVIDED TO LOCATE EXTERIOR ENVELOPE FOR BUILDING ADDITION. SEE ENLARGED PLANS FOR ADDITIONAL DIMENSIONS.
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KEYNOTES:

THESE KEYNOTES APPLY TO THIS SHEET ONLY

1 ADA COMPLIANT GRAB BAR WITH CLOSURE PANEL

2 ADA COMBINATION TOILET - SEE PLUMBING SHEETS F.A.I.

59 NEW S.S. FRAMED MODESTY PANEL - SEE DETAIL 5/A641

62 (E) CONCRETE COLUMN

88 NEW 8" CMU WALL

89 (E) CMU WALL

90 NEW 1" WIDE JOINT

91 (E) 3" WIDE COVER PLATE

92 NEW 1/2" STEEL PLATE AT CMU WALL CAP, SEE DETAIL 23/A522

AGENCY APPROVAL

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REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

ENLARGED TOILET PLAN - YARD

SHEET NO.

A522

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

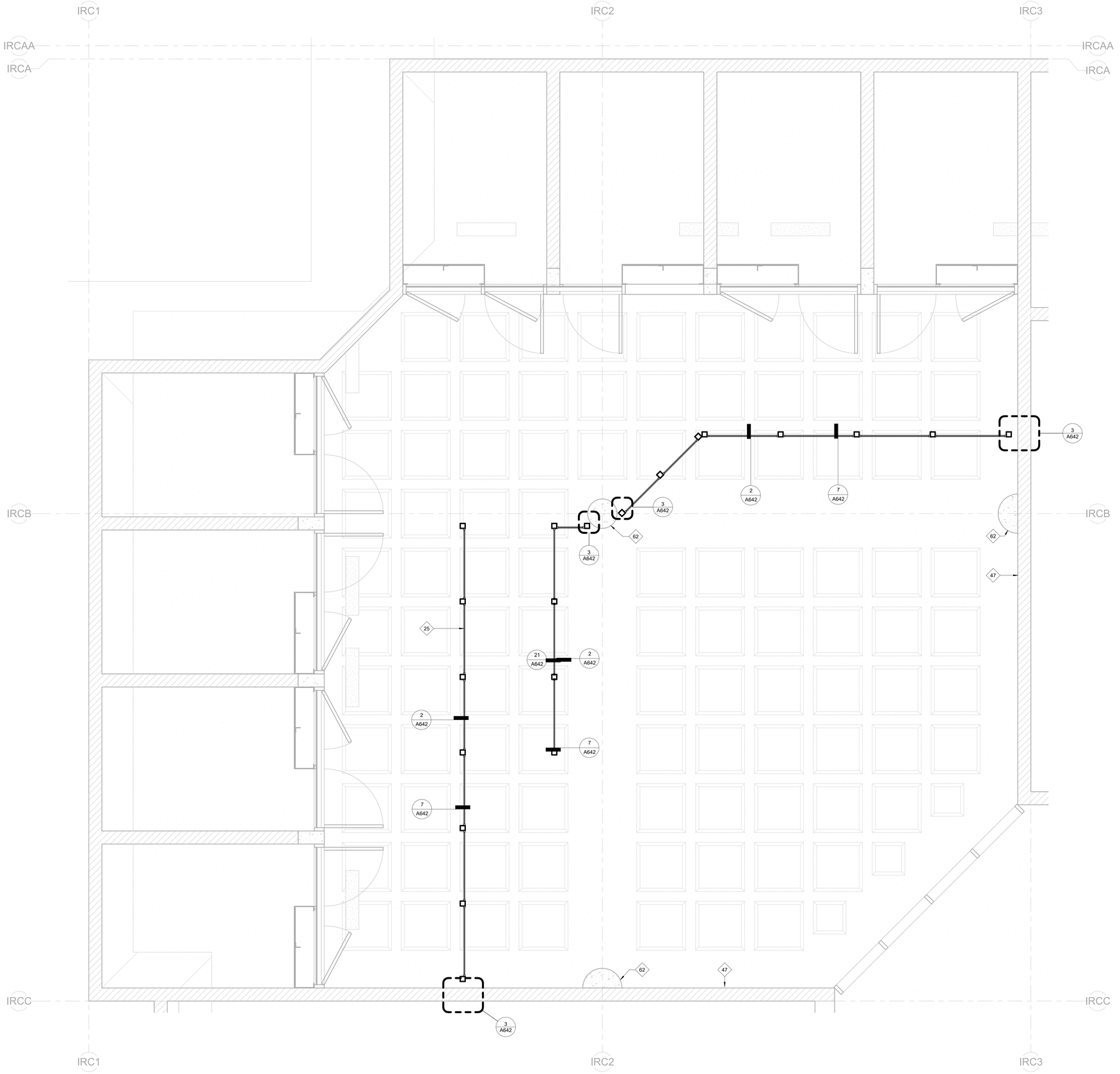
ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET



1 TYPICAL TIER RCP

1/2" = 1'-0"

SHEET NOTES:

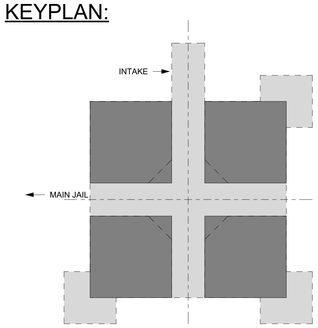
THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
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KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
25	SECURITY MESH PANELS (BID ALTERNATE 1) - SEE SHEET A420
47	CONCRETE MASONRY UNIT WALL - SEE STRUCTURAL SHEETS F.A.I.
62	(E) CONCRETE COLUMN

KEYPLAN:



AGENCY APPROVAL

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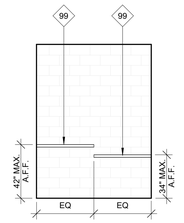
SHEET TITLE

ENLARGED CEILING PLANS - TYPICAL DAYROOM TIER

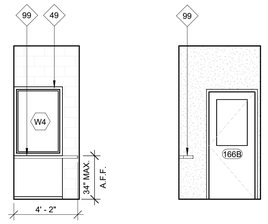
SHEET NO.

A542

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

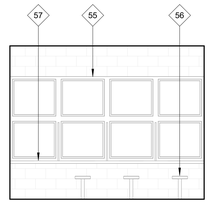


30B E140 - EAST
1/4" = 1'-0"



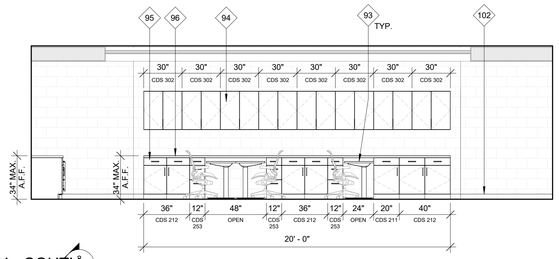
25B E166 - EAST
1/4" = 1'-0"

25C E166 - SOUTH
1/4" = 1'-0"



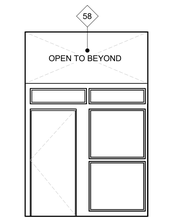
20D E144 - WEST
1/4" = 1'-0"

ROOM E144A SIM. O.H.

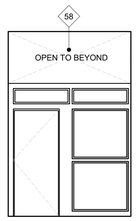


10C E174 - SOUTH
1/4" = 1'-0"

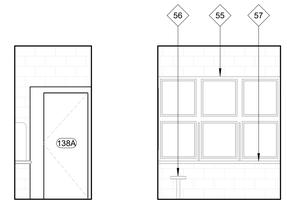
A410



29A E180 - NORTH
1/4" = 1'-0"

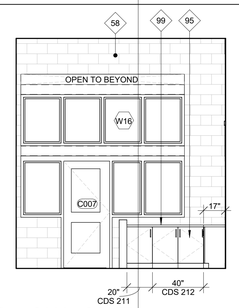


24B E179 CONTROL DOOR (E180 SIM.)
1/4" = 1'-0"

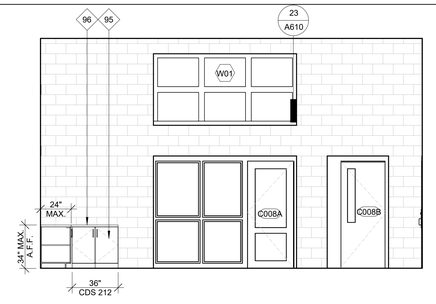


19A E138 - NORTH
1/4" = 1'-0"

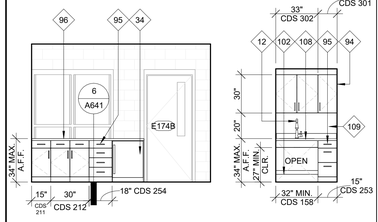
19D E138 - WEST
1/4" = 1'-0"



9C C008 - SOUTH
1/4" = 1'-0"

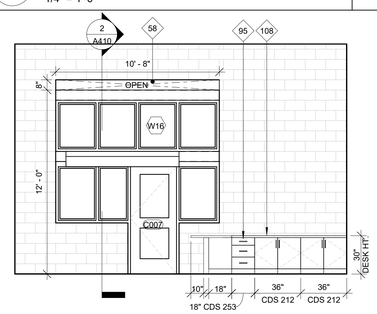


9D C008 - WEST
1/4" = 1'-0"

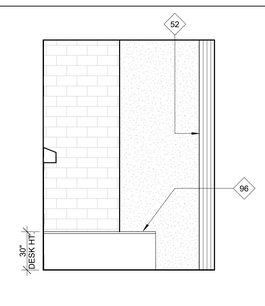


28B E174 - EAST
1/4" = 1'-0"

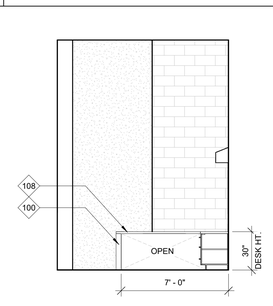
28D E174 - WEST
1/4" = 1'-0"



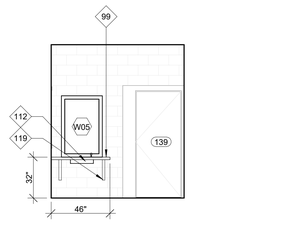
23A C006 - NORTH
1/4" = 1'-0"



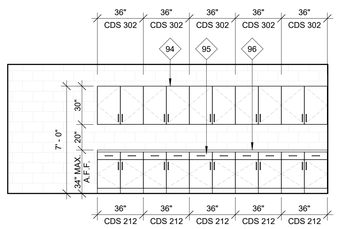
23B C006 - EAST
1/4" = 1'-0"



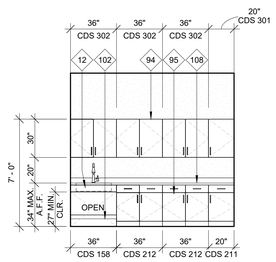
23C C006 - WEST
1/4" = 1'-0"



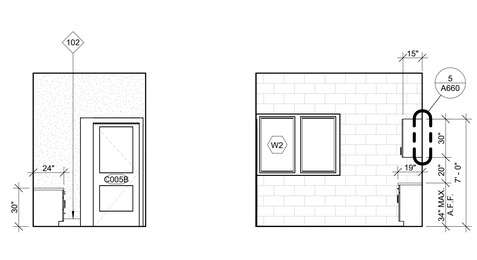
3D E139 - WEST
1/4" = 1'-0"



27A E172 - NORTH
1/4" = 1'-0"



22C E159 - SOUTH
1/4" = 1'-0"

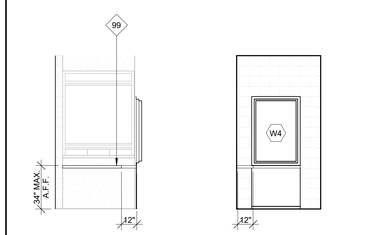


17A C005 - NORTH
1/4" = 1'-0"

17B C005 - EAST
1/4" = 1'-0"

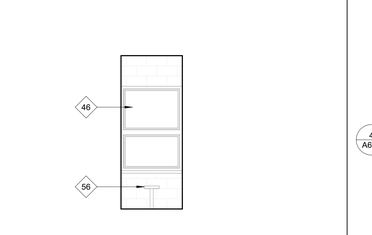
17C C005 - SOUTH
1/4" = 1'-0"

17D C005 - WEST
1/4" = 1'-0"



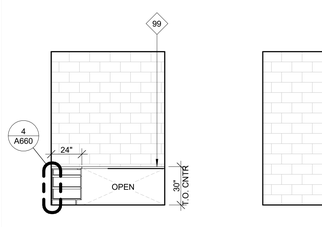
26C E167 - SOUTH
1/4" = 1'-0"

26D E167 - WEST
1/4" = 1'-0"

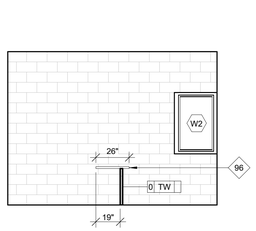


21D E145 - WEST
1/4" = 1'-0"

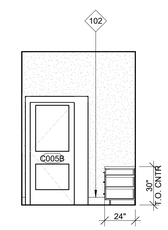
ROOM E145A SIM. O.H.



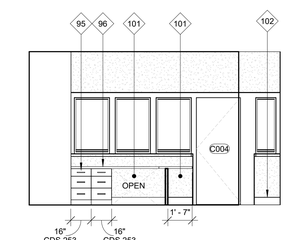
16A C004 - NORTH
1/4" = 1'-0"



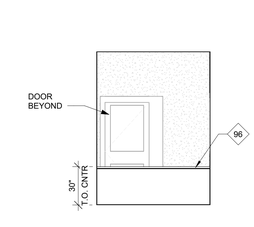
16B C004 - EAST
1/4" = 1'-0"



16C C004 - SOUTH STAFF SIDE
1/4" = 1'-0"



16D C004 - WEST
1/4" = 1'-0"



16E C004 - SOUTH INMATE SIDE
1/4" = 1'-0"

SHEET NOTES:

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1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. SECURITY MESH PANELS AND INSTALLATION SHALL BE BID AS ALTERNATE 1.

KEYNOTES:

#	THESE KEYNOTES APPLY TO THIS SHEET ONLY
12	SINK - SEE PLUMBING SHEETS F.A.I.
34	O.F.O.I. UNDERCOUNTER REFRIGERATOR - SEE ELECTRICAL SHEETS FOR POWER
46	(E) VISITATION WINDOW TO REMAIN
49	WINDOW, HOLLOW METAL
52	WEATHERPROOF EXPANSION JOINT - SEE DETAIL 16/A610
55	(E) VISITATION WINDOW SYSTEM WITH PRIVACY BARRIERS TO REMAIN
56	(E) FLOOR MOUNTED METAL STOOLS TO REMAIN
57	(E) COUNTER TO REMAIN
58	OPEN TO BEYOND
93	SYSTEMS FURNITURE SIT-STAND DESK & CHAIR, O.F.O.I.
94	P. LAM UPPER CASEWORK (PL1), SEE FINISH LEGEND ON SHEET A800 F.A.I.
95	P. LAM BASE CASEWORK (PL1), SEE FINISH LEGEND ON SHEET A800 F.A.I.
96	P. LAM COUNTERTOP (PL2), SEE FINISH LEGEND ON SHEET A800 F.A.I.
99	STAINLESS STEEL COUNTERTOP (STC), SEE SPECIFICATION F.A.I.
100	CASEWORK (PL1) CLOSURE PANEL, SEE FINISH LEGEND ON SHEET A800 F.A.I.
101	27" MIN. KNEE CLEARANCE, OPEN BELOW WORK SURFACE
102	WALL BASE (RB1), SEE FINISH LEGEND ON SHEET A800 F.A.I.
108	SOLID SURFACE COUNTERTOP (SS1), SEE FINISH LEGEND ON SHEET A800 F.A.I.
109	EPOXY PAINT (PC1), THIS WALL. FINISH LEGEND ON A800 AND SPECIFICATION F.A.I.
112	COUNTER HEIGHT PASS THRU. SEE DETAILS 26 & 27/A630
118	BACKSPLASH TO BOTTOM OF WINDOW
119	UNDER COUNTER SUPPORT BRACKET. SEE DETAIL 11/A660 F.A.I.

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916.329.4000

REGISTERED ARCHITECT — No. C-25272 — May 31, 2027

ARCHITECT

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REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

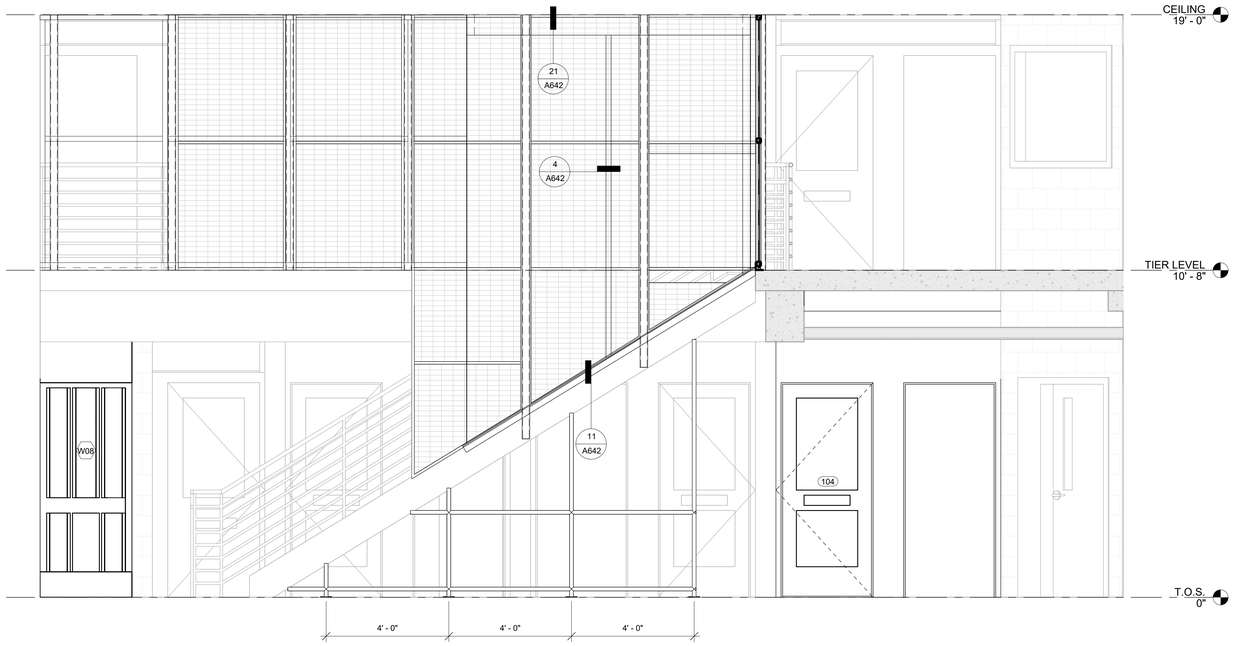
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SHEET TITLE

INTERIOR ELEVATIONS

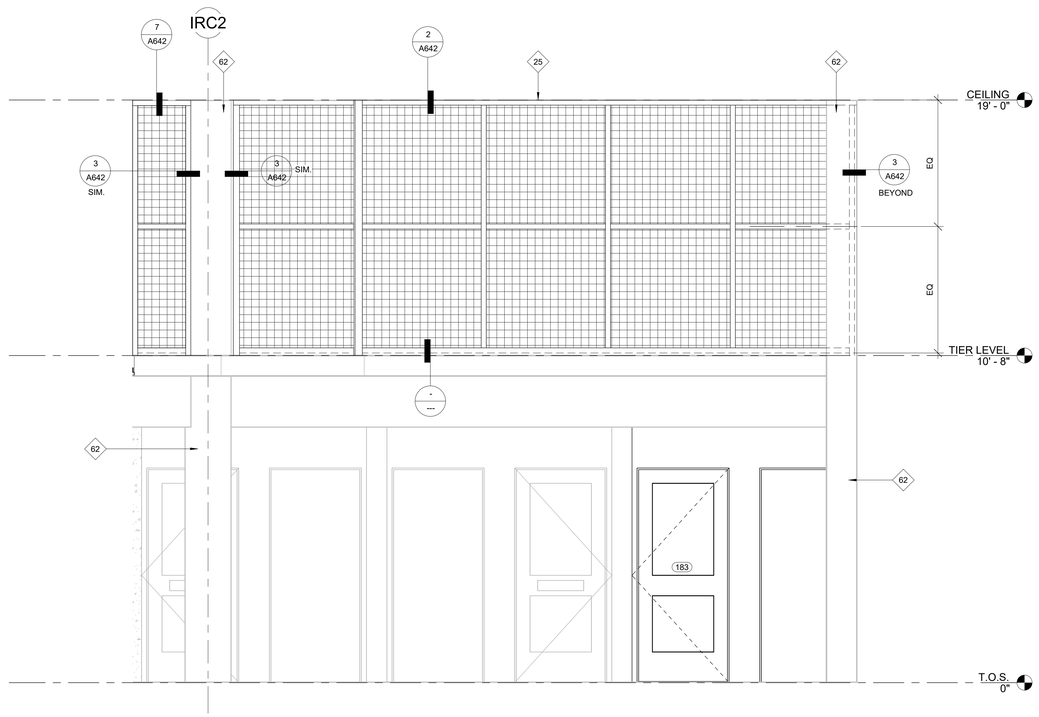
SHEET NO.

A550



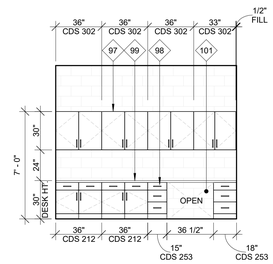
28D E100 DAYROOM WEST ELEVATION

1/2" = 1'-0"



26A E100 DAYROOM NORTH ELEVATION

1/2" = 1'-0"



6B E160 - EAST

1/4" = 1'-0"

SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. FOR ALL MOUNTING HEIGHTS AND CLEARANCES OF ALL ACCESSORIES, SEE SHEET A641.
2. SECURITY MESH PANELS AND INSTALLATION SHALL BE BID AS ALTERNATE 1.

KEYNOTES:

◇ # THESE KEYNOTES APPLY TO THIS SHEET ONLY

25 SECURITY MESH PANELS (BID ALTERNATE 1) - SEE SHEET A420

62 (E) CONCRETE COLUMN

97 STAINLESS STEEL UPPER CASEWORK (STC), SEE SPECIFICATION F.A.I.

98 STAINLESS STEEL BASE CASEWORK (STC), SEE SPECIFICATION F.A.I.

99 STAINLESS STEEL COUNTERTOP (STC), SEE SPECIFICATION F.A.I.

101 27" MIN. KNEE CLEARANCE, OPEN BELOW WORK SURFACE

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Exp. 01.31.2025

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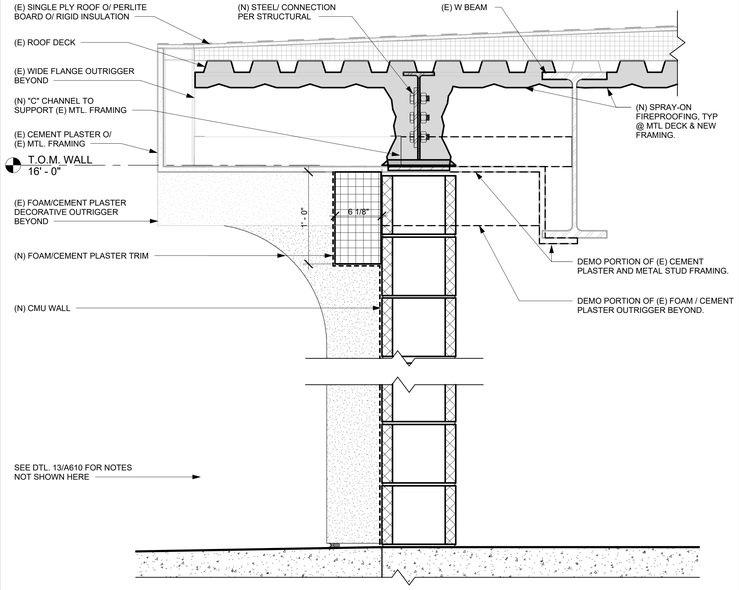
INTERIOR ELEVATIONS

SHEET NO.

A551

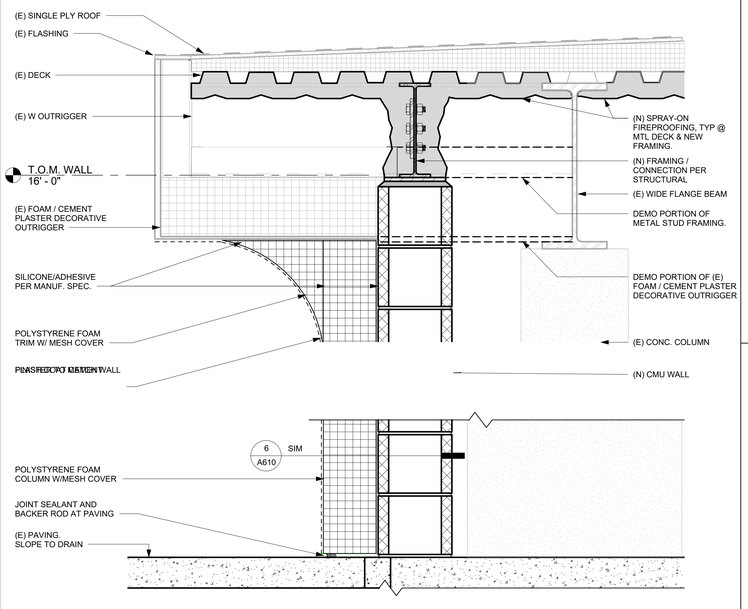
ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

ONE AND ONE-HALF INCH = ONE FOOT
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ONE INCH = TWENTY FEET



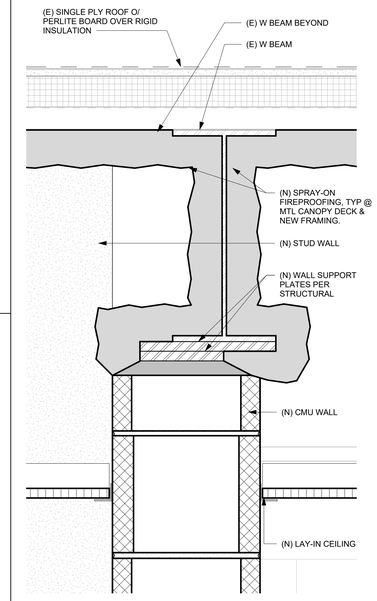
23 NEW CMU WALL TO (E) CANOPY

1 1/2" = 1'-0"



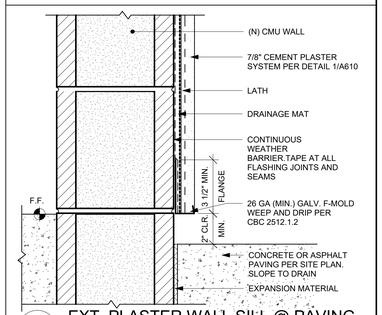
13 CEMENT PLASTER COLUMN/ACCENT

1 1/2" = 1'-0"



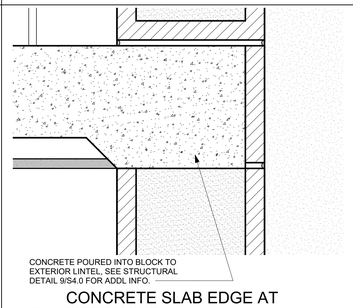
4 CANOPY - BEAM DTL

3" = 1'-0"



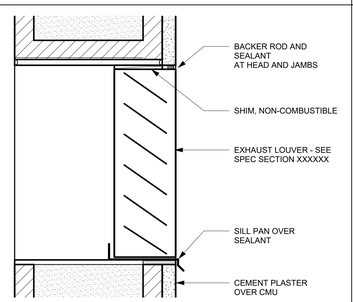
3 EXT. PLASTER WALL SILL @ PAVING

3" = 1'-0"



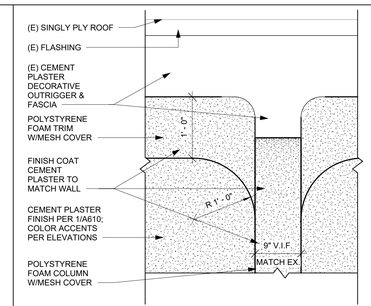
22 CONCRETE SLAB EDGE AT MEZZANINE

3" = 1'-0"



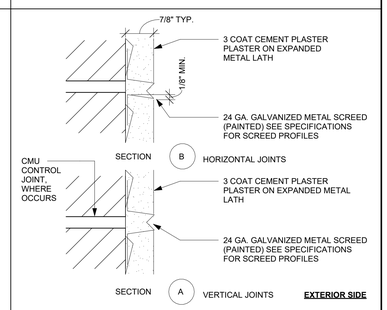
17 LOUVER SECTION

3" = 1'-0"



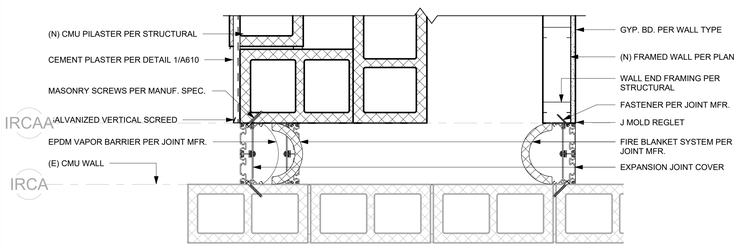
7 CEMENT PLASTER TRIM ELEVATION

1" = 1'-0"



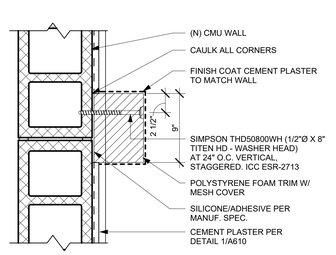
2 CEM. PLASTER CONTROL JOINT

6" = 1'-0"



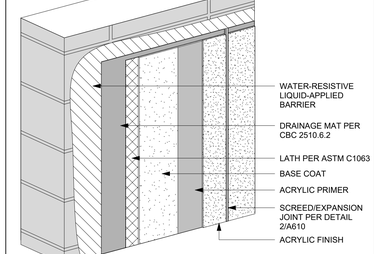
16 CANOPY - EXPANSION JOINT DTL

1 1/2" = 1'-0"



6 CEMENT PLASTER TRIM @ CMU WALL (TYP.)

1 1/2" = 1'-0"



1 CEMENT PLASTER SYSTEM DIRECT TO CMU

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SHEET TITLE

EXTERIOR DETAILS

SHEET NO.

A610

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

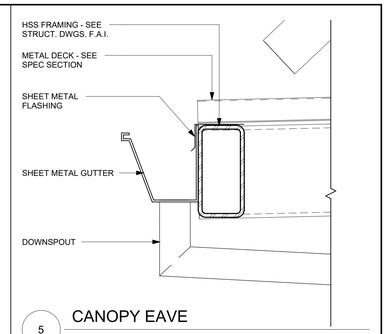
ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

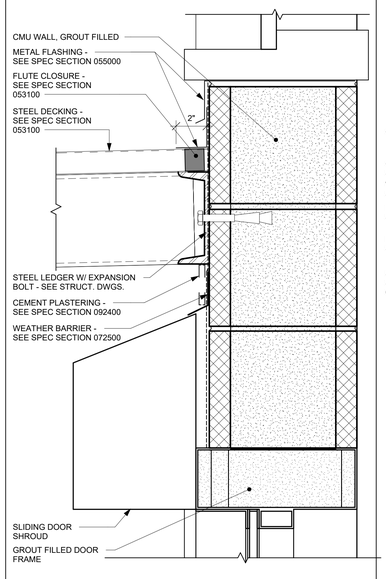
ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

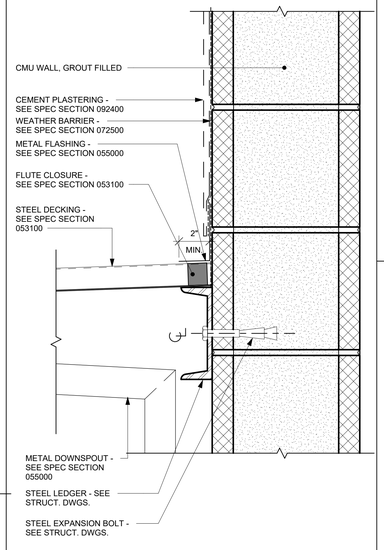
ONE INCH = TWENTY FEET



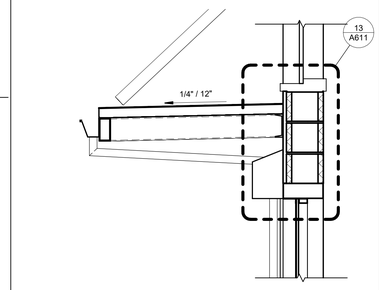
5 CANOPY EAVE
3" = 1'-0"



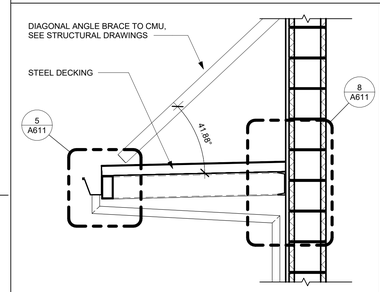
13 CANOPY TO WALL AT WINDOW
3" = 1'-0"



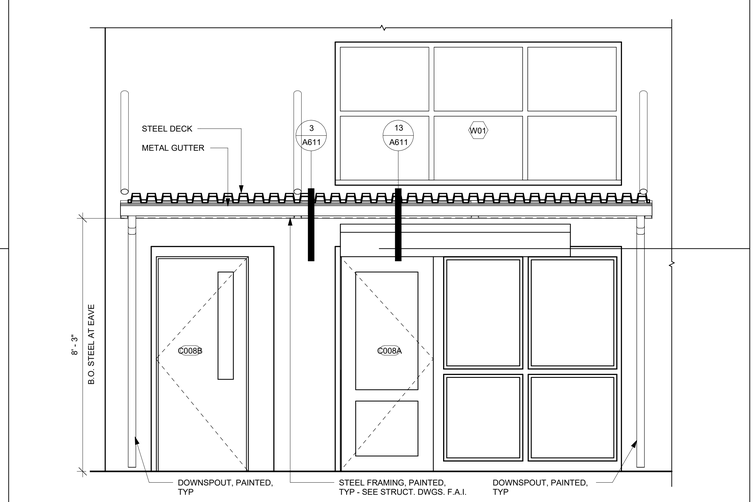
8 CANOPY TO WALL
3" = 1'-0"



4 CANOPY SECTION AT WINDOW
3/4" = 1'-0"

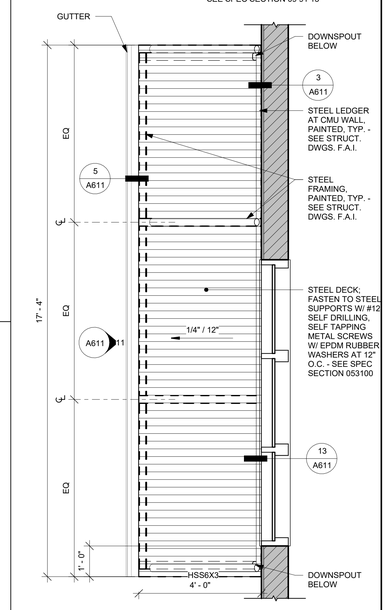


3 CANOPY SECTION
3/4" = 1'-0"



11 CANOPY ELEVATION
1/2" = 1'-0"

NOTE: ALL EXPOSED SHEET METAL AND STEEL FOR CANOPY SHALL BE PAINTED - SEE SPEC SECTION 09 91 13



1 CANOPY PLAN
1/2" = 1'-0"

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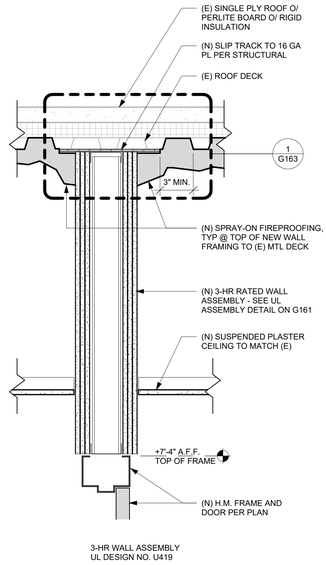
JOB NO. Y2213.00

SHEET TITLE

CANOPY DETAILS

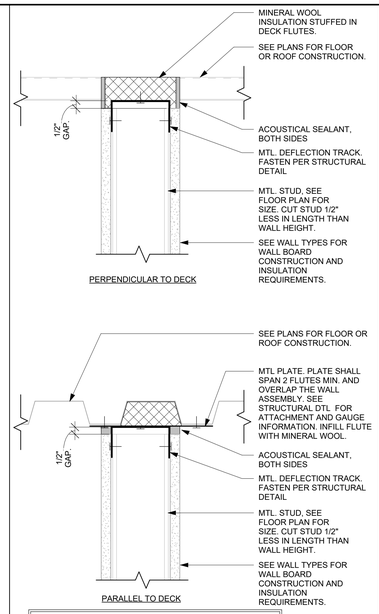
SHEET NO.

A611



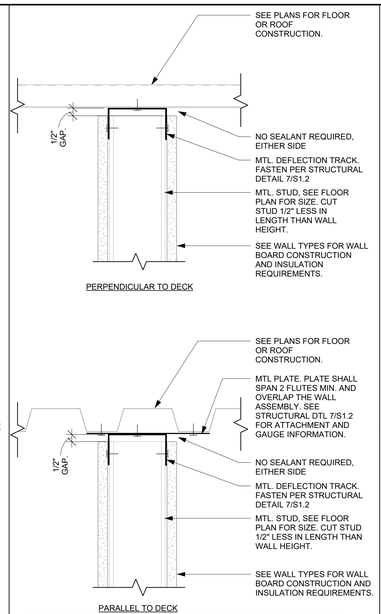
3-HR WALL ASSEMBLY
UL DESIGN NO. U419

24 METAL FRAMED WALL @ 3-HR DOOR
1 1/2" = 1'-0"



A - ACOUSTICAL TERMINATION: BOTH SIDES OF WALL AND FINISH SHALL TERMINATE AT BOTTOM OF ROOF DECK WITH CONTINUOUS SEALANT JOINT.

19 WALL TERMINATION - A
3" = 1'-0"

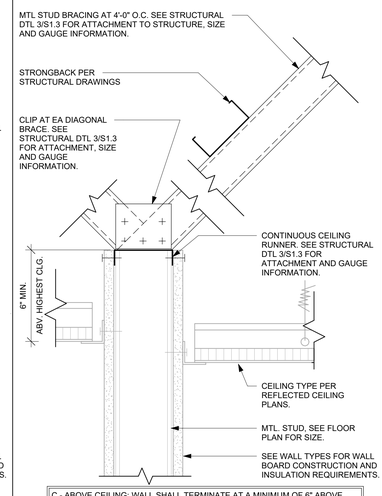


B - BOTH SIDES TO STRUCTURE TERMINATION: BOTH SIDES OF WALL AND FINISH SHALL TERMINATE AT BOTTOM OF ROOF DECK. SEE DETAIL XXXX/XXXX AT FURRING LOCATIONS.

14 WALL TERMINATION - B
3" = 1'-0"

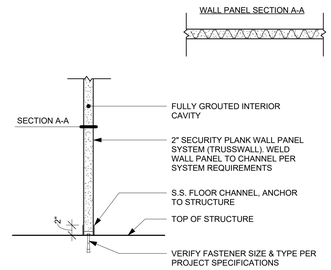
NOTE:

1. SEE STRUCTURAL DRAWINGS FOR BRACING ATTACHMENT AT STRUCTURE.
2. 12'-0" MAXIMUM DIAGONAL BRACING LENGTH TO STRUCTURE ABOVE.
3. LOCATE BRACING WITHIN 12" OF DOOR / WINDOW JAMB STUDS AND / OR PROVIDE ADDITIONAL BRACING AT JAMBS.

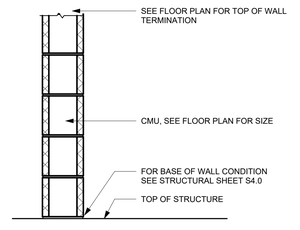


C - ABOVE CEILING: WALL SHALL TERMINATE AT A MINIMUM OF 6" ABOVE HIGHEST ADJOINING CEILING U.O.N. ON PLANS. TERMINATE 1 FULL COURSE ABOVE AT FURRED MASONRY WALLS. SEE DETAIL XXXX/XXXX AT FURRING LOCATIONS.

9 WALL TERMINATION - C
3" = 1'-0"



4 WALL TYPE TW
1" = 1'-0"



PARTITION TYPE VARIATIONS

NONE

3 WALL TYPE C
1" = 1'-0"

SHEET NOTES:

1. GYPSUM BOARD FASTENERS: 1 5/8" LONG TYPE S SCREWS SPACED 8" O.C. ALONG EDGES AND 12" IN THE FIELD U.O.N.
2. METAL STUD SPACING SHALL BE 16" U.O.N.
3. ALL PARTITION TYPES INDICATED ARE INDEPENDENT OF APPLIED FINISHES. SEE FINISH PLAN / SCHEDULE FOR ADDITIONAL INFORMATION REGARDING APPLIED FINISHES.

WALL TERMINATION LEGEND

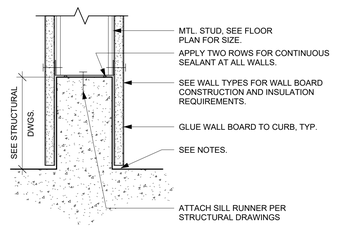
A - ACOUSTICAL
SEE DETAIL 19/A610

B - BOTH SIDES TO STUCTURE
SEE DETAIL 14/A610

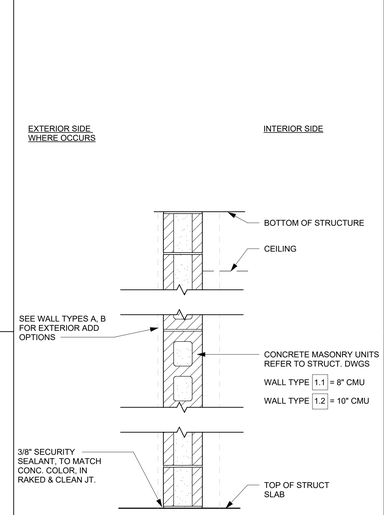
C - ABOVE CEILING
SEE DETAIL 9/A610

17 TRUSSWALL TO CMU
3" = 1'-0"

NOTE:
1. APPLY SEALANT ON BOTH SIDES AT ALL PRIVATE OFFICES, CONFERENCE ROOMS, RESTROOMS AND ACOUSTICALLY RATED WALLS.
2. FOR FIRE RATED WALLS, SEE UL FOR SPECIFIC FIRE SEALANT MATERIAL AND GAP DIMENSION REQUIREMENTS.
3. SEE STRUCTURAL DRAWINGS FOR AREAS TO RECEIVE A CONCRETE CURB.

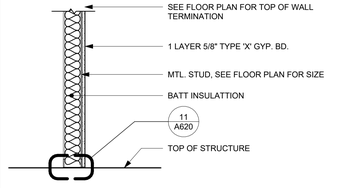


12 WALL TERMINATION AT CONC. CURB
3" = 1'-0"



6 EXTERIOR PARTITION
1" = 1'-0"

FULL HEIGHT MASONRY WALL UP TO 4 HR FIRE RATED (UL NO. U901)

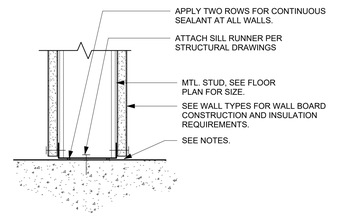


PARTITION TYPE VARIATIONS

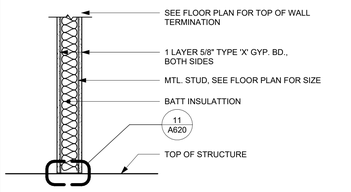
A - REPLACE GYP. BD. WITH WATER RESISTANT GYPSUM BOARD ON TOILET ROOM / SINK / DF SIDE OF WALL

2 WALL TYPE B - FURRING
1" = 1'-0"

NOTE:
1. APPLY SEALANT ON BOTH SIDES AT ALL PRIVATE OFFICES, CONFERENCE ROOMS, RESTROOMS AND ACOUSTICALLY RATED WALLS.
2. FOR FIRE RATED WALLS, SEE UL FOR SPECIFIC FIRE SEALANT MATERIAL AND GAP DIMENSION REQUIREMENTS.
3. SEE STRUCTURAL DRAWINGS FOR AREAS TO RECEIVE A CONCRETE CURB. SEE DETAIL 12/A620 FOR CONSTRUCTION OF CONCRETE CURB.



11 WALL TERMINATION AT SILL
3" = 1'-0"

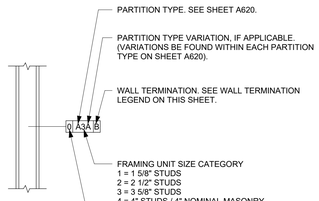


PARTITION TYPE VARIATIONS

A - REPLACE GYP. BD. WITH WATER RESISTANT GYPSUM BOARD ON TOILET ROOM / SINK / DF SIDE OF WALL

1 WALL TYPE A
N.T.S.

WALL TAG SYMBOL LEGEND



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STATE OF CALIFORNIA — No. C-25272 — May 31, 2027

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

PARTITION TYPES

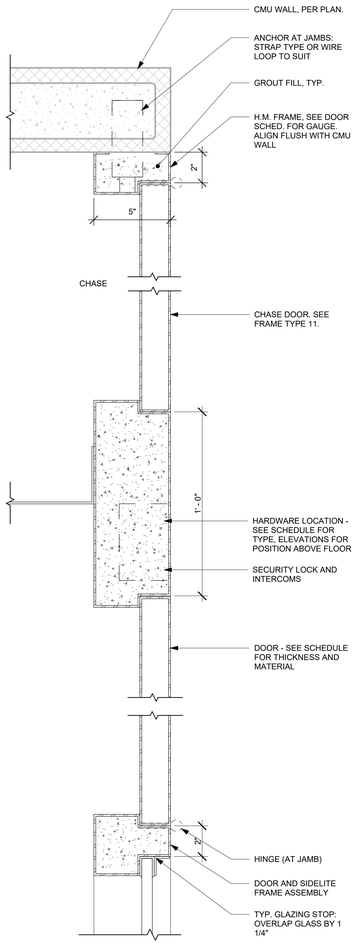
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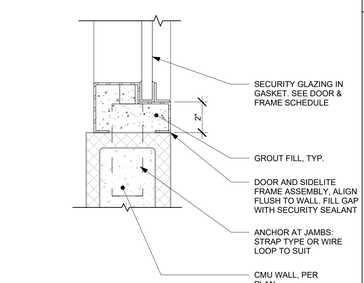
A620

ONE INCH = TWENTY FEET 0 5 10 20 40 60 80
ONE-SIXTEENTH INCH = ONE FOOT 0 4 8 16 32
ONE-EIGHTH INCH = ONE FOOT 0 4 8 16
ONE-QUARTER INCH = ONE FOOT 0 4 8
THREE-QUARTERS INCH = ONE FOOT 0 6 2
ONE-HALF INCH = ONE FOOT 0 4
ONE INCH = ONE FOOT 0 6
ONE AND ONE-HALF INCH = ONE FOOT 0 6 1

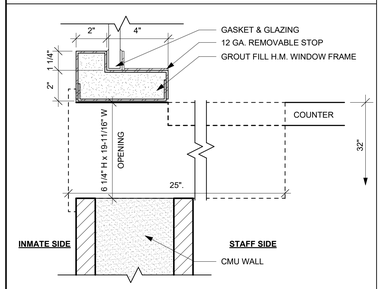
ONE AND ONE-HALF INCH = ONE FOOT
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THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

NOTES:
1. COORDINATE OUTSIDE FRAME DIMENSIONS WITH ROUGH OPENING. LIMIT GAP TO 1/4" MAX. FILL GAP WITH SECURITY SEALANT AND GROUT. FLUSH FRAMES ARE NEEDED TO FACILITATE A FLUSH MOUNTING OF FURNISHINGS TO BOTH THE WALL AND FRAME.
2. SECURITY H.M. FRAMES PROFILE: SINGLE RABBET WITH A STOP RETURN OF 3/4" TYP. AT DOORS AND 1-1/2" TYP. AT GLASS FOR GLAZING STOP

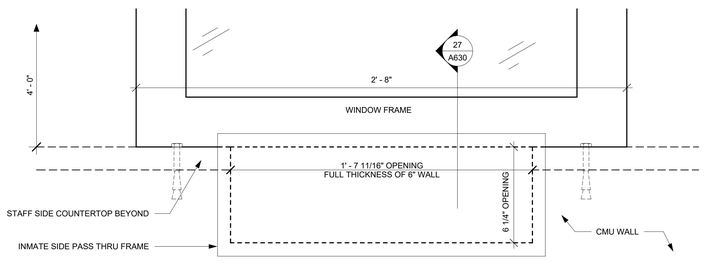




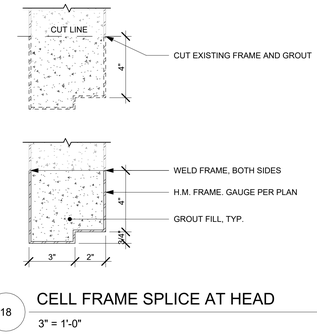
22 CELL WITH SIDELITE AND CHASE
3" = 1'-0"



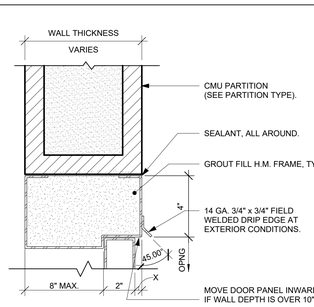
27 WINDOW SILL AT CONCRETE W/ PASS-THRU
3" = 1'-0"



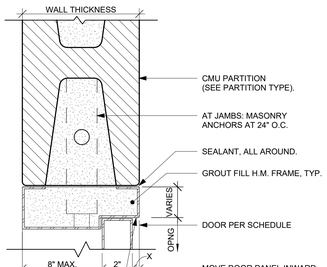
26 WINDOW SILL AT CONCRETE W/ PASS THRU ELEVATION
3" = 1'-0"



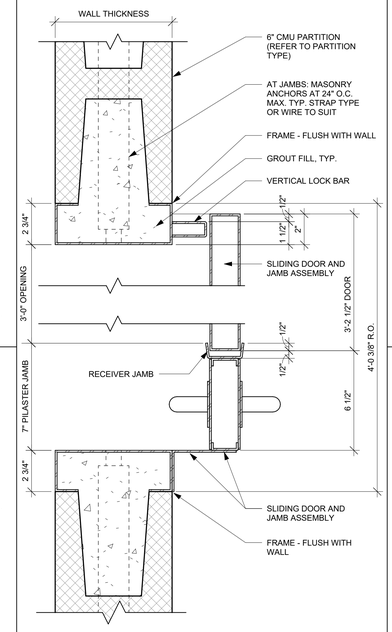
18 CELL FRAME SPLICE AT HEAD
3" = 1'-0"



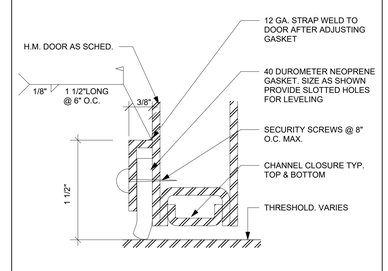
17 DOOR HEAD AT CMU
3" = 1'-0"



16 DOOR JAMB AT CMU
3" = 1'-0"

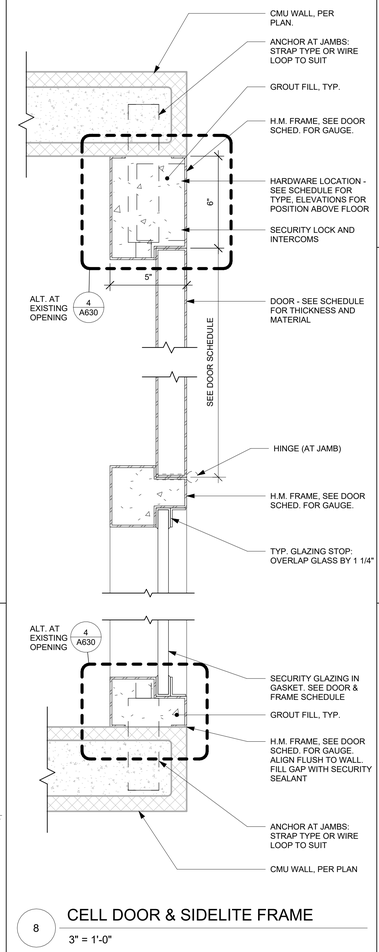


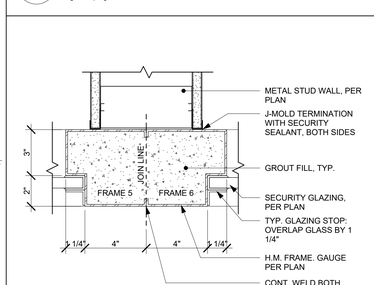
12 JAMBS AT SLIDING DOOR
3" = 1'-0"



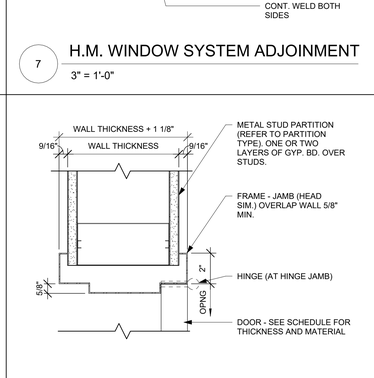
11 SPECIAL DOOR SWEEP
NOT TO SCALE

NOTES:
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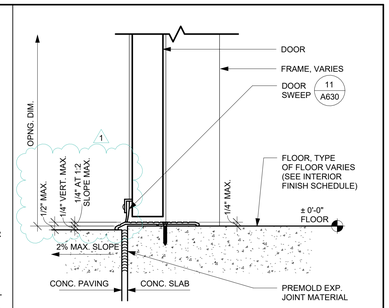




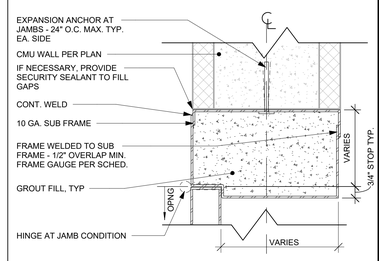
8 CELL DOOR & SIDELITE FRAME
3" = 1'-0"



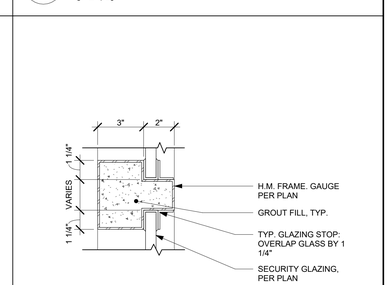
7 H.M. WINDOW SYSTEM ADJOINMENT
3" = 1'-0"



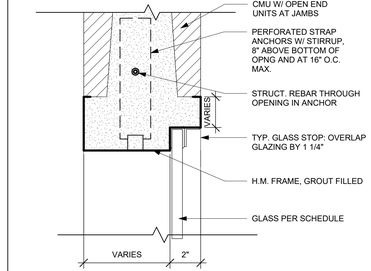
5 EXT. ACSB DOOR SILL
3" = 1'-0"



4 POST INSTALLED H.M. FRAME @ CMU
3" = 1'-0"
(JAMB CONDITION SIM.)



3 H.M. MULLION AT DOOR/GLASS, TYP.
3" = 1'-0"



2 H.M. MULLION AT GLASS, TYP.
3" = 1'-0"

6 H.M. FRAME IN STUD WALL
3" = 1'-0"

1 HEAD/JAMB/SILL AT CMU
3" = 1'-0"

AGENCY APPROVAL

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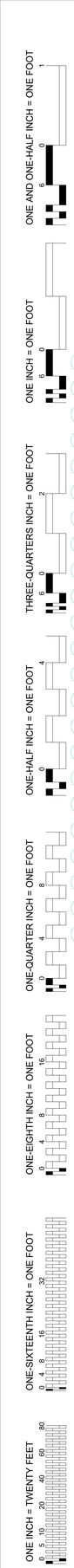
NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

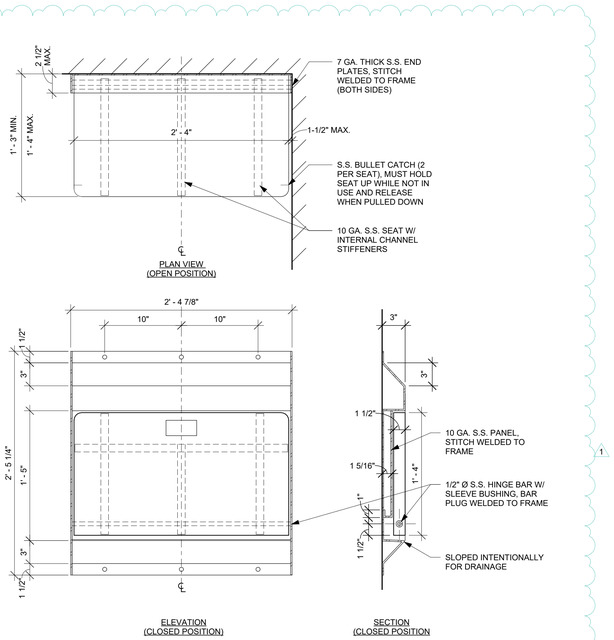
DATE 2/25/25
JOB NO. Y2213.00
SHEET TITLE

OPENING DETAILS

SHEET NO.

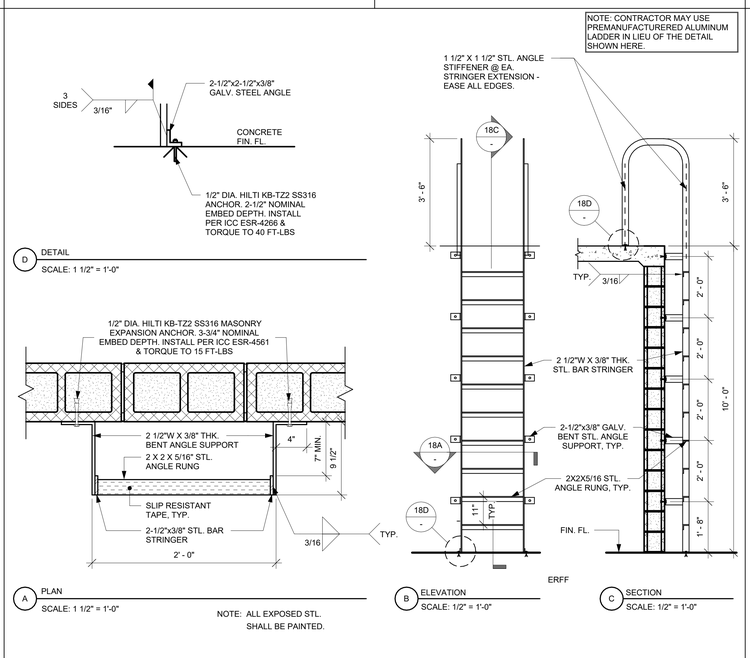
A630





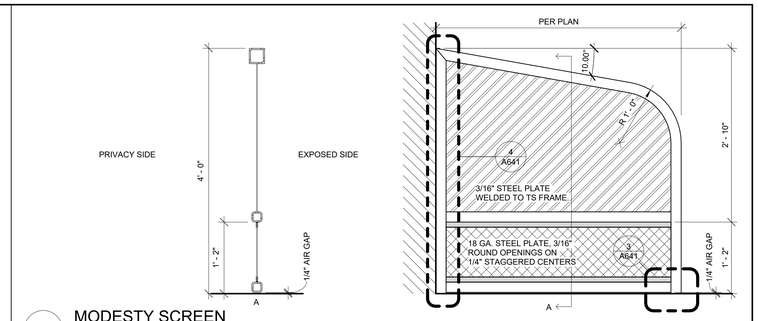
28 FOLDING S.S. SHOWER SEAT

1 1/2" = 1'-0"



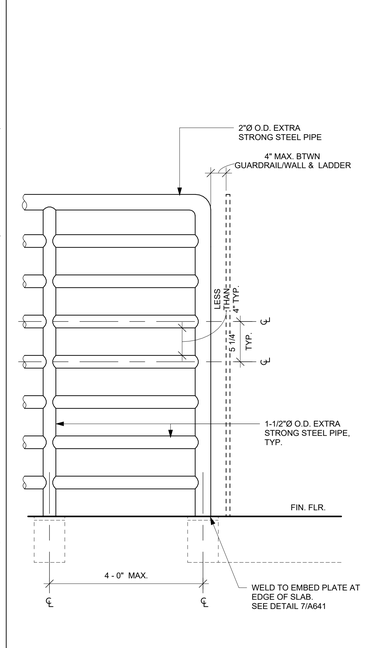
18 FIXED LADDER - MECH. ACCESS

VARIES - SEE DETAIL



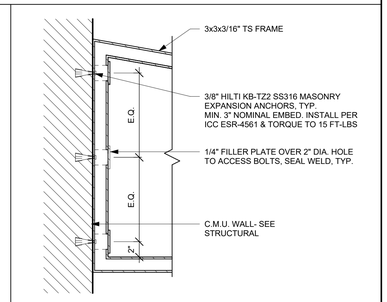
10 MODESTY SCREEN

1" = 1'-0"



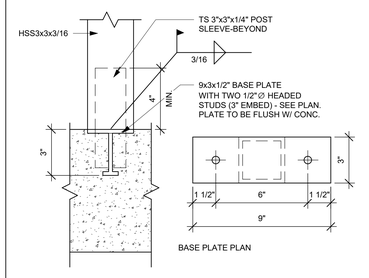
8 GUARDRAIL AT MECH. MEZZANINE

1 1/2" = 1'-0"



4 MODESTY ANCHORAGE

1 1/2" = 1'-0"

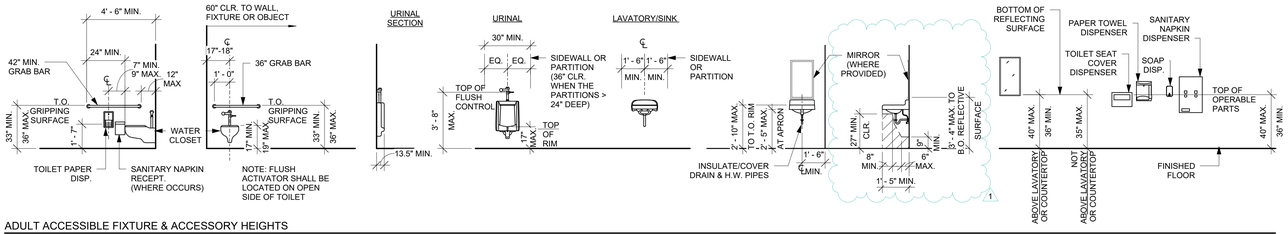


3 MODESTY ANCHORAGE

3" = 1'-0"

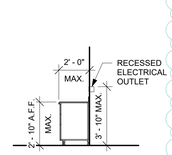
NOTES:

1. WHERE TOWELS, SANITARY NAPKINS, WASTE RECEPTACLES, DISPENSERS AND OTHER EQUIPMENT AND CONTROLS ARE PROVIDED, AT LEAST ONE OF EACH TYPE SHALL BE LOCATED ON AN ACCESSIBLE ROUTE, WITH ALL OPERABLE PARTS, INCLUDING COIN SLOTS, PLACED WITHIN THE HEIGHTS SHOWN IN THIS DETAIL.
2. PROVIDE BACKING FOR ALL WALL HUNG ACCESSORIES. FOR TYPICAL ANCHORAGE AT METAL STUD WALLS - SEE DETAIL
3. FLUSH CONTROLS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING OR TWISTING OF THE WRIST.
4. FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND NOT REQUIRE TIGHT GRASPING, PINCHING OR TWISTING OF THE WRIST.
5. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 lbf.



ADULT ACCESSIBLE FIXTURE & ACCESSORY HEIGHTS

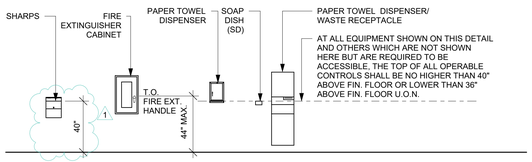
(SEE ADDITIONAL PLANS, ELEVATIONS, AND DETAILS FOR FURTHER ACCESSIBILITY REQUIREMENTS)



NOTE: 24" MAX. DIMENSION FROM WALL INCLUDES FACE OF CASEWORK DOOR AND/OR COUNTER EDGE

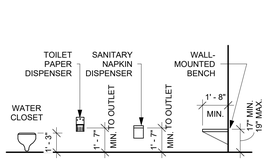
ADA SIDE REACH

AT COUNTERTOPS

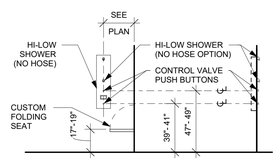


ADULT ACCESSIBLE FIXTURE & ACCESSORY HEIGHTS CONTINUED

(SEE ADDITIONAL PLANS, ELEVATIONS, AND DETAILS FOR FURTHER ACCESSIBILITY REQUIREMENTS)



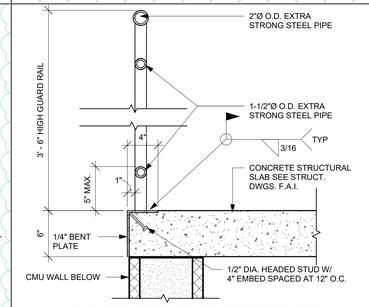
STANDARD FIXTURE & ACCESSORY HEIGHTS



IN AREAS SUBJECT TO EXCESSIVE VANDALISM

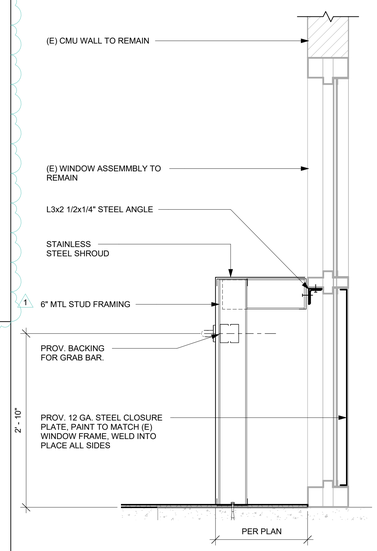
26 ACCESSIBLE MOUNTING HEIGHTS

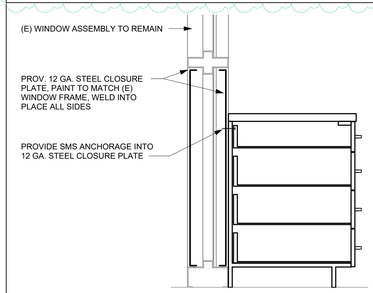
1/4" = 1'-0"



7 GUARDRAIL AT CONCRETE SLAB

1 1/2" = 1'-0"





6 CLOSURE PANEL AT WINDOW

1" = 1'-0"

1 METAL SHROUD AT WINDOW

1" = 1'-0"

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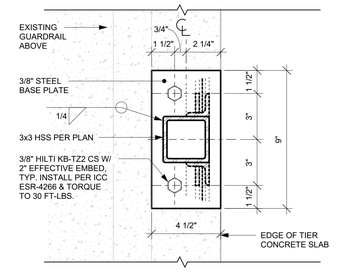
SHEET TITLE

INTERIOR DETAILS

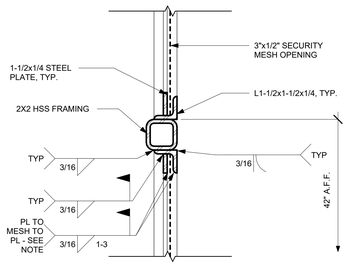
SHEET NO.

A641

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
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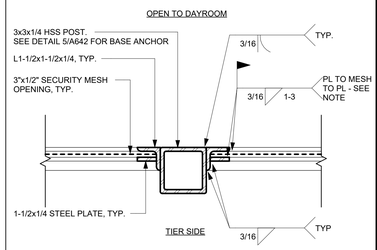


5 POST TO TIER SLAB
3" = 1'-0"



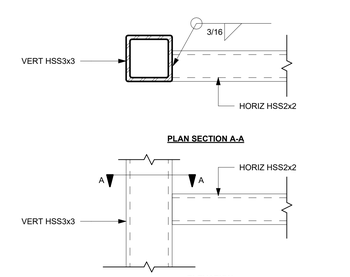
NOTE: CONTRACTOR TO PROVIDE BACKING PL. AT EACH WELD. ALIGN WELD W/ WIRE OF SECURITY MESH AND WITH WELD OPPOSITE SIDE, TYPICAL.

9 SECURITY MESH TO MIDRAIL
3" = 1'-0"

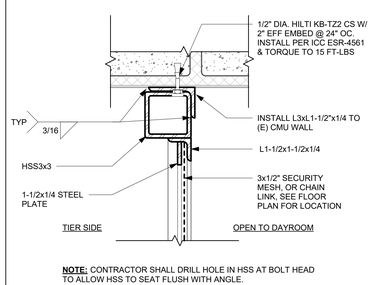


NOTE: CONTRACTOR TO PROVIDE BACKING PL. AT EACH WELD. ALIGN WELD W/ WIRE OF SECURITY MESH AND WITH WELD OPPOSITE SIDE, TYPICAL.

4 SECURITY MESH @ POST
3" = 1'-0"

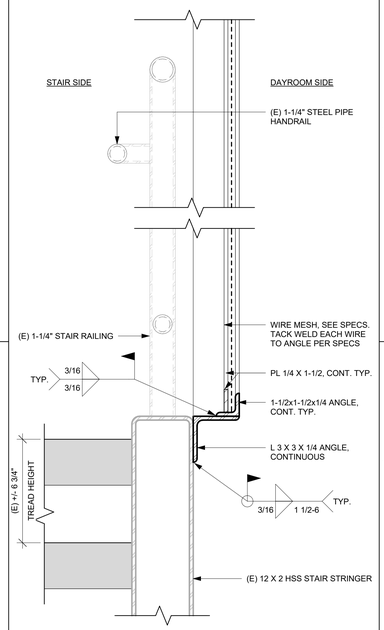


8 TYP. HSS TO HSS CONNECTIONS
3" = 1'-0"

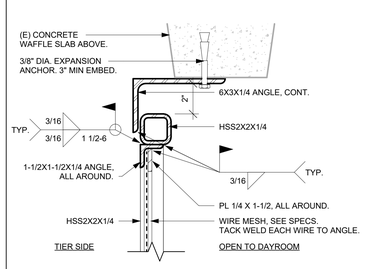


NOTE: CONTRACTOR SHALL DRILL HOLE IN HSS AT BOLT HEAD TO ALLOW HSS TO SEAT FLUSH WITH ANGLE.

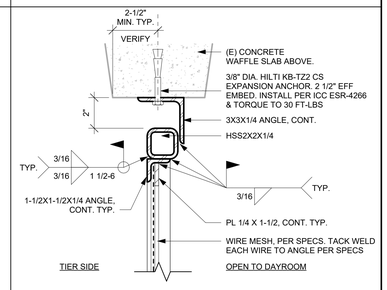
3 SECURITY MESH AT CMU WALL
3" = 1'-0"



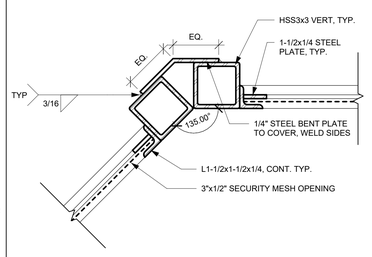
11 SECURITY MESH AT STAIR STRINGER
3" = 1'-0"



7 SECURITY MESH AT CEILING - OFFSET
3" = 1'-0"



2 SECURITY MESH AT CEILING
3" = 1'-0"



6 SECURITY MESH JOINT @ ANGLE
3" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER — No. C-25272 — Exp. May 31, 2027 — CIVIL — STATE OF CALIFORNIA

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95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

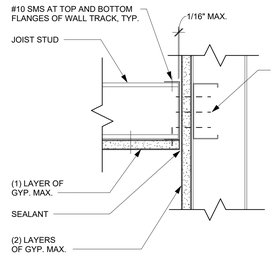
SHEET TITLE

NO CLIMB FENCING DETAILS - ADD ALTERNATE ONLY

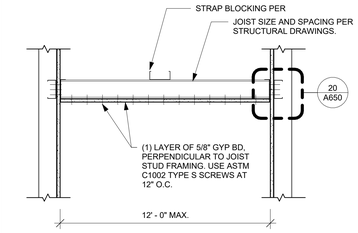
SHEET NO.

A642

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

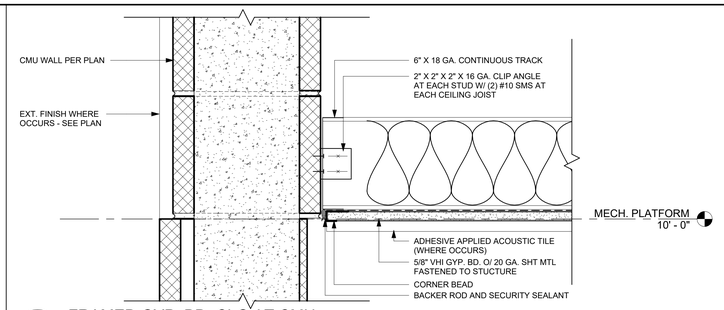


20 JOIST GYP BD CEILING ATTACHMENT
3" = 1'-0"

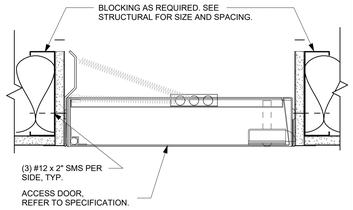


NOTE:
1. ATTACH GYP BD TO FRAMING WITH ASTM C1002 TYPE S SCREWS WITH CORROSION RESISTANT TREATMENT AT 12" O.C. MAX.
2. WHEN GYP BD IS TO BE APPLIED TO BOTH CEILING AND WALLS, GYP BD SHALL BE APPLIED FIRST TO THE CEILING AND THEN TO THE WALLS IN ACCORDANCE WITH ASTM C840.

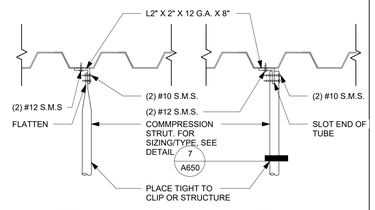
15 JOIST GYP BD CEILING SECTION
1" = 1'-0"



10 FRAMED GYP. BD. CLG AT CMU
3" = 1'-0"

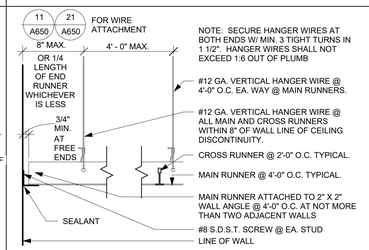


19 CEILING ACCESS DOOR
3" = 1'-0"



NOTE: PROVIDE PLATE WHERE STRUT DOES NOT HIT METAL DECK RIB LIKE SHOWN. PLATE SHALL BE 12 GAUGE, FASTEN W/ #12, 2 @ EA. FLUTE (4" W., MIN.)

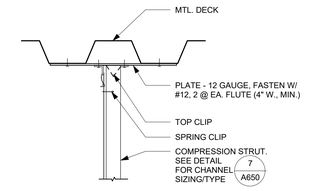
14 TUBE COMPRESSION STRUT TO DECK
1 1/2" = 1'-0"



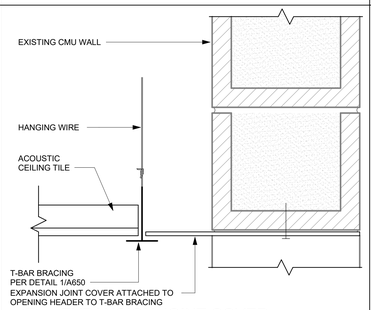
NOTE: SECURE HANGER WIRES AT BOTH ENDS W/ MIN. 3 TIGHT TURNS IN 1 1/2". HANGER WIRES SHALL NOT EXCEED 1:6 OUT OF PLUMB

NOTE: AT THE PERIMETER OF THE CEILING AREA WHERE MAIN OR CROSS RUNNERS ARE NOT CONNECTED TO THE ADJACENT WALL, PROVIDE INTERCONNECTION BETWEEN THE RUNNERS AT THE FREE END TO PREVENT LATERAL SPREADING. A METAL STRUT OR A 16 GA. WIRE WITH A POSITIVE MECHANICAL CONNECTION TO THE RUNNER MAY BE USED. WHERE THE PERPENDICULAR DISTANCE FROM THE WALL TO THE FIRST PARALLEL RUNNERS 12" OR LESS, THIS INTERLOCK IS NOT REQUIRED.

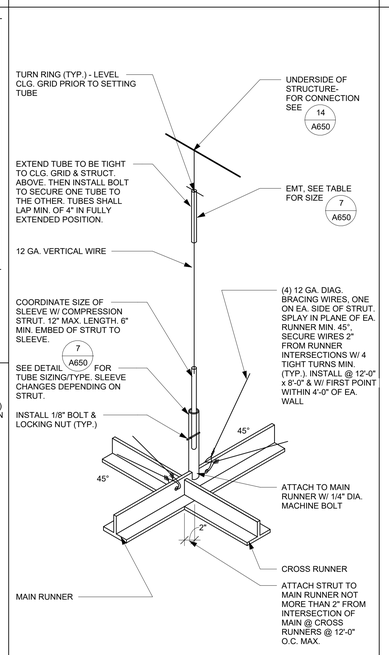
9 CEILING GRID AT WALL
1 1/2" = 1'-0"



4 CHANNEL COMPRESSION STRUT TO DECK
1 1/2" = 1'-0"



18 EXPANSION JOINT COVER
3" = 1'-0"



12 TUBE COMPRESSION STRUT
1" = 1'-0"

COMPRESSION STRUT TABLE (SUSPENDED ACOUSTICAL CEILINGS)

EMT COMPRESSION	MAXIMUM LENGTH
1/2" DIA. EMT (0.042" WALL THICKNESS)	3'-11"
3/4" DIA. EMT (0.049" WALL THICKNESS)	6'-4"
1" DIA. EMT (0.057" WALL THICKNESS)	9'-9"
1-1/4" DIA. EMT (0.065" WALL THICKNESS)	12'-9"
1-1/2" DIA. EMT (0.065" WALL THICKNESS)	14'-9"
2" DIA. EMT (0.065" WALL THICKNESS)	18'-10"

CHANNEL COMPRESSION	MAXIMUM LENGTH
250S125-33	5'-0"
250S137-33	6'-10"
362S137-33	8'-0"
250S137-43	8'-10"
400S137-43	10'-10"

NOTE: INSTALLATION SHALL BE IN ACCORDANCE WITH C.B.C.

PROVIDE TRAPEZE OR EQUIVALENT SUPPORT AT OBSTRUCTIONS TO MAIN RUNNER VERTICAL HANGERS. PROVIDE ADDITIONAL HANGERS, STRUTS, OR BRACES AS REQUIRED AT ALL CEILING BREAKS, SOFFITS OR DISCONTINUOUS AREAS.

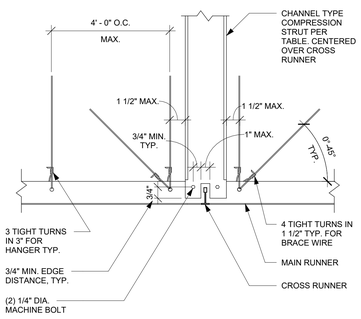
SEPARATE ALL CEILING HANGING AND BRACING WIRES AT LEAST 6" FROM ALL PIPES, DUCTS, CONDUITS ETC.

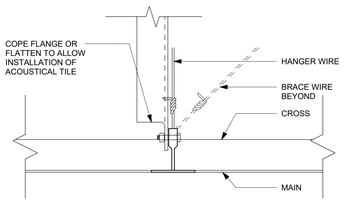
INSTALL COMPRESSION STRUT PER MANUFACTURER'S RECOMMENDATIONS. STEEL SECTION WITH L/R RATIO OF 200 MAX.

COMPRESSION STRUT TABLE (SUSPENDED GYPSUM BOARD CEILINGS)

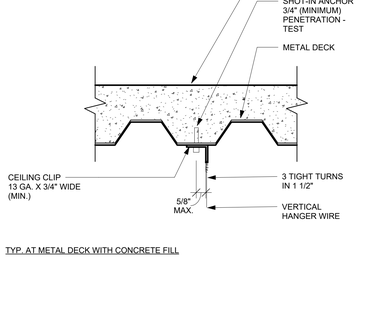
STRUT SCHEDULE	
L	STRUT
L ≤ 5'-0"	250T125-33
5'-0" < L ≤ 8'-0"	400S137-33

7 COMPRESSION STRUT TABLES
N.T.S.

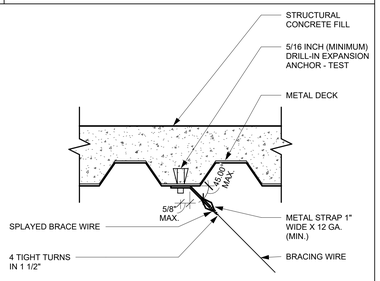




2 CHANNEL COMPRESSION STRUT
3" = 1'-0"

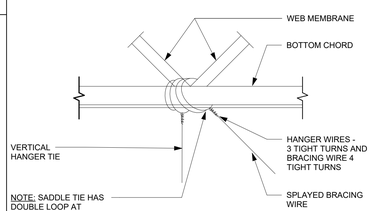


TYP. AT METAL DECK WITH CONCRETE FILL



TYP. AT METAL DECK WITH CONCRETE FILL

NOTE: IF SELF TAPPING SCREWS ARE USED



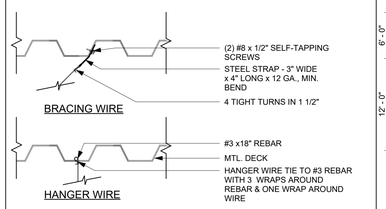
NOTE: SADDLE TIE HAS DOUBLE LOOP AT SUPPORT

TYP. AT OPEN-WEB STEEL JOIST

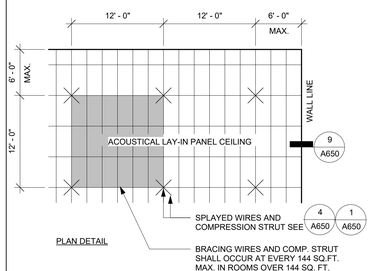
SPLAY WIRES PARALLEL TO JOIST. SPLAY WIRES CAN NOT BE PERPENDICULAR TO JOIST.

TYP. AT METAL DECK WITH CONCRETE FILL

21 BRACING WIRE ATTACHMENT AT CONC. FILLED MTL. DECK
3" = 1'-0"

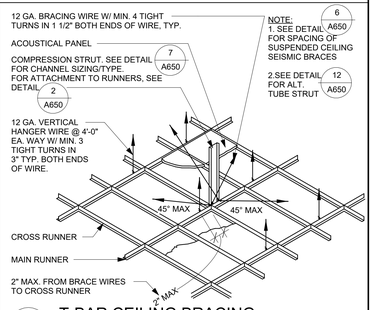


11 BRACING WIRE ATTACH. @ MTL. DECK
1 1/2" = 1'-0"



PLAN DETAIL

6 ACOUST. LAY-IN PANEL SUSP.SYST.
1/8" = 1'-0"



1 T-BAR CEILING BRACING
N.T.S.

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS
4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

CONSULTANT

nacht&lewis
600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

No. C-25272 May 31, 2027

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

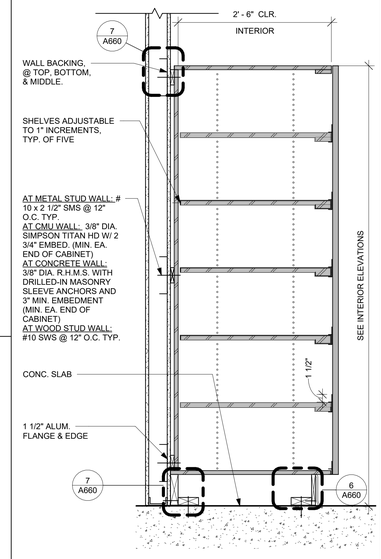
DATE 2/25/25
JOB NO. Y2213.00
SHEET TITLE

CEILING DETAILS

SHEET NO.

A650

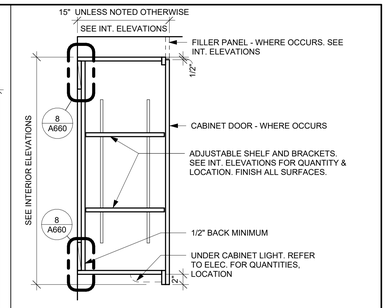
ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
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ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



NOTES:
1. PLAM ALL EXPOSED SURFACES. COLOR TO BE SELECTED BY ARCHITECT.

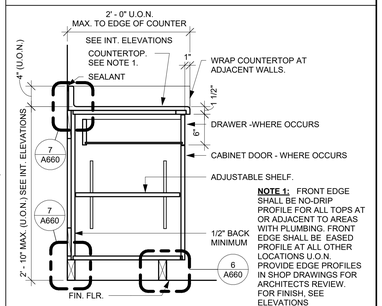
PLAM FULL HEIGHT CABINET WITH ADJUSTABLE SHELVING

9 — 1" = 1'-0"



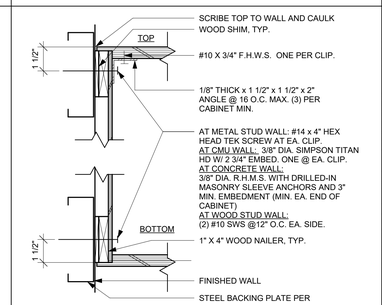
PLAM UPPER CABINET DETAIL

5 — 1" = 1'-0"



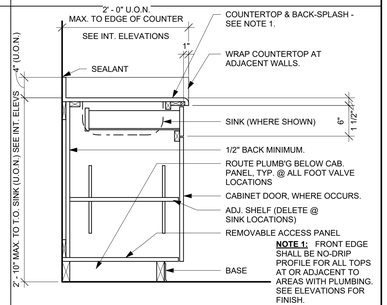
PLAM BASE CABINET

4 — 1" = 1'-0"



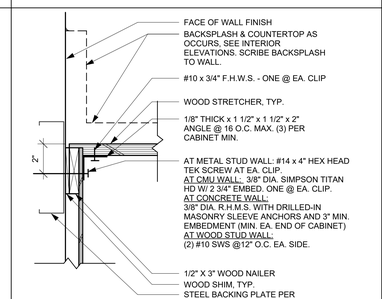
PLAM WALL HUNG CABINET ANCHORS

8 — 3" = 1'-0"



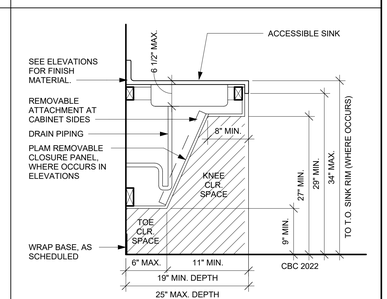
PLAM BASE CABINET W/ PLUMBING

3 — 1" = 1'-0"



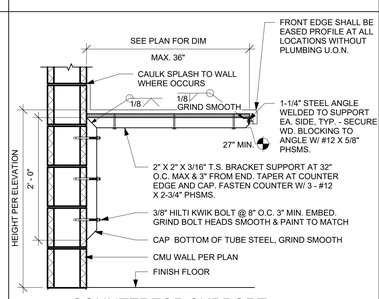
BASE/WALL PLAM CABINET ANCHOR

7 — 3" = 1'-0"



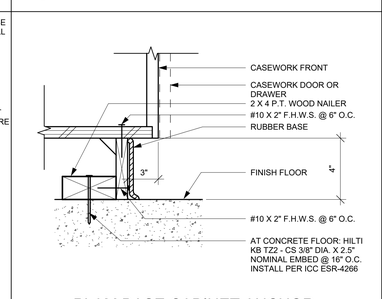
KNEE SPACE CLEARANCES

2 — 1" = 1'-0"



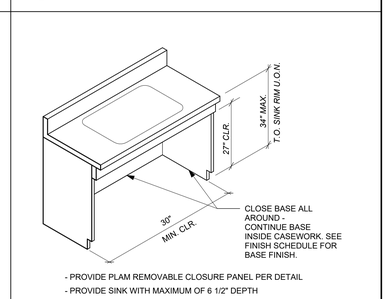
COUNTERTOP SUPPORT @ CMU WALL

11 — 1" = 1'-0"



PLAM BASE CABINET ANCHOR AT TOE KICK

6 — 3" = 1'-0"



- PROVIDE PLAM REMOVABLE CLOSURE PANEL PER DETAIL
- PROVIDE SINK WITH MAXIMUM OF 6 1/2" DEPTH

ACSB BASE CABINET W/ PLUMBING

1 — 1/4" = 1'-0"

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

CONSULTANT

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916.329.4000



ARCHITECT

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SHEET TITLE

CASEWORK DETAILS

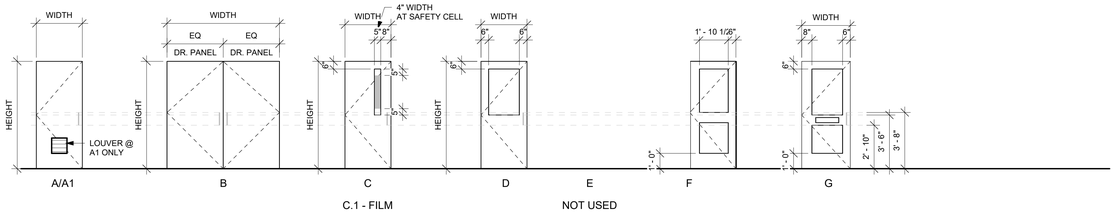
SHEET NO.

A660

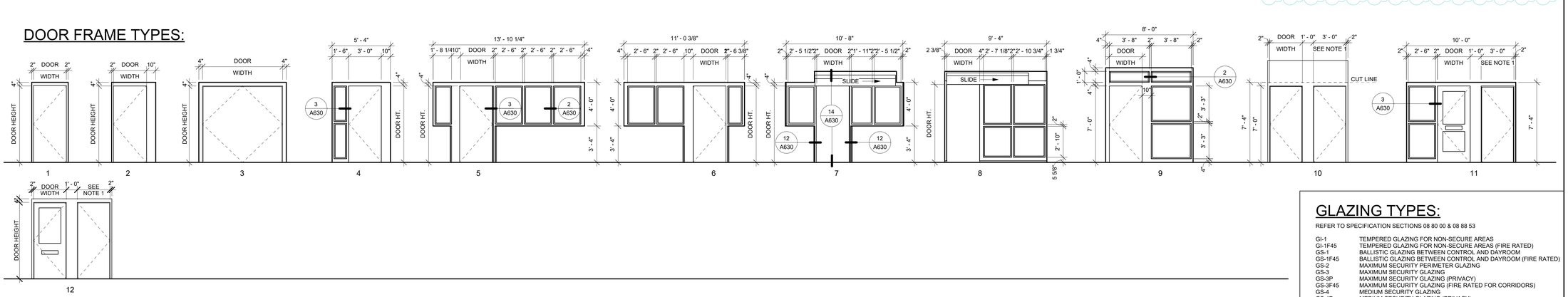
DOOR, FRAME & HARDWARE SCHEDULE (INDIVIDUAL HARDWARE)

DOOR NO.	ROOM NAME/LOCATION	DOOR OPENING WIDTH	DOOR OPENING HEIGHT	DOOR PANEL TYPE	DOOR PANEL MAT.	DOOR PANEL FINISH	DOOR PANEL GLASS TYPE	DOOR FRAME TYPE	DOOR FRAME MAT.	DOOR FRAME FINISH	DOOR FRAME GLASS TYPE	ASSEMBLY STC	ASSEMBLY FIRE RATING	REFER. ELEC. SECURITY SHEETS DOOR MONITORED	REFER. ELEC. SECURITY SHEETS SECURITY ACCESS	DETAILS (REF. AXXX) HEAD	DETAILS (REF. AXXX) JAMB	DETAILS (REF. AXXX) SILL	HARDWARE LOCK OR EXIT DEVICE	HARDWARE KEY GROUP	HARDWARE DOOR POSITION SWITCH	HARDWARE CLOSER	HARDWARE HINGES	HARDWARE PUSH/ PULL	HARDWARE FLOOR/WALL STOP	DOOR TRIM W/ STRIP & THRESHOLD	DOOR TRIM SMOKE SEAL	DOOR TRIM SOUND SEAL	INTERCOM	SCREAM DETECTOR	SIGNAGE TYPE	DOOR NO.	SPECIAL REQUIREMENTS
104	ADA CELL	3' - 0"	7' - 0"	G	HM12	P1	GS-2	10	HM12	P1	-	-	-	YES	NO	3/A630	4/A630	-	52E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	DOOR				Y		PAINT	104	
110	INMATE TOILET	3' - 0"	7' - 0"	C.1	HM12	P1	GS-3	2	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	(2) NO.4	WALL				REX		PAINT	110	CONCEALED PULL OUTSIDE TO ALLOW DOOR TO OPEN 90 DEGREES
112	4-PERSON ADA CELL	3' - 0"	7' - 0"	G	HM12	P1	GS-2	12	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	O.H.				Y	Y	PAINT	112	
113	4-PERSON ADA CELL	3' - 0"	7' - 0"	G	HM12	P1	GS-2	12	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	WALL				Y	Y	PAINT	113	
115	DETOX ADA CELL	3' - 0"	7' - 4"	G	HM12	P1	GS-2	11	HM12	P1	GS-2	-	-	YES	NO	4/A630	22/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	WALL				Y	Y	PAINT	115	
116	INTERVIEW OR OFFICE	3' - 0"	7' - 4"	G	HM12	P1	GS-3	4	HM12	P1	GS-3	-	-	YES	NO	4/A630	8/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	(2) NO.2	WALL				Y	Y	PAINT	116	
121	ADA CELL	3' - 0"	7' - 0"	G	HM12	P1	GS-2	10	HM12	P1	-	-	-	YES	NO	3/A630	4/A630	-	52E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	DOOR				Y	Y	PAINT	121	
126	CHANGE IN	3' - 0"	7' - 0"	C.1	HM14	P1	GS-4	EXISTING	-	P1	-	-	-	YES	NO	4/A630	4/A630	-	D9372		Y		(4) 4-1/2 FM-ICS		WALL				REX		PAINT	126	
128	CHANGE OUT	3' - 0"	7' - 0"	C.1	HM14	P1	GS-4	EXISTING	-	P1	-	-	-	YES	NO	4/A630	4/A630	-	D9372		Y		(4) 4-1/2 FM-ICS		WALL				REX		PAINT	128	
132	ADA CELL	3' - 0"	7' - 0"	G	HM12	P1	GS-2	10	HM12	P1	-	-	-	YES	NO	3/A630	4/A630	-	52E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	DOOR				Y	Y	PAINT	132	
136A	SOUTH CORRIDOR	3' - 0"	7' - 0"	D	HM12	P1	GS-3	2	HM12	P1	-	-	-	YES	NO	4/A630	/A630	-	56E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	(2) NO.2	WALL				Y		PAINT	136A	Ex int
139	SALLYPORT	3' - 0"	7' - 0"	D	HM12	P1	GS-3	2	HM12	P1	-	-	-	YES	NO			-	56E DEADLATCH		Y		(4) 4-1/2 FM-ICS	(2) NO.2	WALL				Y		PAINT	139	
143	SALLYPORT	3' - 0"	7' - 0"	D	HM12	P1	GS-3	2	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	56-6 DEADLATCH		Y	Y	(4) 4-1/2 FM-ICS	NO. 2/NO.4	WALL				Y		PAINT	143	CONCEALED PULL SALLYPORT SIDE TO ALLOW DOOR TO OPEN 90 DEGREES
144	SALLYPORT	3' - 0"	7' - 0"	D	HM12	P1	GS-3	2	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	56E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	(2) NO.2	WALL				Y		PAINT	144	
144A	SOUTH CORRIDOR	3' - 0"	7' - 0"	D	HM12	P1	GS-3	2	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	56E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	WALL				Y		PAINT	144A	
150	ADA CELL	3' - 0"	7' - 0"	G	HM12	P1	GS-2	10	HM12	P1	-	-	-	YES	NO	3/A630	4/A630	-	52E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	DOOR				Y	Y	PAINT	150	
155	STAFF TOILET	3' - 0"	7' - 0"	A	HM16	P1	-	1	HM16	P1	-	-	-	NO	NO			-	D9335		N		(4) 4-1/2 FM-ICS		WALL			X			PAINT	155	
158	MEDICAL EXAM	3' - 0"	7' - 0"	C.1	HM14	P1	GS-4	EXISTING	-	P1	-	-	-	YES	NO	4/A630	4/A630	-	D9372				(4) 4-1/2 FM-ICS								PAINT	158	
165	DETOX ADA CELL	3' - 0"	7' - 0"	C	HM12	P1	GS-3	4	HM12	P1	GS-3	-	-	YES	NO	4/A630	8/A630	-	52E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	WALL				Y	Y	PAINT	165	
166B	N.C. INTERVIEW	3' - 0"	7' - 0"	D	HM12	P1	GS-3	1	HM12	P1	-	-	-	NO	NO	6/A630	6/A630	-	BUILDER'S - PASSAGE		N		(3) 4-1/2 FM-ICS		FLOOR			X			PAINT	166B	
177	CORRIDOR	7' - 4"	7' - 0"	A	HM14	P1	-	3	HM14	P1	-	-	3 HR	NO	NO	9/A640	16/A630	-	BUILDERS - PANIC		N	Y	(4) 4-1/2 FM-ICS					X			PAINT	177	MAGNETIC HOLD OPEN TIED TO FIRE/SMOKE ALARM
179	SOUTH CORRIDOR	3' - 0"	7' - 0"	D	HM12	P1	GS-3	9	HM12	P1	GS-3	-	-	YES	NO	-	16/A630	-	56E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	(2) NO.2	WALL				Y		PAINT	179	
180	NORTH CORRIDOR	3' - 0"	7' - 0"	D	HM12	P1	GS-3	9	HM12	P1	GS-3	-	-	YES	NO	-	16/A630	-	56E-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	(2) NO.2	WALL				Y		PAINT	180	
181	VISITATION	3' - 0"	7' - 0"	F	HM12	P1	GS-3	10	HM12	P1	-	-	-	YES	NO	3/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	DOOR				Y	Y	PAINT	181	
182	VISITATION	3' - 0"	7' - 0"	F	HM12	P1	GS-3	10	HM12	P1	-	-	-	YES	NO	3/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	DOOR				Y	Y	PAINT	182	
183	VISITATION	3' - 0"	7' - 0"	F	HM12	P1	GS-3	10	HM12	P1	-	-	-	YES	NO	3/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	DOOR				Y	Y	PAINT	183	
184	VISITATION	3' - 0"	7' - 0"	F	HM12	P1	GS-3	10	HM12	P1	-	-	-	YES	NO	3/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	DOOR				Y	Y	PAINT	184	
186	INTERVIEW	3' - 0"	7' - 0"	D	HM12	P1	GS-3	2	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	56-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	WALL				Y		PAINT	186	
187	SAFETY CELL	3' - 0"	7' - 0"	C	HM12	P1	GS-3	2	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	(1) NO.2	WALL				Y		PAINT	187	
188	NORTH CORRIDOR	3' - 0"	7' - 0"	G	HM12	P1	GS-3	12	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	WALL				Y	Y	PAINT	188	
189	ADA HOLD/ OBSERVATION	3' - 0"	7' - 0"	G	HM12	P1	GS-2	12	HM12	P1	-	-	-	YES	NO	4/A630	4/A630	-	52-6 DEADLATCH		Y		(4) 4-1/2 FM-ICS	NO. 2/NO.4	WALL				Y	Y	PAINT	189	
C001	OFFICER TOILET	3' - 0"	7' - 0"	A	HM14	P1	-	1	HM14	P1	-	-	-	NO	NO	17/A630	16/A630	-	D9350		Y		(4) 4-1/2 EH		FLOOR			X			PAINT	C001	10" LOCK JAMB FOR IC
C002	INMATE TOILET & STRIP SEARCH	3' - 0"	7' - 0"	C.1	HM14	P1	GS-3	1	HM14	P1	-	-	-	YES	NO	17/A630	16/A630	-	D9349		Y		(4) 4-1/2 EH		WALL				REX		PAINT	C002	10" LOCK JAMB FOR IC
C003	MECH	3' - 0"	7' - 0"	A1	HM14	P1	-	1	HM14	P1	-	-	-	YES	NO	17/A630	16/A630	5/A630	BUILDER'S - STORE/ROOM		Y		(2) 4-1/2 FM-ICS	(2) NO.2	WALL	X					PAINT	C003	
C004	ASSESSMENT	3' - 0"	7' - 0"	D	HM14	P1	GS-4	5	HM14	P1	GS-4	-	-	YES	NO		16/A630	-	D9350		Y		(4) 4-1/2 EH		FLOOR					Y	PAINT	C004	CONSIDER MOUNTING STOP TO WORKSTATION - 10 LOCK JAMB FOR IC
C005A	CLINICIAN OFFICE	3' - 0"	7' - 0"	D	HM14	P1	GS-4	6	HM14	P1	GS-4	-	-	YES	YES		16/A630	-	D9349		Y		(4) 4-1/2 EH	(2) NO.2	FLOOR				X	Y	PAINT	C005A	10" LOCK JAMB FOR IC
C005B	CLINICIAN OFFICE	3' - 0"	7' - 0"	D	HM14	P1	GS-4	2	HM14	P1	-	-	-	YES	YES	6/A630	6/A630	-	D9349		Y		(4) 4-1/2 EH	(2) NO.2	WALL				X	Y	PAINT	C005B	10" LOCK JAMB FOR IC
C007	BODY SCAN	3' - 0"	7' - 0"	F	HM12	P1	GS-3	7	HM12	P1	GS-3	-	-	YES	NO	14/A630	12/A630	-	D5B		Y		NA		NA						PAINT	C007	IC NOT NEEDED BECAUSE CUSTODY STATION IS THERE
C008A	PRE-BOOKING	3' - 0"	7' - 0"	F	HM12	P1	GS-2	8	HM12	P1	GS-2	-	-	YES	NO	14/A630	12/A630	-	D5B		Y		NA		NA	X					PAINT	C008A	CAN USE IC AT C008B
C008B	PRE-BOOKING	3' - 0"	7' - 0"	C	HM12	P1	GS-2	2	HM12	P1	-	-	-	YES	NO	17/A630	16/A630	5/A630	56E-6 DEADLATCH		Y	Y	(4) 4-1/2 FM-ICS	(2) NO.2	WALL	X			Y		PAINT	C008B	

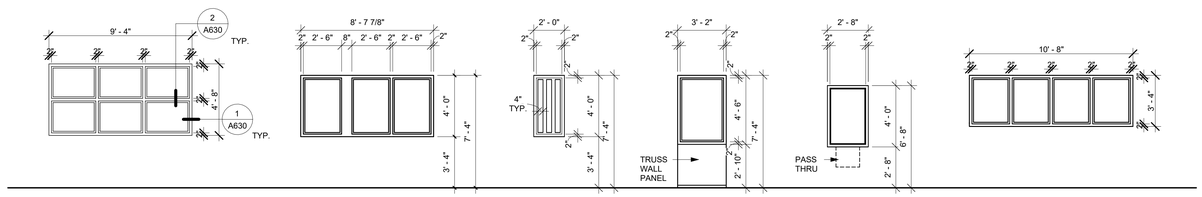
DOOR TYPES:



DOOR FRAME TYPES:



WINDOW TYPES:



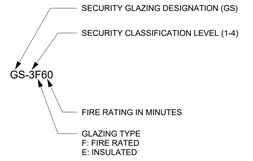
GLAZING TYPES:

REFER TO SPECIFICATION SECTIONS 08 80 00 & 08 88 53

GI-1	TEMPERED GLAZING FOR NON-SECURE AREAS
GI-1F45	TEMPERED GLAZING FOR NON-SECURE AREAS (FIRE RATED)
GS-1	BALLISTIC GLAZING BETWEEN CONTROL AND DAYROOM
GS-1F45	BALLISTIC GLAZING BETWEEN CONTROL AND DAYROOM (FIRE RATED)
GS-2	MAXIMUM SECURITY PERIMETER GLAZING
GS-3	MAXIMUM SECURITY GLAZING
GS-3P	MAXIMUM SECURITY GLAZING (PRIVACY)
GS-3F45	MAXIMUM SECURITY GLAZING (FIRE RATED FOR CORRIDORS)
GS-4	MEDIUM SECURITY GLAZING
GS-4P	MEDIUM SECURITY GLAZING (PRIVACY)
GS-4F45	MAXIMUM SECURITY GLAZING (FIRE RATED FOR CORRIDORS)

SECURITY GLAZING TYPES:

FOR ADDITIONAL INFORMATION ON SECURITY GLAZING TYPES, SEE SPECIFICATION SECTION 08 88 53.



SHEET NOTES:

THESE SHEET NOTES APPLY TO THIS SHEET ONLY

1. AT DOOR FRAME TYPES 10,11 AND 12, IN ADDITION TO THE INDICATED SCHEDULED DOOR, CONTRACTOR SHALL PROVIDE A CHASE ACCESS DOOR TO BE INSTALLED IN SECOND FRAME OPENING. DOOR SHALL BE:

   PANEL TYPE: A
   WIDTH: 3'-0"
   HEIGHT: 7'-0"
   MATERIAL: 'HM12'
   FINISH: 'P1'

   DOOR MONITORED: YES
   LOCK: 82-6 DEADLOCK
   DOOR POSITION SWITCH: YES
   HINGES: (4) 4-1/2 FM-ICS
   CHASE DOOR WITH DEADBOLT ONLY- NO PULL

2. ALL HOLLOW METAL DOOR AND WINDOW FRAMES SHALL BE FULLY GROUTED U.N.O.. SEE SHEET A630 FOR DETAILS

1 3. REFER TO SPECIFICATION SECTIONS XXXX & XXXX FOR DOOR AND OPENING SPECIFICATIONS.

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916.329.4000

LICENSED ARCHITECT — No. C-25272 — Exp. May 31, 2027 — CALIFORNIA

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

OPENING SCHEDULE

SHEET NO.

A710

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

ONE AND ONE-HALF INCH = ONE FOOT

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ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET

FINISH MATERIAL LEGEND

CEILING

SYMB	PRODUCT	MFRG	STYLE	COLOR	SPEC. SECTION
ACT1	ACOUSTICAL TILE CEILINGS	ARMSTRONG	FINE FISSURED SECOND LOOK, MINERAL FIBER TILES	WHITE	09 51 23
GYP	GYPSUM BOARD				
SSC1	ACOUSTICAL METAL PAN CEILINGS		SEE SPECIFICATION FOR INFORMATION		09 51 33

WALL

SYMB	PRODUCT	MFRG	STYLE	COLOR	SPEC. SECTION
DRP	DETENTION ROOM PADDING		SEE SPECIFICATION FOR INFORMATION		11 98 19
SSW1	METAL INTERIOR WALL PANELING		SEE SPECIFICATION FOR INFORMATION		09 78 13
WP1	WALL PROTECTION	INPRO	PALLADIUM RIGID SHEET .040		10 26 23.16
WT1	CERAMIC WALL TILE	DAL TILE	COLORWHEEL 6X6	MATTE URBAN PUTTY 0761	09 30 13
WT2	CERAMIC WALL TILE	DAL TILE	COLORWHEEL1.5" HEXAGON MOSAIC	GLOSSY BISCUIT K175	09 30 13

BASE

SYMB	PRODUCT	MFRG	STYLE	COLOR	SPEC. SECTION
ICB1	6" HIGH, INTEGRAL COVE BASE	SHERWIN WILLIAMS	RESUFLOR GARD	CANADA GREY (51)	09 67 23 SEE FLOORING SPEC
RB1	4" HIGH, RUBBER BASE	ARMSTRONG FLOORING	RUBBER	PEBBLE	09 65 13
TB1	6" HIGH, TILE BASE	DAL TILE	VOLUME 1.0 P-36C9TB	ACCENT BROWN VL78	09 30 13

FLOOR

SYMB	PRODUCT	MFRG	STYLE	COLOR	SPEC. SECTION
DRP	DETENTION ROOM PADDING	GOLD MEDAL SAFETY PADDING	JAIL SAFETY PADDING SYSTEM	NA	NA - SEE WEBSITE
EPX1	EPOXY RESINOUS FLOORING	SHERWIN WILLIAMS	RESUFLOR GARD	CANADA GREY (51)	09 67 23
FT1	FLOOR TILE	DAL TILE	VOLUME 1.0 12x12	ACCENT BROWN VL78	09 30 13
SC1	CONCRETE TOPICAL TREATMENTS		SEE SPECIFICATION FOR INFORMATION	NA	03 35 46
SSF1	STAINLESS STEEL FLOORING		SEE SPECIFICATION FOR INFORMATION	NA	09 62 63.16
SV1	VINYL SHEET FLOORING	ARMSTRONG FLOORING	NATRALIS HOMOGENOUS SHEET 2.0 MM	TBD	09 65 16.23

CASEWORK

SYMB	PRODUCT	MFRG	STYLE	COLOR	SPEC. SECTION
PL1	PLASTIC LAMINATE	WILSONART	TBD		12 32 16
PL2	PLASTIC LAMINATE	WILSONART	TBD		12 31 00
SS1	SOLID SURFACE COUNTERTOP	CORIAN	TBD		12 36 61
STC	STAINLESS STEEL CASEWORK & COUNTERTOP		SEE SPECIFICATION FOR INFORMATION		

PAINT

SYMB	PRODUCT	MFRG	STYLE	COLOR	SPEC. SECTION
P1	INTERIOR PAINTING	DUNN EDWARDS	SEE SPECIFICATION FOR SHEEN TYPE	DEHW08 CLASSIC WHITE	09 91 23
P2	INTERIOR PAINTING	DUNN EDWARDS	SEE SPECIFICATION FOR SHEEN TYPE	TBD	09 91 23
P3	INTERIOR PAINTING	DUNN EDWARDS	SEE SPECIFICATION FOR SHEEN TYPE	TBD	09 91 23
P4	EXTERIOR PAINTING	DUNN EDWARDS			09 91 13
P5	EXTERIOR PAINTING	DUNN EDWARDS			09 91 13
PC1	HIGH PERFORMANCE EPOXY COATING		SEE SPECIFICATION FOR INFORMATION	TO MATCH P1	09 96 56

EXTERIOR

SYMB	PRODUCT	STYLE	COLOR	SPEC. SECTION
CMU1	CONCRETE MASONRY UNIT			04 22 00
MP1	FORMED METAL WALL PANELS			07 42 13.13
IMP1	INSULATED METAL WALL PANELS			07 42 13.19
MCP1	METAL COMPOSITE MATERIAL WALL PANELS			07 42 13.23
FCS1	FIBER-CEMENT SIDING			07 46 46
SP1	SOFFIT PANELS			07 42 93

SHEET NOTES:

1. REFER TO FINISH SCHEDULE ON SHEET A811 FOR MATERIAL CALLOUT AND RESPECTIVE SPECIFICATION REFERENCE.
2. ALL WAINSCOT OR OTHER VERTICAL DIMENSIONS NOTED IN THE FINISH SCHEDULE ARE TAKEN FROM THE FINISH FLOOR U.N.O.
3. ALL HM DOOR FAMES ARE TO BE PAINTED.

AGENCY APPROVAL

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ACCESSIBILITY IMPROVEMENTS

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STATE OF CALIFORNIA — REGISTERED ARCHITECT — No. C-25272 — Exp. May 31, 2027

ARCHITECT

95% CONSTRUCTION DOCUMENTS

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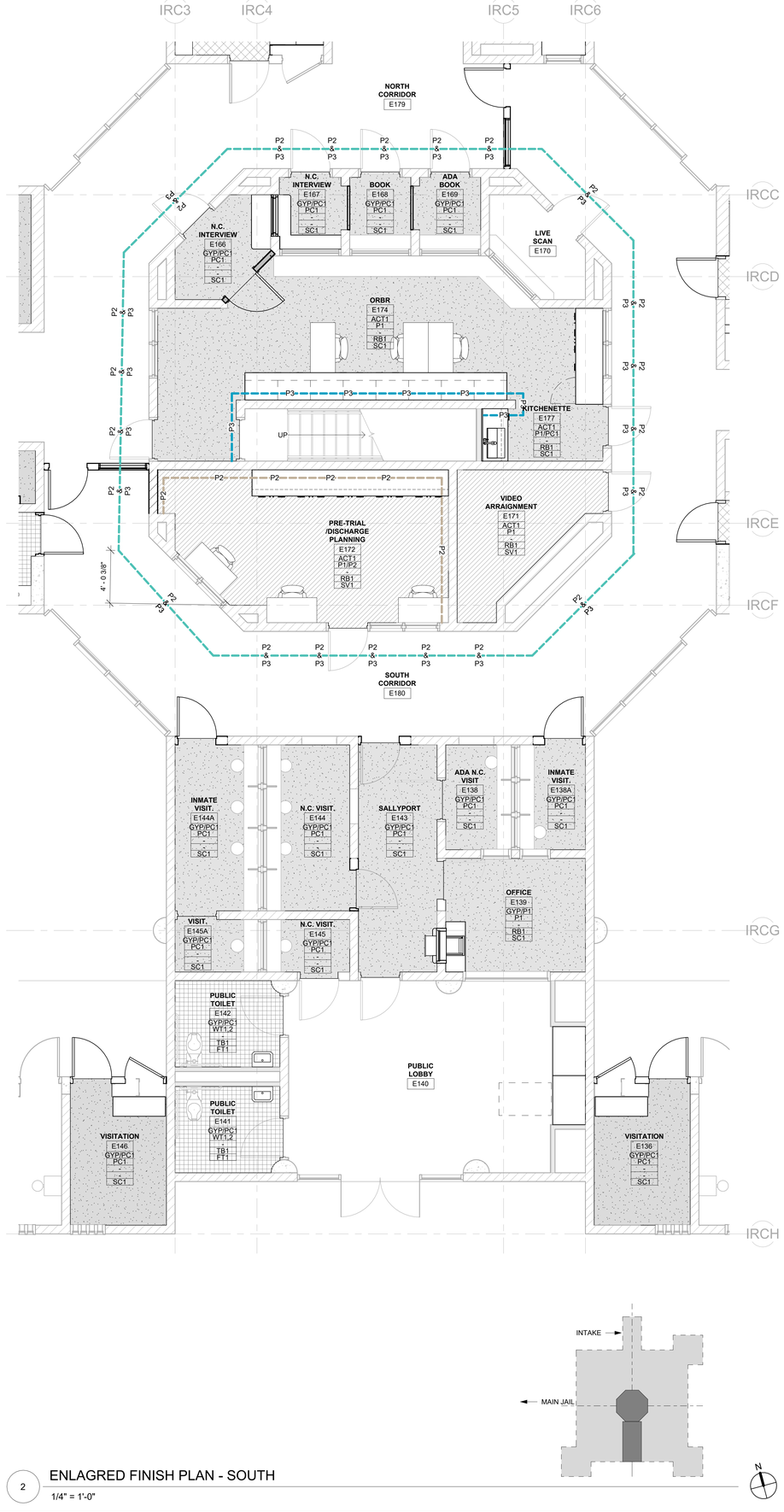
JOB NO. Y2213.00

SHEET TITLE

FINISH MATERIAL LEGEND

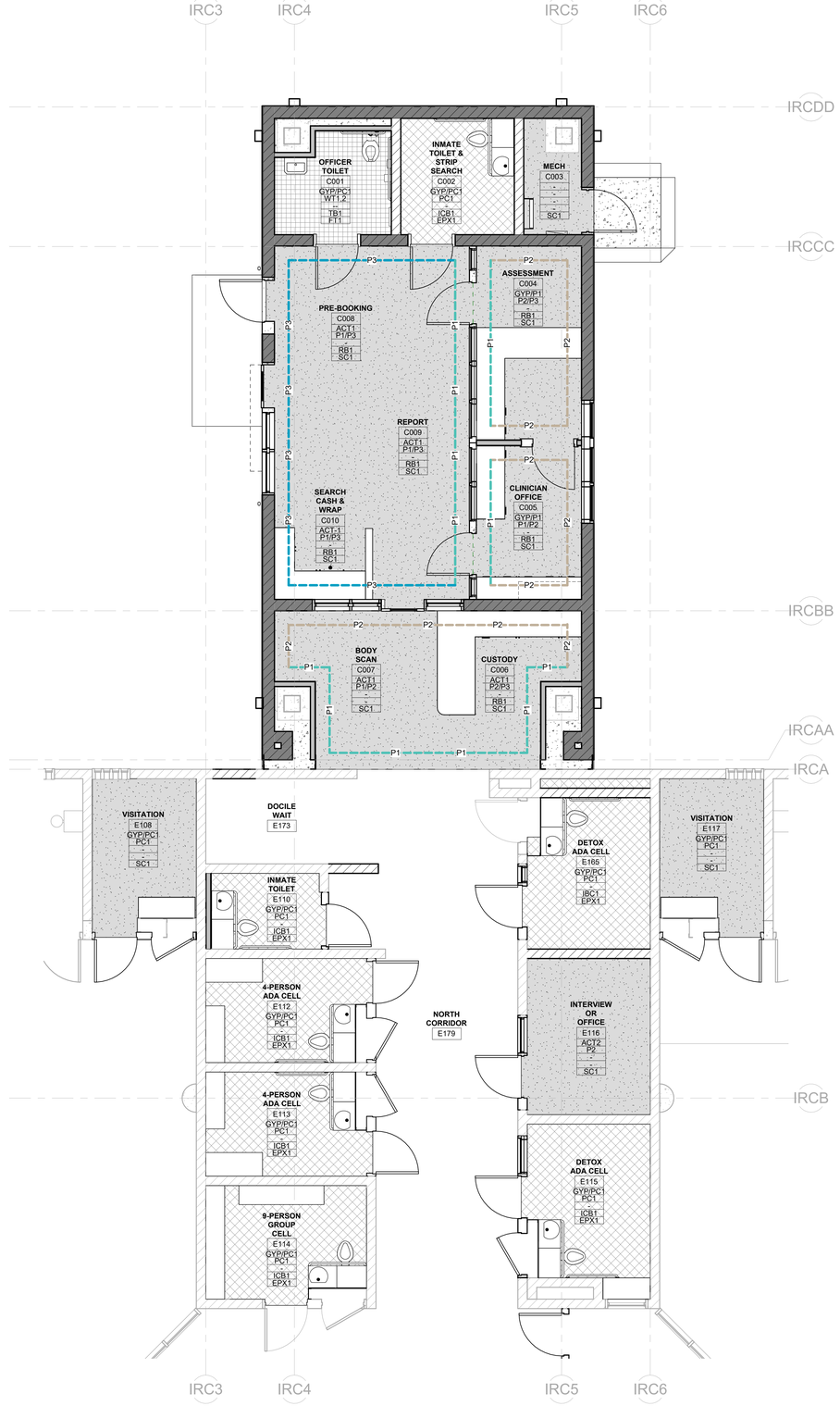
SHEET NO.

A800



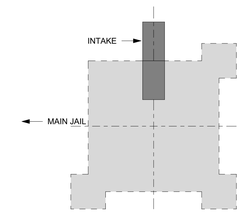
2 ENLAGRED FINISH PLAN - SOUTH

1/4" = 1'-0"



1 ENLAGRED FINISH PLAN - NORTH

1/4" = 1'-0"



SHEET NOTES:

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3. ALL HM DOOR FAMES ARE TO BE PAINTED.

KEYNOTES:

(#) THESE KEYNOTES APPLY TO THIS SHEET ONLY

LEGEND:

- P1 INTERIOR PAINT LOCATION (P1)
- P2 INTERIOR ACCENT PAINT LOCATION (P2)
- P3 EXTERIOR PAINT LOCATION (P3)
- WALL PROTECTION LOCATION WHEN IT DOES NOT OCCUR ON ALL WALLS WITHIN ROOM

ROOM NAME
101
Ceiling
Wall
WP
Base
Floor

- CEILING FINISH (WHERE OCCURS). FOR CEILING MATERIAL & CONSTRUCTION, SEE A211 REFLECTED CEILING PLAN.
- DOMINANT WALL FINISH (SEE PLAN FOR ACCENT FINISH LOCATIONS)
- WALL PROTECTION/WAINSCOT (WHERE OCCURS). *SEE PLAN FOR LOCATIONS WHEN WALL PROTECTION DOES NOT OCCUR ON ALL WALLS WITHIN ROOM.
- BASE FINISH
- DOMINANT FLOOR FINISH (SEE PLAN FOR ACCENT FINISH LOCATIONS)

FLOOR FINISH

- CT1 CERAMIC TILE; HATCH PATTERN INDICATES MATERIAL BUT DOES NOT REPRESENT ORIENTATION OR GROUT LINES
- DRP DETENTION ROOM PADDING
- EPX1 EPOXY RESINOUS FLOORING
- PC1 POLISHED CONCRETE FINISHING
- SC1 SEALED, CONCRETE TOPICAL TREATMENT
- SSF1 STAINLESS STEEL FLOORING
- SV1 VINYL SHEET FLOORING

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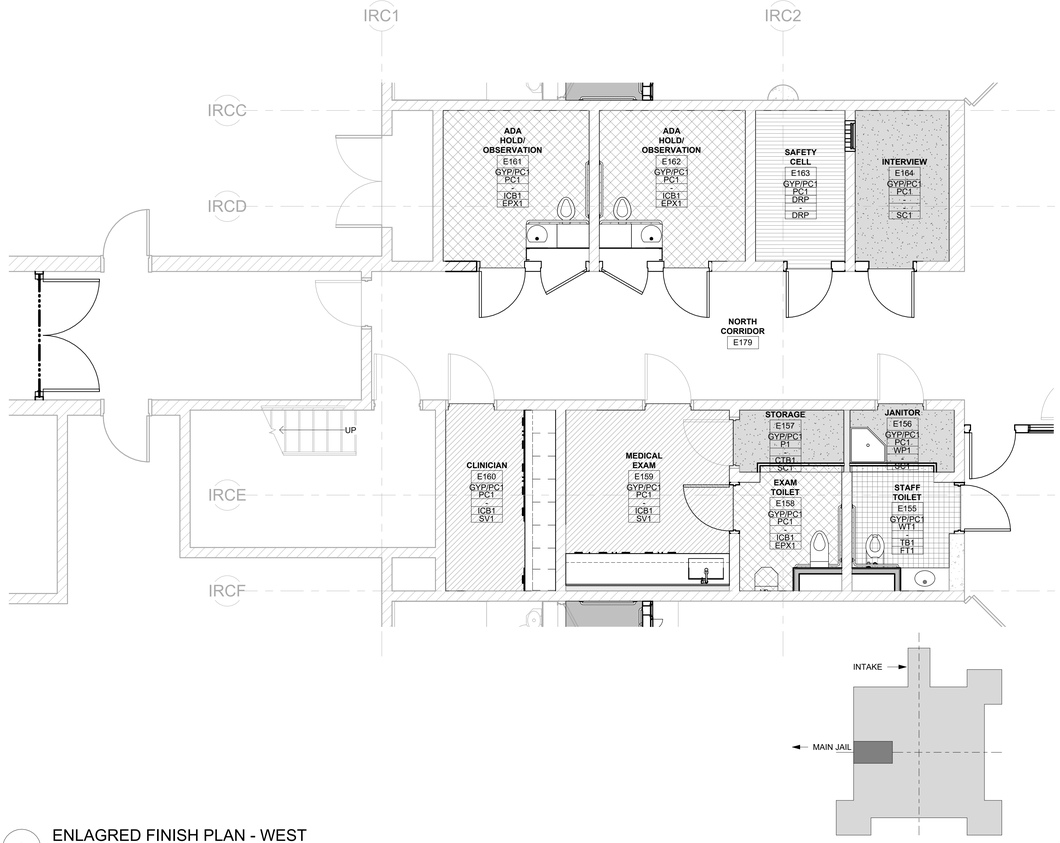
SHEET TITLE

ENLARGED FINISH PLANS - NORTH AND SOUTH - GROUND LEVEL

SHEET NO.

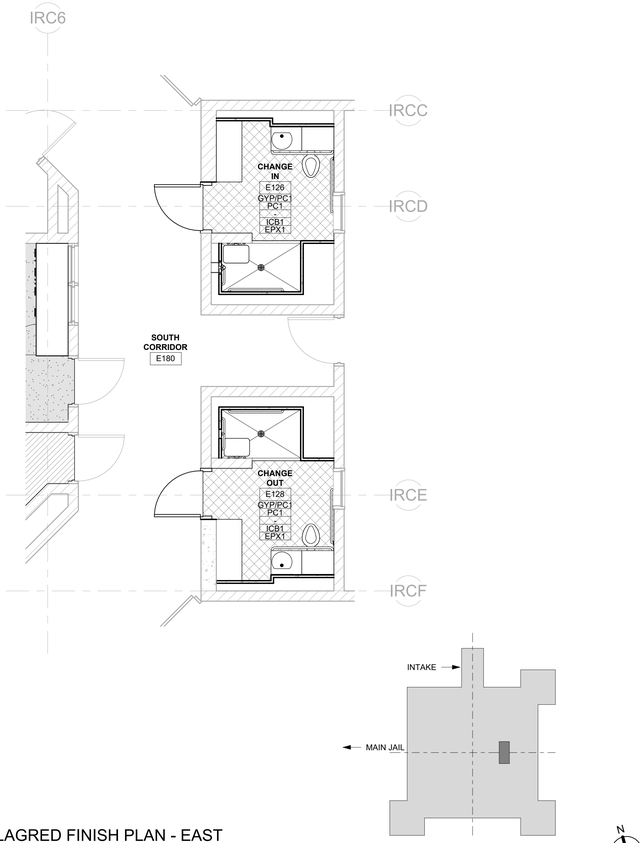
A810

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



2 ENLAGRED FINISH PLAN - WEST

1/4" = 1'-0"



1 ENLAGRED FINISH PLAN - EAST

1/4" = 1'-0"

SHEET NOTES:

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2. ALL WAINSCOT OR OTHER VERTICAL DIMENSIONS NOTED IN THE FINISH SCHEDULE ARE TAKEN FROM THE FINISH FLOOR U.N.O.
3. ALL HM DOOR FAMES ARE TO BE PAINTED.

KEYNOTES:

◇ # THESE KEYNOTES APPLY TO THIS SHEET ONLY

LEGEND:

- P1 INTERIOR PAINT LOCATION (P1)
- P2 INTERIOR ACCENT PAINT LOCATION (P2)
- P3 EXTERIOR PAINT LOCATION (P3)
- WALL PROTECTION LOCATION WHEN IT DOES NOT OCCUR ON ALL WALLS WITHIN ROOM

ROOM NAME
101
Ceiling
Wall
WP
Base
Floor

- CEILING FINISH (WHERE OCCURS). FOR CEILING MATERIAL & CONSTRUCTION, SEE A211 REFLECTED CEILING PLAN.
- DOMINANT WALL FINISH (SEE PLAN FOR ACCENT FINISH LOCATIONS)
- WALL PROTECTION/WAINSCOT (WHERE OCCURS). *SEE PLAN FOR LOCATIONS WHEN WALL PROTECTION DOES NOT OCCUR ON ALL WALLS WITHIN ROOM.
- BASE FINISH
- DOMINANT FLOOR FINISH (SEE PLAN FOR ACCENT FINISH LOCATIONS)

FLOOR FINISH

- CT1 CERAMIC TILE: HATCH PATTERN INDICATES MATERIAL BUT DOES NOT REPRESENT ORIENTATION OR GROUT LINES
- DRP DETENTION ROOM PADDING
- EPX1 EPOXY RESINOUS FLOORING
- PC1 POLISHED CONCRETE FINISHING
- SC1 SEALED, CONCRETE TOPICAL TREATMENT
- SSF1 STAINLESS STEEL FLOORING
- SV1 VINYL SHEET FLOORING

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No. C-25272 May 31, 2021

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JOB NO. Y2213.00

SHEET TITLE

ENLARGED FINISH PLANS - WEST AND EAST

SHEET NO.

A811

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET



2 FINISH PLAN - TIER LEVEL

1/4" = 1'-0"



1 ENLARGED FINISH PLAN - HOUSING POD - GROUND LEVEL - TYP. OF 4

1/4" = 1'-0"

SHEET NOTES:

1. REFER TO FINISH SCHEDULE ON SHEET A811 FOR MATERIAL CALLOUT AND RESPECTIVE SPECIFICATION REFERENCE.
2. ALL WAINSCOT OR OTHER VERTICAL DIMENSIONS NOTED IN THE FINISH SCHEDULE ARE TAKEN FROM THE FINISH FLOOR U.N.O.
3. ALL HM DOOR FAMES ARE TO BE PAINTED.

KEYNOTES:

THESE KEYNOTES APPLY TO THIS SHEET ONLY

LEGEND:

P1 P1 INTERIOR PAINT LOCATION (P1)

P2 P2 INTERIOR ACCENT PAINT LOCATION (P2)

P3 P3 EXTERIOR PAINT LOCATION (P3)

WALL PROTECTION LOCATION WHEN IT DOES NOT OCCUR ON ALL WALLS WITHIN ROOM

ROOM NAME 101 Ceiling Wall WP Base Floor

- CEILING FINISH (WHERE OCCURS). FOR CEILING MATERIAL & CONSTRUCTION, SEE A211 REFLECTED CEILING PLAN.
- DOMINANT WALL FINISH (SEE PLAN FOR ACCENT FINISH LOCATIONS)
- WALL PROTECTION/WAINSCOT (WHERE OCCURS). *SEE PLAN FOR LOCATIONS WHEN WALL PROTECTION DOES NOT OCCUR ON ALL WALLS WITHIN ROOM.
- BASE FINISH
- DOMINANT FLOOR FINISH (SEE PLAN FOR ACCENT FINISH LOCATIONS)

FLOOR FINISH

CT1	CERAMIC TILE: HATCH PATTERN INDICATES MATERIAL BUT DOES NOT REPRESENT ORIENTATION OR GROUT LINES
DRP	DETENTION ROOM PADDING
EPX1	EPOXY RESINOUS FLOORING
PC1	POLISHED CONCRETE FINISHING
SC1	SEALED, CONCRETE TOPICAL TREATMENT
SSF1	STAINLESS STEEL FLOORING
SV1	VINYL SHEET FLOORING

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

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No. C-25272 May 31, 2027

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

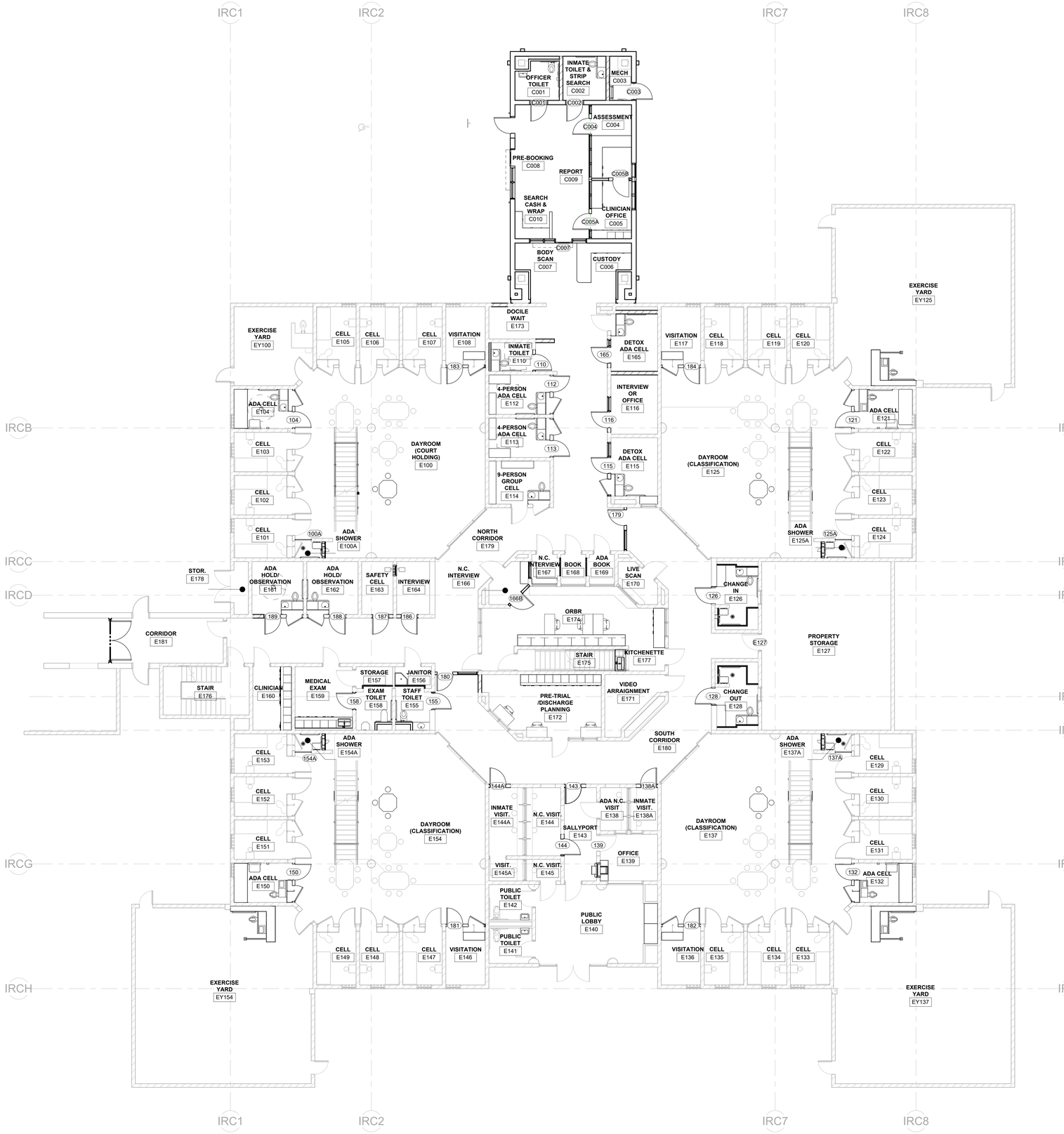
JOB NO. Y2213.00

SHEET TITLE

ENLARGED FINISH PLANS - HOUSING POD, TYP.

SHEET NO.

A812



1 SIGNAGE PLAN - GROUND LEVEL

1/8" = 1'-0"

SIGNAGE SCHEDULE (GROUND LEVEL)

DOOR NO.	SIGN TYPE	TEXT/PICTOGRAPH	DET	REMARK
104	PAINT	114	9/A921	
110	PAINT	INMATE TOILET	6, 16 & 17/A921	PAINTED VERSION OF DETAILS
112	PAINT	H1	8/A921	
113	PAINT	H2	8/A921	
115	PAINT	H3	8/A921	
116	PAINT	INTERVIEW / OFFICE	8/A921	
121	PAINT	215	9/A921	
126	PAINT	CHANGE IN	8/A921	
128	PAINT	CHANGE OUT	8/A921	
132	PAINT	314	9/A921	
138A	PAINT	NON-CONTACT VISITING	8/A921	
139	PAINT	OFFICE	8/A921	
143	PAINT	SALLYPORT (EXIT)	8/A921	
144	PAINT	NON-CONTACT VISITING	8/A921	
144A	PAINT	NON-CONTACT VISITING	8/A921	
150	PAINT	415	9/A921	
155	PAINT	STAFF TOILET	6, 16 & 17/A921	PAINTED VERSION OF DETAILS
158	PAINT	EXAM TOILET	6, 16 & 17/A921	PAINTED VERSION OF DETAILS
165	PAINT	H5	8/A921	
166B	PAINT	NON-CONTACT INTERVIEW	8/A921	
181	PAINT	VISITATION	8/A921	
182	PAINT	VISITATION	8/A921	
183	PAINT	VISITATION	8/A921	
184	PAINT	VISITATION	8/A921	
186	PAINT	INTERVIEW	8/A921	
187	PAINT	SAFETY CELL	8/A921	
188	PAINT	OBSERVATION 1	9/A921	
189	PAINT	OBSERVATION 2	9/A921	
C001	PAINT	OFFICER TOILET	6, 16 & 17/A921	PAINTED VERSION OF DETAILS
C002	PAINT	INMATE TOILET	6, 16 & 17/A921	PAINTED VERSION OF DETAILS
C003	PAINT	MECHANICAL ROOM	8/A921	
C004	PAINT	ASSESSMENT	8/A921	
C005A	PAINT	CLINICIAN OFFICE	8/A921	
C005B	PAINT	CLINICIAN OFFICE	8/A921	
C007	PAINT	BOOKING / PREBOOKING	8/A921	'BOOKING' ONLY ON SOUTH SIDE. 'PREBOOKING' ONLY ON NORTH SIDE

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REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

SIGNAGE FLOOR PLAN - GROUND LEVEL

SHEET NO.

A911

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



18 ACCESSIBLE ROOM IDENTIFICATION SIGN

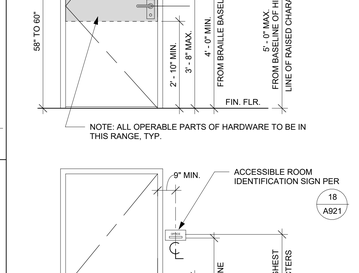
1 1/2" = 1'-0"

13 DOOR FRAME SIGNAGE

NTS

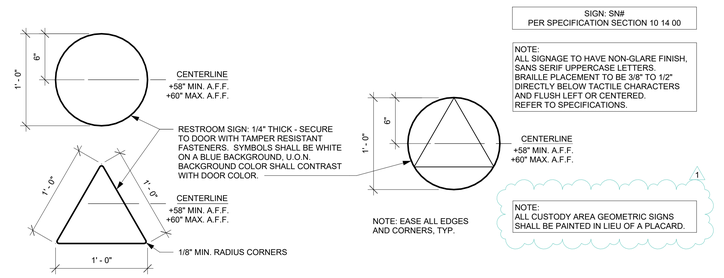
8 ABOVE DOOR SIGNAGE

NTS



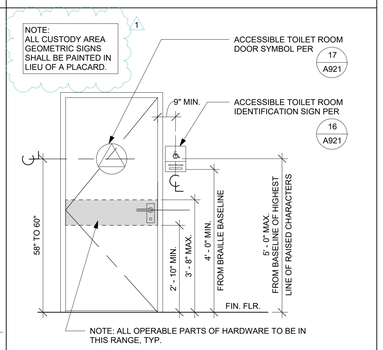
9 SIDE OF DOOR SIGNAGE

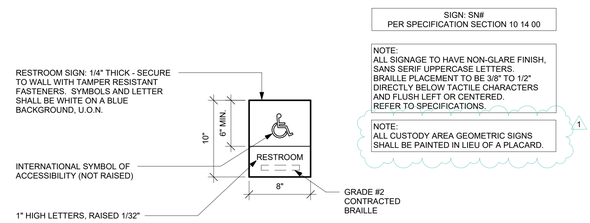
NTS



17 ACCESSIBLE TOILET ROOM DOOR SYMBOLS

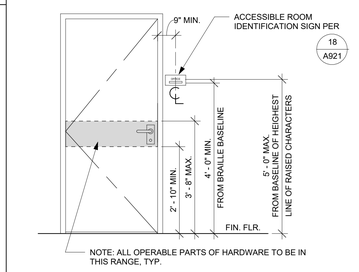
1 1/2" = 1'-0"





16 ACCESSIBLE TOILET ROOM IDENTIFICATION SIGNS

1 1/2" = 1'-0"



6 ACCESSIBLE DOOR SIGN HEIGHTS

1/2" = 1'-0"

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NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

SIGNAGE DETAILS

SHEET NO.

A921

STRUCTURAL ABBREVIATIONS:
(FOR REFERENCE, NOT ALL ARE APPLICABLE)

@	AT	JST	JOIST
L	ANGLE	JT	JOINT
AB	ANCHOR BOLT	KSI	KIPS PER SQUARE INCH
ABV	ABOVE	LBS	POUNDS
AC	ASPHALTIC CONCRETE	LL	LIVE LOAD
ACI	AMERICAN CONCRETE INSTITUTE	LLH	LONG LEG HORIZONTAL
ADDNL	ADDITIONAL	LLV	LONG LEG VERTICAL
ADJ	ADJACENT	LGTH	LENGTH
AFF	ABOVE FINISH FLOOR	LONG	LONGITUDINAL
AGG	AGGREGATE	LS	LAG SCREW
AHJ	AUTHORITY HAVING JURISDICTION	LSL	LAMINATED STRAND LUMBER
AISC	AMERICAN INSTITUTE FOR STEEL CONSTRUCTION	LT WT	LIGHT WEIGHT
		LVL	LAMINATED VENEER LUMBER
AISI	AMERICAN IRON & STEEL INSTITUTE	LWC	LIGHT WEIGHT CONCRETE
ALT	ALTERNATE	MAX	MAXIMUM
ALUM	ALUMINUM	MB	MACHINE BOLT
APA	THE ENGINEERED WOOD ASSOCIATION	MCJ	MASONRY CONTROL JOINT
APPROX	APPROXIMATE	MDT	MASONRY DOWEL JOINT
ARCH	ARCHITECT / ARCHITECTURAL	MECH	MECHANICAL
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS	MEP	MECHANICAL, ELECTRICAL, PLUMBING
ASD	ALLOWABLE STRESS DESIGN	MEZZ	MEZZANINE
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS	MFR	MANUFACTURER
		MIN	MINIMUM
ATR	ALL-THREAD ROD	MISC	MISCELLANEOUS
AWS	AMERICAN WELDING SOCIETY	MKJ	MASONRY KEY JOINT
BEV	BEVELED	mm	MILLIMETER
BLDG	BUILDING	MRD	METAL ROOF DECK
BLK	BLOCK	MRJ	MASONRY RAKE JOINT
BLKG	BLOCKING	MTL	METAL
BLW	BELOW	(N)	NEW
BM	BEAM	N / A	NOT APPLICABLE
BN	BOUNDARY NAILING / BOUNDARY FASTENING	NDS	NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION
BOC	BOTTOM OF CONCRETE	NIC	NOT IN CONTRACT
BOF	BOTTOM OF FOOTING	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
BOS	BOTTOM OF STEEL		
BOTT	BOTTOM	NO. (#)	NUMBER OR POUNDS
BRBF	BUCKLING - RESTRAINED BRACED FRAME	NOM	NOMINAL
BRCG	BRACING	NS&FS	NEARSIDE & FARSIDE
BRG	BEARING	NSG	NON SHRINK GROUT
BRG PL	BEARING PLATE	NTS	NOT TO SCALE
BTW	BETWEEN	NWC	NORMAL WEIGHT CONCRETE
BYD	BEYOND	OC	ON CENTER
C	CAMBER	OD	OUTSIDE DIAMETER
CBC	CALIFORNIA BUILDING CODE	OH	OPPOSITE HAND
CCR	CALIFORNIA CODE OF REGULATIONS	OP	OPERATING
CE	CIVIL ENGINEER	OPG	OPENING
CG	CENTER OF GRAVITY	OPP	OPPOSITE
CIP	CAST-IN-PLACE	OSB	ORIENTED STRAND BOARD
CJ	CONSTRUCTION JOINT	OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINSTRATION
CJP	COMPLETE JOINT PENETRATION		
CL	CENTERLINE	OH	OPPOSITE HAND
CLG	CEILING	OVSH	OVERSIZED HOLE
CLR	CLEAR	OWSJ	OPEN WEB STEEL JOIST
CLSM	CONTROLLED LOW-STRENGTH MATERIAL	PAF	POWDER / POWER-ACTUATED FASTENER
CMU	CONCRETE MASONRY UNIT		
COL	COLUMN	PC	PIPE COLUMN
CONC	CONCRETE	PCC	PRECAST CONCRETE
CONN	CONNECTION	PCF	POUNDS PER CUBIC FOOT
CONSTR	CONSTRUCTION	PEMB	PRE-ENGINEERED METAL BUILDING
CONT	CONTINUOUS	PERP	PERPENDICULAR
COORD	COORDINATE / COORDINATION	PJP	PARTIAL JOINT PENETRATION
CRC	COLD-ROLLED CHANNEL	PL	PLATE
CRS	COLD-ROLLED STEEL	PLF	PER LINEAR FOOT
CTR	CENTER	PLWD	PLYWOOD
CTRD	CENTERED	PN	PERIMETER NAILING / PERIMETER FASTENING
CTSK	COUNTERSINK / COUNTERSUNK		
DBL	DOUBLE	PSF	POUNDS PER SQUARE FOOT
DEG	DEGREE	PSI	POUNDS PER SQUARE INCH
DEMO	DEMOLITION	PSL	PARALLEL STRAND LUMBER
DEPR	DEPRESSED	PT	POINT
DF	DOUGLAS FIR	PTDF	PRESSURE TREATED DOUG FIR
DIA (Ø)	DIAMETER	PV	PHOTOVOLTAIC
DIAG	DIAGONAL	PVC	POLYVINYL CHLORIDE
DIM	DIMENSION	R	RADIUS
DJ	DOWELED JOINT	REINF	REINFORCING / REINFORCEMENT
DL	DEAD LOAD	REQ	REQUIRED
DLT	DEEP LEG TRACK	RHWS	ROUND HEAD WOOD SCREW
DN	DOWN	RJ	ROOF JOIST
DO	DUPLICATE ORDER	RR	ROOF RAFTER
DSA	DIVISION OF THE STATE ARCHITECT	RSB	RECESSED STUD BOLT
DTL	DETAIL	SAD	SEE ARCHITECTURAL DRAWINGS
DWG	DRAWING	SC	SLIP-CRITICAL
(E)	EXISTING CONDITION	SCBF	SPECIAL CONCENTRIC BRACED FRAME
EA	EACH	SCHED	SCHEDULE
EB	EXPANSION BOLT	SCJ	SHRINKAGE CONTROL JOINT
EE	EACH END	SDPWS	SPECIAL DESIGN PROVISIONS FOR WIND & SEISMIC
EF	EACH FACE		
EJ	EXPANSION JOINT	SDST	SELF-DRILLING SELF-TAPPING
ELEV	ELEVATION	SE	STRUCTURAL ENGINEER
EMBED	EMBEDMENT	SEIS JT	SEISMIC JOINT
EN	EDGE NAILING / EDGE FASTENING	SEOR	STRUCTURAL ENGINEER OF RECORD
EOR	ENGINEER OF RECORD	SHRWL	SHEARWALL
EOS	EDGE OF SLAB	SHT	SHEET
EQ (=)	EQUAL	SHTHG	SHEATHING
EQUIP	EQUIPMENT	SIM	SIMILAR
ES	EACH SIDE	SJ	SHRINKAGE JOINT
EW	EACH WAY	SFRS	SEISMIC FORCE RESISTING SYSTEM
EXTR	EXTERIOR	SM	SHEET METAL
f ' c	MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE	SMRF	SPECIAL MOMENT RESISTING FRAME
		SMS	SHEET METAL SCREWS
f ' m	MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF MASONRY	SOG	SLAB ON GRADE
		SP	STRUCTURAL PANEL
FAB	FABRICATE	SPCG	SPACING
FBC	FLAT BAR COLLECTOR	SPEC	SPECIFICATION
FD	FLOOR DRAIN	SQ	SQUARE
FF	FINISH FLOOR	SS	STAINLESS STEEL
FFE	FINISH FLOOR ELEVATION	STAG	STAGGER
FG	FINISH GRADE	STD	STANDARD
FHWS	FLAT HEAD WOOD SCREW	STIFF	STIFFENER
FIN	FINISH	STL	STEEL
FJ	FLOOR JOIST	STRUC	STRUCTURAL
FLG	FLANGE	SYM	SYMMETRICAL
FLR	FLOOR	T24	TITLE 24 CALIFORNIA CODE
FN	FIELD NAILING / FIELD FASTENING	tf	FLANGE THICKNESS
FND	FOUNDATION	THK	THICK / THICKNESS
FOC	FACE OF CONCRETE	THRD	THREAD OR THREADED
FOM	FACE OF MASONRY	TN	TOE NAIL
FOS	FACE OF STUD	T.O.	TOP OF
FRMG	FRAMING	TOC	TOP OF CONCRETE
FRP	FIBER REINFORCED POLYMER	TOF	TOP OF FOOTING / TOP OF FRAMING
FT (')	FOOT / FEET	TOM	TOP OF MASONRY
FTG	FOOTING	TOS	TOP OF STEEL / TOP OF SLAB
Fy	SPECIFIED YIELD STRENGTH OF REINFORCING, PSI OR SPECIFIED MINIMUM YIELD STRESS OF STEEL, KSI	TOW	TOP OF WALL
		TRAN	TRANSVERSE
		TS	(SEE HSS)
GA	GAUGE	TYP	TYPICAL
GALV	GALVANIZED	T&B	TOP & BOTTOM
GL	GLUE LAMINATED LUMBER	T&G	TONGUE & GROOVE
GRD	GRADE	UBC	UNIFORM BUILDING CODE
GT	GROUT	UNO	UNLESS NOTED OTHERWISE
GWB	GYPSUM WALLBOARD	URM	UNREINFORCED MASONRY
HAS	HEADED ANCHOR STUD	VERT	VERTICAL
HCAI	DEPARTMENT OF HEALTH CARE ACCESS & INFORMATION	VIF	VERIFY IN FIELD
		W/	WITH
HD	HOLDOWN	W/O	WITHOUT
HDG	HOT-DIPPED GALVANIZED	WDW	WINDOW
HDR	HEADER	WF	WIDE FLANGE
HK	HOOK	WP	WORK POINT
HORIZ	HORIZONTAL	WPS	WELDING PROCEDURE SPECIFICATION
HSB	HIGH-STRENGTH BOLT	WRT	WITH RESPECT TO
HSS	HOLLOW STRUCTURAL SECTION	WS	WOOD SCREW
HT	HEIGHT		
IBC	INTERNATIONAL BUILDING CODE		
ICC	INTERNATIONAL CODE COUNCIL		
ID	INSIDE DIAMETER		
IJ	ISOLATION JOINT		
IN (")	INCH		
INFO	INTERIOR		
INTR	INFORMATION		

FOUNDATIONS:

1. REFER TO RECOMMENDATIONS IN GEOTECHNICAL REPORT, FILE NO. 306476-003 BY EARTH SYSTEMS PACIFIC DATED JUNE 5, 2025. ALLOWABLE SOIL BEARING PRESSURE FOR FOUNDATION IS 3,000 PSF (DL + LL) AND 4,000 PSF (DL + LL + SEISMIC OR WIND).
2. ALL SITEWORK AND GRADING SHALL BE DONE IN COMPLIANCE WITH THE GEOTECHNICAL REPORT AND THE CONTRACT DOCUMENTS.
3. GEOTECHNICAL ENGINEER SHALL BE RETAINED TO PROVIDE INSPECTION AND TESTING SERVICES DURING GRADING AND FOUNDATION PHASE OF CONSTRUCTION AS PER GEOTECHNICAL REPORT RECOMMENDATIONS. INSPECTION AND TESTING REPORTS SHALL BE SUBMITTED TO THE ARCHITECT & GEOTECHNICAL ENGINEER. THE GEOTECHNICAL ENGINEER SHALL VERIFY CONDITION AND/OR ADEQUACY OF ALL FOUNDATION EXCAVATIONS PRIOR TO PLACING FORMS OR REINFORCING. WHERE FOOTING BOTTOMS WILL BEAR ON CONTROLLED LOW-STRENGTH MATERIAL (CLSM), THE CLSM SHALL COMPLY WITH THE PROVISIONS OF THE GEOTECHNICAL REPORT AS REQUIRED BY SECTION 1804.7 OF THE 2022 CBC.
4. ALL FOUNDATIONS ARE SHOWN AND DIMENSIONED AS BEING FORMED. FOUNDATIONS MAY BE PLACED IN NEAT EXCAVATIONS PROVIDED THE SIDES ARE INCREASED IN WIDTH.
5. EXCAVATIONS SHALL BE CLEANED OF ALL DEBRIS AND LOOSE SOIL. STANDING WATER SHALL BE REMOVED PRIOR TO CONCRETE PLACEMENT.
6. FOUNDATION DEPTHS INDICATED ON PLANS ARE MINIMUMS BASED OFF OF THE GEOTECHNICAL REPORT MENTIONED ABOVE, AND ARE FOR ESTIMATING PURPOSES. FINAL DEPTHS OF FOOTINGS MAY CHANGE AT THE TIME OF EXCAVATION BY THE GEOTECHNICAL ENGINEER. FOUNDATION DEPTHS DO NOT NECESSARILY ACCOUNT FOR ALL PIPES, CONDUITS, UTILITIES AND TRENCHES ADJACENT TO OR CROSSING FOOTINGS AS SHOWN OR INDICATED ON ALL OTHER CONTRACT DOCUMENTS. STEP FOOTINGS AS REQUIRED TO COMPLY WITH TYPICAL DETAILS FOR PIPES AND CONDUITS AT FOOTINGS.
7. TOPS AND BOTTOMS OF ALL FOUNDATIONS SHALL BE LEVEL. SLOPING FOUNDATIONS ARE NOT PERMITTED.
8. FOOTINGS SHALL BE CENTERED UNDER WALLS AND/OR COLUMNS UNLESS OTHERWISE INDICATED ON DRAWINGS.
9. CONTRACTOR SHALL CHECK FOOTING FORMS TO VERIFY THAT THEY ARE SQUARE AND PLUMB. THE CONTRACTOR SHALL ALSO VERIFY THAT ALL INSERTS AND EMBEDS ARE IN THEIR CORRECT LOCATION AND ORIENTATION PRIOR TO PLACING CONCRETE.
10. NOTIFY THE STRUCTURAL ENGINEER 48 HOURS IN ADVANCE OF PLACING CONCRETE.
11. **THE GEOTECHNICAL ENGINEER MUST REVIEW THE CONSTRUCTION DOCUMENTS PRIOR TO CONSTRUCTION.**

SHOP DRAWINGS:

PRIOR TO FABRICATION, SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER:

1. THE CONTRACTOR AGREES THAT SHOP DRAWING SUBMITTALS PROCESSED BY THE ENGINEER ARE NOT CHANGE ORDERS.
2. THE CONTRACTOR AGREES THAT THE PURPOSE OF SHOP DRAWING SUBMITTALS IS TO DEMONSTRATE TO THE ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN INTENT OF THE PROJECT AND COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS BY INDICATING WHICH MATERIAL THE CONTRACTOR INTENDS TO FURNISH AND INSTALL AND BY DETAILING THE FABRICATION AND INSTALLATION METHODS THE CONTRACTOR INTENDS TO USE.
3. THE CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS ON THE SHOP DRAWINGS, WHICH MUST BE CONFIRMED AND CORRELATED AT THE JOBSITE, FOR COORDINATION OF HIS OR HER WORK WITH THAT OF ALL OTHER TRADES AND FOR PERFORMING WORK IN A SAFE AND SATISFACTORY MANNER.
4. THE CONTRACTOR IS RESPONSIBLE FOR MATERIAL QUANTITIES ON THE SHOP DRAWINGS.
5. THE CONTRACTOR IS TO REVIEW AND BE IN AGREEMENT WITH COMMENTS BY THE STRUCTURAL ENGINEER PRIOR TO PROCEEDING WITH FABRICATION.
6. THE SHOP DRAWINGS SHALL BE PREPARED FROM FRESH WORK. REPRODUCTIONS OF THE APPROVED DRAWINGS IS NOT PERMITTED.
7. PRIOR TO SUBMISSION THE CONTRACTOR SHALL REVIEW ALL SUBMITTALS FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS AND SHALL STAMP SUBMITTALS AS BEING "REVIEWED FOR CONFORMANCE".
8. ANY DETAIL ON THE SHOP DRAWING THAT DEVIATES FROM THE CONTRACT DOCUMENTS SHALL BE CLEARLY MARKED WITH THE NOTE "THIS IS A CHANGE". SEE GENERAL NOTES FOR MATERIAL SUBSTITUTIONS.
9. SHOP DRAWINGS OR CALCULATIONS SUBMITTED FOR REVIEW THAT REQUIRE MORE THAN ONE RESUBMITTAL FOR REVIEW SHALL BE BILLED HOURLY FOR SUCH TIME TO THE GENERAL CONTRACTOR. THE THIRD REVIEW WILL NOT PROCEED WITHOUT WRITTEN APPROVAL FROM THE GENERAL CONTRACTOR FOR ADDITIONAL ENGINEERING REVIEW SERVICES.
10. CAD FILES OF APPROVED DRAWINGS WILL NOT BE PROVIDED TO THE CONTRACTOR, SUBCONTRACTOR OR FABRICATOR FOR THE PREPERATION OF SHOP DRAWINGS.
11. SHOP DRAWING REVIEWS DO NOT CONSTITUTE AN APPROVAL FOR PURCHASE OR FABRICATION OF MATERIALS.

STATEMENT OF SPECIAL INSPECTIONS & TESTS:

THE FOLLOWING SPECIAL INSPECTIONS AND TESTS ARE REQUIRED PURSUANT TO THE 2022 CBC SECTIONS 1704.3 AND 1705:

1. SPECIAL INSPECTIONS AND TESTS OF EXISTING SITE SOIL CONDITIONS, FILL PLACEMENT AND LOAD BEARING REQUIREMENTS SHALL BE PERFORMED IN ACCORDANCE WITH THE 2022 CBC SECTION 1705.6 AND TABLE 1705.6. THE APPROVED GEOTECHNICAL REPORT AND THE CONSTRUCTION DOCUMENTS PREPARED BY THE REGISTERED DESIGN PROFESSIONALS SHALL BE USED TO DETERMINE COMPLIANCE.

TABLE 1705.6
REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	-	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	-	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	-	X
4. DURING FILL PLACEMENT, VERIFY USE OF PROPER MATERIALS AND PROCEDURES IN ACCORDANCE WITH THE PROVISIONS OF THE APPROVED GEOTECHNICAL REPORT. VERIFY DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	-
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	-	X

2. SPECIAL INSPECTION AND TESTS FOR STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE QUALITY ASSURANCE INSPECTION REQUIREMENTS OF AISC 360. PROVIDE TESTS AND INSPECTIONS AS PER BELOW TABLE.

ON-SITE SPECIAL INSPECTIONS STEEL	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
CBC 1705.2.5 FIELD WELDING	X	-
AWS D1.1 3 & 4 & AWS D1.8.6.1 FIELD WELDING - WPS/WPQR	X	-
CBC 1705.2 & 1705.2.6 HIGH STRENGTH BOLT INSTALLATION	X	-
CBC 1705.2, 1705.12.2, & 1705.13.3 COLD-FORMED STEEL LIGHT FRAME CONSTRUCTION	-	X
CBC 1705.13 SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE	X	-

TESTS STEEL	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
CBC 2202.1 TESTING OF UNIDENTIFIED STEEL OR IDENTIFICATION TEST FOR STRUCTURAL STEEL AND COLD FORMED STEEL	X	-
CBC 2213.1 & 1705.2.6 HIGH STRENGTH BOLTS, NUTS, AND WASHERS	-	X
CBC 1705.2.5 NON-DESTRUCTIVE TESTING OF WELDS	X	-
CBC 2205.4 & 1705.14.1 NON-DESTRUCTIVE TESTS FOR SEISMIC RESISTANCE	X	-

3. SPECIAL INSPECTION AND TESTS FOR WELDING SHALL BE IN ACCORDANCE WITH AISC 360 TABLES N5.4-1, N5.4-2, AND N5.4-3.
4. MASONRY CONSTRUCTION SHALL BE INSPECTED AND VERIFIED IN ACCORDANCE WITH TMS 402 AND TMS 602 QUALITY ASSURANCE PROGRAM REQUIREMENTS.
5. PROVIDE PERIODIC SPECIAL INSPECTION DURING THE ANCHORAGE OF ELECTRICAL EQUIPMENT FOR EMERGENCY OR STANDBY POWER SYSTEMS PER 2022 CBC SECTION 1705.13.6 ITEM #1.
6. PROVIDE PERIODIC SPECIAL INSPECTION DURING THE ANCHORAGE OF OTHER ELECTRICAL EQUIPMENT IN STRUCTURES PER 2022 CBC SECTION 1705.13.6 ITEM #2.

DESIGN CRITERIA (2022 CBC):

OCCUPANCY
RISK CATEGORY III

LIVE LOADS
ROOF ..... 20.0 PSF (REDUCIBLE) TYP
MEZZANINE ..... 100 PSF

LATERAL LOADS
WIND
EXPOSURE C
WIND SPEED (BASIC DESIGN) ..... 100 MPH (3 SEC GUST)
WIND SPEED (ASD) ..... 77 MPH
INTERNAL PRESSURE COEFFICIENT ..... GC pi = + 0.18 (ENCLOSED)

COMPONENTS & CLADDING (DESIGNED BY OTHERS)

ELEMENT	ZONE	$P = P_{TABLE}\,(EAF)(RF)\,K_{zt}$
ROOF	1 2 3	16 PSF & -37.5 PSF 16 PSF & -49.5 PSF 16 PSF & -67 PSF
ROOF OVERHANG	2 3	-49.5 PSF -67 PSF
WALL	4 5	20 PSF & -22 PSF 20 PSF & -26 PSF

1. PLUS & MINUS SIGNIFY PRESSURES ACTING TOWARD AND AWAY FROM THE SURFACES, RESPECTIVELY.
2. WIND PRESSURES ARE NET VALUES.
3. COMPONENT & CLASSING WIND LOADS ARE FOR A TRIBUTARY ARE OF 10 SQ FT OR LESS. WIND LOADS ON TRIBUTARY AREAS GREATER THAN 10 SQ FT MAY BE REDUCED FOLLOWING THE PROVISIONS OF ASCE 7-16.
4. ROOF SYSTEM, INCLUDING CONNECTIONS, SHALL BE DESIGNED AND CONSTRUCTED FOR THE REQUIRED UPLIFT PRESSURES.
5. ROOF OVERHANG PRESSURE INCLUDES LOAD FROM BOTH TOP & BOTTOM SURFACE OF OVERHANG.

SEISMIC
V = EQUIVALENT LATERAL FORCE PROCEDURE BASE SHEAR (STRENGTH DESIGN)

$V = C_S W = 0.45\ W$

$C_S = \dfrac{S_{DS}}{(R\ /\ I_e)} = 0.45$

BASIC SEISMIC-FORCE-RESISTING SYSTEM: SPECIAL REINFORCED MASONRY SHEAR WALLS

R = 5.0	SITE CLASS = D - DEFAULT		
I_e = 1.25	S_S = 2.252	F_a = 1.2	S_{DS} = 1.802
Ω_o = 2.5	S_1 = 0.798	F_v = 2.55 *	S_{D1} = 1.357
ρ = 1.0		* = F_v INCREASED BY 50% PER ASCE 7-16 11.4.8 EXCEPTIONS (SUPPLEMENT 3)	
C_d = 3.5	SEISMIC DESIGN CATEGORY = E		

STORY DRIFT
DEFORMATION COMPATIBILITY AS REQUIRED BY ASCE 7-16 SECTION 12.12.5 FOR USE IN CLADDING, STAIRS & OTHER NON-STRUCTURAL ELEMENTS

Δ = 0.15h (in)

FLOOD DESIGN DATA
BUILDING NOT LOCATED IN FLOOD HAZARD AREA

SPECIAL LOADS
NONE APPLICABLE

INSPECTION NOTES:

GENERAL:
IN ADDITION TO THE INSPECTIONS REQUIRED BY SECTION 110 OF THE 2022 CBC, THE OWNER SHALL EMPLOY A SPECIAL INSPECTOR TO PERFORM SPECIAL INSPECTIONS AND TESTS AS INDICATED ON THE STATEMENT OF SPECIAL INSPECTIONS.

1. INSPECTORS: ALL TESTS AND INSPECTIONS SHALL BE PERFORMED BY AN INDEPENDENT INSPECTION AGENCY WHICH IS IN THE EMPLOYMENT OF THE OWNER.
2. ALL SPECIAL INSPECTION AND TESTING AGENCIES SHALL BE QUALIFIED PER ASTM E329 AND APPROVED BY THE BUILDING DEPARTMENT.
3. SPECIAL INSPECTORS SHALL SUBMIT INSPECTION REPORTS TO BUILDING DEPARTMENT, OWNER, ARCHITECT AND ENGINEER WITHIN TWO WEEKS OF PERFORMANCE OF INSPECTION OR TEST.
4. REFER TO CHAPTER 17 OF THE CODE FOR OTHER REQUIRED SPECIAL INSPECTIONS AND TESTS NOT LISTED.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT THE TESTS AND INSPECTIONS ARE PERFORMED. JOBSITE VISITS BY THE STRUCTURAL ENGINEER DO NOT CONSTITUTE AND ARE NOT A SUBSTITUTE FOR INSPECTIONS.
6. PRIOR TO THE COMPLETION OF WORK INCLUDED IN THE CONSTRUCTION DOCUMENTS, SPECIAL INSPECTORS SHALL SUBMIT A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS AND TESTS, AND CORRECTIONS OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS OR TESTS, TO THE BUILDING OFFICIAL, OWNER, ARCHITECT AND ENGINEER.
7. WHERE THE CONTRACTOR CHOOSES TO USE AN APPROVED ALTERNATIVE MEANS FOR FASTENING OR ANCHORING MATERIALS THAT REQUIRE SPECIAL FIELD INSPECTION, SUCH AS FIELD WELDING, ADHESIVE OR EXPANSIVE ANCHORS, ETC. ALL ADDITIONAL SPECIAL INSPECTION AND TESTING COSTS SHALL BE PAID BY THE OWNER AND DEDUCTED FOR THE CONTRACT AMOUNT.

PERIODIC STRUCTURAL OBSERVATION:

CONTRACTOR SHALL NOTIFY STRUCTURAL ENGINEER AT FOLLOWING STAGES OF CONSTRUCTION AND PROVIDE ALL NECESSARY ACCESS AND ASSISTANCE TO ALLOW THE STRUCTURAL ENGINEER TO PERFORM SITE OBSERVATION VISITS. THESE VISITS DO NOT CONSTITUTE INSPECTION OF THE WORK. PROVIDE A MINIMUM OF 2 BUSINESS DAYS NOTICE PRIOR TO REQUIRED TIME OF VISIT.

[ ] PRIOR TO FOUNDATION CONCRETE POUR(S)
[ ] PRIOR TO CONCRETE SLAB ON GRADE CONCRETE POUR(S)
[ ] STRUCTURAL FRAME 50% COMPLETE
[ ] STRUCTURAL FRAME 100% COMPLETE
[ ] PRIOR TO CONCRETE POUR(S) FOR ELEVATED SLABS

GENERAL NOTES:

1. ALL DRAWINGS ARE CONSIDERED TO BE A PART OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REVIEW AND COORDINATION OF ALL DRAWINGS AND SPECIFICATIONS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES THAT OCCUR SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE START OF CONSTRUCTION SO THAT A CLARIFICATION CAN BE ISSUED. ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS OR ANY CODE REQUIREMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN EXPENSE AND AT NO EXPENSE TO THE OWNER OR ARCHITECT.
2. TYPICAL NOTES AND DETAILS SHALL APPLY UNLESS OTHERWISE SHOWN OR NOTED ON DRAWINGS.
3. DETAILS OF CONSTRUCTION NOT FULLY SHOWN SHALL BE OF THE SAME NATURE AS SHOWN FOR SIMILAR CONDITION.
4. ALL NEW WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE 2022 CALIFORNIA BUILDING CODE, CCR, TITLE 24, PART 2, VOLUME 2 WITH LATEST REVISIONS REFERRED TO HEREIN AS THE "CODE", AND OTHER REGULATING AGENCIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK. INCLUDING THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY, AND THOSE CODES AND STANDARDS LISTED IN THESE NOTES AND SPECIFICATIONS.
5. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE GIVEN, CONSTRUCTION SHALL BE AS SHOWN FOR SIMILAR WORK. IF CONFLICTS OCCUR BETWEEN DRAWINGS AND SPECIFICATIONS, THE MOST EXPENSIVE MATERIALS OR METHODS SHALL PREVAIL (FOR BIDDING). STRUCTURAL ENGINEER SHALL BE NOTIFIED OF CONFLICTS AND THAT PORTION OF WORK SHOULD NOT PROCEED UNTIL CONFLICT IS RESOLVED.
6. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION.
7. ASTM SPECIFICATIONS ON THE DRAWINGS AND SPECIFICATIONS SHALL BE OF THE LATEST REVISION.
8. CONSTRUCTION MATERIAL SHALL BE SPREAD OUT IF PLACED ON FRAMED ROOF OR FLOOR. LOAD SHALL NOT EXCEED DESIGN LIVE LOAD PER SQUARE FOOT. PROVIDE ADEQUATE SHORING AND / OR BRACING WHERE STRUCTURE HAS NOT ATTAINED DESIGN STRENGTH.
9. HEAVY EQUIPMENT, CRANES AND MATERIAL STOCKPILES SHALL NOT BE LOCATED ON OR ADJACENT TO SHORING.
10. SUBSTITUTIONS FOR STRUCTURAL MEMBERS, HARDWARE, OR DETAILS SHALL BE REVIEWED BY THE ARCHITECT AND STRUCTURAL ENGINEER AND APPROVED BY THE APPROPRIATE AGENCY. FOR A SUBSTITUTION TO BE REVIEWED THE CONTRACTOR SHALL AGREE AND COMPLY WITH THE FOLLOWING:
    A. THE CONTRACTOR SHALL BE BILLED ON A TIME AND MATERIALS BASIS FOR THE REVIEW OF THE SUBSTITUTION WITH NO GUARANTEE OF APPROVAL.
    B. VERIFY THAT THE SUBSTITUTION DOES NOT AFFECT DIMENSIONS SHOWN ON DRAWINGS.
    C. THE CONTRACTOR SHALL ALSO PAY FOR CHANGES TO THE BUILDING DESIGN, WHICH INCLUDES BUT IS NOT LIMITED TO; ENGINEERING DESIGN, DETAILING, APPROVAL AGENCY PROCESS AND CONSTRUCTION COSTS CAUSED BY THE REQUESTED SUBSTITUTION.
    D. THE PROPOSED SUBSTITUTION IS TO HAVE NO ADVERSE AFFECT ON OTHER TRADES, THE CONSTRUCTION SCHEDULE, OR THE SPECIFIED WARRANTY REQUIREMENTS.
11. NO STRUCTURAL MEMBERS SHALL BE CUT, NOTCHED OR OTHERWISE PENETRATED UNLESS SPECIFICALLY APPROVED BY THE STRUCTURAL ENGINEER IN ADVANCE OR SHOWN ON THESE DRAWINGS.
12. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION. DIMENSIONS AND ELEVATIONS MUST BE VERIFIED WITH ARCHITECTURAL DRAWINGS. IN THE EVENT OF A CONFLICT, THE STRUCTURAL ENGINEER AND ARCHITECT ARE TO BE NOTIFIED IMMEDIATELY. DRAWING SCALES GIVEN ARE APPROXIMATE - DO NOT SCALE PLANS OR DETAILS.
13. SITE VISITS BY STRUCTURAL ENGINEER SHALL NOT BE IN LIEU OF INSPECTIONS.
14. SEE ARCHITECTURAL DRAWINGS FOR THE FOLLOWING:
    - SIZE AND LOCATION OF ALL DOOR AND WINDOW OPENINGS.
    - SIZE AND LOCATION OF ALL INTERIOR AND EXTERIOR NON-BEARING PARTITIONS.
    - SIZE AND LOCATION OF ALL CONCRETE CURBS, EQUIPMENT PADS, PITS, FLOOR DRAINS, SLOPES AND DEPRESSED AREAS, CHANGE IN LEVEL, CHAMFERS, GROOVES, INSERTS, ETC.
    - SIZE AND LOCATION OF ALL FLOOR AND ROOF OPENINGS EXCEPT AS SHOWN.
    - FLOOR AND ROOF FINISHED.
    - DIMENSIONS NOT SHOWN ON STRUCTURAL DRAWINGS.
15. SEE MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR THE FOLLOWING:
    - PIPE RUNS, SLEEVES, HANGERS, TRENCHES, WALL AND SLAB OPENINGS, ETC EXCEPT AS SHOWN OR NOTED.
    - ELECTRICAL CONDUIT RUNS, BOXES, OUTLETS IN WALL OR SLABS.
    - CONCRETE INSERTS FOR ELECTRICAL, MECHANICAL OR PLUMBING FIXTURES.
    - SIZE AND LOCATION OF MACHINE OR EQUIPMENT BASES AND ANCHOR BOLTS FOR MOTOR MOUNTS.

EXISTING BUILDING NOTES:

1. EXISTING BUILDING INFORMATION SHOWN ON THESE DRAWINGS IS BASED ON OUR INTERPRETATION OF THE EXISTING CONDITIONS, WHICH IS BASED UPON REVIEW OF EXISTING DRAWINGS AND LIMITED VISUAL INSPECTION. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY THE ARCHITECT AND ENGINEER IF ANY DISCREPANCIES WITH THESE DRAWINGS ARE FOUND BEFORE PROCEEDING WITH WORK.
2. SHOULD ANY CONDITION DEVELOP NOT COVERED BY THE APPROVED CONST

STRUCTURAL STEEL:

1. FABRICATION, ERECTION AND MATERIALS SHALL CONFORM WITH:
   A. AISC 360-16 "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS"
   B. AISC 341-16 "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS"
   C. 2022 CBC
2. THE STRUCTURAL STEEL FABRICATOR SHALL FURNISH SHOP DRAWINGS TO THE ARCHITECT OF ALL STEEL FOR ARCHITECT AND ENGINEER'S REVIEW BEFORE FABRICATION.
3. STRUCTURAL STEEL SHAPES AND CONNECTORS SHALL CONFORM TO THE FOLLOWING (UNO):
   A. WIDE FLANGE ..... ASTM A992, GRADE 50 (Fy = 50 KSI)
   B. ROUND HSS ..... ASTM A500, GRADE C (Fy = 46 KSI), OR ASTM A1085
      SQUARE OR RECTANGULAR HSS ..... ASTM A500, GRADE C (Fy = 50 KSI), OR ASTM A1085
   C. PIPE ..... ASTM A53, TYPES E OR S, GRADE B (Fy = 35 KSI)
   D. PLATES, ANGLES, CHANNELS, BARS
      AND MISCELLANEOUS SHAPES ..... ASTM A36
   E. MOMENT FRAME CONTINUITY PLATES, STIFFENER PLATES, SHEAR PLATES AT BEAM / COLUMN
      CONNECTIONS AND BASE PLATES ..... ASTM A572, GRADE 50
   F. MACHINE BOLTS ..... ASTM A307
   G. HIGH STRENGTH BOLTS (HSB) ..... ASTM A325-N
   H. WELDED HEADED STUDS ..... ASTM A108, GRADE 1010 THRU 1020
   I. HARDENED STEEL WASHERS ..... ASTM F436
   J. ANCHOR BOLTS ..... ASTM F1554, GRADE 36 (HEADED OR LOCKNUT)
   K. ALL THREAD RODS ..... ASTM A307
   L. ANCHOR ROD, HEADED,
      THREADED & NUTTED ..... ASTM F1554 GRADE 36
4. SPLICING STRUCTURAL MEMBERS WHERE NOT DETAILED ON THE DRAWING IS PROHIBITED WITHOUT PRIOR APPROVAL OF THE STRUCTURAL ENGINEER. BEAM PENETRATIONS AND OPENINGS IN STRUCTURAL MEMBERS ARE NOT ALLOWED UNLESS SPECIFICALLY DETAILED ON THE DRAWINGS.
5. EXCEPT AS OTHERWISE NOTED, ALL BOLTS SHALL BE MACHINE BOLTS.
6. FOR ALL HIGH-STRENGTH BOLTS, HARDENED WASHERS SHALL BE PROVIDED UNDER THE TURNING ELEMENT OF BOLT FOR TORQUING AS REQUIRED.
7. HOLES FOR MACHINE BOLTS SHALL BE DRILLED AND OF THE SAME NOMINAL DIAMETER AS THE BOLT PLUS 1/16", UNO.
8. COLUMN BASE PLATE ANCHOR BOLT HOLES MAY BE OVERSIZED IN ACCORDANCE WITH AISC 360-16 SECTION J9 AND TABLE 14-2 OF THE 15TH EDITION OF THE STEEL CONSTRUCTION MANUAL, WITH HEAVY HEX NUTS OR PLATE WASHERS UNDER BASE PLATE.
9. USE STANDARD AISC GAGE AND PITCH FOR BOLTS EXCEPT AS OTHERWISE NOTED.
10. "SLIP-CRITICAL" BOLTED CONNECTIONS:
    A. "SLIP-CRITICAL" CONNECTIONS (A325SC DESIGN VALUES WITH SPECIAL INSPECTION) ARE REQUIRED AT ALL LATERAL FRAME LINES, SEISMIC FORCE RESISTING SYSTEM COMPONENTS, AND ALL BOLTS IN OVERSIZED OR SLOTTED HOLES.
    B. THE SPECIAL INSPECTOR MUST BE PRESENT DURING THE ENTIRE INSTALLATION AND TIGHTENING OPERATION OF "SLIP-CRITICAL" CONNECTIONS.
11. ALL WELDING IS TO BE DONE BY CERTIFIED WELDERS USING E70XX ELECTRODES, UNO. THE USE OF E70-T4 WELDING WIRE IS NOT ALLOWED FOR ANY APPLICATION. ALL WELDS SHALL BE IN CONFORMITY WITH THE PROJECT SPECIFICATIONS AND STRUCTURAL WELDING CODE - STEEL OF THE AMERICAN WELDING SOCIETY (AWS D1.1 LATEST REVISION). SEE INSPECTION NOTES FOR WELDING INSPECTION REQUIREMENT. SUBMIT ALL WELDING PROCEDURES AND SPECIFICATIONS TO OWNER'S TESTING LABORATORY FOR REVIEW AND APPROVAL PRIOR TO BEGINNING FABRICATION.
12. ALL WELDS USED IN MEMBERS AND CONNECTIONS IN THE SFRS SHALL BE MADE WITH A FILLER METAL THAT CAN PRODUCE WELDS THAT HAVE A MINIMUM CHARPY V-NOTCH TOUGHNESS OF 20 FT-LB AT 0 DEGREES F, AS DETERMINED BY THE APPROPRIATE AWS AS CLASSIFICATION TEST METHOD OR MANUFACTURER CERTIFICATION (AWS D1.8 / D1.8M LATEST REVISION). WHERE WELDS ARE DESIGNATED AS DEMAND CRITICAL AS DEFINED IN AISC 341-16 SECTION A3.4B AND AWS D1.8 / D1.8M, THEY SHALL BE MADE WITH A FILLER METAL CAPABLE OF PROVIDING A MINIMUM CHARPY V-NOTCH TOUGHNESS OF 20 FT-LB AT -20 DEGREES F AND 40 FT-LB AT 70 DEGREES F.
13. WELD LENGTHS CALLED FOR ON PLANS ARE THE NET EFFECTIVE LENGTH REQUIRED. WHERE WELD LENGTH NOT CALLED FOR ON PLANS, PROVIDE WELD THE FULL LENGTH OF JOINT. WHERE FILLET WELD SYMBOL IS GIVEN WITHOUT INDICATION OF SIZE, USE MINIMUM SIZE WELDS AS SPECIFIED IN AISC 360-16, SECTION J2.2b.
14. ALL STRUCTURAL STEEL SURFACES THAT ARE ENCASED IN CONCRETE, MASONRY, OR SPRAY-ON FIREPROOFING, SHALL BE LEFT UNPAINTED. DO NOT PAINT THE TOP OF BEAMS AND GIRDERS TO RECEIVE STEEL DECK OR OTHER WELDED ATTACHMENTS.
15. ALL EXPOSED STRUCTURAL STEEL AND MISCELLANEOUS METAL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
16. ALL ENDS OF EXTERIOR TUBE STEEL AND PIPE SHALL BE CAPPED WITH A 1/4" PLATE AND WELDED CONTINUOUSLY TO SEAL.
17. PROVIDE 3" MINIMUM CONCRETE COVERAGE ON ALL STEEL BELOW GRADE.
18. ALL STRUCTURAL STEEL SHALL BE ERECTED PLUMB AND TRUE TO LINE. TEMPORARY BRACING SHALL BE INSTALLED AND SHALL BE LEFT IN PLACE UNTIL OTHER MEANS ARE PROVIDED TO ADEQUATELY BRACE THE STRUCTURE.
19. COMPOSITE STEEL DECKING AND ALL BEAMS AND GIRDERS SHALL REMAIN UNSHORED DURING AND AFTER THE PLACING OF THE CONCRETE FILL, UNO.
20. NON-SHRINK GROUT: A PRE-MIXED NON-METALLIC FORMULA WITH NO CHLORIDES HAVING THE FOLLOWING CHARACTERISTICS:
    A. FLOWABLE MIX AT TIME OF PLACEMENT
    B. NO SHRINKAGE AFTER PLACEMENT
    C. COMPRESSIBLE STRENGTH OF 5000 PSI (MINIMUM) AT 7 DAYS
    D. CONFORMS TO ASTM C1107 (GRADE C)
21. SEE ARCHITECTURAL DRAWINGS FOR NAILER HOLES, WELDED STUDS OR OTHER ITEMS NOT SHOWN IN THE DRAWINGS. WHERE STEEL IS EMBEDDED IN CONCRETE OR MASONRY, PROVIDE DRILLED HOLES (1" DIAMETER MAXIMUM) AS REQUIRED FOR PASSAGE OF CONTINUOUS REINFORCING BARS.

COLD-FORMED STEEL FRAMING:

1. ALL COLD-FORMED STEEL MEMBER NOMENCLATURE AND PROPERTIES SHALL BE PER ICC-ES EVALUATION REPORT ESR-3064P AND PRODUCT TECHNICAL INFORMATION CATALOGS OF THE STEEL STUD MANUFACTURER'S ASSOCIATION.
2. ALL MATERIAL AND WORKMANSHIP SHALL CONFORM WITH THE LATEST EDITION OF THE AISC "SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS".
3. STEEL STUDS, TRACK AND ALL MANUFACTURED MISCELLANEOUS ITEMS FOR STUD CONSTRUCTION SHALL BE MANUFACTURED BY A MEMBER COMPANY OF THE STEEL STUD MANUFACTURER'S ASSOCIATION. STUDS OF OTHER MAKE MAY BE SUBSTITUTED WITH WRITTEN APPROVAL BY STRUCTURAL ENGINEER.
4. ALL COLD-FORMED STUDS, TRACK, BRIDGING AND ACCESSORIES SHALL BE G60 HOT-DIP GALVANIZED AND SHALL MEET THE REQUIREMENTS OF ASTM A653, STRUCTURAL QUALITY, GRADE 50, CLASS 1 (Fy = 50 KSI) FOR STEELS THICKER THAN 18 GAUGE (43 MILS) AND ASTM A653, STRUCTURAL QUALITY, GRADE 33 (Fy = 33 KSI) FOR 18 GAUGE (43 MILS) AND THINNER STEELS FOR THE ITEM AND USE INTENDED.
5. ALL MEMBERS SHALL BE CUT SQUARELY OR AS REQUIRED, FITTED AND SEATED PROPERLY TO ABUTTING MEMBERS. STUDS SHALL BE PLUMBED, ALIGNED AND SECURELY ATTACHED AT FLANGES OR WEBS OR TRACKS.
6. PROVIDE ALL ACCESSORIES INCLUDING, BUT NOT NECESSARILY LIMITED TO, TRACKS, CLIPS, WEB STIFFENERS, ANCHORS, FASTENING DEVICES, RESILIENT CLIPS, AND OTHER ACCESSORIES REQUIRED FOR A COMPLETE AND PROPER INSTALLATION, AND AS RECOMMENDED BY THE MANUFACTURER FOR THE STEEL MEMBERS USED.
7. FASTENING OF COMPONENTS SHALL BE WITH GRABBER SCREWS OR EQUIVALENT SELF-DRILLING, SELF-TAPPING SCREWS OR WELDING. SCREWS OR WELD SIZES SHALL BE SHOWN ON THE DRAWINGS. SEE SHEET METAL SCREW REQUIREMENTS FOR ADDITIONAL INFORMATION.
8. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS AND IN ACCORDANCE WITH THE LATEST EDITION OF AWS D1.3.
9. TEMPORARY BRACING SHALL BE PROVIDED AS REQUIRED UNTIL ERECTION IS COMPLETE AND SAFELY SECURED TO STRUCTURE.
10. SEE ICC-ES EVALUATION REPORT ESR-3064P FOR TYPICAL COLD-FORMED STEEL STUD INSTALLATION.
11. PUNCH-OUT WEB SECTIONS SHALL BE LOCATED IN THE CENTER OF WEB WITH A MINIMUM SPACING OF 24" OC AND THE NEAR EDGE OF THE PUNCH-OUT SHALL NOT BE WITHIN 10" OF THE END OR EDGE OF BEARING OF A COLD-FORMED STEEL MEMBER. COLD-FORMED STEEL MEMBERS SHALL BE UNPUNCHED WHERE USED FOR JOISTS, TRACKS, HEADERS & SILLS OF OPENINGS WIDER THAN 3' - 0", AND BUILT-UP BOX AND BACK - TO - BACK SECTIONS, UNO.
12. MATERIAL THICKNESS OF TRACK SHALL MATCH STUD EXCEPT AS NOTED ON THE PLANS OR DETAILS. ALL BOLTED SILL TRACKS SHALL BE 54 MILS (0.0566") THICK, MINIMUM.
13. SSMA DESIGNATION / PRODUCT IDENTIFICATION:



FOR ALL "T" SECTIONS, MEMBER DEPTH IS THE INSIDE TO INSIDE DIMENSION BETWEEN THE FLANGES.

A. MATERIAL THICKNESS (IN MILS) REPRESENTS 95% OF THE DESIGN THICKNESS AND IS THE MINIMUM ACCEPTABLE THICKNESS OF THE BASE METAL DELIVERED TO THE JOBSITE.
B. THE MINIMUM RETURN LIP DIMENSION IS 0.375".
C. MINIMUM FLANGE WIDTH SHALL BE 1 5/8" AT STUDS & 1 1/2" AT TRACKS, UNO

STRUCTURAL SECTION PROPERTIES

SSMA DESIGNATIONS	GAUGE	Fy (KSI)	GROSS A (in²)	EFFECTIVE Sx (in³)	EFFECTIVE Ix (in⁴)	REQUIRED MIN SIZE TRACK
400S162-43	18	33	0.357	0.443	0.892	400T150-43
400S162-54	16	50	0.443	0.549	1.098	400T150-54
600S162-43	18	33	0.447	0.767	2.316	600T150-43
600S162-54	16	50	0.556	0.927	2.860	
800S162-43	18	33	0.537	1.158	4.663	800T150-43
800S162-54	16	50	0.670	1.397	5.736	
800S162-68	14	50	0.836	1.772	7.089	
400T150-43	18	33	0.315	0.293	0.719	
400T150-54	16	50	0.396	0.399	0.960	
600T150-43	18	33	0.405	0.534	1.868	
600T150-54	16	50	0.509	0.714	2.464	
800T150-43	18	33	0.496	0.741	3.825	
800T150-54	16	50	0.622	1.106	4.952	
800T150-68	14	50	0.926	2.081	11.303	
600T200-43	18	33	0.451	0.565	2.076	
800T200-43	18	33	0.541	0.741	4.230	
800T200-54	16	50	0.679	0.962	5.353	

SHEET METAL SCREW REQUIREMENTS:

1. ALL FASTENERS SUPPLIED TO THE PROJECT SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO USE. THIS REVIEW DOES NOT CONSTITUTE AN APPROVAL. IT IS PROVIDED FOR COMPLIANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS.
2. PROVIDE AN INTERNATIONAL CODE COUNCIL (ICC) EVALUATION REPORT FOR ALL TYPES AND BRANDS OF FASTENERS USED.
3. SUBSTITUTIONS FOR SPECIFIC FASTENERS IDENTIFIED WITHIN THESE PLANS MAY BE MADE PROVIDED THAT THE SUBSTITUTION IS COMPLIANT WITH NOTES 1 & 2, AND FOUND TO BE ACCEPTABLE FOR USE BY THE BUILDING DEPARTMENT. EACH REQUEST SHALL BE IN WRITTEN FORM IDENTIFYING THE ITEM BEING SUBSTITUTED FOR, THE SUBSTITUTION ITEM WITH BRAND NAME, PART NUMBER, AND INTERNATIONAL CODE COUNCIL (ICC) REPORT. THE AFFECTED PLANS, DETAILS AND SECTIONS SHALL ALSO BE IDENTIFIED. SEE GENERAL NOTES FOR ADDITIONAL SUBSTITUTION REQUIREMENTS.
4. FASTENERS SHOWN TO PROJECT THROUGH MAIN FRAMING MEMBERS SHALL PROJECT BEYOND THE MEMBER BY 3 FULL THREADS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING THE PROPER FASTENER FEATURES UNLESS NOTED:
   A. FLAT HEAD FASTENERS SHALL BE USED AT PLYWOOD CONNECTIONS.
   B. WAFER HEAD FASTENERS SHALL BE USED AT FRAMING CONNECTIONS COVERED WITH PLYWOOD, GYPSUM BOARD OR OTHER MATERIAL THAT MAY BE IMPEDED BY THE PROJECTION OF THE FASTENER HEAD.
   C. HEX WASHER HEAD FASTENERS SHALL BE USED AT ALL OTHER CONDITIONS.
   D. THREAD PITCH SHALL BE COMPATIBLE WITH THE THICKNESS OF THE PARTS BEING CONNECTED. THINNER GAUGE PARTS REQUIRE COARSER THREADS COMPARED TO THICKER GAUGE PARTS.
   E. THE FASTENER SHALL BE OF SUFFICIENT LENGTH IN ORDER TO COMPLY WITH NOTE 4 ABOVE.
   F. SELECT THE PROPER PROPRIETARY SELF-DRILLING TIP TYPE THAT IS CAPABLE OF TAPPING THE MATERIALS BEING CONNECTED.
6. ALL SCREWS SHALL BE MANUFACTURED BY GRABBER CONSTRUCTION PRODUCTS UNLESS PROVIDING AN EQUIVALENT SUBSTITUTION IN ACCORDANCE WITH NOTE 3 ABOVE.
7. FRAMING SCREWS SHALL BE #6 X 5/8" (16 mm) WAFER HEAD SELF-DRILLING, UNO.
8. PLYWOOD SCREWS SHALL BE A MINIMUM #8 X 1" (25 mm) FLAT HEAD WITH A MINIMUM HEAD DIAMETER OF 0.292" (7.4 mm), UNO.

REINFORCING STEEL:

1. REINFORCING SHALL CONFORM TO ASTM A706 - GRADE 60 UNO.
2. NO REINFORCING BARS SHALL BE WELDED UNLESS SPECIFICALLY DETAILED IN CONTRACT DOCUMENTS. ALL BARS SO DETAILED TO BE WELDED SHALL BE ASTM A706 BARS.
3. ALL REBAR TO BE WELDED SHALL BE CONTINUOUSLY INSPECTED BY A QUALIFIED TESTING LABORATORY. CONTRACTOR MUST FURNISH TO THE LABORATORY MILL CERTIFICATES SHOWING CHEMICAL ANALYSIS. ALL PREHEATING AND WELDING SHALL BE DONE BY WELDERS CERTIFIED TO WELD REINFORCING BARS IN ACCORDANCE WITH AWS D1.4 - 17 STANDARDS.
4. E80xx ELECTRODE SHALL BE USED FOR ALL REBAR WELDING.
5. TACK WELDING TO REBAR IS STRICTLY PROHIBITED.
6. WIRE FABRIC SHALL CONFORM TO ASTM A1064. WELDED WIRE FABRIC SHALL BE LAP SPLICED TWO SQUARES MINIMUM EACH DIRECTION.
7. REINFORCING, DOWELS, BOLTS, ANCHORS, SLEEVES, ETC. TO BE EMBEDDED SHALL BE SECURELY POSITIONED BEFORE PLACING CONCRETE OR GROUTING MASONRY. OBTAIN APPROVAL OF ALL AFFECTED TRADES PRIOR TO PLACING CONCRETE OR GROUTING MASONRY.
8. DRILL THROUGH STEEL COLUMNS AND BEAMS TO PASS CONTINUOUS REINFORCING (1" DIAMETER MAXIMUM) UNO.
9. SEE CONCRETE AND / OR MASONRY NOTES AS APPLICABLE FOR ADDITIONAL REQUIREMENTS.

REINFORCEMENT LAP SPLICE LENGTHS:

f ' c = 3000 PSI AT 28 DAYS

SPLICE CLASS	REINFORCEMENT LOCATION	REINFORCEMENT SIZE (GR60, UNO)								
		#3	#4	#5	#6	#7	#8	#9	#10	#11
B	TOP	28	37	46	56	81	93	104	118	131
	OTHER	21	28	36	43	62	71	80	91	101

f ' c = 4000 PSI AT 28 DAYS

SPLICE CLASS	REINFORCEMENT LOCATION	REINFORCEMENT SIZE (GR60, UNO)								
		#3	#4	#5	#6	#7	#8	#9	#10	#11
B	TOP	24	32	40	48	70	80	91	102	113
	OTHER	19	25	31	37	54	62	70	79	87

FOOTNOTES:
1. TABLE ABOVE IS BASED ON UNCOATED REINFORCING.
2. TOP REINFORCING IS HORIZONTAL REINFORCEMENT THAT HAS MORE THAN TWELVE INCHES OF FRESH CONCRETE CAST BELOW IT.
3. FOR BARS WITH COVER LESS THAN 1 BAR DIAMETER OR WITH CLEAR SPACING LESS THAN 2 BAR DIAMETERS, INCREASE LAP SPLICE BY 50%.
4. FOR LIGHTWEIGHT AGGREGATE CONCRETE, (WT = 110 PCF) INCREASE LAP SPLICE BY 33%.
5. ALL LAP SPLICES SHALL BE CLASS B, UNO.

MASONRY:

1. CONCRETE MASONRY UNITS SHALL BE LIGHTWEIGHT UNITS CONFORMING TO ASTM C90 WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI ON AVERAGE NET AREA (f ' m = 2000 PSI).
2. MORTAR SHALL BE TYPE S CONFORMING TO ASTM C270 AND CBC SECTION 2103.2.
3. GROUT SHALL BE COARSE GROUT CONFORMING TO ASTM C476 AND CBC SECTION 2103.3 WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH TO MEET OR EXCEED THE SPECIFIED f ' m.
4. REINFORCING STEEL SHALL BE DETAILED, FABRICATED AND INSTALLED IN ACCORDANCE WITH TMS 602. SEE REINFORCING STEEL NOTES FOR ADDITIONAL REQUIREMENTS.
5. LAP ALL BARS AS FOLLOWS (UNO):

LAP SPLICE LENGTHS (INCHES) FOR f ' m = 2000 PSI

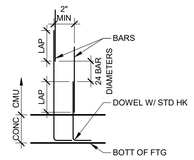
REINFORCEMENT LOCATION	NOMINAL WALL THICKNESS	REINFORCEMENT SIZE GR 60)						
		#3	#4	#5	#6	#7	#8	#9
SINGLE LAYER	8"	12	12	19	37	51	72	NA
DOUBLE LAYER	10"	12	21	30	54	63	72	81

LAPS IN SPECIAL REINFORCED MASONRY WALLS SHALL BE INCREASED BY 50%.

TABLE BASED ON UNCOATED REINFORCING.

BARS LARGER THAN #8 ARE TO BE LAPPED WITH MECHANICAL SPLICES THAT DEVELOP A MINIMUM OF 125 PERCENT OF THE YIELD STRENGTH OF THE BAR.

6. BEFORE MASONRY IS PLACED ON CONCRETE, THOROUGHLY CLEAN CONCRETE OF ALL LAITANCE AND ALL LOOSE MATERIAL. CONCRETE SHALL BE ROUGHENED BY CHIPPING THE ENTIRE SURFACE, SANDBLASTING, OR HOSING THE SURFACE 4 TO 6 HOURS AFTER THE POUR WITH A FINE SPRAY.
7. CONCRETE MASONRY UNITS SHALL BE BUILT TO PRESERVE THE UNOBSTRUCTED CONTINUITY OF THE VERTICAL CELLS. WALLS AND CROSS WEBS FORMING SUCH CELLS SHALL BE FULLY BEDDED IN MORTAR. ALL HEAD OR END JOINTS SHALL BE SOLIDLY FILLED WITH MORTAR FOR A DISTANCE IN FROM THE FACE OF THE WALL OR UNITS NOT LESS THAN THE THICKNESS OF THE LONGITUDINAL FACE SHELLS.
8. VERTICAL CELLS SHALL HAVE VERTICAL ALIGNMENT SUFFICIENT TO MAINTAIN A CLEAR UNOBSTRUCTED CONTINUOUS VERTICAL CELL MEASURING NOT LESS THAN 3" X 3".
9. CLEAN OUT OPENINGS SHALL BE PROVIDED AT THE BOTTOMS OF ALL CELLS TO BE FILLED AT EACH LIFT OR POUR OF GROUT WHERE SUCH LIFT OR POUR OF GROUT IS IN EXCESS OF 4' - 0" IN HEIGHT. ANY OVERHANGING MORTAR OR OTHER OBSTRUCTION OR DEBRIS SHALL BE REMOVED FROM INSIDE OF SUCH CELLS. THE CLEANOUTS SHALL BE SEALED AFTER INSPECTION AND BEFORE GROUTING. HIGH-LIFT GROUTING (IN EXCESS OF 4' - 0" IN HEIGHT) MUST BE APPROVED BY THE BUILDING OFFICIAL.
10. VERTICAL REINFORCING SHALL BE HELD IN POSITION AT TOP AND BOTTOM AND AT INTERVALS NOT EXCEEDING 192 BAR DIAMETERS.
11. WHEN GROUTING IS STOPPED FOR ONE HOUR OR LONGER, HORIZONTAL CONSTRUCTION JOINTS SHALL BE FORMED STOPPING THE POUR 1 1/2" BELOW THE TOP OF THE UPPERMOST UNIT.
12. PLACE ALL HORIZONTAL BARS IN BOND BEAM UNITS. WHEN 2 BARS ARE USED, STAGGER LAPS 6' - 0" MINIMUM.
13. PROVIDE DOWEL TO FOUNDATION OF EQUAL DIAMETER WITH LAP SPLICE AT EACH VERTICAL BAR IN WALLS. DOWELS TO BE STRAIGHT AND PLUMB.
14. ALL CELLS SHALL BE GROUTED SOLID.
15. ALL CONCRETE MASONRY UNITS SHALL BE OPEN END BOND BEAM UNITS.
16. SPECIAL INSPECTION REQUIRED ON ALL MASONRY WALLS.
17. ALL ANCHOR BOLTS SHALL BE HEX HEADED BOLTS CONFORMING TO ASTM A307 OR F1554 OR PLAIN ROD CONFORMING TO ASTM A36 WITH THREADED ENDS AND DOUBLE HEX NUTS AT ANCHORED END. BENT BAR ANCHOR BOLTS SHALL NOT BE USED. WHERE EMBEDMENT LENGTH IS NOT PROVIDED, THE MINIMUM EFFECTIVE EMBEDMENT LENGTH SHALL BE 6 BOLT DIAMETERS, BUT NO LESS THAN 3".
18. CONCRETE MASONRY UNITS SHALL BE PLACED WITH RUNNING BOND.
19. REINFORCING, DOWELS, BOLTS, ANCHORS, SLEEVES, ETC TO BE EMBEDDED IN MASONRY SHALL BE SECURELY POSITIONED AND FREE OF EXCESSIVE SCALE, RUST, DIRT, GREASE, OIL OR ANY OTHER SUBSTANCES THAT WILL IMPAIR BOND WITH MASONRY. OBTAIN APPROVAL OF ALL AFFECTED TRADES PRIOR TO GROUTING MASONRY.
20. PIPE OR CONDUIT SHALL NOT BE EMBEDDED IN ANY MASONRY UNLESS SPECIFICALLY DETAILED.



ELEVATION
BARS LOCATED IN THE SAME CELL

CONCRETE:

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE CODE PER GENERAL NOTES.
2. CONCRETE SHALL BE PLACED IN ACCORDANCE WITH ASTM C94 AND ACI STANDARD 304. IN ADDITION, MAXIMUM FREE FALL OF CONCRETE SHALL BE 4' - 0".
3. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY SUITABLE MEANS DURING PLACEMENT AND SHALL BE THOROUGHLY WORKED AROUND REINFORCEMENT AND EMBEDDED FIXTURES AND INTO CORNERS OF FORMS.
4. THE MINIMUM 28 DAY STRENGTH SHALL BE MIX DESIGN SCHEDULE.
5. CEMENT SHALL CONFORM TO ASTM C150, TYPE I OR II.
6. CONCRETE AGGREGATES:
   A. NATURAL SAND AND ROCK AGGREGATES SHALL CONFORM TO ASTM C33.
   B. LIGHTWEIGHT AGGREGATES SHALL CONFORM TO ASTM C330.
7. MINERAL ADMIXTURES SHALL COMPLY WITH ASTM C618 CLASS F.
8. LIQUID ADMIXTURES SHALL COMPLY WITH THE FOLLOWING:
   A. WATER REDUCERS..... ASTM C494 TYPE A
   B. MID-RANGE WATER REDUCERS..... ASTM C494 A & F
   C. NON-CHLORIDE ACCELERATORS..... ASTM C494 TYPE C OR C & E
   D. RETARDING ADMIXTURES ..... ASTM C494 TYPE B OR B & D
9. GENERAL:
   A. NO PIPES OR DUCT SHALL BE PLACED IN CONCRETE SLABS OR WALLS UNLESS SPECIFICALLY DETAILED.
   B. REFER TO ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS FOR ALL MOULDS, GROOVES, ORNAMENTS, CLIPS, ETC. TO BE CAST IN CONCRETE.
10. ALL CONSTRUCTION JOINTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ACI 318 SECTION 26.5.6 AND THE TYPICAL CONSTRUCTION JOINT DETAILS SHOWN ON THE STRUCTURAL DRAWINGS. ALL SURFACES OF CONSTRUCTION JOINTS SHALL BE CLEANED TO REMOVE DUST, CHIPS, OR OTHER FOREIGN MATTER PRIOR TO PLACING THE ADJACENT CONCRETE. THE CONTRACTOR SHALL SUBMIT THE PROPOSED LOCATIONS OF CONSTRUCTION JOINTS TO THE ENGINEER FOR REVIEW BY THE STRUCTURAL ENGINEER BEFORE STARTING CONSTRUCTION.
11. MAXIMUM SPACING OF CONSTRUCTION OR CONTROL JOINTS FOR A REINFORCED SLAB ON GRADE OR ELEVATED SLAB OVER METAL DECK SHALL BE 20' - 0" OC.
12. REMOVE ALL DEBRIS AND EXCESS WATER FROM THE FORMS BEFORE PLACING ANY CONCRETE.
13. REINFORCING, DOWELS, BOLTS, ANCHORS, SLEEVES, ETC. TO BE EMBEDDED IN CONCRETE SHALL BE SECURELY POSITIONED AND FREE OF EXCESSIVE SCALE, RUST, DIRT, GREASE, OIL OR ANY OTHER SUBSTANCES THAT WILL IMPAIR BOND WITH CONCRETE. OBTAIN APPROVAL OF ALL AFFECTED TRADES PRIOR TO PLACING CONCRETE.
14. CONCRETE IN WALLS, PIERS OR COLUMNS SHALL SET AT LEAST 2 HOURS BEFORE PLACING CONCRETE IN BEAMS, SPANDRELS OR SLABS SUPPORTED THEREON.
15. NO WOOD SPREADERS ALLOWED. NO WOOD STAKES ALLOWED IN AREAS TO BE CONCRETED.
16. CONTRACTOR SHALL PREPARE AND SUBMIT CONCRETE MIX DESIGNS TO THE ARCHITECT / ENGINEER OF RECORD FOR REVIEW PRIOR TO PLACEMENT OF ANY CONCRETE. CONCRETE MIX DESIGNS SHALL BE PER ACI 318 CHAPTER 26 AND ACI 301 SECTION 4. CALCIUM CHLORIDE OR ADMIXTURES WHICH ADD CHLORIDES ARE NOT PERMITTED.
17. NOTIFY THE ENGINEER OF RECORD (AND BUILDING OFFICIAL WHEN REQUIRED) 2 BUSINESS DAYS PRIOR TO PLACING CONCRETE.
18. CAST-IN-PLACE CONCRETE (NON-PRESTRESSED). THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:
   A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH ..... 3"
   B. CONCRETE EXPOSED TO EARTH OR WEATHER:
      NO. 6 THROUGH NO. 11 BAR ..... 2"
      NO. 5 BAR, W31 OR D31 WIRE AND SMALLER ..... 1 1/2"
   C. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
      SLABS, WALLS, JOISTS:
      NO. 14 AND NO. 18 BAR ..... 1 1/2"
      NO. 11 BAR AND SMALLER ..... 3/4"
      BEAMS, COLUMNS:
      PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS ..... 1 1/2"
19. A. ALL BARS SHALL HAVE A CLASS B MINIMUM SPLICE LAP, UNO.
   B. SPLICES IN ADJACENT BARS SHALL BE NOT LESS THAN 5' - 0" APART, UNO.
   C. DOWEL ALL VERTICAL REINFORCING IN WALLS AND COLUMNS FROM FOUNDATION WITH THE SAME SIZE REINFORCING, UNO.
   D. SPLICE CONTINUOUS BARS IN SPANDRELS, GRADE BEAMS, WALL BEAMS, ETC. AS FOLLOWS: TOP AT MID-SPAN, BOTTOM BARS AT CENTERLINE SUPPORT, UNO.
20. REINFORCING STEEL SHALL BE DETAILED, FABRICATED AND INSTALLED IN ACCORDANCE WITH ACI 315. SEE REINFORCING STEEL NOTES FOR ADDITIONAL REQUIREMENTS.
21. FINAL PRODUCT AS INDICATED ON DRAWINGS SHALL COMPLY WITH THE FOLLOWING:
   A. ALL CONCRETE SHALL HAVE A "CLASS B" FINISH PER ACI 347 WITH GRADUAL IRREGULARITIES LIMITED TO 1/4" IN 5' - 0" AS MEASURED WITH A STRAIGHT EDGE.
   B. SURFACE IRREGULARITIES ATTRIBUTABLE TO PLACEMENT AND CONSOLIDATION DEFICIENCIES AS DEFINED IN ACI 309.2R (E.G., BUG HOLES, HONEYCOMB, ETC.) WILL BE REVIEWED BY THE ARCHITECT AND ENGINEER. UNSATISFACTORY WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
   C. GRADUAL SURFACE IRREGULARITIES SHALL NOT BE CUMULATIVE.
22. FOR CONTROLLED LOW-STRENGTH MATERIAL (CLSM), SEE FOUNDATION NOTES.

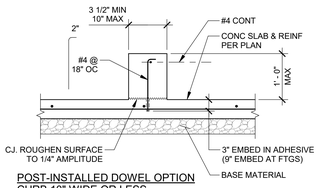
MIX DESIGN SCHEDULE

TYPE	USE CLASS	STRENGTH f ' c* MIN @ 28 DAYS (PSI)	CONCRETE UNIT WEIGHT (PCF)	MAX AGGREGATE SIZE (IN)	MAX (6) SLUMP (IN)	MAX WATER TO CEMENT RATIO (%)	FLY ASH (7) REPLACEMENT (%)
A	SLAB ON GRADE	4000	150	1" ± 1/4"	4" ± 1"	.40	15% MIN 25% MAX
B	FOUNDATIONS	3000	150	1" ± 1/4"	4" ± 1"	.50	15% MIN 25% MAX
D	ELEVATED SLAB	4000	150	1" ± 1/4"	4" ± 1"	.50	15% MIN 25% MAX
E	SITE	2500	---	1" ± 1/4"	4" ± 1"	.55	15% MIN 25% MAX

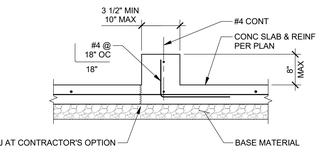
FOOTNOTES:
1. ADD WATER REDUCING ADMIXTURES PER SPECIFICATIONS FOR PLACING.
2. FOR HOT WEATHER CONCRETING REFER TO ACI 305R.
3. FOR COLD WE

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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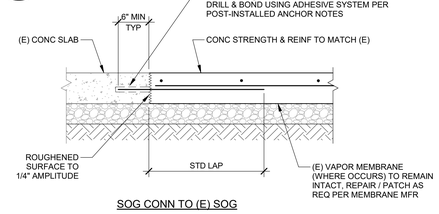
POST-INSTALLED DOWEL OPTION
CURB 10" WIDE OR LESS



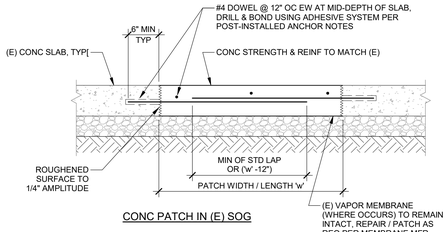
CIP DOWEL OPTION
CURB 10" WIDE OR LESS

NOTE:
SEE OTHER DWGS FOR CURB SIZE & LOCATION.

9 / S1.0 TYP CONC CURB
NTS

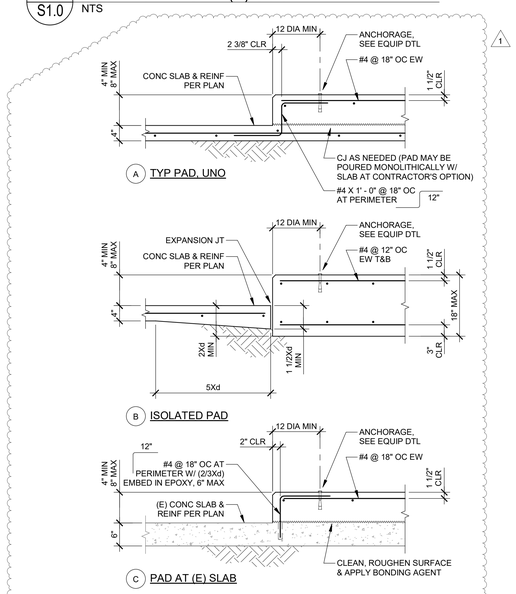


SOG CONN TO (E) SOG



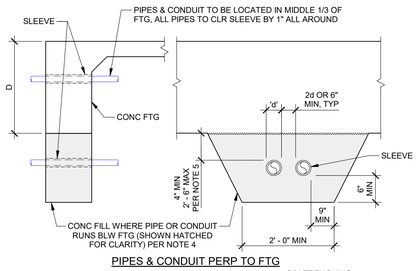
CONC PATCH IN (E) SOG

10 / S1.0 SLAB DOWELS AT (E) SOG
NTS

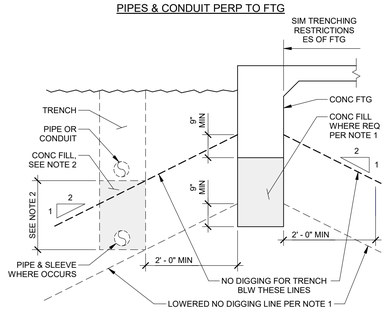


NOTES:
1. SEE ARCH, ELECTRICAL, PLUMBING & MECH DWGS FOR SIZE & LOCATION OF EQUIP / HOUSEKEEPING PADS.
2. HOUSEKEEPING PADS SHALL BE TYPE 'A' W/ A PAD HT OF 6", TYP UNO. PADS MAY BE CONSTRUCTED ACCORDING TO TYPE 'C' AT CONTRACTOR'S OPTION.
3. HOUSEKEEPING PADS AT CONC FILLED MTL DECK SHALL BE SIMILAR & CONSTRUCTED EITHER AS TYPE 'A' OR TYPE 'C' W/ A PAD HT OF 6", TYP UNO.

11 / S1.0 TYP HOUSEKEEPING PADS
NTS



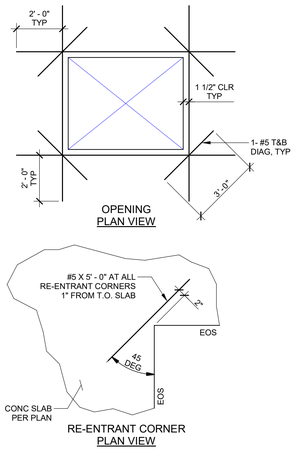
PIPES & CONDUIT PERP TO FTG



PIPES & CONDUIT PARALLEL TO FTG

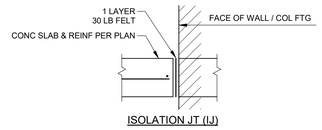
NOTES:
1. WHERE TRENCH OCCURS BLW "NO DIGGING LINE" (SHOWN AS HEAVY DASHED LINE), LOWER BOF W/ CONC FILL TO LOWER NO DIGGING LINE AS REQ (SHOWN AS LIGHT DASHED LINE).
2. IN LIEU OF LOWERING BOF WHERE TRENCH OCCURS BLW NO DIGGING LINE, FILL PORTION OF TRENCH BLW NO DIGGING LINE W/ CONC FILL PRIOR TO EXCAVATING FTG. PROVIDE SLEEVE W/ 1" CLR AROUND PIPE TO BE ENCASED IN CONC.
3. CONC FILL SHALL HAVE f ' c AT 28 DAYS > 1500 PSI.
4. CONC FILL TO BE SAME WIDTH AS FTG & FULL WIDTH OF PIPE TRENCH.
5. STEP CONC FILL OR FTG IF PIPE IS MORE THAN 2' - 6" BLW BOF.
6. NO PIPE SHALL BE PLACED BLW SPREAD FTGS, TYP.
7. IF PIPE IS IN PLACE PRIOR TO CASTING CONC, INSTALL A NON-COMPRESSIBLE SLEEVE AROUND THE PIPE W/ A 1" GAP AROUND THE PIPE.
8. PROVIDE 2" CLR MIN BTW PIPES OR CONDUIT & REINF.
9. NO PIPES ARE ALLOWED WITHIN FTG IN LONGITUDINAL DIRECTION.
10. CONDUITS WITHIN FTG SHALL BE LOCATED SUCH THAT VERT RISERS DO NOT CROSS ADJ HORIZ CONDUIT. MIN COVER SHALL BE 1 1/2" & 2d MIN SEPARATION.

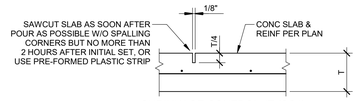
7 / S1.0 PIPE & CONDUIT AT FTG
NTS

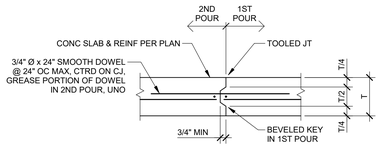


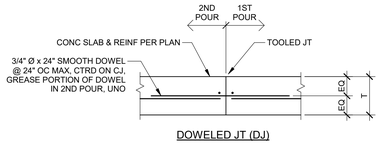
NOTES:
1. DTL ONLY SHOWS THE ADDNL REINF. OTHER DTLS SUCH AS MTL DECK, EOS, SUPPORT FRMG ARE NOT SHOWN FOR CLARITY.
2. ALL OPGS W/ A DIM OF 12" OR GREATER SHALL BE TRIMMED.
3. THIS REINF IS IN ADDITION TO ANY REINF INDICATED ON THE PLANS.

8 / S1.0 SLAB OPG & RE-ENTRANT CORNER
NTS



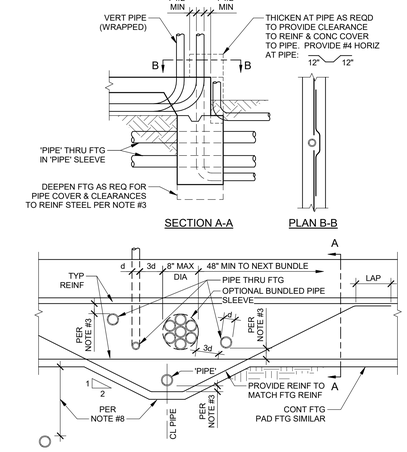






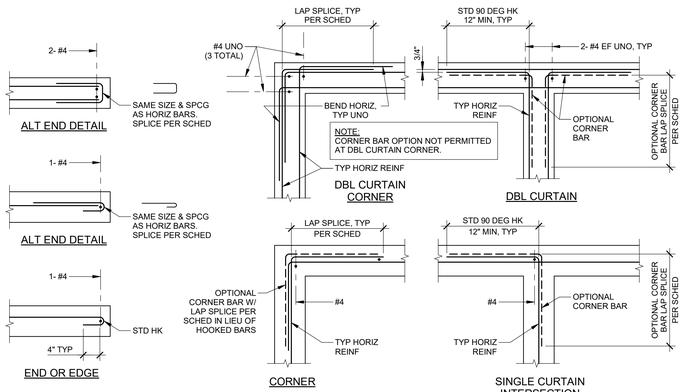
NOTE:
PROVIDE CONSTR OR CONTROL JTS AT MAX SPCG (PER CONC NOTES) TO DIVIDE SLAB INTO RECTANGULAR AREAS W/ LONG TO SHORT DIM RATIO NOT EXCEEDING 1 1/2 TO 1. AREAS SHALL NOT HAVE RE-ENTRANT CORNERS.

5 / S1.0 SOG JTS
NTS



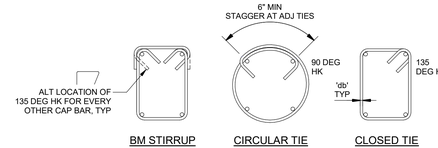
NOTES:
1. 'PIPE' = ANY PENETRATION THRU OR EMBEDDED IN FOUNDATION.
2. ALL PIPES THROUGH FOOTINGS TO BE WRAPPED OR SLEEVED. SLEEVES SHALL BE PVC, I.D. TO BE 2" LARGER THAN PIPE O.D. PIPES IN PLACE PRIOR TO PLACING CONCRETE MAY BE WRAPPED W/ 1" THICK FLEXIBLE INSULATION INSTEAD OF SLEEVE.
3. WRAPPED AND SLEEVED PIPES SHALL HAVE 1 1/2" MIN CLEAR TO REINF STEEL. MINIMUM CONCRETE COVER AT WRAPPED & SLEEVED PIPES TO BE 3".
4. CLEARANCE BETWEEN 'PIPES' TO BE 3d MIN TYP WITH A MAXIMUM OF (8) PIPES PER 48". GROUPS OF PIPES MAY BE BUNDLED AS SHOWN EXCEPT IN PAD FOOTINGS.
5. NO 'PIPE' TO RUN PARALLEL IN FOOTINGS, STEM OR CURB.
6. PVC CONDUIT ('PIPE') EMBEDDED IN CURB/STEM MAY BE WIRE TIED TO HORIZONTAL REINF.
7. NO HORIZONTAL PIPES ALLOWED THROUGH FOOTING WITHIN 2'-0" EACH SIDE OF HOLDOWNS OR STEEL COLUMNS. NO VERTICAL PIPES ALLOWED IN FOOTINGS AT BRACED FRAMES.
8. PROVIDE 18" MIN OF COMPACTED FILL ABOVE PIPES UP TO 12"ø. FOR LARGER PIPES INCREASE COMPACTED FILL DEPTH 1'-0" FOR EACH 6" INCREASE IN PIPE DIAMETER. OTHERWISE DEEPEN FOOTING AS SHOWN.

6 / S1.0 PIPE & CONDUIT AT FOOTING
NTS

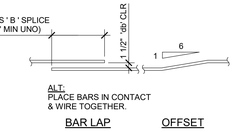


NOTES:
1. BAR INTERSECTIONS APPLY TO ALL SINGLE, DBL & MULTIPLE CURTAIN INTERSECTIONS & TO ALL VARIATIONS OF VERT & HORIZ REBAR POSITIONS.
2. TYP VERT REINF NOT SHOWN FOR CLARITY.
3. LAP SPLICES PER SCHED ON SHT S0.2.

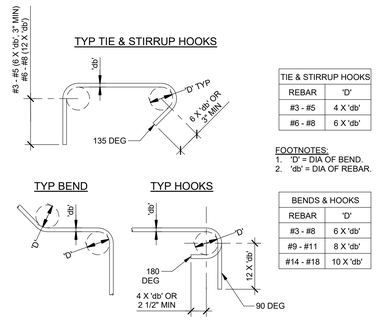
1 / S1.0 TYP REINF SPLICES AT INTERSECTIONS OF BMS, WALL & FTGS
NTS



NOTES:
1. 'db' = DIA OF REBAR.
2. FOR BEND & HK INFO NOT SHOWN, SEE TYP REINF BENDS DTL.



2 / S1.0 TYP REINF
NTS

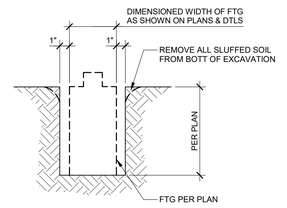


TIE & STIRRUP HOOKS	
REBAR	'D'
#3 - #5	4 X 'db'
#6 - #8	6 X 'db'

FOOTNOTES:
1. 'D' = DIA OF BEND.
2. 'db' = DIA OF REBAR.

BENDS & HOOKS	
REBAR	'D'
#3 - #8	6 X 'db'
#9 - #11	8 X 'db'
#14 - #18	10 X 'db'

3 / S1.0 TYP REINF BENDS
NTS



4 / S1.0 UNFORMED FTGS
NTS

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ARCHITECT

95% CONSTRUCTION DRAWINGS

REVISIONS

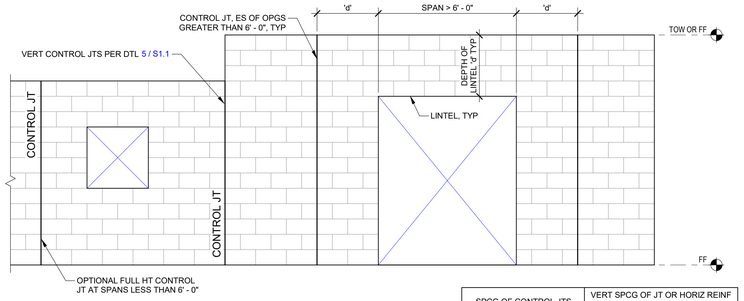
NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 02/25/2025
JOB NO. Y2213.00
SHEET TITLE

TYPICAL DETAILS - CONCRETE

SHEET NO.

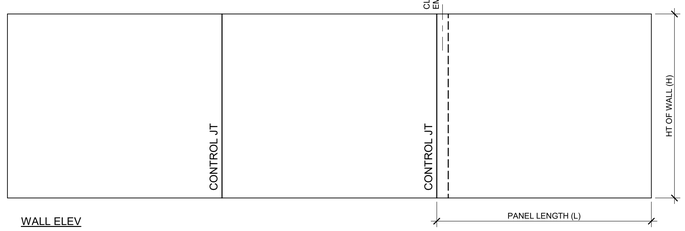
S1.0



WALL ELEV

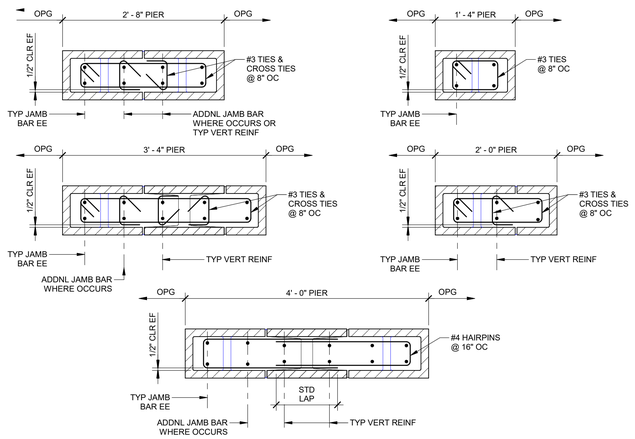
NOTE
THIS DTL IS A SCHEMATIC THAT SHOWS THE PLACES WHERE JTS CAN BE LOCATED AS WELL AS JT SPCGS. SAD FOR SPECIFIC JT LOCATIONS.
THIS DTL SHALL GOVERN OVER THE ARCH DWGS WHEN SPECIFIC JT LOCATIONS ARE NOT PROVIDED.

SPCG OF CONTROL JTS	VERT SPCG OF JT OR HORIZ REINF			
	48"	24"	16"	8"
EXPRESSED AS RATIO OF PANEL LENGTH TO HT (L / H)	2	2 1/2	3	4
WITH PANEL LENGTH (L) NOT TO EXCEED:	40' - 0"	45' - 0"	50' - 0"	60' - 0"

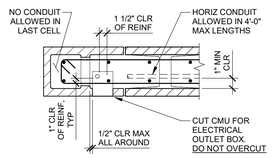


WALL ELEV

10 / S1.1 SUGGESTED LOCATIONS & SPACING FOR MASONRY WALL CONTROL JTS
NTS

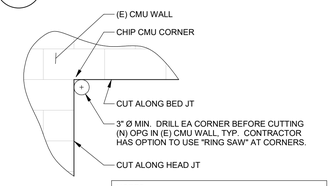


11 / S1.1 TYP MASONRY PIERS
1" = 1'-0"



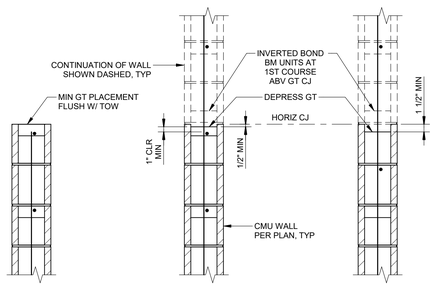
NOTES:
1. DO NOT TIE CONDUIT TO REINFORCING.
2. PLACE CONDUIT IN CELLS WITHOUT REINFORCING WHERE POSSIBLE.
3. MAX CONDUIT = 1 1/4"Ø

12 / S1.1 CONDUIT IN CMU
1" = 1'-0"

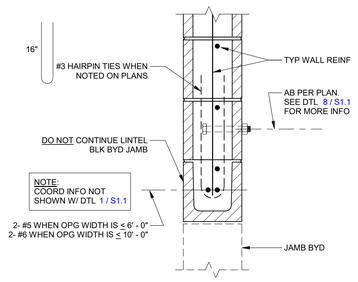


NOTES:
1. DO NOT OVERCUT AT CORNERS.
2. PAINT ALL EXPOSED OR CUT REINF.
3. SE IS TO BE NOTIFIED ONCE CMU CUTS ARE LAID OUT & 48 HOURS PRIOR TO CUTTING. ALL LOCATIONS ARE TO BE REVIEWED BY THE INSPECTOR OF RECORD.

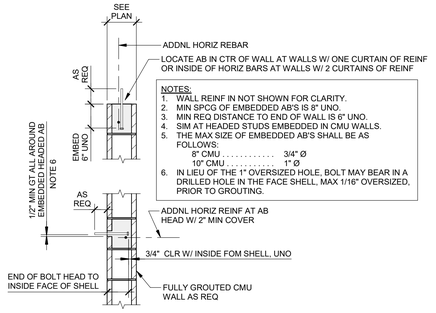
13 / S1.1 (N) OPG IN (E) CMU WALL
NTS



6 / S1.1 TYP CMU GROUT CONSTR JT
1" = 1'-0"



7 / S1.1 MASONRY WALL LINTEL
1 1/2" = 1'-0"



NOTES:
1. WALL REINF IN NOT SHOWN FOR CLARITY.
2. MIN SPCG OF EMBEDDED AB'S IS 8" UNO.
3. MIN REQ DISTANCE TO END OF WALL IS 6" UNO.
4. SIM AT HEADED STUDS EMBEDDED IN CMU WALLS.
5. THE MAX SIZE OF EMBEDDED AB'S SHALL BE AS FOLLOWS:
   8" CMU . . . . . 3/4" Ø
   10" CMU . . . . . 1" Ø
6. IN LIEU OF THE 1" OVERSIZED HOLE, BOLT MAY BEAR IN A DRILLED HOLE IN THE FACE SHELL, MAX 1/16" OVERSIZED, PRIOR TO GROUTING.

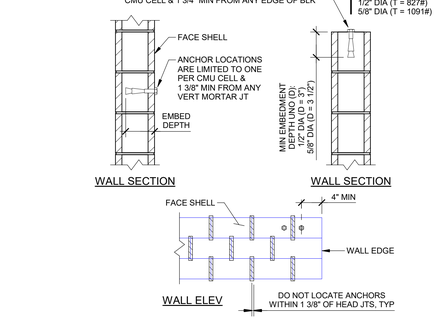
8 / S1.1 TYP EMBEDDED AB IN CMU
NTS

ANCHORS LOCATED IN THE FACE SHELL

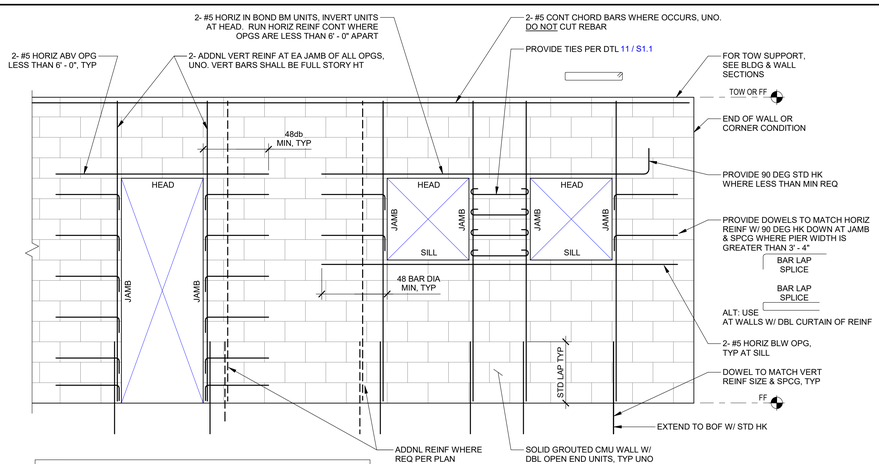
ANCHOR TYPE	HILTI KB-TZ2 (ICC ESR-4561)					
MATERIAL	MASONRY (f ' m = 2000 PSI)					
ANCHOR SIZE	3/8" Ø	1/2" Ø	1/2" Ø	5/8" Ø	5/8" Ø	3/4" Ø
MIN EMBED (IN)	2 1/2	2 1/4	3 1/2	2 3/4	4	3 1/4
TENSION TEST (LB) ✶	1002	803	1158	1041	1590	1326
INSTALLATION TORQUE	15	25	25	65	65	120

✶ TENSION TEST CRITERIA:
2X ALLOWABLE TENSION LOAD AS PROVIDED IN ICC-ESR.

1. ANCHORS TO BE INSTALLED W/ SPECIAL INSPECTION IN ACCORDANCE W/ MFR INSTRUCTIONS & ICC REPORT.
2. 4" MIN DISTANCE FROM EDGE OF WALL.

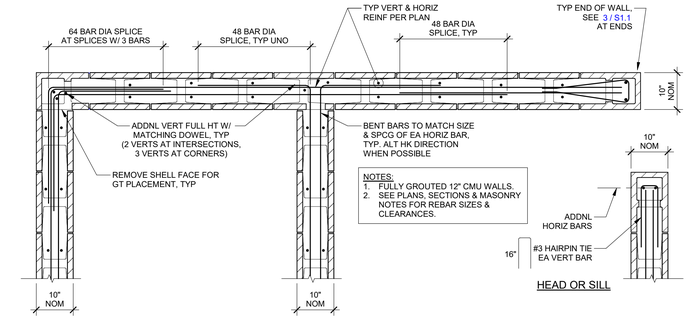


9 / S1.1 MASONRY POST-INSTALLED ANCHORS
NTS



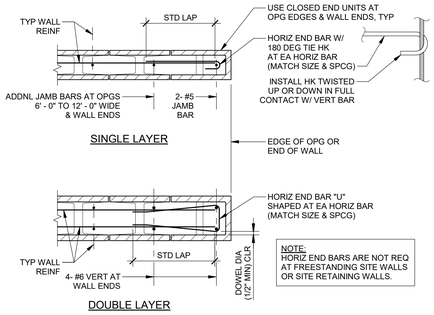
NOTES:
1. ALL REINF SHOWN IS IN ADDNL TO MAIN WALL REINF.
2. REINF SHOWN AROUND OPGS OCCURS AT EA CURTAIN OF REINF PER PLAN.
3. SEE DTL 10 / S1.1 FOR CONTROL JTS AT OPGS.

1 / S1.1 TYP MASONRY WALL OPGS
NTS

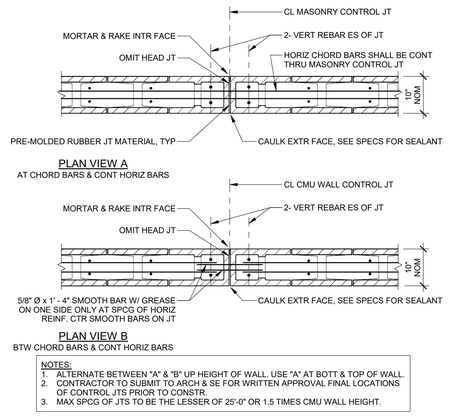


NOTES:
1. FULLY GROUTED 12" CMU WALLS.
2. SEE PLANS, SECTIONS & MASONRY NOTES FOR REBAR SIZES & CLEARANCES.

2 / S1.1 TYP MASONRY WALL REINF AT INTERSECTIONS, CORNERS & ENDS (10" WALL)
NTS



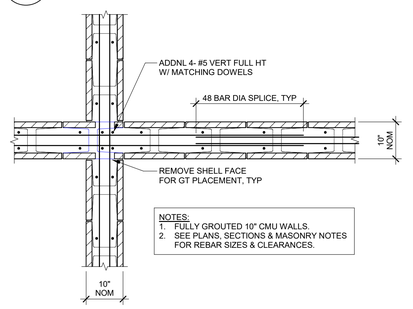
NOTE:
HORIZ END BARS ARE NOT REQ AT FREESTANDING SITE WALLS OR SITE RETAINING WALLS.



NOTES:
1. ALTERNATE BETWEEN "A" & "B" UP HEIGHT OF WALL. USE "A" AT BOTT & TOP OF WALL.
2. CONTRACTOR TO SUBMIT TO ARCH & SE FOR WRITTEN APPROVAL FINAL LOCATIONS OF CONTROL JTS PRIOR TO CONSTR
3. MAX SPCG OF JTS TO BE THE LESSER OF 25'-0" OR 1.5 TIMES CMU WALL HEIGHT.

5 / S1.1 MASONRY WALL CONTROL JTS (10" WALL)
NTS

3 / S1.1 TYP MASONRY REINF AT WALL ENDS / JAMBS
NTS



NOTES:
1. FULLY GROUTED 10" CMU WALLS.
2. SEE PLANS, SECTIONS & MASONRY NOTES FOR REBAR SIZES & CLEARANCES.

4 / S1.1 TYP MASONRY WALL INTERSECTION
NTS

ONE INCH = TWENTY FEET
ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT

8/4/2025 9:23:21 AM C:\Users\FaikR\Desktop_Revit Projects\2023 Santa Barbara Task 3\22023 SBSC Main Jail RKC_CYS_2024_Central_reloccal.rvt

AGENCY APPROVAL

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SANTA BARBARA COUNTY

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ARCHITECT

95% CONSTRUCTION DRAWINGS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 02/25/2025

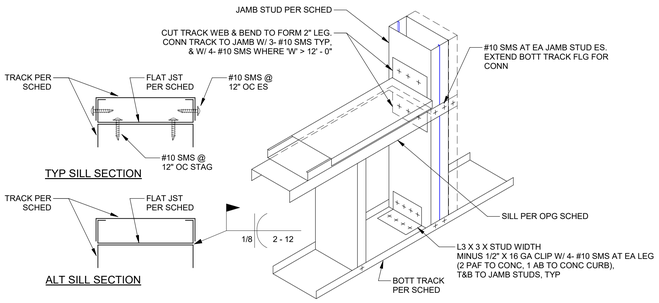
JOB NO. Y2213.00

SHEET TITLE

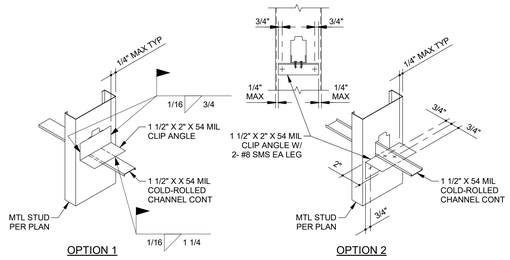
TYPICAL DETAILS - MASONRY

SHEET NO.

S1.1

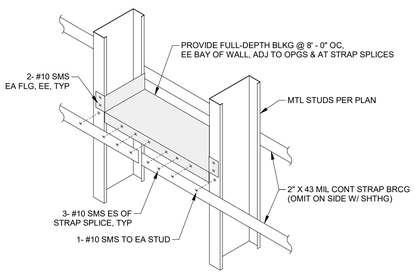


10 S1.2 WDW SILL DETAIL
NTS



NOTE:
WHERE DEPTH OF INTR WALL STUD IS GREATER THAN 6", INSTALL STRAP BRCG AS SHOWN FOR EXTR WALLS BLW.

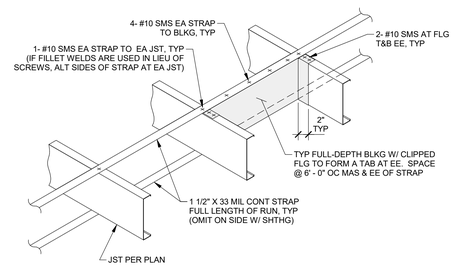
INTERIOR WALLS



EXTERIOR WALLS

NOTES:
1. LATERAL BRCG SHALL BE LOCATED VERTICALLY AT:
   - MID-SPAN WHERE SHTHG OCCURS ON BOTH SIDES &
   - 4' - 0" OC MAX WHERE SHTHG OCCURS ON ONE SIDE OR NO SIDES.
2. NOTCHING OR CUTTING OF COLD-ROLLED CHANNEL, BLKG OR STRAP BRCG IS NOT PERMITTED FOR ANY CONDITION.

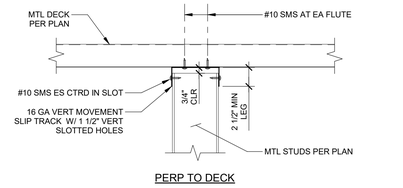
LATERAL BRACING AT STUDS



NOTE:
LATERAL BRCG SHALL BE LOCATED AS FOLLOWS, TYP UNO:
- MID-SPAN WHERE SHTHG OCCURS ON BOTH SIDES &
- 4' - 0" OC MAX WHERE SHTHG OCCURS ON ONE SIDE OR NO SIDES.

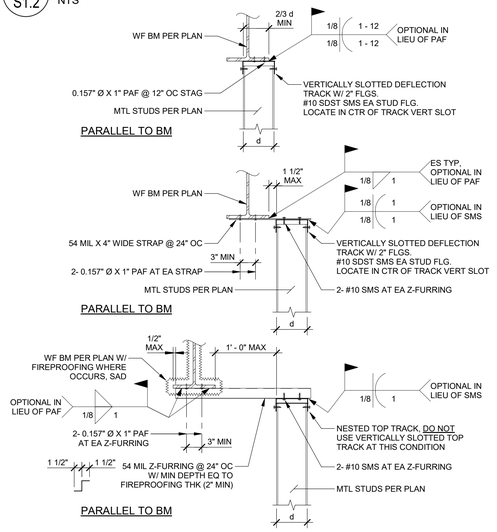
LATERAL BRACING AT JOISTS

11 S1.2 TYP STUD / JST BRIDGING LATERAL BRCG
NTS



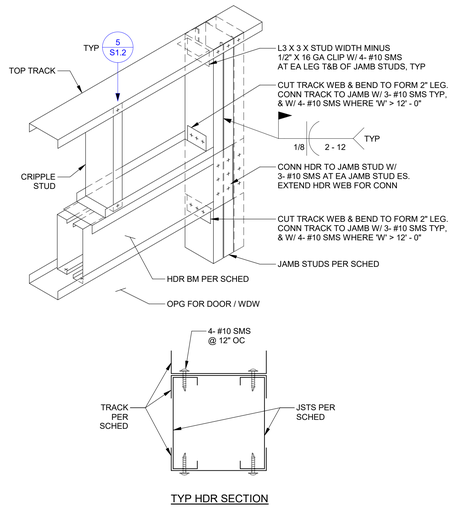
NOTE:
ATTACH WALL SHTHG TO STUDS & NOT TO SLIP TRACK.

7 S1.2 INTR NON-BRG WALL SLIP TRACK AT MTL DECK
NTS

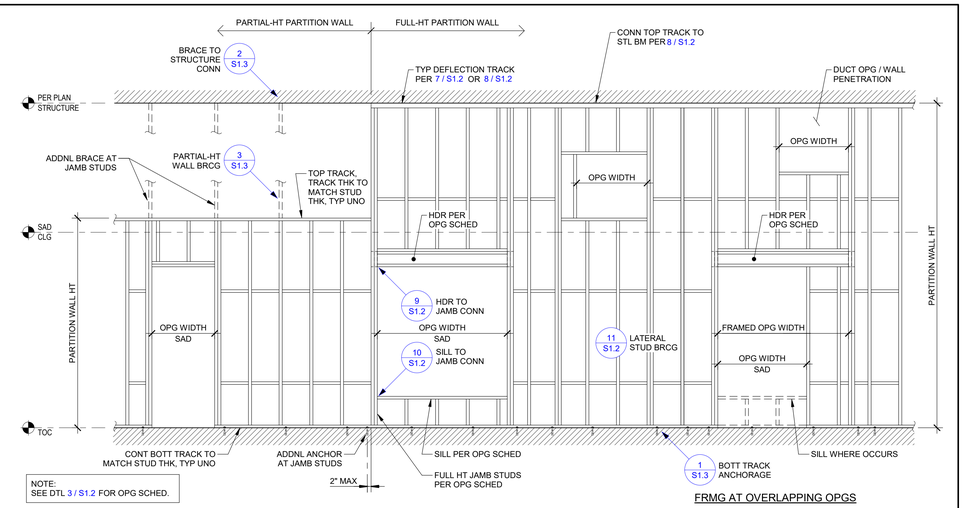


NOTE:
1. FOR STUD TO TRACK CONN, SEE FULL-HT PARTITION WALL TYP DEFLECTION TRACK PER 7 / S1.2
2. PAF = HILTI X-U POWDER-ACTUATED FASTENER (ICC ESR-2269).

8 S1.2 FULL HT PARTITION WALL TOP TRACK CONN TO STL BM
NTS



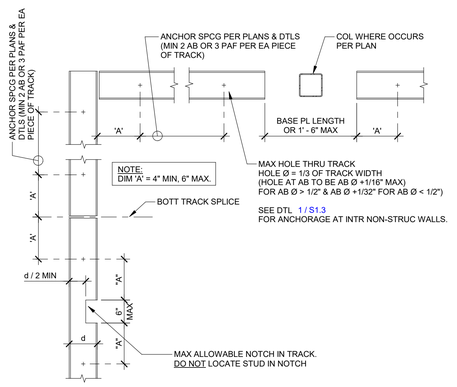
9 S1.2 HDR BM DETAIL
NTS



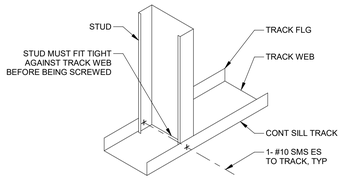
NOTE:
SEE DTL 3 / S1.2 FOR OPG SCHED.

FRMG AT OVERLAPPING OPGS

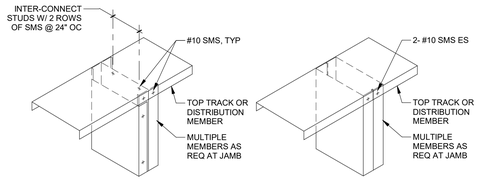
1 S1.2 INTR PARTITION WALL FRMG ELEVATION
NTS



4 S1.2 TYP SILL TRACK DETAIL
NTS



5 S1.2 TYP STUD TRACK CONN
NTS



6 S1.2 JAMB AT TOW DETAIL
NTS

INTERIOR NON-STRUCTURAL WALL STUD SCHED (S-SECTION)

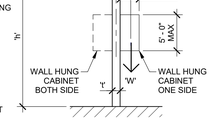
THICKNESS (MILS)	STUD SIZE 'I'	MAX HT 'h' @ 24" OC TYP WALL	@ 24" OC WALL HUNG CABINETS ON ONE SIDE OR BOTH SIDES	@ 16" OC TYP WALL	@ 16" OC WALL HUNG CABINETS ON ONE SIDE OR BOTH SIDES	@ 12" OC TYP WALL	@ 12" OC WALL HUNG CABINETS ON ONE SIDE OR BOTH SIDES
33 (20 GA)	3 5/8	14' - 6"	NOT PERMITTED	16' - 0"	NOT PERMITTED	17' - 6"	10' - 0"
	4	16' - 0"	NOT PERMITTED	18' - 0"	NOT PERMITTED	19' - 6"	11' - 6"
	6	21' - 6"	NOT PERMITTED	24' - 6"	11' - 6"	26' - 6"	18' - 0"
43 (18 GA)	3 5/8	16' - 0"	NOT PERMITTED	18' - 0"	11' - 0"	19' - 6"	15' - 6"
	4	17' - 0"	NOT PERMITTED	19' - 0"	13' - 0"	21' - 0"	17' - 6"
	6	25' - 6"	12' - 0"	28' - 0"	20' - 0"	30' - 6"	25' - 6"
	8	30' - 6"	15' - 0"	34' - 0"	24' - 6"	37' - 6"	31' - 6"
54 (16 GA)	4	18' - 6"	11' - 0"	21' - 0"	17' - 6"	22' - 6"	19' - 6"
	6	27' - 0"	18' - 0"	30' - 0"	25' - 6"	32' - 6"	28' - 0"
	8	32' - 6"	23' - 6"	36' - 6"	33' - 0"	40' - 0"	36' - 0"
68 (14 GA)	6	28' - 6"	23' - 6"	32' - 0"	27' - 6"	34' - 6"	30' - 6"
	8	35' - 0"	30' - 6"	39' - 6"	35' - 6"	43' - 0"	39' - 6"

NOTES:
1. STUDS ARE 'S-SECTIONS' TYPE W/ 1 1/4" MIN FLGS IN ACCORDANCE W/ SSMA, TYP UNO.
2. TRACKS ARE 'T-SECTIONS' TYPE W/ 1 1/2" MIN FLGS IN ACCORDANCE W/ SSMA, TYP UNO.
3. HT IS BASED ON PROPERLY ATTACHED SHEATHING ON EA FLG OVER ENTIRE LENGTH OF STUDS.
4. MAX DEFLECTION LIMITED TO L / 240.
5. 68 & 54 MIL STUDS BASED ON Fy = 50 KSI.
6. 5 PSF INTERIOR LATERAL LOAD APPLIED.
7. DESIGNED IN ACCORDANCE W/ THE CBC 2022 EDITION.
8. REQUIREMENTS OF ICC-ES EVALUATION REPORT ER - #4943P APPLY.
9. MIN ATTACHMENT FOR WALL HUNG CABINETS SHALL BE AS FOLLOWS:
   A. DIRECTLY TO STUDS: T&B OF CABINET EA STUD MIN.
   B. TO BLKG / BACKING BTW STUDS: T&B OF CABINET AT SAME SPCG AS STUDS MIN.

e = t / 2+8"

W = WT OF WALL HUNG CABINET

= 20 PLF DL + 205 PLF LL



TYP WALL SECTION

2 S1.2 INTR PARTITION WALL STUD SCHED

COLD-FORMED WALL OPENING SCHED [1]

OPG 'W'	WALL WIDTH	HDR	SILL	JAMB	COMMENTS
8' - 0" MAX	6"	2- 600S162-43 JOISTS 2- 600T150-43 TRACKS	1- 600S162-43 STUD 2- 600T150-43 TRACKS	2- 600S162-54 STUDS	-----
	8"	2- 800S162-43 JOISTS 2- 800T150-43 TRACKS	1-800S162-43 STUD 2- 600T150-43 TRACKS	2- 800S162-43 STUDS	-----
	12"	2- 800S162-54 JOISTS 2- 1200T150-54 TRACKS	1- 1200S162-54 STUD 2- 1200T150-54 TRACKS	2- 1200S162-54 STUDS	-----
10' - 0" MAX	6"	2- 600S162-54 JOISTS 3- 600T150-54 TRACKS	1- 600S162-54 STUD 2- 600T150-54 TRACKS	2- 600S162-54 STUDS	-----
13' - 0" MAX	6"	2- 600S162-54 JOISTS 3- 600T150-54 TRACKS	1- 600S-54 STUD 2- 600T150-54 TRACKS	3- 600S162-54 STUDS	-----
	12"	2- 800S162-54 JOISTS 2- 1200T150-54 TRACKS	1- 1200S162-68 STUD 2- 1200T150-68 TRACKS	2- 1200S162-68 STUDS	-----
18' - 0" MAX	6"	2- 800S162-54 JOISTS 3- 600T150-54 TRACKS	1- 600S162-54 STUD 2- 600T150-54 TRACKS	3- 600S162-54 STUDS	-----

NOTES:
1. SEE COLD-FORMED WALL FRMG DTLS FOR MORE INFO.
2. SEE DTL 9 / S1.2 FOR HDR & DTL10 / S1.2 FOR SILL.

3 S1.2 COLD-FORMED WALL OPG SCHED

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REVISIONS

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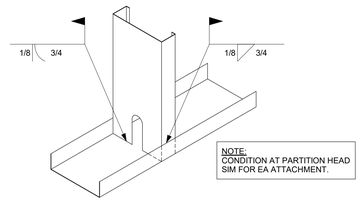
TYPICAL DETAILS - COLD-FORMED STEEL

SHEET NO.

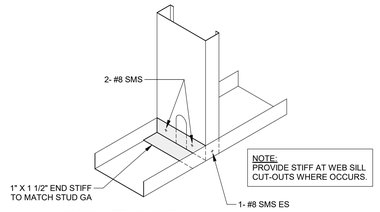
S1.2

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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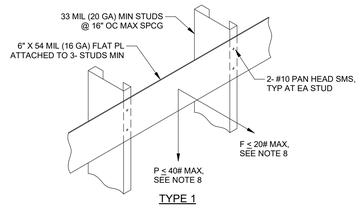


WELD ATTACHMENT
FOR STRUC STUDS



SCREW ATTACHMENT
FOR HEAD TRACK & BOTT TRACK

7 S1.3 PUNCH-OUT LOCATION AT END OF STUD
NTS



TYPE 1

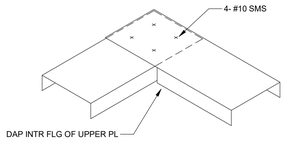
TYP USES: MIRRORS, FLAT SIGNS, TACK BOARDS, CHALKBOARDS, BULLETIN BOARDS MARKER BOARDS, FRAMED ARTWORK.

TYPE 2

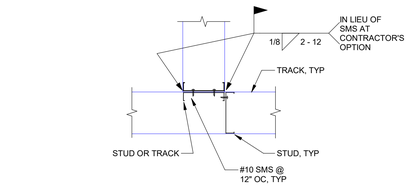
TYP USES: TOILET & BATH ACCESSORIES UNO, DOOR STOPS, DOOR HOLDERS, CABINETS, DISPLAY CABINETS, TOILET PARTITIONS, UNO.

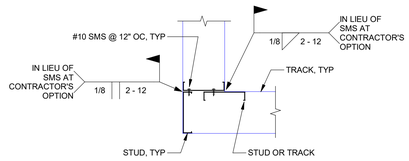
NOTES:
1. EXTEND BACKING PL TO NEXT STUD BYD SIDE OF FIXTURE OR ACCESSORY. DO NOT NOTCH OR CUT BACKING PL EXCEPT AS SHOWN ABV.
2. PROVIDE MTL SLEEVES THRU WALL FIN AT FIXTURE & EQUIP FASTENING.
3. FOR MECH WORK ANCHORAGE, SEE MECH DWGS.
4. FOR ELECTRICAL WORK ANCHORAGE, SEE ELECTRICAL DWGS.
5. FOR OTHER WORK ANCHORAGE, SAD.
6. 54 MIL (16 GA) BLKG MUST BE SPLICED AT STUDS W/ SMS SHOWN ABV EE. SEE PLAN AT SPLICE.
7. WHERE F > 75#, 6" X 54 MIL (16 GA) MIN STUDS REQ.
8. P IS VERT LOAD AT FACE OF BLKG @ 16" OC MIN SPCG. F IS HORIZ LOAD, PERP TO FACE OF BLKG, @ 16" OC MIN SPCG.

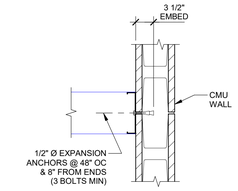
8 S1.3 TYP STUD WALL BACKING PLATE
NTS



INTERSECTING WALL TRACKS

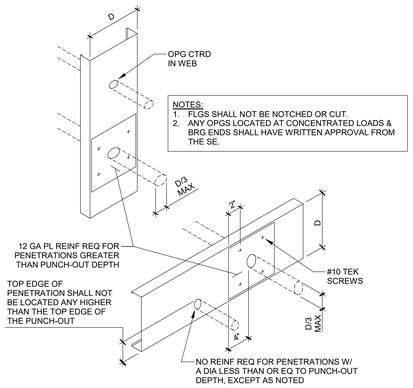




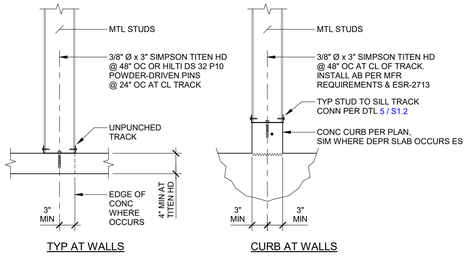


INTERIOR WALLS

5 S1.3 TYP CORNER & INTERSECTION FRMG
NTS

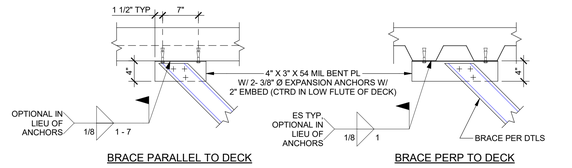


6 S1.3 PENETRATION DETAIL
NTS

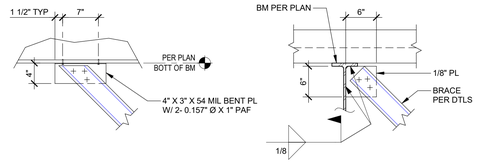


TYP AT WALLS CURB AT WALLS

1 S1.3 INTR WALL SILL TRACK ANCHORAGE
NTS



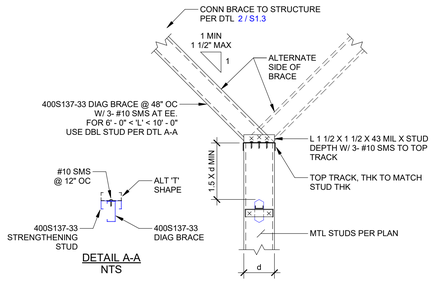
BRACE PARALLEL TO DECK BRACE PERP TO DECK



BRACE PARALLEL TO STL BM BRACE PERP TO STL BM

NOTES:
1. PAF = HILTI X-U POWDER-ACTUATED FASTENER (ICC ESR-2269).
2. EXPANSION ANCHOR = HILTI KB-TZ (ICC ESR-1917). TORQUE TEST = INSTALLATION TORQUE PER ICC REPORT.

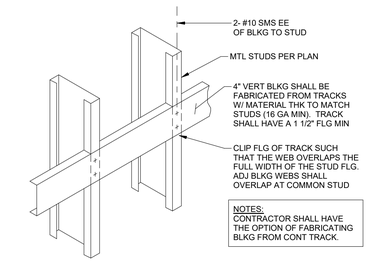
2 S1.3 BRACE CONN TO STRUCTURE
NTS



DETAIL A-A
NTS

NOTE:
INSTALL DIAG BRACE AT JAMB STUDS ES OF OPGS "w" > 8' - 0" WIDE.

3 S1.3 PARTIAL-HT PARTITION WALL TOW BRCG
NTS



4 S1.3 BACKING PLATE
NTS

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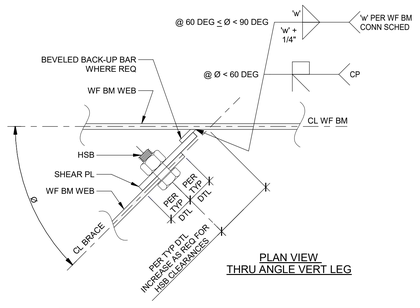
TYPICAL DETAILS - COLD-FORMED STEEL

SHEET NO.

S1.3

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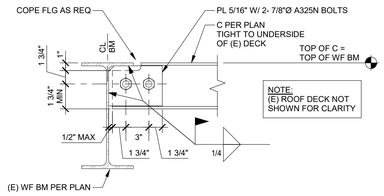
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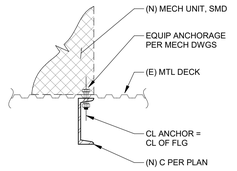
PLAN VIEW
THRU ANGLE VERT LEG

NOTES:
1. FOR ADDNL INFO, SEE TYP DTLS & BOLTING SCHED.
2. WHERE WELD IS REQ AT TOP OR BOTT OF SHEAR PL PER TYP DTL & ACCESS IS LIMITED TO ONLY ONE SIDE OF PL, PROVIDE CP WELD OF SHEAR PL IN LIEU OF DBL SIDED FILLET WELD.

5 / S1.4 TYP SKEWED SHEAR PLATE
NTS



6 / S1.4 TYP CHANNEL TO WF BM CONN
NTS

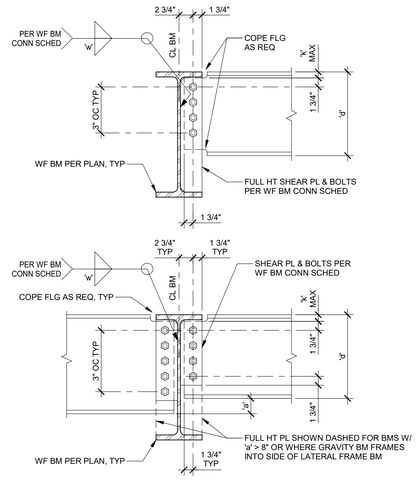


7 / S1.4 MECH UNIT CONN TO CHANNEL
NTS

BM SIZE	SHEAR PL THICKNESS	BOLTS			WELD 'w'	REMARKS
		NO.	DIA	TYPE		
C6X, W8X & W10X	5/16"	2	7/8"	A325N	1/4"	
W12X & W14X	5/16"	3	7/8"	A325N	1/4"	
W16X	3/8"	4	7/8"	A325N	5/16"	
W18X	3/8"	5	7/8"	A325N	5/16"	
W21X	3/8"	5	7/8"	A325N	5/16"	
W24X	1/2"	6	7/8"	A325N	3/8"	

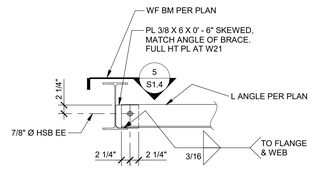
NOTES:
1. THIS SCHED APPLIES TO NON-MOMENT FRAME CONNS, TYP.
2. ALL CONNS FOR GRAVITY FRMG SHALL BE SNUG TIGHT EXCEPT AS NOTED IN NOTE #3 BLW & UNO.
3. ALL GRAVITY BMS IN LINE W/ (IN THE SAME PLANE AS) MOMENT FRAMES & BRACED FRAMES SHALL HAVE PRE-TENSIONED (PT) CONNS PER THE SPEC FOR STRUC JTS USING HIGH-STRENGTH BOLTS (HSB) & SHALL MEET THE REQUIREMENTS FOR SLIP-CRITICAL (SC) FAYING SURFACES IN ACCORDANCE W/ AISC 360 SECTION J3.8 W/ A CLASS A SURFACE.
4. ALL BOLTS SHALL BE INSTALLED IN STD HOLES, EXCEPT AS NOTED IN REMARKS OR DTLS.
5. SEE PLAN FOR CONNS W/ BOLTS IN MULTIPLE ROWS.
6. SEE PLANS & DTLS FOR LOCATIONS WHERE BM CONNS REQUIRE PT OR SC BOLTED CONNS AS PART OF THE SFRS OTHER THAN AS NOTED IN NOTE #3 ABV. SUCH BMS ARE IDENTIFIED ON PLANS W/ (PT) OR (SC) NEXT TO THE BM SECTION DESIGNATION. SEE FRAMING LEGEND ON PLANS FOR MORE INFO.

1 / S1.4 WF BM CONN SCHED

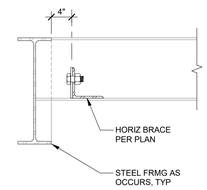


NOTE:
'k' MAX = LARGEST (OF BOTH WF BMS) DISTANCE FROM OUTER FACE OF FLG TO THE WEB TOE OF FILLET USED FOR DETAILING. VALUES ARE PUBLISHED IN AISC STEEL CONSTRUCTION MANUAL.

2 / S1.4 TYP WF BM TO WF BM CONN
NTS



3 / S1.4 SKEWED BRACING DETAIL
NTS



4 / S1.4 BRACE PLACEMENT
NTS

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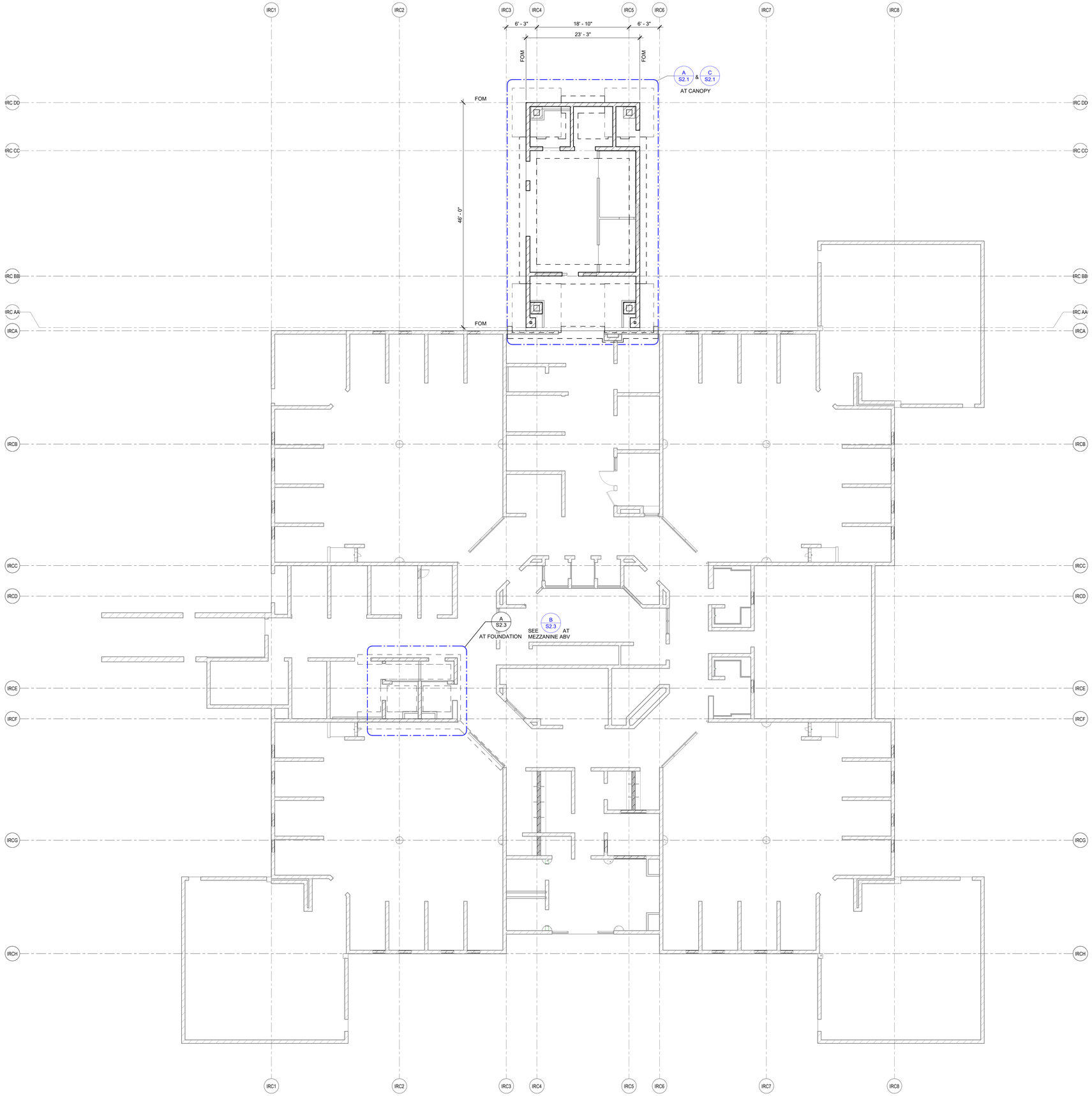
SHEET TITLE

TYPICAL DETAILS - STEEL

SHEET NO.

S1.4

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FOUNDATION PLAN
1/8" = 1'-0"

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
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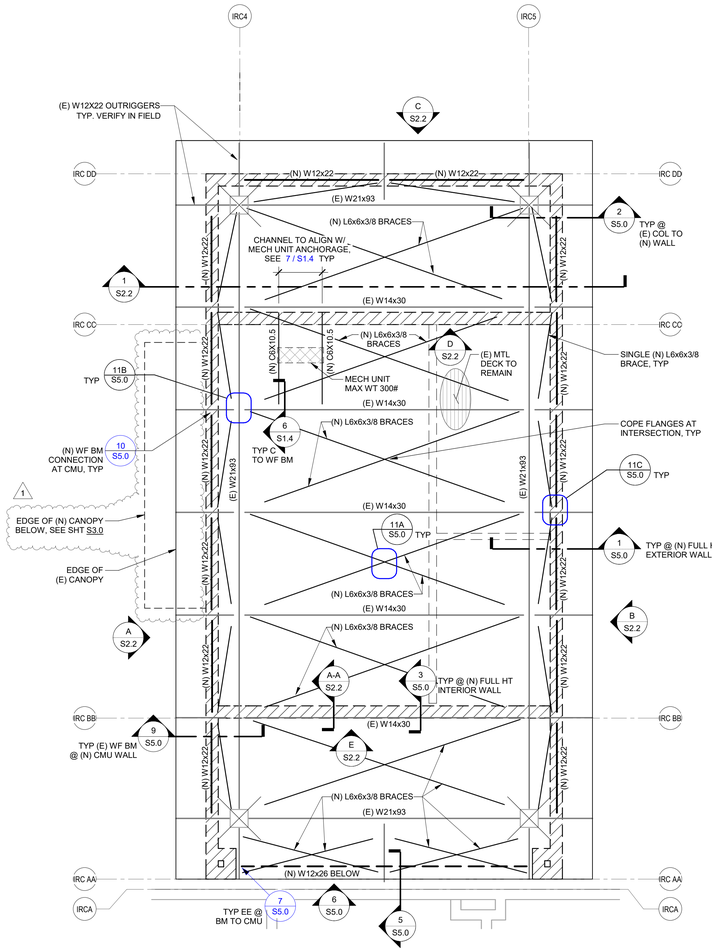
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FOUNDATION PLAN

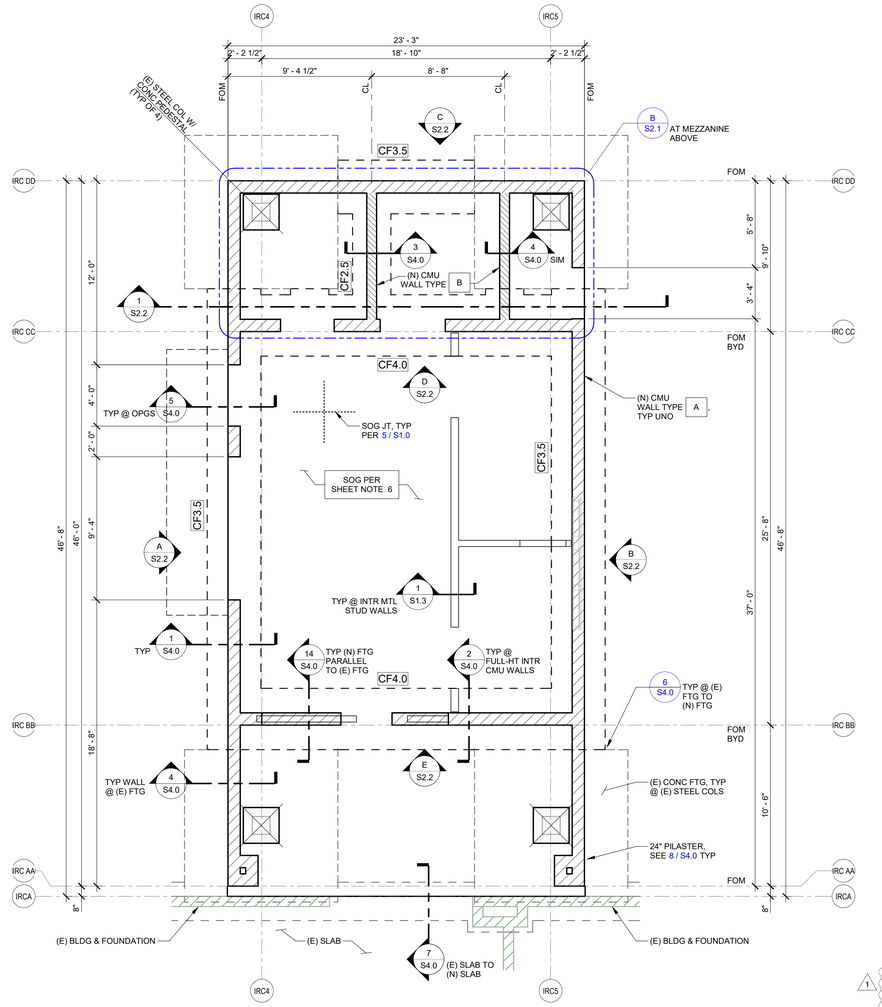
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S2.0



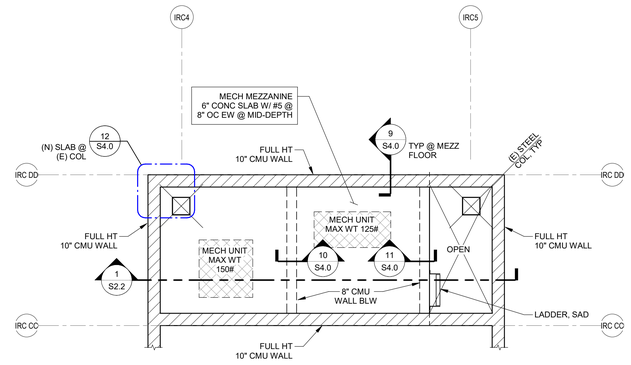
C S2.1 PLAN AT CANOPY ROOF

1/4" = 1'-0"



A S2.1 FOUNDATION PLAN AT ENCLOSED CANOPY

1/4" = 1'-0"



B S2.1 PLAN AT MEZZANINE (ELEVATION = 10' - 0")

1/4" = 1'-0"

FOUNDATION NOTES

1. SEE S0 SHEETS FOR GENERAL NOTES & TYPICAL DETAILS.
2. SEE SHEET S2.2 FOR WALL ELEVATIONS.
3. SEE CIVIL DWGS, GEOTECHNICAL REPORT & SPECS FOR SUB-GRADE RECOMMENDATIONS.
4. DIMS ARE TO FOM OR CENTERLINE OF COLS, TYP UNO.
5. SAD FOR DIMS, EXTENT & NATURE OF ALL WALLS.
6. TOP OF SOG ELEV = 0' - 0" (DATUM ELEV), UNO.
   SOG IS 5" THK CONC W/ #4 @ 16" OC EW AT MID-DEPTH (UNO) OVER 15 MIL VAPOR BARRIER (ASTM E1745-97 CLASS A OR B) OVER 4" CRUSHED ROCK (1/2 OR 3/4 INCH, W/ NO MORE THAN 5 PERCENT PASSING THE NO. 200 SIEVE), TYP UNO. SEE PLAN FOR TOC SLAB ELEVS.
7. TOP OF FTG (TOF) ELEV = -0' - 8" TYP UNO TO MATCH TOP OF (E) PAD FTGS, VIF. SAD & OTHER CONSULTANT DWGS FOR UTILITIES THAT WILL AFFECT FTGS & COMPLY W/ TYPICAL DETAILS.
8. SOG C/J LOCATIONS SHALL BE SUBMITTED BY THE CONTRACTOR AND REVIEWED BY THE ARCHITECT / ENGINEER PRIOR TO PLACEMENT OF CONC PER DTL .
9. EXTR CONC FLATWORK IS NOT SHOWN. SEE CIVIL & ARCH DWGS.
10. PROVIDE 3" MIN CONC COVER AT ALL COLS, AB'S & BASE PLATES BLW GRD, TYP.
11. CONC SUB-CONTRACTOR TO COORD LOCATIONS OF THE CMU DOWELS W/ THE CMU SUB-CONTRACTOR.

FOUNDATION LEGEND

- INDICATES (N) 10" CMU WALL TYPE [A]
- INDICATES (N) 8" CMU WALL TYPE [B]
- INDICATES NON-STRUC MTL STUD WALL AS OCCURS, SAD
- [CFX.X] CONT FTG MARK PER "CONTINUOUS FOOTING SCHEDULE" THIS SHT
- INDICATES APPROX SIZE, LOCATION, & MAX WT OF EQUIP PER MECH DWGS. SEE ARCH & MECH DWGS FOR EQUIP INFO & ANCHORAGE.
- INDICATES (E) STEEL COL & CONCRETE PEDESTAL, SAD

CONTINUOUS FOOTING SCHEDULE				
MARK	WIDTH	DEPTH	LONG REINF	TRANS REINF
CF2.5	2' - 6"	2' - 0"	4- #5 CONT T&B	#3 TIES @ 32" OC
CF3.5	3' - 6"	2' - 0"	5- #5 CONT T&B	#3 TIES @ 32" OC
CF4.0	4' - 0"	2' - 0"	5- #5 CONT T&B	#3 TIES @ 32" OC

NOTES:
1. PROVIDE [CF3.5] FOOTINGS AT WALL TYPE [A] AND [CF2.5] FOOTINGS AT WALL TYPE [B] , TYP UNO.
2. CONT FTGS SHALL BE CTRD UNDER WALLS.
3. FOR TYP DTLS OF CONT FTGS AT EXTR WALLS, SEE DTL 1 / S4.0 .
4. FOR TYP DTLS OF CONT FTGS AT INTR WALLS, SEE DTLS 2 / S4.0 & 3 / S4.0 .
1. 5. PER SOILS REPORT DATED JUNE 5, 2025, ALL FOOTINGS MUST HAVE A MINIMUM EMBEDMENT DEPTH OF 30" BELOW THE LOWEST ADJACENT GRADE AND MUST BE EMBEDDED A MINIMUM OF 6" INTO THE SANTA BARBARA SOIL FORMATION.

CMU WALL SCHEDULE			
MARK	NOMINAL WIDTH	HORIZ REINF	VERT REINF
A	10"	2- #5 @ T&B & @ 24" OC	#5 @ 16" OC AT EF
B	8"	#5 @ T&B & @ 24" OC	#5 @ 16" OC CTRD IN WALL

NOTES:
1. FOR WALL DETAILS, SEE 1 / S4.0, 2 / S4.0 , & 3 / S4.0 .
2. ALL CMU TO BE SOLID GROUTED, TYP.

ROOF FRAMING NOTES

1. SEE S0 SHEETS FOR GENERAL NOTES & TYPICAL DETAILS.
2. SEE SHEET S2.2 FOR WALL ELEVATIONS.
3. DIMS ARE TO FACE OF MASONRY OR CENTERLINE OF COLS, TYP UNO.
4. BM CENTERLINES SHALL ALIGN W/ WALL / COL CENTERLINES, UNO.

ROOF FRAMING LEGEND

- INDICATES (E) STEEL COL BELOW
- INDICATES CMU WALL BELOW
- INDICATES (E) BUILDING WALL
- INDICATES NON-STRUC MTL STUD WALL BELOW AS OCCURS, SAD
- INDICATES (E) METAL ROOF DECK TO REMAIN

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS
4436 Calle Real, Santa Barbara, CA 93110
SANTA BARBARA COUNTY

CYS STRUCTURAL ENGINEERS
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916.920.2020 www.cyseng.com
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CONSULTANT

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Sacramento, CA 95811
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NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 02/25/2025

JOB NO. Y2213.00

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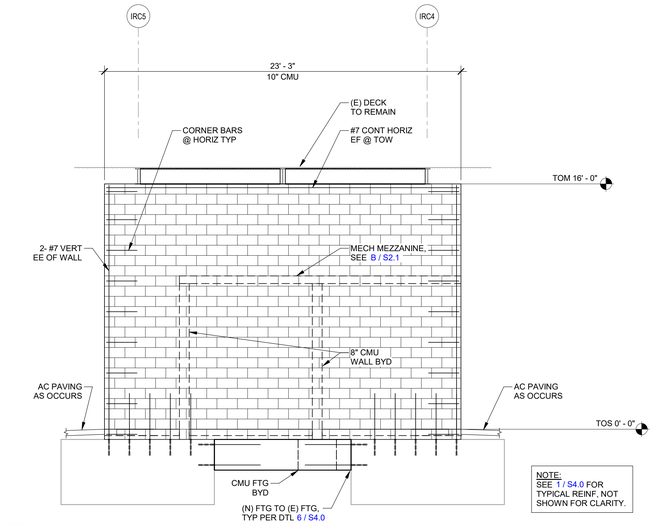
ENLARGED PLANS AT ENCLOSED CANOPY

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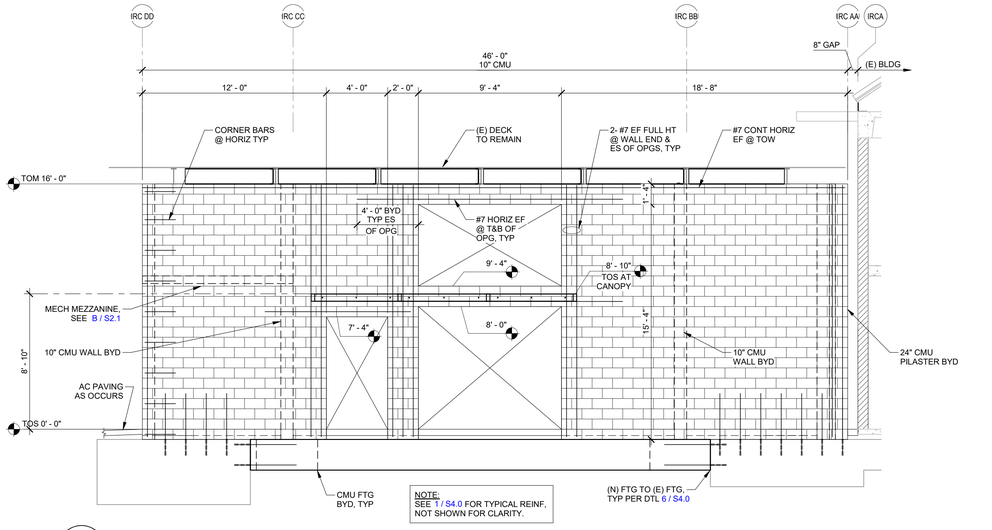
S2.1

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

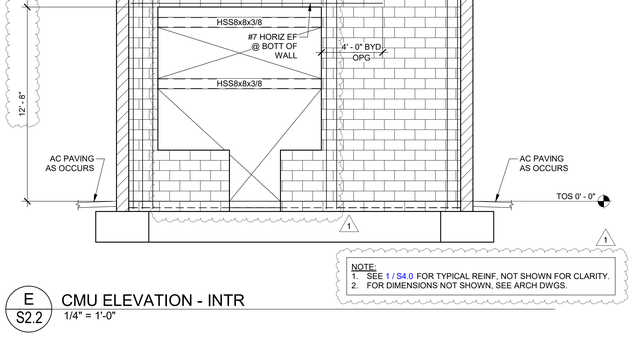
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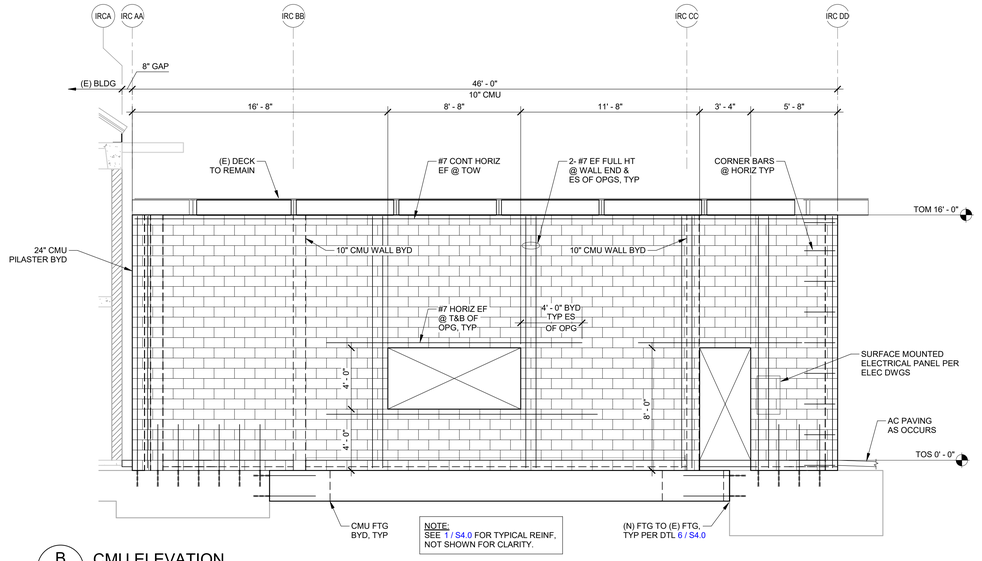
C S2.2 CMU ELEVATION
1/4" = 1'-0"



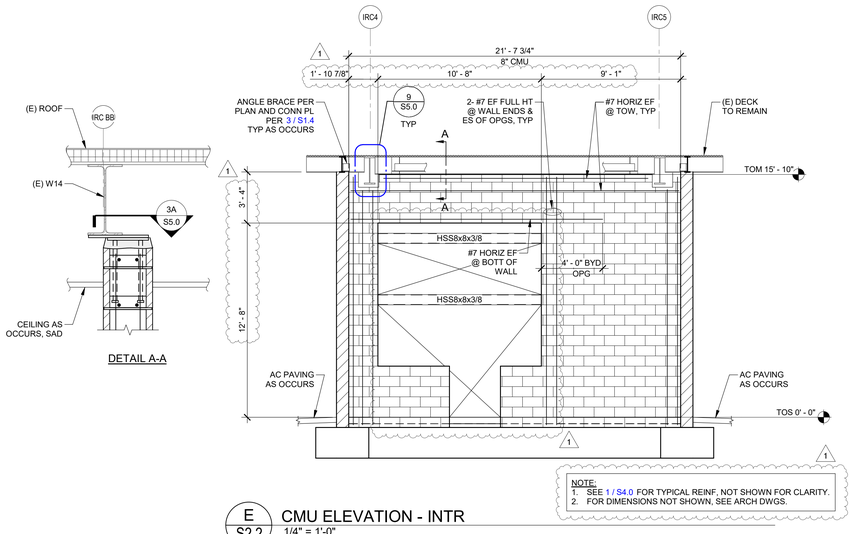
A S2.2 CMU ELEVATION
1/4" = 1'-0"



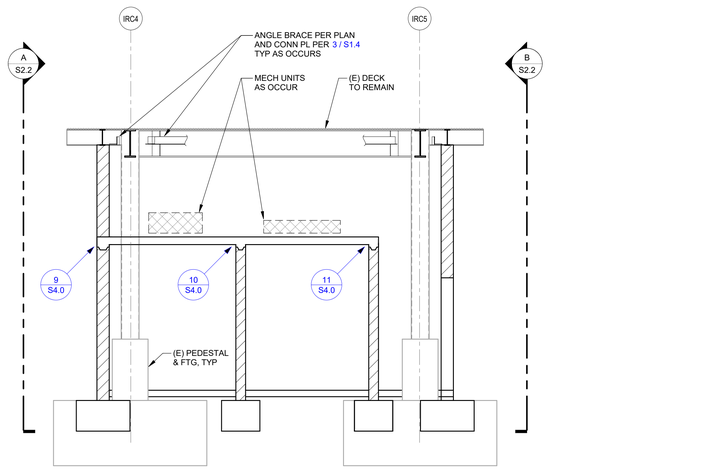
D S2.2 CMU ELEVATION - INTR
1/4" = 1'-0"



B S2.2 CMU ELEVATION
1/4" = 1'-0"



E S2.2 CMU ELEVATION - INTR
1/4" = 1'-0"



1 S2.2 SECTION AT MECHANICAL MEZZANINE
1/4" = 1'-0"

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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SHEET TITLE

BUILDING ELEVATIONS

SHEET NO.

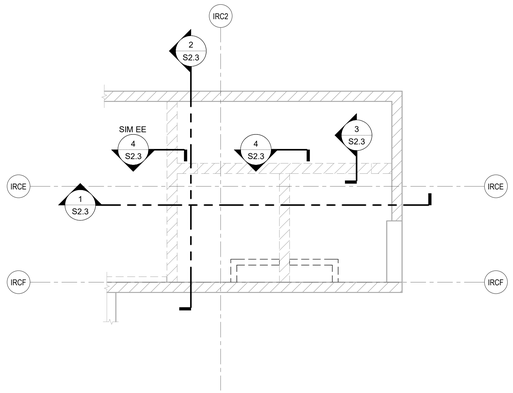
S2.2

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THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
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ONE-SIXTEENTH INCH = ONE FOOT
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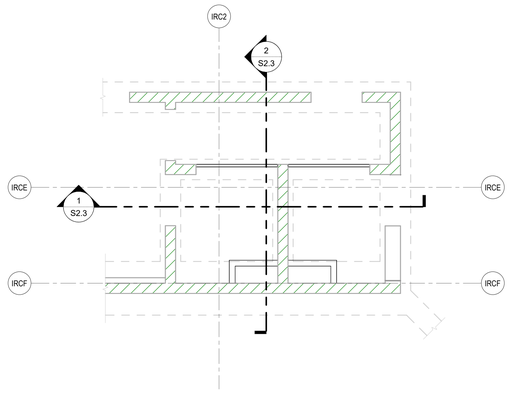
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FRAMING LEGEND

- INDICATES (E) CMU WALL BELOW
- INDICATES FULL HT (E) 8" CMU WALL
- INDICATES FULL HT (E) 12" CONC WALL
- INDICATES NON-STRUC MTL STUD WALL AS OCCURS, SAD



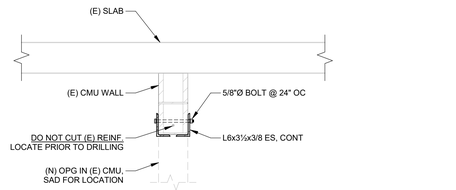
B S2.3 PLAN AT IRC MEZZANINE
1/4" = 1'-0"



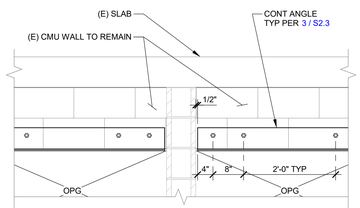
A S2.3 FOUNDATION PLAN AT IRC
1/4" = 1'-0"

FOUNDATION LEGEND

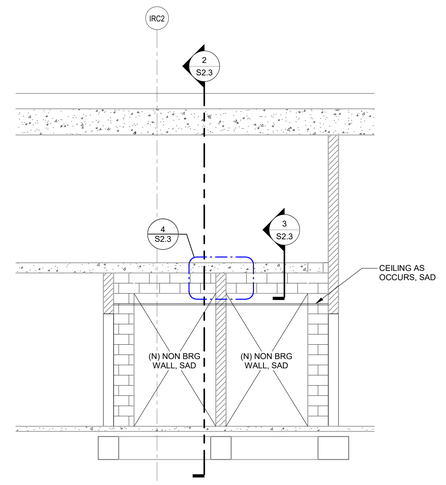
- INDICATES (E) 8" CMU WALL
- INDICATES (N) 8" CMU WALL INFILL
- INDICATES (E) 12" CONC WALL
- INDICATES (N) 12" CONC WALL INFILL
- INDICATES NON-STRUC MTL STUD WALL AS OCCURS, SAD



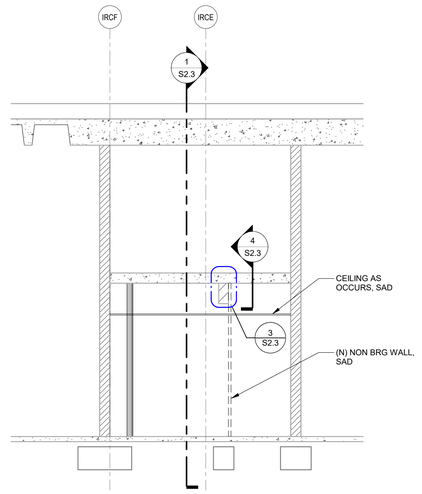
3 S2.3 SECTION
3/4" = 1'-0"



4 S2.3 SECTION
3/4" = 1'-0"



1 S2.3 SECTION
1/4" = 1'-0"



2 S2.3 SECTION
1/4" = 1'-0"

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ARCHITECT

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REVISIONS

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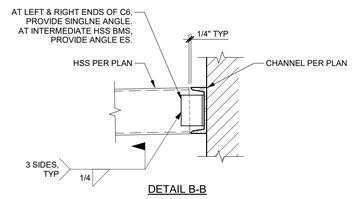
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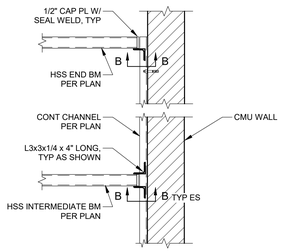
ENLARGED PLANS AND DETAILS AT IRC

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S2.3

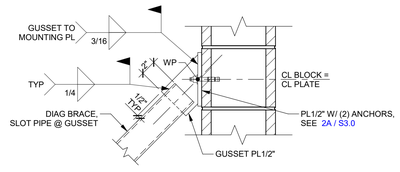


DETAIL B-B

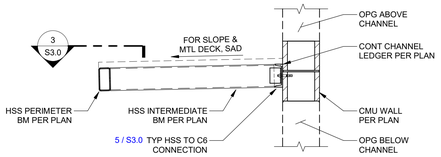


PLAN

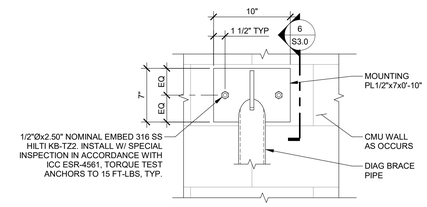
5 S3.0 HSS BM TO C6 CONNECTION
3/4" = 1'-0"



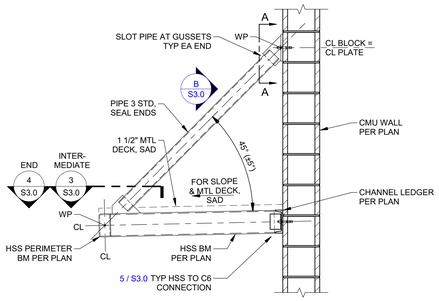
6 S3.0 PIPE TOP CONNECTION
1 1/2" = 1'-0"



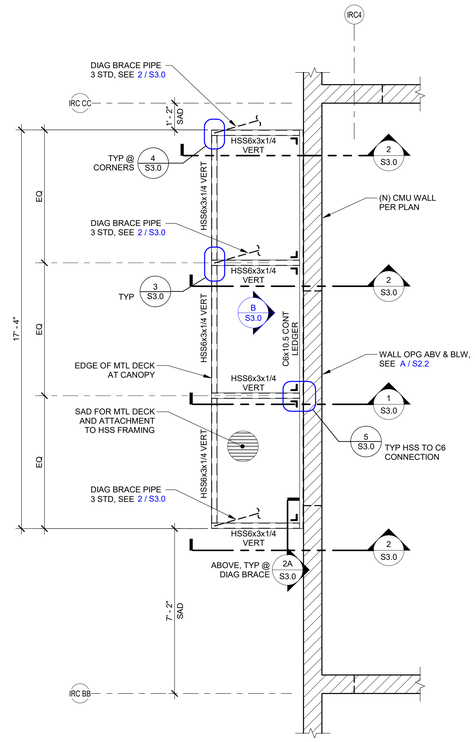
1 S3.0 CANOPY SECTION
3/4" = 1'-0"



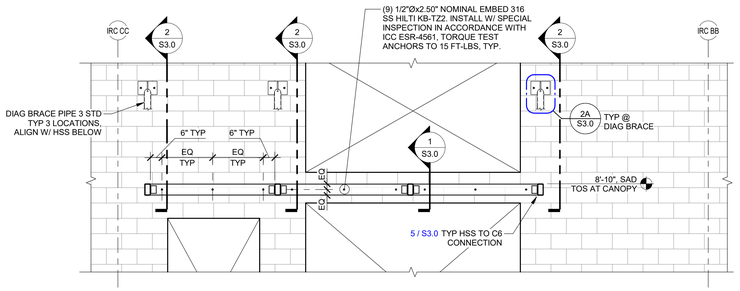
DETAIL A-A



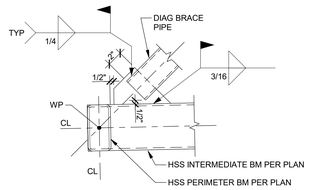
2 S3.0 CANOPY SECTION
3/4" = 1'-0"



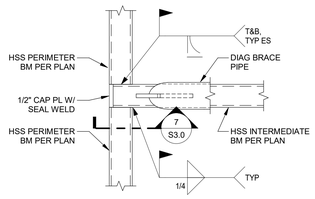
A S3.0 CANOPY FRAMING PLAN
3/8" = 1'-0"



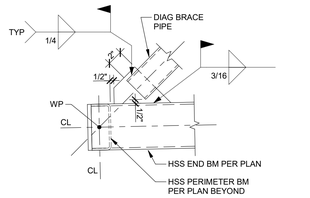
B S3.0 CANOPY FRAMING PLAN
3/8" = 1'-0"



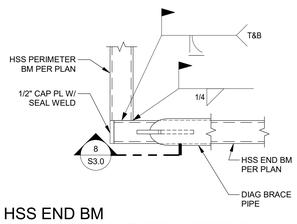
7 S3.0 HSS INTERMEDIATE BM CONNECTION AT DIAG BRACE
1 1/2" = 1'-0"



3 S3.0 HSS INTERMEDIATE BM CONNECTION AT PERIMETER BM
1 1/2" = 1'-0"



8 S3.0 HSS END BM CONNECTION AT DIAG BRACE
1 1/2" = 1'-0"



4 S3.0 HSS END BM CONNECTION AT PERIMETER BM
1 1/2" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER — JASON ERNEST NACHT — No. S2030 — STRUCTURAL — STATE OF CALIFORNIA

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SHEET TITLE

CANOPY PLAN AND DETAILS

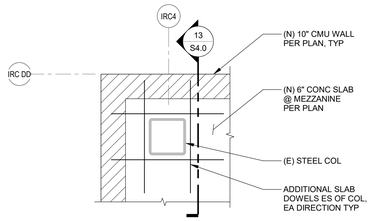
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1 S3.0

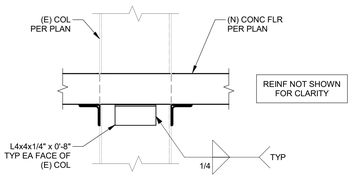
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ONE AND ONE-HALF INCH = ONE FOOT
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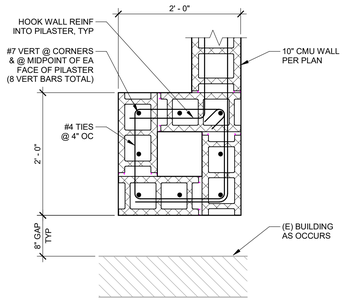
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12 S4.0 PLAN @ (E) COL
1/2" = 1'-0"

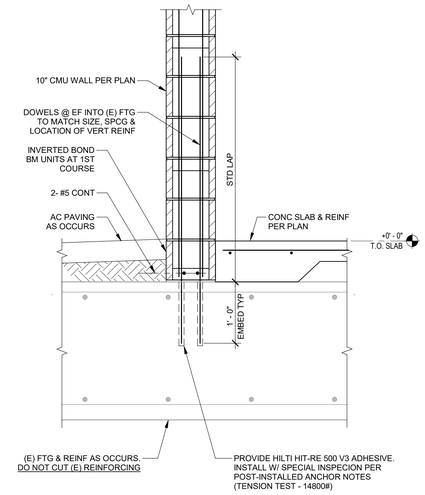


13 S4.0 (N) FLOOR @ (E) COL
1" = 1'-0"

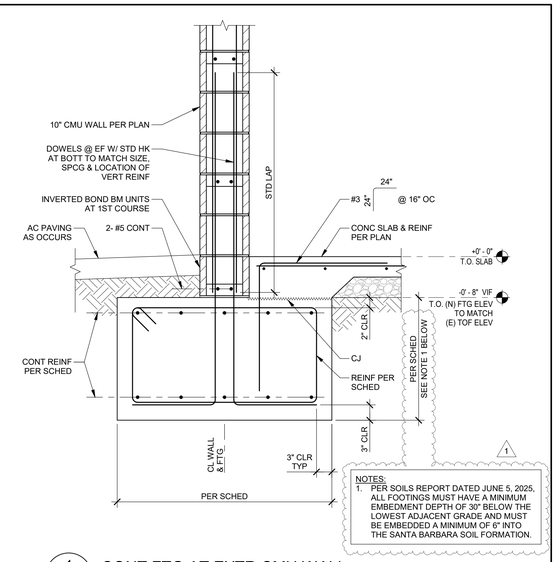


PLAN @ PILASTER

8 S4.0 PILASTER DETAIL
1" = 1'-0"



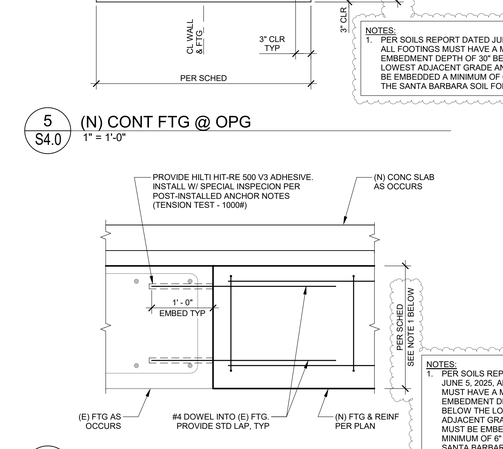
4 S4.0 (E) FTG AT EXTR CMU WALL
1" = 1'-0"



1 S4.0 CONT FTG AT EXTR CMU WALL
1" = 1'-0"

14 S4.0 (N) CONT FTG @ (E) PAD FTG
1" = 1'-0"

9 S4.0 MEZZANINE SLAB CONNECTION
1" = 1'-0"



5 S4.0 (N) CONT FTG @ OPG
1" = 1'-0"

2 S4.0 CONT FTG AT 10" INTR CMU WALL
1" = 1'-0"

10 S4.0 DETAIL
1" = 1'-0"

6 S4.0 (N) FTG @ (E) FTG
1" = 1'-0"

3 S4.0 CONT FTG AT 8" INTR CMU WALL
1" = 1'-0"

11 S4.0 DETAIL
1" = 1'-0"

7 S4.0 (N) SLAB @ (E) SLAB
1" = 1'-0"

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 02/25/2025

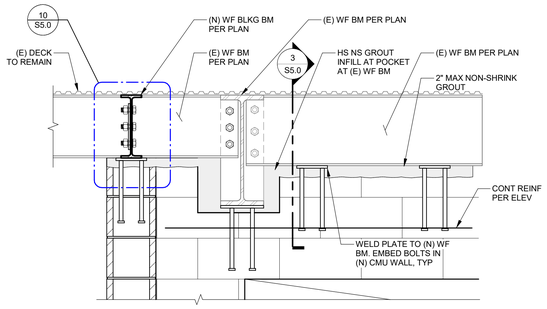
JOB NO. Y2213.00

SHEET TITLE

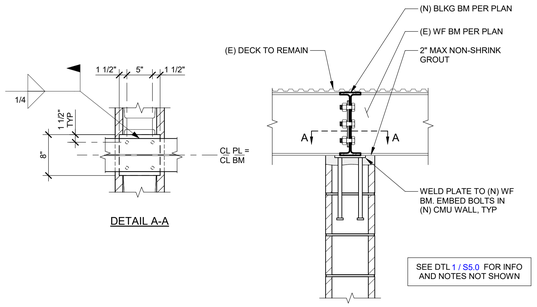
FOUNDATION AND MEZZANINE DETAILS

SHEET NO.

S4.0

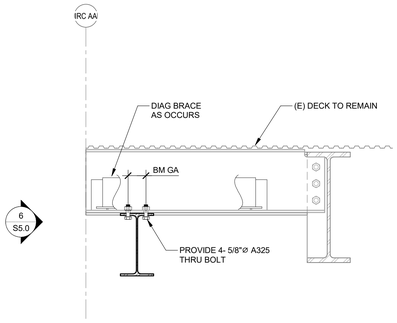


9 S5.0 WF BM AT CMU WALL
1" = 1'-0"

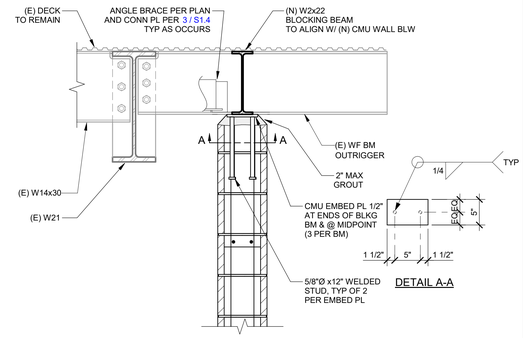


DETAIL A-A

10 S5.0 WF BM AT CMU WALL
NTS

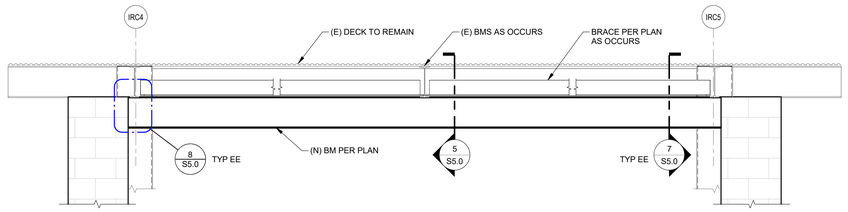


6 S5.0 ELEVATION
1/2" = 1'-0"

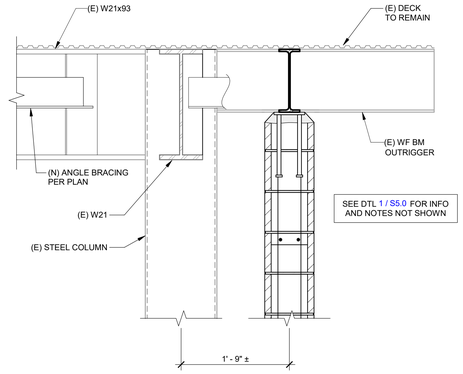


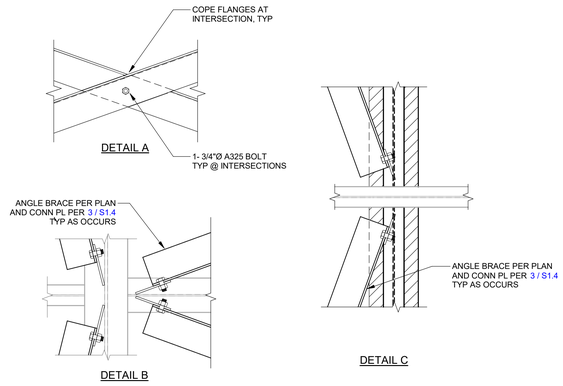
DETAIL A-A

5 S5.0 DETAIL
1" = 1'-0"



1 S5.0 DETAIL
1" = 1'-0"



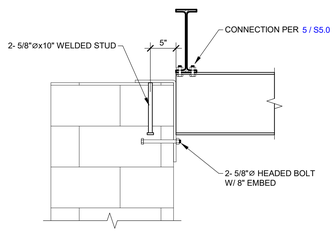


DETAIL A

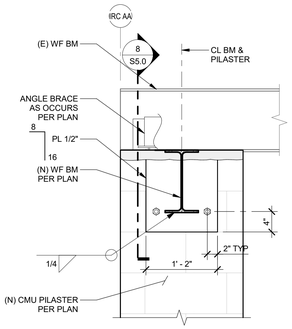
DETAIL B

DETAIL C

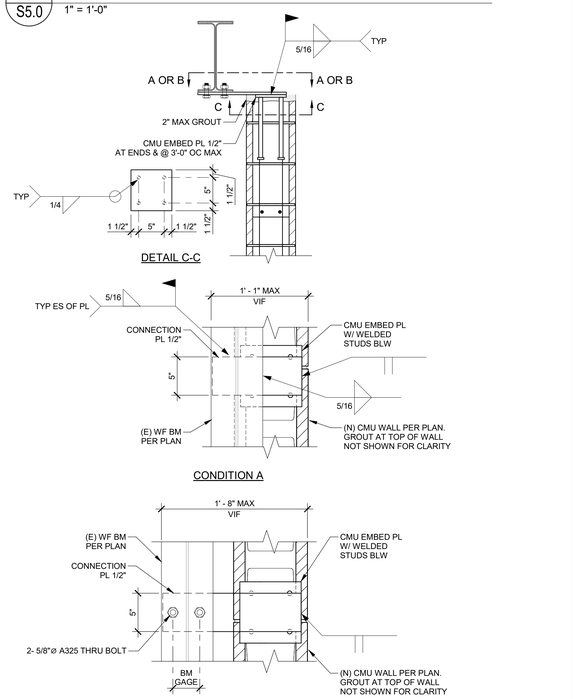
11 S5.0 BRACE CONNECTIONS
1" = 1'-0"



8 S5.0 DETAIL
1" = 1'-0"



7 S5.0 DETAIL
1" = 1'-0"



DETAIL C-C

CONDITION A

CONDITION B

2 S5.0 DETAIL
1" = 1'-0"

3 S5.0 DETAIL
1" = 1'-0"

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
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4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

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916.920.2020 www.cyseng.com
CYS Job No. 22023.03

REGISTERED PROFESSIONAL ENGINEER
ALYSON ERNEST ROSENTRETER
No. S2030
STRUCTURAL
STATE OF CALIFORNIA

CONSULTANT

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ARCHITECT

95% CONSTRUCTION DRAWINGS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 02/25/2025

JOB NO. Y2213.00

SHEET TITLE

FRAMING DETAILS

SHEET NO.

S5.0

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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9/4/2025 9:23:37 AM

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET

VRF HEAT PUMP SCHEDULE

EQUIP TAG	"DAIKIN" MODEL	COOLING CAP [MBH]	HEATING CAP [MBH]	VOLT/PH	ELECTRICAL DATA						SEER2	HSPF2	OPER. WT. [LBS]	NOTES
					MODULE 1		MODULE 2		MODULE 3					
					MCA	MOP	MCA	MOP	MCA	MOP				
HP-1	RXTA48AAVJU	46.238	38.954	208/1	29.4	30	/	/	/	/	16	8.5	270	1,2

NOTES:

1. UNIT SELECTED AT 95˚F DB / 68˚F WB SUMMER AMBIENT, 29˚F DB WINTER AMBIENT TEMPERATURE.
2. PROVIDE UNIT WITH R-32 REFRIGERANT.
3. SEE 6/M501 FOR MOUNTING.

VRF FAN COIL UNIT SCHEDULE

EQUIP TAG	"DAIKIN" MODEL	TYPE	SYSTEM SERVED	NOMINAL TONS	AIR FLOW [CFM]	MIN OA [CFM]	ESP [IN. W.G.]	COOLING CAP. [MBH]		HEATING CAP [MBH]	ELECTRICAL DATA			OPER. WT. [LBS]	NOTES
								SENSIBLE	TOTAL		VOLT/PH	MCA	MOP		
FC-1	FXFA07AAVJU	CASSETTE	VRF-1	0.625	440	20	0	5.8	7.4	8.8	208/1	0.30	15	42	
FC-2	FXFA07AAVJU	CASSETTE	VRF-1	0.625	440	15	0	5.8	7.4	8.8	208/1	0.30	15	42	
FC-3	FXSA30AAVJU	DUCTED	VRF-1	2.5	810	315	0.6	22.75	29.7	35.2	208/1	1.8	15	85	

NOTES:

1. UNIT SELECTED AT 95˚F DB / 68˚F WB SUMMER AMBIENT, 29˚F DB WINTER AMBIENT TEMPERATURE.
2. UNIT PROVIDED WITH INTEGRAL CONDESATE PUMP.
3. PROVIDE WITH 2" MERV-13 FILTERS IN FILTER BOXES AT DUCTED FAN COILS.
4. SEE 2/M501 AND 3/M501 FOR MOUNTING

ENERGY RECOVERY VENTILATOR SCHEDULE

EQUIP TAG	"DAIKIN" MODEL	SUPPLY FAN		EXHAUST FAN		ELECTRICAL DATA			EFFECTIVENESS		OPER. WT. [LBS]	NOTES
		CFM	ESP [IN. W.G.]	CFM	ESP [IN. W.G.]	VOLT/PH	MCA	MOP	SUMMER [%]	WINTER [%]		
ERV-1	VAM470GVJU	390	0.4	390	0.4	208/1	3.9	15	63	62	130	

NOTES:

1. PROVIDE WITH MERV-13 FILTER ON THE OUTSIDE AND MERV-8 FILTER ON THE EXHAUST SIDE.
2. SEE 3/M501 FOR MOUNTING.

DIFFUSER, REGISTER & GRILLE SCHEDULE

SYMBOL	DESCRIPTION	KRUEGER	METALAIRE	NAILOR	TITUS	SHOEMAKER
CD	MODULAR CORE SURFACE MOUNT CEILING DIFFUSER FLAT FRAME	1240 FRAME 22	9000-1	7500-B	MCD BORDER TYPE 1	MA
CD-1	ANTI-LIGATURE, CORRECTION GRADE, AND WITH SECURITY FASTENERS.	--	--	--	SG-SD	--
S*	SIDEWALL DOUBLE DEFLECTION SUPPLY GRILLE WITH VERTICAL FRONT BARS, 3/4" SPACING	880 V	V 4004 S	61 DV	300 RS	933
R, T, E	CEILING OR SIDEWALL RETURN, TRANSFER OR EXHAUST GRILLE WITH 35° OR 45° HORIZONTAL BARS.	S 80 H	SRH	7145 H	350 RL	935
R-1, T-1, E-1	ANTI-LIGATURE, CORRECTION GRADE, AND WITH SECURITY FASTENERS.	--	--	--	SG-SD	--

NOTES:

1. ALL SYMBOLS NOTED MAY NOT BE USED. REFER TO PLANS FOR SIZE AND QUANTITY.
2. ALL SUPPLY AIR DIFFUSERS ARE 4 WAY BLOW UNLESS SHOWN OTHERWISE.
3. FURNISH ALL PRODUCTS OF A SINGLE MANUFACTURER.
4. COORDINATE DIFFUSER TYPE WITH ARCHITECTURAL REFLECTED CEILING PLAN.
5. OPPOSED BLADE DAMPERS ARE NOT REQUIRED AT DIFFUSERS, REGISTERS OR GRILLES.
6. PROVIDE MANUAL AIR DAMPERS AT EACH BRANCH DUCT TO A SINGLE DIFFUSER, REGISTER OR GRILLE.
7. SEE 1/M501 FOR MOUNTING.

MECHANICAL GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES, SPECIFICATIONS, LOCAL ORDINANCES, AND INDUSTRY STANDARDS.
2. VERIFY EXACT LOCATION OF ALL (E) EQUIPMENT, DUCTWORK, DIFFUSERS, REGISTERS, AND GRILLES. NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES BETWEEN (E) SYSTEMS AND DRAWINGS.
3. COORDINATE EXACT LOCATION OF EQUIPMENT AND ALL PENETRATIONS THROUGH ROOF, FLOORS, AND WALLS WITH ARCHITECTURAL STRUCTURAL SYSTEMS PRIOR TO COMMENCING WORK.
4. COORDINATE EXACT SIZE AND ROUTING OF DUCTWORK WITH ARCHITECTURAL PLANS, STRUCTURE, AND EQUIPMENT PRIOR TO COMMENCING WORK.
5. SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES.
6. FURNISH AND INSTALL MANUAL AIR DAMPERS AT ALL DUCT BRANCH TAKEOFFS TO A SINGLE DIFFUSER, GRILLE, OR REGISTER.
7. FLEXIBLE DUCTWORK CONNECTIONS TO CEILING DIFFUSERS ARE LIMITED TO 5' MAXIMUM LENGTH.
8. ALL DUCTWORK, CEILING DIFFUSERS/REGISTERS/GRILLES, EQUIPMENT, PIPING, ETC. ARE NEW U.O.N. (SHOWN HEAVY). (E) DUCTWORK, PIPING, ETC. IS SHOWN LIGHT. SEE LEGEND.
9. (E) DUCTWORK AND ITEMS TO BE REMOVED ARE SHOWN CROSSED ("X") OUT, SEE LEGEND. COORDINATE CLOSELY WITH (N) DUCTWORK AND P.O.C.'S SHOWN. ALL OTHER (E) DUCTWORK, ETC. TO REMAIN.
10. WHERE INLET DUCT DIAMETER AND DIFFUSER NECK SIZE ARE THE SAME (I.E. 8"ø AND 9x9) CONTRACTOR SHALL OVERSIZE THE SHEET METAL PLENUM TO ACCOMMODATE THE ROUND DUCT CONNECTION.
11. THERMOSTATS AND ROOM TEMPERATURE SENSORS SHALL BE INSTALLED AT +46" ABOVE FINISHED FLOOR (TO TOP OF DEVICE). DO NOT INSTALL THERMOSTATS AND ROOM TEMPERATURE SENSORS ABOVE CASEWORK, SHELVING OR OTHER OBSTRUCTIONS OVER 24" IN DEPTH AND 34" IN HEIGHT.

TABLE OF BRANCH DUCT SIZES TO INDIVIDUAL DIFFUSERS, GRILLES, & REGISTERS (3) (4)

CFM	DUCT SIZE (INCHES) (1)			
	ROUND	SQUARE	RECTANGULAR	MIN. AREA (SQ. IN.) (2)
0-100	6"	6x6	6x6	36
101-210	8"	8x8	8x6	48
211-380	10"	10x10	10x8	80
381-600	12"	12x12	12x10, 16x8	120
601-900	14"	14x14	14x12, 16x10, 20x8	160
901-1300	16"	16x16	16x14, 18x12, 22x10	220
1301-1800	18"	18x18	18x16, 20x14, 22x12	264
1801-2400	20"	20x20	22x16, 24x14, 30x12	340

NOTES:

1. SIZE OF BRANCH DUCT IF SHOWN ON PLANS OR FROM ABOVE TABLE IS NOT THE INLET SIZE TO DIFFUSER, GRILLE OR REGISTER. PROVIDE PLENUM BOX. SEE NOTE (3)
2. MINIMUM DUCT AREA TO BE USED FOR ALTERNATE DUCT SIZES (DIFFERENT THAN THE TABLE) WHEN REQUESTED BY CONTRACTOR FOR SA, RA, AND EA
3. SEE 1/MD-5.3 FOR PLENUM BOX AT DIFF/REG/GRILLE AND FOR DETAIL OF DUCT BRANCH CONNECTION TO OUTLET (AND INLET) PLENUMS AT DIFF/REG/GRILLE
4. ALL DUCT SIZES SHALL BE SHOWN CLEARLY ON THE CONTRACTORS SUBMITTAL DRAWINGS. SHOW SIZE OF EACH DUCT ON THE PLANS AT EACH DUCT LOCATION

HVAC ABBREVIATIONS

SYMBOL	DESCRIPTION
ABC	ABOVE CEILING
ABV	ABOVE
ACC DR	ACCESS DOOR
ACC P	ACCESS PANEL
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
APD	AIR PRESSURE DROP, INCHES WATER COLUMN
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ATTEN	ATTENUATORS
ATV	ACOUSTIC TURNING VANE
BD	BALANCE DAMPER
BDD	BACK DRAFT DAMPER
BHP	BRAKE HORSE POWER
BLDG	BUILDING
BOD	BOTTOM OF DUCT
BOR	BOTTOM OF REGISTER
BTUH	BRITISH THERMAL UNITS PER HOUR
CAP	CAPACITY
CD	CONDENSATE DRAIN
CEF	CEILING EXHAUST FAN
CFH	CUBIC FEET OF GAS PER HOUR
CFM	CUBIC FEET OF AIR FLOW PER MINUTE
CHV	CHECK VALVE
CLG	CEILING
CLR	CLEAR
CONC	CONCRETE
COND	CONDENSER
CONN	CONNECT/CONNECTION
CONT	CONTINUATION
CONTR	CONTRACTOR
D	DAMPER
DGP	DATA GATHERING PANEL
DIA	DIAMETER
DL	DOOR LOUVER
DN	DOWN
DSP	DRY STAND PIPE
DB	DRY BULB
DTR	DOWN THROUGH ROOF
DWG	DRAWING
EA	EXHAUST AIR
EAD	EXHAUST AIR DAMPER
EC	EVAPORATIVE COOLER
EDB	ENTERING DRY BULB
EER	ENERGY EFFICIENCY RATING
EF	EXHAUST FAN
EFF	EFFICIENCY
EH	EXHAUST HOOD
EL	ELEVATION
ELEC	ELECTRIC/ELECTRICAL
ENT	ENTERING
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
EVAP	EVAPORATOR
EW	ENTERING WATER
EWB	ENTERING WET BULB
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EXT	EXPANSION TANK
f	CUBIC FEET OF AIR FLOW PER MINUTE
F	DEGREES FAHRENHEIT
FA	FROM ABOVE
FB	FROM BELOW
FC	FLEXIBLE CONNECTION
FCV	FLOW CONTROL VALVE
FD	FIRE DAMPER
FF	FLY FAN
FIN	FINISH
FLA	FULL LOAD AMPS
FLR	FLOOR
FPM	FEET PER MINUTE
FSD	FIRE AND SMOKE DAMPER
FT (')	FOOT OR FEET
FT 2	SQUARE FEET
FV	FACE VELOCITY
GA	GAUGE
GALV	GALVANIZED
GI	GALVANIZED IRON
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HDG	HEAVY DUTY GRILLE
HP	HORSE POWER
HPS	HIGH PRESSURE STEAM
HTG	HEATING
HV	HAND VALVE
HW	HOT WATER
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
ICF	INSTANTENEOUS CURRENT FLOW
IE	INVERT ELEVATION
IN, (")	INCH
IN 2	SQUARE INCHES
KEF	KITCHEN EXHAUST FAN
KW	KILOWATTS
LAV	LAVATORY
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LD	LOUVERED DOOR
LDB	LEAVING DRY BULB
LPS	LOW PRESSURE STEAM
LRA	LOCKED ROTOR AMPS
LTCP	LOCAL TEMPERATURE CONTROL PANEL
LVR	LOUVER
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MAT	MIXED AIR TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MBH	THOUSAND BTUs PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
OA	OUTSIDE AIR
OAD	OUTSIDE AIR DAMPER
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD
OV	OUTLET VELOCITY
PCR	PUMPED CONDENSATE RETURN
PD	PRESSURE DROP
PRV	PRESSURE REDUCING VALVE/ PRESSURE REGULATING VALVE
PSI (G) (A)	POUNDS PER SQUARE INCH (GAUGE) (ABSOLUTE)
RA	RETURN AIR
RAD	RETURN AIR DAMPER
REF	ROOF EXHAUST FAN
RF	RETURN FAN
RPM	REVOLUTIONS PER MINUTE
RLA	RATED LOAD AMPS
RV	RELIEF VENTILATOR
S & R	SUPPLY AND RETURN
SA	SUPPLY AIR
SAD	SEE ARCHITECTURAL DRAWINGS
SB	SECURITY BARS
SD	SPLITTER DAMPER
SEER	SEASONAL ENERGY EFFICIENCY RATING
SF	SUPPLY FAN
SG	STEAM GENERATOR
SK	SINK
SM	SHEET METAL
SOV	SHUT OFF VALVE
SP	STATIC PRESSURE
SPD	STATIC PRESSURE DROP
SQ FT	SQUARE FEET
SQ IN	SQUARE INCHES
SS	STAINLESS STEEL
STR	STRAINER
STRUC	STRUCTURAL
T	THERMOSTAT
TA	TO ABOVE
TB	TO BELOW
T.C.C.	TEMPERATURE CONTROL CONTRACTOR
TCP	TEMPERATURE CONTROL PANEL
TCV	TEMPERATURE CONTROL VALVE
TEMP	TEMPERATURE
TFH	THERMAL FLUID HEATER
THK	THICK
TP	TOTAL PRESSURE
TS	TEMPERATURE SENSOR
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UCD	UNDERCUT DOOR
UF	UNDERFLOOR
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
UTR	UP THROUGH ROOF
V (VTR)	VENT (VENT THROUGH ROOF)
VAC	VACUUM
VD	VOLUME DAMPER
VF	VENTILATION FAN
VFC	VARIABLE FREQUENCY CONTROLLER
VLV	VALVE
VRF	VARIABLE REFRIGERANT FLOW
VSD	VARIABLE SPEED DRIVE
VV	VARIABLE AIR VOLUME CONTROLLER
VVRH	VARIABLE AIR VOLUME CONTROLLER WITH REHEAT COIL
W	WATTS
WALL MTD (R)	WALL MOUNTED (RECESSED)
WB	WET BULB
WC	WATER CLOSET
WMS	WIRE MESH SCREEN
WP	WORKING PRESSURE
WPD	WATER PRESSURE DROP FEET OF WATER COLUMN
WT	WEIGHT

DUCT LEGEND

SINGLE LINE SYMBOL	DOUBLE LINE SYMBOL	DESCRIPTION
24x12	24x12	RECTANGULAR DUCT: WIDTH x DEPTH (PLAN VIEW) DEPTH x WIDTH (SECTION VIEW)
26x14L	26x14L	ACOUSTICALLY LINED RECTANGULAR DUCT - DIMENSIONS ARE OUTSIDE
		MANUAL AIR DAMPER
R or D	R or D	RISE OR DROP DUCT IN DIRECTION OF AIR FLOW
	OR	RECTANGULAR TO RECTANGULAR TRANSISTION OR ROUND TO ROUND TRANSITION, MAX. SLOPE OF 1:3
		RECTANGULAR TO ROUND TRANSITION, MAX. SLOPE OF 1:3
	R, W, R/W = 1.5	ELBOW, RECTANGULAR, SMOOTH RADIUS, WITHOUT TURNING VANES
		SQUARE/RECTANGULAR DUCT ELBOW WITH TURNING VANES
		CONVERGING OR DIVERGING TEE, 45° ENTRY, RECTANGULAR MAIN AND BRANCH. WHEN REDUCING MAIN, SIDE OF TAKE OFF OR ENTRY BRANCH TO BE FLAT, OTHER SIDES MAX. SLOPE OF 1:3
	ROUND DUCT	ROUND DUCT TAKE OFF FROM RECTANGULAR VIA SMOOTH CONVERGING BELL MOUTH
		RECTANGULAR DUCT TEE MAD'S ON THE 2 BRANCHES, THROAT SIZED FOR EQUAL PRESSURE DROP
		RECTANGULAR DUCT SPLIT MAD'S, THROAT SIZED FOR EQUAL PRESSURE DROP
		3-WAY RECTANGULAR SPLIT WITH TWO TRANSITIONAL ELBOWS AND TRANSITIONING MAIN. DOWNSTREAM MAD'S OF THE TREE BRANCHES. THROATS SIZED FOR EQUAL PRESSURE DROP.
		FOR CONCEALED DUCT: DROP TO DIFFUSER SHALL BE FULL SIZE OF DIFFUSER NECK. FOR EXPOSED DUCT: DROP SHALL BE FULL SIZE OF OD DIFFUSER FRAME. FLANGE FOR MOUNTING DIFFUSER TURNED IN. AIR EXTRACTOR AND EQUALIZER GRID AT CONNECTION TO MAIN.
		SUPPLY AIR, SUPPLY DROP/RISE
		RETURN AIR, RETURN AIR DROP/RISE
		EXHAUST AIR, EXHAUST AIR DROP/RISE
		NEW - FLEXIBLE DUCT (ROUND)
OR		EXISTING - FLEXIBLE DUCT (ROUND)
10"Ø, 18"Ø, 12"Ø	10"Ø, 18"Ø, 12"Ø	45° REDUCING LATERAL FITTING
18"Ø, 10"Ø, 12"Ø	18"Ø, 10"Ø, 12"Ø	90° REDUCING TEE FITTING

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26, AND 30:

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER.
3. MOVABLE EQUIPMENT THAT IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF THAT DIRECTLY SUPPORT THE EQUIPMENT ARE TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE ATTACHMENT OF THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.

B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTION SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

capital engineering
RANCHO CORDOVA, CALIFORNIA
AC - MH 230008.00
PM - DESIGN TEAM PROJECT NO.

REGISTERED PROFESSIONAL ENGINEER ANTHONY COLOMBO KING No. 24249 STATE OF CALIFORNIA

DATE SIGNED: 9/4/2025

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916.329.4000

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

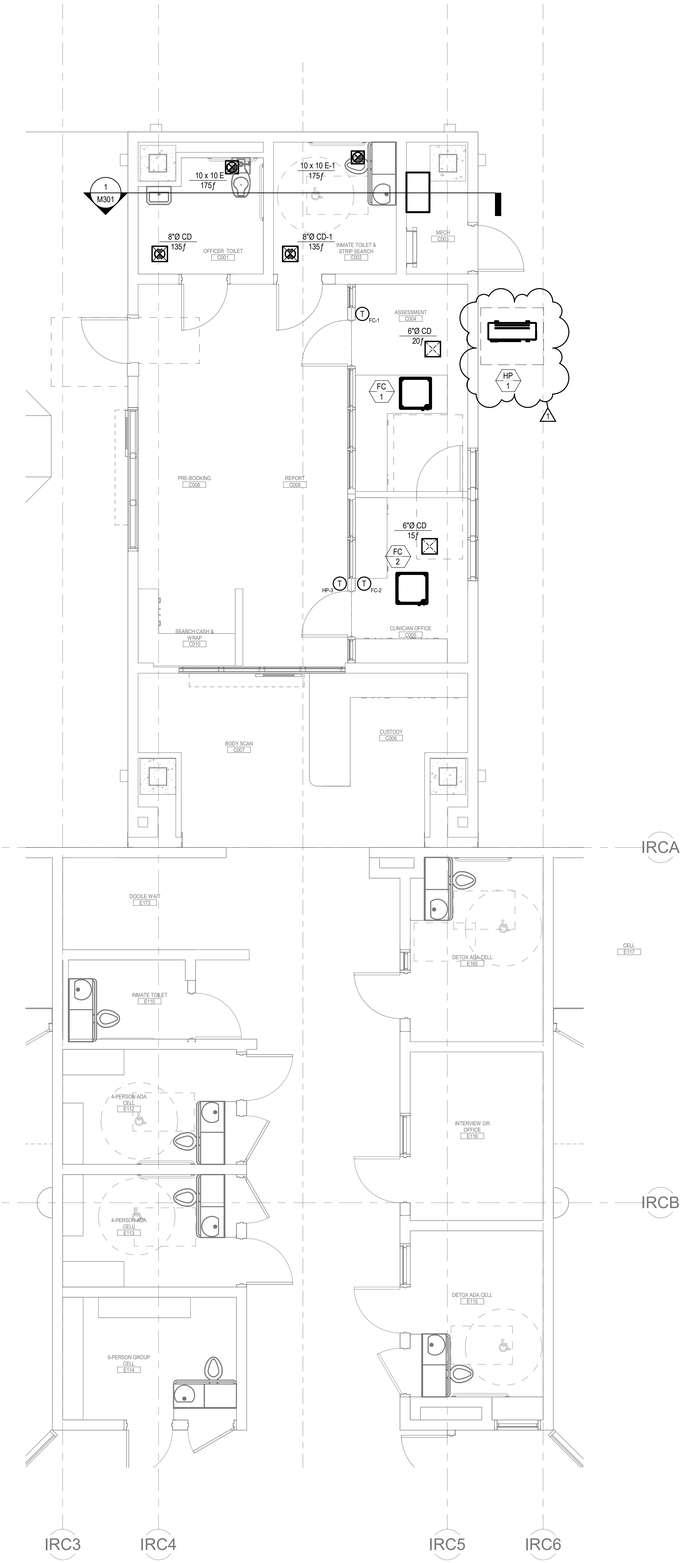
JOB NO. Y2213.00

SHEET TITLE

HVAC LEGENDS & NOTES

SHEET NO.

M001



1 M201 ENLARGED FLOOR PLAN - GROUND LEVEL NORTH

SCALE: 1/4" = 1'-0"

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

capital engineering
RANCHO CORDOVA, CALIFORNIA

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230808.00 — PROJECT NO.

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JOB NO. Y2213.00

SHEET TITLE

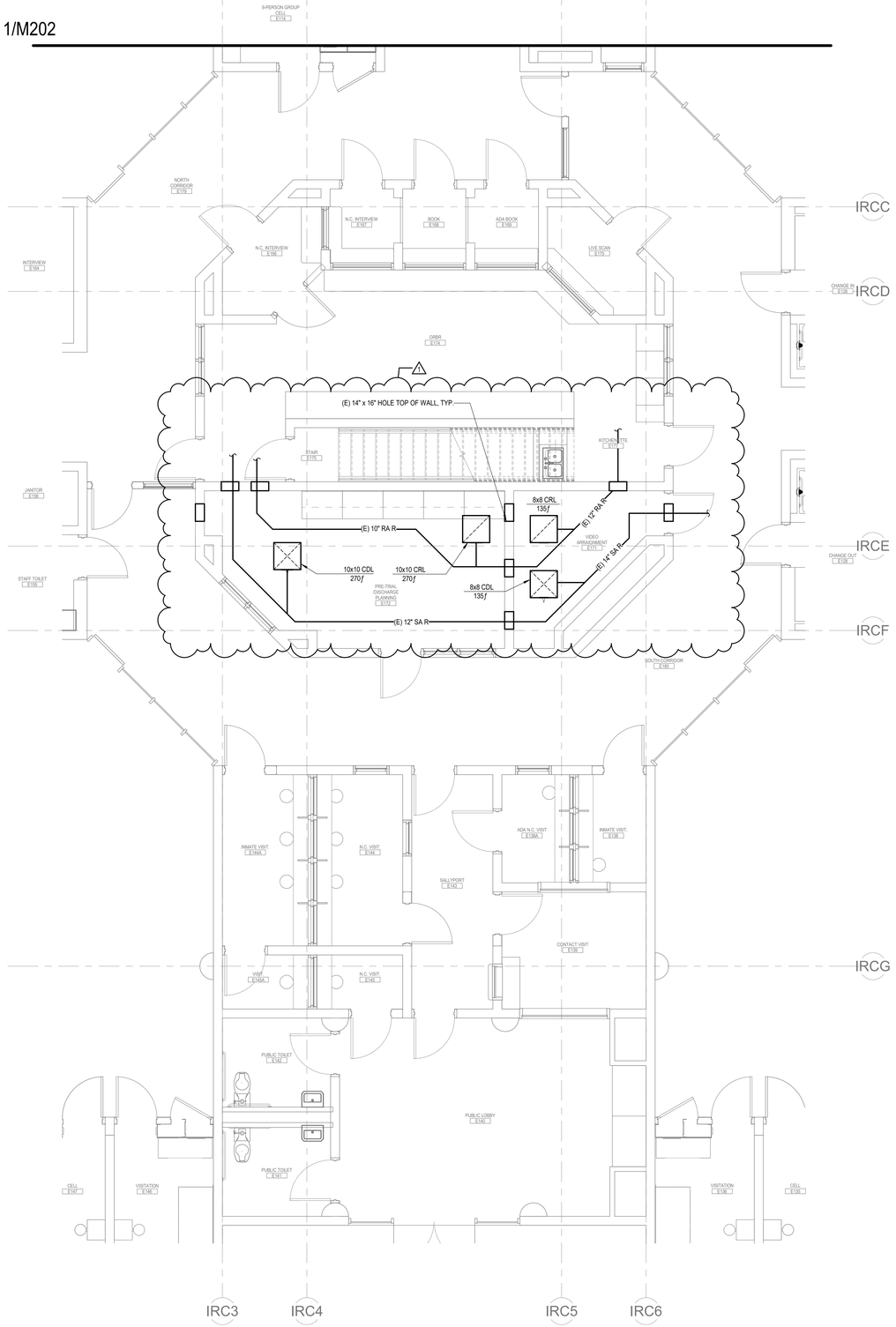
HVAC FLOOR PLAN - GROUND LEVEL

SHEET NO.

M201

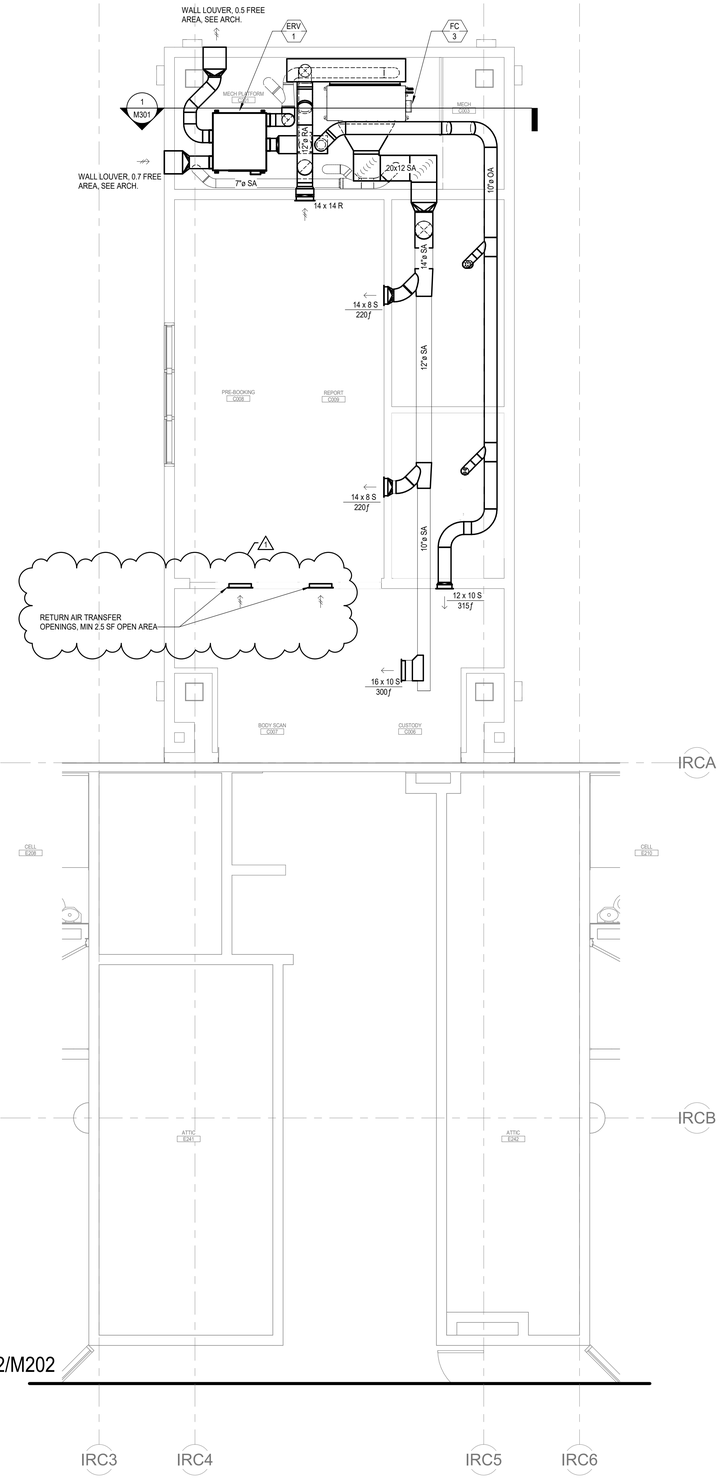
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ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

SEE 1/M202



2 M202 ENLARGED FLOOR PLAN - SOUTH

SCALE: 1/4" = 1'-0"



SEE 2/M202

1 M202 ENLARGED FLOOR PLAN - TIER LEVEL NORTH

SCALE: 1/4" = 1'-0"

AGENCY APPROVAL

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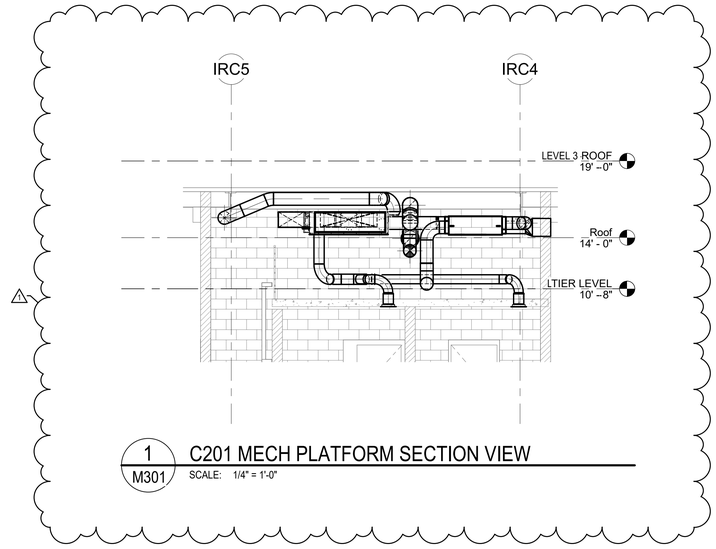
JOB NO. Y2213.00

SHEET TITLE

HVAC FLOOR PLAN - TIER LEVEL

SHEET NO.

M202



1 / M301 C201 MECH PLATFORM SECTION VIEW

SCALE: 1/4" = 1'-0"

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ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

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AC - MH — PM - DESIGN TEAM

230808.00 — PROJECT NO.

REGISTERED PROFESSIONAL ENGINEER
MICHAEL HSIAO
No. 17245
CIVIL
STATE OF CALIFORNIA

DATE SIGNED: 9/4/2025

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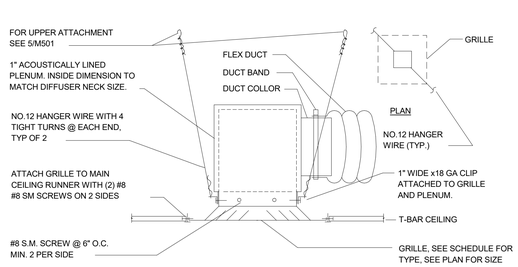
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HVAC SECTIONS

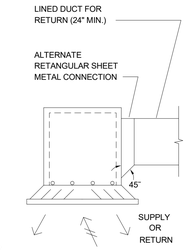
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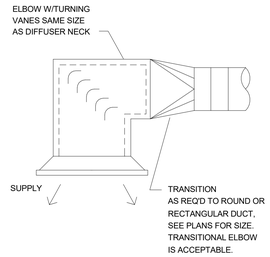
M301





NOTE: AT CEILINGS WITH MEDIUM DUTY LAY-IN GRIDS, 4 HANGER WIRES ARE REQUIRED. 2 HANGER WIRES REQUIRED AT HEAVY DUTY CEILING GRIDS. VERIFY GRID TYPE WITH ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

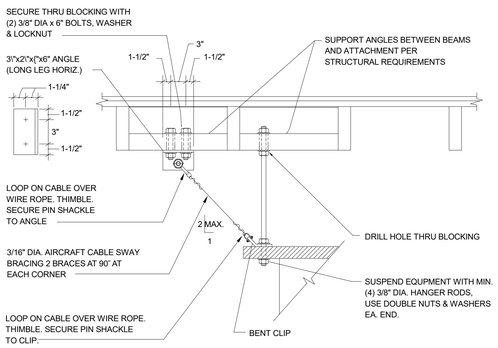




RETURN, EXHAUST, & SUPPLY REGISTER

1 M501

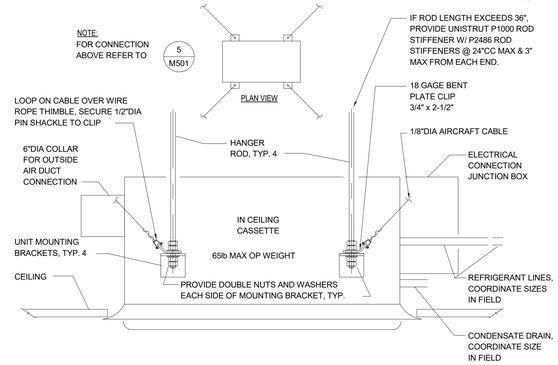
SCALE : NONE



SUSPENDED EQUIPMENT HANGER

5 M501

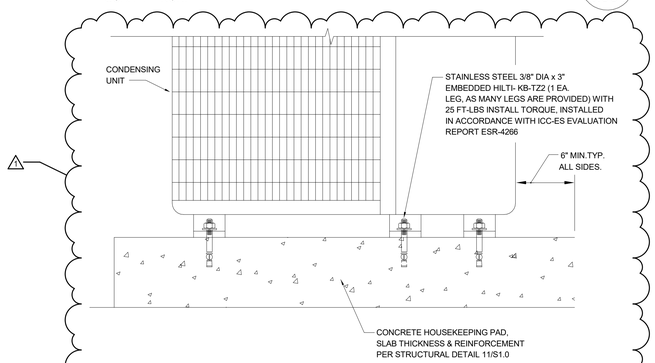
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CASSETTE FCU MOUNTING

2 M501

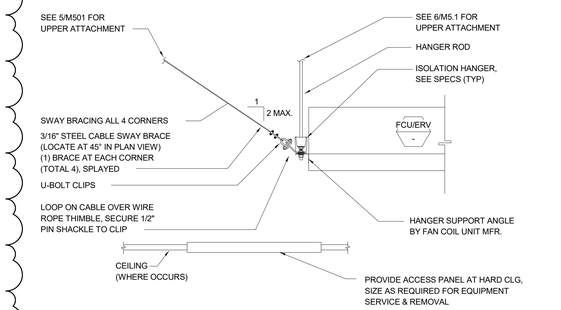
SCALE : NONE



SCU GRADE MOUNTING

6 M5.0

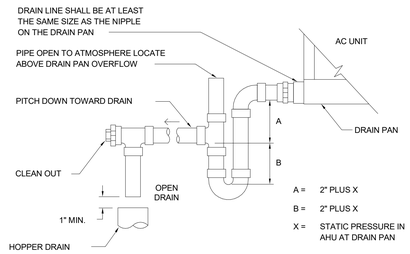
SCALE : NONE



DUCTED FCU/ERV MOUNTING

3 M501

SCALE : NONE



HEAT PUMP UNIT DRAIN PIPING

4 M501

SCALE : NONE

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SHEET TITLE

HVAC DETAILS

SHEET NO.

M501

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ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET

PLUMBING ABBREVIATIONS - General

ABBREVIATION	DESCRIPTION	ABBREVIATION VISIBILITY
(N)	NEW	Yes
AAV	AUTOMATIC AIR VENT	Yes
ABC, ABV	ABOVE CEILING, ABOVE	Yes
AC	AIR CONDITIONING	Yes
ACC DR, AP	ACCESS DOOR, ACCESS PANEL	Yes
ACU	AIR CONDITIONING UNIT	Yes
AD	AREA DRAIN	Yes
ADA	AMERICAN WITH DISABILITIES ACT	Yes
AF, AFF, AFG	ABOVE FLOOR, ABOVE FINISHED FLOOR, ABOVE FINISHED GRADE	Yes
AHU	AIR HANDLING UNIT	Yes
AHV	AIR HOSE VALVE	Yes
APD	AIR PRESSURE DROP IN INCHES WATER COLUMN	Yes
APPROX	APPROXIMATE	Yes
ARCH	ARCHITECTURAL	Yes
AV	ACID VENT	Yes
AW	ACID WASTE	Yes
BFF	BELOW FINISHED FLOOR	Yes
BFP	BACKFLLOW PREVENTER	Yes
BLDG	BUILDING	Yes
BLW	BELOW	Yes
BTUH, BTU(H)	BRITISH THERMAL UNITS PER HOUR	Yes
BV	BALL VALVE	Yes
CC	CENTER TO CENTER	Yes
CD	CONDENSATION DRAIN	Yes
CFH	CUBIC FEET PER HOUR	Yes
CFM	CUBIC FEET PER MINUTE	Yes
CI	CAST IRON	Yes
CL	CENTER LINE	Yes
CLG	CEILING	Yes
CLR	CLEAR	Yes
CO	CLEANOUT	Yes
COL	COLUMN	Yes
COMP	COMPRESSOR	Yes
CONC	CONCRETE	Yes
CONN, CONT	CONNECTION, CONTINUATION	Yes
CONTR	CONTRACTOR	Yes
COTG	CLEANOUT TO GRADE	Yes
CV	CHECK VALVE	Yes
CWH	COLD WATER HEADER	Yes
DEG	DEGREE	Yes
DF	DRINKING FOUNTAIN	Yes
DFU	DRAINAGE FIXTURE UNIT	Yes
DLA, DIAMETER SYMBOL	DIAMETER, DIAMETER OR PHASE	Yes
DN	DOWN	Yes
DR	DRAIN	Yes
DW	DISHWASHER OR DRY WELL	Yes
DWG	DRAWING	Yes
EEOR	ELECTRICAL ENGINEER OF RECORD	Yes
EFF	EFFICIENCY	Yes
EL	ELEVATION	Yes
ELEC	ELECTRICAL	Yes
EQUIP	EQUIPMENT	Yes
ES, EW	EMERGENCY SHOWER, EYE WASH	Yes
ESEW	EMERGENCY SHOWER AND EYE WASH COMBINATION	Yes
EWC	ELECTRIC WATER COOLER	Yes
EXH, EXT	EXHAUST, EXPANSION TANK	Yes
F	DEGREES FAHRENHEIT	Yes
FCO	FLOOR CLEANOUT	Yes
FCV	FLOW CONTROL VALVE	Yes
FD	FLOOR DRAIN	Yes
FF, FFE, FLR	FINISHED FLOOR OR FLY FAN, FINISHED FLOOR ELEVATION, FLOOR	Yes
FIN	FINISH	Yes
FLA	FULL LOAD AMPS	Yes
FPM	FEET PER MINUTE	Yes
FPS	FEET PER SECOND	Yes
FS	FLOOR SINK	Yes
FT, FT (') , /FT	FLUSH TANK, FEET, PER FOOT	Yes
FU	FIXTURE UNIT	Yes
FV	FLUSH VALVE	Yes
G	NATURAL GAS	Yes
GA	GAUGE	Yes
GAL, GPF, GPH, GPM	GALLONS, GALLONS PER FLUSH, GALLONS PER HOUR, GALLONS PER MINUTE	Yes
GALV, GI	GALVANIZED, GALVANIZED IRON	Yes
GCK	GAUGE COCK	Yes
GRD	GRADE	Yes
HC	HEATING COIL	Yes
HCAI	HEALTH CARE ACCESS AND INFORMATION DEPARTMENT	Yes
HP	HORSEPOWER	Yes
HR	HOUR	Yes
HS	HAND SINK	Yes
HT	HEIGHT	Yes
HTG, HTR	HEATING, HEATER	Yes
HW	HOT WATER	Yes
Hz	HERTZ	Yes
IE OR INV	INVERT ELEVATION	Yes
IN (")	INCH	Yes
KEC, KEF	KITCHEN EQUIPMENT CONTRACTOR, KITCHEN EXHAUST FAN	Yes
KS	KITCHEN SINK	Yes
KW, KWH	KILOWATTS, KILOWATT HOUR	Yes
LAT	LEAVING AIR TEMPERATURE	Yes
LAV	LAVATORY	Yes
LBS	POUNDS	Yes
LPA	LOCKED ROTOR AMPS	Yes
LPG	LIQUIFIED PETROLEUM GAS	Yes
LPS	LOW PRESSURE STEAM	Yes
MAX	MAXIMUM	Yes
MBH	THOUSAND BTUs PER HOUR	Yes

PLUMBING ABBREVIATIONS - General

ABBREVIATION	DESCRIPTION	ABBREVIATION VISIBILITY
MCA	MINIMUM CIRCUIT CAPACITY	Yes
MECH	MECHANICAL	Yes
MEOR	MECHANICAL ENGINEER OF RECORD	Yes
MFR	MANUFACTURER	Yes
MIN	MINIMUM	Yes
MOCP	MAXIMUM OVERCURRENT PROTECTION	Yes
MPG	MEDIUM PRESSURE GAS	Yes
MS	MOP SINK	Yes
MTD	MOUNTED	Yes
NC, NO	NORMALLY CLOSED, NORMALLY OPEN	Yes
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION	Yes
NTS	NOT TO SCALE	Yes
OC	ON CENTER	Yes
OD	OUTSIDE DIAMETER, OUTSIDE DIMENSIONS	Yes
OD	OVERFLOW DRAIN	Yes
OFCI, OFOI	OWNER FURNISHED & CONTRACTOR INSTALLED, OWNER FURNISHED & OWNER INSTALLED	Yes
OH	OVERHEAD	Yes
OS & Y	OUTSIDE SCREW AND YOKE	Yes
PD, PG	PRESSURE DROP, PRESSURE GAUGE	Yes
PE	POLYETHYLENE	Yes
PH OR DIAMETER SYMBOL	PHASE	Yes
PLBG	PLUMBING	Yes
PLD	PLANTER DRAIN	Yes
PO	PLUGGED OUTLET	Yes
POC	POINT OF CONNECTION	Yes
POD	POINT OF DISCONNECTION	Yes
PP	POLYPROPYLENE	Yes
PRS, PS	PRE-RINSE SINK, POT SINK	Yes
PRV	PRESSURE REDUCING VALVE	Yes
PSI (G) (A)	POUNDS PER SQUARE INCH (GAUGE) (ABSOLUTE)	Yes
PT	PLASTER TRAP	Yes
QTY	QUANTITY	Yes
RD	ROOF DRAIN	Yes
RE	RIM ELEVATION	Yes
REC	RECESSED	Yes
REQD	REQUIRED	Yes
RET	RETURN	Yes
REV	REVISION	Yes
RLA	RATED LOAD AMPS OR RUNNING LOAD AMPERES	Yes
RM	ROOM	Yes
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER	Yes
RPM	REVOLUTIONS PER MINUTE	Yes
RWL	RAIN WATER LEADER	Yes
S or SK	SINK	Yes
SD	STORM DRAIN, SPLITTER DAMPER, SCHEMATIC DESIGN PHASE	Yes
SD	STORM DRAIN	Yes
SED	SEWAGE EJECTOR DRAIN	Yes
SEOR	STRUCTURAL ENGINEER OF RECORD	Yes
SH	SHOWER	Yes
SM	SHEET METAL	Yes
SOV	SHUT OFF VALVE	Yes
SP GR	SPECIFIC GRAVITY	Yes
SPD	SUMP PUMP DISCHARGE	Yes
SPEC	SPECIFICATION	Yes
SQ FT or FT2, SQ IN or IN2	SQUARE FEET, SQUARE INCHES	Yes
SS	SERVICE SINK, SANITARY SEWER	Yes
SS	STAINLESS STEEL	Yes
SSD	SUB-SOIL DRAIN	Yes
STD	STANDARD	Yes
STRUC	STRUCTURAL	Yes
TD	TRENCH DRAIN	Yes
TDL	TOTAL DEVELOPED LENGTH	Yes
TEMP	TEMPERATURE	Yes
THK	THICK	Yes
TMV	THERMOSTATIC MIXING VALVE	Yes
TOC, TOD	TOP OF CONCRETE, TOP OF DUCT	Yes
TP, TSP	TRAP PRIMER, TOTAL PRESSURE, TOTAL STATIC PRESSURE,	Yes
TW	TEMPERED WATER	Yes
TYP	TYPICAL	Yes
UF, UG, US	UNDER FLOOR, UNDERGROUND, UNDER SLAB	Yes
UL	UNDERWRITERS' LABORATORIES	Yes
UON	UNLESS OTHERWISE NOTED	Yes
UR	URINAL	Yes
UTR	UP THROUGH ROOF	Yes
V, VR, VTR	VENT, VENT RISER, VENT THRU ROOF	Yes
VFC	VARIABLE FREQUENCY CONTROLLER	Yes
VFD	VARIABLE FREQUENCY DRIVE	Yes
VLV, VO	VALVE, VALVED OUTLET	Yes
VSD	VARIABLE SPEED DRIVE	Yes
VW	VACUUM WASTE	Yes
W	WASTE	Yes
W	WATTS	Yes
W/, W/O	WITH, WITHOUT	Yes
WALL MTD (R)	WALL MOUNTED (RECESSED)	Yes
WB	WALL BOX	Yes
WC, WC/L, W, WH	WATER CLOSET, WATER CLOSET & LAVATORY, WATER FOUNTAIN, WALL HYDRANT	Yes
WCO	WALL CLEANOUT	Yes
WMS	WIRE MESH SCREEN	Yes
WP, WPD	WORKING PRESSURE, WATER PRESSURE DROP IN FEET OF WATER COLUMN	Yes
WSFU	WATER SUPPLY FIXTURE UNIT	Yes
WT	WEIGHT	Yes

PLUMBING SYMBOLS - General

SYMBOL	SYMBOL DESCRIPTION
	3 WAY MODULATING CONTROL VALVE
	3 WAY TWO POSITION CONTROL VALVE
	ANGE GLOBE VALVE
	ANGLE VALVE
	AQUASTAT
	AREA DRAIN
	FLOOR SINK
	FLOW ARROW
	GAGE COCK
	GAS COCK, PLUG COCK
	GLOBE VALVE
	HOPPER DRAIN
	HOSE BIBB
	HOSE BIBB
	LIMIT OF DEMOLITION
	PIPE BREAK
	PIPE CAP
	PIPE DOWN
	PIPE GUIDE
	PIPE UP
	POINT OF CONNECTION
	POST INDICATOR VALVE
	PRESSURE REGULATING VALVE
	PRESSURE RELIEF VALVE
	REDUCER
	SOLENOID VALVE
	STRAINER
TS X	TEMPERATURE SENSOR
	TEST PLUG
	THERMOMETER
	TRAP PRIMER
	TWO POSITION CONTROL VALVE
	UNION
	VALVE IN RISE/DROP
	VALVE IN VALVE BOX
	WALL CLEANOUT
	WATER HAMMER ARRESTOR
WM	WATER METER

PLUMBING GENERAL NOTES

1. ACCESS PANELS SHALL BE PROVIDED AS NECESSARY TO PROPERLY ACCESS THE PLUMBING SYSTEM INCLUDING VALVES, REFER TO SPECIFICATION SECTION 08310.
2. OFFSET VENT THROUGH ROOFS 10'-0" MINIMUM FROM AIR INTAKES AND 4'-0" FROM OUTSIDE WALLS.
3. HVAC EQUIPMENT IS SHOWN FOR THE COORDINATION OF UTILITIES ONLY. REFER TO 'M' SHEETS FOR MORE INFORMATION.
4. THE CONNECTION OF NATURAL GAS LINES TO EQUIPMENT SHALL INCLUDE A LINE SIZE SHUT-OFF VALVE, UNION AND A MINIMUM 6" LONG DIRT LEG WITH ACCESSIBLE END CAP.
5. THE CONNECTION OF CONDENSATE DRAIN LINES TO HVAC EQUIPMENT SHALL INCLUDE A MINIMUM 4" DEEP "P"-TRAP AND PLUGGED TEE AT ALL OFFSETS.
6. PROVIDE WATER HAMMER ARRESTORS (WHA) AS INDICATED ON PLUMBING PLANS AND/OR AS DESCRIBED WITHIN DIVISION 22 SPECIFICATIONS. SIZING SHALL BE IN ACCORDANCE WITH PDI STANDARD WH-201.
7. FOR PIPES PASSING THROUGH, UNDER OR PARALLEL TO BUILDING FOOTINGS, RETAINING WALLS ETC. REFER TO STRUCTURAL DETAILS, 'S' SHEETS, FOR TYPICAL ARRANGEMENT.
8. CONTRACTOR SHALL FIELD VERIFY ALL POINTS OF CONNECTION TO SITE PIPING (LOCATIONS AND INVERT) PRIOR TO EXCAVATION, FABRICATION AND INSTALLATION OF ASSOCIATED PIPING RUNS. NOTIFY ARCHITECT AND OR ENGINEER IMMEDIATELY IF POINTS OF CONNECTION OR INVERTS ARE DIFFERENT THAN REPRESENTED ON THE DRAWINGS.
9. OFFSET ALL RISERS AND DROPS TO AVOID PENETRATIONS AT TOP PLATES.
10. PENETRATION OF PIPES, CONDUIT, ETC., IN WALLS AND/OR FLOORS REQUIRING PROTECTED OPENINGS SHALL BE FIRE STOPPED. MATERIAL SHALL BE A TESTED ASSEMBLY APPROVED BY THE STATE FIRE MARSHAL.
11. SEAL ALL PIPE PENETRATIONS THRU FLOORS WATERTIGHT.
12. DRAWINGS SHALL BE CONSIDERED DIAGRAMMATIC ONLY. CONTRACTOR SHALL FIELD VERIFY WHERE POSSIBLE, EXACT LOCATIONS, SIZES, AND ELEVATIONS OF ALL ITEMS SHOWN PRIOR TO THE INSTALLATION OF ANY NEW WORK.
13. THE DRAWINGS ARE NOT INTENDED TO SHOW EVERY OFFSET OR FITTING OR EVERY STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED DURING INSTALLATION OF THE WORK. LOCATION OF ALL ITEMS NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. EXACT LOCATIONS NECESSARY TO SECURE BEST CONDITIONS AND RESULTS MUST BE DETERMINED AT THE JOB SITE AND SHALL HAVE THE APPROVAL OF THE ARCHITECT BEFORE BEING INSTALLED.
14. ALL VALVES SHOWN SHALL BE FULL LINE SIZE UNLESS OTHERWISE NOTED.
15. CLOSELY COORDINATE ALL WORK WITH OTHER TRADES PRIOR TO TRENCHING OR INSTALLATION OF NEW. IDENTIFY SIZE AND LOCATIONS OF ALL PENETRATIONS THROUGH FOUNDATIONS, WALLS OR ROOFS PRIOR TO FABRICATION OF ANY SYSTEMS OR ORDERING MATERIALS AFFECTED BY POSSIBLE COORDINATION CONFLICTS.
16. CONCRETE ANCHORS SHALL BE HILTI, KWIK BOLT TZ2 3/8" WITH EMBEDMENT AS PER STRUCTURAL PLANS. ANCHORS SHALL BE TESTED PER IR 19-1, INTERPRETIVE REGULATION FOR EXPANSION ANCHORS IN HARDENED CONCRETE. ANCHOR TEST SHALL BE 968 LBS. TENSION.
17. PIPING SHALL BE SUPPORTED AND BRACED IN STRICT COMPLIANCE WITH DIVISION 22 SPECIFICATIONS.
18. PENETRATION OF PIPES, CONDUITS, ETC., IN WALLS AND/OR FLOORS REQUIRING PROTECTED OPENINGS SHALL BE FIRE STOPPED. MATERIAL SHALL BE A TESTED ASSEMBLY APPROVED BY THE STATE FIRE MARSHAL.
19. ALL NEW SANITARY WASTE PIPING SHOWN SHALL BE SLOPED AT 1/4" PER FOOT MINIMUM UNLESS OTHERWISE NOTED ON PLANS. WHERE SLOPES LESS THAN 1/4" PER FOOT ARE INDICATED, CONTRACTOR SHALL SLOPE NEW PIPING UNIFORMLY BETWEEN UPPER TERMINAL OF PIPE AND THE POINT OF CONNECTION TO THE SITE PIPING (AS INDICATED ON THE CIVIL PLANS) TO ACHIEVE MAXIMUM SLOPE POSSIBLE AND IN NO CASE SHALL THE PIPING BE SLOPED LESS THAN THE MINIMUM INDICATED.
20. CONCEAL ALL PIPING IN WALL FURRING, PARTITIONS, ETC., EXCEPT AT MECHANICAL ROOMS.
21. REFER TO ARCHITECTURAL DRAWINGS FOR BUILDING DIMENSIONS AND EXACT LOCATIONS OF PLUMBING FIXTURES.

PIPING, DUCTWORK & ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTIONS 13.6.5, 13.6.6, 13.6.7, 13.6.8; AND 2022 CBC, SECTIONS 1617A.1.24, 1617A.1.25, AND 1617A.1.26.

THE BRACING AND ATTACHMENTS TO THE STRUCTURE SHALL BE DETAILED ON THE APPROVED DRAWINGS OR THEY SHALL COMPLY WITH ONE OF THE OSHPD PRE-APPROVALS (OPM #)

COPIES OF THE MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF HANGING THE BRACING OF THE PIPE, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS.

THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26, AND 30:

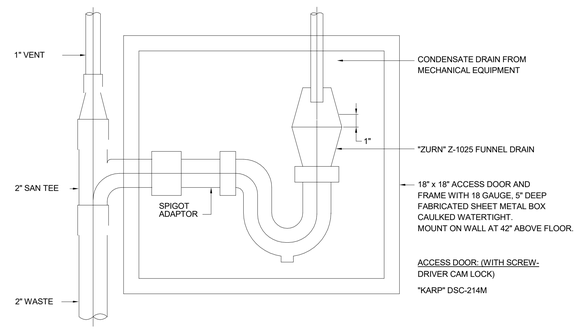
1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER.
3. MOVABLE EQUIPMENT THAT IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF THAT DIRECTLY SUPPORT THE EQUIPMENT ARE TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE ATTACHMENT OF THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.

B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTION SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.



1 / P001 Plbg - Hopper Drain

SCALE: 1/8" = 1'-0"

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ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

PLUMBING LEGENDS & NOTES

SHEET NO.

P001

PLUMBING FIXTURE SCHEDULE

ADA	SYMBOL	FIXTURE	FIXTURE MANUFACTURER AND MODEL No.	FAUCET OR VALVE MANUFACTURER AND MODEL No.	TRIM AND SUPPORT MANUFACTURER AND MODEL No.	REMARKS	VENT	WASTE		COLD WATER		HOT WATER	
								BRANCH	OUTLET	BRANCH	OUTLET	BRANCH	OUTLET
	WC-1	WATER CLOSET WALL MOUNTED FLUSH VALVE	"AMERICAN STANDARD" AFWALL WALL-MOUNTED ELONGATED BOWL WATER CLOSET. 18" RIM HEIGHT FOR ADA, TOP SPUD, SIPHON JET ACTION.	PROVIDE "SLOAN" ROYAL MODEL 116-1.28 MANUAL FLUSH FLUSHOMETER VALVE ASSEMBLY, 1.28 GPF CHROMED PLATED WITH ADJUSTABLE TAILPIECE.	SEAT: "KOHLER" LUSTRA OPEN FRONT SEAT PROVIDE WATER HAMMER ARRESTOR, SIZE PER PDI.		2"	4"	4"	1-1/4"	1"	-	-
	WC-2	WATER CLOSET FLOOR MOUNTED FLUSH VALVE FRONT ACCESS	"WILLOUGHBY" MODEL ETWS-1490-FA-FA FLOOR MOUNTED, REAR OUTLET WATER CLOSET. 1.28 GPF, TYPE 304 STAINLESS STEEL, ELONGATED BOWL, WALL SUPPLY, BLOWOUT JET ACTION. 18" INTEGRAL SEAT HEIGHT FOR ADA	PROVIDE "SLOAN" REGAL XL FLUSHOMETER MODEL 9603-1.28 W/ RHY97ALC (WILLOUGHBY P/N: 320640), CONCEALED, HYDRAULICALLY ACTIVATED, 1.28 GPF, ADA COMPLIANT, ROUGH BRASS FINISH, NON-HOLD-OPEN PUSH BUTTON.	WATER HAMMER ARRESTOR, SIZE PER PDI.	PROVIDE "WILLOUGHBY" WMS-II PROGRAMMABLE CONTROL, NON-NETWORKED. DIV. 22. SHALL PROVIDE HARD-WIRED 120V TRANSFORMER AND ALL LOW-VOLTAGE WIRING. SEE ELECTRICAL PLANS FOR LOCATION OF 120V CIRCUIT.	2"	4"	4"	1-1/4"	1"	-	-
	WC/L-1	WATER CLOSET/LAVATORY COMBINATION UNIT WALL MOUNTED FLUSH VALVE	"WILLOUGHBY" SERIES 4896, LEFT OFFSET OR RIGHT OFFSET TOILET BOWL MODEL. 1.28 GPF, ELONGATED BOWL, 14 GAUGE STAINLESS STEEL, ON-FLOOR, WALL OUTLET W/CLEANOUT, BLOW OUT JET ACTION, 18" RIM HEIGHT. PROVIDE DUAL TEMP ELECTRONIC VALVES AND AND PIEZO PUSH BUTTONS.	PROVIDE "SLOAN" REGAL XL FLUSHOMETER MODEL 9603-1.28 W/ RHY97ALC (WILLOUGHBY P/N: 320640). CONCEALED, HYDRAULICALLY ACTIVATED, 1.28 GPF, ADA COMPLIANT, ROUGH BRASS FINISH, NON-HOLD-OPEN PUSH BUTTON.	SEAT: INTEGRAL, STAINLESS STEEL. CARRIER: "WILLOUGHBY" WALL MOUNTING HARDWARE PROVIDE WATER HAMMER ARRESTOR, SIZE PER PDI.	LAVATORY BOWL: RECTANGULAR BOWL 14" x 9-1/2" x 6" DEEP. PROVIDE WITH HEMISPHERICAL PENAL BUBBLER, -PZPB PUSHBUTTON VALVES FOR COLD & TEMPERED WATER, ET4 ELECTRONIC TOILET OVERFLOW PREVENTER OPTION, SUICIDE PREVENTION SKIRT, WALL SLEEVE. PROVIDE SUICIDE RESISTANT 36" GRAB BAR CLOSURE PLATE (-ASGB36). PROVIDE "WILLOUGHBY" WMS-II PROGRAMMABLE CONTROL, NON-NETWORKED. DIV. 22. SHALL PROVIDE "RIB" MODEL PSH500A BOX-MOUNT 120V TRANSFORMER AND ALL LOW-VOLTAGE WIRING. SEE ELECTRICAL PLANS FOR LOCATION OF 120V CIRCUIT.	2"	4"	4"	1-1/4"	1"	3/4"	1/2"
	L-1	LAVATORY WALL MOUNTED HOT AND COLD WATER	"KOHLER" KINGSTON MODEL K-2006, ADA STAFF LAVATORY, WALL HUNG, VITREOUS CHINA WITH CONCEALED ARM RECESS, FRONT OVERFLOW, WITH SOAP DEPRESSION, 4" CENTERS, 21-1/4"L x 18-1/8"W SHAPED BOWL.	"KOHLER" MODEL K-10272 WIDESPREAD LAVATORY FAUCET, POLISHED CHROME FINISH, PROVIDE 0.5 GPM FLOW RESTRICTOR, VANDAL RESISTANT HARDWARE. ADA COMPLIANT.	CAST BRASS LAVATORY GRID DRAIN WITH 1-1/4" 17 GAUGE SEAMLESS BRASS OFFSET TAILPIECE, INTEGRAL PERFORATED GRID ASSEMBLY FOR WHEELCHAIR, CHROME FINISH, MOUNT P-TRAP FLUSH TO WALL. PROVIDE WATER HAMMER ARRESTOR, SIZE PER PDI.	MOUNT AT HEIGHT INDICATED ON ARCHITECTURAL DRAWINGS. PROVIDE "J.R. SMITH" #0700-M31 CONCEALED ARMS AND FLOOR SUPPORT, WITH FEET OF SUPPORT ANCHORED TO FLOOR. IN ADDITION ANCHOR TOP OF SUPPORT TO WALL CONSTRUCTION.	1-1/2"	2"	1-1/2"	3/4"	1/2"	3/4"	1/2"
	L-2	LAVATORY COUNTER MOUNTED HOT AND COLD WATER	"AMERICAN STANDARD" AQUALYN NO. 0476.028 COUNTER MOUNTED, SELF-RIMMING, VITREOUS CHINA, FRONT OVERFLOW, SINGLE HOLE FAUCET DRILLING, 20" x 17"	PROVIDE "SLOAN" OPTIMA MODEL ETF-880 SENSOR FAUCET, 4" CENTER SET, DECK MOUNTED, 0.5 GPM, HARDWIRED	CAST BRASS LAVATORY GRID DRAIN WITH 1-1/4" 17 GAUGE SEAMLESS BRASS OFFSET TAILPIECE, INTEGRAL PERFORATED GRID ASSEMBLY FOR WHEELCHAIR, CHROME FINISH, MOUNT P-TRAP FLUSH TO WALL. PROVIDE PROVIDE WATER HAMMER ARRESTOR, SIZE PER PDI.	MOUNT AT HEIGHT INDICATED ON ARCHITECTURAL DRAWINGS.	1-1/2"	2"	1-1/2"	3/4"	1/2"	3/4"	1/2"
	L-3	LAVATORY WALL HUNG FRONT ACCESS HOT AND COLD WATER	"WILLOUGHBY" MODEL HS-1013-46-HC-FA, WALL HUNG INMATE LAVATORY, FRONT ACCESS, 14 GAGE STAINLESS STEEL, OVAL BOWL, 13" x 9-1/2" x 6". PROVIDE SECURITY LIGATURE-RESISTANT PENAL BUBBLER/FILLER, DUAL TEMPERATURE ELECTRONIC VALVES WITH PIEZO ELECTRONIC PUSH BUTTONS.		PROVIDE "WILLOUGHBY" WALL MOUNTING HARDWARE AND WALL TEMPLATE. PROVIDE WATER HAMMER ARRESTOR, SIZE PER PDI.	ANCHOR TOP OF SUPPORT TO WALL CONSTRUCTION. PROVIDE "WILLOUGHBY" WMS-II PROGRAMMABLE CONTROL, NON-NETWORKED. DIV. 22. SHALL PROVIDE HARD-WIRED 120V TRANSFORMER AND ALL LOW-VOLTAGE WIRING. SEE ELECTRICAL PLANS FOR LOCATION OF 120V CIRCUIT.	1-1/2"	2"	1-1/2"	3/4"	1/2"	3/4"	1/2"
	SH-1	SHOWER WALL MOUNTED	"ACORN" LR1748ADA-03-M WALL SHOWER, 14 GAUGE, TYP3 304 STAINLESS STEEL WITH TWO CONICAL FIXED SHOWER HEADS, ADA COMPLIANT, TEMPERATURE/PRESSURE BALANCING MIXING VALVE, CONTROL VALVE PUSH BUTTONS. PROVIDE WITH MOUNTING HARDWARE.			MOUNT BOTH SHOWER HEADS AT HEIGHT INDICATED ON ARCHITECTURAL PLANS.	-	-	-	3/4"	1/2"	3/4"	1/2"
	S-1	SINK COUNTER MOUNTED HOT AND COLD WATER	"JUST MFG" MODEL DL-ADA-1829-A, DOUBLE BOWL PREP SINK, DROP IN, 18 GAUGE, STAINLESS STEEL, STANDARD DEPTH WITH FAUCET LEDGE PROVIDE WITH 2 HOLES, 4" ON CENTER.	"CHICAGO" 2304-GN10ASWGE35AB SINGLE LEVER GOOSE NECK FAUCET WITH SIDE SPRAY, 1.5 GPM, USER ADJUSTABLE TEMPERATURE CONTROL, VANDAL RESISTANT AERATOR.	17 GAUGE ADJUSTED P-TRAP CHROME PLATED, CHROME PLATED ANGLE VALVE AND ESCUTCHEONS, LOOSE KEY, CHICAGO 1017. JUST JV35 CUP STRAINER. PROVIDE WATER HAMMER ARRESTOR, SIZE PER PDI. GARBAGE DISPOSER: "IN SINK ERATOR" MODEL EVOLUTION ESSENTIAL, 3/4 HP, 120 V/1 PH/60 HZ, 8.1 AMP.	PROVIDE FACTORY ADHERED VANDAL RESISTANT BACKING PLATE AT FAUCET AND PROVIDE SLOT AT FAUCET FOR VANDAL RESISTANT PINS. BACKING PLATE SHALL BE 14 GAUGE, 304 STAINLESS STEEL, FORMED AS A CHANNEL.	1-1/2"	2"	1-1/2"	3/4"	1/2"	3/4"	1/2"
	FD-1	FLOOR DRAIN	"J.R. SMITH" MODEL 2010 CPHU		6" ROUND POLISHED NICKEL BRONZE STRAINER WITH VANDAL PROOF GRATE.	PROVIDE FLASHING RING AND CLAMP AT FLOORS WITH WATER RESISTANT MEMBRANE. SET TOP OF DRAIN SLIGHTLY BELOW FLOOR TO INSURE DRAINAGE. INSTALL VENTED P-TRAP. WHERE TRAP PRIMERS ARE INDICATED PROVIDE PROPER CONNECTION TO P-TRAP. PROVIDE VANDAL RESISTANT HARDWARE.	2"	2", 3"	2", 3"	-	-	-	-
	FCO	FLOOR CLEAN OUT	"WADE" MODEL W-8480 R, STAINLESS STEEL WITH EXTRA HEAVY BRASS NEOPRENE SEAL SCREW PLUG WITH RECESSED HOOD DRILLED & TAPPED.			SEE FLOOR PLANS FOR SIZE	-	2", 3", 4"	2", 3", 4"	-	-	-	-

INSTANTANEOUS WATER HEATER SCHEDULE

EQUIP TAG	MFR	MODEL	TEMP RISE [F]	FLOW [GPM]	TEMP SETTING [F]	ELECTRICAL DATA		MOUNTING DETAIL	OPER WT [LBS]	NOTES
						VOLT/PH	WATTS			
IWH-1	CHRONOMITE	ER-42L	65	1.5	120	480/3	20000		30	

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ONE INCH = TWENTY FEET

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REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

PLUMBING FIXTURE SCHEDULES

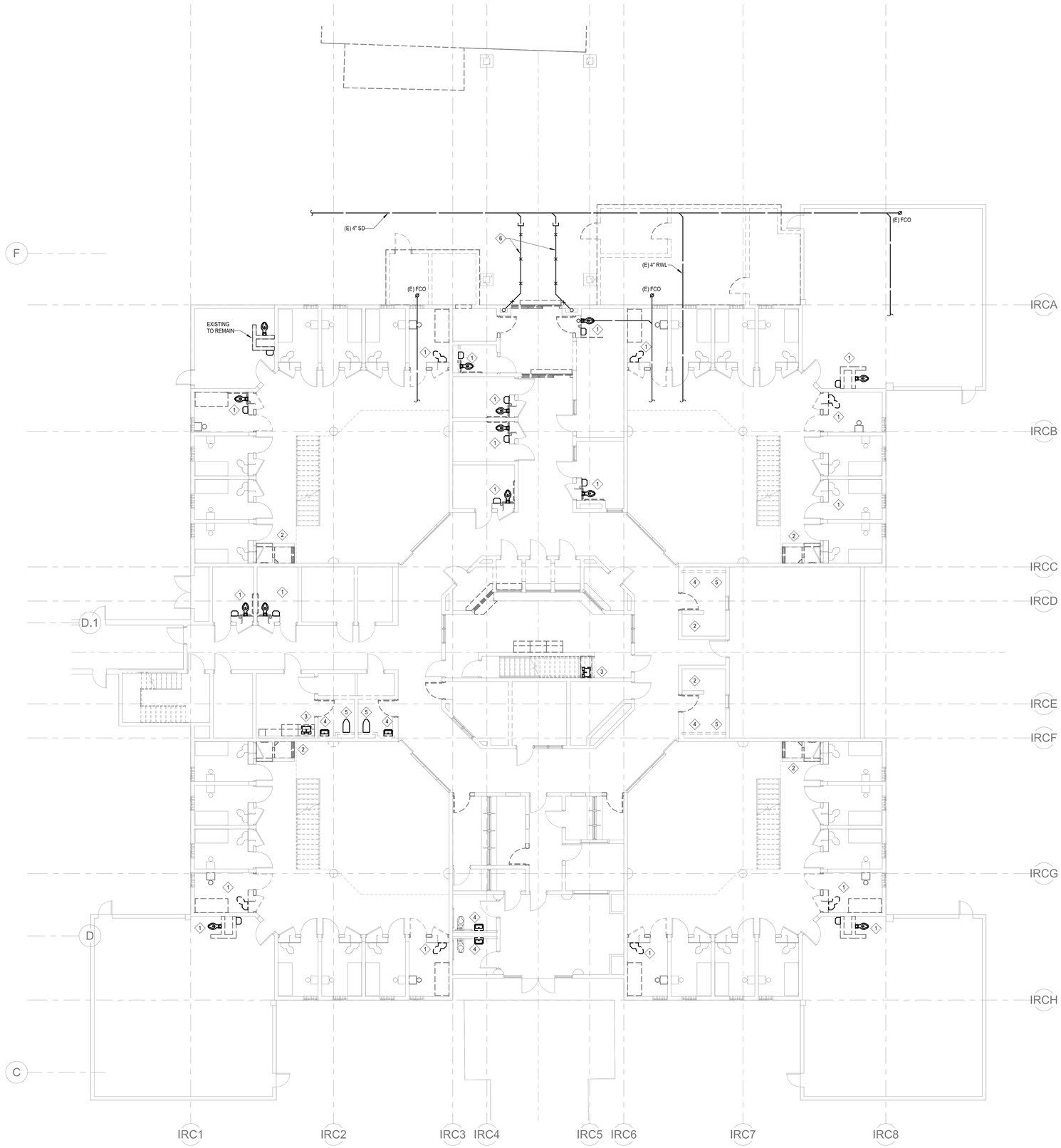
SHEET NO.

P002

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

KEY NOTES

1. DEMOLISH (E) COMBINATION TOILET/LAVATORY, CAP (E) DOMESTIC WATER, SANITARY WASTE, AND SANITARY VENT SERVICES IN WALL AND AT FLOOR SLAB. SEE P201 FOR RECONNECTION TO (N) FIXTURE.
2. DEMOLISH (E) SHOWER SYSTEM AND FLOOR DRAIN. CAP (E) WASTE LINE AND (E) DOMESTIC WATER SERVICES IN WALL AND AT FLOOR SLAB. SEE P201 FOR RECONNECTION TO (N) FIXTURE.
3. DEMOLISH (E) SINK, CAP (E) DOMESTIC WATER, SANITARY WASTE, AND SANITARY VENT SERVICES IN WALL AND AT FLOOR SLAB. SEE P201 FOR RECONNECTION TO (N) FIXTURE.
4. DEMOLISH (E) LAVATORY, CAP (E) DOMESTIC WATER, SANITARY WASTE, AND SANITARY VENT SERVICES IN WALL AND AT FLOOR SLAB. SEE P201 FOR RECONNECTION TO (N) FIXTURE.
5. DEMOLISH (E) WATER CLOSET, CAP (E) DOMESTIC WATER, SANITARY WASTE, AND SANITARY VENT SERVICES IN WALL AND AT FLOOR SLAB. SEE P201 FOR RECONNECTION TO (N) FIXTURE.
6. DEMOLISH (E) 4" SD BACK TO RISER AND CAP ABOVE CEILING. SEE P201 FOR RECONNECTION TO (N) RAINWATER LEADER.



1 / P101 PLUMBING DEMOLITION FLOOR PLAN - GROUND LEVEL

SCALE: 1/8" = 1'-0"

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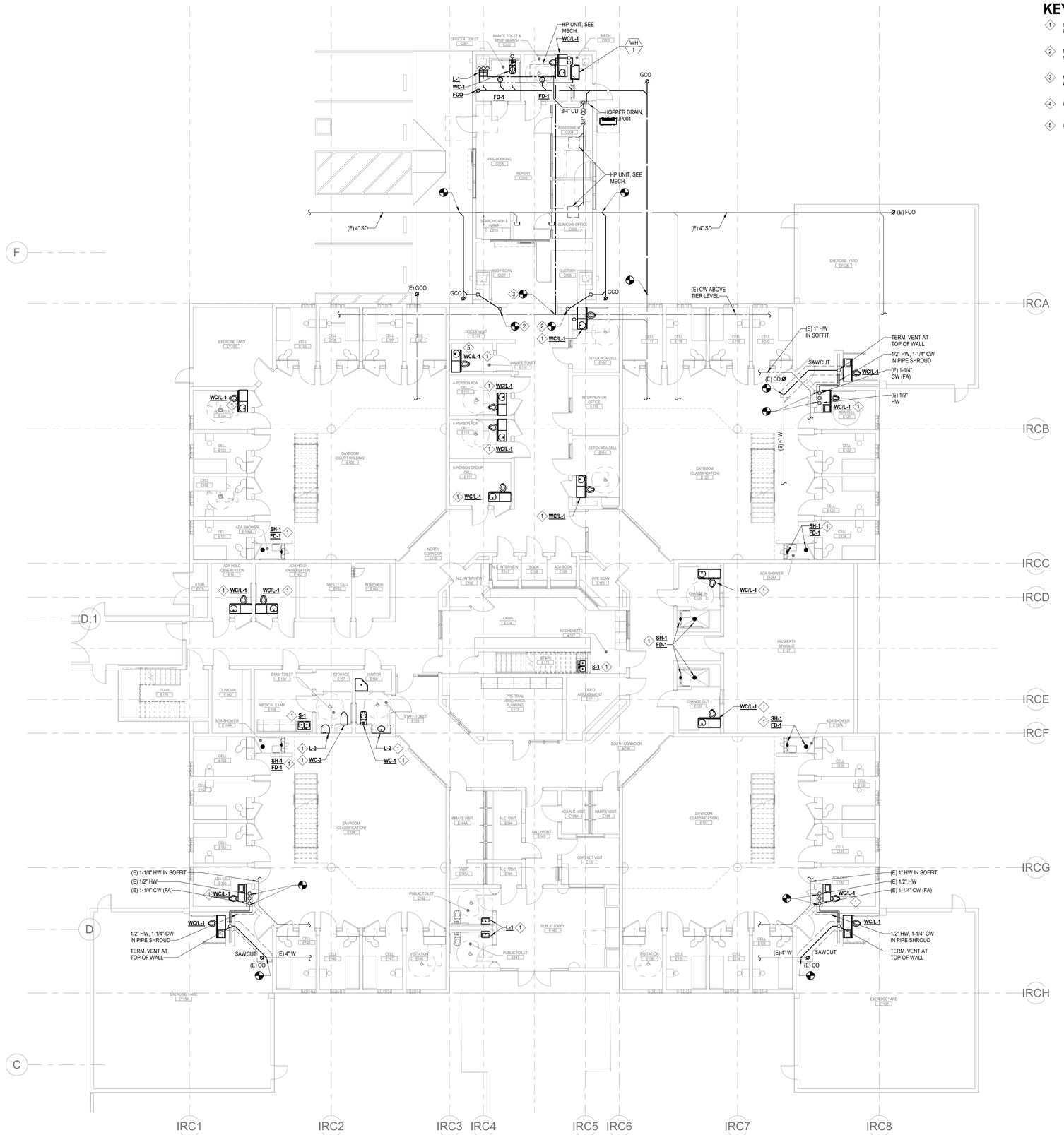
JOB NO. Y2213.00

SHEET TITLE

PLUMBING DEMOLITION FLOOR PLAN - GROUND LEVEL

SHEET NO.

P101



1 P201 PLUMBING FLOOR PLAN - GROUND LEVEL

SCALE: 1/8" = 1'-0"

KEY NOTES

1. RECONNECT NEW PLUMBING FIXTURE TO PREVIOUS PIPING SERVICES SERVING DEMOLISHED FIXTURE IN THE SAME AREA.
2. MAKE POINT OF CONNECTION TO (E) CAPPED 3" RWL ABOVE CEILING, EXTEND DOWN THROUGH NEW PIPE CHASE AND TURN OUT BELOW GRADE. MAKE POINT OF CONNECTION TO (E) 4" SD.
3. MAKE POINT OF CONNECTION TO (E) 2" CW ABOVE TIER LEVEL CEILING, EXTEND TO SERVE ADDED SPACES.
4. PROTECT AND MAINTAIN EXISTING STORM DRAIN LINE TO REMAIN ACTIVE.
5. VERIFY (E) EXHAUST GRILLE IS SECURITY TYPE WITH SECURITY FASTENERS.

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REVISIONS

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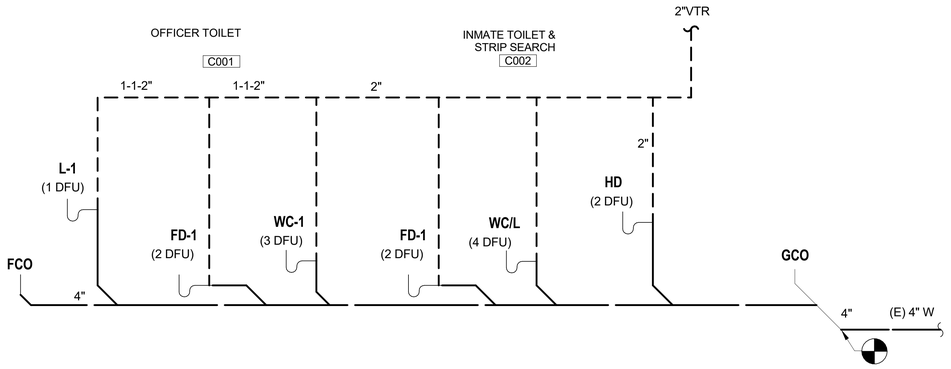
SHEET TITLE

PLUMBING FLOOR PLAN - GROUND LEVEL

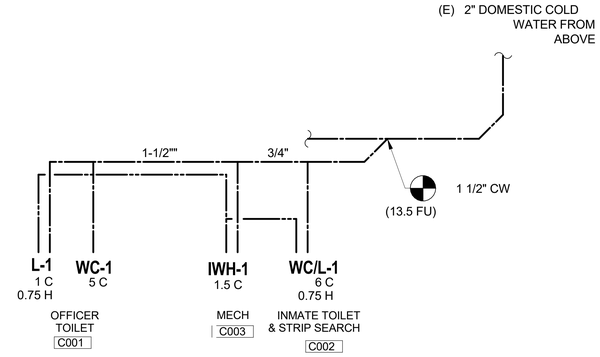
SHEET NO.

P201

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
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ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



1 P401 SANITARY WASTE & VENT RISER DIAGRAM
SCALE: NOT TO SCALE



2 P401 DOMESTIC WATER RISER DIAGRAM
SCALE: NOT TO SCALE

GENERAL NOTES:

1. WASTE AND VENT PIPING TO BE CAST IRON - SEE SPECIFICATION 221000 FOR COMPLETE REQUIREMENTS.
2. WASTE PIPING TO SLOPE 1/4-INCH PER FOOT MINIMUM.
3. DOMESTIC WATER PIPING TO BE TYPE L COPPER - SEE SPECIFICATION 221000 FOR COMPLETE REQUIREMENTS.

AGENCY APPROVAL

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DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

PLUMBING RISER DIAGRAMS

SHEET NO.

P401

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ONE AND ONE-HALF INCH = ONE FOOT
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ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

FIXTURE SCHEDULE

TYPE	MANUFACTURER AND CATALOG NUMBER	LAMP TYPE	LAMP COLOR	LAMP WATTS	DRIVER	OPTIC/LENS	REMARKS
A 40	LUMINAIRE LED URP2X2FGMIN1ZT4000LM40K880CRIMVOLTFPC125	LED	4000K	40	0-10V	FRC-125	VANDAL LED 2X2 TROFFER
B 40	LUMINAIRE LED URP2X2FLMIN1ZT6000LM40K880CRIMVOLTFPC125		4000K	40	0-10V	FRC-125	VANDAL LED 2X2 GYP BD CEILING
C 25	LUMINAIRE LED SMP S12 H14CRSP MIN1 25W MVOLT ALS 5ES WHT	LED	4000K	25	LED DRIVER	CLEAR DIFFUSION LENS	ADA LED SURFACE MOUNT CELL LIGHT
D 20	JUNO JSF13IN176M40K90CRI120FRPCWH			20	FRCP	DIFFUSE	13 IN ROUND S/M
F 40	LITHONIA FMLWL84840K		4000K	40	0-10V	DIFFUSE	4 FT WRAP
X 54	LITHONIA TWX2LEDP440KMBOLTDDBXD	LED	4000K	54	0-10V	PRISMATIC	WALL PACK

(N) PANEL SCHEDULE "M"

SERVICE: 120/208V 3Φ 4W | MAIN BKR.: MLO | BUS: 225A | LOC.: SEE PLAN
SQUARE D NQ | MTG.: SURFACE

REMARKS	LOAD ΦA	LOAD ΦB	LOAD ΦC	REC	LTG	MISC	POLE	TRIP	CIRC	CIRC	TRIP	POLE	REC	LTG	MISC	LOAD ΦA	LOAD ΦB	LOAD ΦC	REMARKS
FC - 3	200					1	2	15	1	2	40	3			1	3333			IWH - 1
"		200					X	X	3	4	X	X					3333		"
HP - 1			3240			1	2	30	5	6	X	X						3333	"
"	3240						X	X	7	8	20	1	1			180			TV RECEPTACLE
ROOF REC		180				1	1	20	9	10	20	1	2				360		COUNTER REC
ERV - 1			480			1	2	15	11	12	20	1	4					720	OFFICE REC
"	480						X	X	13	14	20	1							SPARE
OFFICE REC		540		3			1	20	15	16	20	1							"
OPEN OFFICE REC			200	2			1	20	17	18	20	1	3					540	R/R + JANITOR REC
R/R REC	500			1			1	20	19	20	20	1			1	500			VISITATION VIDEO
SCANNER		800		1			1	20	21	22	20	1			1		500		"
RECEPTION REC			720	4			1	20	23	24	20	1			1			500	"
GEN REC	540			3			1	20	25	26	20	1			1	500			"
OFFICE REC		360		2			1	20	27	28	20	1			1		500		"
WORK STATIONS			540	3			1	20	29	30	20	1			1			500	"
COUNTER REC	540			3			1	20	31	32	20	1			1	500			"
U/C REFRIG		600		1			1	20	33	34	20	1	3				540		WORK STATIONS
OFFICE REC			540	3			1	20	35	36	20	1	4					720	"
BODY SCAN	800			1			1	20	37	38	20	1							SPARE
FC - 1, FC - 2		300				2	2	15	39	40	20	1							"
"			300				X	X	41	42	20	1							"

TOTAL WATTS= 29,799 | ΦA= 11,313 | ΦB= 8,213 | ΦC= 12,333
AMPS= 83A | MINIMUM BKR | A.I.C. RATING= 10,000 AMPS SYM

GENERAL NOTES

1. VISIT JOB SITE AND VERIFY EXISTING CONDITIONS PRIOR TO BID.
2. THE ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE 2022 CALIFORNIA ELECTRICAL CODE AND ALL APPLICABLE LOCAL ORDINANCES. WHERE PLANS CALL FOR A HIGHER STANDARD THAN APPLICABLE CODES, THE PLANS SHALL GOVERN.
3. CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY. EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD TO SUIT FIELD CONDITIONS.
4. ALL ELECTRICAL EQUIPMENT, APPLIANCES AND LIGHTING FIXTURES SHALL BE LISTED BY A RECOGNIZED TEST LAB AND BEAR THAT LABEL OF APPROVAL.
5. CONTRACTOR SHALL FURNISH, INSTALL AND CONNECT ALL MATERIAL AND EQUIPMENT FOR THIS WORK UNLESS OTHERWISE NOTED.
6. FURNISH DISCONNECT SWITCHES AT REMOTE MOTORS.
7. ALL SPACES AS INDICATED ON PANELS OR SWITCHBOARDS SHALL BE COMPLETE WITH HARDWARE AND BUSSING FOR FUTURE BREAKER OR SWITCH.
8. CHECK ARCHITECTURAL PLANS FOR DOOR SWINGS BEFORE INSTALLING SWITCH OUTLETS.
9. GROUNDING AND BONDING SHALL BE PER CODE PLUS ANY ADDITIONAL PROVISIONS SPECIFIED OR SHOWN ON DRAWINGS.
10. ALL CONDUIT RUNS SHALL CONTAIN A CODE SIZED GREEN GROUND WIRE.
11. THESE PLANS ARE NOT COMPLETE UNTIL APPROVED BY THE AUTHORITY HAVING JURISDICTION.
12. ALL CONDUCTORS SHALL BE IN CONDUIT.
13. ALL CONDUCTORS SHALL BE COPPER WITH TYPE THHN/THWN INSULATION.
14. ALL WALL PLATES FOR SWITCHES AND RECEPTACLES SHALL BE S/S WITH TAMPER SCREWS.

ACCESSIBILITY NOTES

Installation of switches, outlets and controls to reflect the accessibility requirements of the 2022 CBC Chapters 11A and 11B for Accessibility.

1. CBC 11B-308.1.1 Electrical controls and switches intended to be used by the occupant of a room or area shall be located within the allowable reach ranges. Low reach shall be measured from the bottom of the outlet box and high reach is measured to the top of the outlet box.

2. CBC 11B-308.1.2 Electrical receptacle outlets on branch circuits of 30 amperes or less and communication system receptacles shall be located in the allowable reach range. Low reach shall be measured from the bottom of the outlet box and high reach is measured to the top of the outlet box.

3. CBC 11B-308.2.1 High forward reach that is unobstructed shall be 48 inches maximum and the low forward reach shall be 15 inches minimum above finish floor or ground.

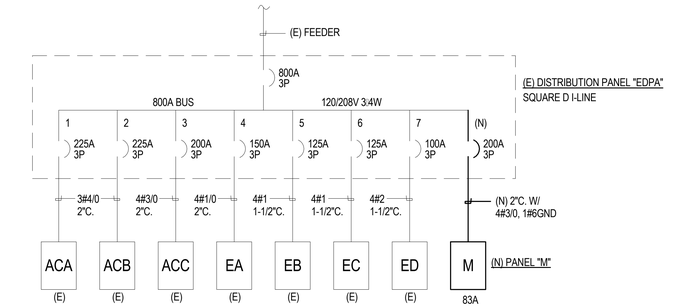
4. CBC 11B-308.2 Forward Reach Obstructed - Electrical receptacle outlets shall be located no more than 44 inches measured from the top of the receptacle outlet box when the obstruction is over 20" and does not exceed 25". When the depth is less than 20" height can be increased to 48". (desk counters)

5. CBC 11B-308.3 Side Reach Obstructed - Electrical receptacle outlets shall be located no more than 46 inches measured from the top of the receptacle outlet box when the obstruction is over 10" and does not exceed 24". When the depth is less than 10" height can be increased to 48".

6.Overhang light fixtures or wall fixtures projecting more than 4" from the wall surface shall be a minimum of 80" above the walking surface.

LOAD SUMMARY

EXISTING HIGH DEMAND = 372A
372A x 1.25 = 465A
(N) PANEL "M" = 83A
TOTAL = 548A



SINGLE LINE DIAGRAM

SCALE : NONE

A E001

SYMBOLS

- CONDUIT EXISTING
- CONDUIT CONCEALED IN WALL OR CEILING
- CONDUIT CONCEALED UNDER FLOOR OR BELOW GRADE
- CONDUIT STUBBED OUT AND CAPPED
- CONDUIT TURNED UP
- CONDUIT TURNED DOWN
- HATCH MARKS INDICATE NO. OF #12 WIRES IN CODE SIZED CONDUIT (3) MAX. IN 1/2" C., (5) MAX. IN 3/4" C., (8) MAX. IN 1"C., NO MARKS = 2#12
- A-3 HOME RUN: LETTER INDICATES PANEL, NUMBER(S) INDICATES CIRCUIT(S).
- SAWCUT
- GROUND CONNECTION
- DISTRIBUTION SWITCHBOARD OR PANEL
- PANEL, BRANCH CIRCUIT TYPE, SURFACE AND FLUSH
- SIGNAL TERMINAL CABINET, SURFACE & FLUSH
- LINEAR SURFACE FIXTURE
- 2 a OUTLET DATA: BAR INDICATES WALL MOUNT, LETTER INDICATES SWITCH CONTROL, NO. INDICATES CIRCUIT.
- SURFACE FIXTURE ON FLUSH OUTLET.
- RECESSED FIXTURE WITH JUNCTION BOX FOR THRU WIRING
- EXIT LIGHT WITH ARROWS AS SHOWN ON PLANS, WALL AND CEILING MOUNT.
- LOW LEVEL EXIT SIGN, +6" AFF, +4" FROM DOOR JAMB
- A 100 LIGHT FIXTURE DESIGNATION, LETTER INDICATES TYPE, NO. INDICATES WATTAGE. SEE FIXTURE SCHEDULE.
- FC 1 MECHANICAL EQUIPMENT DESIGNATION. SEE MECHANICAL DRAWINGS.
- SPECIAL RECEPTACLE - SEE PLAN
- METER
- FLUSH FLOOR RECEPTACLE
- RECEPTACLE, DUPLEX, 15A, 125V, NEMA 5-15R +18" U.N.O.
- DUPLEX RECEPTACLE MTD. ABOVE BACKSPLASH
- DUPLEX RECEPTACLE W/LOWER HALF SWITCHED
- GFI GROUND FAULT CIRCUIT INTERRUPTING RECEPTACLE
- DOUBLE DUPLEX RECEPTACLE
- CEILING RECEPTACLE
- RECEPTACLE, DUPLEX, 20A, 125V, NEMA 5-20R +18" U.N.O.
- J JUNCTION BOX 4" SQUARE, 1-1/2" DEEP U.N.O.
- T THERMOSTAT F.B.O. +48"
- 2 MOTOR, NO. INDICATES HORSEPOWER
- CLOCK OUTLET +7'-6" U.N.O.
- DISCONNECT SWITCH, NON-FUSED
- F DISCONNECT SWITCH FUSED HORSEPOWER RATED OR SIZED AS NOTED
- COMBINATION MAGNETIC STARTER WITH DISCONNECT SWITCH AND FUSES
- MAGNETIC MOTOR STARTER W/OVERLOADS IN EACH PHASE
- D DIMMER W/INTEGRAL "ON-OFF" SW.
- PUSHBUTTON
- PC PHOTOCELL
- SD SMOKE DETECTOR
- TELEPHONE/COMPUTER/DATA OUTLET, TWO GANG BOX W/1 GANG COVERPLATE & GROMMETED OPENING +18" U.N.O.
- TV CABLE TV OUTLET +18" U.N.O.
- MOTION SENSOR
- $ EXISTING SWITCH
- S SINGLE POLE SWITCH
- ^{2} DOUBLE POLE SWITCH
- ^{3} THREE WAY SWITCH
- ^{P} SWITCH W/PILOT LT.

  (S, ^{2}, ^{3}, ^{P}: QUIET TOGGLE TYPE RATED AT 20A, 120/277V A.C. +42" U.N.O.)
- ^{M} MANUAL MOTOR STARTER
- FACP FIRE ALARM CONTROL PANEL
- GFI GROUND FAULT CIRCUIT INTERRUPTING
- LST LABOR SAVING TANDEM
- MLO MAIN LUGS ONLY
- w/ WITH
- C.O. CONDUIT ONLY
- W.P. WEATHERPROOF
- F.B.O. FURNISHED BY OTHERS, INSTALL & CONNECT
- U.N.O. UNLESS NOTED OTHERWISE
- N.E.C. NATIONAL ELECTRICAL CODE
- N.I.C. NOT IN CONTRACT
- (E) EXISTING
- (N) NEW
- (R) REMOVE
- (RL) RELOCATE
- S/M SURFACE MOUNT
- U/G UNDERGROUND
- CWP COLD WATER PIPE
- AFF ABOVE FINISHED FLOOR
- HACR HEATING AND AIR CONDITIONING RATED CIRCUIT BREAKER
- N.L. NIGHT LIGHT

NOTE: NOT ALL SYMBOLS SHOWN ARE USED ON THIS PROJECT.

AGENCY APPROVAL

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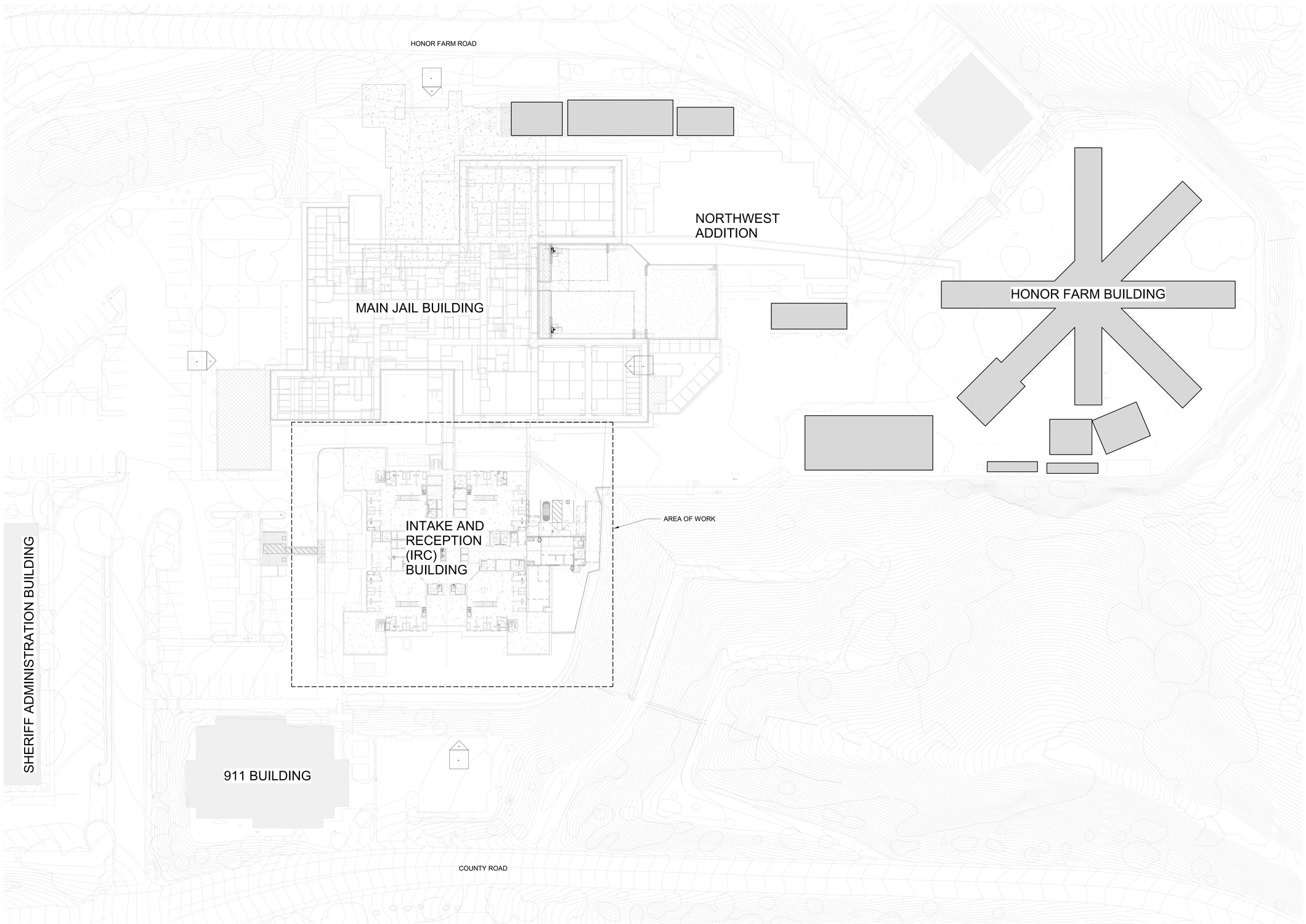
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1	ADDENDUM B	08/25/25

DATE 8/25/25
JOB NO. Y2213.00
SHEET TITLE

GENERAL NOTES & SYMBOLS

SHEET NO.

E-001



1 ELECTRICAL SITE PLAN
1" = 30'-0"

N

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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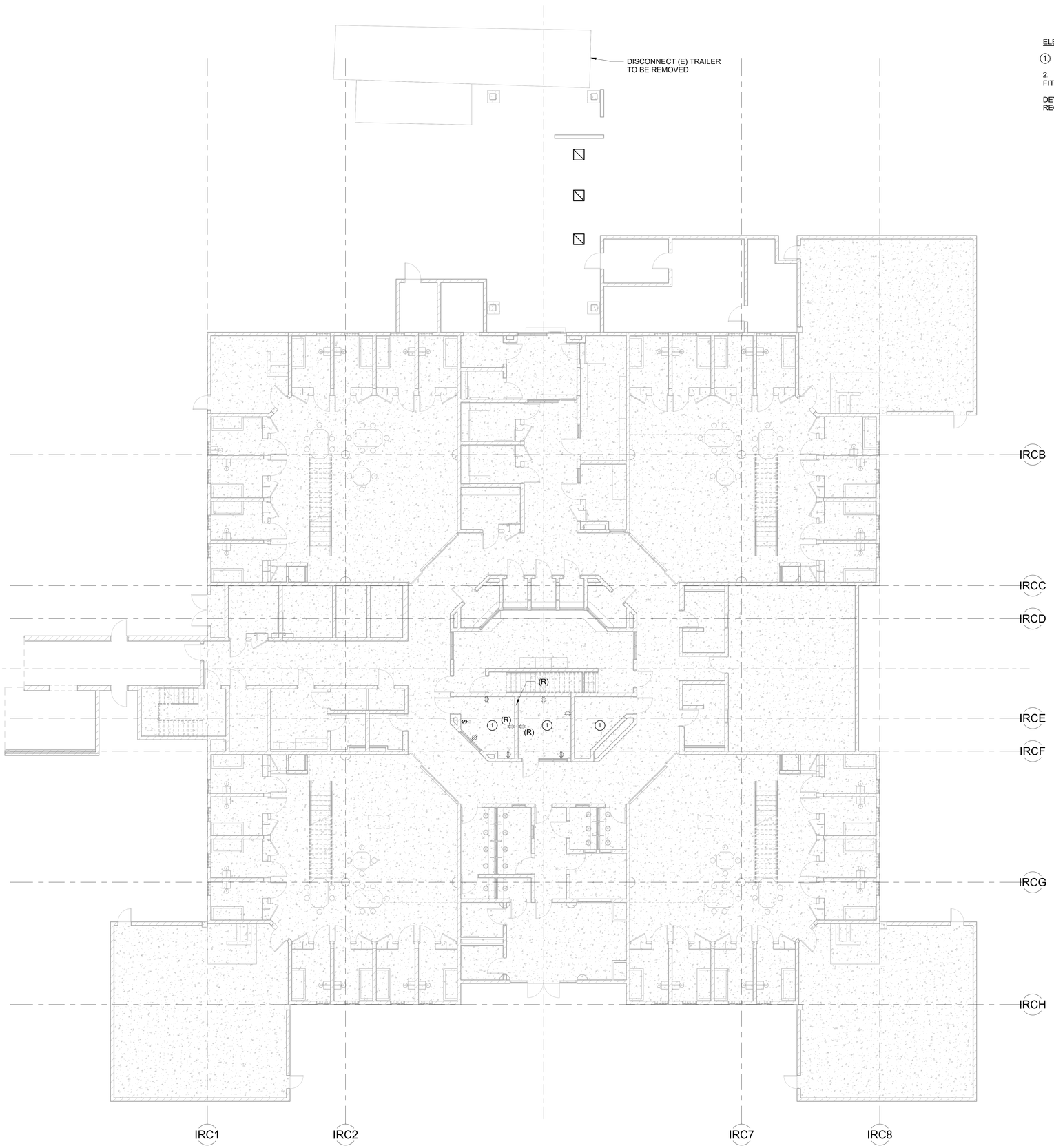
JOB NO. Y2213.00

SHEET TITLE

ELECTRICAL SITE PLAN

SHEET NO.

E-100



ELECTRICAL DEMOLITION NOTES

1. REMOVE ALL EXISTING LIGHTING COMPLETE.

2. REMOVE ALL DEVICES, BOXES, CONDUIT, WIRE, FITTINGS, ETC.
ON WALLS TO BE REMOVED. WHERE REMOVED DEVICES SERVE DOWNSTREAM ONES TO REMAIN, RECONNECT THESE.

1 GROUND LEVEL ELECTRICAL DEMOLITION PLAN
1/8" = 1'-0"

N

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
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ONE INCH = TWENTY FEET

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SHEET TITLE

GROUND LEVEL ELECTRICAL DEMOLITION PLAN

SHEET NO.

E-111D

ELECTRICAL NOTES

1. CONNECT VIDEO VISITATION ROOM EQUIPMENT 106, 117, 136, 146
2. U/C REFRIGERATOR
3. CONNECT BODY SCAN EQUIPMENT

(N) PANEL "M"

2 E-111

M-27

M-29

IRCB

IRCC

IRCD

M-33

(E) (E)

(N) (N) (E)

M-35

IRCE

IRCF

IRCG

M-20

M-21

M-25

M-23

IRCH

IRC1 IRC2 IRC7 IRC8

1 GROUND LEVEL POWER PLAN
1/8" = 1'-0"

N

208V 3ø 20KW IWH 1

#6 G

(N) PANEL "M"

M-9

GFI WP

30AS 30AF 2P. WP

M-5.7 3/4"C. W/ 2#10, 1#10GND

FC 1

HP 1 208V 1ø 27A

Sm 2

SEE 2 E311

FC 2

Sm 2

M-1.3

1"C.O. TO IDF

M-37

1"C.O. TO IDF

M-8

+84"

2 ENLARGED AREA ELECTRICAL PLAN
1/4" = 1'-0"

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SHEET TITLE

GROUND LEVEL POWER PLAN

SHEET NO.

E-111

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

ONE-HALF INCH = ONE FOOT 0 4

THREE-QUARTERS INCH = ONE FOOT 0 2

ONE INCH = ONE FOOT 0 1

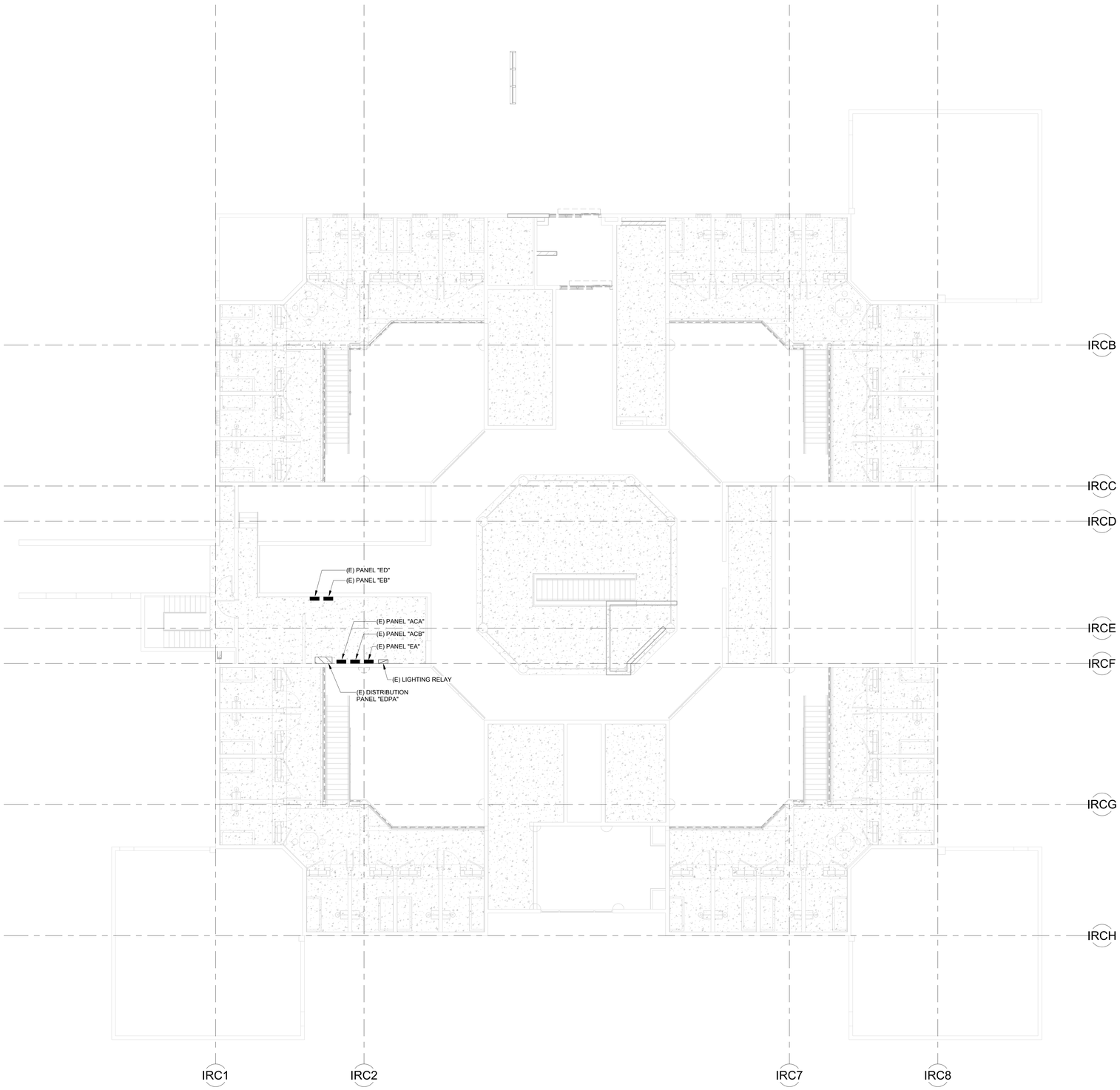
ONE AND ONE-HALF INCH = ONE FOOT 0 1

ONE-QUARTER INCH = ONE FOOT 0 4 8

ONE-EIGHTH INCH = ONE FOOT 0 4 8 16

ONE-SIXTEENTH INCH = ONE FOOT 0 4 8 16 32

ONE INCH = TWENTY FEET 0 5 10 20 40 60 80



1 TIER LEVEL ELECTRICAL DEMOLITON PLAN
1/8" = 1'-0"

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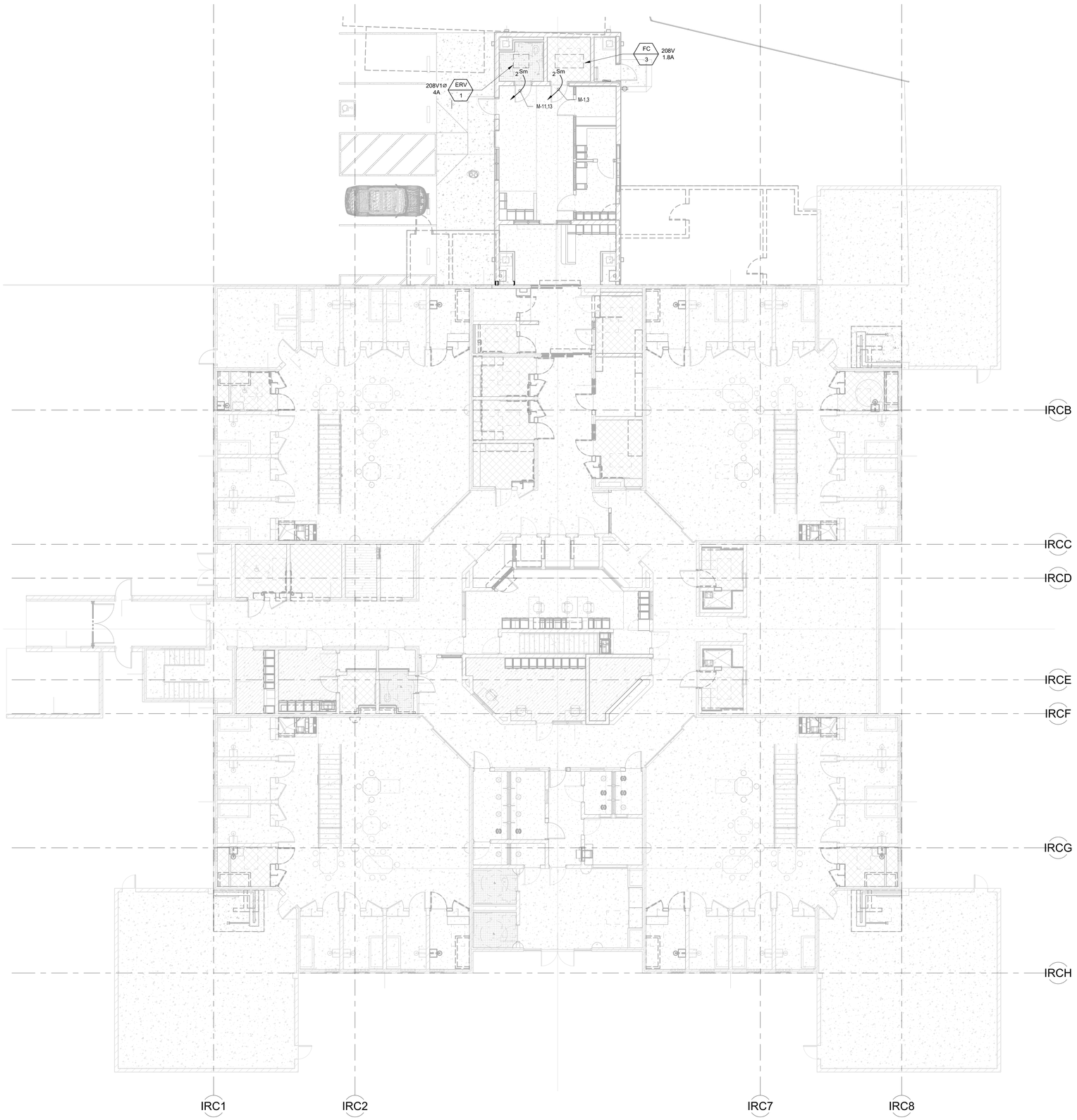
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SHEET TITLE

TIER LEVEL
ELECTRICAL
DEMOLITION PLAN

SHEET NO.

E-112D



1 TIER LEVEL POWER PLAN
1/8" = 1'-0"

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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SHEET TITLE

TIER LEVEL POWER PLAN

SHEET NO.

E-112

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

IRC1 IRC2 IRC3 IRC4 IRC5 IRC6 IRC7 IRC8
IRCDD IRCCC IRCBB IRCAA IRCA IRCB IRCC IRCD IRCE IRCF IRCG IRCH

LIGHTING NOTES
1. 0 - 10V DIMMER
2. MC LUMINARY CABLE 2#12, 2#14, 1#12GND
3. LUTRON #MSZ101WH WITH S/S PLATE

C001 +9'-4" | C002 +9'-4" | C003 | TYP. OF 4
C004 +10'-0" | C005 +10'-0"
OPEN TO ABOVE
CONNECT TO (E) EXTERIOR LIGHTING CIRCUIT
CONNECT TO (E) CIRCUIT
TYPICAL
E100 OPEN TO ABOVE | E125 OPEN TO ABOVE | E154 OPEN TO ABOVE | E137 OPEN TO ABOVE
E472 +9'-0" | E171 +9'-0"
TYPICAL
AT UPPER LEVEL
CONNECT TO (E) CIRCUIT & CONTROL
0-10V
WALL MOUNTED

1 GROUND LEVEL LIGHTING PLAN
1/8" = 1'-0"

2 ENLARGED LIGHTING PLAN
1/4" = 1'-0"

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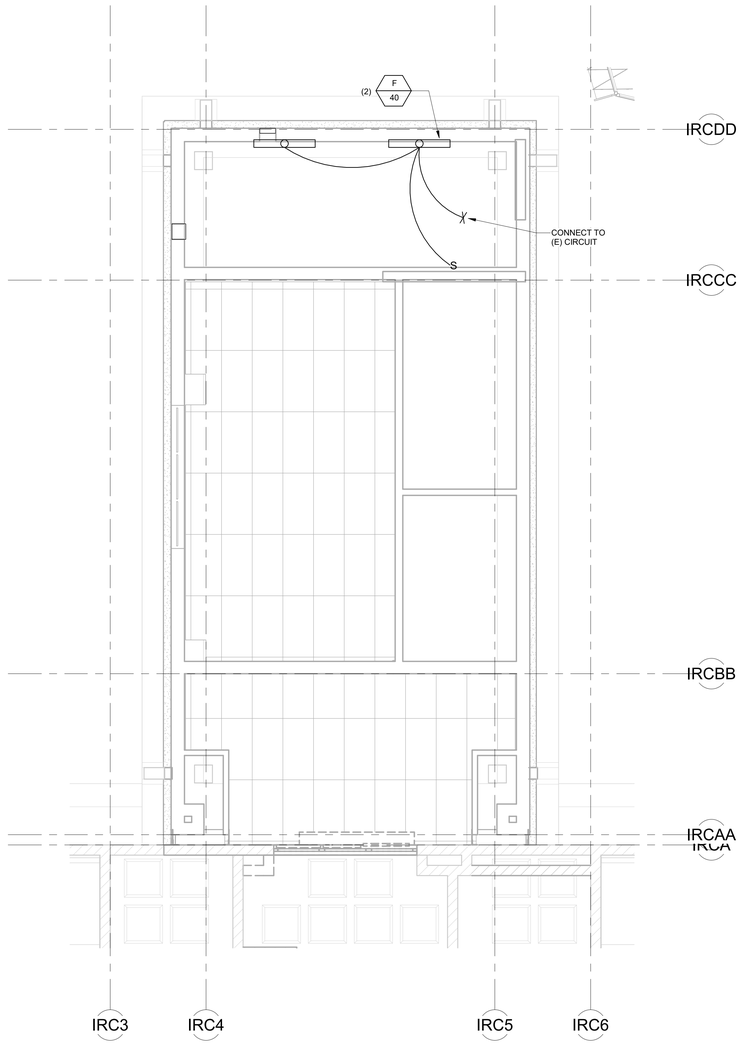
JOB NO. Y2213.00

SHEET TITLE

GROUND LEVEL LIGHTING PLAN

SHEET NO.

E-211



1 MID LEVEL LIGHTING PLAN
1/4" = 1'-0"

ONE-HALF INCH = ONE FOOT
ONE AND ONE-HALF INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

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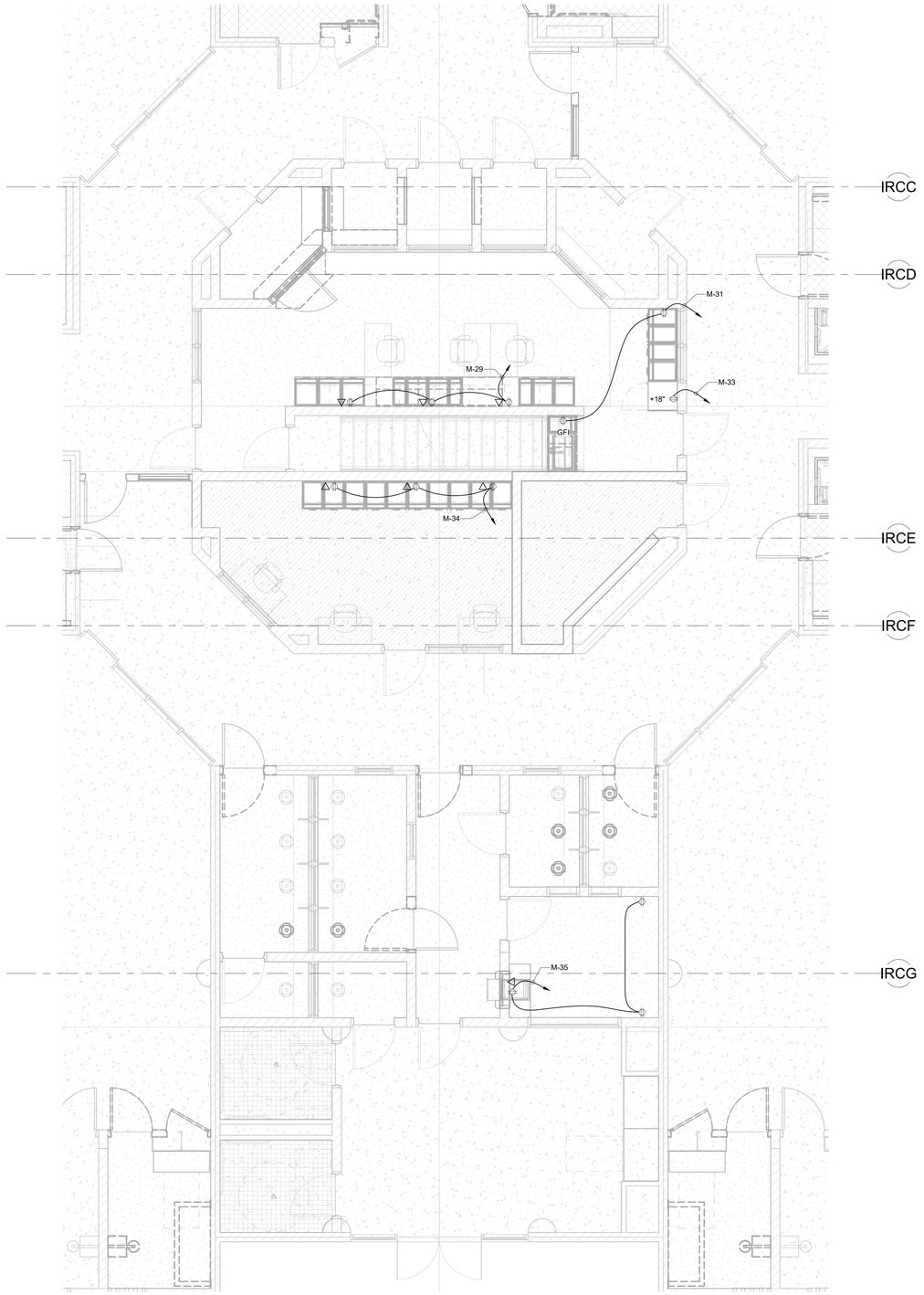
SHEET TITLE

MID LEVEL
LIGHTING PLAN

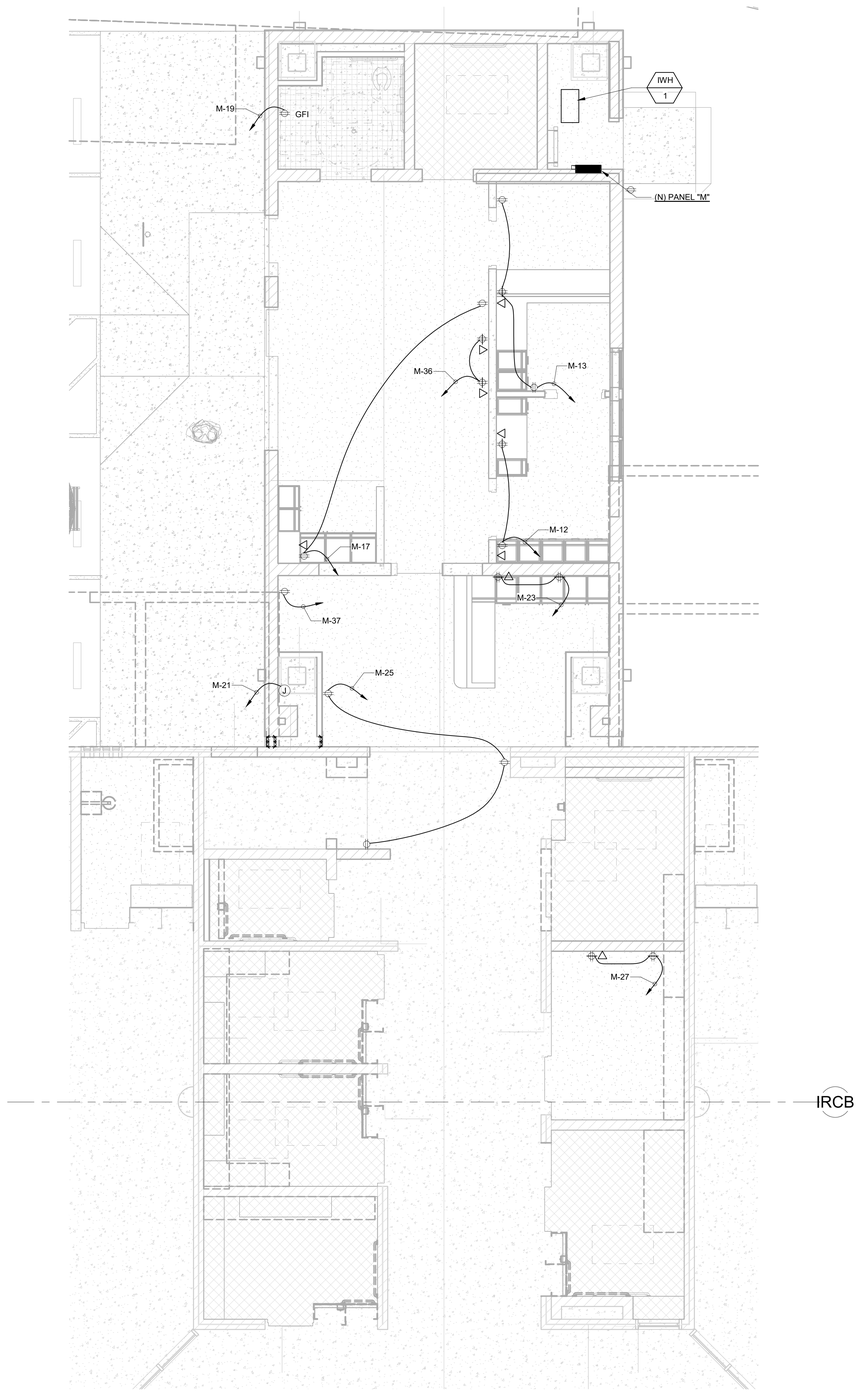
SHEET NO.

E-212

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



1 ENLARGED ELECTRICAL PLAN - SOUTH
1/4" = 1'-0"



2 ENLARGED ELECTRICAL PLAN - NORTH
1/4" = 1'-0"

AGENCY APPROVAL

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ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
	PLAN CHECK	07/18/25
1	ADDENDUM B	08/25/25

DATE 8/25/25

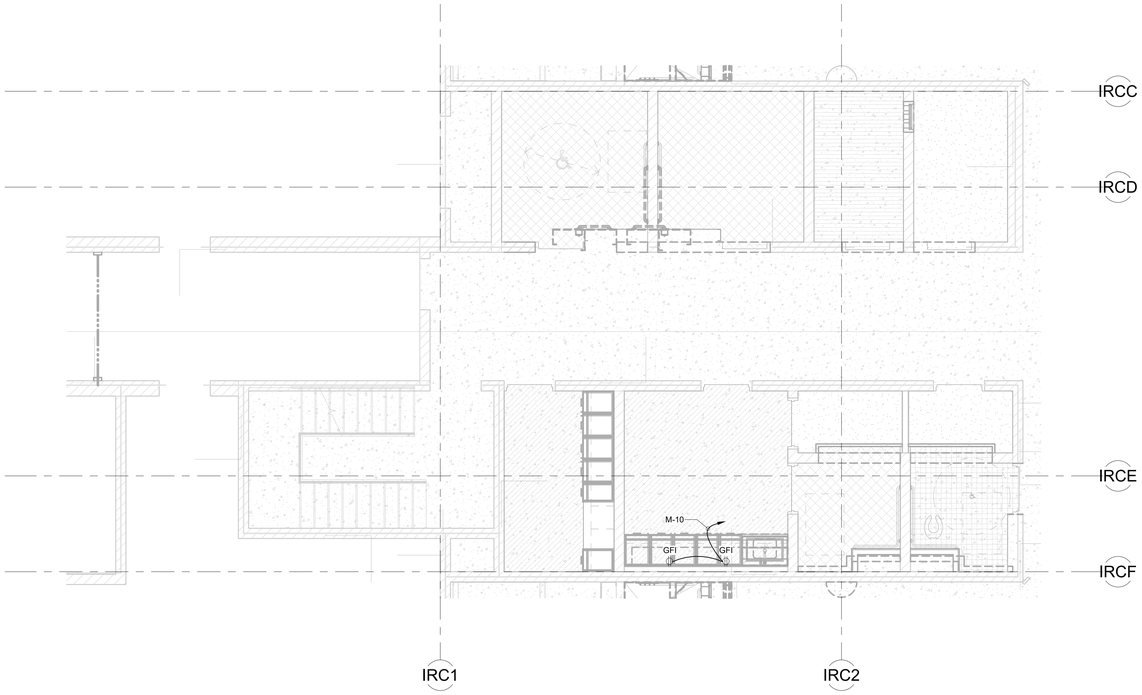
JOB NO. Y2213.00

SHEET TITLE

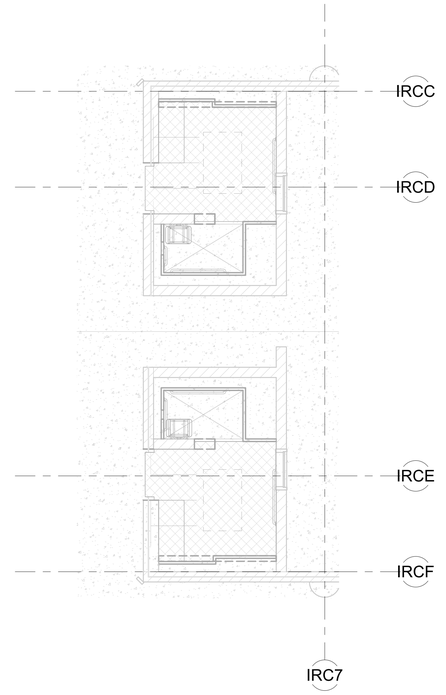
ENLARGED NORTH & SOUTH ELECTRICAL PLANS

SHEET NO.

E-311



1 ENLARGED ELECTRICAL PLAN - WEST
1/4" = 1'-0"



2 ENLARGED ELECTRICAL PLAN - EAST
1/4" = 1'-0"

ONE-HALF INCH = ONE FOOT
ONE AND ONE-HALF INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara,
CA 93110

SANTA BARBARA COUNTY

JMPE
ELECTRICAL ENGINEERING
LIGHTING DESIGN
CA REGISTRATION NO E13083

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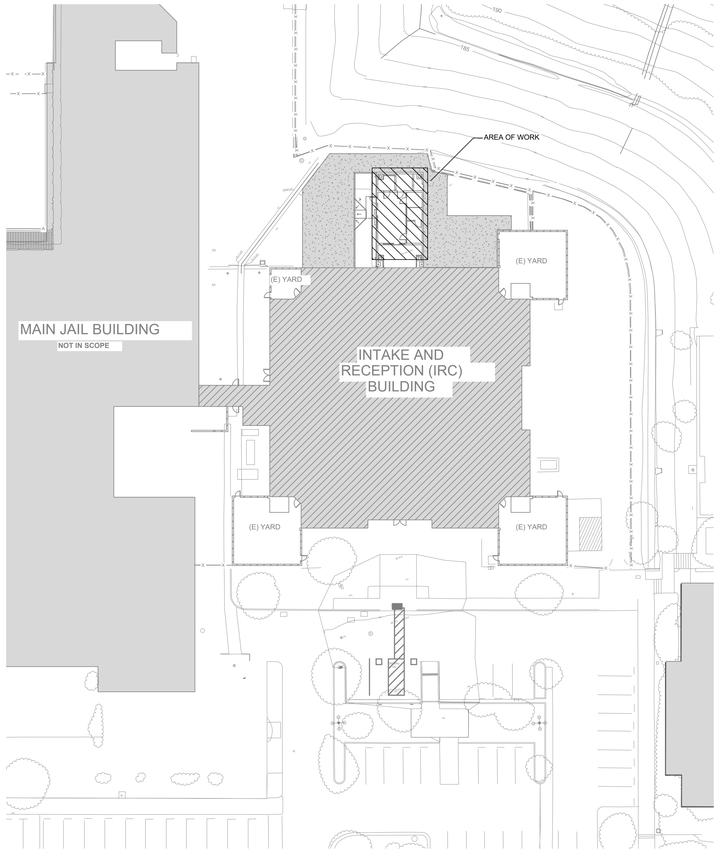
SHEET TITLE

ENLARGED
WEST & EAST
ELECTRICAL
PLANS

SHEET NO.

E-312

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



SITE PLAN

SCALE: 1" = 30'-0"

N

PROJECT DESCRIPTION:

ADDRESS:	4436 CALLE REAL SANTA BARBARA, CA 93110
APN:	59-140-24
OCCUPANCY:	I-3 CONDITION 4
CONSTRUCTION TYPE:	IA
BUILDING HEIGHT:	-
STORIES:	I STORY WITH A TIER
FIRE SPRINKLERS:	YES
FIRE ALARM TYPE:	AUTOMATIC

ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
APN	ASSESSOR'S PARCEL NUMBER
CKT	CIRCUIT
FA	FIRE ALARM
FACU	FIRE ALARM CONTROL UNIT
FS	FLOW SWITCH
ITM	INSPECTION, TESTING, AND MAINTENANCE
NAC	NOTIFICATION APPLIANCE CIRCUIT
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
SBCFD	SANTA BARBARA COUNTY FIRE DEPARTMENT
SLC	SIGNALING LINE CIRCUIT
TS	TAMPER SWITCH
TYP	TYPICAL
(E)	EXISTING TO REMAIN

CALIFORNIA FIRE CODE NOTES:

GROUP I-3 NOTES

907.2.6.3 GROUP I-3 OCCUPANCIES.
GROUP I-3 OCCUPANCIES SHALL BE EQUIPPED WITH A MANUAL FIRE ALARM SYSTEM AND AUTOMATIC SMOKE DETECTION SYSTEM INSTALLED FOR ALERTING STAFF.

EXCEPTION: AN AUTOMATIC SMOKE DETECTION SYSTEM IS NOT REQUIRED WITHIN TEMPORARY HOLDING CELLS.

907.2.6.3.1 SYSTEM INITIATION.
ACTUATION OF AN AUTOMATIC FIRE-EXTINGUISHING SYSTEM, AUTOMATIC SPRINKLER SYSTEM, A MANUAL FIRE ALARM BOX OR A FIRE DETECTOR SHALL INITIATE AN APPROVED FIRE ALARM SIGNAL THAT AUTOMATICALLY NOTIFIES STAFF.

907.2.6.3.2 MANUAL FIRE ALARM BOXES.
MANUAL FIRE ALARM BOXES ARE NOT REQUIRED TO BE LOCATED IN ACCORDANCE WITH SECTION 907.4.2 WHERE THE FIRE ALARM BOXES ARE PROVIDED AT STAFF-ATTENDED LOCATIONS HAVING DIRECT SUPERVISION OVER AREAS WHERE MANUAL FIRE ALARM BOXES HAVE BEEN OMITTED.

907.2.6.3.2.1 MANUAL FIRE ALARMS BOXES IN DETAINEE AREAS.
MANUAL FIRE ALARM BOXES ARE ALLOWED TO BE LOCKED IN AREAS OCCUPIED BY DETAINEES, PROVIDED THAT STAFF MEMBERS ARE PRESENT WITHIN THE SUBJECT AREA AND HAVE KEYS READILY AVAILABLE TO OPERATE THE MANUAL FIRE ALARM BOXES.

907.2.6.3.3 AUTOMATIC SMOKE DETECTION SYSTEM.
AN AUTOMATIC SMOKE DETECTION SYSTEM SHALL BE INSTALLED THROUGHOUT RESIDENT HOUSING AREAS, INCLUDING SLEEPING UNITS AND CONTIGUOUS DAY ROOMS, GROUP ACTIVITY SPACES AND OTHER COMMON SPACES NORMALLY OPEN TO INMATES.

EXCEPTIONS:

1. OTHER APPROVED SMOKE DETECTION ARRANGEMENTS MAY BE USED TO PREVENT DAMAGE OR TAMPERING OR FOR OTHER PURPOSES PROVIDED THE FUNCTION OF DETECTING ANY FIRE IS FULFILLED AND THE LOCATION OF THE DETECTORS IS SUCH THAT THE SPEED OF DETECTION WILL BE EQUIVALENT TO THAT PROVIDED BY THE SPACING AND LOCATION REQUIRED IN ACCORDANCE WITH NFPA 72 AS REFERENCED IN CHAPTER 80. THIS MAY INCLUDE THE LOCATION OF DETECTORS IN RETURN AIR DUCTS FROM CELLS, BEHIND GRILLES OR IN OTHER LOCATIONS. SPOT TYPE, COMBINATION DUCT AND OPEN AREA SMOKE DETECTORS MAY BE USED WHEN LOCATED NOT MORE THAN 14 INCHES (356 MM) FROM THE RETURN AIR GRILL. FOR INITIATION AND ANNUNCIATION PURPOSES, THESE DETECTORS MAY BE COMBINED IN GROUPS OF FOUR. THE FIRE CODE OFFICIAL HAVING JURISDICTION, HOWEVER, MUST APPROVE THE PROPOSED EQUIVALENT PERFORMANCE OF THE DESIGN.
2. FOR DETENTION HOUSING AND/OR MENTAL HEALTH HOUSING AREA(S), INCLUDING CORRECTIONAL MEDICAL AND MENTAL HEALTH USES, AUTOMATIC SMOKE DETECTION SYSTEM IN SLEEPING UNITS SHALL NOT BE REQUIRED WHEN ALL OF THE FOLLOWING CONDITIONS ARE MET:
   2.1 ALL ROOMS, INCLUDING THE INMATE CELLS, ARE PROVIDED WITH AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION 903.3.1.1.
   2.2 BUILDING IS CONTINUOUSLY STAFFED BY A CORRECTIONAL OFFICER AT ALL TIMES.
3. SMOKE DETECTORS ARE NOT REQUIRED TO BE INSTALLED IN INMATE CELLS WITH TWO OR FEWER OCCUPANTS IN DETENTION FACILITIES WHICH DO NOT HAVE A CORRECTIONAL MEDICAL AND MENTAL HEALTH USE.
4. SMOKE DETECTORS ARE NOT REQUIRED TO BE INSTALLED IN INMATE DAY ROOMS OF DETENTION FACILITIES WHERE 24-HOUR DIRECT VISUAL SUPERVISION IS PROVIDED BY A CORRECTIONAL OFFICER(S) AND A MANUAL FIRE ALARM BOX IS LOCATED IN THE CONTROL ROOM.

907.2.6.3.4 SYSTEM ANNUNCIATION.
A STAFF ALERTING FIRE ALARM SHALL SOUND AT ALL STAFF CONTROL STATIONS ON THE FLOOR OF ACTIVATION AND AN AUDIBLE AND VISUAL SIGNAL SHALL BE INDICATED ON AN ANNUNCIATOR AT THE FACILITY CONTROL CENTER UPON ACTIVATION OF ANY AUTOMATIC EXTINGUISHING SYSTEM, AUTOMATIC DETECTION SYSTEM OR ANY SMOKE DETECTOR OR MANUAL ACTUATING OR INITIATING DEVICE. IN ADDITION, WHERE THERE ARE STAFF-CONTROL STATIONS ON THE FLOOR, AN AUDIBLE, VISUAL AND MANUAL ALARM SHALL BE LOCATED IN EACH STAFF CONTROL STATION.

FIRE AND TROUBLE SIGNALS OF FIRE ALARM SYSTEMS AND SPRINKLER WATER-FLOW AND SUPERVISORY SIGNALS OF EXTINGUISHING SYSTEMS SHALL BE ANNUNCIATED IN AN AREA DESIGNATED AS THE FACILITY CONTROL CENTER WHICH SHALL BE CONSTANTLY ATTENDED BY STAFF PERSONNEL. ALL SUCH SIGNALS SHALL PRODUCE BOTH AN AUDIBLE SIGNAL AND VISUAL DISPLAY AT THE FACILITY CONTROL CENTER INDICATING THE BUILDING, FLOOR ZONE OR OTHER DESIGNATED AREA FROM WHICH THE SIGNAL ORIGINATED, IN ACCORDANCE WITH SECTION 907.6.4.

ALL LOCAL DETENTION FACILITIES WITHIN THE SCOPE OF SECTION 6031.4 OF THE PENAL CODE SHALL HAVE AN AUTOMATIC SMOKE DETECTION SYSTEM. A MANUAL FIRE ALARM-INITIATING DEVICE SHALL BE INSTALLED IN ALL GUARD CONTROL STATIONS AND SHALL BE CAPABLE OF ALERTING PERSONNEL IN A CENTRAL CONTROL POINT TO THE PRESENCE OF FIRE OR SMOKE WITHIN THE FACILITY.

SANTA BARBARA COUNTY FIRE DEPARTMENT

FIRE PREVENTION DIVISION DEVELOPMENT STANDARD - #5
VERBATIM NOTES

1. THIS FIRE ALARM SYSTEM SHALL BE DESIGNED AND INSTALLED PER THE SANTA BARBARA COUNTY FIRE CODE CHAPTER 15, THE 2022 CALIFORNIA BUILDING CODE (CBC), NFPA 72-2022, AND OTHER APPLICABLE STANDARDS.
2. ALL FIRE ALARM SYSTEMS WIRING SHALL BE INSTALLED PER NATIONAL ELECTRICAL CODE REQUIREMENTS.
3. AUTOMATIC FIRE SPRINKLER WATER FLOW ALARMS, SUPERVISORY INITIATING DEVICES, AND THEIR CIRCUITS, SHALL BE DESIGNED AND INSTALLED SO THEY CANNOT BE READILY TAMPERED WITH, OPENED, OR REMOVED WITHOUT INITIATING A SIGNAL.
4. THE CIRCUIT DISCONNECT BREAKER PROVIDING POWER TO THE FIRE ALARM UNIT SHALL BE LOCKED AND IDENTIFIED IN RED AS " FIRE ALARM CONTROL UNIT."
5. ALL FIRE ALARM CONTROL UNITS SHALL BE INTERCONNECTED WITH ANY OTHER FIRE ALARM CONTROL UNITS LOCATED WITHIN THE FACILITY.
6. ALL AUDIBLE ALARM NOTIFICATION SIGNALS SHALL BE A THREE PULSE TEMPORAL PATTERN. FOR INSTALLATIONS WITH A VOICE EVACUATION SYSTEM, SUBMIT THE VOICE EVACUATION MESSAGE FOR REVIEW AND APPROVAL BY SBCFD.
7. UPON GENERAL ALARM, ALL DOORS WITH ELECTRO-MAGNETIC LOCKS SHALL RELEASE.
8. COMBINATION FIRE/BURGLARY ALARM UNITS ARE NOT PERMITTED IN SANTA BARBARA COUNTY. LISTED COMBINATION CONTROL PANEL MAY BE USED FOR FIRE ALARM PURPOSES ONLY. AN ENGRAVED PLASTIC PLACARD WITH WHITE LETTERS ON RED BACKGROUND SHALL BE PERMANENTLY AFFIXED TO THE FRONT OF THE FACU AND SHALL READ " FIRE ALARM CIRCUIT WIRING ONLY" .
9. A MANUAL MEANS TO TRANSMIT AN ALARM SINGLE SHALL BE REQUIRED IN SYSTEMS INSTALLED IN REMOTE LOCATIONS.
10. DUCT DETECTORS SHALL SHUT DOWN THE INDIVIDUAL UNIT ALONG WITH ITS SMOKE/FIRE DAMPERS.
11. DUCT DETECTORS THAT ARE NOT READILY VISIBLE SHALL HAVE A REMOTE LED WITH LABEL MOUNTED ON THE CEILING DIRECTLY BELOW THE DETECTOR.
12. PROVIDE A SIGN AT THE DOOR TO THE FIRE CONTROL PANEL TO READ " FIRE ALARM CONTROL PANEL INSIDE" .
13. UPON COMPLETION OF THE WORK ON THE APPROVED PLANS, A SATISFACTORY TEST OF THE ENTIRE INSTALLATION SHALL BE CONDUCTED IN THE PRESENCE OF A FIRE PREVENTION BUREAU REPRESENTATIVE.
14. THE CONTRACTOR SHALL CONDUCT A 100% PRE-TEST OF THE SYSTEM PRIOR TO INSPECTION. THE INSPECTION WILL INCLUDE AN ACTUAL TEST OF THE SYSTEM. IF DURING THE INSPECTION, DEFICIENCIES ARE NOTED, THE TEST MAY BE STOPPED AND RE-INSPECTION FEES MAY BE CHARGED.
15. A FINAL COPY OF THE " RECORD OF COMPLETION" SHALL BE GIVEN TO THE SYSTEM OWNER AND THE FIRE CODE OFFICIAL AFTER COMPLETION OF ALARM TESTING AS WITNESSED BY A SBCFD REPRESENTATIVE.
16. A DOCUMENT BOX THAT CONTAINS REQUIRED RECORDS INCLUDING APPROVED PLANS, RECORDS OF COMPLETION, AND ITM REPORTS AND PLACED ADJACENT TO THE PANEL.
17. AN EXTERIOR NOTIFICATION APPLIANCE (AUDIO AND VISUAL) SHALL BE PROVIDED AT THE LOCATION OF THE MAIN FIRE DEPARTMENT APPARATUS ACCESS POINT.
18. SECONDARY (STANDBY) POWER SUPPLY SHALL BE TESTED IN ACCORDANCE WITH NFPA 72 IN THE PRESENCE OF SANTA BARBARA COUNTY FIRE REPRESENTATIVE.
19. SMOKE DETECTORS SHALL BE TESTED USING SMOKE. REFER TO MANUFACTURER FOR COMPATIBILITY.

SCOPE OF WORK:

1. ADDITION TO THE EXISTING FIRE ALARM SYSTEM FOR SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENT.
2. THIS SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH:

- CALIFORNIA BUILDING CODE (2022 EDITION)
- CALIFORNIA FIRE CODE (2022 EDITION)
- NFPA 72 (2022 EDITION)
- NFPA 13 (2022 EDITION)
- SANTA BARBARA COUNTY FIRE DEPARTMENT STANDARDS

SHEET INDEX:

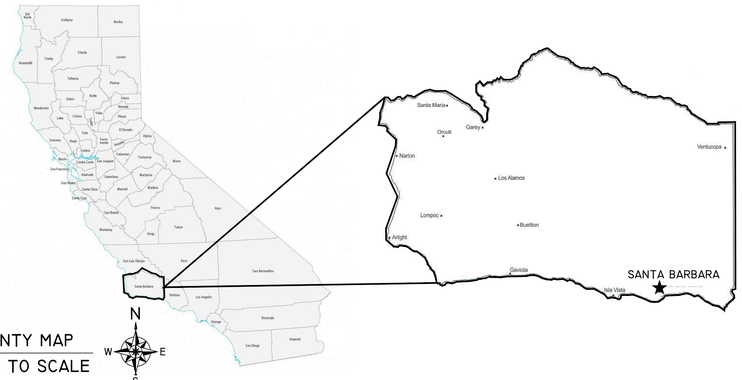
FA-0.0	FIRE ALARM GENERAL NOTES
FA-1.0	FIRE ALARM - GROUND LEVEL
FA-2.0	FIRE ALARM - TIER LEVEL
FA-3.0	BATTERY CALCULATIONS AND RISER DIAGRAM
FA-4.0	WIRING DIAGRAMS AND DETAILS

SYSTEM OUTPUTS

FIRE ALARM SYSTEM OUTPUTS

		CONTROL UNIT ANNUNCIATION						NOTIFICATION				REQUIRED FIRE SAFETY CONTROL							
		ACTUATE COMMON ALARM SIGNAL INDICATOR	ACTUATE AUDIBLE ALARM SIGNAL	ACTUATE COMMON SUPERVISORY SIGNAL INDICATOR	ACTUATE AUDIBLE SUPERVISORY SIGNAL	ACTUATE COMMON TROUBLE SIGNAL INDICATOR	ACTUATE AUDIBLE COMMON TROUBLE SIGNAL	TRANSMIT FIRE ALARM SIGNAL TO "CENTRAL STATION"	TRANSMIT SUPERVISORY SIGNAL TO "CENTRAL STATION"	TRANSMIT TROUBLE SIGNAL TO "CENTRAL STATION"		ACTUATE BUILDING NOTIFICATION						
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
FA SYSTEM INPUTS	1 AREA SMOKE DETECTION	●	●						●				●						
	2 MANUAL PULL STATION	●	●						●				●						
	3																		
	4																		
	5																		
	6 FIRE ALARM AC POWER FAILURE					●	●				●								
	7 FIRE ALARM SYSTEM LOW BATTERY					●	●				●								
	8																		
	9																		
	10 OPEN CIRCUIT					●	●				●								
	11 GROUND CIRCUIT					●	●				●								
	12 NOTIFICATION APPLIANCE CIRCUIT SHORT					●	●				●								
	13																		
	14																		
	15																		
	16																		
	17																		
	18																		
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R

SYSTEM INPUTS



COUNTY MAP
NOT TO SCALE

SEQUENCE OF OPERATION MATRIX

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS
4436 Calle Real, Santa Barbara, CA 93110
SANTA BARBARA COUNTY

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FRED EDELMAN
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ARCHITECT

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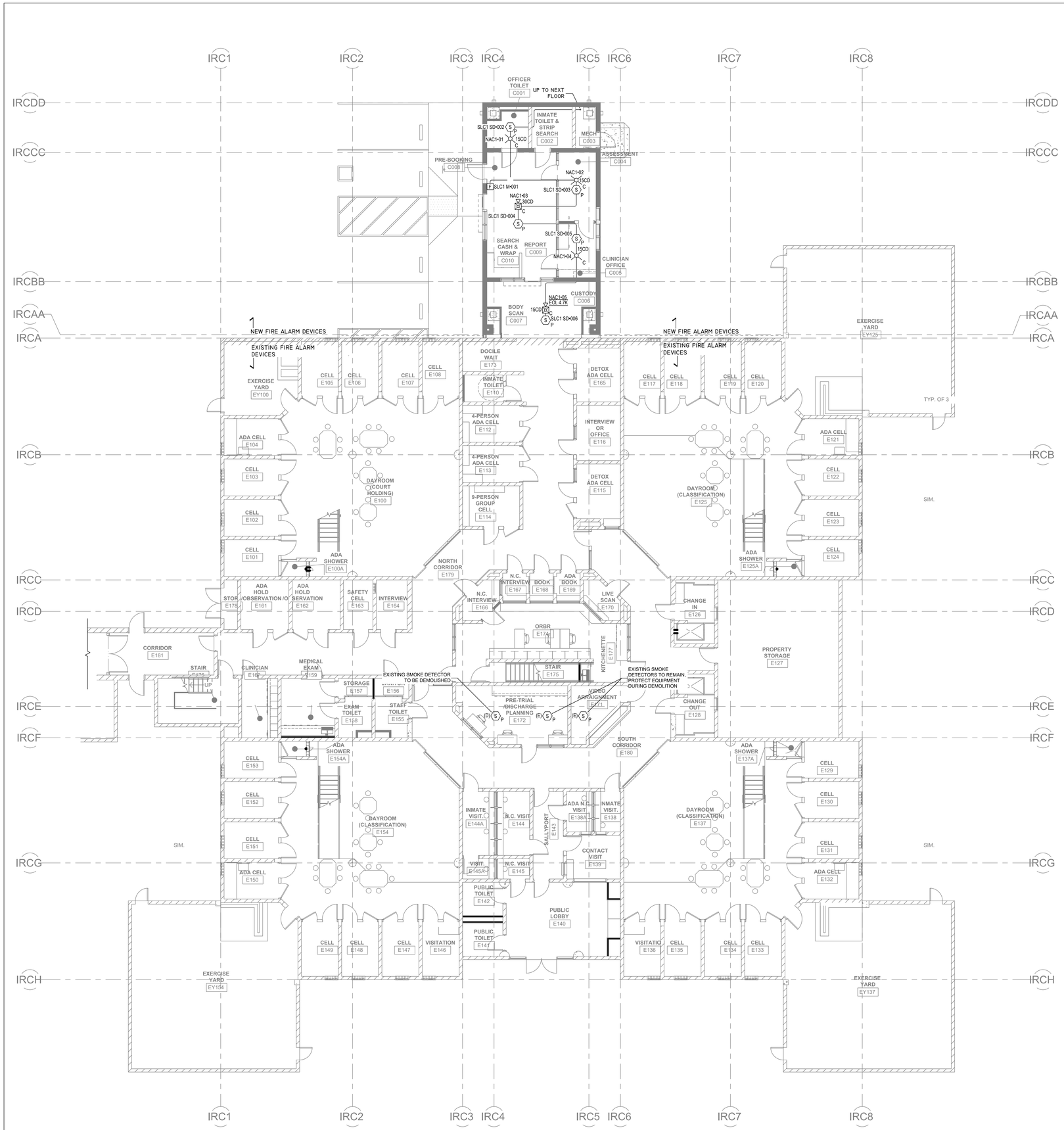
SHEET TITLE

FIRE ALARM
GENERAL NOTES

SHEET NO.

FA-0.0

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ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



DEVICE LEGEND

SYMBOL	QUANTITY	MANUFACTURER	PART NO	DESCRIPTION	CSFM
FACU (E)	1	SILENT KNIGHT	IFP-1000	INTELLIGENT FIRE ALARM CONTROL PANEL	7165-0559:0135
F	1	SILENT KNIGHT	SD500-PSDA	DUAL ACTION PULL STATION	7150-0559:0136
S P	6	SILENT KNIGHT	SD505-PHOTO W/SD505-6AB	ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR, BASE	7272-0559:0178
C	3	SYSTEM SENSOR	SCWLED	STROBE, CEILING, WHITE	7300-1653:0525
C	2	SYSTEM SENSOR	PC2WLED	2-WIRE, HORN STROBE, CEILING, WHITE	7135-1653:0526
———	NEW CONDUIT (1" DIAM. UNLESS OTHERWISE NOTED) EXPOSED AT LATERAL RUNS ONLY, CONCEALED IN WALLS AT DROPS SERVING WALL MOUNTED DEVICES.				
(E)	EXISTING EQUIPMENT TO REMAIN				

INTAKE RECEPTION CENTER FIRE ALARM PLAN

SCALE: 1/8" = 1'-0"

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

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SHEET TITLE

FIRE ALARM - GROUND LEVEL

SHEET NO.

FA-1.0

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

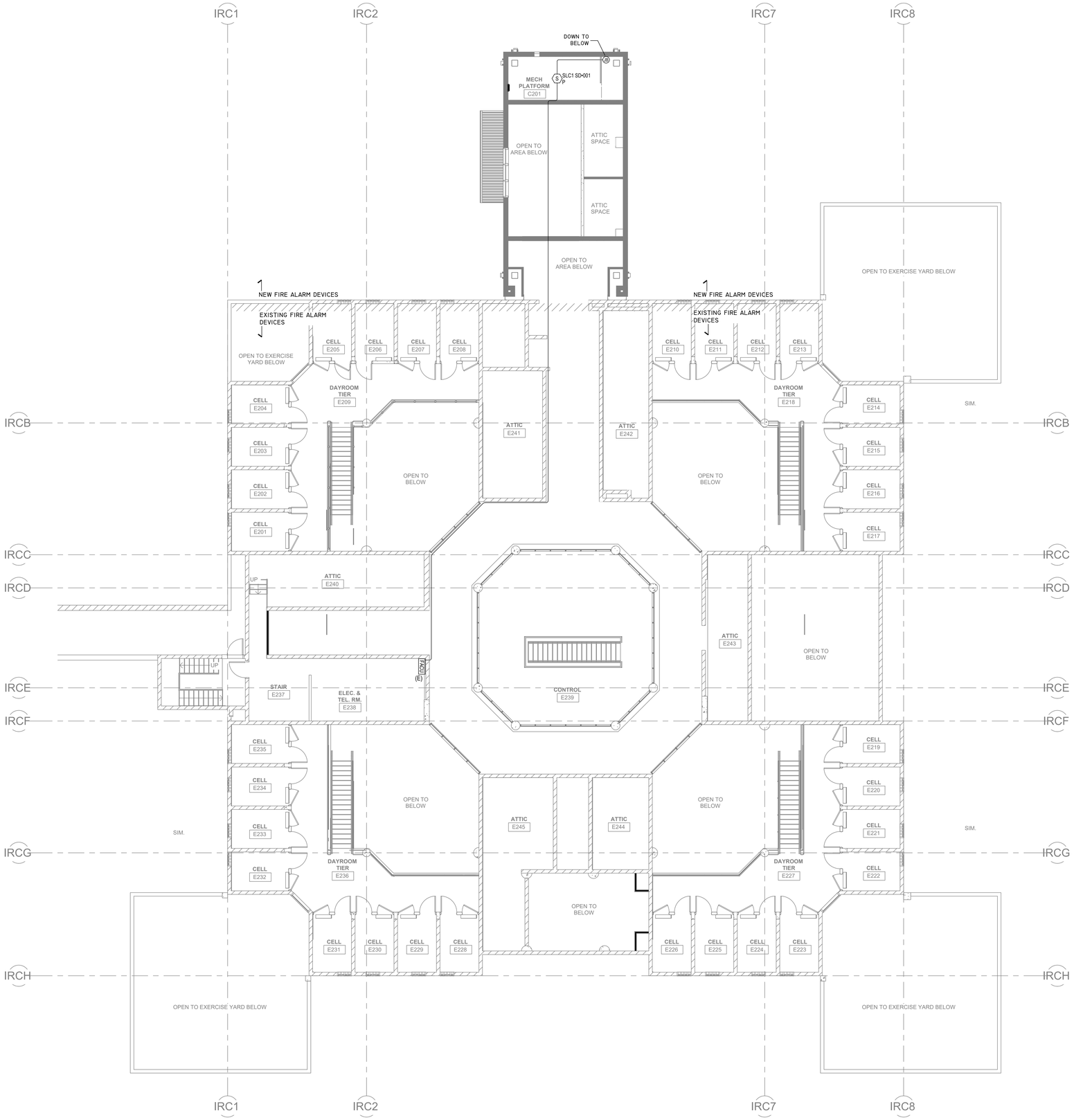
ONE-HALF INCH = ONE FOOT

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ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET



TIER LEVEL FIRE ALARM PLAN

SCALE: 1/8" = 1'-0"

DEVICE LEGEND

SYMBOL	QUANTITY	MANUFACTURER	PART NO	DESCRIPTION	CSFM
FACU (E)	1	SILENT KNIGHT	IFP-1000	INTELLIGENT FIRE ALARM CONTROL PANEL	7165-0559:0135
F	1	SILENT KNIGHT	SD500-PSDA	DUAL ACTION PULL STATION	7150-0559:0136
S P	6	SILENT KNIGHT	SD505-PHOTO W/SD505-6AB	ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR, BASE	7272-0559:0178
C	3	SYSTEM SENSOR	SCWLED	STROBE, CEILING, WHITE	7300-1653:0525
C	2	SYSTEM SENSOR	PC2WLED	2-WIRE, HORN STROBE, CEILING, WHITE	7135-1653:0526
———	NEW CONDUIT (1" DIAM. UNLESS OTHERWISE NOTED) EXPOSED AT LATERAL RUNS ONLY, CONCEALED IN WALLS AT DROPS SERVING WALL MOUNTED DEVICES.				
(E)	EXISTING EQUIPMENT TO REMAIN				

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SHEET TITLE

FIRE ALARM - TIER LEVEL

SHEET NO.

FA-2.0

PANEL (IFP-1000) BATTERY CALCULATION (SECONDARY POWER SOURCE REQUIREMENTS)										
								STANDBY CURRENT		SECONDARY ALARM CURRENT	
PANEL COMPONENTS					QTY	PART NO.	DESCRIPTION	CURRENT DRAW (A)	TOTAL (A)	CURRENT DRAW (A)	TOTAL (A)
					1	IFP-1000	INTELLIGENT FIRE ALARM CONTROL PANEL	0	0	0	0
					1	IFP-1000 MAIN BOARD	MAIN BOARD	0.215	0.215	0.385	0.385
CIRCUIT	**MAX CARD AMPS**	**USED CARD AMPS**	**SPARE CARD AMPS**	**SYMBOL**	**QTY**	**PART NO**	**DESCRIPTION**	**CURRENT DRAW (A)**	**TOTAL (A)**	**CURRENT DRAW (A)**	**TOTAL (A)**
NAC1	6	0.130850	5.869150	C	1	PC2WLED	2-WIRE, HORN STROBE, CEILING, WHITE 15CD	0	0	0.035	0.035
				C	1	PC2WLED	2-WIRE, HORN STROBE, CEILING, WHITE 30CD	0	0	0.038	0.038
				C	3	SCWLED	STROBE, CEILING, WHITE 15CD	0	0	0.018	0.054
SLC1				F	1	SD500-PSDA	DUAL ACTION PULL STATION	0.00055	0.00055	0.00055	0.00055
				S P	6	SD505-PHOTO W/SD505-6AB	ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR, BASE	0.00055	0.0033	0.00055	0.0033
								TOTAL STANDBY (A)	0.21885	TOTAL ALARM (A)	0.515850
								REQUIRED STANDBY TIME (HOURS)		24	
								REQUIRED ALARM TIME (MINUTES)		5	
SECONDARY STANDBY LOAD (A)							0.21885	24		5.25	
SECONDARY ALARM LOAD (A)							0.515850	0.083		0.043	
STANDBY AND ALARM SUBTOTAL (AMP HOURS)								5.30			
DERATING FACTOR								1.25			
SECONDARY LOAD REQUIREMENTS (AMP HOURS)								6.62			
PROVIDE (2) 12V 7AH BATTERIES											

NAC1 VOLTAGE DROP REPORT	CURRENT SUMMARY		POWER SUMMARY	
	MAX. CIRCUIT CURRENT (A):	3	STARTING CALC. VOLTAGE:	20.40
	TOTAL CIRCUIT CURRENT (A):	0.127	MAX. VOLTAGE DROP:	0.23
	SPARE CIRCUIT CURRENT (A):	2.87	VOLTAGE DROP %:	**1.12 %**
	SPARE CIRCUIT CURRENT %:	**95.77 %**	MIN. OPERATIONAL VOLTAGE:	16
	MAX. CARD CURRENT (A):	6	END OF LINE VOLTAGE:	20.17
	TOTAL CARD CURRENT (A):	0.13085	WIRE RESISTANCE (Ω/KFT):	3.07
	SPARE CARD CURRENT (A):	5.87	TOTAL CIRCUIT LENGTH (FT):	293
	SPARE CARD CURRENT %:	**97.82 %**	TOTAL CIRCUIT RESISTANCE (Ω):	1.80

CIRCUIT WIRING PROPERTIES: 'V' 14/2 FPLP/R (NAC) 14 AWG, 2 COND. SOLID COPPER FPLP/R ANALOG UNSHIELDED

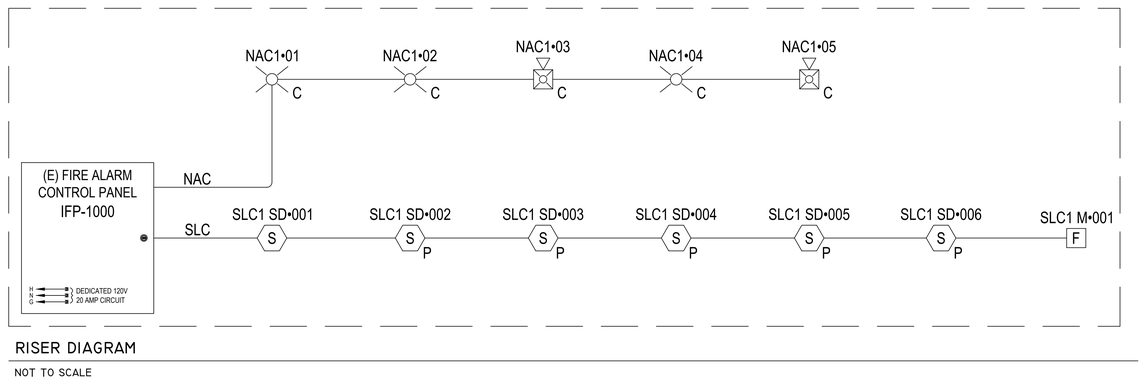
DISTANCE MEASURED USING DRAWN SEGMENT LENGTHS WITH 10.00 % ADDITIONAL LENGTH CALCULATED

SYMBOL	QUANTITY	PART NO	DESCRIPTION	CANDELAS	ALARM CURRENT (A)	TOTAL CURRENT (A)
C	1	PC2WLED	2-WIRE, HORN STROBE, CEILING, WHITE	15CD	0.035	0.035
C	1	PC2WLED	2-WIRE, HORN STROBE, CEILING, WHITE	30CD	0.038	0.038
C	3	SCWLED	STROBE, CEILING, WHITE	15CD	0.018	0.054

CALCULATION METHODS:

TOTAL RESISTANCE (Ω) = WIRE RESISTANCE (Ω/FT) X 2 X TOTAL CIRCUIT LENGTH (FT)

TOTAL VOLTAGE DROP = TOTAL RESISTANCE (Ω) X TOTAL CIRCUIT CURRENT (A)



RISER DIAGRAM

NOT TO SCALE

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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SANTA BARBARA COUNTY JAIL
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Sacramento, CA 95811
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916.329.4000

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

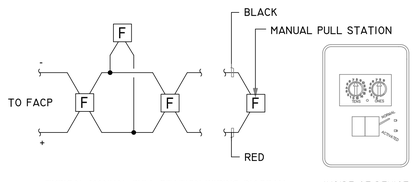
JOB NO. Y2213.00

SHEET TITLE

BATTERY CALCULATIONS AND RISER DIAGRAM

SHEET NO.

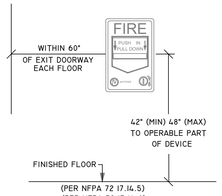
FA-3.0

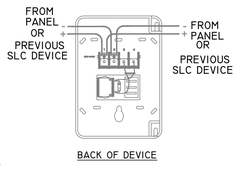


TYPICAL MANUAL PULL STATION WIRING DIAGRAM

INSIDE OF DEVICE

ADDRESSABLE

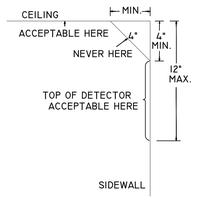




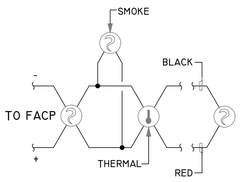
BACK OF DEVICE

ADDRESSABLE PULL STATION

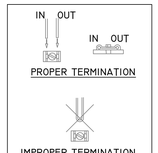
6 PULL STATIONS — TYPICAL INSTALLATION DETAIL — NOT TO SCALE



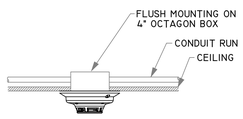
MOUNTING LOCATIONS
PER NFPA 72 17.6.3.1.3.1



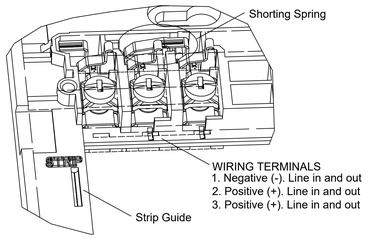
TYPICAL DETECTOR WIRING DIAGRAM

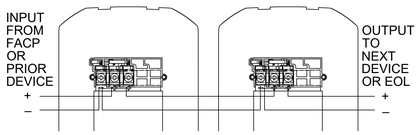


TERMINATION
PER NFPA 72 17.4.7



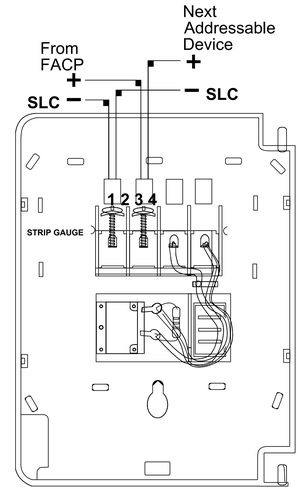
5 HEAT & SMOKE DETECTORS MOUNTING — TYPICAL INSTALLATION DETAIL — NOT TO SCALE





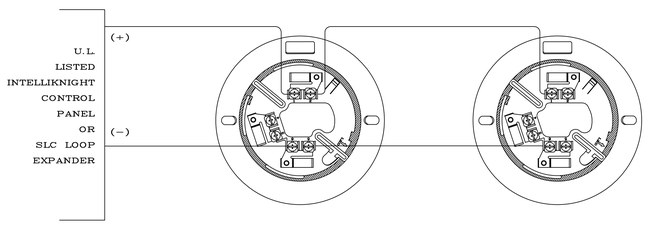
PC2WLED/SCWLED

4 STROBE & HORN/STROBE CONNECTIONS — TYPICAL WIRING DETAIL — NOT TO SCALE



SD500-PSDA

3 PULL STATION — TYPICAL WIRING DETAIL — NOT TO SCALE



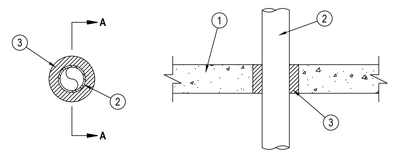
SD505-PHOTO

2 SMOKE DETECTOR — TYPICAL WIRING DETAIL — NOT TO SCALE

CLASSIFIED — Classified by Underwriters Laboratories, Inc. to UL 1479

System No. F-A-2058
F Rating — 2 Hr
T Rating — 0 Hr

FA 2058



SECTION A-A

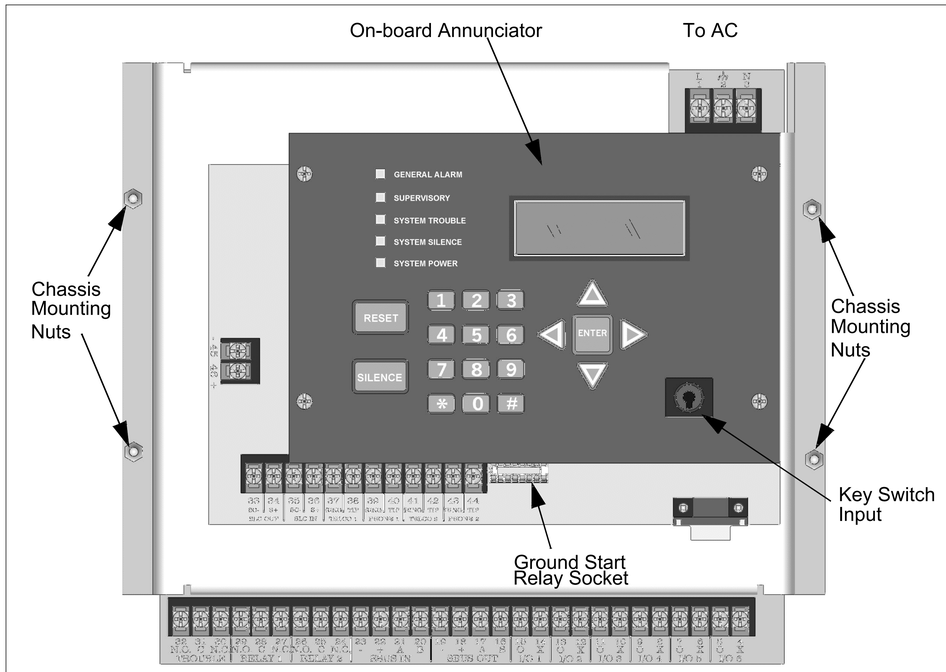
1. Floor Assembly — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete. Max diam of opening is 4 in. (102 mm).
   1A. Floor Assembly — (Optional — Not Shown) — The fire-rated unprotected concrete and steel floor assembly shall be constructed of the materials and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
   A. Concrete — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete.
   B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design. Max diam of opening is 4 in. (102 mm).
2. Through Penetrants — One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be min 3/8 in. and max 1 in. (9.5 to 25 mm). Pipe to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
3. Fill, Void or Cavity Materials*-Sealant — Min 2-1/2 in. (64 mm) thickness of sealant applied within annular space, flush with top surface of floor. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant.

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

HILTI — Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 15, 2015

1 FIRE RATED WALL PENETRATION — TYPICAL INSTALLATION DETAIL — NOT TO SCALE



EXISTING IFP-1000 FIRE ALARM CONTROL PANEL

ELEC. & TEL. ROOM E238

AGENCY APPROVAL

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DAVID E. COLLINGS — No. 1847 — EXPIRES 6/30/2026 — PROFESSIONAL ENGINEER — STATE OF CALIFORNIA — FIRE PROTECTION

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ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

WIRING DIAGRAMS AND DETAILS

SHEET NO.

FA-4.0

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
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ONE INCH = TWENTY FEET

ONE AND ONE-HALF INCH = ONE FOOT

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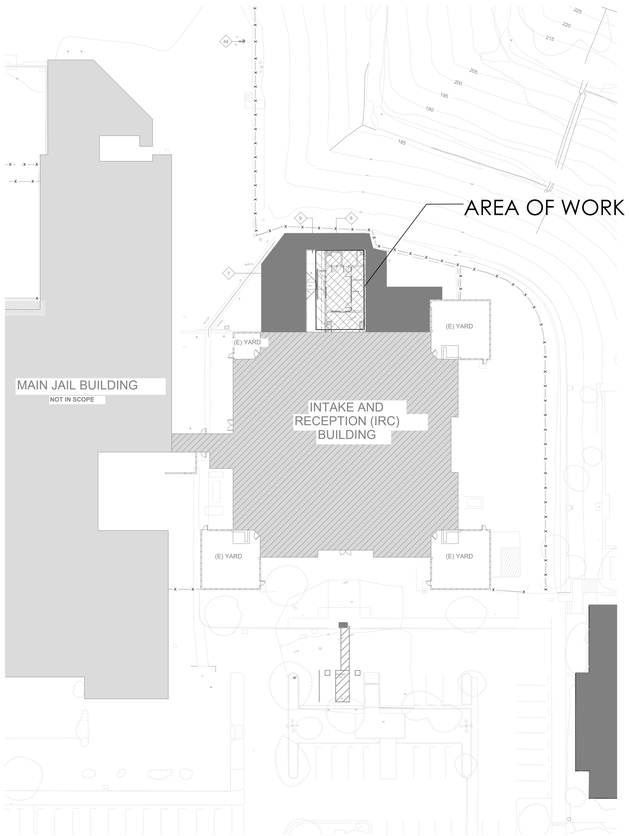
ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET



N

SITE PLAN

NOT TO SCALE

SEISMIC NOTES

1. SWAY BRACES SHALL BE DESIGNED AND INSTALLED IN COMPLIANCE WITH NFPA 13. CALCULATION BASED ON ZONE OF INFLUENCE.(SEE DETAIL SHEET FOR SEISMIC BRACING CALCULATION)
2. LATERAL BRACE SHALL NOT APPLY TO PIPES INDIVIDUALLY SUPPORTED BY RODS LESS THAN 6 IN. LONG MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE. PER NFPA 13.
3. LATERAL BRACE SHALL NOT APPLY WHERE U-TYPE HOOKS OF THE WRAP-AROUND TYPE OR THOSE U-TYPE HOOKS ARRANGED TO KEEP THE PIPE TIGHT TO THE UNDERSIDE OF THE STRUCTURE ELEMENT SHALL BE PERMITTED TO BE USED TO SATISFY THE REQUIREMENTS FOR LATERAL SWAY BRACE BRACING, PROVIDED THE LEGS ARE BENT OUT AT LEAST 30 DEGREES FROM THE VERTICAL. PER NFPA 13.

HANGER NOTES

1. 3/8" ALL-THREADED ROD (ATR) ROD SHALL BE USED ON PIPES 1 TO 4 INCHES. ½" ATR FOR 5, 6 & 8 INCHES PIPE, AND 5/8" ATR FOR 10 & 12 INCHES PIPE.
2. THE MAX. UNSUPPORTED LENGTH FROM THE END OF A LINE TO HANGER SHALL BE 36" FOR 1", 48" FOR 1¼, 60" FOR 1½" PIPE AND ABOVE.
3. THE MAXIMUM HANGER SPACING SHALL BE 12 FT. FOR 1" TO 1¼" PIPE, 15 FT. FOR 1½" PIPE AND ABOVE EXCEPT THREADED LIGHT WALL. FOR THREADED LIGHT WALL MAXIMUM SPACING IS 12 FT. FOR PIPE UP TO 3 IN.(UNLESS NOTED OTHERWISE).
4. HANGERS ARE REQUIRED ON ARM-OVER EXCEEDING 2 FT. FROM CENTER TO CENTER
5. ALL HANGERS SHALL BE IN ACCORDANCE WITH NFPA-13. ALL ARM-OVER MORE THAN 2'-0 SHALL HAVE HANGER. IF STATIC PRESSURE EXCEEDS 100 PSI, HANGER IS REQUIRED ON ARM-OVER MORE THAN 1'-0".
6. RESTRAINT OF BRANCH LINES SHALL NOT APPLY TO PIPES INDIVIDUALLY SUPPORTED BY RODS LESS THAN 6 IN. LONG MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE. PER NFPA 13.

FIRE SPRINKLER NOTES

1. THIS FIRE SPRINKLER SYSTEM SHALL BE DESIGNED AND INSTALLED PER NFPA 13, 2022 EDITION.
2. THE SPRINKLER CONTRACTOR WILL PROVIDE THE OWNER WITH THE NECESSARY INSTRUCTION MANUALS FOR THE UPKEEP OF THE SYSTEM.
3. PROVIDE ALL EQUIPMENT, I.E., CONTROL VALVES, BACKFLOW PREVENTER, CHECK VALVES, FLOOR CONTROL VALVE ASSEMBLIES WITH A MINIMUM CLEARANCE OF 3 FEET.
4. A SET OF APPROVED PLANS SHALL BE MAINTAINED AT ALL TIMES ON THE JOB SITE.
5. ALL NEW SPRINKLERS TO BE QUICK RESPONSE.
6. THE SYSTEM SHALL ONLY EMPLOY THE USE OF U.L. LISTED MATERIALS AND DEVICES.
7. ONLY NEW SPRINKLERS SHALL BE EMPLOYED IN THE INSTALLATION OF THE SPRINKLER SYSTEM.
8. ALL TAMPER SWITCHES SHALL BE CONNECTED TO AN APPROVED CENTRAL STATION SUPERVISION COMPANY.
9. ALL VALVES SHALL HAVE A PERMANENTLY AFFIXED SIGN INDICATING ITS FUNCTION.
10. A STOCK OF SPARE SPRINKLERS OF EACH STYLE, TYPE, AND TEMPERATURE RATING, ALONG WITH A SPRINKLER WRENCH, SHALL BE LOCATED AT EACH RISER, PER NFPA 13, 2022 EDITION.
11. AUTOMATIC SPRINKLER SYSTEM SHALL BE SUPERVISED BY AN APPROVED CENTRAL STATION SERVICE AND A LOCAL ALARM WHICH WILL GIVE AN AUDIBLE SIGNAL AT A CONSTANTLY ATTENDED LOCATION.
12. ALL LOW POINTS IN THE SYSTEM TO BE PROVIDED WITH AUXILIARY DRAIN.
13. FERROUS PIPING WELDED OR SEAMLESS STEEL, ANSI/ASTM A-53 WITH WELDING PERFORMED BY A CERTIFIED WELDER.
14. PLAIN END FITTINGS WITH MECHANICAL COUPLINGS AND FITTINGS THAT USE STEEL GRIPPING DEVICES TO BIT INTO THE PIPE ARE PROHIBITED. STEEL PIPING WITH WALL THICKNESS LESS THAN SCHEDULE 40 MUST NOT BE THREADED.
15. PIPES 2 INCH OR SMALLER TO BE SCHEDULE 40 STEEL PIPE WITH THREADED FITTINGS.
16. PIPES 2½ TO 8 INCH TO BE SCHEDULE #10 STEEL PIPE WITH GRVD END FITTINGS.
17. ALL THREADED FITTINGS TO BE CLASS 125 D.I. AND ALL GROOVED FITTINGS AND COUPLING TO BE VICTAULIC OR EQUAL.
18. ALL SYSTEM PIPING SHALL BE HYDROSTATICALLY TESTED AT 200 PSI FOR TWO HOURS, OR AT 50 PSI ABOVE THE SYSTEM OPERATING PRESSURE, WHICHEVER IS GREATER.
19. ROUGH AND FINAL INSPECTION ARE REQUIRED ON ALL SYSTEMS.
20. A METAL CALCULATION PLATE INDICATING THE HIGHEST RESIDUAL PRESSURE REQUIRED FOR THE SYSTEM OPERATION SHALL BE PERMANENTLY ATTACHED TO THE RISER.

SCOPE OF WORK

1. TO DESIGN A COMPLETE WET FIRE SUPPRESSION SYSTEM TO A PARTIAL PART OF INTAKE AND RECEPTION (IRC) BUILDING, LOCATED AT 4436 CALLE REAL, SANTA BARBARA, CA 93110, SEE SITE PLAN FOR THE AREA OF WORK.
2. SYSTEM DESIGN TO COMPLY IN ACCORDANCE WITH THE NFPA 13, 2022 EDITION AND SANTA BARBARA COUNTY FIRE DEPARTMENT STANDARDS.

DESIGN CRITERIA

1. DESIGN AREA 1: TIER LEVEL - LIGHT HAZARD
   DESIGN FOR 0.10 DENSITY OVER 1000 FT² OR THE ENTIRE AREA, PER TABLE & FIGURE 19.2.3.1.1 DENSITY AREA OF THE NFPA 13, 2022 EDITION.

   WITH 100 GPM HOSE STREAM ALLOWANCE PER TABLE 19.2.3.1.2 OF THE NFPA 13, 2022 EDITION

   STANDARD QUICK RESPONSE UPRIGHT 150 FT² MINIMUM TO 196 FT² MAXIMUM SPACING, ½" NPT, K-FACTOR OF 5.6, WITH 155° TEMP.

2. DESIGN AREA 2: GROUND LEVEL - LIGHT HAZARD
   DESIGN FOR 0.10 DENSITY OVER 1000 FT² OR THE ENTIRE AREA, PER TABLE & FIGURE 19.2.3.1.1 DENSITY AREA OF THE NFPA 13, 2022 EDITION.

   WITH 100 GPM HOSE STREAM ALLOWANCE PER TABLE 19.2.3.1.2 OF THE NFPA 13, 2022 EDITION

   STANDARD QUICK RESPONSE UPRIGHT 150 FT² MINIMUM TO 196 FT² MAXIMUM SPACING, ½" NPT, K-FACTOR OF 5.6, WITH 155° TEMP.

PROJECT DATA:

TYPE OF CONSTRUCTION:	TYPE I
OCCUPANCY TYPE:	I-3
FIRE SPRINKLERED:	YES
AREA:	2011 SQ. FT.
ADDRESS:	4436 CALLE REAL
	SANTA BARBARA, CA 93110

SPRINKLER HEAD INFORMATION

SYM.	MANUFACTURER	SIN	NPT	K	TEMP	DESCRIPTION	QTY.
○	VICTAULIC	V2704	½	5.6	155	QUICK RESPONSE UPRIGHT SPRINKLER	4
⊠	VICTAULIC	V2704	½	5.6	200	QUICK RESPONSE UPRIGHT SPRINKLER	1
◉	VICTAULIC	V2708	½	5.6	155	QUICK RESPONSE PENDENT SPRINKLER	8
⊠	VICTAULIC	V2708	½	5.6	155	QUICK RESPONSE PENDENT SPRINKLER	2
						TOTAL	15

APPLICABLE CODES

- 2022 CALIFORNIA BUILDING CODE (CBC) WITH CALIFORNIA AMENDMENTS
- 2022 CALIFORNIA FIRE CODE (CFC) WITH CALIFORNIA AMENDMENTS
- 2022 NFPA 13, INSTALLATION OF FIRE SPRINKLER SYSTEMS
- 2022 NFPA 72, NATIONAL FIRE ALARM CODE (CA AMENDED)
- SANTA BARBARA COUNTY FIRE DEPARTMENT STANDARDS

SHEET INDEX

FP-0.0	SITE PLAN AND GENERAL NOTES
FP-1.0	FIRE SPRINKLER GROUND LEVEL PLAN
FP-2.0	FIRE SPRINKLER TIER LEVEL PLAN
FP-3.0	FIRE SPRINKLER DETAILS AND SEISMIC CALCULATIONS
FP-4.0	MANUFACTURER'S DATA SHEETS

1. UNDERGROUND FIRE SERVICE AND ASSOCIATED COMPONENTS ARE FOR REFERENCE ONLY. REFER TO CIVIL ENGINEER'S WATER UTILITY PLAN FOR PRECISE INFORMATION.
2. HYDRAULIC CALCULATIONS TO TERMINATE AT PUBLIC WATER SOURCE. (NODE W1)

AGENCY APPROVAL

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PHONE: (805)658-0083 FAX: (805)658-0044
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LICENSED PROFESSIONAL ENGINEER — TED EDELMAN — No. 18847 — EXPIRES 6/30/2026 — FIRE PROTECTION — STATE OF CALIFORNIA

CONSULTANT

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ARCHITECT

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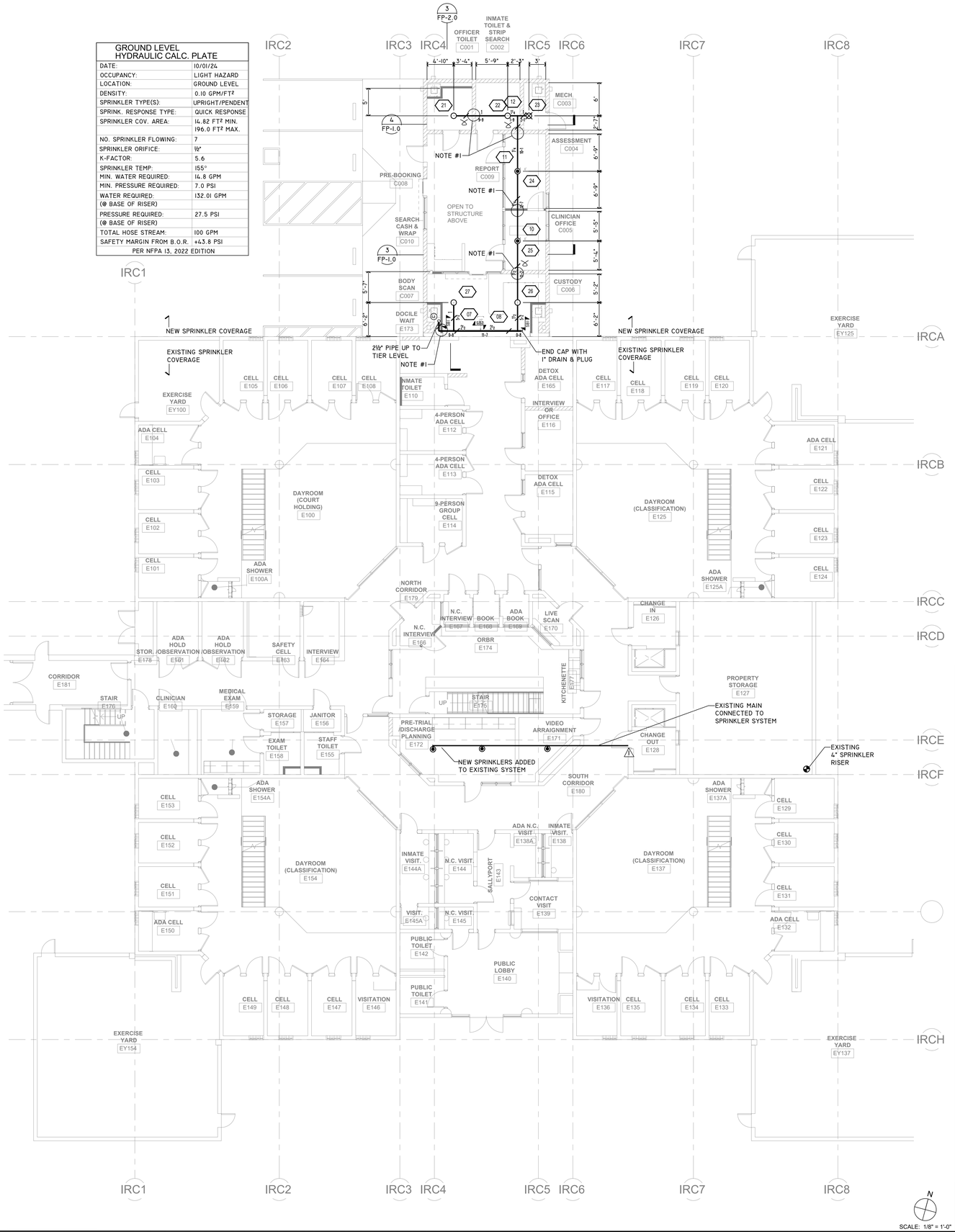
SHEET TITLE

SITE PLAN AND GENERAL NOTES

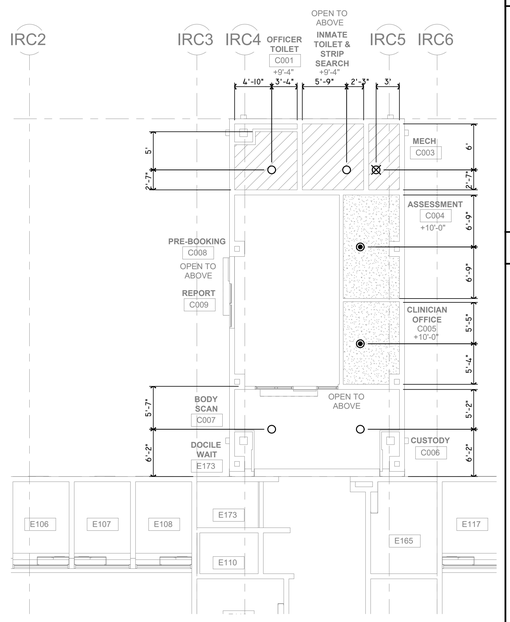
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FP-0.0

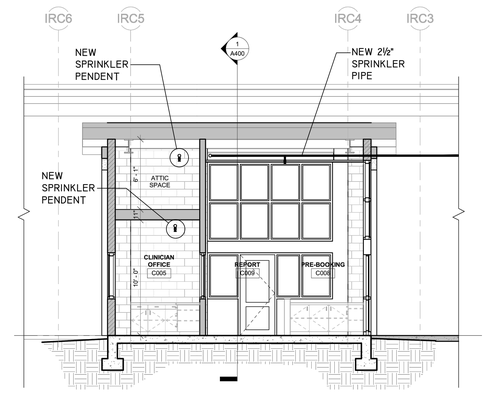
GROUND LEVEL HYDRAULIC CALC. PLATE	
DATE:	10/01/24
OCCUPANCY:	LIGHT HAZARD
LOCATION:	GROUND LEVEL
DENSITY:	0.10 GPM/FT²
SPRINKLER TYPE(S):	UPRIGHT/PENDENT
SPRINK. RESPONSE TYPE:	QUICK RESPONSE
SPRINKLER COV. AREA:	14.82 FT² MIN. 196.0 FT² MAX.
NO. SPRINKLER FLOWING:	7
SPRINKLER ORIFICE:	½"
K-FACTOR:	5.6
SPRINKLER TEMP:	155°
MIN. WATER REQUIRED:	14.8 GPM
MIN. PRESSURE REQUIRED:	7.0 PSI
WATER REQUIRED: (@ BASE OF RISER)	132.01 GPM
PRESSURE REQUIRED: (@ BASE OF RISER)	27.5 PSI
TOTAL HOSE STREAM:	100 GPM
SAFETY MARGIN FROM B.O.R.	+43.8 PSI
PER NFPA 13, 2022 EDITION	



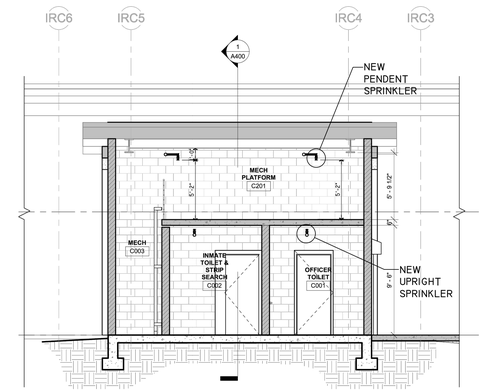
GROUND LEVEL SPRINKLER PIPING PLAN | 1



GROUND LEVEL SPRINKLER CEILING PLAN | 2



INTAKE SECTION | 3



SCALE: 3/16" = 1'-0"

INTAKE SECTION | 4

SEISMIC NOTES

1. SWAY BRACES SHALL BE DESIGNED AND INSTALLED IN COMPLIANCE WITH NFPA 13. CALCULATION BASED ON ZONE OF INFLUENCE.(SEE DETAIL SHEET FOR SEISMIC BRACING CALCULATION)
2. LATERAL BRACE SHALL NOT APPLY TO PIPES INDIVIDUALLY SUPPORTED BY RODS LESS THAN 6 IN. LONG MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE. PER NFPA 13.
3. LATERAL BRACE SHALL NOT APPLY WHERE U-TYPE HOOKS OF THE WRAP-AROUND TYPE OR THOSE U-TYPE HOOKS ARRANGED TO KEEP THE PIPE TIGHT TO THE UNDERSIDE OF THE STRUCTURE ELEMENT SHALL BE PERMITTED TO BE USED TO SATISFY THE REQUIREMENTS FOR LATERAL SWAY BRACE BRACING, PROVIDED THE LEGS ARE BENT OUT AT LEAST 30 DEGREES FROM THE VERTICAL. PER NFPA 13.

HANGER NOTES

1. 3/8" ALL-THREADED ROD (ATR) ROD SHALL BE USED ON PIPES 1 TO 4 INCHES. ½" ATR FOR 5, 6 & 8 INCHES PIPE, AND 5/8" ATR FOR 10 & 12 INCHES PIPE.
2. THE MAX. UNSUPPORTED LENGTH FROM THE END OF A LINE TO HANGER SHALL BE 36" FOR 1", 48" FOR 1¼, 60" FOR 1½" PIPE AND ABOVE.
3. THE MAXIMUM HANGER SPACING SHALL BE 12 FT. FOR 1" TO 1¼" PIPE, 15 FT. FOR 1½" PIPE AND ABOVE EXCEPT THREADED LIGHT WALL. FOR THREADED LIGHT WALL MAXIMUM SPACING IS 12 FT. FOR PIPE UP TO 3 IN.(UNLESS NOTED OTHERWISE).
4. HANGERS ARE REQUIRED ON ARM-OVER EXCEEDING 2 FT. FROM CENTER TO CENTER
5. ALL HANGERS SHALL BE IN ACCORDANCE WITH NFPA-13. ALL ARM-OVER MORE THAN 2'-0 SHALL HAVE HANGER. IF STATIC PRESSURE EXCEEDS 100 PSI, HANGER IS REQUIRED ON ARM-OVER MORE THAN 1'-0".
6. RESTRAINT OF BRANCH LINES SHALL NOT APPLY TO PIPES INDIVIDUALLY SUPPORTED BY RODS LESS THAN 6 IN. LONG MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE. PER NFPA 13.

LEGEND & SYMBOLS

	SPRINKLER RISER
	PENDENT SPRINKLER - 155°
	QUICK RESPONSE UPRIGHT - 155°
	TYP. HANGER SYMBOL, SEE DETAILS
	PIPE RESTRAINT, SEE DETAILS
	SPRINKLER BELL
	PIPE UP OR DOWN
00	HYDRAULIC REFERENCE NODE
	NEW SPRINKLER PIPE
4 AV	AUTOMATIC AIR VENT, SEE DETAILS
	LATERAL BRACE
	LONGITUDINAL BRACE
	4-WAY EARTHQUAKE BRACE

SPRINKLER HEAD INFORMATION

SYM.	MANUFACTURER	SIN	NPT	K	TEMP	DESCRIPTION	QTY.
○	VICTAULIC	V2704	½	5.6	155	QUICK RESPONSE UPRIGHT SPRINKLER	4
⊠	VICTAULIC	V2704	½	5.6	200	QUICK RESPONSE UPRIGHT SPRINKLER	1
◉	VICTAULIC	V2708	½	5.6	155	QUICK RESPONSE PENDENT SPRINKLER	11
⊠	VICTAULIC	V2708	½	5.6	155	QUICK RESPONSE PENDENT SPRINKLER	2
						TOTAL	15

NOTE TO CONTRACTOR

1. ALL PIPE DIMENSIONS ARE CENTER-TO-CENTER.
2. LATERAL BRACE SHALL NOT BE REQUIRED ON MAIN AND BRANCH LINES, IF ALL HANGER RODS ARE 6 IN OR LESS. MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE.
3. PIPING IS SHOWN AS NEAR AS POSSIBLE. HOWEVER EXACT LOCATIONS WITH REGARDS TO THE BUILDING STRUCTURE SHALL BE VERIFIED AND DETERMINED IN THE FIELD PRIOR TO FABRICATION AND INSTALLATION.
4. CONTRACTOR TO BE RESPONSIBLE FOR INSTALLING COMPLETE INSTALLATION AND SHALL CONFIRM AS-BUILT CONDITIONS PRIOR TO ANY WORK.
5. CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL POSSIBLY INTERFERING PIPING, STRUCTURAL STEEL AND MISCELLANEOUS ITEMS BEFORE INSTALLATION OF SPRINKLER SYSTEMS TO AVOID INTERFERENCE.
6. SURFACE MOUNTED FIXTURES PLACE ON THE CEILING CREATING AN OBSTRUCTION TO FIRE SPRINKLERS COVERAGE, SHALL COMPLY WITH NFPA 13 REQUIREMENTS.

NOTE

1. SEE FP-3.0 DETAIL #3 FOR WALL AND FLOOR PENETRATION.

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

COLLINGS & ASSOCIATES
FIRE PROTECTION ENGINEERING
260 MAPLE COURT, 241 VENTURA, CA 93003
PHONE: (805)658-0083 FAX: (805)658-0044
www.collingsandassociates.com

LICENSED PROFESSIONAL ENGINEER — No. 16547 — EXPIRES 6/30/2026 — FIRE PROTECTION — STATE OF CALIFORNIA

CONSULTANT

nacht&lewis
600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

FIRE SPRINKLER GROUND LEVEL PLAN

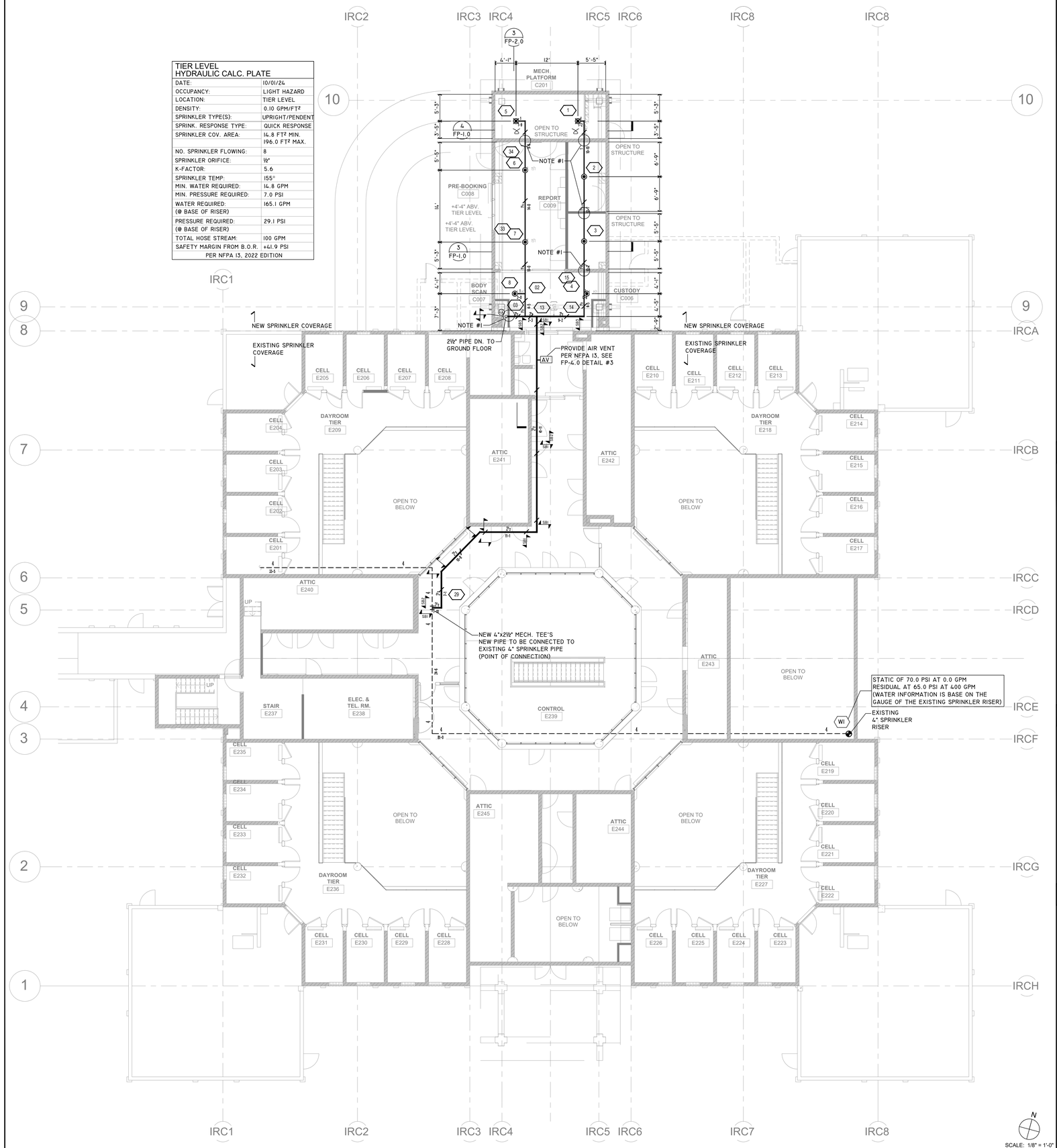
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FP-1.0

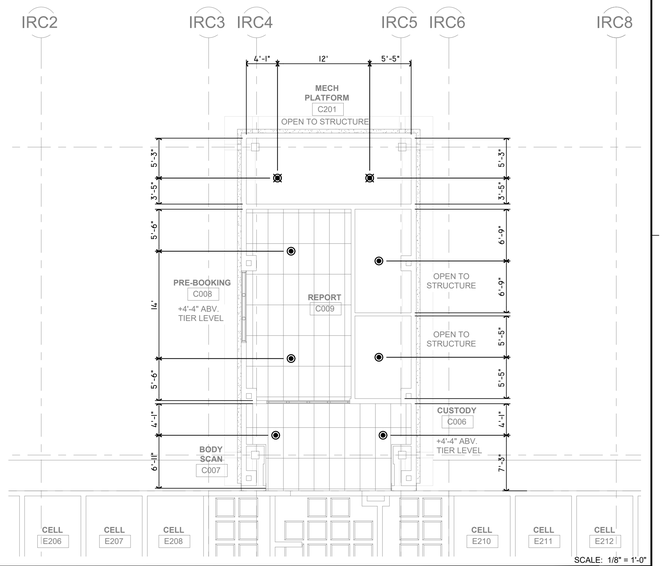
ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

TIER LEVEL HYDRAULIC CALC. PLATE	
DATE:	10/01/24
OCCUPANCY:	LIGHT HAZARD
LOCATION:	TIER LEVEL
DENSITY:	0.10 GPM/FT²
SPRINKLER TYPE(S):	UPRIGHT/PENDENT
SPRINK. RESPONSE TYPE:	QUICK RESPONSE
SPRINKLER COV. AREA:	14.8 FT² MIN, 196.0 FT² MAX.
NO. SPRINKLER FLOWING:	8
SPRINKLER ORIFICE:	½"
K-FACTOR:	5.6
SPRINKLER TEMP:	155°
MIN. WATER REQUIRED:	14.8 GPM
MIN. PRESSURE REQUIRED:	7.0 PSI
WATER REQUIRED: (@ BASE OF RISER)	165.1 GPM
PRESSURE REQUIRED: (@ BASE OF RISER)	29.1 PSI
TOTAL HOSE STREAM:	100 GPM
SAFETY MARGIN FROM B.O.R.	+41.9 PSI
PER NFPA 13, 2022 EDITION	

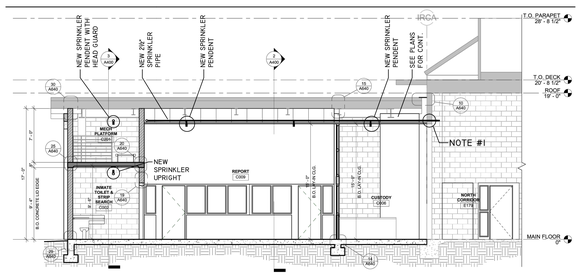


TIER LEVEL SPRINKLER PIPING PLAN | 1



SCALE: 1/8" = 1'-0"

TIER LEVEL SPRINKLER CEILING PLAN | 2



SCALE: 1/8" = 1'-0"

UNDER CANOPY & INTAKE PROCESS BUILDING SECTION | 3

NOTE

1. SEE FP-3.0 DETAIL #3 FOR WALL AND FLOOR PENETRATION.

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ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

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Sacramento, CA 95811
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ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

FIRE SPRINKLER TIER LEVEL PLAN

SHEET NO.

FP-2.0

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

TOLBrace™ Seismic Bracing Calculations

V8.8.136

Project Address: Sanata Barbara County Jail
4436 Celle Real
Sanata Barbara, Ca 93110
Job #

Contractor: Collings & Associates
Address: 260 Maple Court, #241
Ventura , Ca 93003
Phone: 805-658-0003
License:

Calculations based on 2019 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1"
Type of Brace	Sch.40
Angle of Brace	30° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	926 lbs (420 kg)

Fastener Information

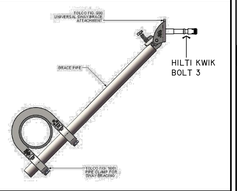
Orientation to Connecting Surface	NFPA Type D
Fastener	DeWalt Power-Stud+ SD2 3/8in. x 2 3/8in. (3,000 PSI Normal Weight Cracked Concrete)
Type	
Diameter	3/8in.
Length	2 3/8in.
Maximum Load	225 lbs (102 kg)
Prying Factor	1.31

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Load
Fig. 1001 Clamp	2000 lbs (907 kg)	1000 lbs (454 kg)
Fig.980 - 3/8" Universal Swivel	1600 lbs (726 kg)	800 lbs (363 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans SB3

Brace Type Lateral [X] Longitudinal [ ] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 1.07

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
2.5" (65 mm)	Sch. 10	8 ft (2.4 m)	8 ft (2.4 m)	5.89 lb/ft (8.77 kg/m)	47 lbs (21 kg)
1.5" (40 mm)	Sch. 40	5 ft (1.5 m)	5 ft (1.5 m)	3.61 lb/ft (5.37 kg/m)	18 lbs (8 kg)
1.25" (32 mm)	Sch. 40	24 ft (7.3 m)	24 ft (7.3 m)	2.93 lb/ft (4.36 kg/m)	70 lbs (32 kg)
1" (25 mm)	Sch. 40	11 ft (3.4 m)	11 ft (3.4 m)	2.05 lb/ft (3.05 kg/m)	23 lbs (10 kg)

Subtotal Weight	158 lbs (72 kg)
Wp (incl. 15%)	182 lbs (82 kg)
Total (Fpw)	194 lbs (88 kg)

Main Size 2.5" | Type/Sch. Sch. 10 | Spacing (ft) 8
Maximum Fpw per 18.5.5.2 (if applicable) 641 lb (290 kg)

(TOLBrace™ Version 8) Use of TOLBrace™ is subject to terms and conditions per the end user license agreement

TOLBrace™ Seismic Calculations

V8.8.136

Project Address: Sanata Barbara County Jail
4436 Celle Real
Sanata Barbara, Ca 93110
Job #

Contractor: Collings & Associates
Address: 260 Maple Court, #241
Ventura , Ca 93003
Phone: 805-658-0003
License:

Calculations based on 2019 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1"
Type of Brace	Sch.40
Angle of Brace	30° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	926 lbs (420 kg)

Fastener Information

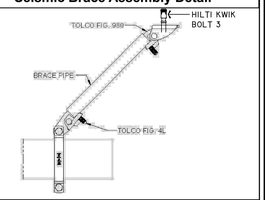
Orientation to Connecting Surface	NFPA Type A
Fastener	DeWalt Power-Stud+ SD2 1/2in. x 3 3/4in. (3,000 PSI Normal Weight Cracked Concrete)
Type	
Diameter	1/2in.
Length	3 3/4in.
Maximum Load	326 lbs (148 kg)
Prying Factor	2.93

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Load
Fig. 4L Clamp	2000 lbs (907 kg)	1000 lbs (454 kg)
Fig.980 - 1/2" Universal Swivel	2100 lbs (953 kg)	1050 lbs (476 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans SB2

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 1.07

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
2.5" (65 mm)	Sch. 10	21 ft (6.4 m)	21 ft (6.4 m)	5.89 lb/ft (8.77 kg/m)	124 lbs (56 kg)

Subtotal Weight	124 lbs (56 kg)
Wp (incl. 15%)	143 lbs (65 kg)
Total (Fpw)	153 lbs (69 kg)

Main Size 2.5" | Type/Sch. Sch. 10 | Spacing (ft) 21
Maximum Fpw per 18.5.5.2 (if applicable) N/A

(TOLBrace™ Version 8) Use of TOLBrace™ is subject to terms and conditions per the end user license agreement

TOLBrace™ Seismic Bracing Calculations

V8.8.136

Project Address: Sanata Barbara County Jail
4436 Celle Real
Sanata Barbara, Ca 93110
Job #

Contractor: Collings & Associates
Address: 260 Maple Court, #241
Ventura , Ca 93003
Phone: 805-658-0003
License:

Calculations based on 2019 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1"
Type of Brace	Sch.40
Angle of Brace	30° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	926 lbs (420 kg)

Fastener Information

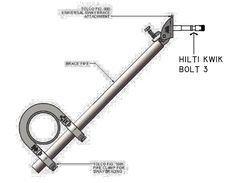
Orientation to Connecting Surface	NFPA Type D
Fastener	Wedge Anchor 1/2in. x 3 3/4in. (3,000 PSI Normal Weight Cracked Concrete)
Type	
Diameter	1/2in.
Length	3 3/4in.
Maximum Load	263 lbs (119 kg)
Prying Factor	1.31

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Load
Fig. 1001 Clamp	2000 lbs (907 kg)	1000 lbs (454 kg)
Fig.980 - 1/2" Universal Swivel	2100 lbs (953 kg)	1050 lbs (476 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans SB1

Brace Type Lateral [X] Longitudinal [ ] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 1.07

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
2.5" (65 mm)	Sch. 10	21 ft (6.4 m)	21 ft (6.4 m)	5.89 lb/ft (8.77 kg/m)	124 lbs (56 kg)

Subtotal Weight	124 lbs (56 kg)
Wp (incl. 15%)	143 lbs (65 kg)
Total (Fpw)	153 lbs (69 kg)

Main Size 2.5" | Type/Sch. Sch. 10 | Spacing (ft) 21
Maximum Fpw per 18.5.5.2 (if applicable) 513 lb (232 kg)

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TOLBrace™ Seismic Calculations

Sanata Barbara County Jail Job #
4436 Celle Real

Brace Identification	SB3
Brace Type (Per NFPA#13)	NFPA Type D
Braced Pipe (ft)	2.5" Sch.10 Steel Pipe
Spacing of Brace	8' 0" (2.44 m)
Orientation of Brace	Lateral
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	30°
Type of Fastener	DeWalt Power-Stud+ SD2 3/8in. x 2 3/8in. (3,000 PSI Normal Weight Cr
Length of Fastener	2 3/8in.

Summary of Pipe within Zone of Influence

2.5" Sch.10 Steel Pipe (63.5 mm)	8 ft (2.4 m)
1.5" Sch.40 Steel Pipe (38.1 mm)	5 ft (1.5 m)
1.25" Sch.40 Steel Pipe (31.75 mm)	24 ft (7.3 m)
1" Sch.40 Steel Pipe (25.4 mm)	11 ft (3.4 m)

TABLE 9.3.6.4(a) *Maximum Spacing (ft)(m) of Steel Pipe Restraints*

Pipe (in.) (mm)	Seismic Coefficient, C_p $C_p \le 0.50$	$0.5 < C_p \le 0.71$	$0.71 < C_p \le 1.40$	$C_p \ge 1.40$
½ (15)	34 (10.3)	29 (8.8)	20 (6.1)	18 (5.5)
¾ (20)	38 (11.6)	32 (9.7)	23 (7.0)	20 (6.1)
1 (25)	43 (13.1)	36 (11.0)	26 (7.9)	22 (6.7)
1¼ (32)	46 (14.0)	39 (11.9)	27 (8.2)	24 (7.3)
1½ (40)	49 (14.9)	41 (12.5)	29 (8.8)	25 (7.6)
2 (50)	53 (16.1)	45 (13.7)	31 (9.4)	27 (8.2)

G-Factor Used 1.07
Allowance for Heads and Fittings 15%
Conclusions
Total Adjusted Load of Pipe in Zone of Influence 194 lbs (88 kg)
Material Capacity 926 lbs (420 kg)
Fastener Capacity 225 lbs (102 kg)
Fig. 1001 Clamp 1000 lbs (454 kg)
Fig.980 - 3/8" Universal Swivel 800 lbs (363 kg)
Structural Member CONCRETE STRUCTURE

Calculations prepared by Collings & Associate:

* The description of the Structural Member is for informational purposes only.
TOLBrace™ software calculates the brace assembly only, not the structure it is attached to.
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SB3 SEISMIC BRACING CALCULATIONS | 6

TOLBrace™ Seismic Calculations

Sanata Barbara County Jail Job #
4436 Celle Real

Brace Identification	SB2
Brace Type (Per NFPA#13)	NFPA Type A
Braced Pipe (ft)	2.5" Sch.10 Steel Pipe
Spacing of Brace	21' 0" (6.4 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	30°
Type of Fastener	DeWalt Power-Stud+ SD2 1/2in. x 3 3/4in. (3,000 PSI Normal Weight Cr
Length of Fastener	3 3/4in.

Summary of Pipe within Zone of Influence

2.5" Sch.10 Steel Pipe (63.5 mm)	21 ft (6.4 m)

TABLE 9.3.6.4(a) *Maximum Spacing (ft)(m) of Steel Pipe Restraints*

Pipe (in.) (mm)	Seismic Coefficient, C_p $C_p \le 0.50$	$0.5 < C_p \le 0.71$	$0.71 < C_p \le 1.40$	$C_p \ge 1.40$
½ (15)	34 (10.3)	29 (8.8)	20 (6.1)	18 (5.5)
¾ (20)	38 (11.6)	32 (9.7)	23 (7.0)	20 (6.1)
1 (25)	43 (13.1)	36 (11.0)	26 (7.9)	22 (6.7)
1¼ (32)	46 (14.0)	39 (11.9)	27 (8.2)	24 (7.3)
1½ (40)	49 (14.9)	41 (12.5)	29 (8.8)	25 (7.6)
2 (50)	53 (16.1)	45 (13.7)	31 (9.4)	27 (8.2)

G-Factor Used 1.07
Allowance for Heads and Fittings 15%
Conclusions
Total Adjusted Load of Pipe in Zone of Influence 152 lbs (69 kg)
Material Capacity 926 lbs (420 kg)
Fastener Capacity 326 lbs (148 kg)
Fig. 4L Clamp 1000 lbs (454 kg)
Fig.980 - 1/2" Universal Swivel 1050 lbs (476 kg)
Structural Member CONCRETE WALL

Calculations prepared by Collings & Associate:

* The description of the Structural Member is for informational purposes only.
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SB2 SEISMIC BRACING CALCULATIONS | 5

TOLBrace™ Seismic Calculations

Sanata Barbara County Jail Job #
4436 Celle Real

Brace Identification	SB1
Brace Type (Per NFPA#13)	NFPA Type D
Braced Pipe (ft)	2.5" Sch.10 Steel Pipe
Spacing of Brace	21' 0" (6.4 m)
Orientation of Brace	Lateral
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	30°
Type of Fastener	Wedge Anchor 1/2in. x 3 3/4in. (3,000 PSI Normal Weight Cracked Con
Length of Fastener	3 3/4in.

Summary of Pipe within Zone of Influence

2.5" Sch.10 Steel Pipe (63.5 mm)	21 ft (6.4 m)

TABLE 9.3.6.4(a) *Maximum Spacing (ft)(m) of Steel Pipe Restraints*

Pipe (in.) (mm)	Seismic Coefficient, C_p $C_p \le 0.50$	$0.5 < C_p \le 0.71$	$0.71 < C_p \le 1.40$	$C_p \ge 1.40$
½ (15)	34 (10.3)	29 (8.8)	20 (6.1)	18 (5.5)
¾ (20)	38 (11.6)	32 (9.7)	23 (7.0)	20 (6.1)
1 (25)	43 (13.1)	36 (11.0)	26 (7.9)	22 (6.7)
1¼ (32)	46 (14.0)	39 (11.9)	27 (8.2)	24 (7.3)
1½ (40)	49 (14.9)	41 (12.5)	29 (8.8)	25 (7.6)
2 (50)	53 (16.1)	45 (13.7)	31 (9.4)	27 (8.2)

G-Factor Used 1.07
Allowance for Heads and Fittings 15%
Conclusions
Total Adjusted Load of Pipe in Zone of Influence 152 lbs (69 kg)
Material Capacity 926 lbs (420 kg)
Fastener Capacity 263 lbs (119 kg)
Fig. 1001 Clamp 1000 lbs (454 kg)
Fig.980 - 1/2" Universal Swivel 1050 lbs (476 kg)
Structural Member Concrete Wall

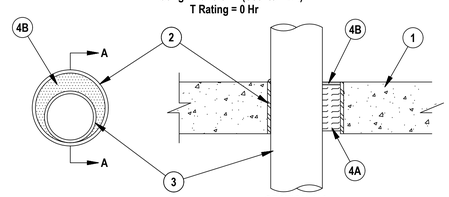
Calculations prepared by Collings & Associate:

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SB1 SEISMIC BRACING CALCULATIONS | 4

1. FLOOR OR WALL ASSEMBLY - MIN 4-1/2 IN. (114 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600-2400 KG/M3) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 6 IN. (152 MM).
SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. METALLIC SLEEVE - (OPTIONAL) NOM 6 IN. (152 MM) DIAM (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL SLEEVE CAST OR GROUTED INTO FLOOR OR WALL ASSEMBLY, FLUSH WITH FLOOR OR WALL SURFACES.
3. THROUGH-PENETRANT - ONE METALLIC PIPE OR CONDUIT TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN PIPE, TUBE OR CONDUIT AND PERIPHERY OF OPENING SHALL BE MIN 0 IN. (0 MM) (POINT CONTACT) TO MAX 5-3/8 IN. (137 MM). PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR CONDUITS MAY BE USED:
A. STEEL PIPE - NOM 4 IN. (102 MM) DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
B. IRON PIPE - NOM 4 IN. (102 MM) DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
C. COPPER PIPE - NOM 4 IN. (102 MM) DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
D. COPPER TUBING - NOM 4 IN. (102 MM) DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
E. CONDUIT - NOM 4 IN. (102 MM) DIAM (OR SMALLER) STEEL CONDUIT.
F. CONDUIT - NOM 4 IN. (102 MM) DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT).
4. FIRESTOP SYSTEM - THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. PACKING MATERIAL - MIN 4 IN. (102 MM) THICKNESS OF MIN 4 PCF (64 KG/M3) MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
B. FILL, VOID OR CAVITY MATERIAL* - SEALANT - MIN 1/4 IN. (6 MM) THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL. FOR 3 HR RATED ASSEMBLIES, A MIN 1/4 IN. (6 MM) DIAM BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE CONCRETE/PIPE INTERFACE AT THE POINT CONTACT LOCATION ON THE TOP SURFACE OF FLOOR AND ON BOTH SURFACES OF WALL. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC - FS-ONE SEALANT OR CP604 SELF-LEVELING FIRESTOP SEALANT. CP604 SHALL BE USED IN FLOOR APPLICATIONS ONLY. WHEN CP604 IS USED, F RATING IS 2 HR.
*BEARING THE UL CLASSIFICATION MARK

System No. C-AJ-1421
F Rating - 2 and 3 Hr (See Item 4B)
T Rating = 0 Hr



Hilti Firestop Systems

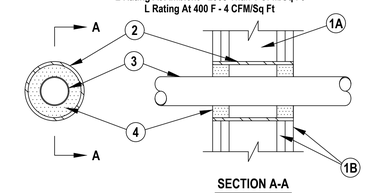
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1. FLOOR OR WALL ASSEMBLY -- THE FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
A. STUDS -- WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2-1/2 IN. WIDE AND SPACED MAX 24 IN. OC.
B. GYPSUM BOARD* -- NOM 5/8 IN. THICK GYPSUM WALLBOARD, AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIAM OF OPENING IS 4 IN.
2. METALLIC SLEEVE -- (OPTIONAL) -- NOM 4 IN. DIAM (OR SMALLER) SCHEDULE 40 (OR THINNER) STEEL PIPE CAST INTO WALL ASSEMBLY WITH JOINT COMPOUND AND INSTALLED FLUSH WITH WALL SURFACES.
3. ELECTRICAL NONMETALLIC TUBING+ -- NOM 2 IN. DIAM (OR SMALLER) CORRUGATED WALL ELECTRICAL NONMETALLIC TUBING (ENT) CONSTRUCTED OF POLYVINYL CHLORIDE (PVC). TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. A NOM ANNULAR SPACE OF 3/4 IN. IS REQUIRED WITHIN THE FIRESTOP SYSTEM.
SEE ELECTRICAL NONMETALLIC TUBING (FKHU) CATEGORY IN THE ELECTRICAL CONSTRUCTION MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS.
4. FILL, VOID OR CAVITY MATERIAL* -- SEALANT -- INSTALLED SYMMETRICALLY ON BOTH SIDES OF THE WALL. THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED. FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH EACH END OF THE STEEL SLEEVE AT THE THICKNESS SHOWN IN THE TABLE BELOW:

F Rating 2 Hr	T Rating 2 Hr	Fill Mtl Depth 1½ in.
1	0	5/8

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-One Sealant
+Bearing the UL Listing Mark
*Bearing the UL Classification Marking

System No. W-L-2075
F Ratings - 1 & 2 Hr (See Item 4)
T Ratings - 0 and 2 Hr (see Item 4)
L Rating At Ambient - Less Than 1 CFM/Sq Ft
L Rating At 400 F - 4 CFM/Sq Ft



Hilti Firestop Systems

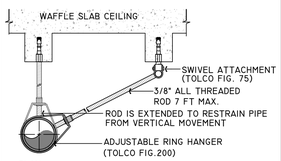
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NOT TO SCALE

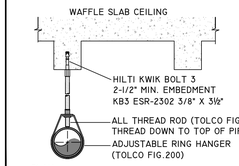
FIRE STOP SYSTEM | 3

BRANCH LINES SHALL BE LATERALLY RESTRAINED AT INTERVALS NOT TO EXCEED PER TABLE 18.6.4(A) OR 18.6.4(B) BASED ON BRANCH LINE DIAMETER AND THE VALUE OF CP.

END LINE BRACING SHALL BE LOCATED WITHIN 2'-0 OF A HANGER THAT RESTRAINT THE PIPE FROM UPWARD MOVEMENT.



END LINE BRACING | 2



NOT TO SCALE

EXPANSION ANCHOR | 1

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

COLLINGS & ASSOCIATES
FIRE PROTECTION ENGINEERING
260 MAPLE COURT, 241 VENTURA, CA 93003
PH(805) (805)658-0003 FAX: (805)658-0044
www.collingsandassociates.com

CONSULTANT

nacht&lewis
600 Q Street, Suite 100
Sacramento, CA 95811
www.nachtlewis.com
916.329.4000

ARCHITECT

95% CONSTRUCTION DOCUMENTS

REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

FIRE SPRINKLER DETAILS AND SEISMIC CALCULATIONS

SHEET NO.

FP-3.0

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

Table 9.3.5.9.3 Seismic Coefficient Table

S_S	C_p	S_S	C_p
0.33 or less	0.35	2.2	1.03
0.4	0.38	2.3	1.07
0.5	0.4	2.4	1.12
0.6	0.42	2.5	1.17
0.7	0.42	2.6	1.21
0.8	0.44	2.7	1.26
0.9	0.48	2.8	1.31
1	0.51	2.9	1.35
1.1	0.54	3	1.4
1.2	0.57	3.1	1.45
1.3	0.61	3.2	1.49
1.4	0.65	3.3	1.54
1.5	0.7	3.4	1.59
1.6	0.75	3.5	1.63
1.7	0.79	3.6	1.68
1.8	0.84	3.7	1.73
1.9	0.89	3.8	1.77
2	0.93	3.9	1.82
2.1	0.98	4	1.87

SEISMIC COEFFICIENT | 6

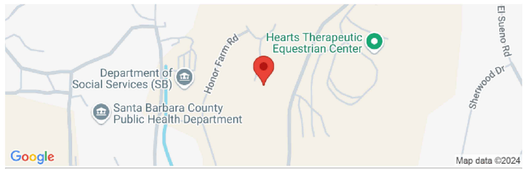
USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
USGS web services are now operational so this tool should work as expected.

OSHPD

Santa Barbara County Jail

4436 Calle Real, Santa Barbara, CA 93110, USA

Latitude, Longitude: 34.44462, -119.7766346



Date	9/30/2024, 8:21:00 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	2.252	MCE_R ground motion. (for 0.2 second period)
S_1	0.798	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.703	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.802	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.985	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.182	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	2.252	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.565	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	3.142	Factored deterministic acceleration value. (0.2 second)
S1RT	0.798	Probabilistic risk-targeted ground motion. (1.0 second)

USGS DESIGN CODE REFERENCE | 5

Victaulic

AUTOMATIC SPRINKLERS FIRE PROTECTION PRODUCTS 40.81

Sprinkler Cabinets

PRODUCT DESCRIPTION



Victaulic Automatic Sprinkler Cabinets provide for storage of a supply of sprinklers. Maintaining a supply of spare sprinklers on the premises of automatic sprinkler systems will aid in the prompt replacement of operated or damaged sprinklers and returning a fire protection system to service as soon as possible.

This is a requirement of NFPA and most Authorities Having Jurisdiction. Refer to the applicable NFPA standard governing your specific installation for further details.

Six or twelve sprinkler capacity cabinets are available. This also provides for storage of the appropriate wrench which is required for the installation and removal of sprinklers.

NFPA 25 requires the total number of spare sprinklers to be stored on the premises of an automatic sprinkler system meet the minimum quantities shown in the accompanying table. When the sprinkler system includes more than one type of temperature rating sprinkler, the stock of spare sprinklers must include a proportional sampling of each type and temperature rating; however, a minimum of 3 each is recommended.

Sprinklers in Building	Min. Number of Spare Sprinklers
Under 300	6*
300 to 1000	12
Over 1000	24

*A minimum of three sprinklers of each type and temperature rating are required for residential fire sprinkler systems in one- and two-family dwellings and mobile homes.

TECHNICAL SPECIFICATIONS

Models:
- ❑ 12 sprinklers
- ❑ 6 sprinklers
- ❑ 3 sprinklers (NFPA/3D, Residential)
- ❑ 6 large sprinklers

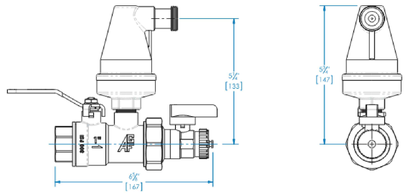
Material: Heavy gauge steel, red enamel.

Cabinets are available in six or twelve sprinkler capacities with dimensions and shelf variations as shown on page 2. The cabinets are of welded construction fabricated from low carbon steel sheet. The box and shelves are fabricated from 0.030" thick material and the cover is fabricated from 0.042" thick material.

The cover is mounted to the box, at the top, with two 0.036" thick steel butt type hinges. A coat of red enamel paint is applied inside and out, and a label indicating that the cabinet is for spare sprinklers is bonded to the cover.

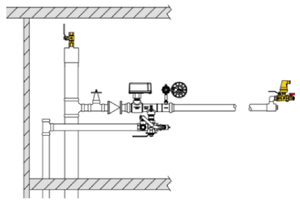
SPRINKLER CABINET | 4

Model 7900AAV Dimensions



Model 7900AAV Installation Locations

AGF recommends installing the M7900AAV Automatic Air Venting Valve at high points near the end of system branch lines, whenever possible.



Item ID	Item Description
7900AAV	1" Automatic Air Venting Valve

PURGENVENT™
Model 7900AAV

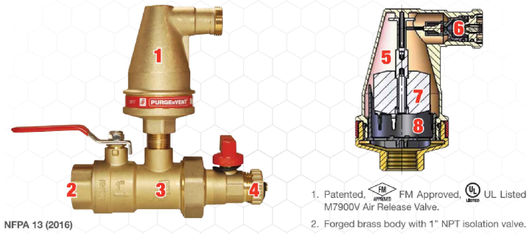
WWW.PURGENVENT.COM

Automatic Air Venting Valve

The PURGENVENT™ Model 7900AAV Automatic Air Venting Valve is designed to exceed NFPA 13 code that requires a single air vent be provided on each wet pipe sprinkler system utilizing metallic pipe.

To rapidly remove air from the system attach a hose to the purge valve's hose connection and open the valve while the system is being filled. Once the system is in operation the automatic vent will release any excess air. The purge valve is also convenient for cleaning the strainer.

AGF recommends installing the M7900AAV at high points near the end of system branch lines, whenever possible.



1. Patented, FM Approved, UL Listed M7900V Air Release Valve.
2. Forged brass body with 1" NPT isolation valve.
3. Stainless Steel 20 mesh strainer.
4. Adjustable purge valve with hose connection, thread cap, and lanyard.
5. Unique conical shape maximizes clearance to protect valve from contamination.
6. Recessed venting valve prevents damage to vent mechanism and float.
7. Single float on rigid shaft only allows vertical movement.
8. Bubble Breaker aids in the passage of air to the vent and acts as a secondary filter.

NFPA 13 (2016)

7.1.5 Air Venting
A single air vent with a connection conforming to 8.16.6 shall be provided on each wet pipe system utilizing metallic pipe.

8.16.6* Air Venting
The vent required by 7.1.5 shall be located near a high point in the system to allow air to be removed from that portion of the system by one of the following methods:
- Manual valve, minimum 1/2" (15mm) size
- Automatic air vent
- Other approved means

AUTOMATIC AIR VENT VALVE | 3

Victaulic® VicFlex™ Series FL-SC/VS2
Standard Coverage, Quick/Standard Response Sprinklers
K5.6 (80)

Victaulic 10.93



1.0 PRODUCT DESCRIPTION

The Series FL-SC/VS2 is a listed sprinkler and hose assembly that has been calibrated as a K5.6. This product does not require further calculation or use of equivalent length values.

STANDARD RESPONSE RECESSED PENDENT SPRINKLER	
SIN	V3201
ORIENTATION	PENDENT
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Standard
CONNECTION	1" NPT/25mm BSPT/1" IGS
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Recessed
LENGTHS	56"/1422mm and 68"/1727mm

QUICK RESPONSE RECESSED PENDENT SPRINKLER	
SIN	V3202
ORIENTATION	PENDENT
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Quick
CONNECTION	1" NPT/25mm BSPT/1" IGS
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Recessed
LENGTHS	56"/1422mm and 68"/1727mm

STANDARD RESPONSE CONCEALED PENDENT SPRINKLER	
SIN	V3203
ORIENTATION	CONCEALED PENDENT
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Standard
CONNECTION	1" NPT/25mm BSPT/1" IGS
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Concealed
LENGTHS	56"/1422mm and 68"/1727mm

QUICK RESPONSE CONCEALED PENDENT SPRINKLER	
SIN	V3204
ORIENTATION	CONCEALED PENDENT
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Quick
CONNECTION	1" NPT/25mm BSPT/1" IGS
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Concealed
LENGTHS	56"/1422mm and 68"/1727mm

AVAILABLE WRENCHES	
SPRINKLER	V32 Socket
Pendent	■

Factory Hydrostatic Test: 100% @ 500 psi/3447 kPa/34 bar
Min. Operating Pressure: 7 psi/48 kPa/.5 bar
Temperature Rating: See tables in section 2.0

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

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2.0 CERTIFICATION/LISTINGS

c UL us LISTED

APPROVALS/LISTINGS				
SIN	V3201	V3202	V3203	V3204[1]
Nominal K Factor Imperial	5.6	5.6	5.6	5.6
Metric K-Factor (lpm/(bar)½)	80	80	80	80
Orientation	Pendent	Pendent	Pendent	Pendent
Escutcheon	Recessed	Recessed	Concealed	Concealed
Approved Temperature Ratings F°/C°				
cULus	155°F/68°C 200°F/93°C	155°F/68°C 200°F/93°C	155°F/68°C 200°F/93°C	155°F/68°C 200°F/93°C

[1] The V3204 is UL-Listed as a standard response sprinkler when installed with a gasketed coverplate. Coverplate gaskets are optional and ordered separately.

NOTES
- Listings and approval as of printing.
- For system design purposes, no equivalent length calculations are required.
- These sprinklers are required to be vented. Installations with a positive pressure air plenum above the housing are not permitted.

MAXIMUM ALLOWABLE NUMBER OF BENDS	
Nominal Sprinkler Length inches mm	Maximum Allowable Number of 90° Bends at 2"/51mm Bend Radius for UL Listing
56.0 1422	4
68.0 1727	4

Agency	Approved/Listed Bracket Styles
UL	A82, A84, A85, A810

FLEXIBLE DROP | 2

Victaulic® FireLock™ Series FL-QR
Standard Coverage, Quick Response
Upright, Pendent and Recessed Pendent Sprinklers
K2.8 (4.0), K4.2 (6.1), K5.6 (8.1), K8.0 (11.5)

Victaulic 41.01



1.0 PRODUCT DESCRIPTION

QUICK RESPONSE UPRIGHT SPRINKLERS				
SIN	V2815	V4215	V2704	V3402
ORIENTATION	UPRIGHT	UPRIGHT	UPRIGHT	UPRIGHT
K-FACTOR[1]	2.8 lmp./4.0 S.I.	4.2 lmp./6.1 S.I.	5.6 lmp./8.1 S.I.	8.0 lmp./11.5 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT/IGS	¾" NPT/20mm BSPT/IGS
MAX. WORKING PRESSURE	175 psi/1200 kPa	175 psi/1200 kPa	175 psi/1200 kPa cULus 250 psi/1725 kPa	175 psi/1200 kPa
GLOBE RE-DESIGNATION	GL2815	GL4215	–	–
GLOBE EQUIVALENT	–	–	GL5615	GL8118

QUICK RESPONSE PENDENT SPRINKLERS				
SIN	V2801	V4201	V2708	V3406
ORIENTATION	PENDENT	PENDENT	PENDENT	PENDENT
K-FACTOR[1]	2.8 lmp./4.0 S.I.	4.2 lmp./6.1 S.I.	5.6 lmp./8.1 S.I.	8.0 lmp./11.5 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT/IGS	¾" NPT/20mm BSPT/IGS
MAX. WORKING PRESSURE	175 psi /1200 kPa	175 psi /1200 kPa	175 psi /1200 kPa cULus 250 psi/1725 kPa	175 psi/1200 kPa
GLOBE RE-DESIGNATION	GL2801	GL4201	–	–
GLOBE EQUIVALENT	–	–	GL5601	GL8101

QUICK RESPONSE RECESSED PENDENT SPRINKLERS				
SIN	V2801	V4201	V2708	V3406
ORIENTATION	PENDENT	PENDENT	PENDENT	PENDENT
K-FACTOR[1]	2.8 lmp./4.0 S.I.	4.2 lmp./6.1 S.I.	5.6 lmp./8.1 S.I.	8.0 lmp./11.5 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT/IGS	¾" NPT/20mm BSPT/IGS
MAX. WORKING PRESSURE	175 psi /1200 kPa	175 psi /1200 kPa	175 psi /1200 kPa cULus 250 psi/1725 kPa	175 psi/1200 kPa
ESCUTCHEON	Recessed	Recessed	Recessed	Recessed
GLOBE RE-DESIGNATION	GL2801	GL4201	–	–
GLOBE EQUIVALENT	–	–	GL5601	GL8101

AVAILABLE GUARDS/SHIELDS				
SPRINKLER	V28	V42	V27	V34
Upright			■	■
Pendent			■	■

AVAILABLE WRENCHES							
SPRINKLER	V56-2 Recessed	V56 Open End	V27-2 Recessed	V27 Open End	V34-2 Recessed	V34 Open End	5/16 Hex-Bit
V2815 and V4215		■					
V2707 and V2704				■			■
V3402						■	■
V2801, and V4201	■	■					
V2706 and V2708			■	■			■
V3406						■	■

Factory Hydrostatic Test: 100% @ 500 psi/3447 kPa/34 bar
Min. Operating Pressure: UL/FM: 7 psi/48 kPa/.5 bar
VdS: 5 psi/35 kPa/.35 bar (Upright only)
Temperature Rating: See tables in section 2.0

[1] For K-Factor when pressure is measured in bar, multiply S.I. units by 10.0.

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

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2.0 CERTIFICATION/LISTINGS

UPRIGHT APPROVALS/LISTINGS				
SIN	V2815	V4215	V2704	V3402
Nominal K Factor Imperial	2.8	4.2	5.6	8.0
Nominal K Factor S.I.[2]	4.0	6.1	8.1	11.5
Orientation	UPRIGHT	UPRIGHT	UPRIGHT	UPRIGHT
Approved Temperature Ratings F°/C°				
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
FM	–	–	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
LPCB	–	–	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
CE	–	–	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
VdS	–	–	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
CCC K-ZSTZ	–	–	155°F/68°C 175°F/79°C 286°F/141°C	155°F/68°C 286°F/141°C

[2] For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

PENDENT APPROVALS/LISTINGS				
SIN	V2801	V4201	V2708	V3406
Nominal K Factor Imperial	2.8	4.2	5.6	8.0
Nominal K Factor S.I.[2]	4.0	6.1	8.1	11.5
Orientation	PENDENT	PENDENT	PENDENT	PENDENT
Escutcheon	Flush/Extended	Flush/Extended	Flush/Extended	Flush/Extended
Approved Temperature Ratings F°/C°				
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
FM	–	–	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
CCC K-ZSTX	–	–	155°F/68°C 200°F/93°C 286°F/141°C	155°F/68°C 286°F/141°C

[2] For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

NOTES
- Listings and approval as of printing.
- Where cULus Listed, Polyester and VC-250 Coatings Listed as Corrosion Resistant (V3402 with VC-250 Only)
- Where FM Approved, VC-250 Coating Approved as Corrosion Resistant
- New York City Acceptance - All UL Listed and/or FM Approved sprinklers acceptable to NYC per section 28-113 of the Administrative Code and the OTCR Rule.

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VICTAULIC SPRINKLER HEAD | 1

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REVISIONS

NO.	DESCRIPTION	DATE
1	PLAN CHECK	9/8/25

DATE 2/25/25
JOB NO. Y2213.00
SHEET TITLE

MANUFACTURER'S DATA SHEETS

SHEET NO.

FP-4.0

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

4436 CALLE REAL, SANTA BARBARA, CA 93110.

GENERAL NOTES

1. THESE DRAWINGS PROVIDE SUPPLEMENTAL INFORMATION TO THE SPECIFICATIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COMPLETE SET OF CONTRACT DOCUMENTS, ADDENDA, DRAWINGS AND SPECIFICATIONS.
2. THESE DRAWINGS SHALL NOT BE USED FOR FIELD INSTALLATION. THE APPROVED SHOP DRAWINGS ARE TO BE USED FOR FIELD INSTALLATION. REFER TO THE SPECIFICATIONS FOR SHOP DRAWING REQUIREMENTS.
3. THE CONTRACTOR SHALL COORDINATE ITS WORK WITH OTHER TRADES AT THE SITE. ANY COSTS TO INSTALL WORK THAT IS DIFFERENT FROM THE WORK AS SHOWN ON THE DRAWINGS SHALL BE INCURRED BY THE CONTRACTOR. ANY DISCREPANCIES, AMBIGUITIES OR CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER DURING BID TIME FOR CLARIFICATION. ANY SUCH CONFLICTS NOT CLARIFIED PRIOR TO BID SHALL BE SUBJECT TO THE INTERPRETATION OF THE OWNER AT NO ADDITIONAL COST TO THE COUNTY.
4. THE CONTRACTOR SHALL PROVIDE AND KEEP A UP-TO-DATE AND COMPLETE RECORD SET OF SHOP DRAWINGS. THESE PRINTS SHALL BE CORRECTED DAILY AND SHOW EVERY CHANGE FROM THE APPROVED SHOP DRAWINGS. THIS SET OF DRAWINGS SHALL BE KEPT ON THE JOB SITE AND SHALL BE USED ONLY AS A RECORD SET. THIS SHALL NOT BE CONSTRUED AS AUTHORIZATION FOR THE CONTRACTOR TO MAKE CHANGES IN THE CONTRACT DOCUMENTS WITHOUT WRITTEN COUNTY AUTHORIZATION.
5. THE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT SHALL BE COORDINATED WITH THE ELECTRICAL AND MECHANICAL DRAWING DETAILS, OR SECTIONS PRIOR TO INSTALLATION. MOUNTING HEIGHTS OF ALL DEVICES AND EQUIPMENT ARE FROM FINISHED FLOOR TO THE CENTER OF DEVICES AND EQUIPMENT UNLESS OTHERWISE NOTED. BOXES INSTALLED IN LOCATIONS THAT ARE NOT APPROVED BY THE OWNER SHALL BE RELOCATED AS DIRECTED BY THE OWNER AT NO ADDITIONAL COST TO THE OWNER.
6. FULLY COORDINATE THE LAYOUT OF ALL CABINETS AND RACKS WITH OTHER EQUIPMENT AND FURNITURE WITHIN THE SAME ROOM PRIOR TO SUBMITTING SHOP DRAWINGS FOR APPROVAL.
7. ALL WORK SHALL BE INSPECTED AND APPROVED BEFORE COVER-UP.
8. ALL RECESSED FIXTURES, SPEAKERS, RECEPTACLES, SWITCHES, ETC., MOUNTED IN THE FIRE RATED CEILINGS OR WALLS SHALL BE ENCLOSED WITH AN APPROVED ENCLOSURE CARRYING THE SAME FIRE RATING AS THE CEILING OR WALL.
9. CONTRACTOR SHALL TEST AND IDENTIFY ALL EXISTING CONDITIONS OF SYSTEMS RELEVANT AND/OR AFFECTED BY THIS PROJECT. SUBMIT A LIST OF IDENTIFIED PROBLEMS AND SEQUENCES OF OPERATIONS TO THE COUNTY IN PREPARATION OF PRODUCT DATA AND SHOP DRAWING SUBMITTALS. FAILURE TO DOCUMENT PROBLEMS WILL RESULT IN THE INSTALLATION COMPANY BEING HELD RESPONSIBLE FOR REPAIRS OR CORRECTIONS. THIS INCLUDES BUT IS NOT LIMITED TO PROGRAMMING OF SYSTEMS.

LEGEND NOTES

- CONDUIT TURNING DOWN (VARIOUS SIZES AND TYPES)
- CONDUIT TURNING UP (VARIOUS SIZES AND TYPES)
- ## — CONDUIT SIZE; WIRE/CABLE QUANTITY AND TYPE (REFER TO SYMBOL & WIRE/CABLE LEGEND); CABLING HOMERUN
- HOMERUN DESIGNATION (ROOM OR CABINET LABEL)
- SE1-01 / 1 — REF. SHEET, REF. DETAIL — COMPLY WITH THE REQUIREMENTS IN ALL REFERENCE DETAILS.
- ◈ KEY NOTE.
- (#) DETAIL NOTE.
- DEVICE SEGMENT IDENTIFIER: (C1,D2.#) — PANEL SEGMENT ID., CONTROL PANEL ID.
- REMOVE DEVICE.
- (E) EXISTING EQUIPMENT
- END OF LINE RESISTOR, "E.O.L."
- EXISTING DUCTWORK IN CEILING SPACE
- (1) INTERLOCK
- FB1 FB1 — 1 HOUR FIRE BARRIER SEPARATION

PATHWAY ELECTRICAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC ONLY, ROUTING OF RACEWAYS SHALL BE AT THE OPTION OF THE CONTRACTOR UNLESS OTHERWISE NOTED AND SHALL BE COORDINATED WITH OTHER SECTIONS. DO NOT USE CONTRACT DRAWINGS FOR LOCATIONS OF ANY ELECTRICAL, ARCHITECTURAL, STRUCTURAL, CIVIL, OR MECHANICAL ITEMS.
2. ALL CONDUITS SHALL BE, 3/4" NOMINAL OR LARGER AS REQUIRED BY THE SYSTEMS.
3. ALL INTERRUPTION OF ELECTRICAL POWER SHALL BE KEPT TO A MINIMUM. HOWEVER, WHEN AN INTERRUPTION IS NECESSARY, THE SHUTDOWN MUST BE COORDINATED WITH THE OWNER PRIOR TO THE OUTAGE. ANY OVERTIME PAY SHALL BE INCLUDED IN THE CONTRACTOR'S BID. WORK IN EXISTING SWITCHBOARDS OR PANEL BOARDS SHALL BE COORDINATED WITH THE COUNTY PRIOR TO REMOVING ACCESS PANELS OR DOORS.
4. COMPLY WITH CEC, FOR APPLICATION, SIZE, LOCATION, AND INSTALLATION OF EACH TYPE OF RACEWAY. A GROUNDING CONDUCTOR SHALL BE PROVIDED IN ALL CONDUIT RUNS.
5. PENETRATIONS OF ANY KIND IN FIRE AND SMOKE PARTITIONS, WALLS, AND CEILING ASSEMBLIES, SHALL BE FIRE STOPPED AND SEALED WITH AN APPROVED MATERIAL AND AS REQUIRED BY CODE.
6. ROOF PENETRATIONS OF ANY KIND MUST BE APPROVED BY THE COUNTY AND PERFORMED BY A LICENSED ROOFER.
7. EXACT METHOD AND LOCATION OF CONDUIT PENETRATION AND OPENINGS IN CONCRETE WALLS OR FLOORS OR STRUCTURAL STEEL MEMBERS SHALL BE AS DIRECTED BY THE STRUCTURAL ENGINEER. PERFORM CORING, SAW CUTTING, PATCHING, AND REFINISHING OF EXISTING WALLS AND SURFACES WHEREVER IT IS NECESSARY TO PENETRATE. OPENINGS SHALL BE SEALED IN AN APPROVED METHOD TO MEET THE FIRE RATING OF THE PARTICULAR WALL, FLOOR OR CEILING. EXACT METHOD AND LOCATIONS OF CONDUIT PENETRATIONS AND OPENINGS IN CONCRETE WALLS OR FLOORS SHALL BE UL APPROVED.
5. ROUTE EXPOSED CONDUIT AND CONDUIT IN CEILING SPACE PARALLEL AND PERPENDICULAR TO WALLS AND ADJACENT PIPING. ARRANGE CONDUIT TO MAINTAIN HEADROOM AND TO PRESENT A NEAT APPEARANCE.
6. SECURELY FASTEN ALL DEVICES AND BOXES. USE SECURITY FASTENERS ALSO WHERE DIRECTED.
7. ALL JUNCTION BOXES MUST BE ACCESSIBLE BY MAINTENANCE STAFF, BUT NOT BY THE PUBLIC/INMATES.
8. MAXIMUM NUMBER OF CONDUCTORS IN PULL AND JUNCTION BOXES SHALL CONFORM TO THE CALIFORNIA ELECTRICAL CODE, ARTICLE 314-16 AND 314-28. COMPLY WITH CEC FOR 40% MAXIMUM CONDUIT FILL. UPSIZE CONDUITS ACCORDINGLY AT NO ADDITIONAL COST TO THE OWNER.
9. JUNCTION AND PULLBOXES: FOR INTERIOR DRY LOCATIONS, BOXES SHALL BE GALVANIZED ONE-PIECE, DRAWN STEEL, KNOCKOUT TYPE WITH REMOVABLE MACHINE SCREW SECURED COVERS. BOXES SHALL BE SIZED FOR THE NUMBER AND SIZES OF CONDUCTORS AND CONDUIT ENTERING THE BOX AND EQUIPPED WITH PLASTER EXTENSION RINGS WHERE REQUIRED. BOXES SHALL BE LABELED TO INDICATE PANEL AND CIRCUIT NUMBER, OR TYPE OF SIGNAL OR COMMUNICATIONS SYSTEM.
10. ALL CONDUIT IS TO BE CONCEALED UNLESS OTHERWISE PERMITTED. PAINT ALL EXPOSED CONDUITS TO MATCH EXISTING SURFACES. REPAIR, PATCH, CLEAN AND PAINT EXISTING SURFACES THAT ARE DAMAGED, DISTURBED OR LEFT IN AN UNFINISHED OR MISMATCHING CONDITION AS A RESULT OF THE WORK OF THIS CONTRACT, TO MATCH THE ADJACENT AREA.
11. ALL HOLES ON WALLS OR CEILING REMAINING DUE TO REMOVAL OF EQUIPMENT SHALL BE PROPERLY PATCHED AND PAINTED TO MATCH THE ADJACENT SURFACE. WHEN HOLES REMAINED ON CEILING TILES, REPLACE CEILING TILES. VERIFY REBAR LOCATIONS PRIOR TO CORE DRILLING.
12. THE SEISMIC BRACING AND ANCHORAGE OF ELECTRICAL CONDUITS, BUS DUCT, WIREWAY, AND CABLE TRAY SHALL BE IN ACCORDANCE WITH THE CALIFORNIA BUILDING CODE, CHAPTER 16 AND "GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS AND, PLUMBING PIPING SYSTEMS." PUBLISHED BY SMACNA AND PPIC.
13. RIGID GALVANIZED STEEL CONDUIT FITTINGS SHALL BE THREADED AND THOROUGHLY GALVANIZED. RIGID CONDUIT SHALL BE FULL WEIGHT GALVANIZED STEEL. ELECTRICAL METALLIC TUBING (EMT) CONDUIT FITTINGS SHALL BE STEEL, RAIN TIGHT THREADLESS COMPRESSION TYPE. DIE CAST, SET SCREW, OR INDENTER TYPES ARE NOT ACCEPTABLE. FLEXIBLE STEEL CONDUIT FITTINGS SHALL BE MALLEABLE IRON CLAMP, SQUEEZE TYPE OR STEEL TWIST-IN TYPE WITH INSULATED THROAT. SET SCREW TYPE IS NOT ACCEPTABLE.
14. PROVIDE ADDITIONAL DOOR/ACCESS HATCHES WHERE FUTURE ACCESS IS NEEDED FOR ALL FIELD DEVICES, EQUIPMENT, AND RACEWAYS. SECURE AND NON-SECURE TYPE DOOR/ACCESS HATCHES AS REQUIRED BY LOCATION.

PROJECT NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAW CUTTING, TRENCHING, BACK FILLING, COMPACTION, AND, PATCHING OF CONCRETE AND ASPHALT AS REQUIRED TO PERFORM HIS WORK. ATTENTION IS CALLED TO THE FACT THAT THERE IS UNDERGROUND UTILITY LINES. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN TRENCHING FOR HIS WORK. THE CONTRACTOR SHALL SHALL BE RESPONSIBLE FOR THE PROPER AND APPROVED REPAIR OF ANY AND ALL DAMAGES CAUSED BY ITS WORK.
2. SECURITY REQUIREMENTS, EXPOSED CONDUIT:
   a. WHERE NOT SPECIFICALLY SHOWN ON THE DRAWINGS OR SPECIFIED USE THE FOLLOWING GUIDELINES FOR THE SELECTION OF EXPOSED RACEWAY TYPES:
      1) IMC or RGS – LOCATIONS UNDER FIFTEEN FEET IN HEIGHT FROM FINISHED FLOOR WHERE EXPOSED TO INMATE OR PUBLIC ACCESS.
      2) EMT – LOCATIONS NOT ACCESSIBLE TO INMATES, PUBLIC ACCESS, OR OVER 15 FEET IN HEIGHT FROM FINISHED FLOOR.
   b. PVC – NOT PERMITTED
   c. SECURE RACEWAY WITH TWO HOLE CONDUIT STRAPS IN INMATE AND PUBLIC ACCESSIBLE AREAS, ONE HOLE STRAPS NOT PERMITTED EXCEPT WHEN CONDUIT IS TIGHT TO CORNER.
   d. SUPPORT EXPOSED CONDUIT IN INMATE ACCESSIBLE AREAS WITH CONDUIT STRAPS EVERY FIVE FEET AND WITHIN TWELVE INCHES OF ANY JOINT.
3. CONTRACTOR MAY COMBINE AND HOMERUN TO A SECURITY ELECTRONICS ROOM OR J-BOX UP TO 3 DEVICES UNLESS OTHERWISE NOTED.
4. CONTRACTOR TO MAINTAIN SEPARATION BETWEEN CLASS 1 AND CLASS 2 WIRING AS REQUIRED BY NEC.

CONSTRUCTION NOTES

1. CONTRACTOR AGREES TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSON AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE COUNTY AND ITS REPRESENTATIVE HARMLESS FROM ANY AND ALL LIABILITY, REAL AND/OR ALLEGED, IN CONJUNCTION WITH THE PERFORMANCE OF THIS PROJECT.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGES TO EXISTING STRUCTURES AND UTILITIES DURING CONSTRUCTION.
3. CONTRACTOR SHALL VERIFY LOCATIONS. LEVELS, DISTANCES, AND FEATURES THAT MAY AFFECT THE WORK. SHOULD EXISTING CONDITIONS DIFFER FROM THOSE SHOWN OR INDICATED, OR IF IT APPEARS THAT THESE PLANS, STANDARD SPECIFICATIONS, AND SPECIAL PROVISIONS DO NOT ADEQUATELY DETAIL THE WORK TO BE DONE, CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO CONTINUING WITH ANY RELATED WORK. NO ALLOWANCE WILL BE MADE IN HIS/HER BEHALF FOR ANY EXTRA EXPENSE RESULTING FROM FAILURE OR NEGLECT IN DETERMINING THE CONDITIONS UNDER WHICH WORK IS TO BE PERFORMED. NOTED DIMENSIONS TAKE PRECEDENCE OVER SCALE.
4. A SET OF SIGNED WORKING DRAWINGS AND A SET OF SPECIFICATIONS WILL BE KEPT AT ALL TIMES AT THE JOB SITE ON WHICH ALL CHANGES OR VARIATIONS IN THE WORK, INCLUDING ALL EXISTING UTILITIES, ARE TO BE RECORDED AND/OR CORRECTED DAILY AND SUBMITTED TO THE COUNTY ENGINEER WHEN THE WORK TO BE DONE IS COMPLETED.
5. CONTRACTOR SHALL PROVIDE AND MAINTAIN SUFFICIENT TEMPORARY BARRIERS TO PROVIDE FOR THE SAFETY OF THE STAFF AND PUBLIC TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR AND FACILITY STAFF.
6. CONTRACTOR SHALL CONTACT THE COUNTY'S DIRECTOR OF PUBLIC WORKS, OR HIS/HER DESIGNEE, TO ARRANGE A PRE-CONFERENCE FOR THE PURPOSE OF REVIEWING JOB REQUIREMENTS AND COUNTY PROCEDURES.
7. ALL MATERIALS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR UNLESS OTHERWISE NOTED.
8. CONTRACTOR SHALL COOPERATE WITH ALL NECESSARY STAFF RELOCATIONS, IF REQUIRED TO FACILITATE MAKING AREAS READY FOR WORK.
9. CONTRACTOR SHALL NOTIFY THE DIRECTOR OF PUBLIC WORKS AT LEAST 72 HOURS IN ADVANCE OF COMMENCEMENT OF ANY PART OF THE WORK.
10. CONTRACTOR SHALL COORDINATE CONSTRUCTION SCHEDULE WITH ENGINEER TO MINIMIZE IMPACT TO THE FACILITY.
11. CONTRACTOR IS RESPONSIBLE FOR PROCURING AND PAYING FOR ANY PERMITS.
12. CONTRACTOR SHALL WORK ON THE WEEKEND ONLY IF REQUIRED BY ANY PERMITS.
13. ALL WORKERS WILL BE REQUIRED TO PASS A BACKGROUND CHECK, ENTRY TO FACILITY IS AT THE SOLE DISCRETION OF THE DIRECTOR OF THE COUNTY DEPARTMENT OF CORRECTIONS.
14. CELL PHONES AND ELECTRONIC DEVICES ARE NOT ALLOWED IN THE FACILITY.
15. USE OF CAMERAS MUST BE PREAPPROVED BY THE FACILITY.
16. CONTRACTOR SHALL CLEAN UP AND MAINTAIN DUST/ODOR CONTROL.

SHEET INDEX

SE001	GENERAL NOTES, LEGEND, AND ABBREVIATIONS
SE100	OVERALL SITE PLAN – SECURITY ELECTRONICS
SE111	FLOOR PLAN – GROUND LEVEL – SECURITY ELECTRONICS
SE112	FLOOR PLAN – TIER LEVEL – SECURITY ELECTRONICS
SE201	ENLARGED ROOM LAYOUTS AND ELEVATIONS
SE301	SINGLE LINE DIAGRAMS

WIRE/CABLE LEGEND

SECURITY WIRING

TYPE	DESCRIPTION	MFR./PART No.	
A	#14 AWG THWN	SUBMIT/AS REQ'D	GLASS-1 CONDUCTOR
B	(3) PAIR #22 TWISTED, SHIELDED	BELDEN/AS REQ'D	DATA COMMUNICATIONS
C	RG-59/U COAXIAL CABLE	BELDEN/AS REQ'D	VIDEO SIGNAL
D	(1) PAIR #16 TWISTED	BELDEN/AS REQ'D	DEVICE POWER/Controls
E	(1) PAIR #18 TWISTED/ SHIELDED	BELDEN/AS REQ'D	INTERCOM/LINE AUDIO
F	(1) PAIR #18 TWISTED	BELDEN/AS REQ'D	PAGING/LINE AUDIO
G	(1) PAIR #20 TWISTED	BELDEN/AS REQ'D	COMMUNICATION SIGNAL
K	4-PAIR CAT 6A	BELDEN/AS REQ'D	NETWORK COMMUNICATIONS
L	24-STR MULTI-MODE OPTIC FIBER	BELDEN/AS REQ'D	VIDEO/AUDIO/DATA
M	12-STR MULTI-MODE OPTIC FIBER	BELDEN/AS REQ'D	VIDEO/AUDIO/DATA
N	2-STR MULTI-MODE OPTIC FIBER	BELDEN/AS REQ'D	VIDEO/AUDIO/DATA
R	#12 AWG THWN	BELDEN/AS REQ'D	DEVICE POWER
S	RG-6 COPPER BRAIDED	SUBMIT/AS REQ'D	VIDEO SIGNAL

CODE ANALYSIS

- 2019 BUILDING STANDARD ADMINISTRATIVE CODE PART 1, TITLE 24 C.C.R.
- 2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.
- 2019 CALIFORNIA ELECTRICAL CODE (CEC), PART3, TITLE 24 C.C.R.
- 2019 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24, C.C.R.
- 2019 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24, C.C.R.
- 2019 CALIFORNIA PUBLIC SAFETY, STATE FIRE MARSHAL, DIVISION 1, TITLE 19, C.C.R.

LEGEND

DOOR/GATE CONTROL AND MONITORING SYSTEM

SYMBOL	DESCRIPTION	WIRE TYPE	MOUNTING HEIGHT
	ELECTRIC LOCK HARDWARE W/ POSITION LIMIT SWITCH	2D, 1G	–
	DOOR POSITION SWITCH (DPS)	1G	–
H	REMOTE DOOR CONTROL PUSH BUTTON	1G	48" AFF

DURESS ALARM SYSTEM

SYMBOL	DESCRIPTION	WIRE TYPE	MOUNTING HEIGHT
	PANIC/DURESS ALARM STATION, UNDER DESK/COUNTER	1G	–

INTERCOMMUNICATION SYSTEM

SYMBOL	DESCRIPTION	WIRE TYPE	MOUNTING HEIGHT
HF	INTERCOM CALL BUTTON "F" DENOTES FRAME MOUNTED	1K	48" AFF
H	INTERCOM STATION, WALL MOUNTED	1K	48" AFF
S	PAGING SPEAKER, CEILING MTD.	1F	CEILING MTD.
	INTERCOM SPEAKER, CEILING MTD.	1K	–
HS	PAGING SPEAKER, WALL MTD.	1F	10'-0" AFF

VIDEO SURVEILLANCE (CCTV) SYSTEM

SYMBOL	DESCRIPTION	WIRE TYPE	MOUNTING HEIGHT
(C#)	NEW FIXED COLOR CAMERA IN DOME HOUSING: 'C#' DENOTES CAMERA NUMBER	1K	PER CAMERA SCHEDULE
(C#)#	NEW FIXED COLOR CAMERA IN DOME HOUSING: 'C#' DENOTES CAMERA NUMBER, '#' DEMOTES CAMERA ANGULAR FIELD OF VIEW	1K	PER CAMERA SCHEDULE
M	VIDEO MONITOR WITH MOUNT	HDMI	PER DETAILS
VR	VIDEO EQUIPMENT RACK	–	–

ABBREVIATIONS

(E) – EXISTING
ACP – ACCESS CONTROL PANEL
AFF – ABOVE FINISH FLOOR
AFG – ABOVE FINISH GRADE
AIP – AUDIO INTERFACE PANEL
AMP – AMPLIFIER
AR – AUDIO RACK
ATM – AUDIO THRESHOLD MONITORING
B/W – BLACK AND WHITE
CCTV – CLOSED CIRCUIT TELEVISION (VIDEO SURVEILLANCE SYSTEM)
CM – CONTROL MODULE
CP – CONTROL PANEL
CPU – CENTRAL PROCESSING UNIT
DPS – DOOR POSITION SENSOR
ELEC – ELECTRICAL PANEL
F.A. – FIRE ALARM
FPP – FIBER PATCH PANEL WITH TRANSCEIVERS
HH – HANDHOLE
IA – INTERCOM AUDIO AMPLIFIER
ICM – INTERCOM CALL MASTER STATION
I/O – INPUT OR OUTPUT
M – MONITOR
MD – MAIN DISTRIBUTION FRAME
MH – MANHOLE
MFR – MANUFACTURER
NIC – NOT IN CONTRACT
OFOI – OWNER FURNISHED, OWNER INSTALLED
PBO – PROVIDED BY OTHER
PED – PEDESTAL
PKC – PROGRAMMABLE KEYBOARD CONTROLLER
PS – POWER SUPPLY
PTR – PRINTER
UON – UNLESS OTHERWISE NOTED
UPS – UNINTERRUPTIBLE POWER SUPPLY
VR – VIDEO RACK
WPS – WINDOW POSITION SENSOR

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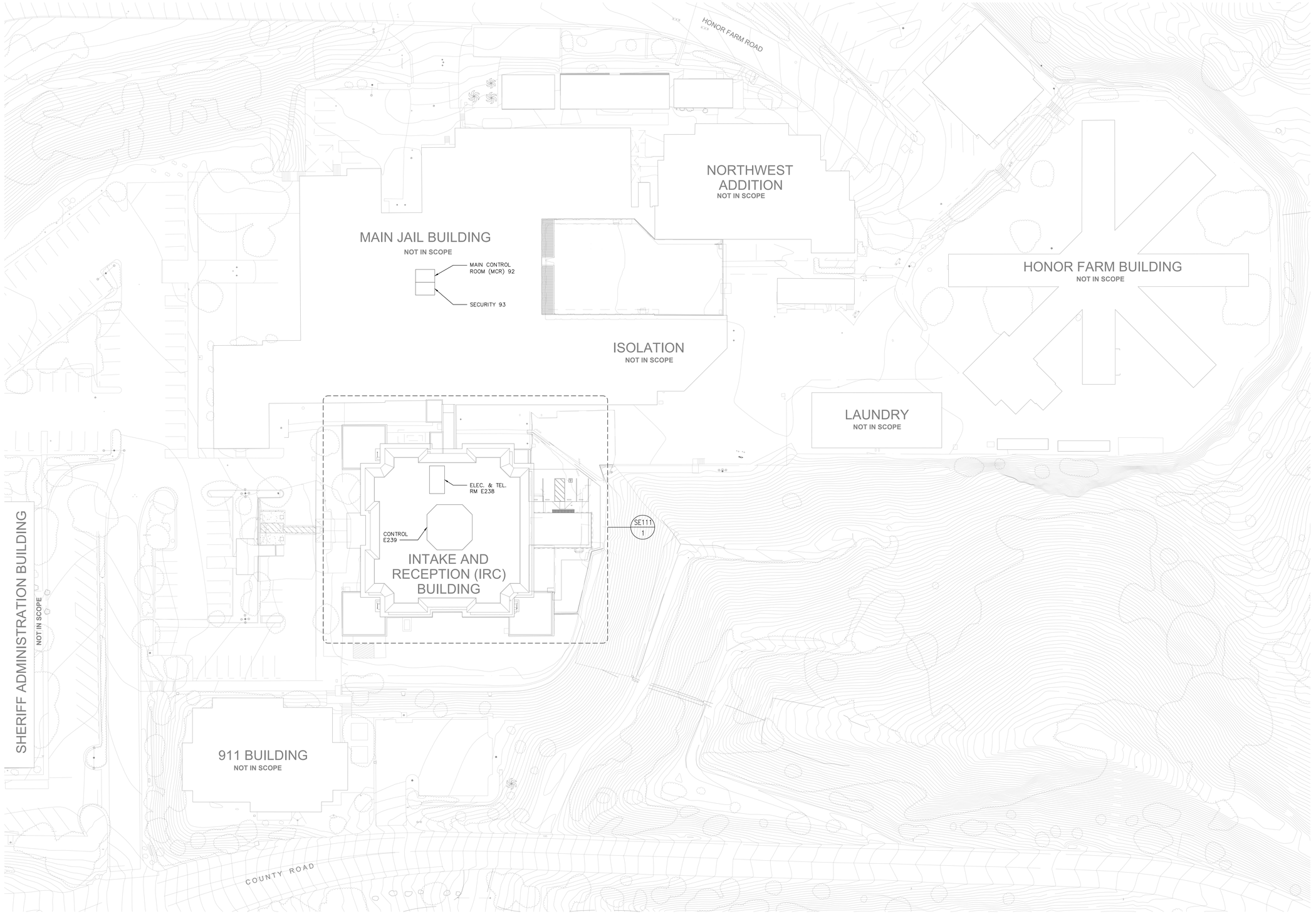
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DATE 2/25/25
JOB NO. Y2213.00
SHEET TITLE

GENERAL NOTES, LEGENDS AND ABBREVIATIONS

SHEET NO.

SE001



1 SITE PLAN - SECURITY ELECTRONICS

1" = 30'-0"

GENERAL NOTES

1. NOT IN USED.

SHEET KEYNOTES

1. NOT IN USED.

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

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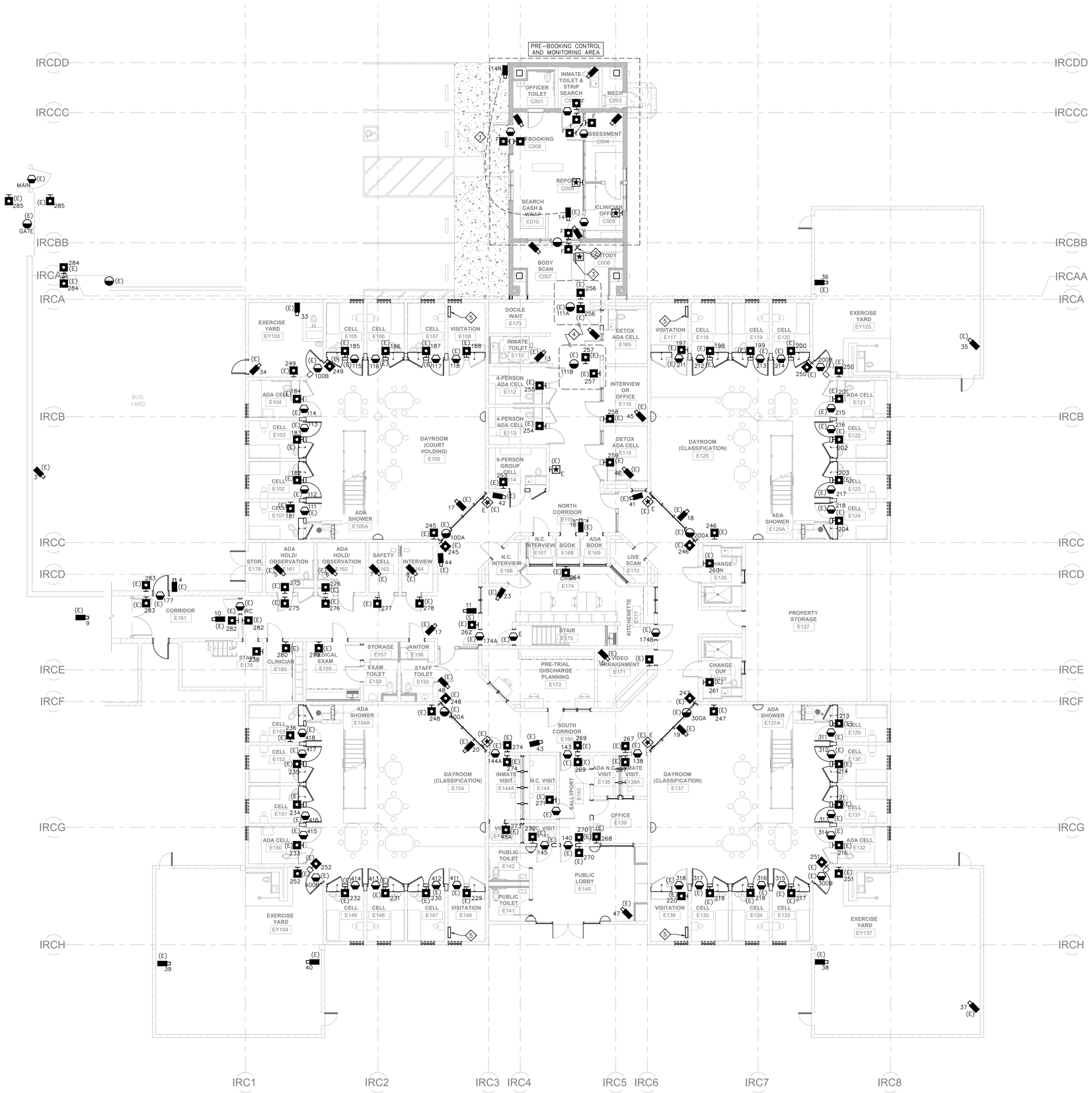
JOB NO. Y2213.00

SHEET TITLE

OVERALL SITE PLAN - SECURITY ELECTRONICS

SHEET NO.

SE100



1 INTAKE RECEPTION CENTER NEW WORK FLOOR PLAN - SECURITY ELECTRONICS

1/8" = 1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL TEST AND VERIFY THE FUNCTIONALITY OF EXISTING DEVICES PRIOR TO INSTALLATION. NOTIFY THE COUNTY OF ANY DEVICES THAT ARE NOT WORKING. ALL DEVICES HOMERUN TO ELEC & TEL RM 238. DEVICES ARE CONTROLLED AND MONITORED FROM CONTROL E239.
2. ALL NEW DEVICES SHALL BE CONSIDERED AS PART OF THE "PRE-BOOKING AREA" AND SHALL HOMERUN TO ELEC & TEL RM 238. INTEGRATE AND TIE IN WITH EXISTING SYSTEM. UPDATE EXISTING GRAPHICS AND PROGRAMMING AT CONTROL E239, ALONG WITH AT CENTRAL CONTROL AT MCR. THE PRE-BOOKING AREA SHALL PRIMARILY BE CONTROLLED BY THE CONTROL STATION AT CUSTODY C006. HOWEVER, TAKEOVER WILL BE POSSIBLE FROM CONTROL E239 AND CENTRAL CONTROL AT MCR.

SHEET KEYNOTES

1. RELOCATE EXISTING CAMERA TO NEW LOCATION SHOWN. PROVIDE NEW MOUNTING AND EXTEND EXISTING WIRING AS NEEDED. UPDATE EXISTING CAMERA SOFTWARE AND HMI TO REFLECT CHANGES.
2. PROVIDE NEW VIDEO SURVEILLANCE MONITOR FOR VIEWS OF THE PRE-BOOKING AREA.
3. PROVIDE NEW HMI STATION FOR CONTROLS AND MONITORING OF PRE-BOOKING AREA.
4. DEVICES TO BE DEMO'D.
5. PROVIDE ON/OFF POWER CONTROL OF THE VIDEO VISITATION STATION (PROVIDED BY OTHERS) AT THE HMI STATION AT CONTROL E239. INTERFACE WITH ELECTRICAL VIA RELAY CONTACTS.

AGENCY APPROVAL

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ARCHITECT

95% CONSTRUCTION DOCUMENT

REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

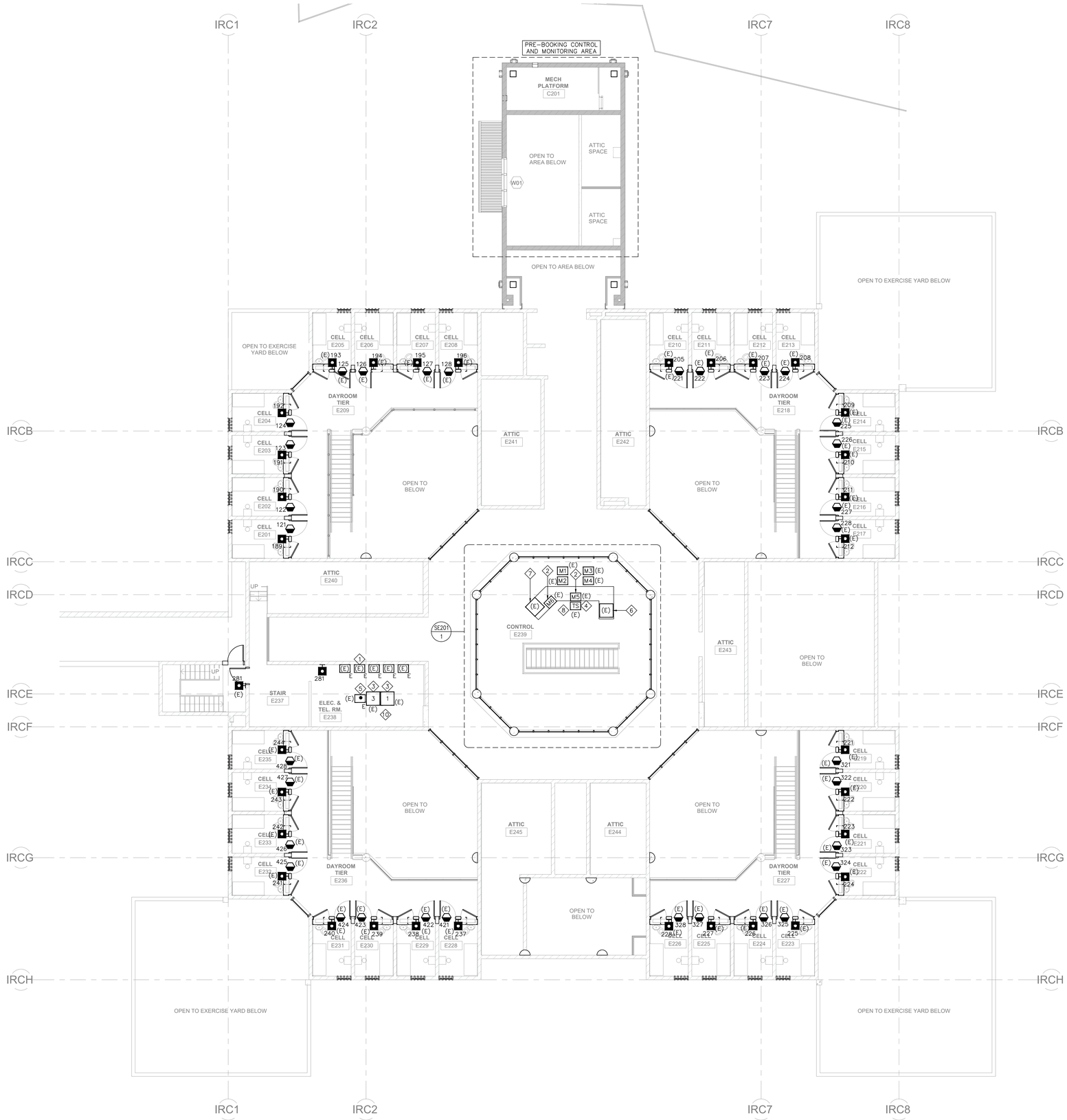
JOB NO. Y2213.00

SHEET TITLE

FLOOR PLAN - GROUND LEVEL - SECURITY ELECTRONICS

SHEET NO.

SE111



1 TIER LEVEL FLOOR PLAN - SECURITY ELECTRONICS

1/8" = 1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL TEST AND VERIFY THE FUNCTIONALITY OF EXISTING DEVICES PRIOR TO INSTALLATION. NOTIFY THE COUNTY OF ANY DEVICES THAT ARE NOT WORKING. ALL DEVICES HOMERUN TO ELEC & TEL RM 238. DEVICES ARE CONTROLLED AND MONITORED FROM CONTROL E239.

SHEET KEYNOTES

1. EXISTING INTERCOM TERMINATION CABINET. ALL INTERCOM FIELD DEVICES FROM INMATE RECEPTION CENTER TERMINATE HERE. CABLES INTERCONNECTION INTERCOM HEAD END EQUIPMENT RUN OVERHEAD TO INTERCOM EQUIPMENT RACK.
2. EXISTING CCTV VIDEO MONITOR (TYPICAL).
3. EXISTING INTERCOM EQUIPMENT RACK (#3) AND PLC EQUIPMENT RACK (#1), HOUSING ALL INTERCOM AND CONTROL EQUIPMENT FOR IRC.
4. EXISTING TOUCH SCREEN CONTROL MONITOR ON COUNTER TOP.
5. EXISTING UPS MOUNTED IN NETWORK OPEN FRAME RACK.
6. EXISTING TOUCHSCREEN PC AND TOUCHSCREEN UPS MOUNTED IN EXISTING EQUIPMENT RACK.
7. EXISTING CCTV HEAD END EQUIPMENT MOUNTED IN EXISTING CONTROL CONSOLE.
8. EXISTING CASEWORKING FOR NEW TOUCH SCREEN CONTROL MONITOR.
9. EXISTING 1" CONDUIT WITH CAT-6 CABLE TO MAIN JAIL SECURITY ROOM 93.
10. EXISTING CCTV BVMS DIP 7000 TO BE INTEGRATED INTO.

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL ACCESSIBILITY IMPROVEMENTS

4436 Calle Real, Santa Barbara, CA 93110

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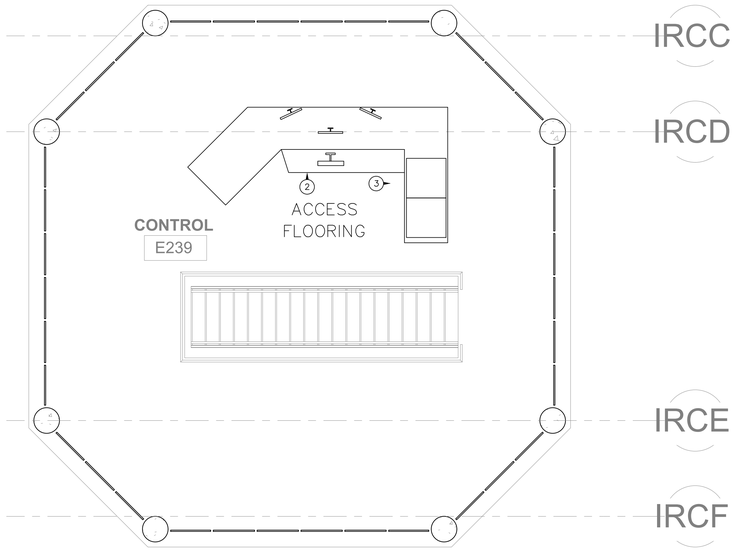
SHEET TITLE

FLOOR PLAN - TIER LEVEL - SECURITY ELECTRONICS

SHEET NO.

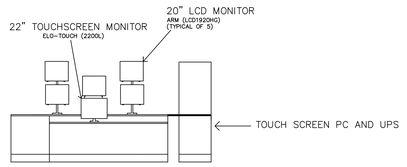
SE112

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET



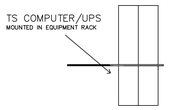
1 EXISTING IRC CONSOLE ENLARGED PLAN VIEW - SECURITY ELECTRONICS

1/4" = 1'-0"



2 EXISTING IRC CONSOLE NORTH ELEVATION VIEW - SECURITY ELECTRONICS

1/4" = 1'-0"



3 EXISTING IRC CONSOLE EAST ELEVATION VIEW - SECURITY ELECTRONICS

1/4" = 1'-0"

GENERAL NOTES

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SHEET KEYNOTES

1. NOT USED.

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS

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REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

ENLARGED ROOM LAYOUTS AND ELEVATIONS

SHEET NO.

SE201

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

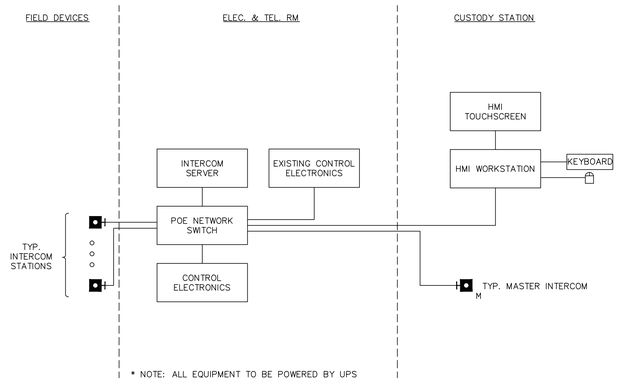
ONE-HALF INCH = ONE FOOT

ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

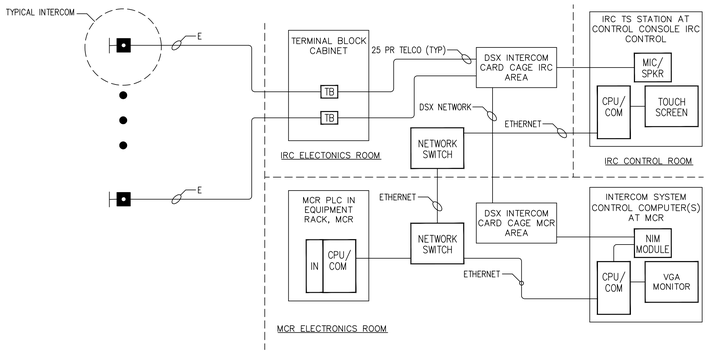
ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET



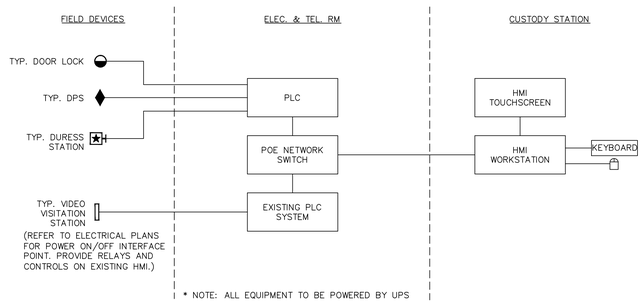
1 INTERCOM & PUBLIC ADDRESS SYSTEM SINGLE LINE DIAGRAM

NOT TO SCALE



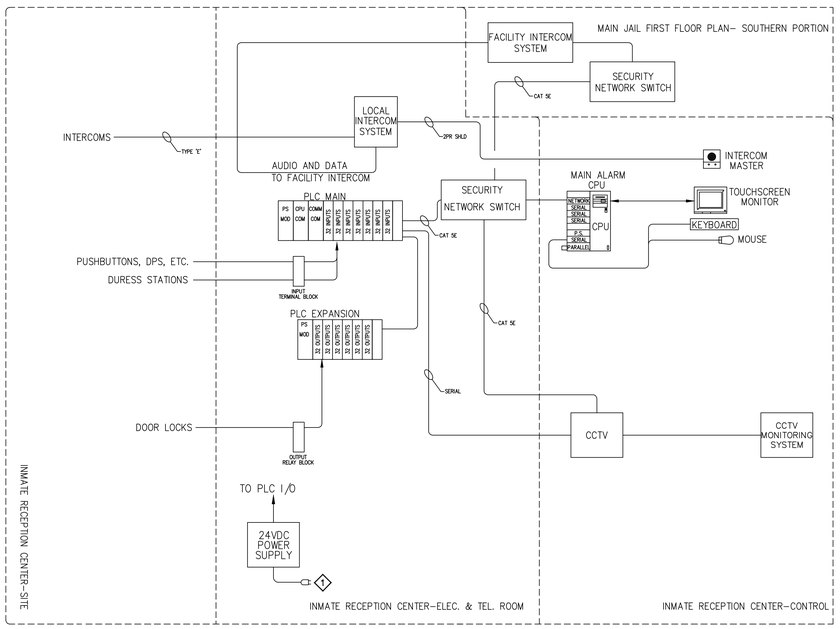
2 EXISTING INTERCOM SYSTEM SINGLE LINE DIAGRAM

IRC TOUCH SCREEN, IRC AREA



3 CONTROL ELECTRONICS SYSTEM SINGLE LINE DIAGRAM

NOT TO SCALE

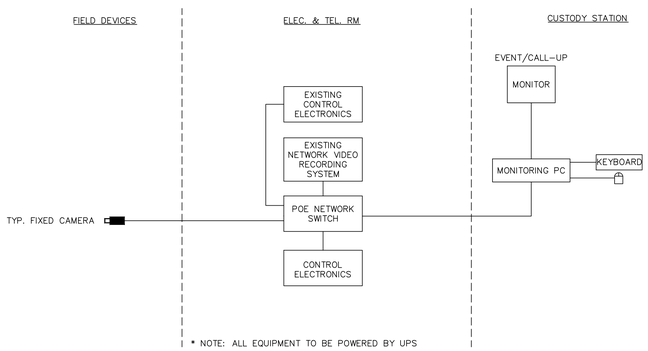


KEYED NOTES:

1 CONNECT TO EMERGENCY POWER WHERE AVAILABLE.

4 EXISTING CONTROL ELECTRONIC SYSTEM SINGLE LINE DIAGRAM

INMATE RECEPTION CENTER



5 CCTV SYSTEM SINGLE LINE DIAGRAM

NOT TO SCALE

GENERAL NOTES

1. CONTRACTOR SHALL TEST AND VERIFY THE FUNCTIONALITY OF EXISTING DEVICES PRIOR TO INSTALLATION. NOTIFY THE COUNTY OF ANY DEVICES THAT ARE NOT WORKING. ALL DEVICES HOMERUN TO ELEC & TEL RM 238. DEVICES ARE CONTROLLED AND MONITORED FROM CONTROL E239.

SHEET KEYNOTES

1. NOT USED.

AGENCY APPROVAL

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ARCHITECT

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REVISIONS

NO.	DESCRIPTION	DATE

DATE 2/25/25

JOB NO. Y2213.00

SHEET TITLE

SINGLE LINE DIAGRAMS

SHEET NO.

SE301

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

AUDIO VISUAL SYSTEMS GENERAL NOTES

1. REFER TO SPECIFICATIONS FOR COMPLETE REQUIREMENTS.
2. PROVIDE CONDUIT, BOXES AND FITTINGS SHOWN ON AUDIO VISUAL SYSTEMS (AV) DRAWINGS UNDER THE WORK OF SECTION 27 05 33 COMMUNICATIONS RACEWAYS, BOXES AND FITTINGS. UNLESS OTHERWISE INDICATED, PROVIDE 1 INCH TRADE SIZE MINIMUM. PROVIDE RACEWAY SIZE AS REQUIRED FOR A MAXIMUM OF 30 PERCENT WIRE FILL.
3. PROVIDE FIRESTOPPING UNDER THE WORK OF SECTION 27 05 33.
4. LOCATIONS SHOWN ON THE ARCHITECTURAL DRAWINGS TAKE PRECEDENCE OVER LOCATIONS SHOWN ON THE COMMUNICATIONS SYSTEMS DRAWINGS.
5. DEVICE QUANTITIES SHOWN ON FLOOR PLANS AND REFLECTED CEILING PLANS TAKE PRECEDENCE OVER DEVICE QUANTITIES SHOWN ON FUNCTIONAL DIAGRAMS.
6. QUANTITIES SHOWN ON FUNCTIONAL DIAGRAMS TAKE PRECEDENCE OVER QUANTITIES SHOWN ON RACK ELEVATIONS.
7. QUANTITIES SHOWN ON DEVICE SCHEDULES TAKE PRECEDENCE OVER QUANTITIES SHOWN ON FUNCTIONAL DIAGRAMS, FLOOR PLANS AND REFLECTED CEILING PLANS.
8. LOCATIONS SHOWN ON LARGE SCALE DRAWINGS TAKE PRECEDENCE OVER LOCATIONS SHOWN ON SMALL SCALE DRAWINGS.
9. COORDINATE FINAL LOCATION OF ALL VISIBLE DEVICES WITH ARCHITECT.
10. WIRING FOR THE WORK OF AUDIO VISUAL SYSTEMS IS NOT PERMITTED TO SHARE CONDUIT, SLEEVES OR J-HOOKS WITH WIRING FOR WORK OF COMMUNICATIONS WIRES, CABLES AND RELATED. MAINTAIN AT LEAST 2 INCHES SEPARATION IF RUNNING PARALLEL. MAINTAIN AT LEAST 1 INCH OF SEPARATION VERTICALLY IF CROSSING AT RIGHT ANGLES.
11. FINAL FINISHES OF ALL VISIBLE DEVICES / SYSTEMS TO BE CONFIRMED BY ARCHITECT. FINISHES TO MATCH WALL OR CEILING ADJACENT.

ALS SCHEDULE

COMPLY WITH CBC 11B-219/11B-706 ASSISTIVE-LISTENING SYSTEMS IN ASSEMBLY AREAS.				
PROVIDE COMPLETE ASSISTIVE-LISTENING SYSTEMS UNDER THE WORK OF SECTION 27 41 16.				
1A	NUMBER OF PERSONAL RECEIVERS REQUIRED UNDER THE WORK OF SECTION 27 41 16:			
	ROOM NAME			OCCUPANCY SERVED
	DOCILE WAITING			4
	VIDEO ARRAIGNMENT			2
	TOTAL OCCUPANCY SERVED AT ALS-REQUIRED SPACES:			6
	PROVIDE QUANTITY OF RECEIVERS:			2
	QUANTITY OF HEARING-AID COMPATIBLE NECK LOOPS:			2
	TOTAL RECEIVERS:			2
2	TYPE OF LISTENING SYSTEM:RF	RF		
3	LOCATION: FOR USE ANYWHERE WITHIN THE ASSEMBLY AREAS.			
4	SIGNAGE: PROVIDE UNDER WORK OF SECTION 10425 SIGNS.			

LEGEND

- SURFACE RACEWAY. FOR COMMUNICATIONS AND POWER SYSTEM PROVIDED UNDER DIV. 27.
- MARK INDICATES RACEWAY DROP FROM CEILING. COORDINATE EXACT LOCATION WITH DIV. 27 PLANS.
- NEW WIRE AND/OR CABLE IN EXPOSED CONDUIT OR RACEWAY. FILL PER SCHEDULE, PLANS AND SPECIFICATIONS.
- NEW WIRE AND/OR CABLE INSIDE NEW CONDUIT WALLS OR IN CEILING .
- CABLE/RACEWAY TURNS UP
- CABLE/RACEWAY TURNS DOWN
- HOME RUN
- 701 — WIRING NOTES
- TKA1 — KEYNOTES

GENERAL SYMBOLS

- ROOM KEY: XXXX ROOM NAME; XXXX ROOM NUMBER
- DETAIL SYMBOL: 1/1 DRAWING NUMBER / SHEET NUMBER
- 1/1 DRAWING NUMBER / SHEET NUMBER
- COLUMN GRID: 1 GRID LINES; A1 BUILDING LABEL
- BLDG. SECTION KEY: 1/1 DRAWING NUMBER / SHEET NUMBER
- WALL SECTION KEY: 1/1 DRAWING NUMBER / SHEET NUMBER
- DRAWING MATCH LINE
- ELEVATION KEY: 1/1 DRAWING NUMBER / SHEET NUMBER
- REVISION SYMBOL: /1 REVISION NUMBER

ABBREVIATIONS

A.D.A.	AMERICANS WITH DISABILITIES ACT
A.F.C.	ABOVE FINISHED CEILING
A.F.F.	ABOVE FINISHED FLOOR
ALT	ALTERNATE
A.M.F.F.	ABOVE MEZZANINE FINISHED FLOOR
BDF	BUILDING DISTRIBUTION FACILITY
B.F.C.	BELOW FINISHED CEILING
BLDG.	BUILDING
B.O.H.	BACK OF HOUSE
C.	CONDUIT
CAT.	CATEGORY
CBC	CALIFORNIA BUILDING CODE
CEC	CALIFORNIA ELECTRICAL CODE
COMM.	COMMUNICATIONS
C.L.	CENTERLINE
C.O.	CONDUIT ONLY
CONT.	CONTINUATION
CS	COMMUNICATIONS SYSTEM
(D)	DEMOLISH EXISTING
DED	DEDUCTIVE
DIA.	DIAMETER
DIV	DIVISION
(E)	EXISTING
EA.	EACH
EIA	ELECTRONIC INDUSTRIES ASSOCIATION
ELEV.	ELEVATION
E.O.L.	END OF LINE
EQPT.	EQUIPMENT
FIN	FINISHED
FUT	FUTURE
H.R.	HOME RUN
HT.	HEIGHT
IDF	INTERMEDIATE DISTRIBUTION FACILITY
J, JBOX	JUNCTION BOX
LAN	LOCAL AREA NETWORK
MAX.	MAXIMUM
MDF	MAIN DISTRIBUTION FACILITY
MIN.	MINIMUM
MMF	MULTI MODE OPTICAL FIBER
MOD.	MODULAR
MPOE	MINIMUM POINT OF ENTRY
(N)	NEW
NEC	NATIONAL ELECTRICAL CODE
N.I.C.	NOT IN CONTRACT
NTS	NOT TO SCALE
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.F.E.	OWNER FURNISHED EQUIPMENT
OPP.	OPPOSITE
OSP	OUTSIDE PLANT
PNL.	PANEL
PROJ.	PROJECT
P.S.R.H	PROJECT STANDARD RECEPTACLE HEIGHT +18" ATT, U.O.N.
P.S.S.H.	PROJECT STANDARD SWITCH HEIGHT +48" AFF TO ℄, U.O.N.
RE:	REFER TO
REF.	REFERENCE
S.A.D.	SEE ARCHITECTURAL DRAWINGS
S.E.D.	SEE ELECTRICAL DRAWINGS
S.I.D.	SEE INTERIORS DRAWINGS
S.M.D.	SEE MECHANICAL DRAWINGS
SIM.	SIMILAR
SMF	SINGLE MODE OPTICAL FIBER
SN	SHEET NOTE
SP	SHIELDED PAIR - SEE SPECIFICATIONS
SPEC	SPECIFICATION
S.R.	SURFACE RACEWAY
STD	STANDARD
STP	SHIELDED TWISTED PAIR
T.C.	TELECOMMUNICATIONS CLOSET
TEL	TELEPHONE
TELCOM	TELECOMMUNICATIONS
TIA	TELECOMMUNICATIONS INDUSTRY ASSOCIATION
TP	TWISTED PAIR
TYP.	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
W/	WITH
WP	WEATHERPROOF

AV FUNCTIONALS LEGEND

Loudspeaker type (See Plans and Specifications)
Loudspeaker quantity
70V power tap
Loudspeaker reference number

BM	TRANSFORMER BALANCED, LINE INPUT MODULE, PRIORITY MUTE GENERATING
MBI	TRANSFORMER BALANCED, MIC INPUT MODULE, PRIORITY MUTE GENERATING
VBI	TRANSFORMER BALANCED, LINE INPUT MODULE, PRIORITY MUTE RECEIVING, ADJUSTABLE MUTE LEVEL
K	RELAY COIL
VC-R	70 WATT PRIORITY ATTENUATOR, RACK MOUNTED
	PUSH BUTTON SWITCH
M	MOMENTARY PUSH BUTTON SWITCH
	SWITCH
	SWITCH
	NORMALLY OPEN CONTACT
	NORMALLY CLOSED CONTACT

NOTES:
X — DENOTES SEQUENCE NUMBER

RR	REPEAT RELAY
XF — XM	XLR CONNECTOR, 3 PIN, FEMALE; MALE
4F — 4M	XLR CONNECTOR, 4 PIN, FEMALE; MALE
ASF — ASM	AUDIO SPEAKER CONNECTOR, FEMALE; MALE
B	BNC CONNECTOR, 75 OHMS IMPEDANCE
D	DIN CONNECTOR, MIDI STANDARD
P	1/4" PHONE CONNECTOR
	TRIPLE FIVE WAY BINDING POSTS
	TYPE "F" CONNECTOR
	RESISTIVE TERMINATION AT CIRCUIT CHARACTERISTIC IMPEDANCE
	WIRING CONTINUES AS INDICATED
	WIRING HOME RUN AS INDICATED
	FLY-ON OR FLY-OFF POINT
	TUBULAR CLAMP BARRIER BLOCK, SWITCH BLOCK SECTION QUANTITY AS REQUIRED BY CIRCUIT
SVM — SVF	S-VIDEO CONNECTOR, MALE; FEMALE
RF — RM	TYPE RCA AUDIO OR VIDEO CONNECTOR, FEMALE; MALE
	SCREW TERMINAL
MF — MM	TRS MINI STEREO AUDIO CONNECTOR, FEMALE; MALE.

JUNCTION BOX SCHEDULE

SYMBOL	H (INCHES)	W (INCHES)	D (INCHES)
J1	6	6	4
J2	8	8	4
J3	12	12	4
J4	12	12	6
J5	12	12	8
J6	16	12	8
J7	18	18	6
J8	20	16	6
J9	20	16	8
J10	20	20	6
J11	20	20	8
J12	24	20	6
J13	24	20	8
J14	24	24	8
J15	30	24	8
J16	30	30	8
J17	36	30	8
J18	36	36	8

SUFFIX:
NONE - NEMA 1
A - NEMA 12
B - NEMA 3R
C - NEMA 4
D - NEMA 4X

NOTE
ALL JUNCTION BOXES TO BE HINGED TYPE, PROVIDED WITHOUT PRE-PUNCHED KNOCKOUTS. PENETRATIONS IN JUNCTION BOXES SHALL BE CUT OR PUNCHED AS REQUIRED FOR INSTALLATION. PAINT ALL INTERIOR BOXES TO MATCH WALL FINISH. COORDINATE FINISH WITH ARCH. PLANS.

AGENCY APPROVAL

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REGISTERED ARCHITECT — PAUL FLORES — No. C-25272 — Ren. May 31, 2027 — STATE OF CALIFORNIA

ARCHITECT

95% CONSTRUCTION DRAWINGS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 02/25/25
JOB NO. Y2213.00
SHEET TITLE

GENERAL NOTES, LEGEND, SYMBOLS, ABBREVIATIONS AND JBOX SCHEDULE

SHEET NO.

TA001

SYMBOL	DEVICE	FUNCTION OR SERVICE	LOCATION	WORK OF	ROUGH-IN	RACEWAY	ELEVATION	CABLE FILL & HOMERUN DESTINATION, U.O.N.	FINISH	WEIGHT, LB	DETAIL SHEET(S)
	WALL SLEEVE/CONDUIT	PATHWAY	INDICATED	27 41 03	N/A	R11					
A	ASSISTIVE LISTENING TRANSMITTER	AUDIO-VISUAL SYSTEMS	CEILING	27 41 16	FLUSH 4S BOX, 1 G. RING. LRI11	R6	ANTENNA IS SURFACE MTD TO CLG.	PER FUNCTIONAL AND AS NOTED	WHITE	1	
CBP	AV PUSHBUTTON CONTROL PANEL, WALL	AUDIO-VISUAL SYSTEMS	WALL	27 41 16	FLUSH 4S BOX, 1 G. RING. LRI11	R7	AT WALL: +36" AFF TO BOTTOM OF BACK BOX U.O.N.	PER FUNCTIONAL AND AS NOTED			
FPWB	FLAT PANEL ROUGH-IN BOX	AUDIO VISUAL SYSTEMS	FLUSH IN WALL	27 41 03	FPWB	(2) 1.25" C., TOTAL. 1 FROM EACH OF (2) LOW VOLTAGE BACKBOXES TO ABOVE ACCESSIBLE CEILING	REFER TO LCD SIZE BELOW.	PER FUNCTIONAL AND AS NOTED	WHITE	5	TA901
HUB	SOUNDBAR, CAMERA, MICROPHONE COMBINATION CONFERENCE HUB	AUDIO VISUAL SYSTEMS	ATTACHED TO DISPLAY	27 41 16	N/A	N/A	ATTACHED TO DISPLAY	PER FUNCTIONAL AND AS NOTED	BLACK	20	
LCD55	FLAT PANEL DISPLAY, WALL MOUNTED, 55" DIAGONAL	AUDIO VISUAL SYSTEMS	WALL	27 41 16	FPWB	(SEE FPWB)	+60" A.F.F. TO CL, U.O.N.	PER FUNCTIONAL	BLACK	100	
LCD65	FLAT PANEL DISPLAY, WALL MOUNTED, 65" DIAGONAL	AUDIO VISUAL SYSTEMS	WALL	27 41 16	FPWB	(SEE FPWB)	+60" A.F.F. TO CL, U.O.N.	PER FUNCTIONAL	BLACK	120	
MP1	WALL PLATE PRESENTER INPUT	AUDIO VISUAL	INDICATED, FLUSH MOUNTED TO WALL OR TO FLOORBOX INTERIOR.	27 41 16	AT WALL, 4-11/16 S WITH 1 GANG RING, 2-1/8" DEEP.	R7	AT WALL: +36" AFF TO BOTTOM OF BACK BOX U.O.N.	PER FUNCTIONAL	WHITE	1	
MPU	WALL PLATE, USB HDMI COMBO	AUDIO-VISUAL SYSTEMS	WALL	27 41 16	AT WALL, 4-11/16 S WITH 1 GANG RING, 2-1/8" DEEP.	R7	AT WALL: +36" AFF TO BOTTOM OF BACK BOX U.O.N.	PER FUNCTIONAL	WHITE	1	
SBS	LOUDSPEAKER, SOUNDBAR TYPE	AUDIO-VISUAL SYSTEMS	ATTACHED TO DISPLAY	27 41 16	N/A	N/A	ATTACHED TO DISPLAY	PER FUNCTIONAL	BLACK	5	

NOTE NO. DEVICE NOTES

DN1 FIRE ALERT LIGHTING ROUGH-IN PROVIDES DAISY CHAINED UTP6-4P BETWEEN OFE CONTROLLER AND THE WALL PLATES IN EACH LIGHTING ZONE. ZONE INDICATED BY SINGLE NUMBER SUBSCRIPT., L1 INDICATES END-OF-LINE AND WAO HAS 1 JACK AND 1 UTP6-4P; L2 INDICATES WAO IS PART OF DAISY CHAIN CKT AND HAS 2 JACKS AND ONE ENTERING AND ONE EXITING UTP4-4P – REFER TO SINGLE LINE DIAGRAM.

WORK OF NOTES

WO1 PROVIDE CABLING AND ROUGH-IN UNDER WORK OF PROJECT – LIGHTING FIXTURE PROVIDED BY OWNER'S CONTRACTOR (N.I.C}..

LOCATION & ROUGH-IN NOTES

LRI1 INSTALLED ASSEMBLY, INCLUDING MONITOR SHALL NOT PROJECT MORE THAN 4" FROM FACE OF WALL. IF LEADING EDGE 27" TO 80" AFF

LRI2 MATCH PROJECT SWITCH HEIGHT

LRI3 4S BOX W/ 1 GANG RING BLANK COVER PLATE

LRI4 WHERE COVER PLATES OCCUR IN GYPSUM BOARD PARTITIONS, COVER PLATE TO BE WHITE PLASTIC.
WHERE COVER PLATES OCCUR IN WOOD, SOLID SURFACE, OR FABRIC-PANEL FINISHES, COVER PLATE IS TO BE BRUSHED STAINLESS STEEL.

LRI5 NOT USED

LRI6 NOT USED

LRI7 MANUFACTURER'S VENTED BACKBOX .

LRI8 NOT USED

LRI9 4S BOX, 2-1/8" DEEP MIN., W/ 1 GANG RING WITH LOCKING HINGED COVER PLATE (FSR WB-MR2G OR EQUAL).

LRI10 NOT USED

LRI11 PROVIDE BACKING AND SUPPORT FOR 5 POUND DEVICE.

LRI12 PROVIDE DEVICE COMPLETE WITH BACKBOX, TILE SUPPORT RAILS AND CEILING CUTOUT TEMPLATE. COMPLY WITH SECTION 09 50 11 ACOUSTICAL PANEL CEILINGS.

LRI13 PROVIDE BACKING IN WALL SUITABLE TO SUPPORT A 20 POUND DEVICE WITH A LOAD CENTROID 18 INCHES FROM THE FACE OF THE WALL.

LRI14 PROVIDE BACKING IN WALL SUITABLE TO SUPPORT A 200 POUND DEVICE WITH A LOAD CENTROID 8 INCHES FROM THE FACE OF THE WALL.

LRI15 AS DETAILED AND/OR SCHEDULED ON THE ARCHITECTURAL DRAWINGS.

RACEWAY NOTES

R1 NOT USED

R2 NOT USED

R3 NOT USED

R4 AS DETAILED AND/OR SCHEDULED

R5 3/4" C. H.R. TO ACCESSIBLE CEILING OR FLOOR, OR TO SERVING BDF, IDF OR EQUIPMENT ROOM, U.O.N.

R6 1" C. H.R. TO ACCESSIBLE CEILING OR FLOOR, OR TO SERVING BDF, IDF OR EQUIPMENT ROOM, U.O.N.

R7 1-1/4" C. H.R. TO ACCESSIBLE CEILING OR FLOOR, OR TO SERVING BDF, IDF OR EQUIPMENT ROOM, U.O.N.

R8 NOT USED

R9 AT ACCESSIBLE CEILING, PROVIDE ABOVE CEILNG PATHWAY USING CABLE HOOKS. WHERE MOUNTED IN GYP CEILING, EXTEND 3/4" C. TO ACCESSIBLE CEILING.

R10 2 1-1/4" C TO 4 GANG COMPARTMENT, 1 - 1" TO 1 GANG COMPARTMENT, STUBBED TO ACCESSIBLE CEILING OR FLOOR EXTEND TO SERVER ROOM USING BASKET TRAY. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL ROUGH-IN.

R11 UNLESS OTHERWISE SHOWN, PROVIDE 1.5" EMT SLEEVE, WITH INSULATED THROAT BUSHING AT EACH END, STUBBED OUT 4 INCHES FROM FACE OF WALL, AT ELEVATION APPROXIMATELY 6 INCHES ABOVE ACCESSIBLE CEILING. INSTALL SLEEVE IN AN ACCESSIBLE LOCATION AS DEFINED IN CALIFORNIA ELECTRICAL CODE, ARTICLE 100 DEFINITIONS. PROVIDE FIRESTOPPING UNDER WORK OF SECTION 27 05 33. BOND TO GROUND. COMPLY WITH DIVISION 26 AND SECTION 27 05 26 GROUNDING.

R12 4 1-1/4" C TO 6 GANG COMPARTMENT, 1 - 1.25" TO EA. 1 GANG COMPARTMENT, STUBBED TO ACCESSIBLE CEILING OR FLOOR, EXTEND TO SERVER ROOM IN BASKET TRAY. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL ROUGH-IN TO 3 GANG COMPARTMENT.

ACCESSIBLE CEILING IS A T-BAR OR SIMILAR GRID BASED, PANELIZED REMOVEABLE CEILING MEETING THE DEFINITION FOR ACCESSIBLE WIRING METHODS IN ARTICLE 100 OF THE CALIFORNIA ELECTRICAL CODE.

ONE AND ONE-HALF INCH = ONE FOOT
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THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

AGENCY APPROVAL

SANTA BARBARA COUNTY JAIL
ACCESSIBILITY IMPROVEMENTS
4436 Calle Real, Santa Barbara, CA 93110

SANTA BARBARA COUNTY

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www.nachtlewis.com
916.329.4000

LICENSED ARCHITECT No. C-25272 Rem: May 31, 2027 STATE OF CALIFORNIA

ARCHITECT

95% CONSTRUCTION DRAWINGS

REVISIONS

NO.	DESCRIPTION	DATE

DATE 02/25/25

JOB NO. Y2213.00

SHEET TITLE

SYMBOL SCHEDULE

SHEET NO.

TA002

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

ONE-HALF INCH = ONE FOOT

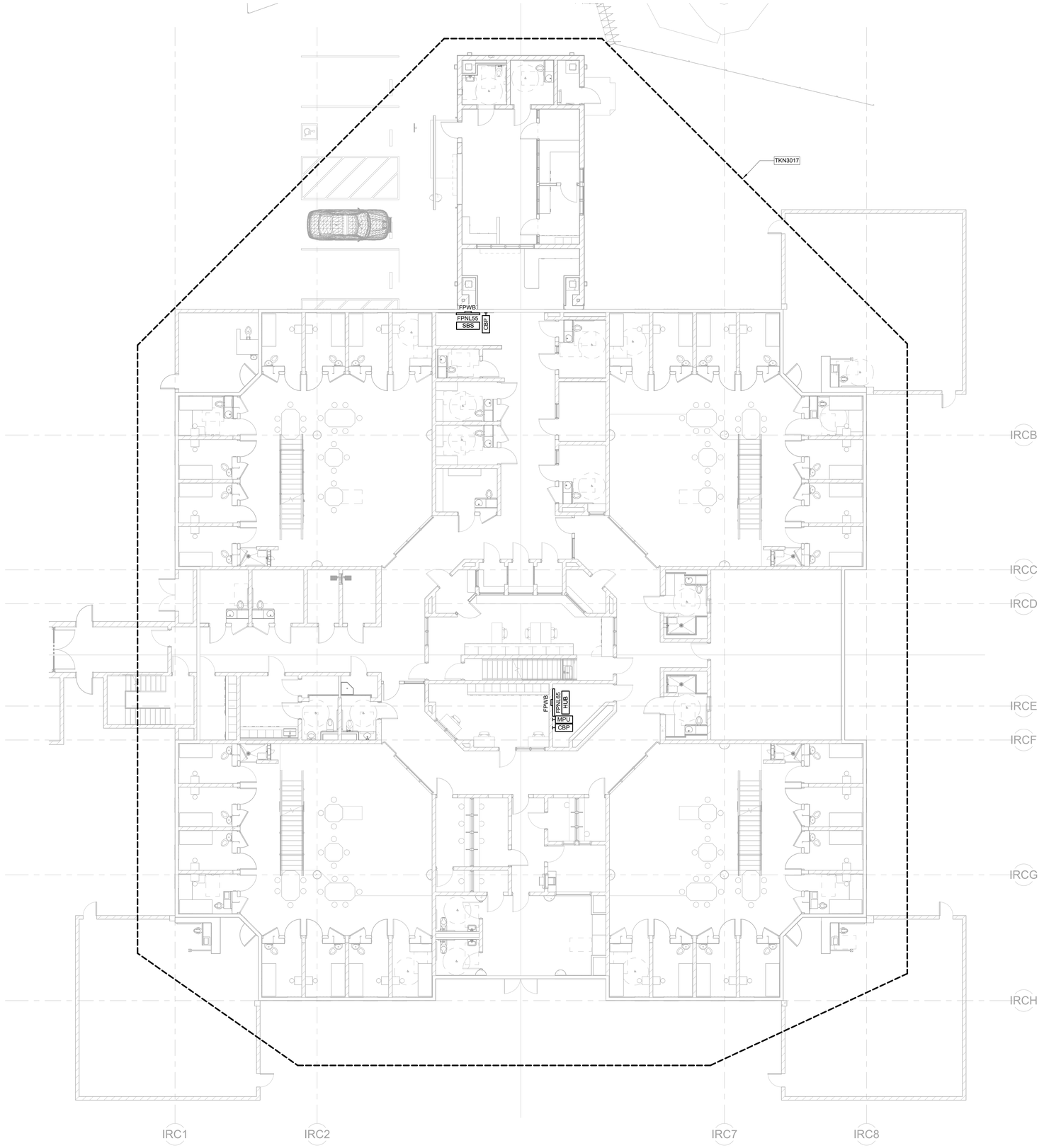
ONE-QUARTER INCH = ONE FOOT

ONE-EIGHTH INCH = ONE FOOT

ONE-SIXTEENTH INCH = ONE FOOT

ONE INCH = TWENTY FEET

KEYNOTES	
TKN3017	EXISTING AUDIOVISUAL SYSTEMS AND EQUIPMENT TO REMAIN U.O.N.



1 AUDIOVISUAL FLOOR PLAN - GROUND LEVEL
1/8" = 1'-0"

AGENCY APPROVAL

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REGISTERED ARCHITECT No. C-25272 Exp. May 31, 2027 STATE OF CALIFORNIA

ARCHITECT

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REVISIONS

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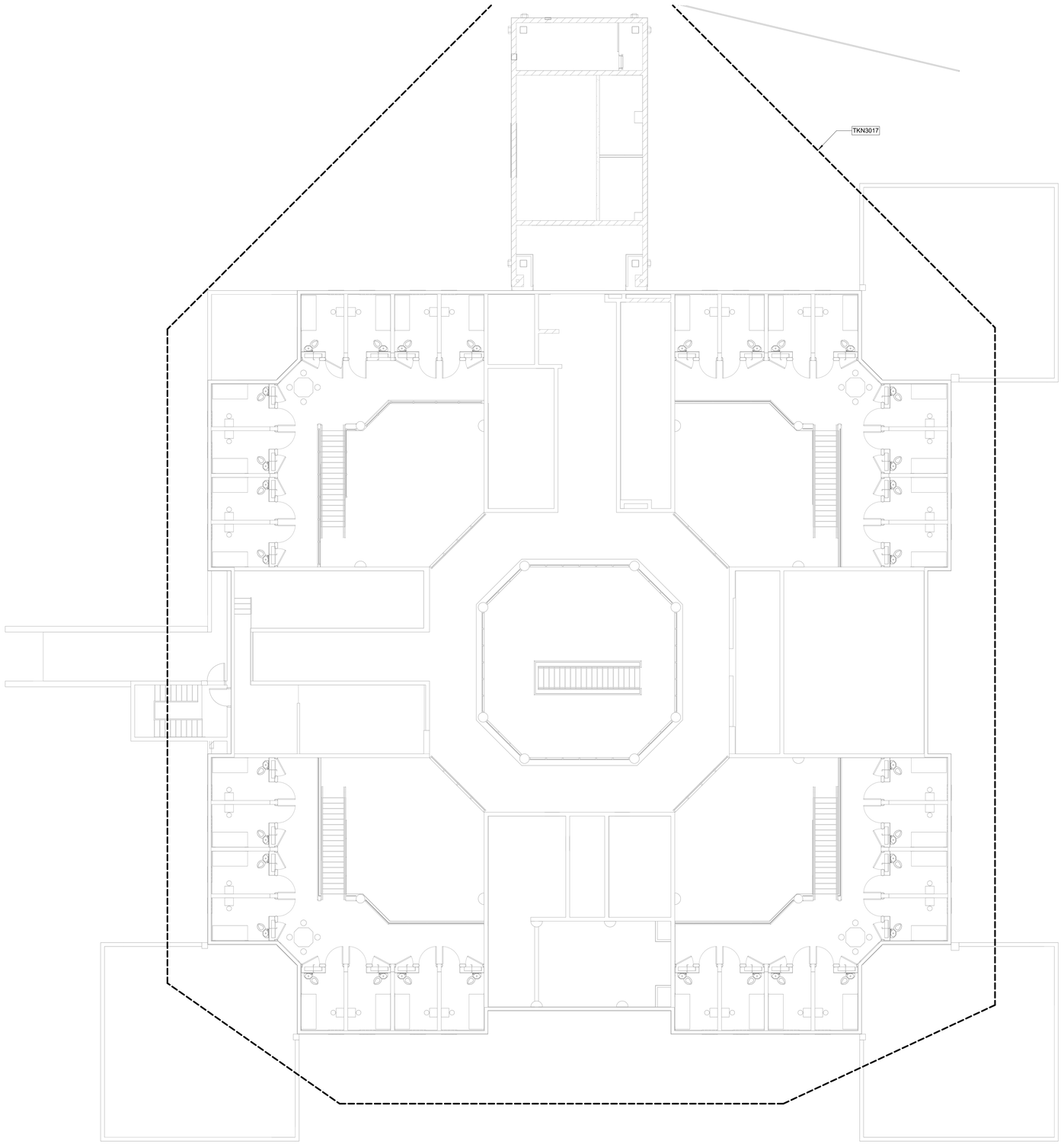
SHEET TITLE

AUDIOVISUAL FLOOR PLAN - GROUND LEVEL

SHEET NO.

TA201

KEYNOTES	
TKN3017	EXISTING AUDIOVISUAL SYSTEMS AND EQUIPMENT TO REMAIN U.O.N.



1 AUDIOVISUAL FLOOR PLAN - TIER LEVEL
1/8" = 1'-0"

N

AGENCY APPROVAL

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REGISTERED ARCHITECT — STATE OF CALIFORNIA — No. C-25272 — Renewal: May 31, 2027

ARCHITECT

95% CONSTRUCTION DRAWINGS

REVISIONS

NO.	DESCRIPTION	DATE

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SHEET TITLE

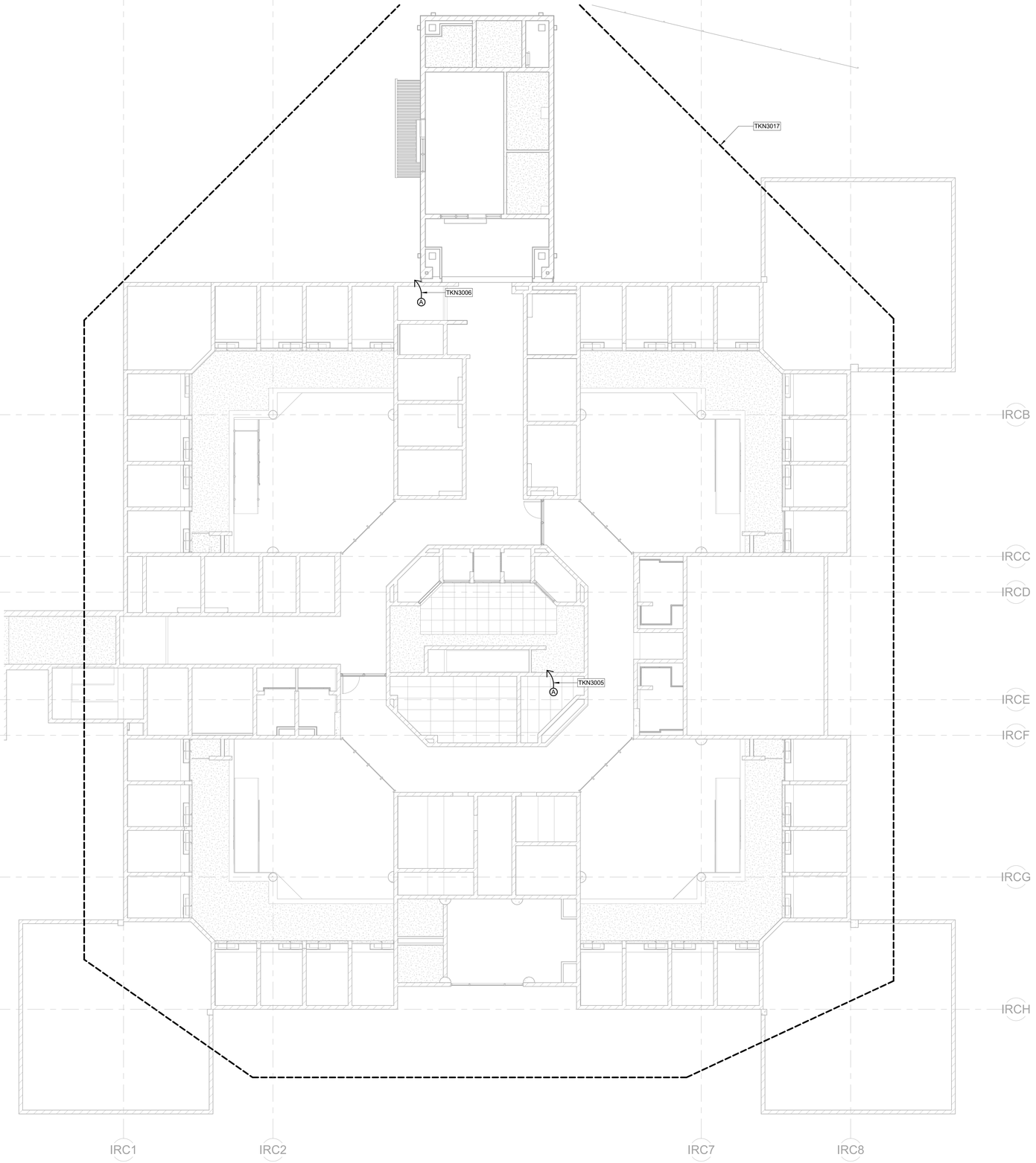
AUDIOVISUAL FLOOR PLAN - TIER LEVEL

SHEET NO.

TA202

ONE AND ONE-HALF INCH = ONE FOOT
ONE INCH = ONE FOOT
THREE-QUARTERS INCH = ONE FOOT
ONE-HALF INCH = ONE FOOT
ONE-QUARTER INCH = ONE FOOT
ONE-EIGHTH INCH = ONE FOOT
ONE-SIXTEENTH INCH = ONE FOOT
ONE INCH = TWENTY FEET

KEYNOTES	
TKN3005	H.R. TO AV RACK R18, SEE TA201.
TKN3006	H.R. TO ALS TRANSMITTER BEHIND DISPLAY, SEE TA201.
TKN3017	EXISTING AUDIOVISUAL SYSTEMS AND EQUIPMENT TO REMAIN U.O.N.



1 AUDIOVISUAL REFLECTED CEILING PLAN - GROUND LEVEL
1/8" = 1'-0"

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No. C-25272
Exp. May 31, 2027

ARCHITECT

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JOB NO. Y2213.00

SHEET TITLE

AUDIOVISUAL REFLECTED CEILING PLAN - GROUND LEVEL

SHEET NO.

TA601

ONE AND ONE-HALF INCH = ONE FOOT

ONE INCH = ONE FOOT

THREE-QUARTERS INCH = ONE FOOT

ONE-HALF INCH = ONE FOOT

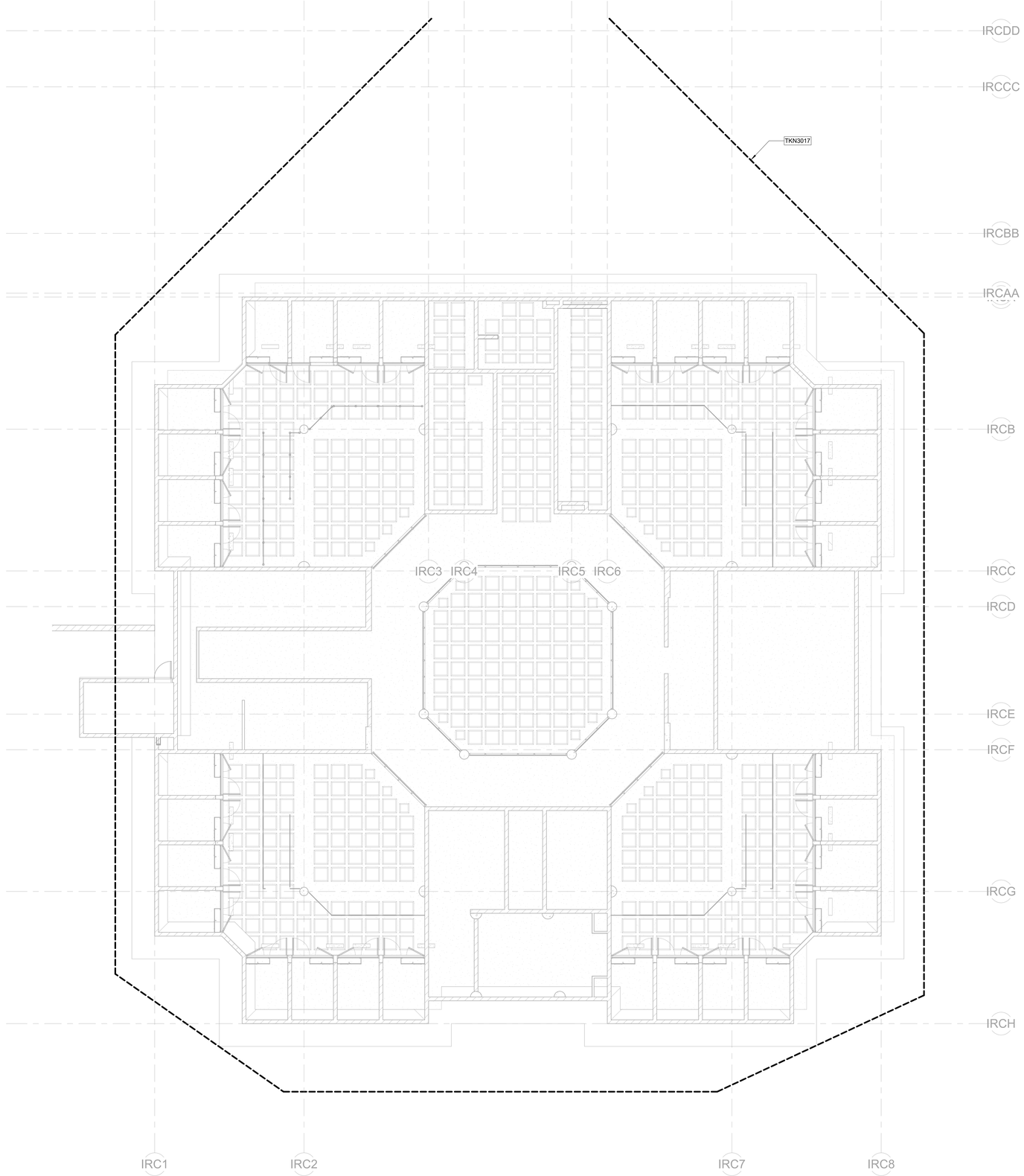
ONE-QUARTER INCH = ONE FOOT

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ONE INCH = TWENTY FEET

KEYNOTES	
TKN3017	EXISTING AUDIOVISUAL SYSTEMS AND EQUIPMENT TO REMAIN U.O.N.



1 AUDIOVISUAL REFLECTED CEILING PLAN - TIER LEVEL
1/8" = 1'-0"

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REGISTERED ARCHITECT — No. C-25272 — Ren. May 31, 2027 — STATE OF CALIFORNIA

ARCHITECT

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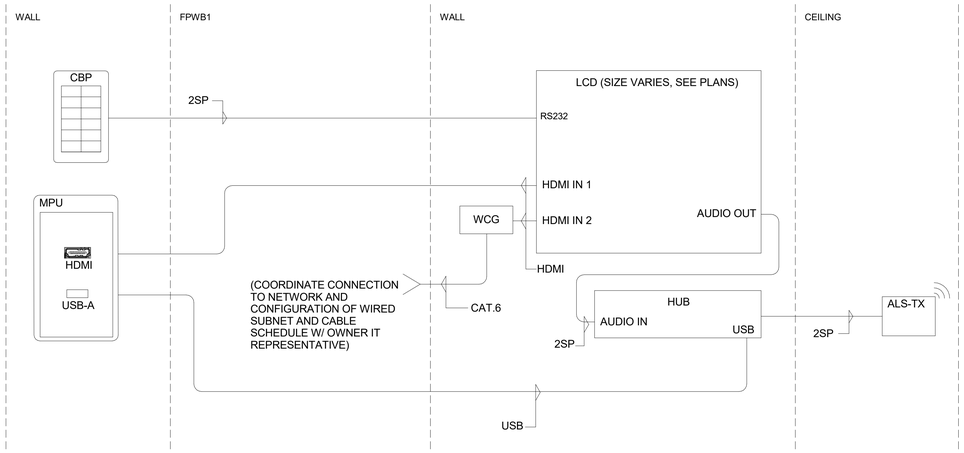
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SHEET TITLE

AUDIOVISUAL REFLECTED CEILING PLAN - TIER LEVEL

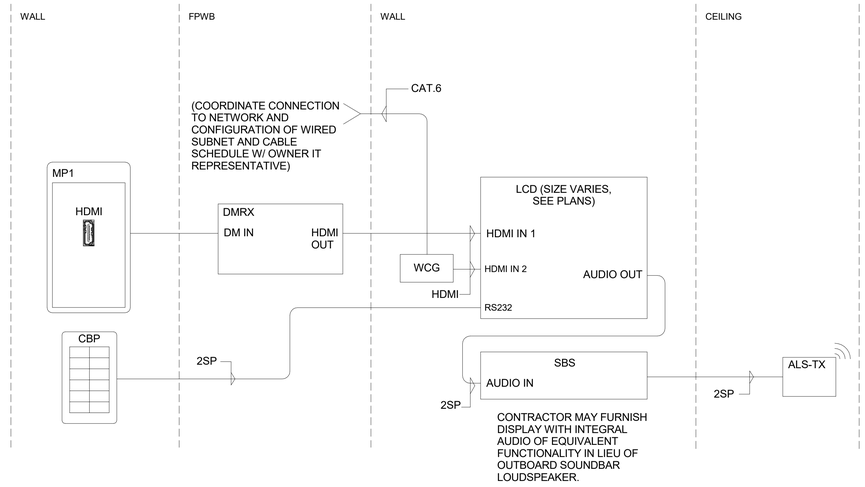
SHEET NO.

TA602



1 E-171 VIDEO ARRAIGNMENT AUDIOVISUAL FUNCTIONAL DIAGRAM

NTS



2 E-173 DOCILE WAITING AUDIOVISUAL FUNCTIONAL DIAGRAM

NTS

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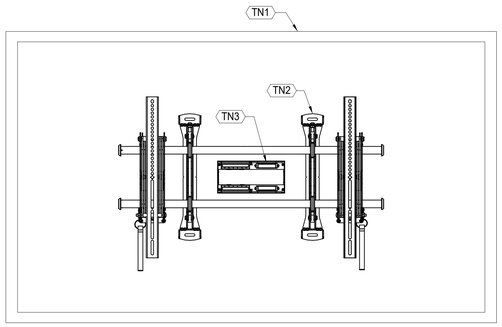
SHEET TITLE

AUDIOVISUAL FUNCTIONAL DIAGRAMS

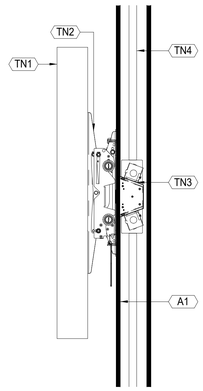
SHEET NO.

TA701

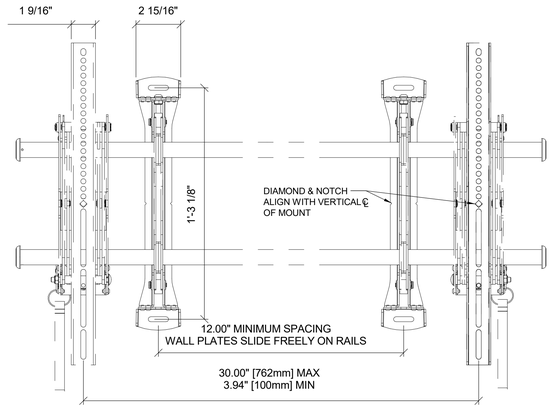
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1A **FRONT VIEW** NTS



1B **SIDE VIEW** NTS

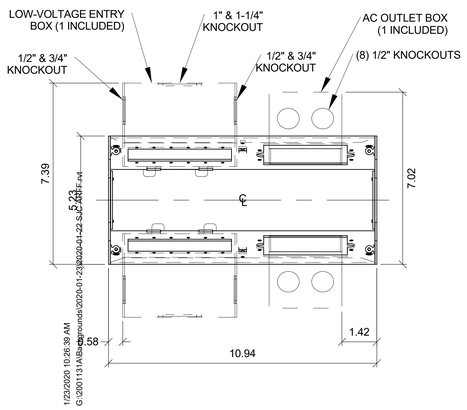


1C **FRONT VIEW** NTS

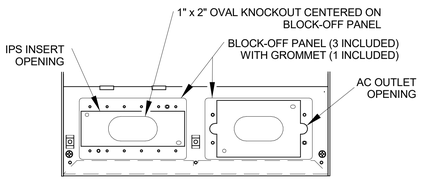


1D **SIDE VIEW** NTS

1 FLAT PANEL MOUNT ASSEMBLY
NTS



2A **FRONT VIEW**



2B **TOP VIEW**

2 FLAT PANEL WALL BOX - FPWB
NTS

KEYNOTES

A	ARCHITECTURAL: COMPLY WITH DIVISIONS 2-14.
A1	WALL CAVITY WITH MINIMUM 200 LB. BACKING.
TN	TELECOMMUNICATIONS SYSTEMS: COMPLY WITH DIVISION 27.
TN1	FLAT PANEL DISPLAY/LCD - NET WEIGHT NOT TO EXCEED 135 LBS.
TN2	FLAT PANEL MOUNT - NET WEIGHT NOT TO EXCEED 40 LBS.
TN3	FLAT PANEL WALL BOX, FPWB1, RECESSED FLUSH IN WALL.
TN14	IN-WALL CONDUIT RACEWAY.

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REGISTERED ARCHITECT
No. C-25272
Ren. May 31, 2027
STATE OF CALIFORNIA

ARCHITECT

95% CONSTRUCTION DRAWINGS

REVISIONS

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JOB NO. Y2213.00

SHEET TITLE

DETAILS - FPWB AND FLAT PANEL MOUNT ASSEMBLY

SHEET NO.

TA901

ONE AND ONE-HALF INCH = ONE FOOT
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ONE INCH = TWENTY FEET

EXECUTED IN 2 ORIGINAL COUNTERPARTS
BOND NUMBER: 7901289718

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That the County of Santa Barbara of the State of California (hereinafter referred to as the County) and ProWest PCM, Inc. dba ProWest Constructors (hereinafter referred to as Principal) have by written agreement dated DECEMBER 4TH, 2025, entered into a contract identified as:

Project Title: County of Santa Barbara
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041

(Hereinafter referred to as the Contract) and

That, pursuant to law and to said Contract, and before entering upon the performance of said Contract, the principal is required to file with the County a good and sufficient bond to secure the payment of labor and materials claims.

NOW, THEREFORE, said Principal and NATIONWIDE MUTUAL INSURANCE COMPANY

as corporate surety (hereinafter referred to as Surety), are held firmly bound unto the County in the amount of $6,024,246.00, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns both jointly and severally. Surety shall be and hereby warrants that it is listed in the Insurance Organizations Authorized by the Insurance Commissioner to Transact Business of Insurance in the State of California, published by the Department of Insurance, State of California or successor publications.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said principal, his or its subcontractors, heirs, executors, administrators, successors, or assigns, shall fail to pay any of the persons named or referred to in Section 9100 of the California Civil Code, or amounts due under Unemployment Insurance Code with respect to work or labor performed by any such claimant, or for any amounts required to be deducted, withheld and paid over to the Employment Development Department from the wages of employees of the Contractor and his subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor as required by the California Civil Code, or this bond, then said Surety will pay for the same, in an amount not to exceed the amount hereinafter set forth.

This bond shall insure to the benefit of any and all persons, entities, companies and corporations named or referred to in Section 9100 of the California Civil Code, so as to give a right of action to them or their assign in any suit brought upon this bond.

And the said Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, or the Specifications accompanying the same, shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Specifications.

In the event suit is brought upon this Bond by County and judgment is recovered, Surety shall pay all costs incurred by the County in such suit, including a reasonable attorney's fee to be fixed by the court.

Death, illness, disability or disqualification of the Principal shall not relieve Surety of its obligations hereunder.

ProWest PPCM, Inc. dba ProWest Constructors
Principal

By: Michael DeMarie, President

DATED: DECEMBER 8TH, 2025

NATIONWIDE MUTUAL INSURANCE COMPANY
Surety

Signature of Attorney-in-fact

KEVIN VEGA, ATTORNEY-in-FACT

500 N. BRAND BLVD. #2000
Address

GLENDALE, CA 91203
City, State & Zip Code

Surety's Agent for Service of Process (located within the State of California):

C&D BONDING & INSURANCE SERVICES
Name of Agent

534 E. BADILLO ST.
Address

COVINA, CA 91723
City, State & Zip Code

626-859-1000
Telephone Number

626-859-1001
FAX Number

NOTE: Signature of those executing for Surety must be properly acknowledged.

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS THAT:

Nationwide Mutual Insurance Company, an Ohio corporation

hereinafter referred to severally as the "Company" and collectively as "the Companies" does hereby make, constitute and appoint:

BRITTON CHRISTIANSEN; KEVIN VEGA; PHILIP E VEGA;

each in their individual capacity, its true and lawful attorney-in-fact, with full power and authority to sign, seal, and execute on its behalf any and all bonds and undertakings, and other obligatory instruments of similar nature, in penalties not exceeding the sum of

UNLIMITED

and to bind the Company thereby, as fully and to the same extent as if such instruments were signed by the duly authorized officers of the Company; and all acts of said Attorney pursuant to the authority given are hereby ratified and confirmed.

This power of attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the board of directors of the Company:

"RESOLVED, that the president, or any vice president be, and each hereby is, authorized and empowered to appoint attorneys-in-fact of the Company, and to authorize them to execute and deliver on behalf of the Company any and all bonds, forms, applications, memorandums, undertakings, recognizances, transfers, contracts of indemnity, policies, contracts guaranteeing the fidelity of persons holding positions of public or private trust, and other writings obligatory in nature that the business of the Company may require; and to modify or revoke, with or without cause, any such appointment or authority; provided, however, that the authority granted hereby shall in no way limit the authority of other duly authorized agents to sign and countersign any of said documents on behalf of the Company."

"RESOLVED FURTHER, that such attorneys-in-fact shall have full power and authority to execute and deliver any and all such documents and to bind the Company subject to the terms and limitations of the power of attorney issued to them, and to affix the seal of the Company thereto; provided, however, that said seal shall not be necessary for the validity of any such documents."

This power of attorney is signed and sealed under and by the following bylaws duly adopted by the board of directors of the Company.

Execution of Instruments. Any vice president, any assistant secretary or any assistant treasurer shall have the power and authority to sign or attest all approved documents, instruments, contracts, or other papers in connection with the operation of the business of the company in addition to the chairman of the board, the chief executive officer, president, treasurer or secretary; provided, however, the signature of any of them may be printed, engraved, or stamped on any approved document, contract, instrument, or other papers of the Company.

IN WITNESS WHEREOF, the Company has caused this instrument to be sealed and duly attested by the signature of its officer the 1st day of April, 2024.

Antonio C. Albanese, Vice President of Nationwide Mutual Insurance Company

ACKNOWLEDGMENT

STATE OF NEW YORK COUNTY OF KINGS: ss

On this 1st day of April, 2024, before me came the above-named officer for the Company aforesaid, to me personally known to be the officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, deposes and says, that he is the officer of the Company aforesaid, that the seal affixed hereto is the corporate seal of said Company, and the said corporate seal and his signature were duly affixed and subscribed to said instrument by the authority and direction of said Company.

Sharon Laburda
Notary Public, State of New York
No. 01LA6427697
Qualified in Kings County
Commission Expires January 3, 2026

Notary Public
My Commission Expires
January 3, 2026

CERTIFICATE

I, Lezlie F. Chimienti, Assistant Secretary of the Company, do hereby certify that the foregoing is a full, true and correct copy of the original power of attorney issued by the Company; that the resolution included therein is a true and correct transcript from the minutes of the meetings of the boards of directors and the same has not been revoked or amended in any manner; that said Antonio C. Albanese was on the date of the execution of the foregoing power of attorney the duly elected officer of the Company, and the corporate seal and his signature as officer were duly affixed and subscribed to the said instrument by the authority of said board of directors; and the foregoing power of attorney is still in full force and effect.

IN WITNESS WHEREOF, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of said Company this 8th day of December, 2025.

Assistant Secretary

BDJ 1(04-24)00

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }

} ss.

County of LOS ANGELES }

On December 8th, 2025 before me, Philip Vega, Notary Public

Here Insert Name and Title of the Officer

personally appeared Kevin Vega, Attorney-in-Fact

Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

PHILIP VEGA
Notary Public - California
Los Angeles County
Commission # 2490569
My Comm. Expires May 31, 2028

Signature:

Place Notary Seal Above

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title of Type of Document:

Document Date: Number of Pages:

Signer(s) Other Than Named Above:

Capacity(ies) Claimed by Signer(s)

Signer's Name:
☐ Individual
☐ Corporate Officer Title(s):
☐ Partner - ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

Right Thumbprint of Signer
Top of thumb here

Signer is Representing:

Signer's Name:
☐ Individual
☐ Corporate Officer Title(s):
☐ Partner - ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

Right Thumbprint of Signer
Top of thumb here

Signer is Representing:

EXECUTED IN 2 ORIGINAL COUNTERPARTS
BOND NUMBER: 7901289718

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That the County of Santa Barbara of the State of California (hereinafter referred to as the County) and ProWest PCM, Inc. dba ProWest Constructors (hereinafter referred to as Principal) have by written agreement dated DECEMBER 4TH, 2025, entered into a contract identified as:

Project Title: County of Santa Barbara
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
(Hereinafter referred to as the Contract) and

That, pursuant to law and to said Contract, and before entering upon the performance of said Contract, the Principal is required under the terms and conditions of said Contract to furnish a bond for the faithful performance of Contract.

NOW, THEREFORE, said Principal and NATIONWIDE MUTUAL INSURANCE COMPANY

as corporate surety (hereinafter referred to as Surety), are held firmly bound unto the County in the amount of $6,024,246.00, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns both jointly and severally. Surety shall be and hereby warrants that it is listed in the Insurance Organizations Authorized by the Insurance Commissioner to Transact Business of Insurance in the State of California, published by the Department of Insurance, State of California or successor publications.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal, his heirs, executors, administrators, successors, or assigns, shall perform all of the covenants, conditions and agreements in said Contract and any alteration thereof made as herein provided, in his or their part, to be kept and performed at the time, and in the manner therein specified, and shall indemnify and save harmless County, its officers, agents, and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force, virtue and effect.

And the said Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or additions to the terms of the Contract or to the work or to the specifications.

In the event suit is brought upon this Bond by County and judgment is recovered, Surety shall pay all costs incurred by the County in such suit, including a reasonable attorney's fee to be fixed by the court.

Death, illness, disability or disqualification of the Principal shall not relieve Surety of its obligations hereunder.

ProWest PCM, Inc. dba ProWest Constructors
Principal

By: _____
Michael DeMarie, President

DATED: DECEMBER 8TH, 2025

NATIONWIDE MUTUAL INSURANCE COMPANY
Surety

_____
Signature of Attorney-in-fact

KEVIN VEGA, ATTORNEY-in-FACT

500 N. BRAND BLVD. #2000
Address

GLENDALE, CA 91203
City, State & Zip Code

Surety's Agent for Service of Process (located within the State of California):

C&D BONDING & INSURANCE SERVICES
Name of Agent

534 E. BADILLO ST.
Address

COVINA, CA 91203
City, State & Zip Code

626-859-1000
Telephone Number

626-859-1001
FAX Number

NOTE: Signature of those executing for Surety must be properly acknowledged.

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS THAT:

Nationwide Mutual Insurance Company, an Ohio corporation

hereinafter referred to severally as the "Company" and collectively as "the Companies" does hereby make, constitute and appoint:

BRITTON CHRISTIANSEN; KEVIN VEGA; PHILIP E VEGA;

each in their individual capacity, its true and lawful attorney-in-fact, with full power and authority to sign, seal, and execute on its behalf any and all bonds and undertakings, and other obligatory instruments of similar nature, in penalties not exceeding the sum of

UNLIMITED

and to bind the Company thereby, as fully and to the same extent as if such instruments were signed by the duly authorized officers of the Company; and all acts of said Attorney pursuant to the authority given are hereby ratified and confirmed.

This power of attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the board of directors of the Company:

"RESOLVED, that the president, or any vice president be, and each hereby is, authorized and empowered to appoint attorneys-in-fact of the Company, and to authorize them to execute and deliver on behalf of the Company any and all bonds, forms, applications, memorandums, undertakings, recognizances, transfers, contracts of indemnity, policies, contracts guaranteeing the fidelity of persons holding positions of public or private trust, and other writings obligatory in nature that the business of the Company may require; and to modify or revoke, with or without cause, any such appointment or authority; provided, however, that the authority granted hereby shall in no way limit the authority of other duly authorized agents to sign and countersign any of said documents on behalf of the Company."

"RESOLVED FURTHER, that such attorneys-in-fact shall have full power and authority to execute and deliver any and all such documents and to bind the Company subject to the terms and limitations of the power of attorney issued to them, and to affix the seal of the Company thereto; provided, however, that said seal shall not be necessary for the validity of any such documents."

This power of attorney is signed and sealed under and by the following bylaws duly adopted by the board of directors of the Company.

Execution of Instruments. Any vice president, any assistant secretary or any assistant treasurer shall have the power and authority to sign or attest all approved documents, instruments, contracts, or other papers in connection with the operation of the business of the company in addition to the chairman of the board, the chief executive officer, president, treasurer or secretary; provided, however, the signature of any of them may be printed, engraved, or stamped on any approved document, contract, instrument, or other papers of the Company.

IN WITNESS WHEREOF, the Company has caused this instrument to be sealed and duly attested by the signature of its officer the 1st day of April, 2024.

Antonio C. Albanese, **Vice President** of Nationwide Mutual Insurance Company

ACKNOWLEDGMENT

STATE OF NEW YORK COUNTY OF KINGS: ss

On this 1st day of April, 2024, before me came the above-named officer for the Company aforesaid, to me personally known to be the officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, deposes and says, that he is the officer of the Company aforesaid, that the seal affixed hereto is the corporate seal of said Company, and the said corporate seal and his signature were duly affixed and subscribed to said instrument by the authority and direction of said Company.

Sharon Laburda
Notary Public, State of New York
No. 01LA6427697
Qualified in Kings County
Commission Expires January 3, 2026

Notary Public
My Commission Expires
January 3, 2026

CERTIFICATE

I, Lezlie F. Chimienti, Assistant Secretary of the Company, do hereby certify that the foregoing is a full, true and correct copy of the original power of attorney issued by the Company; that the resolution included therein is a true and correct transcript from the minutes of the meetings of the boards of directors and the same has not been revoked or amended in any manner; that said Antonio C. Albanese was on the date of the execution of the foregoing power of attorney the duly elected officer of the Company, and the corporate seal and his signature as officer were duly affixed and subscribed to the said instrument by the authority of said board of directors; and the foregoing power of attorney is still in full force and effect.

IN WITNESS WHEREOF, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of said Company this 8th day of December, 2025.

Assistant Secretary

BDJ 1(04-24)00

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State of California }

} ss.

County of LOS ANGELES }

On December 8th, 2025 before me, Philip Vega, Notary Public
Here Insert Name and Title of the Officer

personally appeared Kevin Vega, Attorney-in-Fact
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

PHILIP VEGA
Notary Public - California
Los Angeles County
Commission # 2490569
My Comm. Expires May 31, 2028

Signature: _____
Signature of Notary Public

Place Notary Seal Above

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title of Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name:	Signer's Name:
☐ Individual	☐ Individual
☐ Corporate Officer Title(s):	☐ Corporate Officer Title(s):
☐ Partner - ☐ Limited ☐ General	☐ Partner - ☐ Limited ☐ General
☐ Attorney in Fact	☐ Attorney in Fact
☐ Trustee	☐ Trustee
☐ Guardian or Conservator	☐ Guardian or Conservator
☐ Other:	☐ Other:
Signer is Representing:	Signer is Representing:
Right Thumbprint of Signer Top of thumb here	Right Thumbprint of Signer Top of thumb here

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 12/7/2025

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Cavignac 451 A Street, Suite 1800 San Diego CA 92101	**CONTACT NAME:** Certificate Department **PHONE (A/C, No, Ext):** 619-744-0574 **FAX (A/C, No):** 619-234-8601 **E-MAIL ADDRESS:** certificates@cavignac.com
INSURED PROWESPC01 ProWest PCM Inc. dba ProWest Constructors 22710 Palomar Street Wildomar, CA 92595	**INSURER(S) AFFORDING COVERAGE** — **NAIC #** **INSURER A :** Hartford Fire Insurance Co — 19682 **INSURER B :** Trumbull Insurance Company — 27120 **INSURER C :** Sentinel Insurance Company — 11000 **INSURER D :** Berkley Assurance Company — 39462 **INSURER E :** Hartford Casualty Insurance Co — 29424 **INSURER F :**

COVERAGES **CERTIFICATE NUMBER:** 1308340800 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT X LOC OTHER:	Y		72UEABG9JVT	10/1/2025	10/1/2026	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG DEDUCTIBLE	$ 1,000,000 $ 300,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $ 5,000
B	**AUTOMOBILE LIABILITY** ANY AUTO OWNED AUTOS ONLY SCHEDULED AUTOS X HIRED AUTOS ONLY X NON-OWNED AUTOS ONLY			72UEACB1080	10/1/2025	10/1/2026	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) 	$ 1,000,000 $ $ $ $
E	**UMBRELLA LIAB** OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION $			72RHABG9JWL	10/1/2025	10/1/2026	EACH OCCURRENCE AGGREGATE 	$ $ $
C	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	Y	72WEAAC5MAK	10/1/2025	10/1/2026	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000
D	Professional Liability			PCADB50292121025	10/1/2025	10/1/2026	Each Claim Aggregate	$5,000,000 $5,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Re: Project Name: IRC Expansion & ADA Upgrades. Additional Insured coverage applies to General Liability for County of Santa Barbara, its Officers, Officials, Employees, Agents, and Volunteers per policy form. Primary and Non-Contributory coverage applies to General Liability per policy form. Waiver of subrogation applies to Workers Compensation per policy form. Professional Liability - Claims made form, defense costs included within limit.

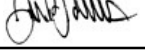
CERTIFICATE HOLDER

County of Santa Barbara
912 W. Foster Road
Santa Maria CA 93455

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



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The insurance afforded herein for any subsidiary not named in this Coverage Part as a named insured does not apply to injury or damage with respect to which such insured is also a named insured under another policy or would be a named insured under such policy but for its termination or the exhaustion of its limits of insurance.

3. Newly Acquired Or Formed Organization

Any organization you newly acquire or form, other than a partnership, joint venture or limited liability company, and over which you maintain financial interest of more than 50% of the voting stock, will qualify as a Named Insured if there is no other similar insurance available to that organization. However:

a. Coverage under this provision is afforded only until the 180th day after you acquire or form the organization or the end of the policy period, whichever is earlier;

b. Coverage **A** does not apply to "bodily injury" or "property damage" that occurred before you acquired or formed the organization; and

c. Coverage **B** does not apply to "personal and advertising injury" arising out of an offense committed before you acquired or formed the organization.

4. Nonowned Watercraft

With respect to watercraft you do not own that is less than 51 feet long and is not being used to carry persons for a charge, any person is an insured while operating such watercraft with your permission. Any other person or organization responsible for the conduct of such person is also an insured, but only with respect to liability arising out of the operation of the watercraft, and only if no other insurance of any kind is available to that person or organization for this liability.

However, no person or organization is an insured with respect to:

a. "Bodily injury" to a co-"employee" of the person operating the watercraft; or

b. "Property damage" to property owned by, rented to, in the charge of or occupied by you or the employer of any person who is an insured under this provision.

5. Additional Insureds When Required By Written Contract, Written Agreement Or Permit

The following person(s) or organization(s) are an additional insured when you have agreed, in a written contract, written agreement or because of a permit issued by a state or political subdivision, that such person or organization be added as an additional insured on your policy, provided the injury or damage occurs subsequent to the execution of the contract or agreement.

A person or organization is an additional insured under this provision only for that period of time required by the contract or agreement.

However, no such person or organization is an insured under this provision if such person or organization is included as an insured by an endorsement issued by us and made a part of this Coverage Part.

a. Vendors

Any person(s) or organization(s) (referred to below as vendor), but only with respect to "bodily injury" or "property damage" arising out of "your products" which are distributed or sold in the regular course of the vendor's business and only if this Coverage Part provides coverage for "bodily injury" or "property damage" included within the "products-completed operations hazard".

(1) The insurance afforded the vendor is subject to the following additional exclusions:

This insurance does not apply to:

(a) "Bodily injury" or "property damage" for which the vendor is obligated to pay damages by reason of the assumption of liability in a contract or agreement. This exclusion does not apply to liability for damages that the vendor would have in the absence of the contract or agreement;

(b) Any express warranty unauthorized by you;

(c) Any physical or chemical change in the product made intentionally by the vendor;

(d) Repackaging, except when unpacked solely for the purpose of inspection, demonstration, testing, or the substitution of parts under instructions from the manufacturer, and then repackaged in the original container;

(e) Any failure to make such inspections, adjustments, tests or servicing as the vendor has agreed to make or normally undertakes to make in the usual course of business, in connection with the distribution or sale of the products;

(f) Demonstration, installation, servicing or repair operations, except such operations performed at the vendor's premises in connection with the sale of the product;

(g) Products which, after distribution or sale by you, have been labeled or relabeled or used as a container, part or ingredient of any other thing or substance by or for the vendor; or

(h) "Bodily injury" or "property damage" arising out of the sole negligence of the vendor for its own acts or omissions or those of its employees or anyone else acting on its behalf. However, this exclusion does not apply to:

(i) The exceptions contained in Sub-paragraphs (**d)** or (**f**); or

(ii) Such inspections, adjustments, tests or servicing as the vendor has agreed to make or normally undertakes to make in the usual course of business, in connection with the distribution or sale of the products.

(2) This insurance does not apply to any insured person or organization, from whom you have acquired such products, or any ingredient, part or container, entering into, accompanying or containing such products.

b. Lessors Of Equipment

(1) Any person(s) or organization(s) from whom you lease equipment; but only with respect to their liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your maintenance, operation or use of equipment leased to you by such person(s) or organization(s).

(2) With respect to the insurance afforded to these additional insureds this insurance does not apply to any "occurrence" which takes place after the equipment lease expires.

c. Lessors Of Land Or Premises

Any person or organization from whom you lease land or premises, but only with respect to liability arising out of the ownership, maintenance or use of that part of the land or premises leased to you.

With respect to the insurance afforded these additional insureds the following additional exclusions apply:

This insurance does not apply to:

1. Any "occurrence" which takes place after you cease to lease that land; or

2. Structural alterations, new construction or demolition operations performed by or on behalf of such person or organization.

d. Architects, Engineers Or Surveyors

Any architect, engineer, or surveyor, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your acts or omissions or the acts or omissions of those acting on your behalf:

(1) In connection with your premises; or

(2) In the performance of your ongoing operations performed by you or on your behalf.

With respect to the insurance afforded these additional insureds, the following additional exclusion applies:

This insurance does not apply to "bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of or the failure to render any professional services by or for you, including:

1. The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or

2. Supervisory, inspection, architectural or engineering activities**.**

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any professional services by or for you.

e. Permits Issued By State Or Political Subdivisions

Any state or political subdivision, but only with respect to operations performed by you or on your behalf for which the state or political subdivision has issued a permit.

With respect to the insurance afforded these additional insureds, this insurance does not apply to:

(1) "Bodily injury", "property damage" or "personal and advertising injury" arising out of operations performed for the state or municipality; or

(2) "Bodily injury" or "property damage" included within the "products-completed operations hazard".

f. Any Other Party

Any other person or organization who is not an additional insured under Paragraphs **a.** through **e**. above, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your acts or omissions or the acts or omissions of those acting on your behalf:

(1) In the performance of your ongoing operations;

(2) In connection with your premises owned by or rented to you; or

(3) In connection with "your work" and included within the "products-completed operations hazard", but only if

(a) The written contract or agreement requires you to provide such coverage to such additional insured; and

(b) This Coverage Part provides coverage for "bodily injury" or "property damage" included within the "products-completed operations hazard".

However:

(1) The insurance afforded to such additional insured only applies to the extent permitted by law; and

(2) If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

With respect to the insurance afforded to these additional insureds, this insurance does not apply to:

"Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:

(1) The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or

(2) Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any professional services by or for you.

The limits of insurance that apply to additional insureds is described in Section **III** - Limits Of Insurance.

How this insurance applies when other insurance is available to the additional insured is described in the Other Insurance Condition in Section **IV** - Commercial General Liability Conditions.

No person or organization is an insured with respect to the conduct of any current or past partnership, joint venture or limited liability company that is not shown as a Named Insured in the Declarations.

SECTION III - LIMITS OF INSURANCE

1. The Most We Will Pay

The Limits of Insurance shown in the Declarations and the rules below fix the most we will pay regardless of the number of:

a. Insureds;

b. Claims made or "suits" brought; or

c. Persons or organizations making claims or bringing "suits".

2. General Aggregate Limit

The General Aggregate Limit is the most we will pay for the sum of:

a. Medical expenses under Coverage **C;**

b. Damages under Coverage **A,** except damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard"; and

c. Damages under Coverage **B.**

3. Products-Completed Operations Aggregate Limit

The Products-Completed Operations Aggregate Limit is the most we will pay under Coverage **A** for damages because of "bodily injury" and "property damage" included in the "products-completed operations hazard".

4. Personal And Advertising Injury Limit

Subject to **2.** above, the Personal and Advertising Injury Limit is the most we will pay under Coverage **B** for the sum of all damages because of all "personal and advertising injury" sustained by any one person or organization.

5. Each Occurrence Limit

Subject to **2.** or **3.** above, whichever applies, the Each Occurrence Limit is the most we will pay for the sum of:

a. Damages under Coverage **A;** and

b. Medical expenses under Coverage **C**

because of all "bodily injury" and "property damage" arising out of any one "occurrence".

6. Damage To Premises Rented To You Limit

Subject to **5.** above, the Damage To Premises Rented To You Limit is the most we will pay under Coverage **A** for damages because of "property damage" to any one premises, while rented to you, or in the case of damage by fire, lightning or explosion, while rented to you or temporarily occupied by you with permission of the owner.

In the case of damage by fire, lightning or explosion, the Damage to Premises Rented To You Limit applies to all damage proximately caused by the same event, whether such damage results from fire, lightning or explosion or any combination of these.

7. Medical Expense Limit

Subject to **5.** above, the Medical Expense Limit is the most we will pay under Coverage **C** for all medical expenses because of "bodily injury" sustained by any one person.

8. How Limits Apply To Additional Insureds

If you have agreed in a written contract or written agreement that another person or organization be added as an additional insured on your policy, the most we will pay on behalf of such additional insured is the lesser of:

a. The limits of insurance specified in the written contract or written agreement; or

b. The Limits of Insurance shown in the Declarations.

Such amount shall be a part of and not in addition to Limits of Insurance shown in the Declarations and described in this Section.

The Limits of Insurance of this Coverage Part apply separately to each consecutive annual period and to any remaining period of less than 12 months, starting with the beginning of the policy period shown in the Declarations, unless the policy period is extended after issuance for an additional period of less than 12 months. In that case, the additional period will be deemed part of the last preceding period for purposes of determining the Limits of Insurance.

SECTION IV - COMMERCIAL GENERAL LIABILITY CONDITIONS

1. Bankruptcy

Bankruptcy or insolvency of the insured or of the insured's estate will not relieve us of our obligations under this Coverage Part.

2. Duties In The Event Of Occurrence, Offense, Claim Or Suit

a. Notice Of Occurrence Or Offense

You or any additional insured must see to it that we are notified as soon as practicable of an "occurrence" or an offense which may result in a claim. To the extent possible, notice should include:

(1) How, when and where the "occurrence" or offense took place;

(2) The names and addresses of any injured persons and witnesses; and

(3) The nature and location of any injury or damage arising out of the "occurrence" or offense.

b. Notice Of Claim

If a claim is made or "suit" is brought against any insured, you or any additional insured must:

(1) Immediately record the specifics of the claim or "suit" and the date received; and

(2) Notify us as soon as practicable.

You or any additional insured must see to it that we receive written notice of the claim or "suit" as soon as practicable.

c. Assistance And Cooperation Of The Insured

You and any other involved insured must:

(1) Immediately send us copies of any demands, notices, summonses or legal papers received in connection with the claim or "suit";

(2) Authorize us to obtain records and other information;

(3) Cooperate with us in the investigation or settlement of the claim or defense against the "suit"; and

(4) Assist us, upon our request, in the enforcement of any right against any person or organization which may be liable to the insured because of injury or damage to which this insurance may also apply.

d. Obligations At The Insureds Own Cost

No insured will, except at that insured's own cost, voluntarily make a payment, assume any obligation, or incur any expense, other than for first aid, without our consent.

e. Additional Insureds Other Insurance

If we cover a claim or "suit" under this Coverage Part that may also be covered by other insurance available to an additional insured, such additional insured must submit such claim or "suit" to the other insurer for defense and indemnity.

However, this provision does not apply to the extent that you have agreed in a written contract or written agreement that this insurance is primary and non-contributory with the additional insured's own insurance.

f. Knowledge Of An Occurrence, Offense, Claim Or Suit

Paragraphs **a.** and **b.** apply to you or to any additional insured only when such "occurrence", offense, claim or "suit" is known to:

(1) You or any additional insured that is an individual;

(2) Any partner, if you or the additional insured is a partnership;

(3) Any manager, if you or the additional insured is a limited liability company;

(4) Any "executive officer" or insurance manager, if you or the additional insured is a corporation;

(5) Any trustee, if you or the additional insured is a trust; or

(6) Any elected or appointed official, if you or the additional insured is a political subdivision or public entity.

This duty applies separately to you and any additional insured.

3. Legal Action Against Us

No person or organization has a right under this Coverage Part:

a. To join us as a party or otherwise bring us into a "suit" asking for damages from an insured; or

b. To sue us on this Coverage Part unless all of its terms have been fully complied with.

A person or organization may sue us to recover on an agreed settlement or on a final judgment against an insured; but we will not be liable for damages that are not payable under the terms of this Coverage Part or that are in excess of the applicable limit of insurance. An agreed settlement means a settlement and release of liability signed by us, the insured and the claimant or the claimant's legal representative.

4. Other Insurance

If other valid and collectible insurance is available to the insured for a loss we cover under Coverages **A** or **B** of this Coverage Part, our obligations are limited as follows:

a. Primary Insurance

This insurance is primary except when **b.** below applies. If other insurance is also primary, we will share with all that other insurance by the method described in **c.** below.

b. Excess Insurance

This insurance is excess over any of the other insurance, whether primary, excess, contingent or on any other basis:

(1) Your Work

That is Fire, Extended Coverage, Builder's Risk, Installation Risk or similar coverage for "your work";

(2) Premises Rented To You

That is fire, lightning or explosion insurance for premises rented to you or temporarily occupied by you with permission of the owner;

(3) Tenant Liability

That is insurance purchased by you to cover your liability as a tenant for "property damage" to premises rented to you or temporarily occupied by you with permission of the owner;

(4) Aircraft, Auto Or Watercraft

If the loss arises out of the maintenance or use of aircraft, "autos" or watercraft to the extent not subject to Exclusion g. of Section **I** - Coverage A - Bodily Injury And Property Damage Liability;

(5) Property Damage To Borrowed Equipment Or Use Of Elevators

If the loss arises out of "property damage" to borrowed equipment or the use of elevators to the extent not subject to Exclusion **j.** of Section **I** - Coverage **A** - Bodily Injury And Property Damage Liability;

(6) When You Are Added As An Additional Insured To Other Insurance

Any other insurance available to you covering liability for damages arising out of the premises or operations, or products and completed operations, for which you have been added as an additional insured by that insurance; or

(7) When You Add Others As An Additional Insured To This Insurance

Any other insurance available to an additional insured.

However, the following provisions apply to other insurance available to any person or organization who is an additional insured under this coverage part.

(a) Primary Insurance When Required By Contract

This insurance is primary if you have agreed in a written contract or written agreement that this insurance be primary. If other insurance is also primary, we will share with all that other insurance by the method described in **c.** below.

(b) Primary And Non-Contributory To Other Insurance When Required By Contract

If you have agreed in a written contract, written agreement, or permit that this insurance is primary and non-contributory with the additional insured's own insurance, this insurance is primary and we will not seek contribution from that other insurance.

Paragraphs **(a)** and **(b)** do not apply to other insurance to which the additional insured has been added as an additional insured.

When this insurance is excess, we will have no duty under Coverages **A** or **B** to defend the insured against any "suit" if any other insurer has a duty to defend the insured against that "suit". If no other insurer defends, we will undertake to do so, but we will be entitled to the insured's rights against all those other insurers.

When this insurance is excess over other insurance, we will pay only our share of the amount of the loss, if any, that exceeds the sum of:

(1) The total amount that all such other insurance would pay for the loss in the absence of this insurance; and

(2) The total of all deductible and self-insured amounts under all that other insurance.

We will share the remaining loss, if any, with any other insurance that is not described in this Excess Insurance provision and was not bought specifically to apply in excess of the Limits of Insurance shown in the Declarations of this Coverage Part.

c. Method Of Sharing

If all of the other insurance permits contribution by equal shares, we will follow this method also. Under this approach each insurer contributes equal amounts until it has paid its applicable limit of insurance or none of the loss remains, whichever comes first.

If any of the other insurance does not permit contribution by equal shares, we will contribute by limits. Under this method, each insurer's share is based on the ratio of its applicable limit of insurance to the total applicable limits of insurance of all insurers.

5. Premium Audit

a. We will compute all premiums for this Coverage Part in accordance with our rules and rates.

b. Premium shown in this Coverage Part as advance premium is a deposit premium only. At the close of each audit period we will compute the earned premium for that period and send notice to the first Named Insured. The due date for audit and retrospective premiums is the date shown as the due date on the bill. If the sum of the advance and audit premiums paid for the policy period is greater than the earned premium, we will return the excess to the first Named Insured.

c. The first Named Insured must keep records of the information we need for premium computation, and send us copies at such times as we may request.

6. Representations

a. When You Accept This Policy

By accepting this policy, you agree:

(1) The statements in the Declarations are accurate and complete;

(2) Those statements are based upon representations you made to us; and

(3) We have issued this policy in reliance upon your representations.

b. Unintentional Failure To Disclose Hazards

If unintentionally you should fail to disclose all hazards relating to the conduct of your business that exist at the inception date of this Coverage Part, we shall not deny coverage under this Coverage Part because of such failure.

7. Separation Of Insureds

Except with respect to the Limits of Insurance, and any rights or duties specifically assigned in this Coverage Part to the first Named Insured, this insurance applies:

a. As if each Named Insured were the only Named Insured; and

b. Separately to each insured against whom claim is made or "suit" is brought.

8. Transfer Of Rights Of Recovery Against Others To Us

a. Transfer Of Rights Of Recovery

If the insured has rights to recover all or part of any payment, including Supplementary Payments, we have made under this Coverage Part, those rights are transferred to us. The insured must do nothing after loss to impair them. At our request, the insured will bring "suit" or transfer those rights to us and help us enforce them.

b. Waiver Of Rights Of Recovery (Waiver Of Subrogation)

If the insured has waived any rights of recovery against any person or organization for all or part of any payment, including Supplementary Payments, we have made under this Coverage Part, we also waive that right, provided the insured waived their rights of recovery against such person or organization in a contract, agreement or permit that was executed prior to the injury or damage.

9. When We Do Not Renew

If we decide not to renew this Coverage Part, we will mail or deliver to the first Named Insured shown in the Declarations written notice of the

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT - CALIFORNIA

Policy Number: 72 WEA AC5MAK **Endorsement Number:**
Effective hour is the same as stated on the Information Page of the policy.
Named Insured and Address: PROWEST PCM INC
22710 PALOMAR ST
WILDOMAR CA 92595

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

You must maintain payroll records accurately segregating the remuneration of your employees while engaged in the work described in the Schedule.

The additional premium for this endorsement shall be 2 % of the California workers' compensation premium otherwise due on such remuneration.

SCHEDULE

Person or Organization	**Job Description**
Any person or organization for whom you are required by written contract or agreement to obtain this waiver of rights from us	

Countersigned by _____
Authorized Representative

BID FORM

1. Pursuant to and in compliance with your Notice to Bidders and the Contract Documents relating to the construction of:

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
Bid Due Date: TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

including Addendum No(s). 1, 2, ___, ___,___, ___, ___, the undersigned bidder, having become thoroughly familiar with the terms and conditions of the Contract Documents and with local conditions affecting the performance and the costs of the Work at the place where the Work is to be done, hereby proposes and agrees to fully perform the Work within the time stated in and in strict accordance with the Contract Documents (including the furnishing of any and all labor, materials, tools, expendable equipment and utility and transportation services necessary to fully perform the work and complete it in a workmanlike manner) for the total sum of:

2. **BASE BID:**

$ | | 5 | , | 7 | 0 | 0 | , | 0 | 0 | 0 | . | 0 | 0 |

(Place figures in appropriate boxes.)

Number of calendar days: 456

Additive Alternate No. 1: Detention Enclosures. Construction of detention enclosures at the tier levels and stairwells to tier levels inside the existing IRC building as indicated on Sheets A112, A420, A512, A542, A551, A642 and as specified in Division 01 Section 05 5 963.

$ | | | , | 3 | 2 | 4 | , | 2 | 4 | 6 | . | 0 | 0 |

(Place figures in appropriate boxes.)

3. If the project has additive bid items or additive groups, the lowest responsible bidder will be determined in accordance with Public Contract Code Division II, Part 3, Chapter 1, Section 20103.8, Subdivision (a) and as follows:
   a. The lowest bid shall be determined based on the lowest Base Bid amount only, without consideration of the prices on any additive or deductive items. The County will notify the lowest responsible bidder within 1 week of the Virtual Bid Opening if the additive alternate will be awarded and included in the final contract amount.

4. It is understood that Owner reserves the right to reject this Bid and that it shall remain open and not be withdrawn for a period of sixty (60) calendar days from the date prescribed for its opening.

5. Attached hereto and incorporated herein is the complete and entire list of subcontractors to be employed by the undersigned and in the performance of the Work.

6. It is understood and agreed that if written notice of the acceptance of this Bid is mailed or delivered personally to the undersigned bidder within thirty (30) calendar days after the opening of the Bid, or at any time thereafter before it is withdrawn, the undersigned bidder will execute and deliver the Contract Documents to Owner in accordance with the Bid as accepted, and will also furnish and deliver to Owner any Payment Bond required under the provisions of California Civil Code Section 3247 through 3252 and Performance Bond as required under the provisions of the California Government Code and/or California Public Contract Code all within fourteen (14) calendar days after personal delivery or deposit in the mails, as the case may be, of the notifications of award. The work under the contract shall be commenced by the undersigned bidder on the date stated in COUNTY'S written Notice to Proceed and shall be completed within **456 calendar** days thereafter.

7. Notice of acceptance or request for additional information may be addressed to the undersigned bidder at the business address set forth below.

8. The bid, contract or other submittal of the CONTRACTOR identified below in connection with the foregoing project is not made in the interest of or on behalf or any undisclosed person, partnership, company, association, organization, or corporation; and that the bid is genuine, and not collusive or sham; that the undersigned bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid and has not directly or indirectly colluded, conspired, connived or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding; that the undersigned bidder has not directly or indirectly sought by agreement, communication or conference with anyone to fix his bid price or the bid price of any other bidder or to fix any overhead, profit or cost element of such bid price or of that of any other bidder or to secure any advantage against the COUNTY of Santa Barbara of anyone interested in the proposed contract; or all statements contained in this Bid are true; and that the undersigned bidder has not directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay any fee to any corporation, partnership, company association, organization, Bid Depository or to any member or agent thereof to effectuate a collusive or sham bid. I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct.

9. Wherever in this Bid an amount is stated in both words and figures, in case of discrepancy between words and figures the words shall prevail; if all or any portion of the Bid is required to be given in unit prices and totals and a discrepancy existing between any such unit prices and totals so given, the unit prices shall prevail.

10. In accordance with the provisions of Sections 1860 and 1861 of the California Labor Code, every CONTRACTOR will be required to secure the payment of compensation of his or her employees. Each CONTRACTOR to whom a public works contract is awarded shall sign the following certification prior to performing the work of the contract: "I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract."

11. Protests shall follow the procedures outlined at the County of Santa Barbara Bid Opportunities website: http://www.countyofsb.org/1580/Bid-Opportunities

CONTRACTOR

ProWest PCM, Inc., dba ProWest Constructors
Company

IRS No.: 33-0647835

22710 Palomar Street
Street Address

License Classification(s): A, B, HAZ

Wildomar, CA 92595
City

Phone Number: 951-678-1038

BY: 
Signature

Michael DeMarie, President
Printed Name, Title

DESIGNATION OF SUBCONTRACTORS

The bidder agrees if this Bid is accepted, that he will contract with the County of Santa Barbara to do all work and furnish all labor, materials, machinery, tools and apparatus necessary to completely perform said Contracts in the manner and time prescribed by said Contract.

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
Bid Due Date: TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

In compliance with the provisions of Section 4100-4107 of the Public Contract Code of the State of California, and any amendments, thereof, the undersigned bidder has set forth below the name and location of the place of business of each subcontractor who will perform work or labor or render service to the undersigned in or about the construction of the work to be performed. That portion of the work which will be done by each subcontractor for each subcontract in excess of one-half of one percent of the undersigned's total aggregate bid shall be listed.

DIVISION OF WORK	SUBCONTRACTOR	LIC NO.	LOCATION
Selective Demolition	Unlimited Environmental, Inc.	668511	Santa Fe Springs, CA
CIP Concrete & Reinforcing Steel	Aguilera Brothers Construction, Inc.	873775	Santa Paula, CA
Structual & Misc. Steel & Metal Deck	Steel Fabricator of America	1140277	Bakersfield, CA
Masonry	Cooper Chase Construction	801675	Santa Maria, CA
Fireproofing (Spray On)	Versatile Coatings, Inc.	641185	Azusa, CA
Drywall & Lath & Plaster	Tarlton & Son, Inc.	342341	Fresno, CA
Ceramic Tile	J. Colavin & Son, Inc.	260803	Los Angeles, CA

COMPANY: ProWest PCM, Inc., dba ProWest Constructors

BY: _____
Bidder's Signature

Michael DeMarie, President

NOTE: This form may be reproduced and attached behind this page to list more Subcontractors.

DESIGNATION OF SUBCONTRACTORS

The bidder agrees if this Bid is accepted, that he will contract with the County of Santa Barbara to do all work and furnish all labor, materials, machinery, tools and apparatus necessary to completely perform said Contracts in the manner and time prescribed by said Contract.

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
Bid Due Date: TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

In compliance with the provisions of Section 4100-4107 of the Public Contract Code of the State of California, and any amendments, thereof, the undersigned bidder has set forth below the name and location of the place of business of each subcontractor who will perform work or labor or render service to the undersigned in or about the construction of the work to be performed. That portion of the work which will be done by each subcontractor for each subcontract in excess of one-half of one percent of the undersigned's total aggregate bid shall be listed.

DIVISION OF WORK	SUBCONTRACTOR	LIC NO.	LOCATION
Resinous Flooring	Specialty Flooring, Inc.	933651	Fontana, CA
Painting	Intone Coatings & Finishes LLC	1116858	Oceanside, CA
Fire Alarm	Huddleston Electric, Inc.	910577	Santa Barbara, CA
AC Paving, Striping & Site Signage	Challenge Asphalt	568465	Santa Barbara, CA
Plumbing	Southland Mechnical Contractors	586900	Oceanside, CA
HVAC, Controls & Wet/Dry Side	Superior Air, Inc.	669421	San Diego, CA
Electrical	Huddleston Electric, Inc.	910577	Santa Barbara, CA

COMPANY: ProWest PCM, Inc., dba ProWest Constructors

BY: _____
Bidder's Signature Michael DeMarie, President

NOTE: This form may be reproduced and attached behind this page to list more Subcontractors.

DESIGNATION OF SUBCONTRACTORS

The bidder agrees if this Bid is accepted, that he will contract with the County of Santa Barbara to do all work and furnish all labor, materials, machinery, tools and apparatus necessary to completely perform said Contracts in the manner and time prescribed by said Contract.

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
Bid Due Date: TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

In compliance with the provisions of Section 4100-4107 of the Public Contract Code of the State of California, and any amendments, thereof, the undersigned bidder has set forth below the name and location of the place of business of each subcontractor who will perform work or labor or render service to the undersigned in or about the construction of the work to be performed. That portion of the work which will be done by each subcontractor for each subcontract in excess of one-half of one percent of the undersigned's total aggregate bid shall be listed.

DIVISION OF WORK	SUBCONTRACTOR	LIC NO.	LOCATION
Low Voltage (Comm, A.V., & Security)	Medina Systems Contracting, Inc.	753150	Camarillo, CA
Site Concrete	Aguilera Brothers Construction, Inc.	873775	Santa Paula, CA
Doors, Frames, Hardware & Installation	Star Hardware, Inc.	766703	Ontario, CA
Security Access Doors, Security Glazing & Detention Equipment	CML Security LLC	1015730	Broomfield, CO
Finish Carpentry, Cabinets & Countertops	Perfection Stainless Fabrication, Inc.	462114	Bakersfield, CA

COMPANY: ProWest PCM, Inc., dba ProWest Constructors

BY: _____
Bidder's Signature

Michael DeMarie, President

NOTE: This form may be reproduced and attached behind this page to list more Subcontractors.

NONCOLLUSION AFFIDAVIT

In accordance with Public Contract Code § 7106. Michael DeMarie
(Bidder's full name)

being first duly sworn, deposes and says that he or she is President
(Bidder's title)

of ProWest PCM, Inc., dba ProWest Constructors
(Company's name)

the party making the foregoing Bid, that the Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the Bid is genuine and not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham Bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham Bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the Bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the Bid price, or of that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed Contract; that all statements contained in the Bid are true; and further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham Bid and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

SIGNATURE BLOCK (*Signature Block **must be** completed in ink& **changes must be** initialed.*)

Bidder's Signature: _____ **Date:** 12/4/25

Bidder's Name & Title (Print): Michael DeMarie, President

At CITY: Wildomar STATE: California

CERTIFICATE OF COMPLIANCE

This is to certify that all requirements for insurance of subcontractors as specified for this project will be met.

12/4/25
Dated

Signature of Principal

Michael DeMarie, President
Printed Name, Title of Principal

ProWest PCM, Inc., dba ProWest Constructors
Company

22710 Palomar Street
Address

Wildomar, CA 92595
City, State & Zip

BIDDER'S STATEMENTS

REGARDING INSURANCE COVERAGE:
Bidder hereby certifies that he has reviewed the insurance coverage requirements specified in the Contract Forms. Should he be awarded the contract for the work, Bidder further certifies that he can meet all the Contract Specification requirements for insurance including insurance coverage of his subcontractors.

REGARDING TITLE 13 OF THE CA CODE OF REGULATIONS, BIDDER'S FLEET:
Bidder must provide to the County, prior to executing the Contract, a true and correct copy of each valid Certificate of Reported Compliance, as described in section 2449(n) of Title 13 of the California Code of Regulations, for Bidder's fleet, and for each fleet of each subcontractor listed in Bidder's Bid, of vehicles subject to 13 CCR section 2449 that may be used in performance of the Contract.

REGARDING PUBLIC CONTRACT CODE SECTION 10232:
In accordance with Public Contract Code Section 10232, the Contractor hereby states, under penalty of perjury, that no more than one final unappealable finding of contempt of court by a Federal Court has been issued against the Contractor within the immediately preceding two year period because of the Contractor's failure to comply with an order of a Federal Court which orders the Contractor to comply with an order of the National Labor Relations Board.

REGARDING PUBLIC CONTRACT CODE SECTION 10162:
In accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

> Has the bidder, any officer of the bidder, or any employee of the bidder who has proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing, a federal, state, or local government project because of a violation of law or safety regulation?
>
> Yes ____ No X

(If the answer is yes, explain the circumstances on a separate sheet of paper and attach to Bid)

12/4/25
Date

Signature of Principal

Michael DeMarie, President
Printed Name, Title of Principal

ProWest PCM, Inc., dba ProWest Constructors
Company

22710 Palomar Street
Address

Wildomar, CA 92595
City, State & Zip

ANTI-FRAUD CERTIFICATION

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041
Bid Due Date: TUESDAY, NOVEMBER 25, 2025, at 3:00 P.M.

In accordance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury that the bidder **has __, has not** X, been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or federal antitrust law in connection with the bidding upon award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or Trustees of the California State University.

The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

NOTE: The bidder must place a check mark after "has" or "has not" in one of the blank spaces provided.

12/4/25
Date

Signature of Principal

Michael DeMarie, President
Printed Name, Title of Principal

ProWest PCM, Inc., dba ProWest Constructors
Company

22710 Palomar Street
Address

Wildomar, CA 92595
City, State & Zip

BIDDER'S BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, ProWest PCM, Inc. dba ProWest Constructors as Principal, and NATIONWIDE MUTUAL INSURANCE COMPANY as Surety (hereinafter referred to as Surety), are held firmly bound unto the County of Santa Barbara, State of California (hereinafter called "Owner") in the penal sum of Ten Percent (10%) of the total aggregate amount of the bid of the Principal above named, submitted by said Principal to Owner for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents. Surety shall be and hereby warrants that it is listed in the Insurance Organizations Authorized by the Insurance Commissioner to Transact Business of Insurance in the State of California, published by the Department of Insurance, State of California or successor publications. In no case shall the liability of the Surety hereunder exceed the sum of TEN PERCENT OF AMOUNT BID DOLLARS ($ 10%).

The condition of this obligation is such that a bid to Owner for certain construction specifically described as follows:

COUNTY OF SANTA BARBARA
IRC EXPANSION & ADA UPGRADES
4436 Calle Real, Santa Barbara, CA 93110
Project No. 20041

for which bids are due on TUESDAY, NOVEMBER 25, 2025 has been submitted by Principal to Owner.

NOW, THEREFORE, if the aforesaid Principal shall not withdraw said bid within the period therein after the opening of the same, or, if no period be specified within sixty (60) days after said opening and shall within the period specified therefore, or, if no period be specified, within eight (8) days after the prescribed forms are presented to him for signature, enter into a written Contract with Owner, in the prescribed form, in accordance with the bid as accepted, and file the two Bonds with Owner, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by law, then this obligation shall be null and void; otherwise, it shall remain in full force, virtue and affect.

Said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any manner affects its obligations on this bond, and it does hereby waive notice of any change, extension, alteration, or addition.

It is hereby agreed that any progress payment made after the scheduled completion date will not constitute a waiver of any liquidated damages heretofore agreed upon.

In the event suit is brought upon said Bond by Owner and judgment is recovered, the Surety shall pay all costs incurred by Owner in such suit, including a reasonable attorney's fee to be fixed by the Court.

Death, Bankruptcy, Receivership, Going Out of Business for any reason, or incompetence of the Principal shall not relieve the Surety of its obligations hereunder.

Dated 12/4/25

ProWest PCM, Inc. dba ProWest Constructors
Name of Principal

Signature of Principal (Seal)
Michael DeMarie, President

NATIONWIDE MUTUAL INSURANCE COMPANY
Name of Surety

ONE WEST NATIONWIDE BLVD. 1-14-301
Address

COLUMBUS, OH 43215
City, State & Zip

Dated NOVEMBER 6TH, 2025

Signature of Surety's Attorney-in-fact (Seal)
KEVIN VEGA

Surety's Agent for Service of Process (located within the State of California):

C&D BONDING & INSURANCE SERVICES
Name of Agent

534 E. BADILLO ST.
Address

COVINA, CA 91723
City, State & Zip

626-859-1000
Telephone Number

626-859-1001
FAX Number

NOTE: Signatures of those executing for Surety MUST be properly acknowledged. This form may be reproduced for transmittal to the Surety for execution and attached to the front of the original Bid Bond Form.

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS THAT:

Nationwide Mutual Insurance Company, an Ohio corporation

hereinafter referred to severally as the "Company" and collectively as "the Companies" does hereby make, constitute and appoint:

BRITTON CHRISTIANSEN; KEVIN VEGA; PHILIP E VEGA;

each in their individual capacity, its true and lawful attorney-in-fact, with full power and authority to sign, seal, and execute on its behalf any and all bonds and undertakings, and other obligatory instruments of similar nature, in penalties not exceeding the sum of

UNLIMITED

and to bind the Company thereby, as fully and to the same extent as if such instruments were signed by the duly authorized officers of the Company; and all acts of said Attorney pursuant to the authority given are hereby ratified and confirmed.

This power of attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the board of directors of the Company:

"RESOLVED, that the president, or any vice president be, and each hereby is, authorized and empowered to appoint attorneys-in-fact of the Company, and to authorize them to execute and deliver on behalf of the Company any and all bonds, forms, applications, memorandums, undertakings, recognizances, transfers, contracts of indemnity, policies, contracts guaranteeing the fidelity of persons holding positions of public or private trust, and other writings obligatory in nature that the business of the Company may require; and to modify or revoke, with or without cause, any such appointment or authority; provided, however, that the authority granted hereby shall in no way limit the authority of other duly authorized agents to sign and countersign any of said documents on behalf of the Company."

"RESOLVED FURTHER, that such attorneys-in-fact shall have full power and authority to execute and deliver any and all such documents and to bind the Company subject to the terms and limitations of the power of attorney issued to them, and to affix the seal of the Company thereto; provided, however, that said seal shall not be necessary for the validity of any such documents."

This power of attorney is signed and sealed under and by the following bylaws duly adopted by the board of directors of the Company.

Execution of Instruments. Any vice president, any assistant secretary or any assistant treasurer shall have the power and authority to sign or attest all approved documents, instruments, contracts, or other papers in connection with the operation of the business of the company in addition to the chairman of the board, the chief executive officer, president, treasurer or secretary; provided, however, the signature of any of them may be printed, engraved, or stamped on any approved document, contract, instrument, or other papers of the Company.

IN WITNESS WHEREOF, the Company has caused this instrument to be sealed and duly attested by the signature of its officer the 1st day of April, 2024.

Antonio C. Albanese, Vice President of Nationwide Mutual Insurance Company

ACKNOWLEDGMENT

STATE OF NEW YORK COUNTY OF KINGS: ss
On this 1st day of April, 2024, before me came the above-named officer for the Company aforesaid, to me personally known to be the officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, deposes and says, that he is the officer of the Company aforesaid, that the seal affixed hereto is the corporate seal of said Company, and the said corporate seal and his signature were duly affixed and subscribed to said instrument by the authority and direction of said Company.

Sharon Laburda
Notary Public, State of New York
No. 01LA6427697
Qualified in Kings County
Commission Expires January 3, 2026

Notary Public
My Commission Expires
January 3, 2026

CERTIFICATE

I, Lezlie F. Chimienti, Assistant Secretary of the Company, do hereby certify that the foregoing is a full, true and correct copy of the original power of attorney issued by the Company; that the resolution included therein is a true and correct transcript from the minutes of the meetings of the boards of directors and the same has not been revoked or amended in any manner; that said Antonio C. Albanese was on the date of the execution of the foregoing power of attorney the duly elected officer of the Company, and the corporate seal and his signature as officer were duly affixed and subscribed to the said instrument by the authority of said board of directors; and the foregoing power of attorney is still in full force and effect.

IN WITNESS WHEREOF, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of said Company this 6th day of November, 2025.

Assistant Secretary

BDJ 1(04-24)00

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }

} ss.

County of LOS ANGELES }

On November 6th, 2025 before me, Philip Vega, Notary Public

Here Insert Name and Title of the Officer

personally appeared Kevin Vega, Attorney-in-Fact

Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

PHILIP VEGA
Notary Public - California
Los Angeles County
Commission # 2490569
My Comm. Expires May 31, 2028

Signature:

Place Notary Seal Above

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title of Type of Document:

Document Date: Number of Pages:

Signer(s) Other Than Named Above:

Capacity(ies) Claimed by Signer(s)

Signer's Name:
☐ Individual
☐ Corporate Officer Title(s):
☐ Partner - ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

Right Thumbprint of Signer
Top of thumb here

Signer is Representing:

Signer's Name:
☐ Individual
☐ Corporate Officer Title(s):
☐ Partner - ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

Right Thumbprint of Signer
Top of thumb here

Signer is Representing:

EXHIBIT C

Indemnification and Insurance Requirements
(For Construction Contracts)

INDEMNIFICATION

CONTRACTOR agrees to indemnify, defend (with counsel reasonably approved by COUNTY) and hold harmless COUNTY and its officers, officials, employees, agents and volunteers from and against any and all claims, actions, losses, damages, judgments and/or liabilities arising out of this Agreement from any cause whatsoever, including the acts, errors or omissions of any person or entity and for any costs or expenses (including but not limited to attorneys' fees) incurred by COUNTY on account of any claim except where such indemnification is caused by the active negligence, sole negligence, or willful misconduct of the COUNTY.

NOTIFICATION OF ACCIDENTS AND SURVIVAL OF INDEMNIFICATION PROVISIONS

CONTRACTOR shall notify COUNTY immediately in the event of any accident or injury arising out of or in connection with this Agreement. The indemnification provisions in this Agreement shall survive any expiration or termination of this Agreement.

INSURANCE

CONTRACTOR shall procure and maintain for the duration of this Agreement insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the CONTRACTOR, its agents, representatives, employees or subcontractors.

A. Minimum Scope and Limit of Insurance
Coverage shall be at least as broad as:

1. **Commercial General Liability (CGL):** Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis, including products-completed operations, personal & advertising injury, with limits no less than $5,000,000 per occurrence and $10,000,000 in the aggregate.
2. **Automobile Liability**: Insurance Services Office Form CA 0001 covering Code 1 (any auto), with limits no less than $2,000,000 per accident for bodily injury and property damage.
3. **Workers' Compensation**: Insurance as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease.
4. **Contractor's Pollution Legal Liability and/or Asbestos Legal Liability:** (if project involves environmental hazards) with limits no less than $1,000,000 per occurrence or claim, and $2,000,000 policy aggregate.

If the CONTRACTOR maintains broader and/or higher limits than the minimums shown above, the COUNTY requires and shall be entitled to the broader coverage and/or higher limits maintained by the CONTRACTOR. Any available insurance proceeds in excess of

the specified minimum limits of insurance and coverage shall be available to the COUNTY.

B. Other Insurance Provisions
The insurance policies are to contain, or be endorsed to contain, the following provisions:

1. **Additional Insured** – COUNTY, its officers, officials, employees, agents and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the CONTRACTOR including materials, parts, or equipment furnished in connection with such work or operations. General liability coverage can be provided in the form of an endorsement to the CONTRACTOR'S insurance at least as broad as ISO Form CG 20 10 11 85 or **both** CG 20 10, CG 20 26, CG 20 33, or CG 20 38; **and** CG 20 37 forms if later revisions used).
2. **Primary Coverage** – For any claims related to this Agreement, the CONTRACTOR'S insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the COUNTY, its officers, officials, employees, agents and volunteers. Any insurance or self-insurance maintained by the COUNTY, its officers, officials, employees, agents or volunteers shall be excess of the CONTRACTOR'S insurance and shall not contribute with it.
3. **Notice of Cancellation** – Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the COUNTY.
4. **Waiver of Subrogation Rights** – **CONTRACTOR hereby agrees to waive rights of subrogation which any insurer of CONTRACTOR may acquire** from CONTRACTOR by virtue of the payment of any loss. CONTRACTOR agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. **The Workers' Compensation policy shall be endorsed with a waiver of subrogation** in favor of the COUNTY for all work performed by the CONTRACTOR, its employees, agents and subcontractors. This provision applies regardless of whether or not the COUNTY has received a waiver of subrogation endorsement from the insurer.
5. **Deductibles and Self-Insured Retention** – Any deductibles or self-insured retentions must be declared to and approved by the COUNTY. At the option of the COUNTY, either: the CONTRACTOR shall cause the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the COUNTY, its officers, officials, employees, agents and volunteers; or the CONTRACTOR shall provide a financial guarantee satisfactory to the COUNTY guaranteeing payment of losses and related investigations, claim administration, and defense expenses.
6. **Acceptability of Insurers** – Unless otherwise approved by Risk Management, insurance shall be written by insurers authorized to do business in the State of California and with a minimum A.M. Best's Insurance Guide rating of "A- VII".
7. **Verification of Coverage** – CONTRACTOR shall furnish the COUNTY with proof of insurance, original certificates and amendatory endorsements as required by this Agreement. The proof of insurance, certificates and endorsements are to be received and approved by the COUNTY before work commences. However, failure to obtain the required documents prior to the work beginning shall not waive the CONTRACTOR'S obligation to provide them. The CONTRACTOR shall furnish evidence of renewal of coverage throughout the term of the Agreement. The

COUNTY reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

8. **Failure to Procure Coverage** – In the event that any policy of insurance required under this Agreement does not comply with the requirements, is not procured, or is canceled and not replaced, COUNTY has the right but not the obligation or duty to terminate the Agreement. Maintenance of required insurance coverage is a material element of the Agreement and failure to maintain or renew such coverage or to provide evidence of renewal may be treated by COUNTY as a material breach of contract.

9. **Subcontractors** – CONTRACTOR shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and CONTRACTOR shall ensure that COUNTY is an additional insured on insurance required from subcontractors. For CGL coverage subcontractors shall provide coverage with a format least as broad as CG 20 38 04 13.

10. **Claims Made Policies** – If any of the required policies provide coverage on a claims-made basis:

    i. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work.
    ii. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work.
    iii. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the CONTRACTOR must purchase “extended reporting” coverage for a minimum of five (5) years after completion of contract work.

11. **Special Risks or Circumstances** – COUNTY reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

Any change requiring additional types of insurance coverage or higher coverage limits must be made by amendment to this Agreement. CONTRACTOR agrees to execute any such amendment within thirty (30) days of receipt.

Any failure, actual or alleged, on the part of COUNTY to monitor or enforce compliance with any of the insurance and indemnification requirements will not be deemed as a waiver of any rights on the part of COUNTY.

County of Santa Barbara
General Services Department
Capital Projects Division
1105 Santa Barbara Street
Santa Barbara, California 93101
(805) 569-3055 FAX (805) 568-3249

CHANGE ORDER NO. *{CCO NO.}*

PROJECT TITLE: {PROJECT TITLE} **PROJECT NO.:** {PRJNO.}

CONTRACTOR: {LEGAL CONTRACTOR NAME} **CONTRACT NO.:** {CONT. NO.}

Except as provided herein, all terms and conditions of the contract referenced above remain unchanged and in full force and effect. The contractor may not exceed the price shown below without further written instruction from the Owner.
NOTE: This contract Change Order is not effective until signed by the Owner's Project manager and until signed by the Owner's Authorized Representative.

DESCRIPTION OF WORK TO BE PERFORMED:

The purpose of Contract Change Order **{CCONO.}** is:

By reason of this Change Order, the Contract Amount and Completion Date is hereby changed as shown below:

AMOUNT OF THIS CHANGE: {$AMT} **ADDT'L DAYS AWARDED**: {NO.DAYS} DATE ISSUED: {DD/MM/YY}

We the undersigned have given careful consideration to all aspects of the change order proposed and hereby agree.

Contractor acknowledges receipt of this Change Order and the not to exceed amount stated above. Contractor understands that the final price for this work will be determined in accordance with General Conditions.
CONTRACTOR:

NAME AND TITLE OF SIGNER (Type or Print):

(Signature of person authorized to sign) Date

By signing below, Owner revises the Contract as provided above, in accordance with General Conditions.

OPM: (Type or Print)

Owner Project Manager Date

OAR NAME: {NAME}, Capital Division Manager

Owner's Authorized Representative Date