Attachment B

Original Board Contract 23134

one COUNTY one FUTURE

COUNTY OF SANTA BARBARA
AGREEMENT FOR:
General Services Project No. 19012-2
County of Santa Barbara
Calle Real Water Loop Project, Phase 2 – Water Main Line Replacement Project
Calle Real Campus – Intersection of Camino del Remedio and Calle Real
BC:_____-_____

THIS AGREEMENT ("Agreement") is made by and between the County of Santa Barbara, a political subdivision of the State of California ("**COUNTY**"), and Tierra Contracting, Inc. ("**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 Calle Real Water Loop Project, Phase 2, Project No. 19012-2 ("Project"), the Notice to Bidders as amended by Addenda Numbers #1-#6, the Bid Bond, the Performance Bond, the Payment Bond, and the proposal or bid documents executed and submitted by the CONTRACTOR for the Project ("Proposal"), to the extent the Proposal is consistent with the provisions of this Agreement other than the Proposal (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 Calle Real Water Loop Project, Phase 2, Project No. 19012-2 ("Project"), the Notice to Contractors, the Bid Bond, the Performance Bond, and the Payment Bond are attached hereto as EXHIBIT A, and a copy of the Proposal 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 COUNTY's Director of General Services ("Director"), all in strict accordance with the Plans and 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 Darrell M. Goo, PM

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 one million-five-hundred-fifty-thousand-nine-hundred-thirty dollars $1,550,930.00 ("Base Contract Amount"), to be paid as provided in the Contract Documents. The 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.

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, materials, corrections, and/or changes to the Specifications as are required for the proper completion of the Work contemplated in the Contract Documents may only be effected to the extent authorized in writing if authorized in writing in advance via Change Order(s) duly executed by both CONTRACTOR and the Director in accordance with Section 32, below, to the extent that a contingency amount or supplemental services amount was approved by the COUNTY Board of Supervisors in approving this Contract along with delegation of authority to the Director to execute Change Orders to approve expenditure of such contingency amount or supplemental services amount, including agreement(s) providing for compensation in addition to the Base Contract Amount at the same rate per unit (or at a corresponding rate for work that is different from that provided for in the Contract Documents, provided that such change(s) and increase(s) are not in any way attributable to any act(s) or omission(s) of or on behalf of CONTRACTOR or any Subcontractor(s), including, but not limited to, faulty or inaccurate calculations or estimations made by or on behalf of CONTRACTOR; provided further that the aggregate amount of such compensation in addition to the Base Contract Amount shall not exceed an amount equal to the sum of $25,000 plus five percent (5%) of the original Base Contract Amount in excess of $250,000; provided further that the Term of this Agreement shall not be extended by more than 150 calendar days other than by an amendment of this Contract in writing approved and executed by the Santa Barbara County Board of Supervisors. CONTRACTOR shall not commence any work other than as set forth in the Contract Documents, and shall not be paid any amount in excess of the Base Contract Amount, unless pursuant to a Change Order duly executed by both the General Services Director and CONTRACTOR, and only to the extent such Change Order authority is expressly authorized and delegated by the COUNTY Board of Supervisors in approving this Contract. Payment may only be made for Change Orders that include objective rates for the change or alteration using a price-determination method that is common in commercial transactions, such as hourly rates or cost plus a fixed fee. 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, AMENDMENTS**: CONTRACTOR shall keep fully informed of, and shall at all times during the Term 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 it be found that the Special Provisions or Standard Specifications for the Work 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 proposal 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. The Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

11. CONTRACT DOCUMENTS ACKNOWLEDGED: CONTRACTOR hereby declares that CONTRACTOR has read all of 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. TERM; TIME FOR COMMENCEMENT, COMPLETION: The term of this Contract shall commence as of the first date that this Agreement is fully executed by all of the parties hereto ("Effective Date") and shall terminate on the date that is One Hundred Fifty (150) calendar days after the Effective Date, unless earlier terminated or extended in accordance with the provisions of this Agreement ("Term"). The Work to be performed under this Contract shall be completed within 150 calendar days after execution of this Agreement. 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. The CONTRACTOR shall begin Work within fifteen (15) calendar days after receiving the Notice to Proceed unless otherwise provided therein. The provisions of this Contract pertaining to Liquidated Damages shall apply in the event of the CONTRACTOR's failure to complete the Work within the Term.

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. NON-DISCRIMINATION: The CONTRACTOR acknowledges that this Agreement is subject to the provisions of Article XIII of Chapter 2 of the Santa Barbara County Code, providing against discrimination in employment. The CONTRACTOR shall perform all requirements of a contractor under the provisions of said Article, and shall pay all costs occasioned to the COUNTY by any noncompliance by the CONTRACTOR.

17. 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 Project Engineer/Architect, whose decision shall be final and binding upon the parties hereto. If, after the decision of the Project Engineer/Architect 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.

18. SUBSTITUTION OF MATERIALS: The County Representative is authorized to act on behalf of the COUNTY hereunder solely to the extent designated by the Director, and solely to the extent of the authority of the Director as specifically authorized by the COUNTY Board of Supervisors in approving this Contract and to extent not inconsistent with any of the numbered sections of this Agreement or Exhibit C.

19. 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.

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

21. 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.

22. 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.

23. 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.

24. 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.

25. 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.

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

27. 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 31, 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.

28. EXECUTION OF COUNTERPARTS: This Contract may be executed 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.

29. ORDER OF PRECEDENCE: In the event of conflict between the provisions contained in the numbered Sections 1 through 31of this Agreement and the provisions contained in the Exhibits, the provisions contained in the numbered Sections 1 through 31 of this Agreement shall prevail over those in the Exhibits other than Exhibit C. CONTRACTOR agrees that in the event of any discrepancy, inconsistency, gap, ambiguity, or conflicting language between 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 1 through 31 of this Agreement, Exhibit A, and Exhibit C) other than Exhibit B shall take precedence and control and prevail over the provisions of Exhibit B.

30. SUBCONTRACTORS: CONTRACTOR is authorized to subcontract with only the subcontractor(s) identified in the Proposal 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.

31. CHANGE ORDERS: No Change Order shall be valid or enforceable against the COUNTY unless duly authorized by the COUNTY in accordance with Article 6 of the General Conditions.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement to be effective as of the Effective Date.

COUNTY
County of Santa Barbara

By: _____
STEVE LAVAGNINO, CHAIR
BOARD OF SUPERVISORS

Dated: 8-27-24

ATTEST:
MONA MIYASATO,
COUNTY EXECUTIVE OFFICER
CLERK OF THE BOARD

By: _____
Deputy Clerk of the Board

CONTRACTOR

Tierra Contracting, Inc., a California corporation

By: _____
AUTHORIZED REPRESENTATIVE

Name: Blair Douglas
Title: President

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 00030 Program 1930 Account 8200 Project #19012-2

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)

EXHIBIT A

Contract Documents

County of Santa Barbara
Calle Real Water Loop Project
Phase 2 #19012-2
Calle Real County Campus

Project No. #19012-2

MANDATORY JOB WALK:
Wednesday, April 24, 2024
10:30am

BID DUE DATE:
Friday, May 10, 2024
3:00 P.M.

VIRTUAL BID OPENING:
Friday, May 10, 2024
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
General Conditions
Exhibit "C" Indemnification and Insurance Requirements (For Construction Contracts)

DRAWINGS AND SPECIFICATIONS

Civil Drawings
Specifications

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
Calle Real Water Loop Project, Phase 2

Calle Real County Campus
Project No. #19012-2

MANDATORY JOB WALK:
Wednesday, April 24,2024
10:30am

BID DUE DATE:
Friday, May 10, 2024
3:00 P.M.

VIRTUAL BID OPENING:
Friday, May 10, 2024
3:30 P.M.

CONSTRUCTION COST ESTIMATE: Estimated cost of construction is $1,000,000.00

PROJECT LOCATION: The Project Site is located off Calle Real between San Antonio Road and Camino del Remedio in Santa Barbara.

MANDATORY JOB WALK: The job walk is MANDATORY on **April 24, 2024 at 10:30am** to start at 267 Camino del Remedio in the parking lot at the corner of Calle Real and Camino del Remedio.

Only those prime contractors attending a job walk shall be qualified to bid the work.

PROJECT DESCRIPTION: The construction of a new water line system to replace the old, antiquated water system for the County of Santa Barbara Calle Real Campus. Project new water line system with all appurtenances, such as valves, tees, crosses, meters, restraints, thrust blocks, etc., the necessary tie-ins to existing services to buildings. Contractor is to maintain water service and provide portable toilets as needed to assure continued service to each building with little to no interruption during construction. The Contractor will be required to coordinate all work with County Facilities/Maintenance to assure all occupants, staff and clients are duly notified of impending construction in the vicinity of their building. All shutdowns will be coordinated with and managed by County Facilities/Maintenance.

CONTRACTOR'S LICENSE: The CONTRACTOR shall possess either a Class A, B or a C-34 license.

QUESTIONS: All questions MUST be submitted electronically through the Public Purchase Portal (www.publicpurchase.com) on or before **May 1, 2024**. 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 **Friday, May 10, 2024 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 proposal 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 proposal 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.—The lowest responsible bidder will be determined in accordance with Public Contract Code Division II, Part 3, Chapter 1, Section 20103.8, Subdivision (c) and as follows:

1. The project funding amount will be disclosed before the first bid is opened.
2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

BID PROTEST: The County of Santa Barbara Bid Protest Procedures are described in Item 10 of the BID FORM, which is included in the bid documents.

CONSTRUCTION TIME: The successful CONTRACTOR (after receiving the Notice to Proceed) shall have **150** calendar days to complete all work called for under the Contract Documents. Subsequent A subsequent 30 calendar days for each included with the Base Bid and accepted by the County

LIQUIDATED DAMAGES: The liquidated damages will be **$250 (Two Hundred Fifty 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: **Join the meeting now** or call in (audio only) 805-724-0311 and use Phone Conference ID: 994 811 154#

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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2

Bid Due Date: Friday, May 10, 2024 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**: Construction of new water main piping and valves, including tie-in with the Goleta Water District Main service connection located at the southeast corner of the Campus, an approximate 1,950 linear feet and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ ☐☐ , ☐☐☐ , ☐☐☐ . ☐☐

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #1: Construction of additional piping and valves to extend the water main loop approximately 1,375 linear feet, to complete the lower water main loop, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ ☐☐ , ☐☐☐ , ☐☐☐ . ☐☐

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #2: Construction of additional piping and valves to extend the water main loop approximately 1,730 linear feet, along the west and north reaches of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ | | , | | | | , | | | , | |

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #3: Construction of additional piping and valves to extend the water main loop approximately 1,530 linear feet, along the east reach of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ | | , | | | | , | | | , | |

(Place figures in appropriate boxes.)

Estimated number of work days: _____

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 (c) and as follows:
    1. The project funding amount will be disclosed before the first bid is opened.
    2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
    3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

4. It is understood that Owner reserves the right to reject the proposal and that it shall remain open and not be withdrawn for a period of ninety (90) 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 proposal is mailed or delivered personally to the undersigned bidder within thirty (30) calendar days after the opening of the proposal, 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 proposal 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 **150 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 proposal 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 proposal 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 proposal 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 of any bid(s) received must be in writing, must specify all grounds for the protest, and must be filed within ten working days after the opening of bids.

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 proposal 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Friday, May 10, 2024 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 Subcontract

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 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 proposal)

_____ _____
Date Signature of Principal

_____
Printed Name, Title of Principal

_____
Company

_____
Address

_____
City, State & Zip

ANTI-FRAUD CERTIFICATION

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Friday, May 10, 2024 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date:
May 10, 2024 at 3:00 P.M.

for which bids are due on Friday, May 3, 2024 at 3:00 P.M. 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 Principal
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
Calle Real Water Loop Project, Phase 2
Project No. 19012-2

(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
Calle Real Water Loop Project, Phase 2
Project No. 19012-2

(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
Calle Real Water Loop Project, Phase 2

Calle Real County Campus

Project No 19012-2

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
Calle Real Water Loop Project, Phase 2

Calle Real County Campus

Project No 19012-2

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. 19012-2
County of Santa Barbara
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
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 Calle Real Water Loop Project, Phase 2, Project No. 19012-2 ("Project"), the Notice to Bidders as amended by Addenda Number {xx-xx}, the Bid Bond, the Performance Bond, the Payment Bond, and the proposal or bid documents executed and submitted by the CONTRACTOR for the Project ("Proposal"), to the extent the Proposal is consistent with the provisions of this Agreement other than the Proposal (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 Calle Real Water Loop Project, Phase 2, Project No. 19012-2 ("Project"), the Notice to Contractors, the Bid Bond, the Performance Bond, and the Payment Bond are attached hereto as EXHIBIT A, and a copy of the Proposal 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 COUNTY's Director of General Services ("Director"), all in strict accordance with the Plans and 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 Darrell M. Goo, PM

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. The 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.

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, materials, corrections, and/or changes to the Specifications as are required for the proper completion of the Work contemplated in the Contract Documents may only be effected to the extent authorized in writing if authorized in writing in advance via Change Order(s) duly executed by both CONTRACTOR and the Director in accordance with Section 32, below, to the extent that a contingency amount or supplemental services amount was approved by the COUNTY Board of Supervisors in approving this Contract along with delegation of authority to the Director to execute Change Orders to approve expenditure of such contingency amount or supplemental services amount, including agreement(s) providing for compensation in addition to the Base Contract Amount at the same rate per unit (or at a corresponding rate for work that is different from that provided for in the Contract Documents, provided that such change(s) and increase(s) are not in any way attributable to any act(s) or omission(s) of or on behalf of CONTRACTOR or any Subcontractor(s), including, but not limited to, faulty or inaccurate calculations or estimations made by or on behalf of CONTRACTOR; provided further that the aggregate amount of such compensation in addition to the Base Contract Amount shall not exceed an amount equal to the sum of $25,000 plus five percent (5%) of the original Base Contract Amount in excess of $250,000; provided further that the Term of this Agreement shall not be extended by more than 150 calendar days other than by an amendment of this Contract in writing approved and executed by the Santa Barbara County Board of Supervisors. CONTRACTOR shall not commence any work other than as set forth in the Contract Documents, and shall not be paid any amount in excess of the Base Contract Amount, unless pursuant to a Change Order duly executed by both the General Services Director and CONTRACTOR, and only to the extent such Change Order authority is expressly authorized and delegated by the COUNTY Board of Supervisors in approving this Contract. Payment may only be made for Change Orders that include objective rates for the change or alteration using a price-determination method that is common in commercial transactions, such as hourly rates or cost plus a fixed fee. 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, AMENDMENTS**: CONTRACTOR shall keep fully informed of, and shall at all times during the Term 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 it be found that the Special Provisions or Standard Specifications for the Work 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 proposal 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. The Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

11. CONTRACT DOCUMENTS ACKNOWLEDGED: CONTRACTOR hereby declares that CONTRACTOR has read all of 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. TERM; TIME FOR COMMENCEMENT, COMPLETION: The term of this Contract shall commence as of the first date that this Agreement is fully executed by all of the parties hereto ("Effective Date") and shall terminate on the date that is One Hundred Fifty (150) calendar days after the Effective Date, unless earlier terminated or extended in accordance with the provisions of this Agreement ("Term"). The Work to be performed under this Contract shall be completed within 150 calendar days after execution of this Agreement. 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. The CONTRACTOR shall begin Work within fifteen (15) calendar days after receiving the Notice to Proceed unless otherwise provided therein. The provisions of this Contract pertaining to Liquidated Damages shall apply in the event of the CONTRACTOR's failure to complete the Work within the Term.

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. NON-DISCRIMINATION: The CONTRACTOR acknowledges that this Agreement is subject to the provisions of Article XIII of Chapter 2 of the Santa Barbara County Code, providing against discrimination in employment. The CONTRACTOR shall perform all requirements of a contractor under the provisions of said Article, and shall pay all costs occasioned to the COUNTY by any noncompliance by the CONTRACTOR.

17. 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 Project Engineer/Architect, whose decision shall be final and binding upon the parties hereto. If, after the decision of the Project Engineer/Architect 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.

18. SUBSTITUTION OF MATERIALS: The County Representative is authorized to act on behalf of the COUNTY hereunder solely to the extent designated by the Director, and solely to the extent of the authority of the Director as specifically authorized by the COUNTY Board of Supervisors in approving this Contract and to extent not inconsistent with any of the numbered sections of this Agreement or Exhibit C.

19. 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.

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

21. 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.

22. 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.

23. 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.

24. 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.

25. 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.

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

27. 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 31, 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.

28. EXECUTION OF COUNTERPARTS: This Contract may be executed 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.

29. ORDER OF PRECEDENCE: In the event of conflict between the provisions contained in the numbered Sections 1 through 31of this Agreement and the provisions contained in the Exhibits, the provisions contained in the numbered Sections 1 through 31 of this Agreement shall prevail over those in the Exhibits other than Exhibit C. CONTRACTOR agrees that in the event of any discrepancy, inconsistency, gap, ambiguity, or conflicting language between 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 1 through 31 of this Agreement, Exhibit A, and Exhibit C) other than Exhibit B shall take precedence and control and prevail over the provisions of Exhibit B.

30. SUBCONTRACTORS: CONTRACTOR is authorized to subcontract with only the subcontractor(s) identified in the Proposal 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.

31. CHANGE ORDERS: No Change Order shall be valid or enforceable against the COUNTY unless duly authorized by the COUNTY in accordance with Article 6 of the General Conditions.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement to be effective as of the Effective Date.

COUNTY
County of Santa Barbara

By: _____
STEVE LAVAGNINO, 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 {FUND} Program {PROGRAM} Account {ACCT} Project #19012

SPECIAL CONDITIONS

SPECIAL CONDITIONS

COUNTY OF SANTA BARBARA
Calle Real Water Loop Replacement Phase 2
Calle Real, Santa Barbara, CA

Project No. 19012

Bid Opening Date: 3:00 P.M., Friday, May 10, 2024

Mandatory Job Walk: 10:30 A.M., Wednesday April 24, 2024

NOTE: ONLY THOSE GENERAL CONTRACTORS ATTENDING THE JOB WALK SHALL BE QUALIFIED TO BID THIS WORK.

Environmental Stewardship-Cultural Resources

Cultural Monitoring is required per Section 011001. Monitoring must be coordinated through the Coastal Band of Chumash Nation Representative:

Gabriel Frausto, Chairman
Director of Cultural Resources
Coastal Band of the Chumash Nation
(805) 568-8063
Fraustogabriel28@gmail.com

If archaeological resources are encountered or suspected, the Contractor shall halt or redirect work immediately and notify the Designated Representative. The Contractor must retain a qualified archaeologist. The archaeologist shall assess the nature, extent, and significance of any discoveries, and shall develop appropriate management recommendations for archaeological resource treatment. Work in the area shall only resume with authorization of the Designated Representative.

GENERAL CONDITIONS

General Conditions

County of Santa Barbara
Calle Real Water Loop Project
Phase 2 #19012-2
April 30, 2024

GENERAL CONDITIONS

GENERAL CONDITIONS

Table of Contents

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 to perform.

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 the building 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, as of 2021, 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 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, up to eight (8) sets of approved Working Drawings and Specifications for the execution of the Work.

1.4.2 All Drawings, Specifications and copies thereof furnished by the Owner are and shall remain its property. They are to be used only with respect to this project and are not to be used on any other project. With the exception of one contract set for each party, such documents are to be returned or suitably accounted for to the Owner on request at the completion of the Work.

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 a set of reproducible mylar record construction drawings and record construction specifications showing significant changes in the Work during the construction process based upon marked up prints of 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 issue change orders. All requests for proposals shall be prepared by the Architect/Engineer, 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 completion. 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 and test borehole data, water table elevations, and soil analyses shown on the drawings or included in the specifications apply only at the locations of the test holes and to the depths indicated. Soil test reports for the test holes which have been drilled are available for inspection at the office of the Director of General Services. 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 soil boring logs 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 do 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 test 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 work.

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 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.

5.4.6 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.

5.4.7 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.

5.4.8 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.

5.4.9 The investigation, review and approval of substitute materials requires a minimum of 30 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.

5.4.10 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.

5.4.11 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.

5.4.12 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.

5.4.13 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.

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

5.4.15 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.

5.4.16 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.

5.4.17 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.

5.4.18 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.

5.4.19 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.

5.4.20 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.

5.4.21 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 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 warranties and guarantees to the Designated Representative for subsequent transmittal to the Architect/Engineer and Owner. All 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.

5.5.1.1 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.

5.5.1.2 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.

5.5.1.3 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.

5.5.1.4 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 48 hours 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.

5.5.1.5 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.

5.5.1.6 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.

5.5.1.7 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.

5.5.1.8 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.

5.5.1.9 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.

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

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

5.5.2 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.

5.6 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 him. 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.

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 Submission of Schedule and Format

5.10.1.1 Within Five **(5) calendar days** of the Notice to Proceed, the Contractor shall submit to the Designated Representative a construction Schedule covering the entire project.

5.10.1.2 The Schedule shall be prepared utilizing the critical path method of scheduling. 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.

5.10.1.3 The maximum duration for any single activity will be twenty (20) working days, with the exception of "Fabrication and Delivery" activities. Although portions of the Work may take longer than 20 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.

5.10.1.4 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.

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

5.10.1.6 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.

5.10.1.7 If construction must commence during Schedule preparation and approval period, the Contractor shall prepare a **twenty (20) calendar day schedule** to cover the initial field construction and submittals. Activities on this Schedule should have maximum durations of five (5) days to allow for monitoring of progress through completion of the incremental activities.

5.10.1.8 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.

5.10.2 Updating of the Schedule

5.10.2.1 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 within **seven (7) calendar days** following the Data Date.

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.

5.10.3 Revision of the Schedule

5.10.3.1 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.

5.10.4 Minor Changes of the Schedule

5.10.4.1 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.

5.10.5 Extensions of Contract Time

5.10.5.1 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.

5.10.6 During Construction

5.10.6.1 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.

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

5.10.6.3 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.

5.10.6.4 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.

5.10.6.5 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.

5.10.6.6 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.

5.10.6.7 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

5.10.7 Owner Directed Schedule

5.10.7.1 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 **fourteen (14) 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 him under its Contract. He 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.

5.14 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 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 he 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.

5.16 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 INSURANCE

5.18.1 Indemnification

5.18.1.1 CONTRACTOR shall defend, indemnify and save harmless the COUNTY, its officers, agents and employees from any and all claims, demands, damages, costs, expenses (including attorney's fees), judgments or liabilities arising out of this Agreement or occasioned by the performance or attempted performance of the provisions hereof, including, but not limited to, any act or omission to act on the part of the CONTRACTOR or its agents or employees or other independent contractors directly responsible to him; except those claims, demands, damages, costs, expenses (including attorney's fees), judgments or liabilities resulting from the sole negligence or willful misconduct of the COUNTY.

5.18.1.2 CONTRACTOR shall notify the COUNTY immediately in the event of any accident or injury arising out of or in connection with this Agreement.

5.18.2 Insurance Requirements for Contractor

5.18.2.1 Without limiting the CONTRACTOR's indemnification of the COUNTY, CONTRACTOR shall procure the following required insurance coverage's at its sole cost and expense. All insurance coverage's 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.

5.18.2.2 Workers' Compensation Insurance: Statutory Workers' Compensation and Employers Liability Insurance shall cover all CONTRACTOR's staff while performing any work incidental to the performance of this Agreement. The policy shall provide that no cancellation, or expiration or reduction of coverage shall be effective or occur until at least thirty (30) days after receipt of such notice by the COUNTY. In the event CONTRACTOR is self-insured, it shall furnish a copy of Certificate of Consent to Self-Insure issued by the Department of Industrial Relations for the State of California. This provision does not apply if CONTRACTOR has no employees as defined in Labor Code Section 3350 et seq. during the entire period of this Agreement and CONTRACTOR submits a written statement to the COUNTY stating that fact.

5.18.2.3 General and Automobile Liability Insurance: The general liability insurance shall include bodily injury, property damage and personal injury liability coverage, shall afford coverage for all premises, operations, products and completed operations of CONTRACTOR and shall include contractual liability coverage sufficiently broad so as to include the insurable liability assumed by the CONTRACTOR in the indemnity and hold harmless provisions [above] of the Indemnification Section of this Agreement between COUNTY and CONTRACTOR. The automobile liability insurance shall cover all owned, non-owned and hired motor vehicles that are operated on behalf of CONTRACTOR pursuant to CONTRACTOR's activities hereunder. CONTRACTORS shall require all subcontractors to be included under its policies or furnish separate certificates and endorsements to meet the standards of these provisions by each subcontractor. COUNTY, its officers, agents, and employees shall be Additional Insured status on any policy. A cross liability clause, or equivalent wording, stating that coverage will apply separately to each named or additional insured as if separate policies had been issued to each shall be included in the policies. A copy of the endorsement evidencing that the policy has been changed to reflect the Additional Insured status must be attached to the certificate of insurance. The limit of liability of said policy or policies for general and automobile liability insurance shall not be less than $1,000,000 per occurrence and $2,000,000 in the aggregate. Any deductible or Self-Insured Retention (SIR) over $10,000 requires approval by the COUNTY.

Said policy or policies shall include a severability of interest or cross liability clause or equivalent wording. Said policy or policies shall contain a provision of the following form: "Such insurance as is afforded by this policy shall be primary and non-contributory to the full limits stated in the declarations, and if the COUNTY has other valid and collectible insurance for a loss covered by this policy, that other insurance shall be excess only."

If the policy providing liability coverage is on a 'claims-made' form, the CONTRACTOR is required to maintain such coverage for a minimum of three years following completion of the performance or attempted performance of the provisions of this agreement. 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.

5.18.2.4 CONTRACTOR shall submit to the office of the designated COUNTY representative certificate(s) of insurance documenting the required insurance as specified above prior to this Agreement becoming effective. COUNTY shall maintain current certificate(s) of insurance at all times in the office of the designated County representative as a condition precedent to any payment under this Agreement. Approval of insurance by COUNTY or acceptance of the certificate of insurance by COUNTY shall not relieve or decrease the extent to which the CONTRACTOR may be held responsible for payment of damages resulting from CONTRACTOR'S services of operation pursuant to the contract, nor shall it be deemed a waiver of COUNTY'S rights to insurance coverage hereunder. In the event the CONTRACTOR is not able to comply with the COUNTY'S insurance requirements, COUNTY may, at their sole discretion and at the CONTRACTOR'S expense, provide compliant coverage.

5.18.2.5 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.

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 will 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.

5.19.1.2 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.

5.19.1.3 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.

5.19.1.4 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.

5.19.1.5 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.

5.19.1.6 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.

5.19.1.7 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.

5.19.1.8 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.

5.19.1.9 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.

5.19.1.10 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.

5.19.1.11 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 be in attendance at 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 be in attendance at 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 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. Extended warranty periods shall be provided under manufacturer warranties, as required by project specifications.

5.21.2 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.

5.21.3 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.

5.21.4 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 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.

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 provided. 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 telegram, 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.

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. A weather table reflecting the meteorological data from the Santa Barbara area is given following the General Conditions and 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.

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 noted in the Notice to Bid. 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 **fifteen (15) days** after award of the contract and at least fifteen (15) days before the first Application for Payment, 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 the contract.
(4) decrease in value of securities on deposit.
(5) the termination of the escrow upon completion of the Contract.

(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 twenty-five percent (125%) 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 clean up 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 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.

11.1.2 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.

11.1.3 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.

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

11.1.5 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.

11.1.6 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.

11.2 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 have been marked by the respective utility owners and 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 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 the system.

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.

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 the compliance.

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 such agreement.

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 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, or if the Designated Representative should arbitrarily fail to issue any certificate for payment within a reasonable time after it is due, or if the Owner should fail to pay within sixty (60) days, any sum certified by the Designated Representative to 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 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, ten (10) 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 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.

16.4.2 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.

16.4.3 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.

16.4.4 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.

16.4.5 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.

16.4.6 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.

16.4.7 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.

16.4.8 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.

16.4.9 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 $2,000,000 per occurrence and $4,000,000 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 higher limits than the minimums shown above, the COUNTY requires and shall be entitled to coverage for the 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

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
COUNTY OF SANTA BARBARA, CALIFORNIA

DRAWING INDEX	
1	
2	
3	
3A	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	

SITE PLAN MAP

VICINITY MAP

PROJECT CONTACTS:

SITE INFORMATION

BENCHMARK

BASIS OF BEARINGS

UNDERGROUND UTILITY STATEMENT

DECLARATION OF RESPONSIBLE CHARGE

COUNTY OF SANTA BARBARA
GENERAL SERVICES DEPARTMENT

APPROVED _____

DIG ALERT

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

1

DISPOSITION NOTES:

[illegible]

LEGEND:

[illegible]

CONSTRUCTION NOTES:

[illegible]

GENERAL NOTES

[illegible]

ABBREVIATIONS

[illegible]

WATER GENERAL NOTES

[illegible]

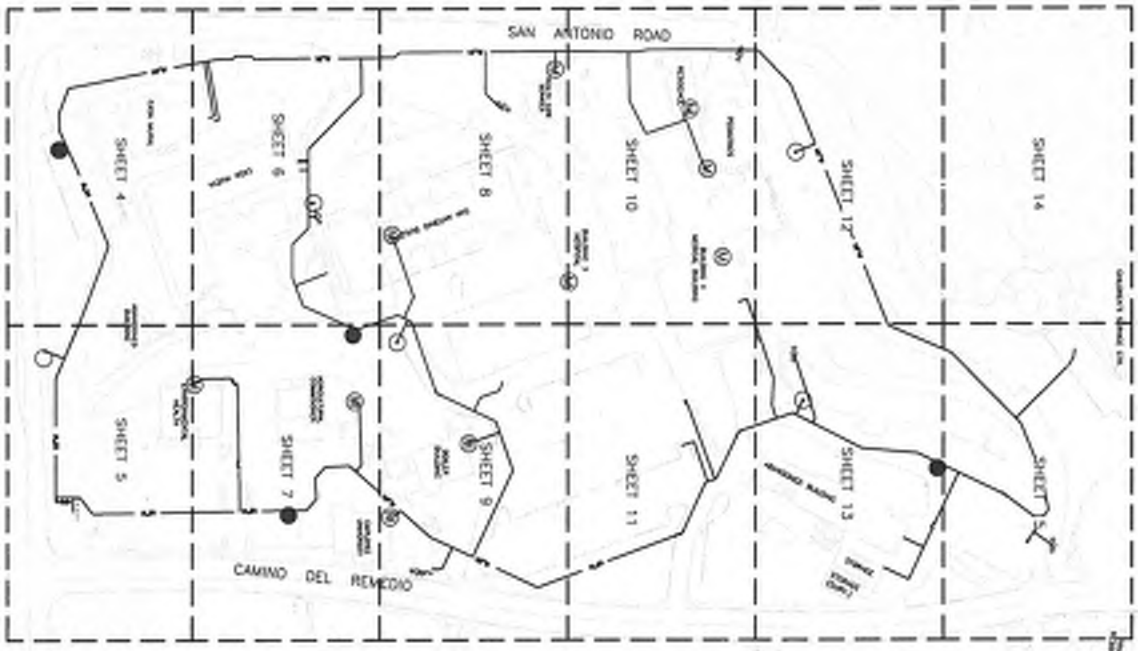
DIG ALERT

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT

CALLE REAL, SANTA BARBARA

COUNTY OF SANTA BARBARA, CA

SHEET 2



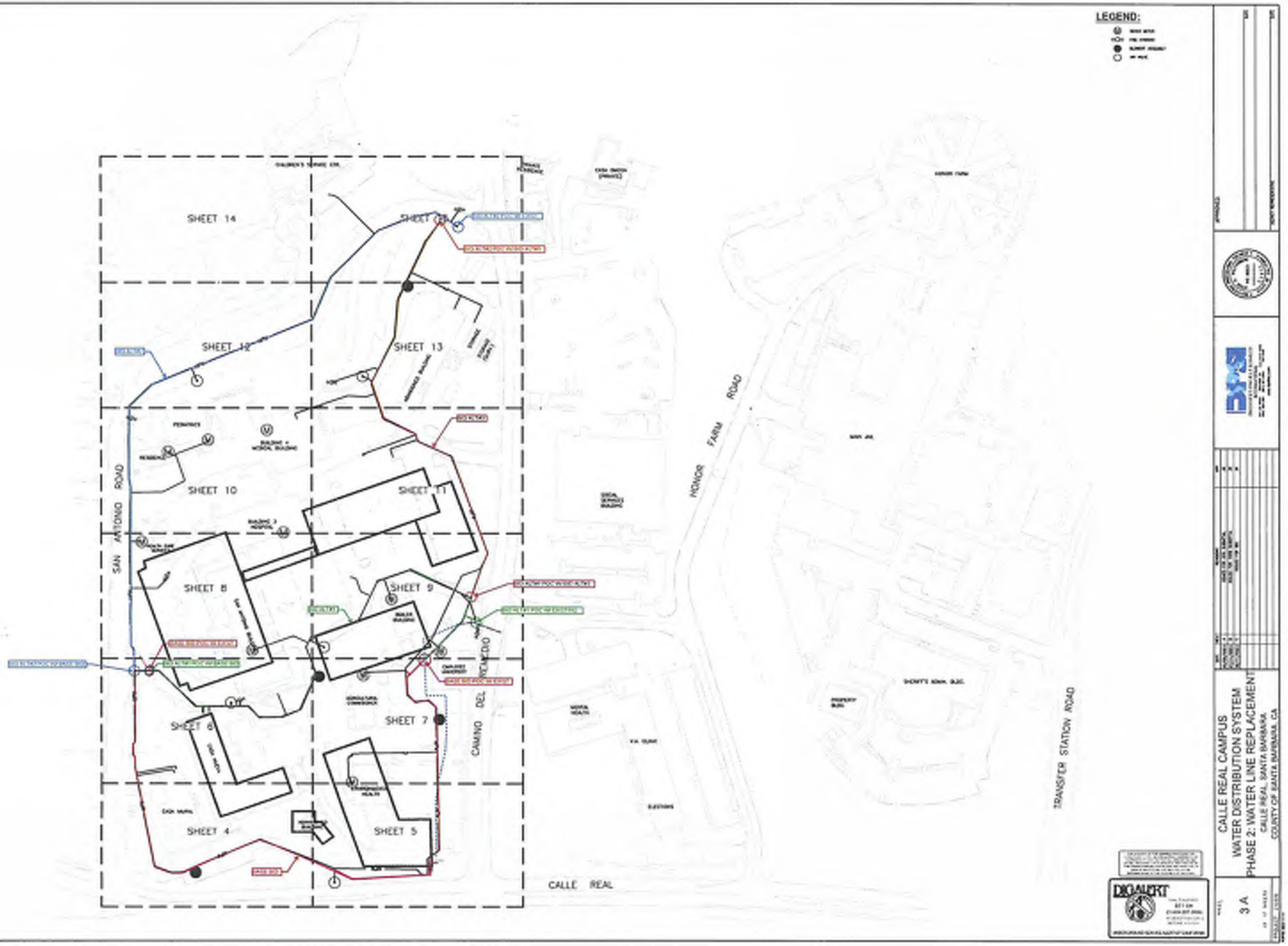
CALLE REAL

HONOR FARM ROAD

TRANSFER STATION ROAD

LEGEND:

3	CALLE REAL CAMPUS WATER DISTRIBUTION SYSTEM PHASE 2: WATER LINE REPLACEMENT CALLE REAL, SANTA BARBARA COUNTY OF SANTA BARBARA, CA		APPROVED: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SHEET 14
SHEET 12
SHEET 13
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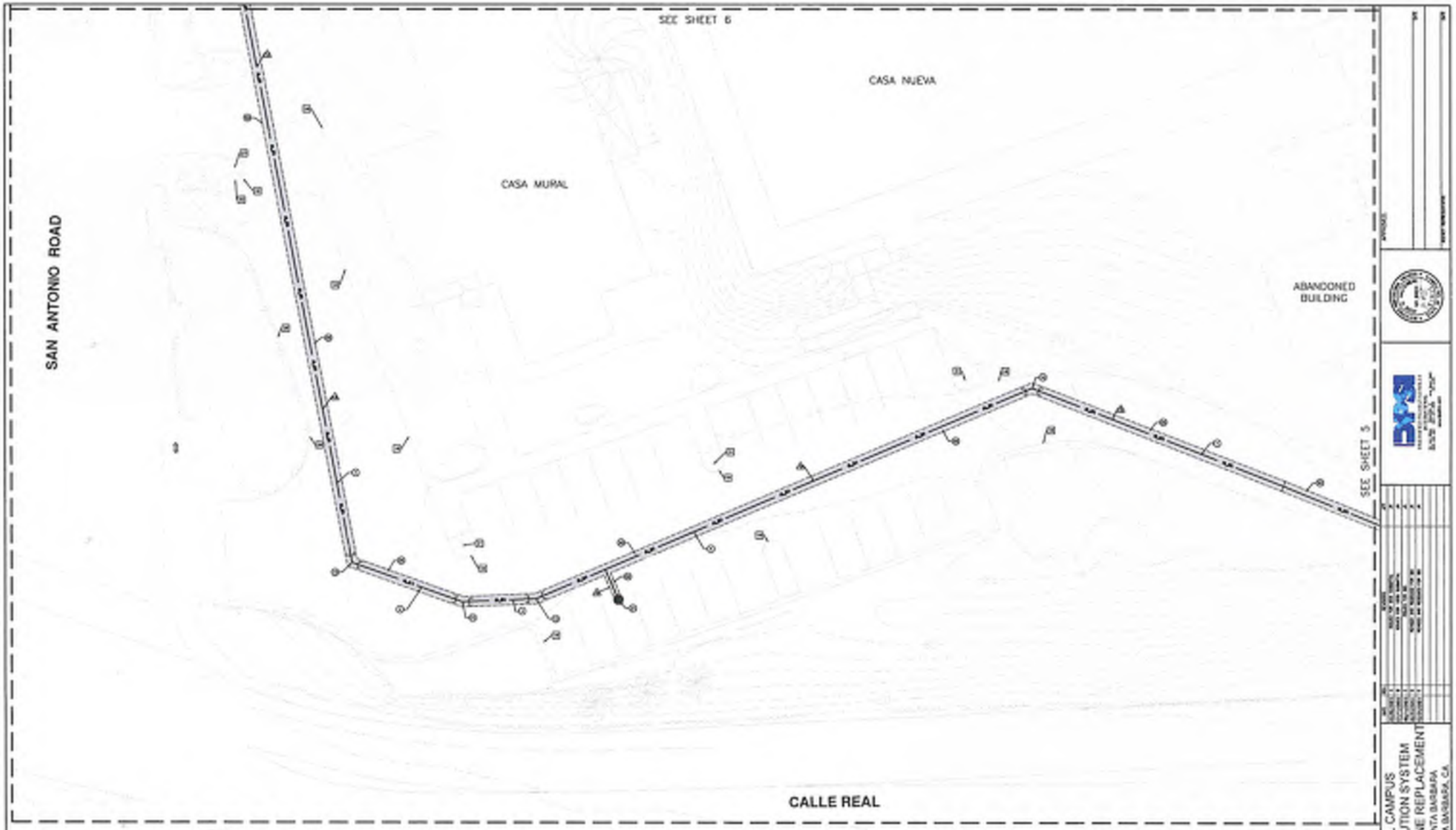
SHEET 9
SHEET 6
SHEET 7
SHEET 4
SHEET 5
SAN ANTONIO ROAD
CAMINO DEL REMEDIO
HONOR FARM ROAD
TRANSFER STATION ROAD
CALLE REAL
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA
3 A



NOTE TO CONTRACTOR:

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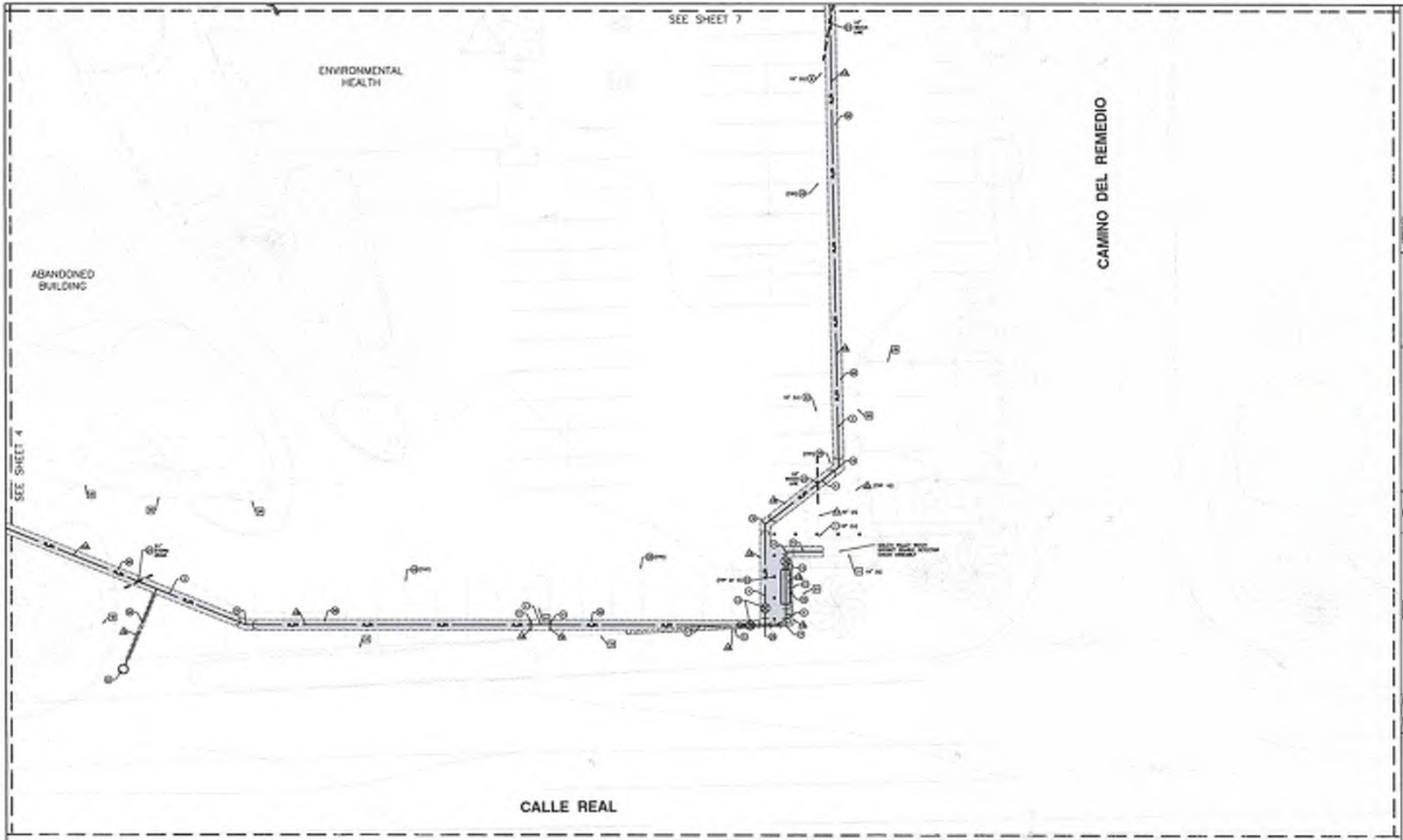
2. LOCATION OF MOST EXISTING UTILITIES ARE NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES THAT MAY BE IN CONFLICT WITH THE PROPOSED IMPROVEMENTS. REPAIR OF ANY DAMAGE TO EXISTING UTILITIES WILL BE SOLELY AT THE CONTRACTOR'S EXPENSE.
3. PROPOSED WATER LINE LOCATIONS SHOWN ON THIS PLAN ARE BASED ON THE EXISTING TOPOGRAPHIC AND UTILITY INFORMATION AVAILABLE. PROPOSED LOCATIONS MAY NEED TO BE FIELD FIT BASED ON ACTUAL SITE CONDITIONS. CONTRACTOR SHALL LAY OUT ALL PROPOSED LINES TO ENSURE THEY CAN BE ADEQUATELY CONSTRUCTED PRIOR TO ORDERING ANY MATERIAL OR BREAKING GROUND.

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

SHEET 4



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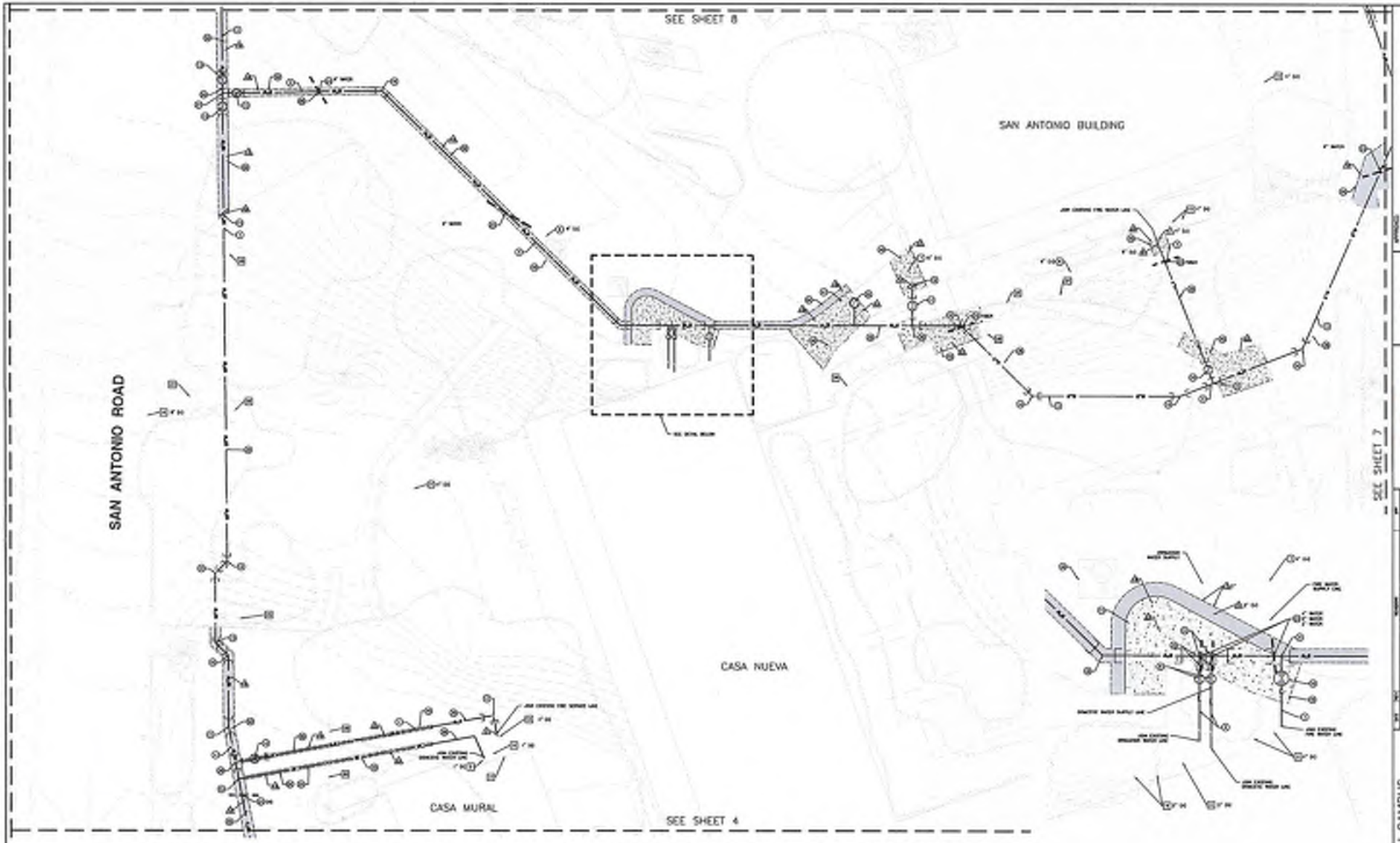
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

5



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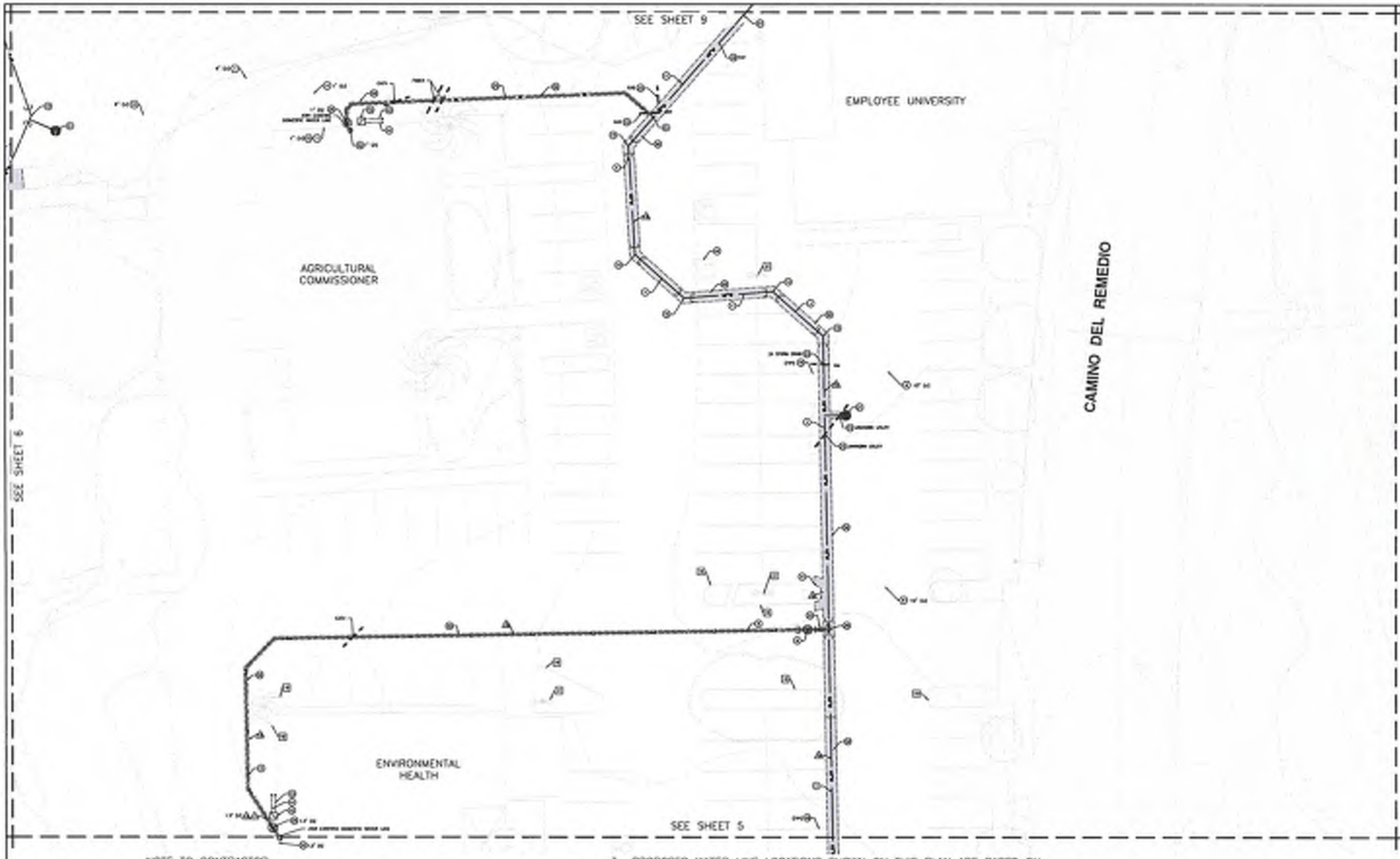
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

6



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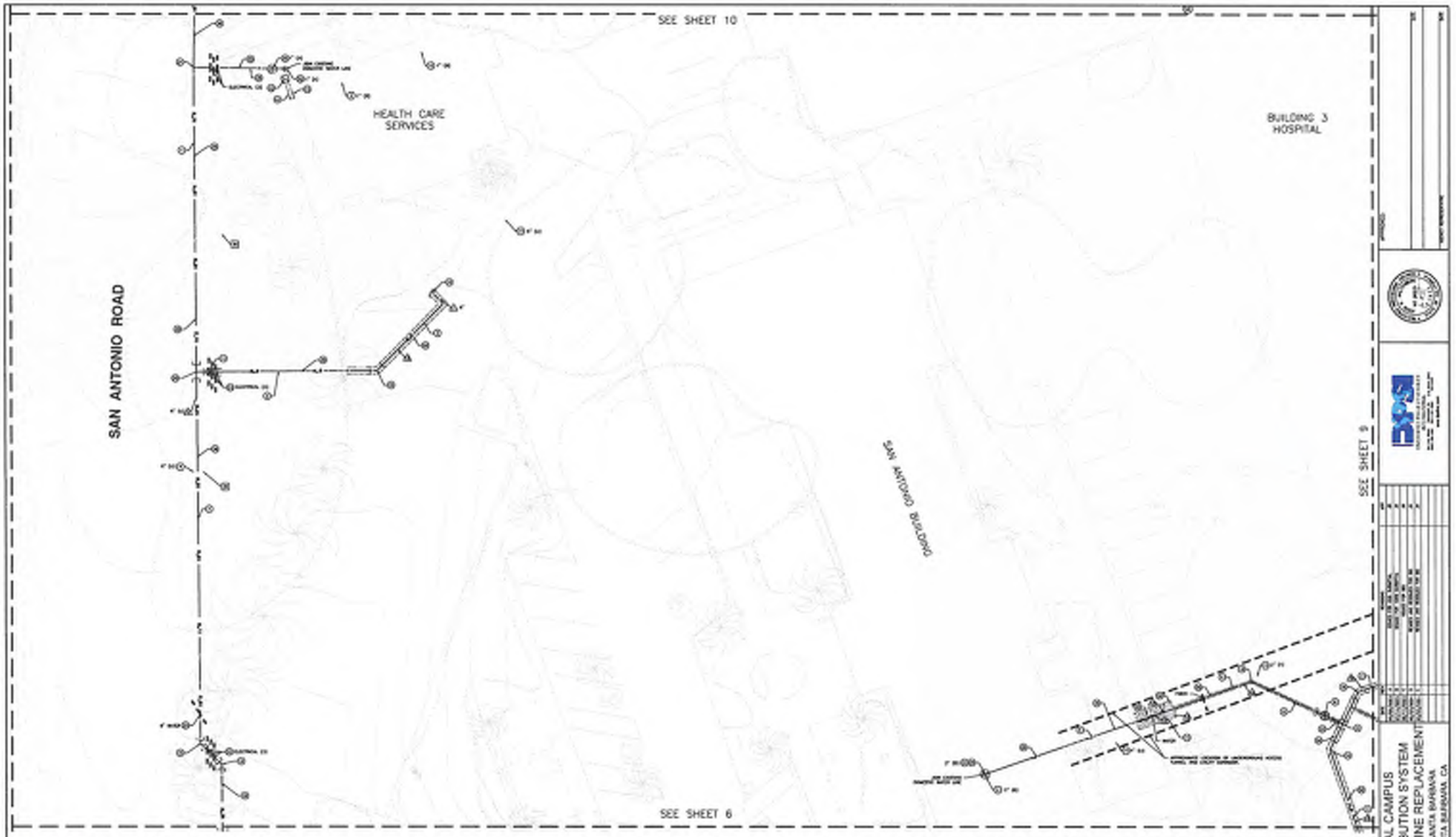
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

7



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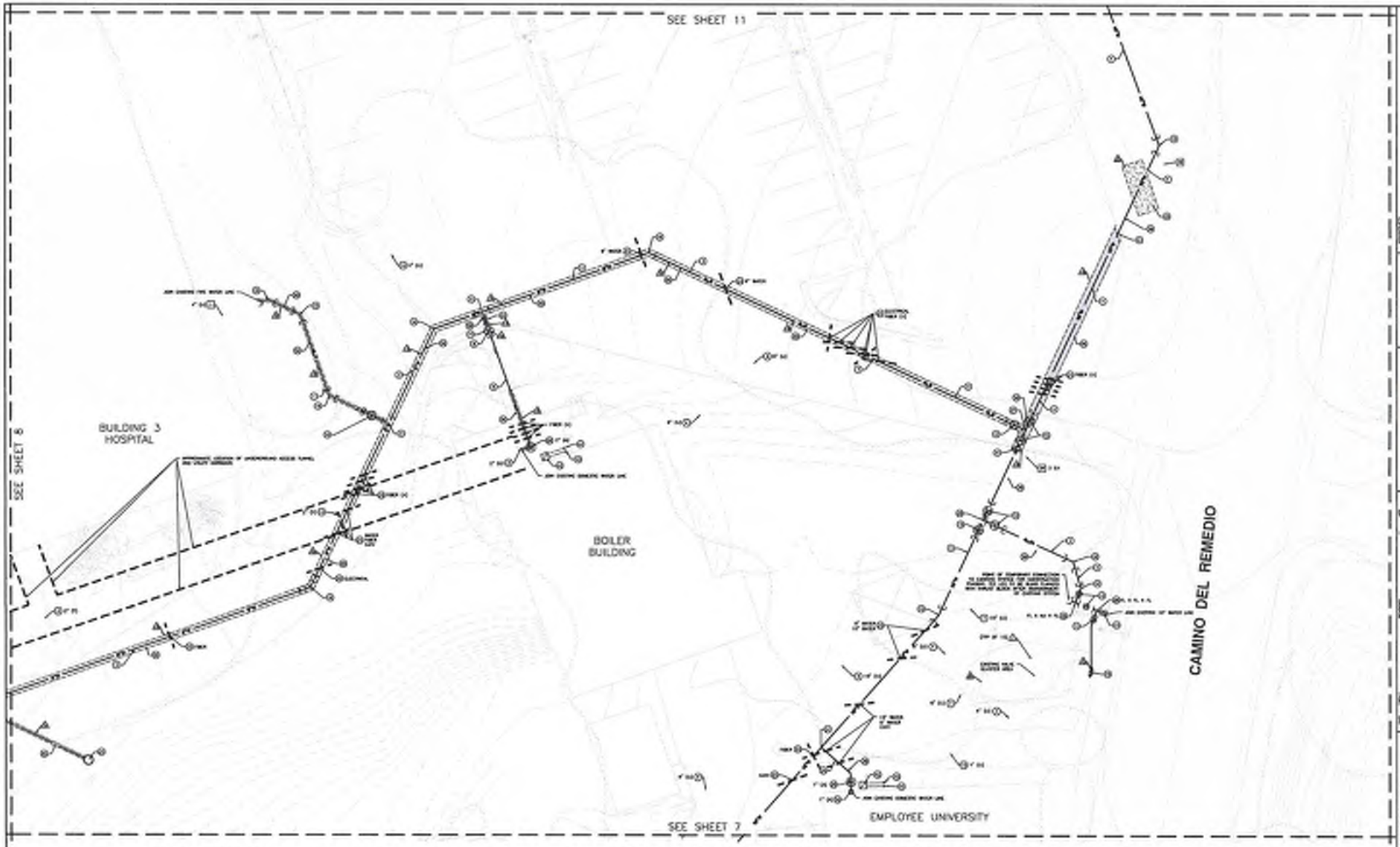
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

8



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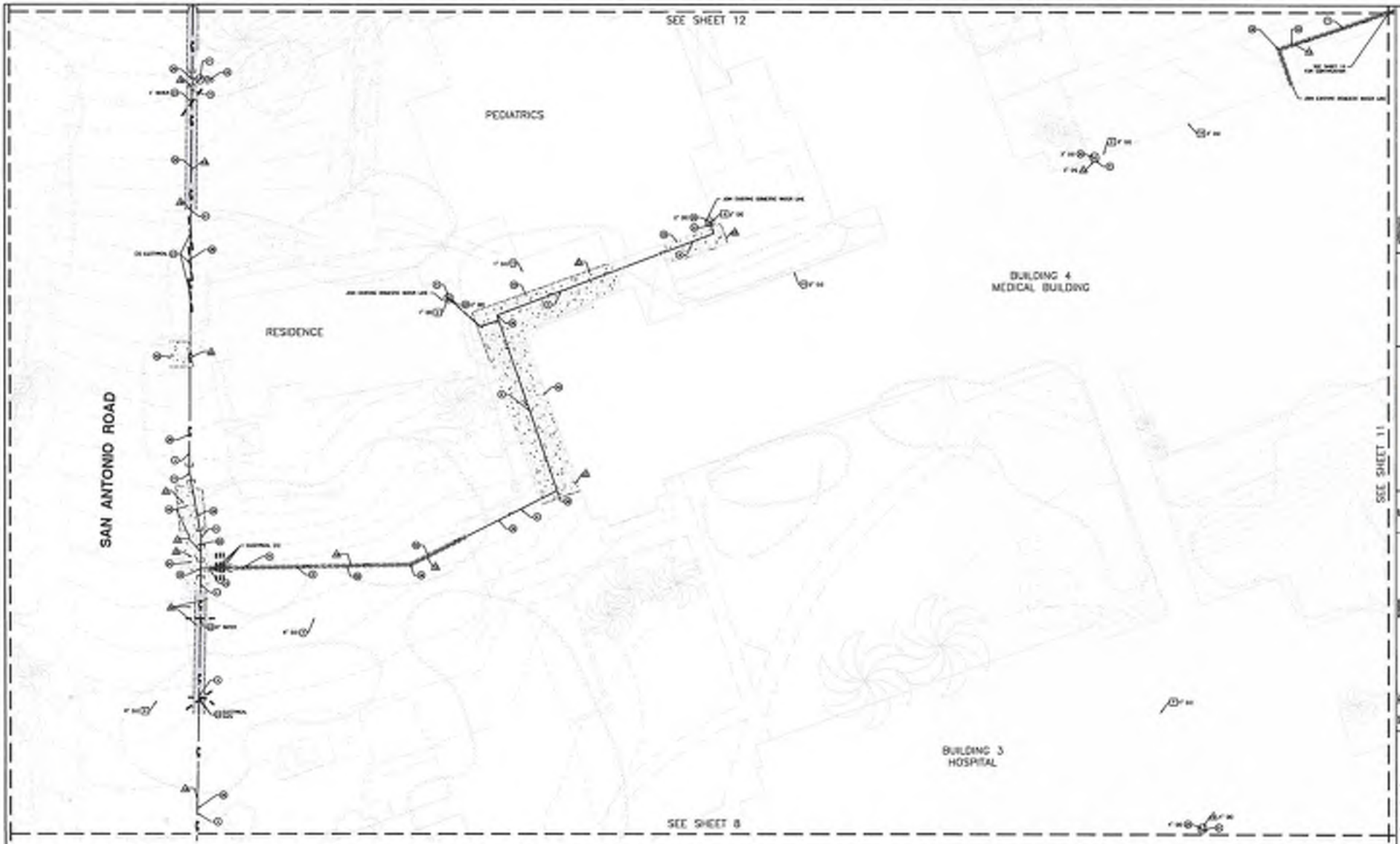
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

SHEET 9



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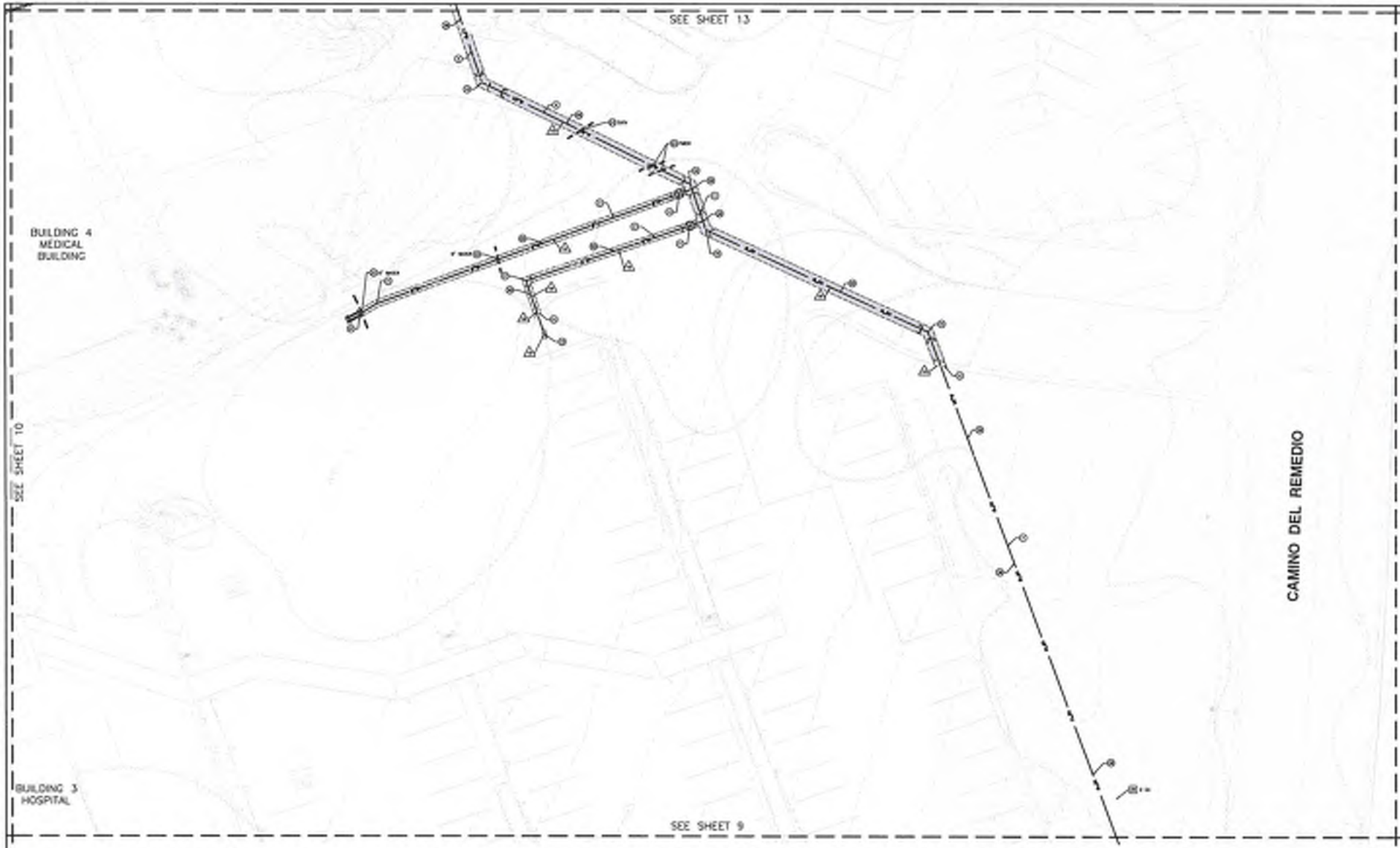
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

10



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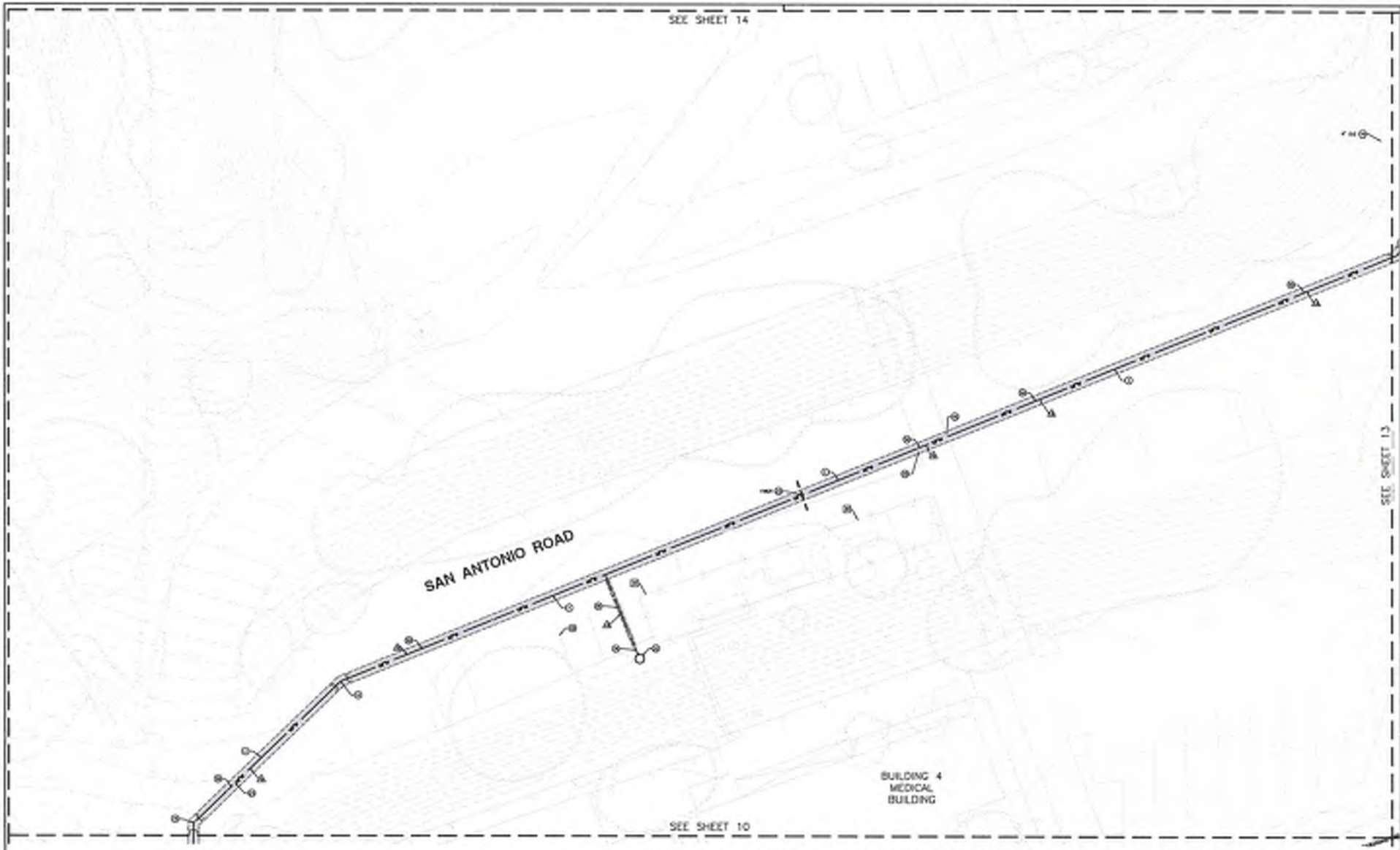
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

11



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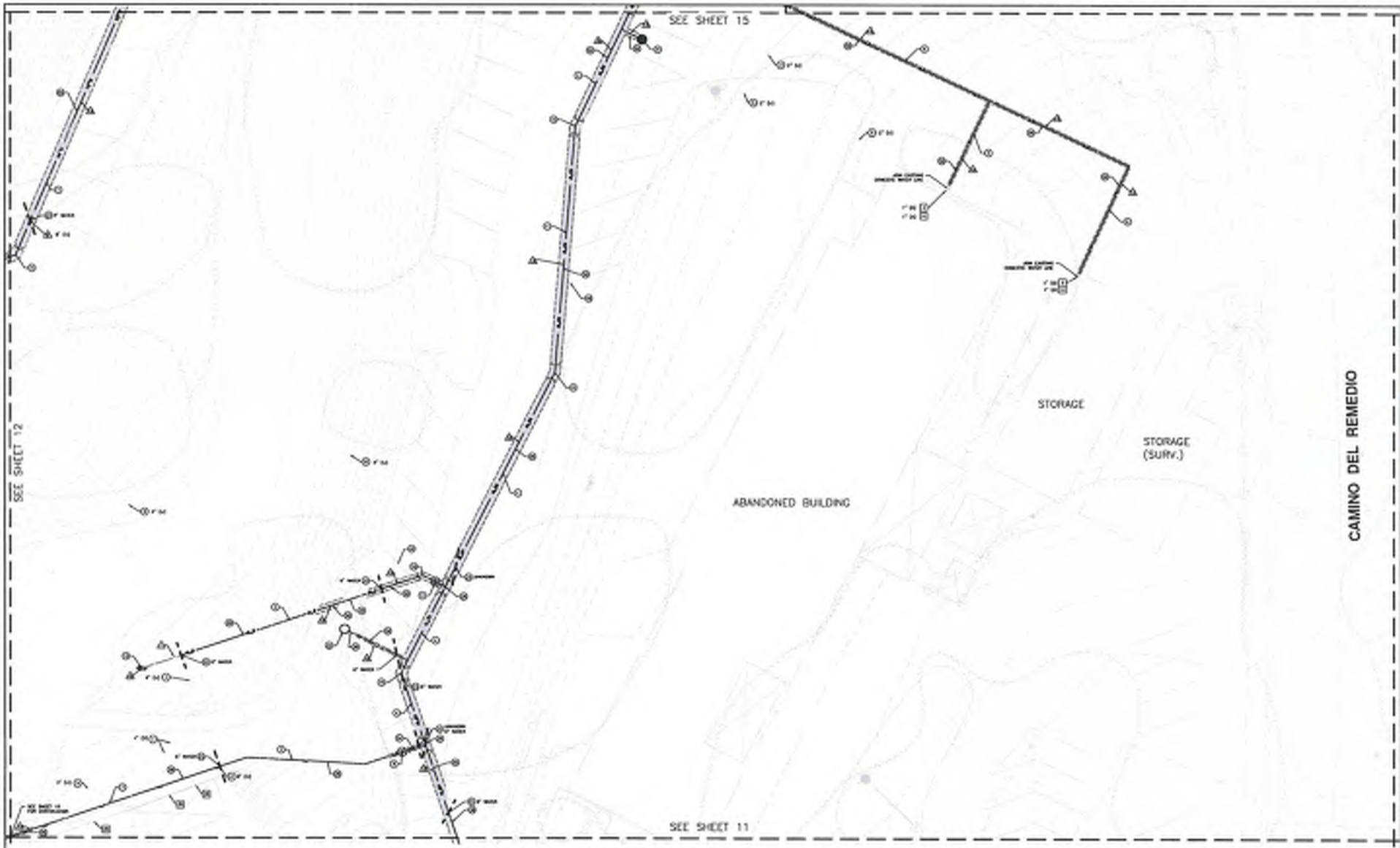
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

12



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CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

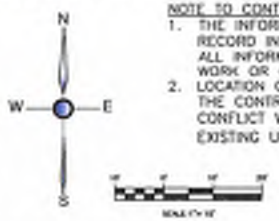
13

CHILDREN'S SERVICE CTR.

NO WORK THIS SHEET

SEE SHEET 15

SEE SHEET 12



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DIGALERT

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

14

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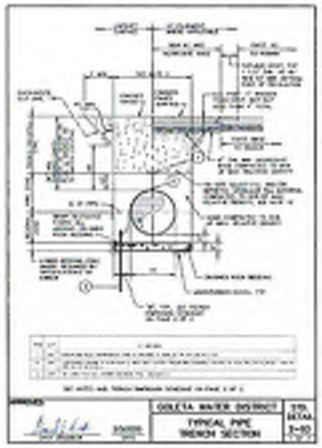
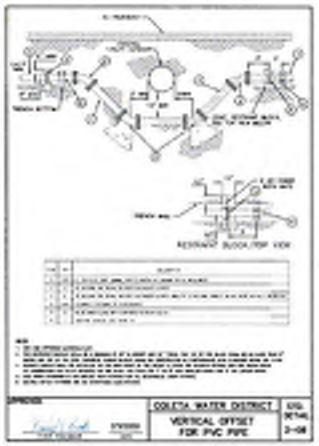
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

15

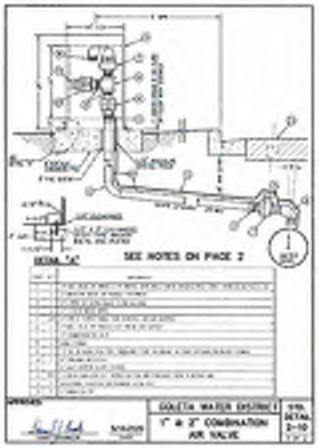


COLETA WATER DISTRICT
TYPICAL PIPE TRENCH SECTION
STD. DETAIL 3-30

COLETA WATER DISTRICT
TYPICAL PIPE TRENCH SECTION
STD. DETAIL 3-03

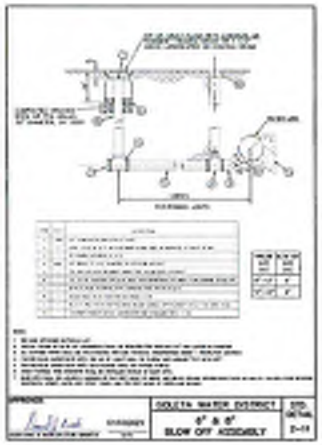


COLETA WATER DISTRICT
VERTICAL OFFSET FOR PVC PIPE
STD. DETAIL 3-08

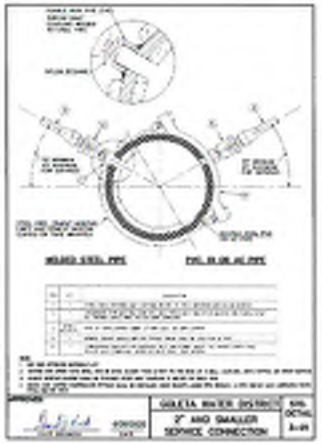


COLETA WATER DISTRICT
1" & 2" COMBINATION AIR VALVE
STD. DETAIL 3-10

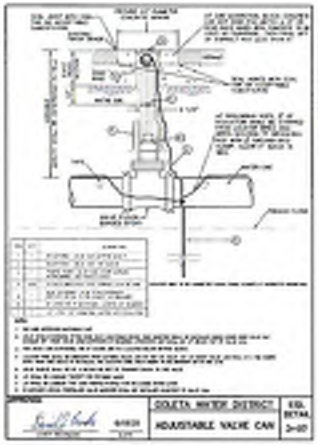
COLETA WATER DISTRICT
1" & 2" COMBINATION AIR VALVE
STD. DETAIL 3-10



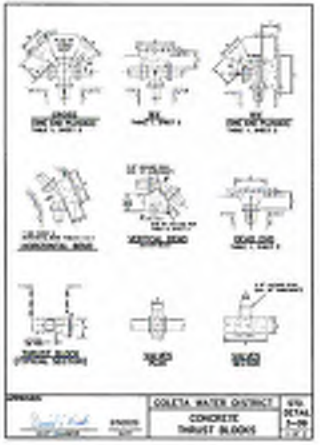
COLETA WATER DISTRICT
6" & 8" BLOW OFF ASSEMBLY
STD. DETAIL 3-11



COLETA WATER DISTRICT
2" AND SMALLER SERVICE CONNECTION
STD. DETAIL 3-01



COLETA WATER DISTRICT
ADJUSTABLE VALVE CAN
STD. DETAIL 3-07



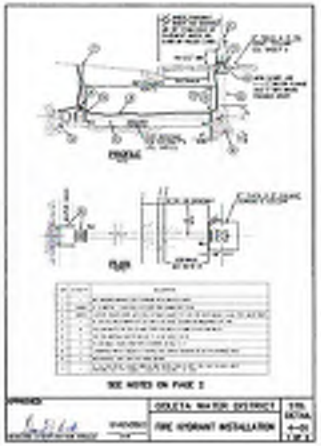
COLETA WATER DISTRICT
CONCRETE THRUST BLOCKS
STD. DETAIL 3-09

COLETA WATER DISTRICT
CONCRETE THRUST BLOCKS
STD. DETAIL 3-09

1 ASPHALT PAVEMENT SECTION

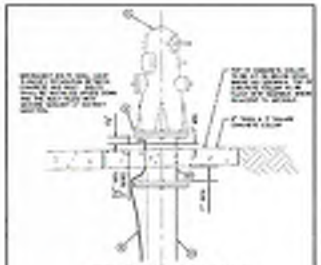
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

16



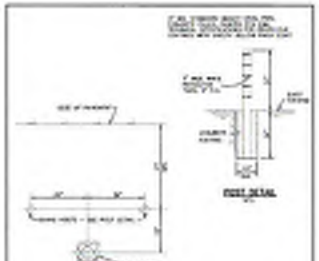
SEE NOTES ON PAGE 2

APPROVED	COLETA WATER DISTRICT	STD. DETAIL
	FIRE HYDRANT INSTALLATION	4-01 1 OF 2



BREAK OUT SPOOL/CONCRETE COLLAR DETAIL

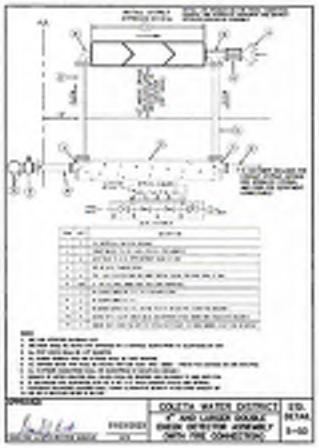
APPROVED	COLETA WATER DISTRICT	STD. DETAIL
	FIRE HYDRANT INSTALLATION	4-01 2 OF 2



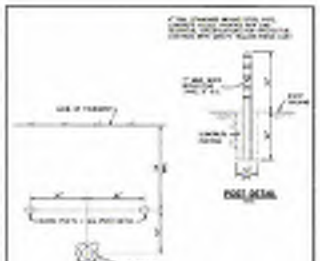
POST DETAIL

PLAN

APPROVED	COLETA WATER DISTRICT	STD. DETAIL
	FIRE HYDRANT GUARD POSTS	4-03



APPROVED	COLETA WATER DISTRICT	STD. DETAIL
	4" AND LARGER DOUBLE CHECK DETECTOR ASSEMBLY (WITH FIRE CONNECTION)	3-50



POST DETAIL

PLAN

APPROVED	COLETA WATER DISTRICT	STD. DETAIL
	FIRE HYDRANT GUARD POSTS	4-03

BASIC SEPARATION STANDARDS

- [illegible]
- [illegible]
- [illegible]

SPECIAL PROVISIONS GENERAL NOTES

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2. [illegible]
3. [illegible]

APPROVED	COLETA WATER DISTRICT	STD. DETAIL
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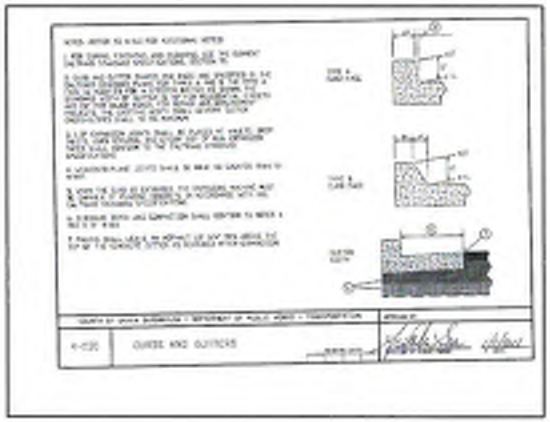
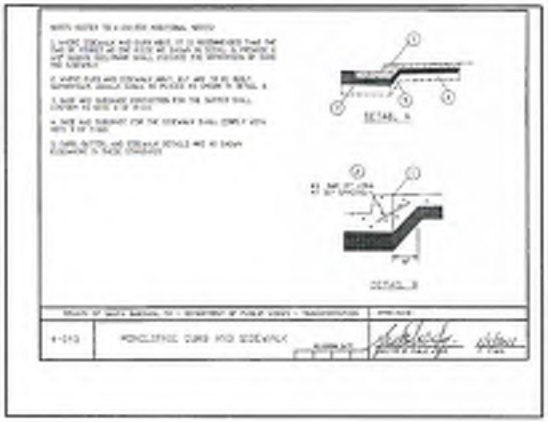


4-02E	CURBS AND GUTTERS	



DETAIL A

DETAIL B

4-01G	MONOLITHIC CURB AND SIDEWALK	

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

17

TECHNICAL SPECIFICATIONS

CALLE REAL CAMPUS

WATER DISTRIBUTION SYSTEM

PHASE 2: WATER LINE REPLACEMENT

COUNTY OF SANTA BARBARA

TECHNICAL SPECIFICATIONS

April 8, 2024

TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS

SECTION 011000

GENERAL

PART 1 - GENERAL

1.1 COORDINATION AND COOPERATION WITH OTHERS

A. During the course of the work to be performed under this contract, it is expected that public agencies, utility companies, and other contractors will be performing work in the immediate vicinity. The Contractor shall notify the other public agencies, utilities, and contractors affected at least five (5) working days prior to beginning construction. The Contractor under this contract shall schedule his work and coordinate his operation with others so as to minimize conflicts and interference between his operations and those of other contractors.

B. Agencies that may be performing work in the immediate vicinity may include, but are not limited to:

1. County of Santa Barbara
2. Santa Barbara County Sanitary District
3. Goleta Water District
4. Southern California Edison
5. Southern California Gas
6. Frontier (Telephone)
7. AT&T (Telephone)
8. Mobil Oil Company
9. Santa Barbara Flood Control District
10. Cox Communications

1.2 QUALITY CONTROL

A. The Contractor shall verify all dimensions in the field and shall check all field conditions continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work.

B. The Contractor shall inspect related and appurtenant work and shall report in writing to the Engineer any conditions that may prevent proper completion of the Work. Any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor at its sole expense.

C. The Work shall be conducted under the general observation of the Engineer and shall be subject to intermittent or continuous inspection by representatives of the County to assure strict compliance with the requirements of the Contract Documents.

D. The work hereunder shall be under the general direction of the Engineer, acting directly and through his or her authorized representatives. The presence of an inspector, however, shall not relieve the Contractor of the responsibility for the proper execution of the Work in accordance with all requirements of the Contract Documents. Compliance is distinctly a duty of the Contractor, and said duty shall not be avoided by any act or omission on the part of an inspector.

E. All materials and articles furnished by the Contractor shall be subject to rigid inspection, and no material or articles shall be used in the Work until it has been inspected and accepted by the Engineer for the County.

F. Unless otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM or other specified published standards, as applicable to the class and nature of the article or materials considered. However, the County reserves the right to

use any generally-accepted system of sampling and testing which, in the opinion of the Engineer will assure the County that the quality of the workmanship is in full accord with the Contract Documents.

G. Samples and test specimens required under the Contract Documents shall be furnished by the Contractor and prepared for testing in ample time for the completion of the necessary tests and analyses before the subject materials or articles are to be used. The Contractor shall furnish all required test specimens at its own expense. Except as otherwise provided in the Contract Documents, performance of the required tests will be by the County, and all costs therefor will be borne by the County; except, that the cost of any test which shows unsatisfactory results shall be borne by the Contractor.

H. Whenever the Contractor is ready to backfill, bury, cast in concrete, hide, or otherwise cover or make inaccessible any work under the Contract, the Contractor shall notify the Engineer not less than 24 hours in advance of beginning any such work so that the required inspections can be scheduled and performed. Failure of the Contractor to notify the Engineer at least 24 hours in advance of any such work shall be reasonable cause for the Engineer to require sufficient delay in the Contractor's schedule to allow time for such inspections and any remedial or corrective work required. All costs of such delays, including its impact or effect upon other portions of the Work shall be borne by the Contractor.

1.3 TEMPORARY UTILITIES

A. The Contractor shall provide, at its own expense, all necessary power required for its operations under the Contract, and shall provide and maintain all temporary power lines required to perform the work in a safe and satisfactory manner. All temporary connections for electricity shall be subject to the approval of the Engineer and the power company representative, and shall be removed in the like manner at the Contractor's expense prior to final acceptance of the work.

B. The Contractor shall provide, at its own expense, all necessary water required for construction of the project, including disinfecting of the pipelines, valving, and appurtenances. The Contractor shall not make connection to, or draw water from any fire hydrant or pipeline without first making application for and obtaining a temporary water meter for construction from the County. For each such connection made, the Contractor shall first attach to the fire hydrant or pipeline a valve, meter, and backflow prevention device of a size and type acceptable to the County. The backflow prevention device shall be tested and certified prior to use of the temporary meter with a copy of the certification provided to the County.

C. Before final acceptance of the work on the project, all temporary connections and piping installed by the Contractor shall be entirely removed, and all affected improvements shall be restored to their original condition, or better, to the satisfaction of the County and to the agency owning the affected utility.

1.4 PROTECTION OF EXISTING FACILITIES

A. All oil, gasoline, power, telephone, communication, gas, water, irrigation, sewer, and storm drain facilities, both underground and overhead, encountered along the line of the Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the owner of said facilities.

B. Prior to any construction in the vicinity of existing underground facilities, the Contractor shall notify the Underground Service Alert agency and the authorized representatives of such utility owners or agencies not less than 3 days nor more than 7 days prior to construction so that a representative of said owners or agencies can be present during such work if they so desire.

C. The right is reserved to the County and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this Contract.

D. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

E. The Contractor shall not perform any work that would affect oil, gas, sewer, or water pipelines, telephone, communications, or electric lines, fences or other structures, nor shall the Contractor enter upon the right-of-way involved until notified by the Engineer that the County has secured the necessary authorization from the proper party. After authorization has been obtained, the Contractor shall give said party due notice of its intention to begin work, and shall give said party convenient access and every facility for removing, shoring, supporting, or otherwise protecting such pipeline, line, or structure, and for replacing same.

F. Existing utility lines that are discovered during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the Contractor. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary. When utility lines that are to be removed are encountered, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of service

G. In the event that the Contractor damages any existing utility lines that are not shown or the locations of which are not made known to the Contractor prior to excavation, a written report thereof shall be made immediately to the Engineer. If directed by the Engineer, repairs shall be made by the Contractor under the provisions for changes and extra work contained in Articles 10, 11, and 12 of the General Conditions. All costs of locating, repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the work which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such work will be paid for as extra work in accordance with the provisions of Articles 10, 11, and 12 of the General Conditions.

H. The Contractor shall be responsible for and shall repair all damage caused by its operations even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling. All repairs to a damaged improvement are subject to inspection and approval by an authorized representative of the improvement owner before being concealed by backfill or other work.

I. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown, the Contractor, without unnecessary delay, shall temporarily replace or relocate such utility or the facility. Restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

J. The Contractor shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced for easy and accurate restoration. All survey markers or points disturbed by the Contractor shall be accurately restored by the Contractor at the Contractor's expense after all street or roadway resurfacing has been completed.

K. All paved areas, including curbs and berms, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the permit of the governing agency. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

L. Wherever sidewalks, driveways, or private roads have been removed for purposes of

construction, the Contractor shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the governing agency before proceeding with the final restoration or, if no such period of times is so fixed, the Contractor shall maintain temporary sidewalks or roadways until the final restoration has been made.

1.5 POTHOLING AND LOCATING EXISTING UNDERGROUND UTILITIES

A. The Contractor shall notify Underground Service Alert (USA) at least 48 hours in advance of any construction or potholing and make arrangements for the existing utilities to be marked by the affected utility companies.

B. The Contractor shall verify the exact location, depth, alignment, and grade of all utilities shown on the construction drawings and marked as part of the USA procedure. The Contractor shall make exploratory excavations (potholing) of all utilities that may interfere with the Work. All such exploratory excavations shall be performed as soon as practicable after award of contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor's work. When such exploratory excavations show the utility location as shown to be in error, the Contractor shall immediately notify the Engineer.

C. **The Contractor shall pothole and locate the existing underground utilities at locations where connections will be made to existing utilities or where proposed facilities cross existing utilities and as shown on the drawings prior to submitting shop drawings.** The Contractor shall submit the pothole data to the engineer for review. The Engineer will not review any submittals by the Contractor until the potholing is completed and the pothole data has been submitted to the Engineer for review. No extension of time or additional compensation will be made for delays caused by the failure of the Contractor to complete the potholing in a timely manner.

D. All costs incurred in exposing and locating the existing utilities including all labor, tools, equipment for excavation, backfill and restoring existing surface improvements, shall be borne by the Contractor. The Contractor shall bear the cost of repairing or replacing any existing utility damaged by his potholing work.

1.6 TEMPORARY ENVIRONMENTAL CONTROLS

A. The use of explosives on the Work will NOT be permitted.

B. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for any damage resulting from any dust originating from its operations. The Contractor's dust abatement measures shall be in accordance with the Santa Barbara County Air Pollution Control District standard dust mitigation measures and any other appropriate agency's dust abatement measures.

C. During the progress of the Work, the Contractor shall keep the site of the Work and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Work site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with all applicable laws and regulations.

D. Fixed or portable chemical toilets shall be provided by the Contractor wherever needed for the use of employees. The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away

from the site in a manner satisfactory to the Engineer and in accordance with all applicable laws and regulations.

E. The Contractor's attention is directed to the Federal Clean Water Act (1977) which requires a Corps of Engineers permit under Section 404 of the Act, for the discharge of one cubic yard or more of any dredged or fill material into "navigable waters" as defined in "Permits for Activities in Navigable Waters or Ocean Waters, Paragraph (d)(2), Federal Register of 25 July 1975, page 3134.

F. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.7 COSTS OF OVERTIME INSPECTION AND OTHER SERVICES

A. Inspection of the work as well as other required services will be provided by the County between the hours of 7:30 a.m. and 4:00 p.m. on Monday through Friday only except County holidays. Any inspections or other services by the County requested by or made necessary as a result of the actions of the Contractor beyond the hours stated above shall be paid for by the Contractor at the prevailing rate of 1-1/2 times the regular hourly rate plus equipment charges.

B. Inspections or other services by the County requested by or made necessary as a result of the actions of the Contractor on Saturdays, Sundays, or holidays, must be scheduled and approved by the County and paid for by the Contractor in advance, at the prevailing rate for overtime and/or holiday work. Unless determined otherwise, the following holidays are observed by the County: New Year's Day, Martin Luther King, Jr. Day, Presidents Day, Cesar Chavez Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the day after Thanksgiving, and Christmas. Contact the County for specific dates and days holidays will be observed prior to scheduling any construction operations. . The need for overtime inspection or other services by the County shall be determined by the Engineer, and his decision shall be final.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION
011001

CULTURAL MONITORING

PART 1 - GENERAL

1.1 REQUIREMENTS

The CONTRACTOR shall contact the Coastal Band of the Chumash Nation (CBCN) so that a qualified Chumash Cultural Resource Site Monitor can be assigned to the Project and perform the WORK in accordance with the following requirements for the duration of the project:

A. Onsite monitoring shall be provided by a qualified Chumash Cultural Resource Site Monitor for all grading, excavation, trenching, vegetation or paving removal, ground clearance, and site preparation that involves earthmoving operations;

B. All contractors, subcontractors and construction personnel shall be alerted to the possibility of uncovering unanticipated subsurface archaeological features or artifacts associated with past human occupation of the parcel;

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 312316 –Trenching, Backfill and Compaction
Section 311000 – Site Preparation

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. If cultural resources are encountered or suspected, work shall immediately be halted or redirected to an area with no known archaeological resources, and the qualified Chumash Cultural Resource Site Monitor notified.

Work that may impact these resources shall not resume without written authorization from the COUNTY project manager.

B. If a discovery consists of possible human remains, all work in the area shall be immediately halted, and the Santa Barbara County Coroner shall be contacted. The qualified Chumash Cultural Resource Site Monitor shall be present for all further subsurface disturbance in the area of the find.

Work that may impact these resources shall not resume without written authorization from the COUNTY project manager.

SECTION 013300

CONTRACTOR SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL

A. **Submittals are required for all tapping sleeves, vaults, vault lids, combination air valve covers, and where called for in the COUNTY Technical Specifications.** Submittals are also required for all materials not otherwise specified in the COUNTY Technical Specifications, or whenever an "or equal" item is requested for use by the CONTRACTOR. Wherever submittals are required, they shall be submitted to the COUNTY.

B. Frequently Used Specification Sections include but are not necessarily limited to:
   a. Division 00 - Procurement and Contracting Requirements.
   b. Division 01 - General Requirements.
   c. Technical Specification Sections identifying required submittals.

1.2 PRECONSTRUCTION CONFERENCE SUBMITTALS

A. At the preconstruction conference, the CONTRACTOR shall submit the following items to the COUNTY for review:

1. A preliminary schedule of Shop Drawing, Sample, and proposed Substitute ("Or-Equal") submittals.

2. A list of all permits and licenses the CONTRACTOR shall obtain indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit.

3. A project overview bar chart.

1.3 SHOP DRAWINGS

A. Wherever called for in the Contract Documents, or where required by the COUNTY, the CONTRACTOR shall furnish to the COUNTY for review, two (2) physical copies of each Shop Drawing submittal and one (1) electronic copy. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop-prepared drawings, fabrication and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and similar items. Whenever the CONTRACTOR is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an engineer registered in the State of California in the appropriate area of expertise.

B. Organization

1. A single submittal transmittal form shall be used for each technical specification section or item or class of material or equipment for which a submittal is required. A single submittal covering multiple sections will not be acceptable, unless the primary specification references other sections for components. Example: if a pump section references other section for the motor, Protective Coatings, anchor bolts, local control panel, and variable frequency drive, a single submittal would be accepted; a single submittal covering vertical turbine pumps and horizontal split case pumps would not be acceptable.

2. On the transmittal form, index the components of the submittal and insert tabs in the submittal to match the components. Relate the submittal components to Technical Specification paragraph and

subparagraph, Drawing number, detail number, schedule title, as applicable.

3. Unless indicated otherwise, terminology and equipment names and numbers used in submittals shall match the Contract Documents.

D. Format

1. Minimum sheet size shall be 8.5 inches by 11 inches. Maximum sheet size shall be 24 inches by 36 inches. Every page in a submittal shall be numbered in sequence. Each copy of a submittal shall be collated and stapled or bound, as appropriate.

2. Where product data from a manufacturer is submitted, clearly mark which model is proposed, with all pertinent data, capacities, dimensions, clearances, diagrams, controls, connections, anchorage, and supports. Sufficient level of detail shall be presented for assessment of compliance with the Contract Documents.

3. Each submittal shall be assigned a unique number. Submittals shall be numbered sequentially. The submittal numbers shall be clearly noted on the transmittal. Original submittals shall be assigned a numeric submittal number. Resubmittals shall bear an alpha-numeric system which consists of the number assigned to the original submittal for that item followed by a letter of the alphabet to represent that it is a subsequent submittal of the original. For example, if submittal 25 requires a resubmittal, the first resubmittal will bear the designation "25-A" and the second resubmittal will bear the designation "25-B" and so on.

4. A submittal log will be maintained by the CONTRACTOR and submitted to the COUNTY that includes, at a minimum, the unique number, subject, anticipated date of submittal, date submitted, date returned by the COUNTY, and COUNTY response.

E. Disorganized submittals that do not meet the requirements above will be returned without review.

F. Except as may otherwise be indicated herein, the COUNTY will return prints of each submittal to the CONTRACTOR with its comments noted thereon, within 14 calendar days following receipt by the COUNTY. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the COUNTY by the second submission of a submittal item. The COUNTY maximum review period for each submittal, including all resubmittals, will be 14 days per submittal.

G. If a submittal is returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal is not required.

H. If a submittal is returned marked "MAKE CORRECTIONS NOTED," CONTRACTOR shall make the corrections on the submittal, but formal revision and resubmission of said submittal is not required.

I. If a submittal is returned marked "AMEND-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the COUNTY for review.

J. If a submittal is returned marked "REJECTED-RESUBMIT," it shall mean that the submitted material or product does not satisfy the specification, the submittal is so incomplete that it cannot be reviewed, or is a substitution request not submitted in accordance with Section 016000 - Products, Materials, Equipment, and Substitutions. The CONTRACTOR shall prepare a new submittal and shall resubmit the required number of copies of said revised submittal to the COUNTY for review.

K. Fabrication of an item shall be commenced only after the COUNTY has reviewed the pertinent submittals and returned copies to the CONTRACTOR marked either "NO EXCEPTIONS TAKEN" or MAKE CORRECTIONS NOTED." Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as changes to the contract requirements.

L. The COUNTY's review of submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits due to any errors in submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

1.4 SAMPLES

A. Whenever in the Specifications samples are required, the CONTRACTOR shall submit not less than two samples of each item or material to the COUNTY for acceptance. Unless otherwise indicated, samples, shall be submitted a minimum of 14 days prior to ordering such material.

B. Samples shall be individually and indelibly labeled or tagged, indicating thereon all specified physical characteristics and Manufacturer's name. Upon receiving acceptance of the COUNTY, one set of the samples will be stamped and dated by the COUNTY and returned to the CONTRACTOR, and one set of samples will be retained by the COUNTY.

C. Unless indicated otherwise, all colors and textures of items presented in sample submittals shall be from the manufacturer's standard colors and standard materials, products, or equipment lines.

D. The CONTRACTOR shall schedule sample submittals such that:

1. Samples are submitted in an orderly sequence which allows the COUNTY 14 days to assemble color panels and select color and texture dependent products and materials without delay to the construction schedule.

2. The CONTRACTOR has sufficient time after approval or selection of color or texture to provide the products or materials without delay to the construction schedule. The Contract Times will not be extended for the CONTRACTOR's failure to allow enough review and approval or selection time, failure to submit all samples requiring color or texture selection, or failure to submit complete samples.

1.5 OPERATIONS & MAINTENANCE MANUAL

A. When so specified in the Contract documents, the CONTRACTOR shall submit technical operation and maintenance information for each item of mechanical and electrical equipment in an organized manner in the Operations & Maintenance (O&M) Manual. It shall be written so that it can be used and understood by the COUNTY'S operation and maintenance staff.

B. The O&M Manual shall be subdivided first by specification section number; second, by equipment item; and last, by "Category" with the following information provided for each item of equipment (as applicable):

1. Category 1 - Equipment Summary: A summary table shall indicate the equipment name, equipment number, and location in which the equipment is installed.

2. Category 2 - Operational Procedures: Manufacturer-recommended procedures shall be included covering: Installation, Adjustment, Operation procedures, Troubleshooting, Disassembly, Re-assembly; and Tabulation of proper settings for all pressure relief valves, low and high pressure switches, and other protection devices.

3. Category 3 - Preventative Maintenance Procedures: Preventative maintenance procedures shall include all manufacturer-recommended procedures to be performed and recommended frequency of preventative maintenance procedures shall be included.

4. Category 4 - Parts List and Drawings: A complete parts list shall be furnished, including a generic description and manufacturer's identification number for each

part. Addresses and telephone numbers of the nearest supplier and parts warehouse shall be included. Cross-sectional or exploded view drawings shall accompany the parts list.

5. Category 5 – Safety Procedures: Engineering, industry, and manufacturer-recommended safety procedures shall be provided covering the safety precautions to be taken when operating and maintaining the equipment or working near it.

6. Category 6 - Documentation: All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be placed in this category.

7. Spare Parts List: The spare parts list shall include those spare parts which each manufacturer recommends be maintained by the COUNTY in inventory at the plant site. The CONTRACTOR shall cross-reference all spare parts lists to the equipment numbers designated in the Contract Documents. Each manufacturer or supplier shall indicate the name, address, and telephone number of its nearest outlet of spare parts to assist the COUNTY in ordering spare parts. The list shall include the current list price of each spare part.

C. The CONTRACTOR shall furnish to the COUNTY 3 identical physical O&M Manuals and one (1) electronic copy. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, 3-ring, loose leaf, vinyl plastic hard cover binder suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches. A table of contents indicating all equipment in the manuals shall be included.

D. Manuals shall be submitted in final form to the COUNTY not later than the 75 percent of construction completion date. All discrepancies found by the COUNTY shall be corrected within 30 days from the date of written notification by the COUNTY.

1.6 RECORD DRAWINGS

A. The CONTRACTOR shall maintain one record set of Drawings at the Site. On these, it shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the information represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. The CONTRACTOR shall provide supplemental detailed sketches as necessary or directed to fully indicate the WORK as actually constructed. These master record drawings of the CONTRACTOR's representation of record drawing conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the WORK. Red ink shall be used for alterations and notes.

B. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the record drawings shall be updated by indicating those portions which are superseded by change order drawings or final Shop Drawings, and by including appropriate reference information describing the change orders by number and the Shop Drawings by manufacturer, drawing, and revision numbers.

C. Record drawings shall be accessible to the COUNTY at all times during the construction period. Said up-to-date record drawings shall be in the form of a set of prints with carefully plotted information overlaid.

D. Upon Substantial Completion of the WORK and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of record drawings to the PROJECT ENGINEER or COUNTY as applicable. This set of drawings shall consist of corrected Drawings showing the reported location of the WORK. The information submitted by the CONTRACTOR and incorporated by the PROJECT ENGINEER into the record drawings will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information, and for any errors or omissions which may appear on the record drawings as a result.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 014200

REFERENCE STANDARDS

PART 1 – GENERAL

1.1 GENERAL

A. **Titles of Sections and Paragraphs:** Titles and subtitles accompanying specification sections and paragraphs are for convenience and reference only, and do not form a part of the Specifications.

B. **Applicable Publications:** Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that construction is started shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth in the Standards & Specifications or shown on the Construction Drawings will be waived because of any provision of, or omission from, said standards or requirements.

C. **Specialists, Assignments:** In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the CONTRACTOR.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. The CONTRACTOR shall construct the WORK in accordance with the Contract Documents and the referenced portions of those referenced codes, standards, and specifications.

B. References herein to "Building Code" or "Uniform Building Code" shall mean Uniform Building Code of the International Conference of Building Officials (ICBO). Similarly, references to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electrical Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the COUNTY for clarification and directions prior to ordering or providing any materials or furnishing labor. The CONTRACTOR shall bid for the most stringent requirements.

D. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

E. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

F. References herein to Caltrans Standards and Specifications Shall mean State of California Department of Transportation Standards and Specifications, current revision.

G. **Applicable Safety Standards:** References herein to "Cal-OSHA" shall mean State of California, Department of Industrial Relations, Construction Safety Orders, as amended to date, and all changes and amendments thereto.

H. References herein to County Standards and Specifications Shall mean County of Santa Barbara, Department of Public Works, Standards and Specifications.

I. References herein to Santa Barbara County Standards and Specifications Shall mean Santa Barbara County, Department of Public Works, Standards and Specifications.

1.3 REGULATIONS RELATED TO HAZARDOUS MATERIALS

A. The CONTRACTOR shall be responsible that all work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015526

TRAFFIC CONTROL & ACCESS

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide traffic control and access in accordance with these Specifications, Caltrans Standard Specifications and Plans, and the standards contained in the "Work Area Traffic Control Handbook" (WATCH) published by Building News, Inc. The CONTRACTOR shall take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall prepare and submit Traffic Control plans and comply with special safety regulations relating to traffic control as may be required by the County of Santa Barbara or other public authorities within their respective jurisdiction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EQUIPMENT TRAVEL ROUTE

A. The CONTRACTOR shall make its own investigation of the condition of available access routes to and from the site of the Work. If suitable access is not available, it shall be the CONTRACTOR's responsibility to construct and maintain any access or haul roads required for its construction operations. The travel route for the CONTRACTOR's equipment shall follow the safest route possible and minimize inconvenience to motorists and pedestrians.

3.2 TEMPORARY STREET USE

A. Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alley, way, or parking area during the performance of the Work hereunder. The CONTRACTOR shall conduct its operations as not to interfere unnecessarily with the authorized work of the COUNTY, utility companies, or other agencies in such streets, alleys, ways, or parking areas.

B. No Street shall be closed to the public without first obtaining the permission of the City of Santa Barbara, the COUNTY, and other proper governmental authority, where applicable. Where excavation is being performed in primary streets or highways, at least one lane of traffic shall be kept open in each direction at all times unless otherwise provided in the Contract Documents or under the terms of the permits issued by the County of Santa Barbara, City of Santa Barbara or other public agencies, as required.

C. Toe boards shall be provided to restrict movement of excavated material if required by the County, or other agency having jurisdiction over the affected street or highway. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, drainage inlets, and other drainage facilities.

3.3 TRAFFIC CONTROL

A. For the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of Caltrans "Manual of Traffic Controls - Warning Signs, Lights, and Devices for Use in Performance of Work Upon Highways."

B. Provide, place and maintain all necessary barricades, traffic cones, warning signs, lights and other safety devices. Post and maintain adequate detour signs at all applicable approaches to forewarn and direct traffic. Use

illuminated and/or reflective warning/construction signs at appropriate locations for the project. Use solar powered flashing arrow boards for each lane closure taper in addition to other delineation. Provide safe and effective work areas and warn, control, protect and expedite vehicular and pedestrian traffic through the construction project.

C. Provide temporary traffic re-striping at the conclusion of any working day for any centerline or lane line which is obliterated by construction. Use temporary asphalt surfacing at the CONTRACTOR's own expense as required to maintain traffic in a safe and non-disruptive manner. Provide temporary delineation as required which includes sandblasting of conflicting markings, installation and removal of temporary centerlines or lane lines, detour signing, barricading, and replacement of traffic lines, and markings in their proper locations upon termination of the detour. Provide any temporary pavement marking. Provide for removal of existing markings and the later removal of temporary markings to restore the permanent markings.

D. Through traffic shall be maintained in both directions during working hours. Reopen all traffic lanes for the traffic circulation at the end of each working day, and during non-working hours including holidays, Saturdays, and Sundays. Provide traffic re-striping and markings prior to opening street traffic.

E. Where required, the CONTRACTOR shall furnish, install, and maintain in-place "No Parking – Tow Away" signs (even if streets have posted "No Parking" signs) which shall be posted at least two (2) working days prior to commencement of work. On the sign, CONTRACTOR shall print the hours, day(s) and date of closure in two-inch-high letters and numbers. The signs shall be spaced at a maximum of 50 feet from street intersection and/or from each adjacent sign.

F. The CONTRACTOR shall be responsible for the project safety on a 24-hours basis each calendar day for the entire duration of the project.

3.4 ACCESS

A. Wherever necessary or required for the convenience of the public or individual residents or business places at street or highway crossings, private driveways, or elsewhere, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges or steel plates. Such written consent shall be delivered to the COUNTY prior to beginning the excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation.

B. Temporary bridges or steel plates for street and highway crossings shall conform to the requirements of the County of Santa Barbara or authority having jurisdiction in each case. The CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

C. Maintain adjacent streets open for ingress and egress and for parking; Provide emergency access for fire trucks, police cars, and other emergency vehicles at all times. The CONTRACTOR shall notify each agency in writing at least three (3) working days prior to work, and submit a copy of notice to COUNTY. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times.

D. Construct temporary AC ramps to provide safe and drivable access to residents and businesses and safe pedestrian crossing paths at all times. Provide alternate crossing areas with appropriate signing and other devices where construction prohibits pedestrian and bicycle access. Provide safe and adequate pedestrian zones and public transportation stops, as well as reasonable pedestrian crossings of the work at frequent intervals. Keep the areas through and adjacent to the construction site clear of any objects that may be hazardous to pedestrians.

3.5 WORKING HOURS

A. Construction work operations shall be performed Monday through Friday except COUNTY observed holidays unless otherwise noted. The CONTRACTOR work hours shall be at COUNTY discretion Monday through Friday except that work within the street right-of-way that effects the flow of traffic shall only be allowed in accordance with the issued encroachment permit.

3.6 NOTIFICATION

A. The CONTRACTOR shall provide notification in writing to affected residences, schools, churches, and businesses informing them of the pending project. A draft notification letter shall be submitted to the COUNTY five working days in advance of required notification date for verification and approval. The CONTRACTOR shall hand deliver copies of the approved notification letter to the affected residences, school, churches, and businesses at least 14 days prior to the scheduled construction on each block. The notification letter shall state the project name, scope of work, date and time of restricted travel on the affected streets, and the CONTRACTOR's and COUNTY's contact persons and phone numbers. Failure to meet the approved schedule requires that the CONTRACTOR immediately notify residents of the cancellation for that day's work and reschedule construction of the affected area at a later date. Notification of rescheduled work shall follow this same procedure.

3.7 TRAFFIC CONTROL PLANS

A. Traffic control plans shall be provided by the CONTRACTOR and submitted to the County of Santa Barbara, City of Santa Barbara or other agencies having jurisdiction as may be required. Traffic control plans shall conform to the requirements of the County of Santa Barbara or City of Santa Barbara as applicable and shall include the location and wording of all signs, barricades, delineators, lights, warning devices, and temporary parking restrictions; separate plan for each stage of construction; and separate detour routing plan.

3.8 TEMPORARY STREET CLOSURE

A. If closure of any street is required during construction, a formal application for a street closure shall be made to the County of Santa Barbara or other authority having jurisdiction at least 30 days prior to the required street closure to allow them to determine the necessary signing and detour requirements to be provided by the CONTRACTOR.

END OF SECTION

SECTION 016000

PRODUCTS, MATERIALS, EQUIPMENT & SUBSTITUTIONS

PART 1 - GENERAL

1.1 DEFINITIONS

A. The word "Products," as used in the Contract Documents, is defined to include purchased items for incorporation into the WORK, regardless of whether specifically purchased for the project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form WORK. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying, and erection of the WORK.

1.2 QUALITY ASSURANCE

A. **Source Limitations:** To the greatest extent possible for each unit of WORK, the CONTRACTOR shall provide products, materials, and equipment of a singular generic kind from a single source.

B. **Compatibility of Options:** Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, the CONTRACTOR shall select an option which is compatible with other products, materials, or equipment. Compatibility is a basic general requirement of product, material and equipment selections.

1.3 SUBSTITUTIONS

A. The CONTRACTOR shall, to the greatest extent possible, provide the materials as specified in these Contract Documents. Where procurement of the material as specified is not possible or the CONTRACTOR would like to submit for consideration an alternative, the CONTRACTOR shall submit shop drawings in accordance Section 013300 and shall clearly indicate the product being substituted.

1.4 PRODUCT DELIVERY AND STORAGE

A. The CONTRACTOR shall deliver and store the products, materials and equipment in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at the Site and overcrowding of construction spaces. In particular, the CONTRACTOR shall ensure coordination to ensure minimum holding or storage times for flammable, hazardous, easily damaged, or sensitive materials to deterioration, theft, and other sources of loss.

1.5 TRANSPORTATION AND HANDLING

A. Products shall be transported by methods to avoid damage and shall be delivered in undamaged condition in manufacturer's unopened containers and packaging.

B. The CONTRACTOR shall provide equipment and personnel to handle products, materials, and equipment including those furnished by COUNTY, by methods to prevent soiling and damage.

C. The CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.6 STORAGE AND PROTECTION

A. Products shall be stored in accordance with manufacturer's written instructions and with seals and labels intact and legible. Sensitive products shall be stored in weather-tight climate controlled enclosures and temperature.

B. Loose granular materials shall be stored on solid flat surfaces in a well-drained area and shall be prevented from mixing with foreign matter.

C. Storage shall be arranged in a manner to provide access for maintenance of stored items and for inspection.

1.7 MAINTENANCE OF PRODUCTS IN STORAGE

A. The CONTRACTOR shall comply with manufacturer's product storage requirements and recommendations. The CONTRACTOR shall maintain a log of inspections and shall make the log available on request. The CONTRACTOR shall periodically inspect products to assure they are undamaged and are maintained under required conditions. The CONTRACTOR shall maintain manufacturer-required environmental conditions continuously.

B. The CONTRACTOR shall ensure that surfaces of products exposed to the elements are not adversely affected and that weathering of finishes does not occur.

C. For mechanical and electrical equipment, the CONTRACTOR shall provide a copy of the manufacturer's service instructions with each item and the exterior of the package shall contain notice that instructions are included.

D. Products shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document prior to final acceptance by the COUNTY.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 028200

ASBESTOS CEMENT PIPE REMOVAL & DISPOSAL

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR may encounter asbestos cement pipe (ACP) during the prosecution of this work. The CONTRACTOR shall remove and dispose of ACP in accordance with State of California requirements, and the Contract Documents. Removal of ACP shall be performed by a CONTRACTOR licensed and certified by Cal/OSHA for such removal.

B. The CONTRACTOR shall follow the AWWA guidelines for handling, removing and disposing of ACP as stated in the applicable sections of AWWA Standards C400, C401, C402, and C403 covering Asbestos-Cement Transmission and Distribution Pipe.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 312316 – Trenching, Backfill and Compaction
Section 330509 – Piping, General

1.3 SUBMITTALS

A. **Asbestos Cement Pipe Removal and Disposal Plan:** The CONTRACTOR shall complete and submit to the COUNTY INSPECTOR an "Asbestos Cement Pipe Removal and Disposal Plan." The CONTRACTOR shall clearly describe his proposed methods for the removal and disposal of ACP that ensures no exposure to airborne asbestos by the CONTRACTOR'S personnel. The written plan shall be submitted to the COUNTY INSPECTOR for review and approval at least one week in advance of the proposed date of removal.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Snap cutting tools shall be used for the removal of asbestos cement pipe whenever the removal of intact pipe sections is not possible. Power "Cut-Off" saws, hand-saws, and other devices and methods that result in the release of asbestos fibers into the air shall not be used for the removal of ACP.

2.2 ENCAPSULANT

A. If during the removal of ACP broken edges occur, the broken edges shall be encapsulated with Certane 1000 Post Removal Encapsulant, or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall perform all cutting and handling of asbestos cement pipe in accordance with State of California requirements. The CONTRACTOR shall provide sufficient supervision and perform monitoring to assure conformance with State requirements. Under no circumstances shall the CONTRACTOR utilize methods of removal that result in the release of asbestos fibers into the air.

3.2 REMOVAL

A. The CONTRACTOR shall, whenever possible, accomplish the removal of ACP by removing intact pipe sections. Where connections are to be made to existing ACP waterlines, the ACP shall be removed in sections back to the nearest ACP coupling. The CONTRACTOR shall pothole and expose the pipe and ACP couplings prior to developing his proposed "Asbestos Cement Pipe Removal and Disposal Plan".

B. Snap cutting tools shall be used for the removal of asbestos cement pipes whenever the removal of intact pipe sections is not possible. The pipe shall be wetted prior to the snapping operation being performed. Use of a hammer and chisel to gradually split an ACP coupling lengthwise may only be performed if the "Asbestos Cement Pipe Removal and Disposal Plan" developed by the CONTRACTOR incorporates measures to prevent the release of asbestos fibers into the air, and is approved by the COUNTY. Power "Cut-Off" saws, hand-saws, and other devices and methods that result in the release of asbestos fibers into the air shall not be used for the removal of ACP.

C. The CONTRACTOR shall continuously wet the ACP around the snap cutting tool during the removal operation. All personnel handling the ACP shall wear properly fitted respirators during the removal and bagging operation, and shall be trained in the use of the respirator equipment. All pedestrian traffic shall be rerouted to maintain 30 feet clear of the ACP work area.

D. All removed sections or pieces of ACP shall be bagged and prepared for disposal immediately after removal as described below. If during the removal of ACP broken edges occur, the broken edges shall be encapsulated with Certane 1000 Post Removal Encapsulant, prior to bagging, in accordance with the manufacturers' recommendations.

3.3 DISPOSAL

A. The CONTRACTOR shall transport all sections and pieces of ACP in accordance with State requirements and shall be delivered to the County yard for disposal. All sections or pieces of ACP shall be wetted and double wrapped or bagged with polyethylene wrap immediately after removal. The minimum thickness of polyethylene wrap shall be 6 mils. The outer wrap shall be securely held in place with tape in a manner to prevent the release of airborne asbestos fibers.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall furnish all materials for concrete in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished concrete, in accordance with the requirements of the Contract Documents.

B. The following types of concrete are covered in this Section:

1. **Structural Concrete:** Concrete to be used in all cases except where indicated otherwise in the Contract Documents.

2. **Sitework Concrete:** Concrete to be used for curbs, gutters, catch basins, sidewalks, pavements, fence and guard post embedment, underground pipe encasement, underground duct bank encasement and all other concrete appurtenant to electrical facilities unless otherwise indicated.

3. **Lean Concrete:** Concrete to be used for thrust blocks, pipe trench cut-off blocks and cradles that are detailed on the Drawings as unreinforced. Lean concrete shall be used as protective cover for dowels intended for future connection.

C. The term "hydraulic structure" used in these specifications means environmental engineering concrete structures for the containment, treatment, or transmission of water, wastewater, or other fluids.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. **Federal Specifications:**

UU-B-790A (1) (2)	Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellant and Fire Resistant)

B. **Commercial Standards:**

ACI 117	Tolerances for Concrete Construction and Materials
ACI 214R-11	Guide to Evaluation of Strength Test Results of Concrete
ACI 301	Structural Concrete
ACI 306.1	Cold Weather Concreting
ACI 309	Consolidation of Concrete
ACI 315	Details and Detailing of Concrete Reinforcement
ACI 318	Building Code Requirements for Structural Concrete
ASTM C 31	Practices for Making and Curing Concrete Test Specimens in the Field
ASTM C 33	Concrete Aggregates

ASTM C 39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 94	Ready-Mixed Concrete
ASTM C 136	Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 143	Test Method for Slump of Hydraulic Cement Concrete
ASTM C 150	Portland Cement
ASTM C 156	Test Methods for Water Loss Through Liquid Membrane Forming Curing Compounds for Concrete
ASTM C 157	Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete
ASTM C 192	Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 260	Air-Entraining Admixtures for Concrete
ASTM C 309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	Chemical Admixtures for Concrete
ASTM C 1077	Practice for Agencies Testing Concrete and Concrete Aggregates for use in Construction & Criteria for Testing Agency Evaluation
ASTM D 448	Classification for Sizes of Aggregate for Road and Bridge Construction
ASTM D 2419	Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM E 119	Method for Fire Tests of Building Construction and Materials
ASTM E 1643	Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
ASTM E 1745	Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs

1.4 CONTRACTOR SUBMITTALS

A. **Mix Designs:** Prior to beginning the WORK and within 14 days of the notice to proceed, the CONTRACTOR shall submit to the COUNTY, for review, preliminary concrete mix designs which shall show the proportions and gradations of all materials proposed for each class and type of concrete specified herein in accordance with Section 013300 - Contractor Submittals.

B. **Delivery Tickets:** Where ready-mix concrete is used, the CONTRACTOR shall furnish delivery tickets at the time of delivery of each load of concrete. Each ticket shall show the state certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, and the amounts of water in the aggregate added at the batching plant, and the amount allowed to be added at the site for the specific design mix. In addition, each ticket shall state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to the times when the batch was dispatched, when it left the plant, when it arrived at the site, when unloading began, and when unloading was finished.

C. Furnish the following submittals in accordance with ACI 301:

1. Mill tests for cement.
2. Admixture certification. Chloride ion content must be included.
3. Aggregate gradation test results and certification.
4. Materials and methods for curing.
5. Reinforcing steel certification.

1.5 QUALITY ASSURANCE

A. General

1. Tests on component materials and for compressive strength and shrinkage of concrete shall be performed as indicated herein. Test for determining slump will be in accordance with the requirements of ASTM C 143.

2. Testing for aggregate shall include sand equivalence, reactivity, organic impurities, abrasion resistance, and soundness, according to ASTM C 33.

3. The cost of all laboratory tests on cement, aggregates, and concrete, will be borne by the COUNTY. However, the CONTRACTOR shall pay the cost of any additional tests and investigation on WORK performed which does not meet the specifications. The laboratory will meet or exceed the requirements of ASTM C 1077.

4. Concrete for testing shall be supplied by the CONTRACTOR, and the CONTRACTOR shall assist the COUNTY in obtaining samples, and disposal and cleanup of excess material.

B. **Field Compression Tests:**

1. Compression test specimens will be taken during construction from the first placement of each class of concrete specified herein and at intervals thereafter as selected by the COUNTY to insure continued compliance with these specifications. Each set of test specimens will be a minimum of 5 cylinders.

C. **Evaluation and Acceptance of Concrete:**

1. Evaluation and acceptance of the compressive strength of concrete will be according to the requirements of ACI 318, Chapter 5 "Concrete Quality," and as indicated herein.

2. A statistical analysis of compression test results will be performed according to the requirements of ACI 214. The standard deviation of the test results shall not exceed 640 psi, when ordered at equivalent water content as estimated by slump.

3. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for all subsequent batches of the type of concrete affected.

4. When the standard deviation of the test results exceeds 640 psi, the average strength for which the mix is designed shall be increased by an amount necessary to satisfy the statistical requirement that the probability of any test being more than 500 psi below or the average of any 3 consecutive tests being below the required compressive strength is 1 in 100. The required average strength shall be calculated by Criterion No. 3 of ACI 214 using the actual standard of deviation.

5. All concrete which fails to meet the ACI requirements and these specifications, is subject to removal and replacement.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. **General:**

1. All materials shall be classified as acceptable for potable water use according to NSF Standard 61.

2. Cement for concrete which will contact potable water shall not be obtained from kilns which burn metal rich hazardous waste fuel.

3. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Cement reclaimed from cleaning bags or leaking containers shall not be used. All cement shall be used in the sequence of receipt of shipments.

B. All materials shall comply with the requirements of Section 4 of ACI 301.

C. Storage of materials shall conform to the requirements of Section 4 of ACI 301.

D. Materials for concrete shall conform to the following requirements:

1. Cement shall be standard brand Portland cement conforming to ASTM C 150 for Type II or Type V, including Table 2 optional requirements. A minimum of 85 percent of cement by weight shall pass a 325 screen. A single brand of cement shall be used throughout the work, and prior to its use, the brand shall be acceptable to the COUNTY. The cement shall be suitably protected from exposure to moisture until used. Cement that has become lumpy shall not be used. Sacked cement shall be stored in such a manner so as to permit access for inspection and sampling. Certified mill test reports, including fineness, for each shipment of cement to be used shall be submitted to the COUNTY, if requested, regarding compliance with these Specifications.

2. Water for mixing and curing shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts, and other impurities. The water shall be considered potable, for the purposes of this Section only, if it meets the requirements of the local governmental agencies. Agricultural water with high total dissolved solids (over 1000 mg/l TDS) shall not be used.

3. Aggregates shall be obtained from pits acceptable to the COUNTY, shall be non-reactive, and shall conform to ASTM C 33. Maximum size of coarse aggregate shall be as indicated herein. Lightweight sand for fine aggregate will not be permitted.

a. Coarse aggregates shall consist of clean, hard, durable gravel, crushed gravel, crushed rock, or a combination thereof. The coarse aggregates shall be prepared and handled in two or more size groups for combined aggregates with a maximum size greater than 3/4-inch. When the aggregates are proportioned for each batch of concrete, the two size groups shall be combined. See the Paragraph in Part 2 entitled "Trial Batch and Laboratory Tests" for the use of the size groups.

b. Fine aggregates shall be natural sand or a combination of natural and manufactured sand that are hard and durable. When tested in accordance with ASTM D 2419, the sand equivalency shall not be less than 75 percent for an average of three samples, nor less than 70 percent for an individual test. Gradation of fine aggregate shall conform to ASTM C 33. The fineness modulus of sand used shall not be over 3.00.

c. Combined aggregates shall be well graded from coarse to fine sizes and shall be uniformly graded between screen sizes to produce a concrete that has optimum workability and consolidation characteristics. Where a trial batch is required for a mix design, the final combined aggregate gradations will be established during the trial batch process.

4. Ready-mix concrete shall conform to the requirements of ASTM C 94.

5. Admixtures: All admixtures shall be compatible and be furnished by a single manufacturer capable of providing qualified field service representation. Admixtures shall be used in accordance with manufacturer's recommendations. If the use of an admixture is producing an inferior end result, the CONTRACTOR shall discontinue use of the admixture. Admixtures shall not contain thiocyanates nor more than 0.05 percent chloride ion, and shall be non-toxic after 30 days.

a. Air-entraining agent meeting the requirements of ASTM C 260 shall be used. Sufficient air-entraining agent shall be used to provide a total air content of 3 to 5 percent. The COUNTY reserves the right, at any time, to sample and test the air-entraining agent. Air entraining agent shall be at the COUNTY's discretion.

b. Set controlling and water reducing admixtures: Admixtures may be added at the CONTRACTOR's option, subject to the COUNTY's approval, to control the set, effect water reduction, and increase workability. The addition of an admixture shall be at the CONTRACTOR's expense. Concrete containing an admixture shall be first placed at a location determined by the COUNTY. Admixtures shall conform to the requirements of ASTM C 494. The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used.

1. Concrete shall not contain more than one water reducing admixture.

7. **Flyash:** Flyash shall not be used.

2.2 REINFORCEMENT STEEL

A. Reinforcement steel for cast-in-place reinforced concrete construction shall conform to the following requirements:

1. Bar reinforcement shall conform to the requirements of ASTM A 615 - Deformed and Plain Billet - Steel Bars, for Grade 60 reinforcement unless otherwise indicated.

2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A 1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete, and the details indicated. Welded wire fabric with longitudinal wire of W4 size wire and smaller shall be in flat sheets or in rolls with a core diameter of not less than 10 inches. Welded wire fabric with longitudinal wires larger than W4 size shall be in flat sheets only.

3. Spiral reinforcement shall be cold-drawn steel wire conforming to the requirements of ASTM A 1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

B. Accessories

1. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcement during concrete placement. Bar supports shall meet the requirements of the CRSI Manual of Standard Practice including special requirements for supporting epoxy coated reinforcing bars. Wire bar supports shall be CRSI Class 1 for maximum protection with a 1/8-inch minimum thickness of plastic coating which extends at least 1/2-inch from the concrete surface. Plastic shall be gray in color.

2. Concrete blocks (dobies) used to support and position reinforcement steel shall have the same or higher compressive strength as required for the concrete in which they are located. Wire ties shall be embedded in concrete block bar supports.

C. Epoxy coating for reinforcing and accessories, where indicated, shall conform to ASTM A 775 - Epoxy - Coated Reinforcing Steel Bars.

2.3 CURING MATERIALS

A. Materials for curing concrete as indicated herein shall conform to the following requirements and ASTM C 309:

1. All curing compounds shall be white pigmented and resin based. Sodium silicate compounds shall not be allowed.

2. Polyethylene sheet for use as concrete curing blanket shall be white and shall have a nominal thickness of 6 mils. The loss of moisture when determined in accordance with the requirements of ASTM C 156 shall not exceed 0.055 grams per square centimeter of surface.

3. Polyethylene-coated waterproof paper sheeting for use as concrete curing blanket shall consist of white polyethylene sheeting free of visible defects, uniform in appearance, have a nominal thickness of 2 mils, and be permanently bonded to waterproof paper conforming to the requirements of Federal Specification UU-B-790A (1) (2). The loss of moisture, when determined in accordance with the requirements of ASTM C 156, shall not exceed 0.055 gram per square centimeter of surface.

4. Polyethylene-coated burlap for use as concrete curing blanket shall be 4-mil thick, white opaque polyethylene film impregnated or extruded into one side of the burlap. Burlap shall weigh not less than 9 ounces per square yard. The loss of moisture, when determined in accordance with the requirements of ASTM C 156, shall not exceed 0.055 grams per square centimeter of surface.

5. Curing mats for use in Curing Method 6 as indicated in Section 3.9, shall be heavy shag rugs or carpets or cotton mats quilted at 4 inches on center. Curing mats shall weigh a minimum of 12 ounces per square yard when dry.

6. Evaporation retardant shall be a material such as MasterKure ER 50 as manufactured by Master Builders Solutions; Eucobar as manufactured by Euclid Chemical Company; E-CON as manufactured by L & M Construction Chemicals, Inc. or equal.

2.4 NON-WATERSTOP JOINT MATERIALS

A. Materials for non-waterstop joints in concrete shall conform to the following requirements:

1. Preformed joint filler shall be a non-extruding, neoprene sponge or polyurethane type

3. Mastic joint sealer shall be a material that does not contain evaporating solvents; that will tenaciously adhere to concrete surfaces; that will remain permanently resilient and pliable; that will not be affected by continuous presence of water and will not in any way contaminate potable water; and that will effectively seal the joints against moisture infiltration even when the joints are subject to movement due to expansion and contraction. The sealer shall be composed of special asphalts or similar materials blended with lubricating and plasticizing agents to form a tough, durable mastic substance containing no volatile oils or lubricants and shall be capable of meeting the test requirements set forth below, if testing is required by the COUNTY.

2.5 CONCRETE DESIGN REQUIREMENTS

A. **General:** Concrete shall be composed of cement, admixtures, aggregates, and water of the qualities indicated. The exact proportions in which these materials are to be used for different parts of the work will be

determined during the trial batch. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage, and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items. The proportions shall be changed whenever necessary or desirable to meet the required results. All changes shall be subject to review by the COUNTY.

C. **Water-Cement Ratio and Compressive Strength:** Concrete shall have the following minimum properties:

Type of Work	Min. 28-Day Compressive Strength (psi)	Max. Size Aggregate	Cement per cu. yd. (lbs)	Max W/C Ratio (by weight)
Structural Concrete:				
Roof, floor slabs, columns, walls and all other concrete items not specified elsewhere.	4,000	1	564-600	0.45
12-inch and thicker walls, slabs on grade and footings. (optional)	4,000	1-1/2	564-600	0.45
Pea Gravel Mix. Thin sections and areas with congested reinforcing at the CONTRACTOR'S option and with the written approval of the COUNTY for the specific location. Maximum fine aggregate 50% by weight of aggregate	4,000	3/8	752-786	0.40
Other Concretes:				
Sitework Concrete	3,000	1	470 (min)	0.50
Lean concrete	2,000	1	470(min	0.60

NOTE: The CONTRACTOR is cautioned that the limiting parameters above are not a mix design. Additional cement or water reducing agent may be required to achieve workability required by the CONTRACTOR'S construction methods and aggregates. The CONTRACTOR is responsible for providing concrete with the required workability.

D. **Adjustments to Mix Design:** The mixes shall be changed whenever such change is necessary or desirable to secure the required strength, density, workability, and surface finish, and the CONTRACTOR shall be entitled to no additional compensation because of such changes.

2.6 CONSISTENCY

A. The quantity of water in a batch of concrete shall be just sufficient, with a normal mixing period, to produce a concrete which can be worked properly into place without segregation and which can be compacted by vibratory methods to give the desired density, impermeability, and smoothness of surface. The quantity of water shall be changed as necessary, with variations in the nature or moisture content of the aggregates, to maintain uniform production of a desired consistency. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143. The slumps shall be as follows:

Part of Work	Slump (in)
All concrete, unless indicated otherwise	3 inches plus or minus 1 inch
With high range water reducer added	7 inches plus or minus 2 inches
Pea gravel mix	7 inches plus or minus 2 inches
Ductbank and pipe encasement	5 inches plus or minus 1 inch

2.9 READY-MIXED CONCRETE

A. At the CONTRACTOR's option, ready-mixed concrete may be used if it meets the requirements as to materials, batching, mixing, transporting, and placing as indicated herein and is in accordance with ASTM C 94, including the following supplementary requirements.

B. Ready-mixed concrete shall be delivered to the site of the work, and discharge shall be completed within one hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first.

PART 3 - EXECUTION

3.1 PROPORTIONING AND MIXING

A. **Proportioning:** Proportioning of the mix shall conform to the requirements of Chapter 4.2.3 "Proportioning" of ACI 301.

B. **Mixing:** Mixing shall conform to the requirements of Chapter 4.3.1of said ACI 301 Specifications.

C. **Slump:** Slumps shall be as indicated herein.

D. **Retempering:** Retempering of concrete or mortar which has partially hardened shall not be permitted.

3.2 PREPARATION OF SURFACES FOR CONCRETING

A. **General:** Earth surfaces shall be thoroughly wetted by sprinkling prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. Vapor Retarder Sheet

2. Sand base shall be at least 2 inches thick within the foundation line after moistening and compaction by mechanical means. Sand surface shall be flat and level within a tolerance of plus 0 inches to minus 3/4-inch.

3. Place, protect, and repair defects in sheet according to ASTM E 1643 and the manufacturer's written instructions. Seams shall be lapped and sealed in accordance with ASTM E 1643.

4. Granular material above the sheet shall be moistened and compacted to 2 inches thickness within the same flatness criteria as the sand base.

C. **Joints in Concrete:** Concrete surfaces upon or against which concrete is to be placed, where the placement of the concrete has been stopped or interrupted so that, as determined by the COUNTY, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bonding. Except where the Drawings call for joint surfaces to be coated, the joint surfaces shall be cleaned of all laitance, loose or defective concrete, foreign material, and be roughened to a minimum 1/4-inch amplitude. Such cleaning and roughening shall be accomplished by hydro-blasting or sandblasting (exposing aggregate) followed by thorough

washing. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

D. After the surfaces have been prepared, all approximately horizontal construction joints shall be covered with a 6-inch lift of a pea gravel mix. The mix shall be placed and spread uniformly. Wall concrete shall follow immediately and shall be placed upon the fresh pea gravel mix.

E. **Placing Interruptions:** When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means, that will secure proper union with subsequent work; provided that construction joints shall be made only where acceptable to the COUNTY.

F. **Embedded Items:** No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the COUNTY at least 4 hours before placement of concrete. All surfaces of forms and embedded items that have become encrusted with dried grout from previous work shall be cleaned before the surrounding or adjacent concrete is placed.

G. All inserts or other embedded items shall conform to the requirements herein.

H. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms at locations indicated on the Drawings or shown by shop drawings and shall be acceptable to the COUNTY before any concrete is placed. Accuracy of placement is the responsibility of the CONTRACTOR.

I. **Casting New Concrete Against Old:** Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydro-blasting or sandblasting (exposing aggregate). The joint surface shall be coated with an epoxy bonding agent unless indicated otherwise by the COUNTY.

J. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the WORK. No concrete shall be deposited underwater nor shall the CONTRACTOR allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, shall be subject to the review of the COUNTY.

K. **Corrosion Protection:** Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2 inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.

L. Openings for pipes, inserts for pipe hangers and brackets, and anchors shall, where practicable, be provided during the placing of concrete.

M. Anchor bolts shall be accurately set and shall be maintained in position by templates while being embedded in concrete.

N. **Cleaning:** The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

O. Reinforcement steel shall be accurately positioned as indicated, and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. Reinforcement steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcement steel. Where concrete is to be

placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. Concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the CONTRACTOR shall provide concrete, metal, plastic, or other acceptable bar chairs and spacers.

P. Limitations on the use of bar support materials shall be as follows.

1. Concrete Dobies: permitted at all locations except where architectural finish is required.
2. Wire Bar Supports: permitted only at slabs over dry areas, interior dry wall surfaces, and exterior wall surfaces.
3. Plastic Bar Supports: permitted at all locations except on grade.

3.3 HANDLING, TRANSPORTING, AND PLACING

A. **General:** Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section. No aluminum materials shall be used in conveying any concrete.

B. **Non-Conforming Work or Materials:** Concrete which during or before placing is found not to conform to the requirements indicated herein shall be rejected and immediately removed from the work. Concrete which is not placed in accordance with these Specifications or which is of inferior quality shall be removed and replaced.

C. **Unauthorized Placement:** No concrete shall be placed except in the presence of a duly authorized representative of the COUNTY. The CONTRACTOR shall notify the COUNTY in writing at least 24 hours in advance of placement of any concrete.

D. **Placement in Wall and Column Forms:** Concrete shall not be dropped through reinforcement steel or into any deep form, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, means such as hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4 feet in walls and 8 feet in columns below the ends of ducts, chutes, or buggies. Concrete shall be uniformly distributed during the process of depositing and in no case after depositing shall any portion be displaced in the forms more than 6 feet in horizontal direction. Concrete in wall forms shall be deposited in uniform horizontal layers not deeper than 2 feet; and care shall be taken to avoid inclined layers or inclined construction joints except where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in wall forms shall not exceed 5 feet of vertical rise per hour. Sufficient illumination shall be provided in the interior of all forms so that the concrete at the places of deposit is visible from the deck or runway.

E. **Casting New Concrete Against Old:** Epoxy adhesive bonding agent shall be applied to the old surfaces according to the manufacturer's written recommendations. This provision shall not apply to joints where waterstop is provided.

G. **Placement in Slabs:** Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement. As the work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screeded in an up-slope direction.

I. **Cold Weather Placement:**

1. Placement of concrete shall conform to ACI 306.1 - Cold Weather Concreting,
3. Maintain the concrete temperature above 50 degrees F for at least 3 days after placement.

3.4 PUMPING OF CONCRETE

A. **General:** If the pumped concrete does not produce satisfactory end results, the CONTRACTOR shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

B. **Pumping Equipment:** The pumping equipment shall have 2 cylinders and be designed to operate with one cylinder in case the other one is not functioning. In lieu of this requirement, the CONTRACTOR may have a standby pump on the site during pumping.

C. The minimum diameter of the hose conduits shall be in accordance with ACI 304.2R.

D. Pumping equipment and hose conduits that are not functioning properly shall be replaced.

E. Aluminum conduits for conveying the concrete shall not be permitted.

F. **Field Control:** Concrete samples for slump, air content, and test cylinders will be taken at the placement end of the hose.

3.5 ORDER OF PLACING CONCRETE

A. The order of placing concrete in all parts of the WORK shall be acceptable to the COUNTY.

3.6 FINISHING CONCRETE SURFACES

A. **General:** Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions shown are defined as tolerances and are indicated in Part 1, above. These tolerances are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.

B. **Formed Surfaces:** No treatment is required after form removal except for curing, repair of defective concrete, and treatment of surface defects. Where architectural finish is required, it shall be as indicated.

1. Surface holes larger than [1/2]-inch in diameter or deeper than [1/4]-inch are defined as surface defects in basins and exposed walls.]

C. **Unformed Surfaces:** After proper and adequate vibration and tamping, all unformed top surfaces of slabs, floors, walls, and curbs shall be brought to a uniform surface with suitable tools. Immediately after the concrete has been screeded, it shall be treated with a liquid evaporation retardant. The retardant shall be used again after each work operation as necessary to prevent drying shrinkage cracks. The classes of finish specified for unformed concrete surfaces are designated and defined as follows:

1. Finish U1 - Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8-inch. No further special finish is required.

2. Finish U2 - After sufficient stiffening of the screeded concrete, surfaces shall be float finished with wood or metal floats or with a finishing machine using float blades. Excessive floating of surfaces while the concrete is plastic and dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted. Floating shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Surface irregularities shall not exceed 1/4-inch. Joints and edges shall be tooled where indicated or as determined by the COUNTY.

3. Finish U3 - After the finish U2 surface has hardened sufficiently to prevent excess of fine material from being drawn to the surface, steel troweling shall be performed with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense, uniform surface free from blemishes, ripples, and trowel marks. The finish shall be smooth and free of all irregularities.

4. Finish U4 - Trowel the Finish U3 surface to remove local depressions or high points. In addition, the surface shall be given a light hairbroom finish with brooming perpendicular to drainage unless otherwise indicated. The resulting surface shall be rough enough to provide a nonskid finish.

D. Unformed surfaces shall be finished according to the following schedule:

UNFORMED SURFACE FINISH SCHEDULE

Area	Finish
Grade slabs and foundations to be covered with concrete or fill material	U1
Floors to be covered with grouted tile or topping grout	U2
Water bearing slabs with slopes 10 percent and less	U3
Water bearing slabs with slopes greater than 10 percent	U4
Slabs not water bearing	U4
Slabs to be covered with built-up roofing	U2
Interior slabs and floors to receive architectural finish	U3
Top surface of walls	U3

E. Floor Hardener (Surface Applied)

1. The following additional requirements apply to the substrate concrete in areas indicated to be under floor hardener:

a. Slump shall be no greater than 4 inches when peak ambient temperatures are expected to exceed 65 degrees F and no greater than 3 inches when temperatures will not exceed 65 degrees F.
b. Air content shall not exceed 3 percent.
c. No calcium chloride or set accelerating admixture containing calcium chloride shall be used.
d. Do not use admixtures that increase bleeding.
e. Do not use fly ash.

2. The CONTRACTOR shall finish areas indicated to receive hardener in conformance with the manufacturer's recommendations and the following. After leveling the concrete surface and as soon as the concrete will support an operator and machine without disturbing the level or working up excessive fines, the CONTRACTOR shall float the surface of the slab with a mechanical float fitted with detachable float shoes. Then apply 1/2 to 2/3 of the total amount of dry shake surface hardener uniformly to the surface. A mechanical spreader is recommended. Float the surface once the shake has absorbed sufficient moisture, as indicated by darkening of the shake. Immediately apply the remainder of the shake and allow it to absorb moisture. Do not apply shake when bleed water is present.

3. Perform a third floating if time and setting characteristics of the concrete will allow, but do not add water to the surface.

4. As the surface stiffens further and loses sheen, trowel with blades set relatively flat, using hand or mechanical methods. Remove all marks and pinholes in a final raised trowel operation.

5. Cure the finished surface using the fill-forming curing compound recommended by the manufacturer at a coverage rate which will provide moisture retention in excess of the requirements of ASTM C 309. Maintain ambient temperatures above 50 degrees F during the curing period.

6. Keep floors covered and prohibit traffic and loads for 10 days minimum after completion.

3.7 CURING AND DAMPPROOFING

A. **General:** All concrete shall be cured for not less than 7 days after placing, in accordance with the methods indicated below for the different parts of the WORK.

Surface to be Cured or Dampproofed	Method
Unstripped forms	1
Wall sections with forms removed	6
Construction joints between footings and walls, and between floor slab and columns	2
Encasement concrete and thrust blocks	3
All concrete surfaces not specifically indicated in this Paragraph	4
Floor slabs on grade in hydraulic structures	5
Slabs not on grade	6

B. **Method 1:** Wooden forms shall be wetted immediately before concrete has been placed and shall be kept wet with water until removal. If steel forms are used the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed within 7 days of placing the concrete, curing shall be continued in accordance with Method 6 below.

C. **Method 2:** The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.

D. **Method 3:** The surface shall be covered with moist earth not less than 4 hours nor more than 24 hours after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 days after placement of concrete.

E. **Method 4:** The surface shall be sprayed with a liquid curing compound.

1. It shall be applied in accordance with the manufacturer's printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film which will seal thoroughly.

2. Where the curing compound method is used, care shall be exercised to avoid damage to the seal during the 7-day curing period. If the seal is damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.

3. Wherever curing compound has been applied by mistake to surfaces against which concrete subsequently is to be placed and to which it is to adhere, compound shall be entirely removed by wet sandblasting just prior to the placing of new concrete.

4. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on unformed surfaces and within 2 hours after removal of forms. Repairs to formed surfaces shall be made within the 2-hour period; provided, however, that any such repairs which cannot be made within the said 2-hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, the area involved shall first be wet-sandblasted to remove the curing compound.

5. At all locations where concrete is placed adjacent to a panel which has been coated with curing compound, the panel shall have curing compound reapplied to an area within 6 feet of the joint and to any other location where the curing membrane has been disturbed.

6. Prior to final acceptance of the WORK, all visible traces of curing compound shall be removed from all surfaces in such a manner that does not damage the surface finish.

F. **Method 5:**

1. Until the concrete surface is covered with curing compound, the entire surface shall be kept damp by applying water using nozzles that atomize the flow so that the surface is not marred or washed. The concrete shall be given a coat of curing compound in accordance with Method 4 above. Not less than one hour nor more than 4 hours after the curing compound has been applied, the surface shall be wetted with water delivered through a fog nozzle, and concrete-curing blankets shall be placed on the slabs. The curing blankets shall be polyethylene sheet, polyethylene-coated waterproof paper sheeting, or polyethylene-coated burlap. The blankets shall be laid with the edges butted together and with the joints between strips sealed with 2-inch wide strips of sealing tape or with edges lapped not less than 3 inches and fastened together with a waterproof cement to form a continuous watertight joint.

2. The curing blankets shall be left in place during the 7-day curing period and shall not be removed until after concrete for adjacent work has been placed. If the curing blankets become torn or otherwise ineffective, the CONTRACTOR shall replace damaged sections. During the first 3 days of the curing period, no traffic of any nature and no depositing, temporary or otherwise, of any materials shall be permitted on the curing blankets. During the remainder of the curing period, foot traffic and temporary depositing of materials that impose light pressure will be permitted only on top of plywood sheets 5/8-inch minimum thickness, laid over the curing blanket. The CONTRACTOR shall add water under the curing blanket as often as necessary to maintain damp concrete surfaces at all times.

G. **Method 6:** This method applies to both walls and slabs.

1. The concrete shall be kept continuously wet by the application of water for a minimum period of at least 7 consecutive days beginning immediately after the concrete has reached final set or forms have been removed.

2. Until the concrete surface is covered with the curing medium, the entire surface shall be kept damp by applying water using nozzles that atomize the flow so that the surface is not marred or washed.

3. Heavy curing mats shall be used as a curing medium to retain the moisture during the curing period. The curing medium shall be weighted or otherwise held substantially in contact with the concrete surface to prevent being dislodged by wind or any other causes. All edges shall be continuously held in place.

4. The curing blankets and concrete shall be kept continuously wet by the use of sprinklers or other means both during and after normal working hours.

5. Immediately after the application of water has terminated at the end of the curing period, the curing medium shall be removed, any dry spots shall be rewetted, and curing compound shall be immediately applied in accordance with Method 4 above.

6. The CONTRACTOR shall dispose of excess water from the curing operation to avoid damage to the work.

H. **Dampproofing**

1. The exterior surface of all buried roof slabs shall be dampproofed as follows.

2. Immediately after completion of curing the surface shall be sprayed with a dampproofing agent consisting of an asphalt emulsion. Application shall be in 2 coats. The first coat shall be diluted to one-half strength by the addition of water and shall be sprayed on so as to provide a maximum coverage rate of 100 square feet per gallon of dilute solution. The second coat shall consist of an application of the undiluted material, and shall be sprayed on so as to provide a maximum coverage rate of 100 square feet per gallon. Dampproofing material shall be as indicated above.

3. As soon as the material has taken an initial set, the entire area thus coated shall be coated with whitewash. Any formula for mixing the whitewash may be used if it produces a uniformly coated white surface and remains until placing of the backfill. If the whitewash fails to remain on the surface until the backfill is placed, the CONTRACTOR shall apply additional whitewash.

3.08 PROTECTION

A. The CONTRACTOR shall protect all concrete against injury until final acceptance.

B. Fresh concrete shall be protected from damage due to rain, hail, sleet, or snow. The CONTRACTOR shall provide such protection while the concrete is still plastic and whenever precipitation is imminent or occurring.

3.09 TREATMENT OF SURFACE DEFECTS

A. As soon as forms are removed, all exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the COUNTY. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall be repaired as indicated below. Concrete containing extensive voids, holes, honeycombing, or similar depression defects shall be completely removed and replaced. Repairs and replacements shall be performed promptly.

3.10 PATCHING HOLES IN CONCRETE

A. **Patching Small Holes:**

1. Holes which are less than 12 inches in the least dimension and extend completely through concrete members shall be filled.

2. Small holes in members which are water-bearing or in contact with soil or other fill material shall be filled with non-shrink grout. Where a face of the member is exposed to view, the non-shrink grout shall be held back 2 inches from the finished surface. The remaining 2 inches shall then be patched according to the Paragraph entitled "Treatment of Surface Defects."

3. Small holes through all other concrete members shall be filled with non-shrink grout, with exposed faces treated as above.

B. **Patching Large Holes:**

1. Holes which are larger than 12 inches in the least dimension shall have a keyway chipped into the edge of the opening all around, unless a formed keyway exists. The holes shall then be filled with concrete as indicated herein.

2. Holes which are larger than 24 inches in the least dimension and which do not have reinforcing steel extending from the existing concrete, shall have reinforcing steel set in grout in drilled holes. The reinforcing added shall match the reinforcing in the existing wall unless indicated otherwise.

3. Large holes in members which are water bearing or in contact with soil or other fill shall have a hydrophilic type waterstop material placed around the perimeter of the hole in accordance with Section 033500 - Joints in Concrete, unless there is an existing waterstop in place.

3.14 CARE AND REPAIR OF CONCRETE

A. The CONTRACTOR shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed WORK, or which departs from the established line or grade. or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete.

END OF SECTION

SECTION 055000

MISCELLANEOUS METALWORK

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide miscellaneous metalwork and appurtenances, complete and in place, in accordance with the Standards & Specifications, and Santa Barbara County Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 099000 – Protective Coatings

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards

ASTM A 123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 193	Alloy Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A 194	Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
ASTM A 307	Carbon Steel Bolts, Studs, and Threaded Rod 60.000 psi Tensile Strength
ASTM A 325	Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

1.4 CONTRACTOR SUBMITTALS

A. General: Furnish submittals in accordance with Section 013300 - Contractor Submittals.

B. Product Information: An ICBO report listing the ultimate load capacity in tension and shear for each size and type of concrete anchor. CONTRACTOR shall submit manufacturer's recommended installation instructions, and procedures for adhesive anchors. Upon review, by COUNTY, these instructions shall be followed specifically.

1.5 QUALITY ASSURANCE

A. No substitution for the indicated adhesive anchors will be considered unless accompanied with ICBO report verifying strength and material equivalency, including temperature at which load capacity is reduced to 90 percent of that determined at 75 degrees F.

PART 2 – PRODUCTS

2.01 BOLTS AND ANCHORS

A. **Bolt, Nut and Washer Requirements:** Unless otherwise indicated, bolts, anchor bolts, washers, and nuts shall be steel as indicated herein. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series. The bolt and nut material shall be free-cutting steel. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the Unified Thread Standard (UTS). Where galvanized bolts are specified, threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing.

1. Except as otherwise indicated, steel for bolt material, anchor bolts and cap screws shall be in accordance with the following:

a. Structural Connections: ASTM A 307 - Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength Grade A or B, hot-dip galvanized.

b. Anchor Bolts: ASTM A 307, Grade A or B, or ASTM A 36, hot-dip galvanized.

c. High Strength Bolts (where indicated): ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

d. Pipe and Equipment Flange Bolts: ASTM A 193 - Alloy Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications , Grade B-7.

2. Washers shall be installed wherever bolts are used to fasten plastic items, or wherever the corrosion protection coating of an item may be damaged when the bolt is tightened. Washers shall be fabricated of material matching the bolts, except that hardened washers for high strength bolts shall conform to the requirements of the AISC Specification. Lock washers and Nylock bolts shall be installed where indicated and shall be fabricated of material matching the bolts.

3. The length of each bolt shall be such that after the joint is made up, the bolt extends a minimum of 1/8-inch beyond the nut, but in no case more than 5/8-inch beyond the nut.

B. **Standard and Above Ground Service (Non-Corrosive Service):** All bolts, nuts, and washers in standard/above ground service on factory assembled items shall be stainless steel or in accordance with the manufacturers recommendations for such exposure. All field installed bolts, nuts, and washers in standard/above ground service shall be Cadmium or Zinc coated unless specified otherwise. Where exposed to moisture or other corrosive conditions, bolts shall be epoxy coated after installation in accordance with Section 099000- Protective Coatings, or as otherwise specified.

C. **Buried Service (Corrosive Service):** All bolts, nuts, and washers in buried service on factory assembled items shall be stainless steel unless specified otherwise. All field installed bolts, nuts, and washers in buried service shall be Cadmium or Zink coated unless specified otherwise. Buried bolts shall be coated/wrapped with #1 Wax-Tape by Trenton Corporation, Ann Arbor, MI 48103.

D. **Vault and Submerged Service (Corrosive Service):** Bolts shall be epoxy coated after installation in accordance with Section 099000- Protective Coatings. All bolts, nuts, and washers in the locations listed below shall be stainless steel unless specified otherwise.

1. Inside vaults, manholes, and buried structures.
2. Submerged locations.
3. Locations subject to seasonal or occasional flooding.
4. Inside hydraulic structures below the top of the structure.

5. Chemical handling areas.
6. Locations indicated by the Contract Documents, the COUNTY Standards & Specifications, or designated by the COUNTY to be provided with stainless steel bolts.

E. **Stainless Steel Bolts:** Unless otherwise indicated, stainless steel bolts, anchor bolts, nuts, and washers shall be Type 316 stainless steel, class 2. Bolts shall conform to ASTM A 193. Nuts shall conform to ASTM A 194 - Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service or Both. All bolt threads shall be protected with an antiseize lubricant suitable for submerged service conforming to government specification MIL-A-907E - Antiseize Thread Compound, High Temperature. Antiseize lubricant shall be NSF-61 approved for use with potable water. Antiseize lubricant shall be "PURE WHITE" by Anti-Seize Technology, Franklin Park, IL, 60131, AS-470 by Dixon Ticonderoga Company, Lakehurst, NJ, 08733 or equal.

END OF SECTION

SECTION 099000

PROTECTIVE COATINGS

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide Protective Coatings, complete and in place, in accordance with the Contract Documents.

B. Definitions

1. The term "paint," "coatings," or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, tape wraps, and all other Protective Coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.

2. The term "DFT" means minimum dry film thickness, without any negative tolerance.

C. The following surfaces shall not be protective coated:

1. Concrete, unless specifically indicated to be coated.
2. Brass fittings, Stainless Steel, and Copper.
3. Machined surfaces.
4. Grease fittings.
5. Glass.
6. Equipment nameplates.
7. Platform gratings, stair treads, door thresholds, and other walk surfaces, unless specifically indicated to be coated.

D. The coating system schedules summarize the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the Construction Drawings are used to show the limits of coating requirements, to show exceptions to the requirements, or to clarify or show details for application of the coating systems.

E. Where Protective Coatings are to be performed by a subcontractor, the subcontractor shall possess a valid state license as required for performance of the painting and coating work called for in this specification and shall provide 2 references which show that the painting subcontractor has previous successful experience with the indicated or comparable coating systems. Include the name, address, and the telephone number for the COUNTY of each installation for which the painting subcontractor provided the Protective Coatings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 330509 – Piping, General

1.3 CONTRACTOR SUBMITTALS

A. **General:** Submittals shall be furnished in accordance with Section 013300 - Contractor Submittals, unless indicated otherwise below.

B. Submittals shall include the following information and be submitted at least 21 calendar days prior to Protective Coatings work:

1. Coating Materials List: Four copies of a coating materials list showing the Manufacturer and

the coating number, keyed to the coating systems herein. The list shall be submitted prior to or at the time of submittal of samples.

2. Paint Manufacturer's Information: For each coating system to be used, the following data:

a. Paint Manufacturer's data sheet for each product proposed, including statements on the suitability of the material for the intended use.
b. Technical and performance information that demonstrates compliance with the system performance and material requirements.
c. Paint Manufacturer's instructions and recommendations on surface preparation and application.
d. Colors available for each product (where applicable).
e. Compatibility of shop and field applied coatings (where applicable).
f. Material Safety Data Sheet for each product used.

1.4 SPECIAL CORRECTION OF DEFECTS REQUIREMENTS

A. **Warranty Inspection:** A warranty inspection will be conducted during the eleventh month following completion of all coating and painting work. The CONTRACTOR and a representative of the coating material Manufacturer may attend this inspection. All defective work shall be repaired in accordance with these specifications and to the satisfaction of the COUNTY.

PART 2 - PRODUCTS

2.1 GENERAL

A. **Suitability:** The CONTRACTOR shall use suitable coating materials as recommended by the Manufacturer.

B. **Compatibility:** In any coating system only compatible materials from a single Manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.

C. **Containers:** Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, and name of manufacturer, all of which shall be plainly legible at the time of use.

D. **Colors:** All colors and shades of colors of all coats of paint shall be as indicated or selected by the PROJECT ENGINEER and approved by the COUNTY. Each coat shall be of a different shade, to facilitate inspection of surface coverage of each coat. Colors for exterior (visible) surfaces shall be as follows unless specified otherwise. Finish color shall be ICI Devoe Car Blue, or equal, for all piping and isolation valves. Finish color shall be ICI Devoe Safety Blue, or equal, for all automatic control valves, pumps, and motors. Finish color shall be ICI Devoe Safety Yellow, or equal, for fire hydrants, and bollards.

E. Substitute or "Or-Equal" Products

1. To establish equality under Section 016000 - Products, Materials, Equipment and Substitutions, the CONTRACTOR shall furnish satisfactory documentation from the manufacturer of the proposed substitute or "or-equal" product that the material meets the indicated requirements and is equivalent or better than the specified product.

2. Protective Coatings Materials shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions.

3. If a proposed substitution requires changes in the WORK, the CONTRACTOR shall bear all

such costs involved.

2.2 MATERIAL SOURCES

A. Each of the following manufacturers is capable of supplying many of the industrial coating materials indicated herein. Proposed substitute materials will be considered as indicated above. All industrial coating materials shall be materials that have a record of satisfactory performance in water and wastewater treatment plants, and under the service conditions to which they will be subjected.

ICI Devoe Coatings
Tnemec Company
Ameron
Trenton Corporation
Carboline Coatings Company
Polyken Technologies
Sherwin Williams

2.3 INDUSTRIAL COATING SYSTEMS

A. **System 1 – Epoxy/Aliphatic Polyurethane:** Two component aliphatic acrylic polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering and with a minimum solids content of 63 percent by volume. Primer and intermediate coats shall be a two component rust inhibitive epoxy coating material with a minimum solids content of 65 percent by volume.

1. Prime coat (field or shop applied) DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

2. Intermediate coat DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

3. Finish coats (one or two coats, DFT = 3 mils), Devoe 379UVA, Tnemec 740, Ameron Amershield, or equal.

4. Total system DFT = 11 mils.

5. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.

B. **System 2 - Inorganic Zinc/Epoxy/Aliphatic Polyurethane:** The inorganic zinc primer shall be a water or solvent based, self-curing, two-component zinc silicate inorganic coating material containing at least 65 percent of metallic zinc by weight in the dried film. This coating material shall be recommended by the coating manufacturer as a primer for this system. The intermediate coat shall be a two component high-build epoxy coating material with a minimum solids content of 56 percent by volume. Finish coats shall be a 2-component aliphatic acrylic or polyester polyurethane coating material that provides superior color and gloss retention, resistance to chemical fumes and severe weathering, and a minimum solids content of 63 percent by volume.

1. Prime coat DFT = 3 mils, Devoe 302H, Tnemec 90-96, Ameron 21-5, or equal.

2. Intermediate coat DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

3. Finish coats (one or two coats, DFT = 3 mils), Devoe 379UVA, Tnemec 740, Ameron Amershield, or equal.

4. Total system DFT = 10 mils.

5. Intermediate coat shall be applied in excess of 4 mils DFT or in more than one coat as

necessary to completely cover the inorganic zinc primer and prevent application bubbling of the polyurethane finish coat.

6. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.

7. If the inorganic zinc primer is used as a pre-construction or shop applied primer, all damaged and uncoated areas shall be spot abrasive blasted and coated after construction using the indicated material.

C. **System 3 – Epoxy(x3):** Two component, rust inhibitive polyamide cured epoxy coating material shall provide a recoatable finish that is available in a wide selection of colors. The coating material shall have a minimum solids content of 65 percent by volume and be resistant to service conditions of condensing moisture, splash and spillage of lubricating oils, and frequent washdown and cleaning.

1. Prime coat (field or shop applied) DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

2. Intermediate and finish coats (2 coats, DFT = 8 mils), Devoe 224HS, Tnemec N69, Ameron 385, or equal.

3. Total system DFT = 12 mils.

2.4 SUBMERGED AND SEVERE SERVICE COATING SYSTEMS

A. **System 101 - Amine Cured Epoxy(x3):** High build, amine cured, epoxy coating material shall have a minimum solids content of 80 percent by volume, and shall be suitable for long-term immersion service in potable water and municipal wastewater. For potable water service, the coating material shall be listed by the NSF International as in compliance with NSF Standard 61 - Drinking Water System Components - Health Effects.

1. Prime, intermediate, and finish coats (three coats, DFT = 18 mils), Devoe 233H, Tnemec 141, Ameron 395FD, or equal.

B. **System 102 - Polyamide Cured Epoxy(x3):** High build, polyamide cured epoxy coating material shall have a minimum solids content of 64 percent by volume, and shall be suitable for long-term immersion service in potable water and municipal wastewater. For potable water service, the coating material shall be listed by the NSF International as in compliance with NSF Standard 61.

1. Prime, intermediate, and finish coats (three coats, DFT = 12 mils), Devoe 233H, Tnemec N140, Ameron 90HS, or equal.

C. **System 103 - Fusion Bonded Epoxy:** The coating material shall be a 100 percent powder epoxy, certified as compliant with NSF Standard 61, applied in accordance with the ANSI/AWWA C213 - Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines, except that the surface preparation shall be as specified in the coating system schedule of this Section. The coating shall be applied using the electrostatic spray or fluidized bed process.

1. Powder coat DFT = 16 mils, Scotchkote 134 or 206N, or equal.

2. For coating of valves, DFT = 12 mils.3. Liquid Epoxy: For field repairs, the use of a liquid epoxy will be permitted, applied to provide a DFT of 15 mils. The liquid epoxy shall be a 100 percent solids epoxy, ScotchKote 323, or equal.

4. For indoors or covered conditions, or inside hydraulic structures and vaults: Field applied finish coat DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

5. For outdoors or exposed conditions: Field applied finish coats (one or two coats, DFT = 3 mils), Devoe 379UVA, Tnemec 740, Ameron Amershield, or equal. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.

6. Total system DFT = 16-20 mils.

2.5 SPECIAL COATING SYSTEMS

A. **System 201 – Joint Wrap:** Prior to wrapping the pipe, nuts and bolts, fittings, flanges or other surfaces with heavy duty joint wrap, the items or surface shall be coated with a liquid adhesive primer. The items or surface shall be wrapped with a 35-mil adhesive joint wrap, half-lapped, to achieve a total thickness of 70 mils. Joint wrap shall be Polyken Technologies, Heavy Duty Joint Wrap, Product No. 930-35, or approved equal. Liquid adhesive primer shall be Polyken Technologies, Liquid Adhesive No. 1027, or approved equal.

B. **System 202 - Cement Mortar Coating:** A 1-1/2-inch minimum thickness mortar coating reinforced with 3/4-inch galvanized welded wire fabric shall be provided. The cement mortar shall contain no less than one part Type V cement to 3 parts sand. The cement mortar shall be cured by a curing compound meeting the requirements of "Liquid Membrane Forming Compounds for Curing Concrete," ASTM C 309, Type II, white pigmented, or by enclosure in an 8-mil thick polyethylene sheet with all edges and joints lapped by at least 6 inches.

C. **System 203 - Polyethylene Encasement:** Application of polyethylene encasement shall be in accordance with ANSI/AWWA C105 using Method C.

2.6 MUELLER RESILIENT WEDGE GATE VALVE COATINGS

The coating shall be a fusion bonded (thermosetting) epoxy protective coating and shall function as a physical, chemical and electrical barrier between the base metal to which it is applied and the surroundings.

The coating shall comply with AWWA C550 and shall be certified to NSF 61. The coating shall be non-toxic and shall not impart taste or odor to water.

The coating shall have a gloss finish and shall be suitable for field over-coating and touch-up without sanding or special surface preparation, or application of heat in excess of room temperature.

The coating shall have a successful record of performance on gate valves for a minimum of five (5) years.

The coating adhesion to the substrate shall exceed cohesion of the coating film as demonstrated by the following test:

1. Prepare test panel and apply coating per manufacturer's recommendation.

2. After sample has properly cured per manufacturer's recommendation, scribe an "X" using a sharp knife or scalpel through the coating to the metal substrate.

3. With the point of the knife at the juncture of two scribes, attempt to lift off the coating. Coating should not lift off substrate or between coats readily, but should break up leaving coating material on the substrate of this damaged area.

4. No disbondment of the film shall be noted as tested above after immersion in tap water for 1500 hours at 100°F.

A Tabor Abrader Test per ASTM D 4060 resulting in a maximum .041 grams coating loss per 1000 cycles when using a CF-17 wheel (1000 gram weight).

Epoxy coating shall be Mueller Pro-Gard™ Epoxy or approved equivalent.

PART 3 - EXECUTION

3.1 MANUFACTURER'S SERVICES

A. The CONTRACTOR shall require the Protective Coatings manufacturer to furnish a qualified technical representative to visit the project site for technical support as may be necessary to resolve field problems attributable or associated with the manufacturer's products.

3.2 WORKMANSHIP

A. Skilled craftsmen and experienced supervision shall be used on all WORK.

B. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure thorough cleaning and an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given to insure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other precautionary measures.

3.3 STORAGE, MIXING, AND THINNING OF MATERIALS

A. Unless otherwise indicated, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed. Coating materials shall be stored under the conditions recommended by the Material Safety Data Sheets, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings of different manufacturers shall not be mixed together. All Protective Coatings materials shall be used within the manufacturer's recommended shelf life.

3.4 PREPARATION FOR COATING

A. **General:** All surfaces to receive Protective Coatings shall be cleaned as indicated prior to application of coatings. The CONTRACTOR shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application. Surfaces to be coated shall be dry and free of visible dust.

B. **Protection of Surfaces Not to be Coated:** Surfaces which are not to receive Protective Coatings shall be protected during surface preparation, cleaning, and coating operations.

C. All hardware, lighting fixtures, switchplates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be painted shall be removed, masked or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.

D. Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The CONTRACTOR shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.

E. **Protection of Painted Surfaces:** Cleaning and coating shall be coordinated so that dust and other

contaminants from the cleaning process will not fall on wet, newly-coated surfaces.

3.5 SURFACE PREPARATION STANDARDS

A. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification:

1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil, salts, and other soluble contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.

2. White Metal Blast Cleaning (SSPC-SP5): Removal of all visible rust, oil, grease, soil, dust, mill scale, paint, oxides, corrosion products and foreign matter by blast cleaning.

3. Commercial Blast Cleaning (SSPC-SP6): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 33 percent of each square inch of surface area.

4. Brush-Off Blast Cleaning (SSPC-SP7): Removal of all visible oil, grease, soil, dust, loose mill scale, loose rust, and loose paint.

5. Near-White Blast Cleaning (SSPC-SP10): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 5 percent of each square inch of surface area.

3.6 METAL SURFACE PREPARATION

A. The minimum abrasive blasting surface preparation shall be as indicated in the coating system schedules included at the end of this Section. Where there is a conflict between these specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.

B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this Section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion Engineers, NACE Standard SSPC-SP - Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive and SSPC-SP - Visual Standard for Surfaces of New Steel Centrifugally Blast Cleaned with Steel Grit.

C. All oil, grease, welding fluxes, and other surface contaminants shall be removed by solvent cleaning per SSPC-SP1 - Solvent Cleaning prior to blast cleaning.

D. All sharp edges shall be rounded or chamfered and all burrs, and surface defects and weld splatter shall be ground smooth prior to blast cleaning.

E. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions.

F. The CONTRACTOR shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.

G. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming, or another approved method prior to painting.

H. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.

I. If the specified abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, then SSPC-SP2 or SSPC-SP3 shall be

used.

J. Shop primed equipment shall be solvent cleaned in the field before finish coats are applied.

3.7 SURFACE PREPARATION AND APPLICATION OF JOINT WRAP

A. Nuts and bolts, couplings, valves, fittings, flanges, and steel pipe to receive heavy duty joint wrap shall be cleaned to remove all visible oil, grease, soil, dust, rust, and other foreign matter. Surfaces to receive joint wrap shall be coated with liquid adhesive primer in accordance with the manufacturer's recommendations. prior to application of joint wrap.

B. After being primed, the items or surface to be protected shall be wrapped with the 35-mil joint wrap, half-lapped, to achieve a total thickness of 70 mils. Care shall be taken to completely encapsulate all nuts and bolts.

3.8 SHOP COATING REQUIREMENTS

A. Unless otherwise indicated, all items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the indicated or selected color. The methods, materials, application equipment and all other details of shop painting shall comply with this section. If the shop primer requires top-coating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.

B. For certain pieces of equipment it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switch-gear or main control boards, submerged parts of pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the indicated quality in the field. Such equipment shall be primed and finish coated in the shop and touched up in the field with the identical material after installation. The coating material data sheet shall be submitted with the shop drawings for the equipment.

C. For certain small pieces of equipment the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals.

D. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 2 months before being top-coated, or less time if recommended by the coating manufacturer. Damage to shop-applied coatings shall be repaired in accordance with this Section and the coating manufacturer's printed instructions.

E. The CONTRACTOR shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment shop drawings.

3.9 APPLICATION OF COATINGS

A. The application of Protective Coatings to steel substrates shall be in accordance with SSPC-PA1 – Shop, Field, and Maintenance Painting of Steel.

B. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The CONTRACTOR shall schedule such inspection with the COUNTY in advance.

C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day.

D. Coatings shall be applied in accordance with the manufacturer's instructions and recommendations,

and this Section, whichever has the most stringent requirements.

E. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe painting for these areas.

F. Special attention shall be given to materials which will be joined so closely that proper surface preparation and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.

G. Finish coats, including touch-up and damage repair coats shall be applied in a manner which will present a uniform texture and color matched appearance.

H. Coatings shall not be applied under the following conditions:

1. Temperature exceeding the manufacturer's recommended maximum and minimum allowable.
2. Dust or smoke laden atmosphere.
3. Damp or humid weather.
4. When the substrate or air temperature is less than 5 degrees F above dewpoint.
5. When air temperature is expected to drop below 40 degrees F or less than 5 degrees F above the dewpoint within 8 hours after application of coating.
6. When wind conditions are not calm.

I. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Dept. of Commerce, Weather Bureau psychometric tables.

J. Unburied steel piping shall be abrasive blast cleaned and primed before installation.

K. The finish coat on all work shall be applied after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust free.

3.10 CURING OF COATINGS

A. The CONTRACTOR shall maintain curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section, whichever is the most stringent, prior to placing the completed coating system into service. In the case of enclosed areas, forced air ventilation, using heated air if necessary, may be required until the coatings have fully cured.

3.11 FIELD INSPECTION AND TESTING

A. **General:** The CONTRACTOR shall give the COUNTY a minimum of 3 days advance notice of the start of any field surface preparation work or coating application work.

B. Inspection by the COUNTY, or the waiver of inspection of any particular portion of the WORK, shall not relieve the CONTRACTOR of its responsibility to perform the work in accordance with these Specifications.

C. **Inspection Devices:** The CONTRACTOR shall furnish, until final acceptance of such coatings, inspection devices in good working condition for the detection of holidays and measurement of dry-film thicknesses of Protective Coatings. Dry-film thickness gages shall be made available for the COUNTY'S use at all times while coating is being done, until final acceptance of such coatings. The CONTRACTOR shall furnish the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of the COUNTY.

D. **Holiday Testing:** The CONTRACTOR shall holiday test all coated surfaces which will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures and surfaces coated with any of the submerged and severe service coating systems. Areas which contain holidays shall be marked and

repaired or recoated in accordance with the coating manufacturer's printed instructions and then retested.

1. Coatings With Thickness Exceeding 20 Mils: For surfaces having a total dry film coating thickness exceeding 20 mils: pulse-type holiday detector such as Tinker & Rasor Model AP-W, D.E. Stearns Co. Model 14/20, or equal shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.

2. Coatings With Thickness of 20 Mils or Less: For surfaces having a total dry film coating thickness of 20 mils or less: Tinker & Rasor Model M1 non-destructive type holiday detector, K-D Bird Dog, or equal shall be used. The unit shall operate at less than 75-volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as Kodak Photo-Flo, or equal, shall be added to the water prior to wetting the detector sponge.

E. **Film Thickness Testing:** On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC -PA 2 "Procedure for Determining Conformance to Dry Coating Thickness Requirements" using a magnetic-type dry film thickness gage such as Mikrotest model FM, Elcometer model 111/1EZ, or equal. Each coat shall be tested for the correct thickness. No measurements shall be made until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gage.

F. **Surface Preparation:** Evaluation of blast cleaned surface preparation work will be based upon comparison of the blasted surfaces with the standard samples available from the NACE, using NACE standards SSPC-SP.

3.12 COATING SYSTEM SCHEDULES

A. **Coating System Schedule, Ferrous Metal - Not Galvanized:**

	Item	Surface Prep.	System No.
FM-1	Piping and miscellaneous surfaces indoors or covered, except those included below.	Commercial Blast Cleaning SSPC-SP6	(3) Epoxy(x3)
FM-2	Miscellaneous surfaces outdoors or exposed, except those included below.	Commercial Blast Cleaning SSPC-SP6	(1) Epoxy/Aliphatic Polyur ethane
FM-3	Piping outdoors or exposed, except as indicated below.	Near White Metal Blast Cleaning SSPC-SP10	(2) Inorganic Zinc/Epoxy/A liphatic Polyurethane
FM-4	Piping and miscellaneous surfaces inside hydraulic structures and vaults.	Near White Metal Blast Cleaning SSPC-SP10	(3) Epoxy(x3)
FM-5	Piping and miscellaneous surfaces inside hydraulic structures and vaults where subject to frequent immersion.	Solvent Cleaning SSPC-SP1 followed by Near White Metal Blast Cleaning SSPC-SP10	(103) Fusion Bonded Epo xy
FM-6	Buried ductile iron pipe.	Removal of oil, grease, soil and salts	(203) Polyethylene Encase ment
FM-7	Buried steel pipe where not mortar-coated, or coal-tar enamel coated.	Removal of oil, grease, soil and salts	(201) Joint Wrap
FM-8	Ferrous surfaces of valves and couplings.	Solvent Cleaning SSPC-SP1 followed by Near White Metal Blast Cleaning SSPC-SP10	(103) Fusion Bonded Epo xy
FM-9	Buried valves, couplings, fittings, and joints, including epoxy-coated surfaces (where piping is mortar-coated steel).	Removal of oil, grease, soil and salts	(202) Cement Mortar Coat ing
FM-10	Buried nuts and bolts, valves, couplings, fittings, and flanged joints (where piping is **not** mortar-coated steel).	Removal of oil, grease, soil and salts	(201) Joint Wrap
FM-11	Buried surfaces that are not indicated to be coated elsewhere.	Near White Metal Blast Cleaning SSPC-SP10	(101) Amine Cured Epoxy (x3)
FM-12	Piping and miscellaneous surfaces submerged in water (excluding shop coated valves, couplings, and pumps).	Near White Metal Blast Cleaning SSPC-SP10	(102) Polyamide Cured Epo xy(x3)
FM-13	Ferrous surfaces in water passages and submerged surfaces of pumps.	Near White Metal Blast Cleaning SSPC-SP10	(101) Amine Cured Epoxy(x3)

B. **Coating System Schedule, Ferrous Metal - Galvanized:** Pretreatment coatings, barrier coatings, or washes shall be applied as recommended by the coating manufacturer. All galvanized surfaces shall be coated except for the following items which shall be coated only if required by other Sections: Floor Gratings and Frames, Ladders, Handrails, Stair Treads, and Chain Link Fencing and Hardware.

	Item	Surface Prep.	System No.
FMG-1	Miscellaneous surfaces indoors or covered, except those included below.	Solvent Cleaning SSPC-SP1	(3) Epoxy(x3)
FMG-2	Miscellaneous surfaces outdoors or exposed, except those included below.	Solvent Cleaning SSPC-SP1	(1) Epoxy/Aliphatic Polyur ethane
FMG-3	Buried steel piping.	Removal of oil, grease, soil and salts	(201) Joint Wrap
FMG-4	Miscellaneous buried surfaces.	Solvent Cleaning SSPC-SP1 followed by Brush-Off Blast Cleaning SSPC-SP7	(3) Epoxy(x3)
FMG-5	Surfaces submerged in water.	Solvent Cleaning SSPC-SP1 followed by Brush-Off Blast Cleaning SSPC-SP7	(102) Polyamide Cured Epoxy(x3)

C. **Coating System Schedule, Fire Hydrants, and Combination Air Valves:**

	Item	Surface Prep.	System No.
FH-1	Fire Hydrants.	Solvent Cleaning SSPC-SP1	(1) Epoxy/Aliphatic Polyur ethane
FAV-1	Combination Air Valves.	SSPC-SP6 Commercial Blast Cleaning	Epoxy/Aliphatic Polyurethane (1)

END OF
SECTION

SECTION 134713

CORROSION MONITORING / CATHODIC PROTECTION

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes installation of bonding across insulating devices, test stations, deep anode wells and rectifiers, as indicated in the plans and details, including electrical connections, installation of test stations, bond cables, exothermic welds, anodes, test leads, rectifiers, conduit. AC service to rectifiers, and all accessories required for a complete operable system, including testing the system after installation.

B. The WORK also includes coordination of assembly, installation and testing.

1.2 CODES AND STANDARDS

A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the COUNTY:

1. National Electric Code

B. The CONTRACTOR shall install each system component in a workmanlike manner and in strict conformance with the latest edition of the following standards:

1.	NEMA	National Electrical Manufacturers Association
2.	ASTM	American Society for Testing and Materials
3.	IEEE	Institute of Electrical and Electronic Engineers
4.	ANSI	American National Standard Institute
5.	ICEA	Insulated Cable Engineers Association
6.	OSHA	Occupational Safety and Health Administration
7.	NACE	National Association of Corrosion Engineers
8.	UL	Underwriters Laboratories

C. Where the drawings or these Specifications require a higher degree of workmanship or better quality of material than implied by the above codes and standards, these drawings and Specifications shall prevail.

1.3 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted to the COUNTY, prior to installation:

1. Catalog cuts, bulletins, brochures or data sheets for all equipment including test stations, wire/cable/test leads, exothermic welding equipment, anode assemblies, rectifiers, test station hardware and test boards, wire identifiers and any other equipment to be installed.

2. Certification that the equipment and materials proposed meets the Specifications and the intent of the Specifications.

1.4 OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL:

1. Operations and maintenance instructions.

2. List of spare parts recommended for 2 years' successful operation.

1.5 INTERFERENCE AND EXACT LOCATIONS

A. The locations of corrosion monitoring/cathodic protection equipment, devices, outlets and appurtenances as indicated are approximate only. The CONTRACTOR, subject to approval of the ENGINEER, shall determine exact locations.

B. The CONTRACTOR shall verify in the field, all data and final locations of work done under other Sections of the Specifications required for placing of the corrosion monitoring/cathodic protection, including installation of A.C. service or other electrical work.

C. In case of interference with other work or erroneous locations with respect to equipment or structures, the CONTRACTOR shall furnish all labor and materials necessary to complete the WORK in an acceptable manner.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials to be installed must be new and of a quality generally accepted by the industry and must comply with the codes and standards as specified in Section 1.2. Nothing in the drawings or Specifications is to be construed as permitting work not conforming to these codes and standards. Where larger size or better grade materials than required by the above-mentioned regulations and codes are specified, these drawings and Specifications shall have precedence. All equipment and materials supplied shall be similar to that which has been in satisfactory service for at least 5 years.

2.2 CONDUIT AND FITTINGS

A. The minimum conduit size shall be 3/4-inch unless otherwise indicated. Rigid steel conduit shall be galvanized conforming to UL 6. Rigid nonmetal conduit shall be PVC schedule 40 conduit approved for underground use.

B. Fittings for use with rigid steel conduit shall be galvanized cast ferrous metal, with gasketed covers, Crouse Hinds Condulets, Appleton Unilets, or equal. Rigid metallic conduit fittings shall be galvanized conforming to UL 514B.

C. Fittings for use with either rigid nonmetallic conduit or duct shall be PVC and shall have solvent weld type conduit connections. If such are not available, then the Specification for rigid steel fittings shall apply except in corrosive locations where PVC coating shall be provided.

D. Union couplings for conduits shall be the Ericson or Appleton type EC or O-Z Gedney 3-piece Type 4, or equal.

2.3 TEST STATION HOUSINGS - POST MOUNTED TEST STATIONS

A. The test station housings shall be made from 3-inch diameter, schedule 80 PVC pipe, 6 feet in length. The test head shall be a "Fink" test head, mounted at the top of the PVC post, as shown in the details.

2.4 TRAFFIC VALVE BOXES - FLUSH MOUNTED TEST STATIONS

A. The traffic valve box for test stations shall be G05 Traffic Box as manufactured by Christy Concrete Products, Inc., No. 1-RT Traffic Valve Box as manufactured by Brooks Products or approved equal. Traffic box covers for anode beds and test stations shall be cast iron with welded bead legend "CP TEST" or "ANODE".

2.5 TERMINAL BOARDS - FLUSH MOUNTED TEST STATIONS

A. Terminal boards for flush mounted test stations shall be "Fink" test heads, as shown in the details. Test boards shall be labeled as required to identify the piping to which the leads are connected. All hardware installed on the test boards shall be brass or bronze.

2.6 WIRE

A. Conductors shall consist of solid or stranded copper of the gauge indicated. Wire sizes shall be based on American Wire Gage (AWG). Copper wire shall be in conformance with ASTM Designations B3 and B8.

B. All wires terminating in a junction box or test station shall have a wire identifier attached within 4 inches of end of wire at terminal board, prior to backfill, as specified under "Wire Identification".

2.7 ANODE WIRES

A. The wire attached to the anodes shall be (AWG) stranded, single conductor, copper and insulated for 600 volts. Wire size shall be minimum No. 6 AWG Kynar for deep anode wells and shall conform to the requirements of ASTM D1248 Type 1, Class C, Grade 5. Connection of wire to the anode shall have a pulling strength, which shall exceed the tensile strength of the wire. Any damage to the wire insulation or anode shall require complete replacement of the wire and anode.

B. The anode supplier shall mark the reel holding the anode wire for shipment to the job site with the same anode numbering system used on the test records and the total length of attached anode wire.

C. Anode wires shall be of one continuous length from the anode connection to rectifier or anode splice box. Anode wires with the attached anode shall be shipped to the job site with the wire wound on a reel. The minimum core diameter of the reel shall be 5-1/2 inches. The anode wire insulation shall be free of surface damage such as nicks, abrasions, scratches, etc., in all respects throughout the entire length of the wire. Precaution shall be taken during fabrication, transportation and installation of the anodes to see that the wire is not kinked or sharply bent. Bends sharper than 2-1/2 inches in radius are not permissible.

D. All wires used for corrosion monitoring/cathodic protection systems shall be visually inspected for any damage to the insulation prior to and after installation by the CONTRACTOR. Any damage to the insulation will require replacement of the cable. Splicing of cables will not be permitted.

2.8 WIRE IDENTIFICATION

A. All test lead and drain cables shall be coded with circular brass stamped or engraved identifier or wrap around marker. The letters and numbers shall be printed, minimum 3/16-inch in size, and shall identify the piping to which the lead is connected.

B. Wire identifiers for anodes shall be the wrap around type with a high resistance to oils, solvents and mild acids. Marker shall fully encircle wire with imprinted alpha-numeric characters for pipe identification.

C. The following colors and minimum wire gauges have been used:

1.	Test Leads: Impressed Current System	#10 THHN	White
2.	Drain Cable: Impressed Current System	#6 HMWPE	Black
3.	Anode Leads: Impressed Current System	#6 Kynar	Black

4. Bond Cables:

At AC Insulators	#4 HMWPE	Black

2.9 EXOTHERMIC WELDS

A. Exothermic welds shall be provided for connecting cables to structures in strict accordance with the manufacturers' recommendations. Connections shall be made at locations indicated. Exothermic welds shall be Cadweld, as manufactured by Erico Products, Inc. or Thermoweld, or approved equal. Duxseal packing as manufactured by JM Clipper or approved equal shall be used where necessary to prevent leakage of molten weld metal.

B. The shape and charge of the exothermic weld shall be chosen based on the following parameters:

1. Pipe material
2. Pipe size
3. Wire material
4. Number of strands to be welded
5. Orientation of weld (vertical or horizontal)

C. All exothermic weld locations shall be coated with a coating, which is compatible with the pipeline coating. The area of the weld shall be coated with a suitable epoxy, as shown in the details, to provide protection to the area of the cadweld and any metal surface exposed during the welding.

2.10 MIXED METAL OXIDE CONTINUOUS ANODE FOR DEEP ANODE WELL

A. Active anode area shall be mixed metal oxide coated titanium, installed in a preassembled unit, including anode lead cables, attached to either end of the active area of the anode, using a waterproof connection. The active area of the anode shall be equipped with a perforated vent pipe. The assembly shall be equipped with a lowering rope and supplied with sufficient coke breeze to fill the annular space between the anode assembly and the drilled hole for the active area of the anode. The active area shall be 100-feet.

2.11 CALCINED COKE BREEZE

A. Backfill material for impressed current system anodes shall be calcined coke breeze with a resistivity of 25 ohm-cm or less when tested with an applied pressure of 2 pounds per square inch. The material shall conform to the following gradation requirements:

Sieve Size	Percent Passing
3/8	100 minimum
1/8	5 maximum

B. The impressed current system anode backfill shall have the following chemical properties:

Fixed carbon	98.0% minimum
Ash	0.5% maximum
Sulfur	5.0% maximum
Volatile matter	1.0% maximum
Moisture	1.0% maximum

2.12 PEDESTAL MOUNTED AIR COOLED RECTIFIERS

A. Rectifiers shall have a minimum 120 Volt Single-phase AC input and have a minimum rated DC output of 20 volts-20 amperes. Rectifiers shall be pedestal mounted. Rectifiers shall be manufactured by Matcor, Inc., or an approved equal.

B. Rectifier shall be supplied with a set of slide out racks for the transformer and stacks.

C. Rectifiers shall meet with the following specifications: NEMA Pub. No. MR-20-1958, reaffirmed by NEMA 1971 and 1975. Rectifiers shall be capable of operating continuously at the rated output current at any voltage from zero to 100 percent without damaging any rectifier components. Full rated DC output voltage shall be adjustable by not less than 20 equal steps from approximately 5 percent of rated voltage to full rated output. This adjustment may be accomplished with studs and link-bars or tap switches. If tap switches are used, they shall not carry over 50 percent of the nominal current rating assigned by the manufacturer. Rectifiers shall be designed to operate continuously at rated maximum voltage and current in ambient temperature of 45 degrees C without damage to the rectifier components. Cooling shall be accomplished by natural convection. Fan cooling is not acceptable for unattended equipment.

D. All rectifiers shall have overload protection. Protection from overload on the input shall be accomplished by molded case, fully magnetic circuit breakers on the incoming power lines. These circuit breakers shall hold at 100 percent of load and may trip between 101 percent and 125 percent of rated load. They shall trip at 125 percent of rated load. The trip point shall be unaffected by changes in ambient temperature. Trip handles of individual pole breakers shall be mechanically linked to open all lines when an overload occurs. Units shall be equipped with silicon stacks, overload protection shall be provided by a quick opening fuse in the transformer secondary.

E. Voltage surge protection for units equipped with silicon stacks shall be supplied by AC and DC lightning arresters and metal oxides varistors across all secondary lines to the stack and across the DC output of the rectifier. The metal oxide varistors must fire before the voltage surge reaches the peak inverse voltage rating of the diodes used in the stack. Transformers shall be isolation type with a grounded electrostatic shield between the primary and secondary windings. Dielectric strength of all insulating materials shall not be less than 2,000 volts RMS as tested for one minute and applied between windings and the transformer core. Magnetic wire insulation and layer insulation shall be rated no less than 155 degrees C. Magnetic wire insulation shall not show signs of softening or crazing after 24 hours immersion in any of the following chemicals: Naptha, Toluene, Ethyl Alcohol, Trichloro-Ethylene, Styrene Polyester, Butyl Acetate, Mild Acids, or Acetone. Impregnating varnish used shall meet the standards for 155 degrees C when tested according to AIEE test procedures. The transformer shall be preheated before dipping and baked after dipping. The transformer temperature rise, as measured by thermocouples within the transformer, shall not exceed 85 degrees C. The transformer efficiency shall not be less than 85 percent. The transformer voltage regulation shall not exceed 3 percent from full rated load to 1/4 of rated load when measured in accordance with the procedure described in MR-20-1958. Chokes and reactors shall meet the requirements listed for transformers.

F. Silicon stacks shall be equipped with silicon diodes rated a minimum of 800 peak inverse volts. Heat sinks shall be sized to keep diode junction and case temperatures from exceeding 100 degrees C under 45 degrees C ambient temperature conditions.

G. Separate voltmeter and ammeter shall be provided for monitoring rectifier output. Minimum meter width shall be 3-1/2 inches round or rectangular with minimum scale length of 2-7/8 inches. Meter movement shall be jewel and pivot D'Arsonval type. Taut band meters are not acceptable because of a tendency to break when jolted during shipment. Meter accuracy shall be a minimum of plus or minus 2 percent of full scale at 80 degrees F and shall be temperature compensated to vary no more than 1 percent per 10 degrees F temperature variation. Scale faces shall be metal or plastic. Ammeter shunt shall be block type mounted on the front panel for easy access. Current and millivolt ratings shall be clearly stamped on the shunt. Shunt accuracy shall be at least plus or minus 1 percent.

H. Electrical tests shall be performed by the manufacturer and recorded as listed below:

- AC Volts Input
- DC Amperes Input

- Apparent Watts Input
- True Watts Input
- Power Factor
- DC Volts Output
- DC Amperes Output
- DC Watts Output
- Conversion Efficiency
- Dielectric Strength
- Transformer Primary to Ground
- Transformer Secondary to Ground
- Transformer Primary to Secondary
- Stack AC to Ground
- Stack DC to Ground
- Ripple Voltage at Full Output

I. Rectifier shall be heavy steel or anodized aluminum swing open case, with white baked-enamel finish, and 10-inch standard leg support, or shall be suitable for post mounting.

PART 3 - EXECUTION

3.1 GENERAL

A. Upon completion of installation of all components as shown on the drawings and in accordance with these specifications, testing shall be performed to demonstrate that the installation has been completed and is in working order in conformance with the Contract Documents. In no case shall the testing be less than that outlined herein unless requested in writing by the CONTRACTOR and approved by the ENGINEER. The interim testing described herein shall be in addition to and not substitution for any required testing of individual items at the manufacturers' plant. CONTRACTOR shall provide testing of the system. The test data shall be submitted to the ENGINEER for acceptance to demonstrate that the system is in proper working order.

3.2 EXCAVATION AND BACKFILL

A. Buried wires shall have a minimum cover of 24 inches. The bottom of the trenches shall be covered with 1 inch of mortar sand prior to placing wires, insulation, anodes, coatings or other underground appurtenances.

B. Wire identification tags shall be placed on the wires prior to placing wire in conduit or backfilling.

3.3 TEST STATIONS

A. Test stations shall be placed at the locations indicated. The CONTRACTOR shall field verify final location of the test stations. Wire identifiers shall be placed on all wire prior to backfill and installation of test stations.

3.4 WIRES

A. Wires buried in the ground shall be laid straight, without kinks. Each wire run shall be continuous in length and free of joints or splices, unless otherwise approved. Care shall be taken during installation to avoid punctures, cuts or other damage to the wire insulation. Damage to insulation shall require replacement of the entire length of wire at the CONTRACTOR'S expense.

B. At least 18 inches of slack (coiled) shall be left for each conductor, at each test station housing. Slack in the wire shall be sufficient to allow removal of wire extension for testing. Wire shall not be bent into a radius of less than 8 times the diameter of the wire. Copper split bolts or other appropriate connection hardware shall be used for all test station connections.

C. Where buried cable is to be placed in existing conduit, the conduit must be of sufficient diameter to accommodate the additional cable. This shall be determined by the number and size of both the existing and new cable in accordance with all applicable codes and standards. This shall also apply where new cable is to be installed in new PVC conduit. PVC conduit shall be installed to a minimum depth of 24 inches below grade.

D. Red caution tape, 3 inches in width, or colorized slurry shall be installed above buried wire and conduits at a maximum depth of 18 inches below grade over the wire and conduit location.

3.5 WIRE IDENTIFICATION

A. Brass wire identifiers or wrap around cable markers shall be placed on the wires prior to backfill.

3.6 EXOTHERMIC WELD CONNECTIONS

A. Exothermic weld connections shall be installed in the manner and at the locations indicated. Coating materials shall be removed from the surface over an area of sufficient size to make the connection. The steel surface shall be cleaned to white metal by grinding or filing prior to welding the conductor. The use of resin impregnated grinding wheels will not be allowed. The conductor shall be welded to the pipe by the exothermic welding process with a copper sleeve fitted over the conductor. Only enough insulation shall be removed such that the copper conductor can be placed in the welding mold.

B. After the weld has cooled, all slag shall be removed and the metallurgical bond shall be tested for adherence to the pipe or casing. All defective welds shall be removed and replaced. All exposed surfaces of the copper and steel shall be covered with insulating materials as indicated. No connections to the piping shall be buried prior to inspection and approval of the ENGINEER.

3.7 COATING OF WELDS

A. The CONTRACTOR shall furnish all materials, clean surfaces and repair any damage to protective coatings and linings damaged as a result of the welding.

B. A coating shall be applied to all exothermic weld locations. The coating shall be an epoxy, as shown in the details. All surfaces must be clean and dry and free of oil, dirt, loose particles and all other foreign materials prior to application of the coating.

3.8 JOINT BONDS

A. Bond cables shall be provided across flexible couplings, A/C insulators and nonwelded joints on steel pipe, on cement mortar coated steel cylinder pipe joints and ductile iron pipe joints as necessary to ensure electrical continuity. Joint bonds shall be installed as indicated. A minimum of two bonds shall be installed per joint. Joint bonds shall not be installed immediately across dielectric flange kits but shall be required around appurtenances, which are isolated, in order to provide electrical continuity along the main pipeline.

3.9 DEEP ANODE WELL INSTALLATION

A. The CONTRACTOR shall obtain and pay for all fees and permits required for well drilling. CONTRACTOR shall log the well in accordance with local and State agency requirements.

B. Anodes shall be installed in the deep anode well at the approximate location indicated. All drilling shall be done in strict conformance to California State Bulletin Number 74 regulating the classification, construction and sealing of wells. In addition, a well permit shall be obtained by the CONTRACTOR from the local, state or federal agency, as required prior to well construction. The CONTRACTOR shall provide a grout seal for a minimum of 50 feet.

C. The impressed current system anode holes shall be drilled by means of a rotary drill rig using circulating water based drilling mud or air, as required. Holes shall be drilled to obtain a nominal 8-inch diameter anode well at a minimum. The well shall be drilled to the minimum depth indicated and shall be essentially straight and plumb. Drilling mud may be circulated through a portable sump or through a sump dug in the ground at the drill site. If a "dug sump" is used, it shall be emptied and backfilled upon completion. Backfilling shall be such that the sump is safe for vehicle traffic without settling. Drilling mud and cuttings shall be disposed by the CONTRACTOR at a suitable disposal site at no additional cost to the OWNER, unless it is determined that the cuttings contain hazardous materials. If hazardous materials are suspected, the cuttings will be tested and disposal and chain of custody would be the responsibility of the COUNTY.

D. When the hole has been drilled to specified depth, and in the presence of the ENGINEER, fresh water shall be circulated from the bottom of the hole to clear the hole of drilling mud and cuttings. The hole shall be flushed until fluid is thinned as much as possible without danger of cave-in. The ENGINEER shall determine the degree to which the hole is flushed. The hole shall be maintained full to the top with fresh water throughout the entire loading operations. Preparation of the impressed current system anode hole and loading of anodes and other equipment in the hole shall be done in the presence of the ENGINEER. Loading of the anode hole shall be begun early enough in the day to insure completion of all loading, including backfilling, to accommodate inspection by County Health inspectors.

E. Anode assemblies shall be lowered into the hole supported by the attached lead wires. The ENGINEER shall visually inspect the insulation on the anode lead wire for abrasion or other damage to the insulation and wire as the anode is lowered into place. Splices and/or any form of wire repair shall not be allowed on the anode lead wire from the point of connection at the anode to the top of the deep well anode bed hole. In the event that an anode must be retrieved after it has been lowered into the hole, the entire length of the anode lead wire shall be inspected by the ENGINEER for abrasion or other forms of damage to the insulation and wire. Anodes with damaged wires shall be rejected by the ENGINEER and shall not be reinstalled.

F. When an anode has been placed at specified depth, it shall be securely fixed in that position by tying the anode lead wire to a rack, sawhorse, etc., placed over or adjacent to the anode hole.

G. All anodes shall be loaded prior to coke breeze backfill. No anodes shall be buried until the ENGINEER has inspected the placement of the anodes and given permission to backfill.

H. Coke breeze shall be placed in the hole by pouring directly from the bag into the anode hole or by pumping. Pouring shall be at a steady rate and shall be slow enough to insure that the coke breeze does not bridge or block in the hole. The hole shall be kept completely full of water during placement of backfill. The top of the hole shall be kept free of floating coke breeze particles.

I. Settling of the backfill and coverage of the anode shall be determined by observing the measurement of anode current output or circuit resistance through a 12V DC power source circuit.

J. Backfill of the hole above the coke breeze column shall be sealed with 5 feet of sand. Following placement of the sand, the hole shall be sealed within 3 feet of the top with premixed grout or bentonite as specified in California State Bulletin Number 74. Backfill of the uppermost 3-foot portion of the anode hole shall consist of round drain rock as indicated. Round drain rock used for backfill shall be 3/4-inch to 1/2-inch diameter thoroughly washed to insure removal of sand and fines.

K. A concrete traffic box shall be set near the top of the anode hole for termination of the vent pipe. From the top of the anode hole, the anode leads shall be run to the rectifier location. Anode leads shall be permanently marked with cable identifiers.

3.10 WIRE CONNECTIONS

A. After installation, all wire connections shall be tested at the test station, junction box locations, or at rectifiers to ensure that they meet the requirements of the Contract Documents.

3.11 EXOTHERMIC WELDS

A. Exothermic welds shall be tested by the CONTRACTOR for adherence to the pipe or casing and for electrical continuity between the pipe or casing and wires. A 22-ounce hammer shall be used for adherence testing by striking a blow to the weld. Care shall be taken to avoid hitting the wires.

3.12 JOINT BOND TESTING

A. After installation, all joint bonds shall be tested for effectiveness. The testing shall be performed prior to backfill of the pipe and shall be verified upon completion of backfilling operations. Prior to backfilling, resistance shall be measured along the pipe segment to ensure electrical continuity of the piping.

3.13 SYSTEM CHECK-OUT

A. Upon completion of the installation, the CONTRACTOR shall provide testing of the system by a qualified corrosion engineer to ensure compliance with the Contract Documents. The testing shall include, but not be limited to the following, at the discretion of the ENGINEER, measurement of all anode currents and potentials, potentials of metallic pipelines prior to and after connection of anodes. Measurements shall be made at all test station locations. Any deficiencies of systems tested shall be reported to the ENGINEER and retesting of systems and repairs to the systems shall be at no additional cost to the COUNTY.

END OF SECTION

SECTION 311000

SITE PREPARATION

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The WORK of this Section includes measures required during the CONTRACTOR's initial move onto the Site to protect existing fences, houses, and associated improvements, streets, and utilities down-slope of construction areas from damage due to boulders, trees, or other objects dislodged during the construction process; clearing, grubbing and stripping; and regrading of certain areas to receive embankment fill.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 015526 – Traffic Control & Access

1.3 SITE INSPECTION

A. Prior to moving onto the Site, the CONTRACTOR shall inspect the Site conditions and review maps of the project site and off-site pipeline routes and facilities delineating the COUNTY's property and right-of-way lines.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRIMARY PROJECT SITE ACCESS

A. The CONTRACTOR shall develop any necessary access to the Site, including access barriers to prohibit entry of unauthorized persons.

B. Utility Interference: Where existing utilities interfere with the WORK, notify the utility owner and the PROJECT ENGINEER before proceeding in accordance with the General Conditions.

3.2 CLEARING, GRUBBING, AND STRIPPING

A. Construction areas shall be cleared of grass and weeds to at least a depth of six inches and cleared of structures, pavement, sidewalks, concrete or masonry debris, trees, logs, upturned stumps, loose boulders, and any other objectionable material of any kind which would interfere with the performance or completion of the WORK, create a hazard to safety, or impair the subsequent usefulness of the WORK, or obstruct its operation. Loose boulders within 10 feet of the top of cut lines shall be incorporated in landscaping or removed from the Site. Trees and other natural vegetation outside the actual lines of construction shall be protected from damage during construction, as directed by the COUNTY.

B. Within the limits of clearing, the areas below the natural ground surface shall be grubbed to a depth necessary to remove all stumps, roots, buried logs, and all other objectionable material. Septic tanks, drain fields, and connection lines and any other underground structures, debris or waste shall be removed if found on the Site. All objectionable material from the clearing and grubbing process shall be removed from the Site and wasted in approved safe locations.

C. The entire area to be affected by construction shall be stripped to a depth of 1.0 foot below the existing ground contours. The stripped materials shall be stockpiled and incorporated into landscaped

areas or other non-structural embankments.

D. Unless otherwise indicated, native trees larger than three inches in diameter at the base shall not be removed without the COUNTY'S approval. The removal of any trees, shrubs, fences, or other improvements outside of rights-of-way, if necessary for the CONTRACTOR's choice of means and methods, shall be arranged with the owner of the property, and shall be removed and replaced at no additional cost to the COUNTY.

3.3 OVEREXCAVATION, REGRADING, AND BACKFILL UNDER FILL AREAS

A. After the fill areas have been cleared, grubbed, and excavated, the areas to receive fill will require over-excavation, regrading, and backfill, consisting of the removal and/or stockpiling of undesirable soils. The ground surface shall be re-contoured for keying the fill and removing severe or abrupt changes in the topography of the Site. The overexcavated volumes to a level 1.0 foot below the existing ground contours shall be backfilled.

B. Any undesirable topsoil and colluvium shall be removed to the level designated by the COUNTY and stockpiled for subsequent use as the first material to be placed in the compacted fill.

END OF SECTION

SECTION 330524

STEEL PIPE (AWWA C200, MODIFIED)

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide mortar-lined and mortar-coated steel pipe, and/or mortar-lined and enamel/tape-coated steel pipe, and/or mortar lined-epoxy coated, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials, complete in place, in accordance with the Contract Documents.

B. A single pipe manufacturer shall be made responsible for furnishing all steel pipe and smaller diameter appurtenant steel pipe and specials, as required by the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 099000 – Protective Coatings
Section 312316 –Trenching, Backfill and Compaction
Section 330110 – Waterline Disinfection & Testing
Section 330509 – Piping, General
Section 331216 – Valves and Appurtenances
Section 331417 – Service Connections

1.3 CONTRACTOR SUBMITTALS

A. **Shop Drawings:** The CONTRACTOR shall submit Shop Drawings and laying diagrams of pipe, joints, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials in accordance with the requirements in Section 013300 - Contractor Submittals, and the following supplemental requirements:

1. Certified dimensional drawings of all fittings and appurtenances.

2. Joint and pipe/fitting wall construction details which indicate the type and thickness of cylinder; the position, type, size, and area of reinforcement; coating and lining holdbacks, manufacturing tolerances; and all other pertinent information required for the manufacture of the product. Joint details shall be submitted where deep bell or butt strap joints are required for control of temperature stresses.

3. Fittings and specials details such as elbows, wyes, tees, outlets, connections, test bulkheads, and nozzles or other specials which indicate amount and position of all reinforcement. All fittings and specials shall be properly reinforced to withstand the internal pressure, both circumferential and longitudinal, and the external loading conditions as indicated in the Contract Documents.

4. Material lists and steel reinforcement schedules which describe all materials to be utilized.

5. Line layout and marking diagrams which indicate the specific number of each pipe and fitting and the location of each pipe and the direction of each fitting in the completed line. In addition, the line layouts shall include: the pipe station and invert elevation at all changes in grade or horizontal alignment; the station and invert elevation to which the bell end of each pipe will be laid; all elements of curves and bends, both in horizontal and vertical alignment; and the limits within each reach of restrained and/or welded joints or of concrete encasement.

6. Full and complete information regarding location, type, size, and extent of all welds shall be shown on the Shop Drawings. The Shop Drawings shall distinguish between shop and field welds. Shop drawings shall indicate by welding symbols or sketches the details of the welded joints, and the

preparation of parent metal required to make them. Joints or groups of joints in which welding sequence or technique are especially important shall be carefully controlled to minimize shrinkage stresses and distortion.

7. Rubber gasket joint design and details

8. Drawings showing the location, design, and details of bulkheads (test plates) for hydrostatic testing of the pipeline, and details for removal of test bulkheads and repair of the lining.

9. Details and locations of closures for length adjustment and for construction convenience.

10. Detail drawings indicating the type, number, and other pertinent details of the slings, strutting, and other methods proposed for pipe handling during manufacturing, transport, and installation.

11. Manufacturer's written Quality Assurance/Control Program.

B. Design calculations shall be submitted to the PROJECT ENGINEER for review prior to manufacture of pipe specials.

C. **Certifications:** A certified affidavit of compliance shall be furnished for all steel plate specials and other products or materials furnished under this Section.

D. **Manufacturer's Qualifications:** Furnish a copy of manufacturer's certification by SPFA or LRQA and documentation of manufacturer's experience in fabricating AWWA C200 pipe.

E. **Certifications:** The CONTRACTOR shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, as specified in ANSI/AWWA C200 - Steel Water Pipe 6-inch and Larger, C203 - Coal Tar Protective Coatings and Linings for Steel Water Pipelines-Enamel and Tape-Hot Applied, and C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe – 4-inch and Larger-Shop Applied, respectively, and the following supplemental requirements:

1. Physical and chemical properties of all steel.
2. Hydrostatic test reports.
3. Results of production weld tests.
4. Sand, cement, and mortar tests.
5. Rubber gasket tests.

F. Performing and paying for sampling and testing necessary for certification are the CONTRACTOR'S responsibility.

1.4 QUALITY ASSURANCE

A. **Pipe and Specials Manufacturer Qualifications:** The pipe manufacturer shall be certified by the Steel Plate Fabricator's Association (SPFA) or Lloyd's Register Quality Assurance (LRQA) and shall be experienced in fabrication of AWWA C200 pipe of similar diameters, lengths, and wall thickness to this WORK. Experience shall be in the production facilities and personnel, not the name of the company that owns the production facility or employs the personnel.

B. **Tests:** Except as modified herein, materials used in the manufacture of the pipe shall be tested in accordance with the requirements of ANSI/AWWA C200 and C205, as applicable.

1. Joint gaskets shall be tested in accordance with ANSI/AWWA C200.

2. After the joint configuration is completed and prior to lining with-cement-mortar, each length of pipe of each diameter and pressure class shall be shop-tested and certified to a pressure of at least 80 percent of the yield strength of the steel.

C. Shop Testing of Steel Pipe Specials

1. If any special has been fabricated from straight pipe not previously tested and is of the type listed below, the special shall be hydrostatically tested with a pressure equal to 1-1/2 times the design working pressure: all bends, wyes, crosses, tees with side outlet diameter greater than 30 percent of the main pipe diameter, and manifolds.

2. All specials not required to be hydrostatically tested shall be tested by liquid dye penetrant inspection method in accordance with ASTM E 165 - Standard Test Methods for Liquid Penetrant Examination, Method A or the magnetic particle method in ASME Section VIII, Division 1, Appendix VI.

3. Reinforcing plates shall be tested by the solution method using approximately 40 psi air pressure introduced between the plates through a threaded test hole. Test hole shall be properly plugged following successful testing.

4. Any weld defects, cracks, leaks, distortion, or signs of distress during testing shall require corrective measures. Weld defects shall be gouged out and re-welded. After corrections, the special shall be retested.

5. Where welded test heads or bulkheads are used, extra length shall be provided to each opening of the special. After removal of each test head, the special shall be trimmed back to the design points with all finished plate edges ground smooth, straight, and prepared for the field joint.

6. Testing shall be performed before joints have been coated or lined.

D. The CONTRACTOR shall be responsible for performing and paying for said material tests. The COUNTY shall have the right to witness all testing conducted by the CONTRACTOR; provided, that the CONTRACTOR's schedule is not delayed for the convenience of the COUNTY.

E. Ultrasonic Examination

1. Steel plate that will be in welded joints or welded stiffener elements shall be examined ultrasonically for laminar discontinuities where both of the following conditions exist:

   a. Any plate in the welded joint has a thickness exceeding 1/4 inch.

   b. Any plate in the welded joint is subject to transverse tensile stress through its thickness during the welding or service.

2. Ultrasonic examination may be waived where joints are designated to minimize potential laminar tearing.

3. The ultrasonic examination shall be in accordance with ASTM A 578 - Straight Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications with a Level I acceptance standard.

4. Plates that are not in conformance with the acceptance criteria in ASTM A 578 may be used in the WORK if the areas that contain the discontinuities are a distance at least four times the greatest dimension of the discontinuity away from the weld joint.

F. In addition to those tests specifically required, the COUNTY may request additional samples of any material including lining and coating for testing by the COUNTY. The additional samples shall be furnished as part of the WORK.

G. **Field Testing:** Field testing shall conform to the requirements of Section 330110 – Waterline Disinfection & Pressure Testing.

H. **Welding Requirements:** Welding procedures used to fabricate and install pipe shall be prequalified under the provisions of ANSI/AWS D1.1 - Structural Welding Code-Steel or the ASME Boiler and Pressure Vessel Code, Section 9. Welding procedures shall be required for longitudinal and girth or spiral welds for pipe cylinders, spigot and bell ring attachments, reinforcing plates and ring flange welds, and plates for lug connections.

I. **Welder Qualifications:** Welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the methods and materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 or the ASME Boiler and Pressure Vessel Code, Section 9 by an independent local, approved testing agency not more than 6 months prior to commencing work on the pipeline. Machines and electrodes similar to those used in the WORK shall be used in qualification tests.

PART 2 - PRODUCTS

2.1 GENERAL

A. Mortar-lined and mortar-coated steel pipe shall conform to ANSI/AWWA C200 and C205 and mortar-lined and epoxy coated steel pipe shall conform to ANSI/AWWA C200 and C203, subject to the following supplemental requirements. The pipe shall be of the diameter and class indicated, shall be provided complete with rubber gaskets or welded joints, as indicated in the Contract Documents. For pipe 14 inches in diameter and larger, the nominal inside diameter after lining shall not be less than the diameter shown on the Drawings, allowing for tolerances according to ANSI/AWWA C200, C203 and C205. Pipe smaller than 14 inches in diameter may be furnished in standard outside diameters. When indicated as a minimum, wall thickness shall include zero minus tolerance.

B. Specials are defined as fittings, closure pieces, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials wherever located, and all piping above ground or in structures.

C. **Markings:** The manufacturer shall legibly mark all pipes and specials in accordance with the laying schedule and marking diagram. Each pipe shall be numbered in sequence and said number shall appear on the laying schedule and marking diagram in its proper location for installation. All pipe sections and fittings shall be marked at each end with top field centerline.

D. **Handling and Storage:** The pipe shall be handled as a minimum at the 1/3 points by use of wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe coating/exterior. The use of chains, hooks, or other equipment which might injure the pipe coating/exterior will not be permitted. Stockpiled pipe shall be suitably supported on padded skids, sand or earth berms free of rock exceeding 3 inches in diameter, sand bags, or suitable means so that the coating will not be damaged. The pipe shall not be rolled and shall be secured to prevent accidental rolling.

E. Handling of coal tar enamel/tape-coated pipe shall have the following additional requirements:

1. It shall be the responsibility of the CONTRACTOR and manufacturer of coal tar enamel/tape coated steel pipe to prevent damage of the coating which might be caused by handling and/or storage of the completed pipe at low temperature.

2. In no case shall coal tar enamel/tape coated steel pipe be handled when the ambient air temperature is below 0 degrees F. When the temperature is between 0 and 25 degrees F, the pipe may be handled, provided the pipe is heated to a temperature of 25 degrees F, as approved by the COUNTY.

3. In no case shall coal tar enamel/tape coated steel pipe be transported when the ambient air temperature is below 30 degrees F. When the ambient air temperature is between 25 degrees F and

30 degrees F, the pipe may be transported, provided special padded supports are used to absorb and minimize impact, as approved by the COUNTY.

F. The CONTRACTOR shall replace or repair damaged pipe.

G. **Strutting:** Adequate strutting shall be provided on all specials, fittings, and straight pipe so as to avoid damage to the pipe and fittings during handling, storage, hauling, and installation. For mortar-lined or mortar-coated steel pipe, the following requirements shall apply:

1. The strutting shall be placed as soon as practicable after the mortar lining has been applied and shall remain in place while the pipe is loaded, transported, unloaded, installed, and backfilled at the Site.

2. The strutting materials, size and spacing shall be adequate to support the earth backfill plus any greater loads which may be imposed by the backfilling and compaction equipment.

3. Any pipe damaged during handling, hauling, storage, or installation due to improper strutting shall be repaired or replaced.

H. **Laying Lengths:** Maximum pipe laying lengths shall be 40 ft with shorter lengths provided as required.

I. **Lining:** The pipe lining shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing, and roughness.

J. **Closures and Correction Pieces:** Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing indicated.

2.2 MATERIALS

A. **Mortar:** Materials for mortar shall conform to the requirements of ANSI/AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4-inch and Larger - Shop Applied; provided, that cement for mortar coating shall be Type II and mortar lining shall be Type II or V. Cement in mortar lining and/or coating shall not originate from kilns which burn metal-rich hazardous waste fuel, nor shall a fly ash or pozzolan be used as a cement replacement. Admixtures shall contain no calcium chloride.

B. **Steel for Cylinder and Fittings:** Pipe manufactured under ANSI/AWWA C200 shall satisfy the following requirements:

1. Minimum yield strength of steel is 42,000 psi.
2. Be manufactured by a continuous casting process
3. Be fully kilned
4. Be fine grain practice
5. Have maximum carbon content of 0.25 percent
6. Have maximum sulfur content of 0.015 percent
7. Have minimum elongation of 22 percent in a 2-inch gauge length.
8. Be in accordance with one of the following:

ASTM A 570 - Steel Sheet and Strip, Hot-Rolled, Structural Quality
ASTM A 36 - Carbon Structural Steel
ASTM A 283 - Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A 572 - High Strength Low-Alloy Columbium-Vanadium Structural Steel

C. **Coal Tar Enamel/Tape Coating:** Coal tar protective coatings shall be a coal tar enamel fibrous

glass mat and mineral glass felt wrap conforming to the requirements of ANSI/AWWA C203, Section 2, as modified by Appendix A, Section A1.5, thereto. The coal tar enamel coating system shall include:

1. Blasting
2. Priming
3. Coal tar enamel (finish coat)
4. Fibrous glass wrapping consisting of fibrous glass mat 0.018 inches thick placed in enamel while enamel is hot
5. Coal tar enameling, second coat
6. Fibrous glass or felt wrapping
7. Whitewashing, latex painting, or Kraft paper

2.3 DESIGN

A. **Design:** Except as otherwise indicated, materials, fabrication and shop testing of straight pipe shall conform to the requirements of ANSI/AWWA C200 - Steel Water Pipe 6 in and Larger, and shall conform to the dimensions of ANSI/AWWA C208 - Dimensions for Fabricated Steel Water Pipe Fittings. The minimum thickness of plate for pipe from which specials are to be fabricated shall be the greatest of those determined by the following 4 criteria:

1. Working and Transient Pressure Design

$$T = \frac{P_w \times D/2}{Y/2S_w} \qquad T = \frac{P_t \times D/2}{Y/2S_t}$$

Where: T = Steel cylinder thickness in inches
D = Outside diameter of steel cylinder in inches
P_w = Design working pressure in psi
P_t = Design transient pressure in psi
Y = Specified minimum yield point of steel in psi
S_w = Safety factor of 2.5 at design working pressure
S_t = Safety factor at design transient pressure; for elbows 1.875, and 2.0 for other specials

2. **Mainline Pipe Thickness:** Plate thickness for specials shall not be less than for the adjacent mainline pipe.

3. **Thickness based on Pipe Diameter:**

Nominal Pipe Diameter (in)	**Pipe Manifolds Piping Above Ground Piping Structures**	**Elbows Bends Reducers**
24 and under	3/16-in	10-ga
25 to 48	1/4-in	1/4-in
over 48	5/16-in	5/16-in

B. Specials installed on saddle supports shall be designed to limit the longitudinal bending stress to a maximum of 10,000 psi. Design shall be in accordance with the provisions of Chapter 7 of AWWA M-11.

2.4 SPECIALS AND FITTINGS

A. General

1. **Mortar:** Materials for mortar shall conform to the requirements of ANSI/AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4-inch and Larger - Shop Applied; provided, that cement for mortar coating shall be Type [II] [V], and mortar lining shall be Type II or V. Cement in mortar lining and coating shall not originate from kilns which burn metal-rich hazardous waste fuel, nor shall a fly ash or pozzolan be used as a cement replacement. Admixtures shall contain no calcium chloride.

2. Reinforcement for wyes, tees, outlets, and nozzles shall be designed in accordance with AWWA Manual M-11. Reinforcement shall be designed for the design pressure indicated and shall be in accordance with the Drawings. Specials and fittings shall be equal in pressure design strength and shall have the same lining and coating as the adjoining pipe. Unless otherwise indicated, the minimum radius of elbows shall be 2.5 times the pipe diameter and the maximum miter angle on each section of the elbow shall not exceed 11-1/4 degrees.

B. Specials and fittings that cannot be mechanically lined and coated shall be lined and coated by hand-application using the same materials as used for the pipe and in accordance with the applicable AWWA or ASTM Standards, as modified by the applicable pipe section in these Specifications. Coating and lining applied in this manner shall provide protection equal to that for the pipe. Fittings may be fabricated from pipe that has been mechanically lined and/or coated. Areas of lining and coating that have been damaged by such fabrication shall be repaired by hand-applications.

C. Access manholes with covers shall be as indicated. Threaded outlets shall be forged steel suitable for 3000 psi service, and shall be as manufactured by Vogt or equal.

D. Moderate deflections and long radius curves may be made by means of beveled joint rings, by pulling standard joints, by using short lengths or pipe, or a combination of these methods; provided that pulled joints shall not be used in combination with bevels. The maximum total allowable angle for beveled joints shall be 5 degrees per pipe joint. Bevels shall be provided on the bell ends. Mitering of the spigot ends will not be permitted. The maximum allowable angle for pulled joints shall be in accordance with the manufacturer's recommendations or the angle which results from a 3/4-inch pull out from normal joint closure, whichever is less. All horizontal deflections or fabricated angles shall fall on the alignment. In congested city streets or at other locations where underground obstructions may be encountered, the chord produced by deflecting the pipe shall be no further than 6 inches from the alignment indicated.

E. Vertical deflections shall fall on the alignment and at locations adjacent to underground obstructions, points of minimum earth cover, and pipeline outlets and structures. The pipe angle points shall match the angle points indicated.

F. Outlets, Tees, Wyes, and Crosses

1. Outlets 12-inch and smaller may be fabricated from Schedule 30 or heavier steel pipe in the standard outside diameters, i.e., 12-3/4-inch, 10-3/4-inch, 8-5/8-inch, 6-5/8-inch, and 4-1/2-inch. Minimum plate thickness for reinforcements shall be 10-gauge.

2. The design of outlet reinforcement shall be in accordance with the procedures given in Chapter 13 of AWWA Manual M-11, and the design pressures and factors of safety above.

3. In lieu of saddle or wrapper reinforcement as provided by the design procedure in Manual M-11, pipe or specials with outlets may be fabricated in their entirety of steel plate having a thickness equal to the sum of the pipe wall plus the required reinforcement.

4. Where Manual M-11 requires the design procedure for crotch plate reinforcement, such reinforcement shall be provided.

5. Outlets shall be fabricated so that there is always at least a 12-inch distance between the outer edge of the reinforcing plate and any field welded joints. For outlets without reinforcing plates, outlets shall penetrate the steel cylinders so that there is at least a 12-inch clearance between the outlet and any field welded joints.

G. Tees, wyes, crosses, elbows, and manifolds shall be fabricated so that the outlet clearances and reinforcing plates from any weld joints are a minimum of 5 times cylinder thickness or 2 inches, whichever is greater. Longitudinal weld joints in adjacent cylinder sections shall be oriented so that there is a minimum offset of 5 times cylinder thickness or 2 inches, whichever is greater.

H. **Steel Welding Fittings:** Steel welding fittings shall conform to ASTM A 234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

I. **Ends for Mechanical-Type Couplings:** Except as otherwise indicated, where mechanical-type couplings are indicated, the ends of pipe shall be banded with Type C collared ends using double fillet welds. Where pipe 12-inch and smaller is furnished in standard schedule thicknesses, and where the wall thickness equals or exceeds the coupling manufacturer's minimum wall thickness, the pipe ends may be grooved.

J. Lining shall conform to the requirements of ANSI/AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 in and Larger - Shop Applied, for lining of specials.

K. **Coating:** All requirements pertaining to thickness and application of coating of adjacent straight pipe shall apply to specials. Unless otherwise indicated, the coating on the buried portion of a pipe section passing through a structure wall shall extend to the center of the wall, or to a wall flange, if one is indicated. Pipe above ground or in structures shall be field-painted in accordance with Section 099000 - Protective Coatings.

L. **Marking:** A mark indicating the true vertical axis of the special shall be placed on the top and bottom of the special.

2.5 PIPE

A. **General:** The pipe shall be steel pipe, mortar-lined and mortar-coated, tape-coated, with rubber gasketed or field welded joints as indicated. The pipe shall consist of a steel cylinder, either shop-lined or lined-in-place with portland cement-mortar with an exterior coating of cement-mortar.

B. The pipe shall be designed, manufactured, tested, inspected, and marked according to applicable requirements previously stated and, except as hereinafter modified, shall conform to ANSI/AWWA C200. Flanged joints shall conform to the requirements of AWWA C207.

C. **Pipe Dimensions:** The pipe shall be of the diameter and minimum wall thickness indicated. In no case shall the wall thickness be less than 0.125 inch. Minimum wall thickness shall include zero minus mill tolerance.

D. **Fitting Dimensions:** The fittings shall be of the diameter and class indicated.

E. Joint Design.

1. Unless indicated otherwise, the standard field joint for cement mortar lined and coated steel pipe shall be a lap welded joint. Single-butt welded or butt-strap joints shall be used only where required for closures or where indicated.

2. Unless indicated otherwise, the standard field joint for mortar lined and coal tar enamel/tape coated pipe shall be a rubber gasket joint. Welded joints shall be provided where indicated. Butt-strap joints shall be used only where required for closures or where indicated.

F. Lap joints prepared for field welding shall be in accordance with ANSI/AWWA C200. The method

used to form, shape, and size bell ends shall be such that the physical properties of the steel are not substantially altered. Unless otherwise approved by the COUNTY, bell ends shall be formed by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. Faying surfaces of the bell and spigot shall be essentially parallel, but in no case shall the bell slope vary more than 2 degrees from the longitudinal axis of the pipe.

G. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself, it will provide watertight joints under all operating conditions when properly installed. The CONTRACTOR shall require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted. Unless otherwise approved by the COUNTY, bell ends shall be formed by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. No process will be permitted in which the bell is formed by rolling.

H. Shop-applied interior linings and exterior coatings shall be held back from the ends of the pipe as indicated or as otherwise acceptable to the COUNTY.

I. **Restrained Joints:** Located where indicated, restrained joints shall be field-welded joints, either single, or inside and outside lap-weld, or butt-weld, or butt-straps as indicated. Designs shall include stresses created by the greater of:

1. Temperature differential of 40 degrees F plus poisson's effect in combination with hoop stress, or;

2. Thrust due to bulkheads, bends, reducers, and line valves resulting from working pressure in combination with hoop stress.

For field welded joints on cement mortar lined and coated pipe, design hoop stresses shall not exceed 50 percent of the allowable yield stress of the material or 18,000 psi, whichever is smaller. For mortar lined and coal tar enamel/tape coated pipe, design hoop stresses shall not exceed 50 percent of the allowable yield stress of the material or 21,000 psi, whichever is smaller. At the CONTRACTOR's option, the steel cylinder area may be progressively reduced from the point of maximum thrust to the end of the restrained length.

2.5 CEMENT-MORTAR LINING

A. **Cement-Mortar Lining for Shop Application:** Unless indicated otherwise, interior surfaces of all pipe, shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C205. During the lining operation and thereafter, the pipe shall be maintained in a round condition by suitable bracing or strutting. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found defective at the Site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.

B. The minimum lining thickness and tolerance shall be in accordance with ANSI/AWWA C205.

C. The pipe shall be left bare as indicated where field joints occur. Ends of the linings shall be left square and uniform. Feathered or uneven edges will not be permitted.

D. Defective linings, as determined by the COUNTY, shall be removed from the pipe wall and shall be replaced to the full thickness required. Defective linings shall be cut back to a square shoulder in order to avoid feather edged joints.

E. The progress of the application of mortar lining shall be regulated in order that all hand work, including the repair of defective areas is cured in accordance with the provisions of ANSI/AWWA C205. Cement-mortar

for patching shall be the same materials as the mortar for machine lining, except that a finer grading of sand and mortar richer in cement shall be used when field inspection indicates that such mix will improve the finished lining of the pipe.

F. **Cement-Mortar Lining for Field Application:** The materials and design of in-place cement-mortar lining shall be in accordance with ANSI/AWWA C602 - Cement-Mortar Lining of Water Pipeline-4in and Larger-Shop Applied. The minimum lining thickness and finished inside diameter shall be as indicated for shop-applied cement-mortar lining.

G. Protection of Pipe Lining/Interior: For all pipe and fittings with plant-applied or cement-mortar linings, the CONTRACTOR shall provide a 12 mil polyethylene sheet or other suitable bulkhead on the ends of the pipe and on all special openings to prevent drying out of the lining. All bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

2.6 EXTERIOR COATING OF PIPE

A. **Exterior Coating of Exposed Piping:** The exterior surfaces of pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of primer compatible with the finish coating required by Section 099000 - Protective Coatings.

B. **Exterior Cement Mortar Coating of Buried Piping:** Pipe for buried service, including bumped heads, shall be coated with a 1-inch minimum thickness of reinforced cement-mortar coating. Unless otherwise indicated, exterior surfaces of pipe or fittings passing through structure walls shall be cement-mortar coated from the center of the wall or from the wall flange to the end of the underground portion of pipe or fitting. The coating shall be reinforced with a spiral wire reinforcement or welded wire fabric in accordance with ANSI/AWWA C205. The welded wire fabric shall be securely fastened to the pipe with welded clips or strips of steel. The wire spaced 2 inches on centers shall extend around the circumference of the pipe. The ends of reinforcement strips shall be lapped 4 inches and the free ends tied or looped to assure continuity of the reinforcement.

C. **Exterior Coal Tar Enamel/Tape Coating of Buried Piping:** Coal tar enamel/tape coating of pipe for buried service shall be applied in accordance 099000- Protective Coatings with ANSI/AWWA C203 as modified herein. Unless otherwise indicated, exterior surfaces of pipe or fittings passing through structure walls shall be coated from the center of the wall or from the wall flange to the end of the underground portion of pipe or fitting. Coal tar enamel/tape coating of pipe for buried service shall be applied in accordance with ANSI/AWWA C203 as modified herein.

2.7 PIPE APPURTENANCES

A. Pipe appurtenances shall be in accordance with the requirements of applicable sections of the specifications. Access manholes with covers shall be as indicated, installed during fabrication, not in the field. Threaded outlets shall be forged steel suitable for 3000 psi service, and shall be as manufactured by Vogt, or equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Installation shall conform to the requirements of AWWA M23, instructions furnished by the pipe manufacturer, and to the supplementary requirements herein. Wherever the provisions of this Section and the aforementioned requirements are in conflict, the more stringent provision shall apply.

B. The CONTRACTOR shall provide all fittings, closure pieces, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials, bolts, nuts, gaskets, jointing materials, and all other appurtenances as required to provide a complete and workable installation. Where pipe support details are indicated, the supports shall conform thereto and shall be placed as indicated; provided, that the support for all

exposed piping shall be complete and adequate regardless of whether or not supporting devices are specifically indicated. Where indicated, concrete thrust blocks and welded joints shall be provided. At all times when the WORK of installing pipe is not in progress, openings into the pipe and the ends of the pipe in trenches or structures shall be kept tightly closed to prevent entrance of animals and foreign materials. The CONTRACTOR shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source, shall assume full responsibility for any damage due to this cause, and shall at its own expense restore and replace the pipe to its required condition and grade if it is displaced due to floating. The CONTRACTOR shall maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until acceptance by the COUNTY.

C. Laying, jointing, testing for defects and for leakage shall be performed in the presence of the COUNTY, and shall be subject to approval before acceptance. Material found to have defects will be rejected and the CONTRACTOR shall promptly remove such defective materials from the Site.

D. The CONTRACTOR shall determine the location of existing underground utility structures in the vicinity of proposed pipe installation prior to excavation. All existing above and below ground structures within the work area shall be protected in place unless indicated otherwise on the Construction Drawings.

E. Whenever the WORK is not actively in progress, the open ends of all installed pipe shall be plugged or capped with bulkhead mechanical joint end cap to prevent the entry of animals, water, or other undesirable substances.

3.2 HANDLING AND STORAGE

A. Pipe and fittings shall be carefully handled and protected against damage to lining and coating/interior and exterior surfaces, impact shocks, and free fall. The pipe shall be handled as a minimum at the 1/3 points by use of wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe coating/exterior. The use of chains, hooks, or other equipment which might injure the pipe coating/exterior will not be permitted Pipe shall not be placed directly on rough ground but shall be supported in a manner which will protect the pipe against injury whenever stored at the Site or elsewhere. Pipe shall be stored at the Site in accordance with the requirements stated: Stockpiled pipe shall be suitably supported on padded skids, sand or earth berms free of rock exceeding 3 inches in diameter, sand bags, or suitable means so that the coating will not be damaged. The pipe shall not be rolled and shall be secured to prevent accidental rolling.. No pipe shall be installed when the lining or coating/interior or exterior surfaces show cracks that may be harmful as determined by the COUNTY. Such damaged lining and coating/interior and exterior surfaces, shall be repaired or a new undamaged pipe shall be provided.

B. The CONTRACTOR, shall inspect each pipe and fitting to insure that there are no damaged portions of the pipe. The CONTRACTOR shall remove or smooth out any burrs, gouges, weld splatter, or other small defects prior to laying the pipe. Pipe damaged prior to Substantial Completion shall be repaired or replaced.

3.3 INSTALLATION OF PIPE AND SPECIALS

A. Trenches shall be in a reasonably dry condition when the pipe special is laid. Necessary facilities including slings shall be provided for lowering and properly placing the pipe sections in the trench without damage. The pipe and specials shall be laid to the line and grade indicated and shall be closely jointed to form a smooth flow line. Immediately before placing each section of pipe in final position for jointing, the bedding shall be checked for firmness and uniformity of surface.

B. Pipe shall be laid directly on the imported bedding material. No blocking will be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid. Bell holes shall be formed at the ends of the pipe to prevent point loading at the bells or couplings. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.

C. **Installation Tolerances:** Each section of pipe shall be laid in the order and position shown on the laying diagram and in accordance with the following:

1. Each section of pipe having a nominal diameter less than 48 inches shall be laid to line and grade, within plus or minus 2 inches horizontal deviation and plus or minus 1-inch vertical deviation.

2. Each section of pipe having nominal diameter 48 inches and larger shall be laid to line and grade, within plus or minus 5 percent of diameter horizontal deviation and plus or minus 2.5 percent of diameter vertical deviation.

3. In addition to the horizontal and vertical tolerances above, lay the pipe so that no high or low points other than those on the laying diagram are introduced.

D. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the COUNTY may change the alignment and/or the grades. Such change shall be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 75 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misfit any amount which will be detrimental to the strength and water tightness of the finished joint. In all cases the joint opening, before finishing with the protective mortar inside the pipe, or prior to applying in-place mortar lining, shall be the controlling factor.

E. Except for short runs which may be permitted by the COUNTY, pipes shall be laid uphill on grades that exceed 10 percent. Pipe that is laid on a downhill grade shall be blocked and held in place until sufficient support is furnished by the following pipe to prevent movement. Bends shall be installed as indicated.

F. Pipe struts shall be left in place until backfilling operations have been completed for pipe 42 inches in diameter and larger. Struts in pipe smaller than 42 inches may be removed immediately after laying. A laboratory selected and paid by the COUNTY may monitor pipe deflection by measuring pipe inside diameter before struts are removed and 24 hours after struts are removed. Pipe deflection shall not exceed 2 percent 24 hours after the struts are removed. After the backfill has been placed, the struts shall be removed and shall remain the property of the CONTRACTOR.

G. **Work Stoppage:** At the end of each working day, CONTRACTOR shall plug or cap the open ends of all unfinished pipelines with securely bolted mechanical joint plugs, mechanical joint end caps, or blind flanges. If Pipe is subject to flooding, pipe shall be anchored as precaution against flotation. Trenches shall be backfilled in accordance with the COUNTY Standards and Specifications.

H. **Pipe and Specials Protection:** The openings of pipe and specials where the pipe and specials have been mortar lined in the shop shall be protected with suitable bulkheads to maintain a moist atmosphere and to prevent unauthorized access by persons, animals, water, or any undesirable substance. The bulkheads shall be so designed to prevent drying out of the interior of the pipe. The CONTRACTOR shall introduce water into the pipe to keep the mortar moist where moisture has been lost due to damaged bulkheads. At all times, means shall be provided to prevent the pipe from floating due to water in the trench from any source. Pipe which has floated shall be repaired, including restoration to original condition and grade.

I. **Pipe Cleanup:** As pipe laying progresses, the CONTRACTOR shall keep the pipe interior free of all debris. The CONTRACTOR shall completely clean the interior of the pipe of all sand, dirt, mortar splatter, and any other debris following completion of pipe laying, pointing of joints, and any necessary interior repairs prior to testing and disinfecting the completed pipeline.

3.2 RUBBER GASKETED JOINTS

A. **Rubber Gasketed Joints:** Immediately before jointing pipe, the spigot end of the pipe shall be thoroughly cleaned, and a clean rubber gasket lubricated with a non-toxic vegetable-based lubricant shall be placed in the spigot groove. The lubricant shall be a compound listed as in compliance with NSF Standard 61.

The volume of the gasket shall be "equalized" by moving a metal rod between the gasket and the spigot ring around the full circumference of the spigot ring. The bell of the pipe already in place shall be carefully cleaned and lubricated. The spigot of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper position. Tilting of the pipe to insert the spigot into the bell will not be permitted. After the pipe units have been joined, a feeler gage shall be inserted into the recess and moved around the periphery of the joint to detect any irregularity in the position of the rubber gasket. If the gasket cannot be "felt" all around, the joint shall be disassembled. The joint shall be reassembled with a new gasket.

3.3 WELDED JOINTS

A. **General:** Field welded joints shall be in accordance with ANSI/AWWA C206 - Field Welding of Steel Water Pipe.

B. Where exterior welds are performed, adequate space shall be provided for welding and inspection of the joints.

C. Butt straps shall be as indicated.

D. After the pipe and joint are properly positioned in the trench, the length of pipe between joints shall be backfilled to at least one foot above the top of the pipe. Care shall be exercised during the initial backfilling to prevent movement of the pipe and to prevent any backfill material from being deposited on the joint.

E. For coal tar enamel/tape coated pipe, a heat resistant shield shall be draped over at least 24 inches of coating beyond the holdback on both sides of the weld during welding to avoid damage to the coating by hot weld splatter. Welding grounds shall not be attached to the coated part of the pipe

F. To control temperature stresses, the unbackfilled joint areas of the pipe shall be shaded from the direct rays of the sun by the use of properly supported awnings, umbrellas, tarpaulins, or other suitable materials for a minimum period of 2 hours prior to the beginning of the welding operation and until the weld has been completed. Shading materials at the joint area shall not rest directly on the pipe but shall be supported to allow air circulation around the pipe. Shading of the pipe joints need not be performed when the ambient air temperature is below 45 degrees F.

G. **Shrinkage Control Joints:** At intervals not exceeding 250 feet along welded reaches of the pipeline and at the first regular lap-welded field joints outside concrete encasements and structures, the pipe shall be laid with an initial lap of not less than 1-inch greater than the minimum lap dimension. The welding of each such shrinkage control joint shall be performed when the temperature is approximately the lowest during the 24-hour day, after at least 250 feet of pipe have been laid and the joints have been welded ahead of and in back of the shrinkage control joint, and after backfill has been completed to at least 1-foot above the top of the pipe ahead of and in back of the shrinkage control joint. Where shrinkage control joints occur in a traveled roadway or other inconvenient location, the location of the shrinkage control joint may be adjusted, as acceptable to the COUNTY.

H. Prior to the beginning of the welding procedure, any tack welds used to position the pipe during laying shall be removed. Any annular space between the faying surfaces of the bell and spigot shall be equally distributed around the circumference of the joint by shimming, jacking, or other suitable means. The weld shall then be made in accordance with ANSI/AWWA C206. Where more than one pass is required, each pass except the first and final one shall be peened to relieve shrinkage stresses; and all dirt, slag, and flux shall be removed before the succeeding bead is applied.

I. Prior to butt welding, the pipe and joint shall be properly positioned in the trench using line up clamps so that, in the finished joint, the abutting pipe sections shall not be misaligned more than 1/16-inch.

J. **Joints:** The pipe ends shall be cut straight on joints where butt straps are used for realignment, adjustment, or deflection, and fillet welds shall be made as indicated.

K. Full circumference lap joint welds shall be performed inside and outside for steel pipe 24-inches and larger. Joints shall be either single-butt welded or lap welded on the outside of pipe for steel pipe less than 24 inches in diameter. Unless double fillet welds are indicated, field welded lap joints shall be made on the outside of the pipe.

L. Unless double fillet welds are indicated, field welded lap joints may, at the CONTRACTOR option, be made on either the inside or the outside of the pipe.

M. **Inspection of Field Welded Joints:** An independent testing laboratory acceptable to the COUNTY but paid by the CONTRACTOR shall inspect the joints. Inspection shall be as soon as practicable after the welds are completed.

1. Fillet welds shall be tested by the Magnetic Particle Inspection Method in accordance with ASME Section VIII, Division 1, Appendix VI.

2. In addition, double fillet welds on butt strap joints shall be tested by the soap solution method using approximately 40 psi air pressure introduced between the plates through a threaded hole as indicated. Test holes shall be plugged by a threaded plug or welding following successful testing.

3. Butt welds shall be inspected by radiographic methods in accordance with API Standard 1104.

N. Following tests of the joint, the exterior joint spaces shall be coated in accordance with these specifications after which backfilling may be completed.

O. **Repair of Welds:** Welds that are defective shall be repaired by the CONTRACTOR to meet the requirements of the applicable sections of these specifications. Defects in welds or defective welds shall be removed, and that section of the joint shall then be re-welded. Only sufficient removal of defective material that is necessary to correct the defect is required. After the repair is made, the joint shall be checked by repeating the original test procedure. Welds deficient in size shall be repaired by adding weld metal.

3.4 JOINT COATING AND LINING

A. **General:** The interior and exterior joint recesses shall be thoroughly wiped clean and all water, loose scale, dirt, and other foreign material shall be removed from the inside surface of the pipe. The grout for joint coating and lining for cement mortar coated pipe shall be cement grout in accordance with Section 036000 - Grout, except that composition shall be one part cement to two parts sand and sufficient water for dry-pack consistency for joint linings and thick cream consistency for joint coatings. Cement, sand, and water shall comply with Section 036000 - Grout.

B. **Joint Coating of Cement Mortar Coated Pipe:** After the pipe has been laid and after sufficient backfill has been placed between the joints to hold the pipe securely in place, the outside annular space between pipe sections shall be completely filled with grout formed by the use of polyethylene foam-lined fabric bands. The grout space shall be flushed with water prior to filling so that the surface of the joint to be in contact with the grout will be thoroughly moistened when the grout is poured. The joint shall be filled with grout by pouring from one side only, and shall be rodded with a wire or other flexible rod or vibrated so that the grout completely fills the joint recess by moving down one side of the pipe, around the bottom of the pipe and up the opposite side. Pouring and rodding the grout shall be continued to allow completion of the filling of the entire joint recess in one operation. Care shall be taken to leave no unfilled space. Grouting of the outside joint spaces shall be kept as close behind the laying of the pipe as possible except that in no case shall grouting be closer than 3 joints of the pipe being laid.

C. **Joint Coating of Shop-Applied Coal Tar Enamel/Tape Coated Pipe:** Joints shall be coated using heavy duty joint wrap in accordance with Section 099000 - Protective Coatings.

D. All joints will be tested by the with an electrical flaw detector capable of at least a 12,000

volt output, furnished by the CONTRACTOR. The tests will be made using a voltage of 6,000 to 7,000 volts. Holidays shall be repaired by the CONTRACTOR at no expense to the COUNTY.

E. **Coating Repair:** Coating repair shall be made using heavy duty joint wrap and primer in accordance with Section 099000 - Protective Coatings.

F. **Coating of Fittings and Specials:** Fittings and specials shall be coated using heavy duty joint wrap in accordance with Section 099000 - Protective Coatings.

G. **Grout Bands (Diapers):** The grout bands or heavy-duty diapers shall be polyethylene foam-lined fabric with steel strapping of sufficient strength to hold the fresh mortar, resist rodding of the mortar, and allow excess water to escape. The foam plastic shall be 100 percent closed cell, chemically inert, insoluble in water and resistant to acids alkalies and solvents, and shall be Dow Chemical Company, Ethafoam 222, or equal.

H The fabric backing shall be cut and sewn into 9-inch wide strips with slots for the steel strapping on the outer edges. The polyethylene foam shall be cut into strips 6 inches wide and slit to a thickness of 1/4-inch which will expose a hollow or open cell surface on one side. The foam liner shall be attached to the fabric backing with the open or hollow cells facing towards the pipe. The foam strip shall cover the full interior circumference of the grout band with sufficient length to permit an 8-inch overlap of the foam at or near the top of the pipe joint. Splices to provide continuity of the material will be permitted. The polyethylene foam material shall be protected from direct sunlight.

I. The polyethylene foam-lined grout band shall be centered over the joint space with approximately equal widths extending over each pipe end and securely attached to the pipe with the steel straps. After filling the exterior joint space with grout, the flaps shall be closed and overlapped in a manner that fully encloses the grout with polyethylene foam. The grout band shall remain in position on the pipe joint.

J. **Joint Lining:** After the backfill has been completed to final grade, the interior joint recess shall be filled with grout. The grout shall be tightly packed into the joint recess and troweled flush with the interior surface. All excess shall be removed. At no point shall there be an indentation or projection of the mortar exceeding 1/16-inch. With pipe smaller than 24 inches in diameter, before the spigot is inserted into the bell, the bell shall be daubed with grout. The joint shall be completed and excess mortar on the inside of the joint shall be swabbed out.

3.5 INSTALLATION OF PIPE APPURTENANCES

A. **Protection of Appurtenances:** Where the joining pipe is concrete or coated with cement mortar, buried appurtenances shall be coated with a minimum thickness of one inch of cement mortar having one part cement to not more than 2 parts plaster sand. Where the joining pipe is coal tar enamel/tape coated, buried appurtenances shall be coated with Trenton Wax Tape #1 in accordance with Section 330509-Piping General.

B. **Installation of Valves:** Valves shall be handled in a manner to prevent any injury or damage to any part of the valve. Joints shall be thoroughly cleaned and prepared prior to installation. The CONTRACTOR shall adjust stem packing and operate each valve prior to installation to insure proper operation. Valves shall be installed so that the valve stems are plumb and in the location indicated.

C. Buried valves and flanges shall be coated and protected in accordance with Section 099000 - Protective Coatings.

D. **Installation of Flanged Joints:** Before the joint is assembled, the flange faces shall be thoroughly cleaned of all foreign material with a power wire brush. The gasket shall be centered and the connecting flanges drawn up watertight without unnecessarily stressing the flanges. Gaskets shall be 1/8 inch thick for steel pipe 14 inches in diameter and greater. Bolts shall be tightened in a progressive diametrically opposite sequence and torqued with a suitable, approved, and calibrated torque wrench. Clamping torque shall be applied to the nuts only. Ring type non-asbestos gaskets shall be applied to the inside face of blind flanges with adhesive.

E. **Insulated Joints:** Insulated joints and appurtenant features shall be provided as indicated. The CONTRACTOR shall exercise special care when installing these joints to prevent electrical conductivity across the joint. After the insulated joint is completed, an electrical resistance test shall be performed by the CONTRACTOR. Should the resistance test indicate a short circuit, the CONTRACTOR shall remove the insulating units to inspect for damage, replace all damaged portions, and reassemble the insulating joint. The insulated joint shall then be retested to assure proper insulation.

F. **Flexible Coupled Joints:** When installing flexible couplings, care shall be taken that the connecting pipe ends, couplings and gaskets are clean and free of all dirt and foreign matter with special attention being given to the contact surfaces of the pipe, gaskets, and couplings. The couplings shall be assembled and installed in conformity with the recommendation and instruction of the coupling manufacturer.

G. Wrenches used in bolting couplings shall be of a type and size recommended by the coupling manufacturer. Coupling bolts shall be tightened so as to secure a uniform annular space between the follower rings and the body of the pipe with all bolts tightened approximately the same amount. Diametrically opposite bolts shall be tightened progressively and evenly. Final tightening shall be done with a suitable, approved, and calibrated torque wrench set for the torque recommended by the coupling manufacturer. Clamping torque shall be applied to the nut only.

3.6 CORROSION CONTROL

A. **Joint Bonding/Electrolysis Test Stations:** Except where otherwise indicated, all joints shall be bonded with a minimum of one steel jumper rod, cad-welded to each pipe, or as shown on the Construction Drawings. Jumper rods shall a minimum length of 3", and a minimum diameter of ¼" with a minimum welded contact length of 1" on each pipe. Plastic coated steel jumper wire (8 gauge minimum) shall also be installed across all valves and fittings. The pipe shall be cleaned to bare bright metal at the point where the bond is installed. In addition, electrolysis test stations shall be installed where indicated.

B. **Cathodic Protection:** Corrosion mitigation and testing materials, such as an impressed current cathodic protection system, magnesium anodes, reference electrodes, and test lead wires shall be provided where indicated on the Construction Drawings and in accordance with Section 134713 Cathodic Protection for Underground and Submerged Piping.

END OF SECTION

SECTION 331213

BACKFLOW PREVENTION DEVICES

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall furnish and install all lead-free backflow prevention devices with associated valves, piping, instrumentation, and controls as shown on the Construction Drawings and specified herein, complete and operable, for backflow prevention. For fire lines, a double check detector assembly shall be used unless there is secondary source of pressurized water or recycled water on site, in which case a Reduced Pressure (RP) Zone Backflow device shall be used.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 330509 – Piping, General
Section 331417 – Service Connections
Section 331423 – Manholes, Vaults, & Meter Boxes

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. **Codes:** All codes, as referenced herein, are specified in Section 014200 - Reference Standards.

B. **Commercial Standards:**

ISA - S 5.1	Instrumentation Symbols and Identification
ANSI - B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800
ANSI/AWWA C207	Steel Pipe Flanges for Waterworks Service - Sizes 4 In Through 144 In.
ANSI/AWWA C510	Double Check Valve Backflow Prevention Assembly
ANSI/AWWA C511	Reduced Pressure Principle Backflow Prevention Assembly

1.4 CONTRACTOR SUBMITTALS

A. The CONTRACTOR shall submit complete shop drawings of backflow prevention devices for review in accordance with Section 013300 - Contractor Submittals. With the shop drawings, the CONTRACTOR shall also furnish certified curves indicating flow versus differential pressure.

PART 2 - PRODUCTS

2.1 BACKFLOW PREVENTION DEVICES

A. Approved devices shall be lead-free and shall be as outlined in Part III of these Standards & Specifications. Devices shall conform to the requirements of the COUNTY, the County of Santa Barbara Environmental Health Services Division, the State of California Department of Drinking Water, and AWWA Standards C510 and C511.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The CONTRACTOR shall assemble and install all equipment specified herein, in strict accordance with the manufacturer's published instructions. under the supervision of the manufacturer's representative, under the general review of the COUNTY. All installations shall be accomplished by competent craftsmen in a workmanlike manner. At a minimum testing and certifications shall be completed after meter installation and before it is unlocked for permanent use. Ongoing testing shall be performed on an annual basis.

3.2 BACKFLOW PREVENTION DEVICES

A. Backflow Prevention devices shall be installed as required by the signed Plans, these Standards & Specifications and the County of Santa Barbara Environmental Health Services Division.

3.3 TESTING

A. Equipment shall be prepared for operational use in accordance with manufacturer's instructions, including bench test and calibration, where required. Each item shall be subjected to an operating test over the total range of capability of the equipment. Where applicable, tests shall be conducted in accordance with the Test Code of the Standards of the Hydraulic Institute.

3.4 ACCEPTANCE BY AGENCY

A. Final acceptance of the equipment is contingent on satisfactory operation after installation and certification of backflow prevention device.

END OF SECTION

SECTION 312316

TRENCHING, BACKFILL, AND COMPACTION

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall dewater trench and structure excavations, perform all earthwork and trenching operations indicated and required for construction of the WORK, mobilize for pavement work, provide advance notification of the affected residents, perform preparation work, construct all asphalt concrete pavements, furnish and apply all prime coats and tack coats as required, and replace pavement markings and striping complete and in place, in accordance with Santa Barbara County or City of Santa Barbara Standards & Specifications and the Contract Documents. The CONTRACTOR shall secure all necessary permits to complete the requirements of this Section of the Specifications.

B. Where indicated and approved by the COUNTY, the CONTRACTOR shall provide Controlled Low Strength Material (CLSM), complete and in place, in accordance with the Contract Documents for the following purposes:

1. Normal CLSM with high slump, non-segregating consistency that readily flows and fills voids and difficult to reach places: trench zone fill, pipe abandonment, structure backfill, and structure cavity fill.

2. Foundation CLSM is used where higher early strengths are required and future excavation is not likely to be required.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 015526 – Traffic Control & Access
Section 330507 – Boring & Jacking

1.3 CONTRACTOR SUBMITTALS

A. Prior to commencement of excavation, the CONTRACTOR shall submit a detailed plan and operation schedule for dewatering of excavations. The CONTRACTOR may be required to demonstrate the system proposed and to verify that adequate equipment, personnel, and materials are provided to dewater the excavations at all locations and times. The CONTRACTOR's dewatering plan is subject to review by the COUNTY and PROJECT ENGINEER.

B. The CONTRACTOR's attention is directed to the provisions for "Shoring and Bracing Drawings" in Section 6705 of the California Labor Code. The CONTRACTOR, prior to beginning any trench or structure excavation 5 feet deep or over shall submit to the COUNTY and shall be in receipt of the COUNTY'S written acceptance of the CONTRACTOR's detailed plan showing design of all shoring, bracing, sloping of the sides of excavation, or other provisions for worker protection against the hazard of caving ground during the excavation of such trenches or structure excavation. If such plan varies from the shoring system standards established in the Construction Safety Orders of the State of California, such alternative systems plans shall be prepared by a civil or structural engineer licensed in the State of California.

C. The CONTRACTOR shall submit a copy of the excavation permit issued by the California Department of Industrial Safety.

D. The CONTRACTOR shall submit samples of all materials as well as the asphalt concrete mix design and associated materials proposed to be used in the work in accordance with the requirements in Section 013300.

E. Submit CLSM mix designs which show the proportions and gradations of all materials proposed for each type of CLSM indicated. Each mix design shall be accompanied by independent laboratory test results of the indicated properties.

1.4 QUALITY CONTROL

A. It shall be the sole responsibility of the CONTRACTOR to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the CONTRACTOR.

B. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals to detect any settlement which may develop. The responsibility for conducting the dewatering operation in a manner that will protect adjacent structures and facilities rests solely with the CONTRACTOR. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the CONTRACTOR.

C. At the option of the COUNTY INSPECTOR, asphalt mix, subgrade, aggregate base course, and asphalt pavement may be tested by the COUNTY testing laboratory and paid for by the COUNTY in accordance with Section 014200 – Reference Standards. Sample sizes shall be as determined by the testing laboratory.

D. All CLSM testing will be done by a testing laboratory selected by the COUNTY at the COUNTY'S expense, except as otherwise indicated.

E. If tests of the CLSM show non-compliance with the specifications, the CONTRACTOR shall make changes as may be required to achieve compliance. Performing and paying for subsequent testing to show compliance shall be the CONTRACTOR's responsibility.

PART 2 - PRODUCTS

2.1 DEWATERING EQUIPMENT

A. Dewatering, where required, may include the use of well points, sump pumps, temporary pipelines for water disposal, rock or gravel placement, and other means. Standby pumping equipment shall be maintained on the job site.

2.2 SUITABLE FILL AND BACKFILL MATERIAL REQUIREMENTS

A. **General:** Fill, backfill, and embankment materials shall be suitable selected or processed clean, fine earth, rock, or sand, free from grass, roots, brush, or other vegetation.

B. Fill and backfill materials to be placed within 6 inches of any structure or pipe shall be free of rocks or unbroken masses of earth materials having a maximum dimension larger than 3 inches.

C. **Suitable Materials:** Materials not defined as unsuitable in Section 2.3 shall be reviewed by the COUNTY and may be used in fills, backfilling, and embankment construction subject to the indicated limitations and at the COUNTY'S discretion. In addition, when acceptable to the COUNTY, some of the material listed as unsuitable may be used when thoroughly mixed with suitable material to form a stable composite.

D. Suitable materials may be obtained from on-site excavations (if applicable), may be processed on-site materials, or may be imported. If imported materials are required by this Section or to meet the quantity requirements of the project, the CONTRACTOR shall provide the imported materials at no additional expense to the COUNTY, unless a unit price item is included for imported materials in the bidding schedule.

E. The following types of suitable materials are defined:

1. **Type A (three-quarters inch minus granular backfill):** Crushed rock or gravel, and sand

with the gradation requirements below. The material shall have a minimum sand equivalent value of 28 and a minimum R-value of 78. If the sand equivalent value exceeds 35 the R-value requirement is waived.

Sieve Size	Percentage Passing
3/4-inch	100
No. 4	30 - 50
No. 200	0 - 12

2. **Type B (Class I crushed stone):** Manufactured angular, crushed stone, crushed rock, or crushed slag with the following gradation requirements. The material shall have a minimum sand equivalent value of 75.

Sieve Size	Percentage Passing
3/4-inch	100
No. 4	30 - 50
No. 200	0 - 5

3. **Type C (sand backfill):** Sand with the following gradation requirements, and with a sand equivalent value not less than 30.

Sieve Size	Percentage Passing
1/2-inch	100
No. 4	85 - 100
No. 8	70 - 95
No. 200	0 - 10

4. **Type F (coarse drainrock):** Crushed rock or gravel with the size gradation for Size Number 4 in ASTM C 33

5. **Type G (aggregate base):** Crushed rock aggregate base material of such nature that it can be compacted readily by watering and rolling to form a firm, stable base for pavements. At the option of the CONTRACTOR, the grading for either the 1-1/2-inch maximum size or 3/4-inch maximum size gradation shall be used. The sand equivalent value shall be not less than 22, and the material shall meet the following gradation requirements:

	Percentage Passing	
Sieve Size	1-1/2-inch Max Gradation	3/4-inch Max. Gradation
2-inch	100	-
1-1/2-inch	90 - 100	-
1-inch	-	100
3/4-inch	50 - 85	90 - 100
No. 4	25 - 45	35 - 55
No. 30	10 - 25	10 - 30
No. 200	2 - 9	2 - 9

6. **Type H (graded drainrock):** Drainrock shall be crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying. The material shall be uniformly graded and shall meet the gradation requirements for Size Number 57 in ASTM C 33. The drainrock shall have a sand equivalent value not less than 75. The finish graded surface of the drainrock immediately beneath hydraulic structures shall be stabilized to provide a firm, smooth

surface upon which to construct reinforced concrete floor slabs.

7. **Type I:** Not Used.

8. **Type K (topsoil):** Stockpiled topsoil material which has been obtained at the site by removing soil to a depth not exceeding 1 foot. Removal of the topsoil shall be done after the area has been stripped of vegetation and debris.

9. **Type L (controlled low strength material):** Controlled low strength material shall be in accordance with this section.

2.3 UNSUITABLE FILL MATERIAL

A. Unsuitable materials include the materials listed below.

1. Soils which, when classified under ASTM D 2487 - Standard Classification of Soils for engineering Purposes (Unified Soil Classification System), fall in the classifications of Pt, OH, CH, MH, or OL.

2. Soils which cannot be compacted sufficiently to achieve the density specified for the intended use.

3. Materials that contain hazardous or designated waste materials including petroleum hydrocarbons, pesticides, heavy metals, and any material which may be classified as hazardous or toxic according to applicable regulations.

4. Soils that contain greater concentrations of chloride or sulfate ions, or have a soil resistivity or pH less than the existing on-site soils.

5. Topsoil, except as allowed by Section 2.4.

2.4 USE OF FILL, BACKFILL, AND EMBANKMENT MATERIAL TYPES

A. The CONTRACTOR shall use the types of materials as designated herein for all required fill, backfill, and embankment construction hereunder.

B. Where these Specifications conflict with the requirements of any local agency having jurisdiction or with the requirements of a pipe material manufacturer, the COUNTY shall be immediately notified. In case of conflict between types of pipe zone bedding, the CONTRACTOR shall use the agency-specified bedding material if that material provides a greater degree of structural support to the pipe, as determined by the COUNTY. In case of conflict between types of trench or final backfill types, the CONTRACTOR shall use the agency-specified backfill material if that material provides the greater in-place density after compaction.

C. Fill and backfill types shall be used in accordance with the following provisions:

1. Embankment fills shall be constructed of Type I material, as defined herein, or any mixture of Type I and Type A through Type H materials.

2. Pipe zone bedding for mortar coated steel pipe, ductile iron pipe, and PVC pipe shall be Type C backfill (pipe bedding) material. Pipe zone bedding for PVC pipe, coal tar enamel coated or tape wrapped steel pipe, and polyethylene encased ductile iron pipe shall be Type C backfill (pipe bedding) material.

3. Trench zone and final backfill for pipelines under paved areas, as defined under "Pipe and Utility Trench Backfill," shall be Type L backfill material unless otherwise shown or specified. Trench zone and final backfill under areas not paved shall be select native material free of rocks larger than 3-inches and free of deleterious material, or Types A, C or G, backfill materials or any mixture thereof.

In agricultural or landscaped areas Type K material shall be used for final backfill unless otherwise indicated.

4. Trench backfill and final backfill for pipelines under structures shall be the same material as used in the pipe zone, except where concrete encasement is required by the Contract Documents.

5. Backfill around structures shall be Type A through Type H materials, or any mixture thereof, except as shown.

6. Backfill materials beneath structures shall be as follows:

   a. Drain rock materials under hydraulic structures or other water retaining structures with underdrain systems shall be Type H material.

   b. Under concrete hydraulic structures or other water retaining structures without underdrain systems, Types G or H materials shall be used.

   c. Under structures where groundwater must be removed to allow placement of concrete, Type F material shall be used. Before the Type F material is placed, filter fabric shall be placed over the exposed foundation.

   d. Under all other structures, Type G or H material shall be used.

7. Backfill used to replace pipeline trench over-excavation shall be a layer of Type F material with a top layer of filter fabric to prevent migration of fines for wet trench conditions or the same material as used for the pipe zone bedding if the trench conditions are not wet.

8. The top 6 inches of embankment fills around hydraulic structures, and all other embankment fills shall consist of Type K material, topsoil.

9. Filter fabric shall be per COUNTY direction.

2.5 SOIL MATERIALS TESTING

A. All soils testing of samples submitted by the CONTRACTOR will be done by a testing laboratory of the COUNTY'S choice and at the COUNTY'S expense. At its discretion, the COUNTY may request that the CONTRACTOR supply samples for testing of any material used in the work.

B. Particle size analysis of soils and aggregates will be performed using ASTM D 422 - Standard Test Method for Particle-Size Analysis of Soils.

C. Determination of sand equivalent value will be performed using ASTM D 2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

D. **Unified Soil Classification System:** References in this Section to soil classification types and standards shall have the meanings and definitions indicated in ASTM D 2487. The CONTRACTOR shall be bound by all applicable provisions of said ASTM D 2487 in the interpretation of soil classifications.

E. The testing for chloride, sulfate, resistivity, and pH will be done in accordance with California Test Methods 417, 422 and 643 of the California Department of Transportation.

2.6 ASPHALT CONCRETE PAVING MATERIALS

A. All materials required for asphalt concrete pavement construction as specified herein shall conform to the Caltrans Standard Specifications:

B. Asphalt concrete for roadway pavement shall be Type B, Grade AR-4000 as specified in Section

39 with ½" mix, unless specified otherwise. Asphalt concrete for construction of sidewalks, berms, dikes, or curbs shall be Type B, Grade AR-4000 as specified in Section 39 with 3/8" mix, unless specified otherwise. Paint binder shall be SS-1h emulsified asphalt conforming requirements of Section 94. Base course shall be treated Class 2 aggregate base material. Paint for traffic stripes and pavement markings shall conform to Section 84.

2.7 CONTROLLED LOW STRENGTH MATERIAL

A. CLSM shall be a mixture of cement, pozzolan, coarse and fine aggregate, admixtures, and water, mixed in accordance with ASTM C 94 - Ready Mixed Concrete.

B. **Composition:** The following parameters shall be within the indicated limits and as necessary to produce the indicated compressive strengths.

1. Mix proportions as necessary

2. Entrained air content shall be between [0][20] percent minimum and [6][30] percent maximum.

3. Water reducing agent content as necessary

C. Properties

1. Density shall be between 120 PCF minimum and 145 PCF maximum

2. Slump shall be as required by the CONTRACTOR's methods, but shall not promote segregation nor shall slump exceed 9 inches.

3. Compressive strength at 28 days: **300** psi

a. Normal CLSM: Between 100 psi minimum and 300 psi maximum (1 sack of cement per cubic yard). Unless specifically indicated otherwise, all CLSM shall be Normal CLSM.

b. Foundation CLSM: 1,000 psi minimum.

D. Cement

1. Cement shall be Type I or II in accordance with ASTM C 150 - Portland Cement.

E. Pozzolan

1. Pozzolan shall be Type F or C in accordance with ASTM C 618 – Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete. Pozzolan content, by weight, in Normal CLSM shall not be greater than cement content.

F. Aggregate

1. Aggregate shall consist of a well graded mixture of crushed rock, soil, or sand, with a nominal maximum size of 3/8-inch. One hundred percent shall pass the 3/4-inch sieve; no more than 30 percent shall be retained on the 3/8-inch sieve; and no more than 12 percent shall pass the number 200 sieve. If more than 5 percent of the aggregate passes the number 200 sieve, the material passing the number 200 sieve shall have a plasticity index of less than 0.73 (liquid limit-20), when tested in accordance with ASTM D 4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils. All aggregate shall be free from organic matter and shall not contain more alkali, sulfates, or salts than the native materials at the Site.

G. Admixtures

1. Air entraining admixtures shall be in accordance with ASTM C 260 - Air-Entraining Admixtures for Concrete.

2. Water reducing admixtures shall be in accordance with ASTM C 494 - Chemical Admixtures for Concrete.

H. Water

1. Water shall be potable, clean and free from objectionable quantities of silt, organic matter, alkali, salt, and other impurities.

PART3 - EXECUTION

3.1 DEWATERING GENERAL REQUIREMENTS

A. The CONTRACTOR shall provide all equipment necessary for dewatering. It shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all times, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failure.

B. Dewatering for structures and pipelines shall commence when groundwater is first encountered, and shall be continuous until such times as water can be allowed to rise in accordance with the provisions of this Section or other requirements. Water shall be kept from entering the open ends of newly installed pipe or the cut end of a waterline where a connection is to occur.

C. At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and be pumped or drained by gravity from the excavation to maintain a bottom free from standing water.

D. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

E. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with drain rock.

F. The CONTRACTOR shall remove water that accumulates in the excavation during the progress of the WORK so that work occurs in a substantially dry trench. The CONTRACTOR shall maintain trenches or other excavations free from water while the pipe or structures are being installed, while concrete is setting, and until backfill has progressed to a sufficient height to anchor the WORK against possible flotation or leakage. All loose material shall be removed from the bottom of the trench prior to placement of any pipe bedding material.

G. The CONTRACTOR shall prevented flotation by maintaining positive and continuous removal of water. The CONTRACTOR shall be fully responsible and liable for all damages which may result from failure to adequately keep excavations dewatered.

H. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sand packed and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the CONTRACTOR shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.

I. The CONTRACTOR shall dispose of water from the WORK in a safe manner without damage to adjacent properties in accordance with COUNTY direction. CONTRACTOR shall be responsible for obtaining any permits that may be necessary to dispose of water. No water shall be drained into work built or under

construction without prior consent of the COUNTY. Water shall be filtered using an approved method to remove sand and fine-sized soil particles before disposal into any drainage system.

J. When making connection to the domestic water system, if greater than 25% of the water within a trench or excavation is caused by leakage of a system isolation valve from the domestic water system, the CONTRACTOR shall dechlorinate the water before disposal into any drainage system.

K. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures, pipelines, and sewers.

L. Dewatering of trenches and other excavations shall be considered as incidental to the construction of the WORK and all costs thereof shall be included in the various items of work, unless a separate bid item has been established for dewatering.

3.2 EXCAVATION - GENERAL

A. **General:** Except when specifically provided to the contrary, excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the WORK. The removal of said materials shall conform to the lines and grades indicated or ordered.

B. **Sheeting, Shoring and Bracing:** The CONTRACTOR shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations and trenches. Excavations and trenches shall be sloped or otherwise supported in a safe manner in accordance with applicable CAL/OSHA requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926). As a minimum, lateral pressures for design of trench sheeting, shoring, and bracing shall be based on type of soil exposed in the trench, groundwater conditions, surcharge loads adjacent to the trench, and type of shoring that will be used in the trench.

3.3 PROTECTION OF EXISTING UTILITIES AND FACILITIES

A. **General:** The CONTRACTOR shall be responsible for the care and protection of all existing sewer pipelines, water pipelines, gas mains, electrical and communications conduits, cables, storm drains, culverts, or other facilities and structures that may be encountered in or near the area of Work.

B. **Notification:** It shall be the duty of the CONTRACTOR to notify each agency having jurisdiction and make arrangements for locating each agency's facilities prior to beginning construction.

C. **Damage:** In the event of damage to any existing facilities during the progress of the work due to the failure of the CONTRACTOR to exercise the proper precautions, the CONTRACTOR shall be responsible for the cost of all repairs and protection to said facilities. The CONTRACTOR's work may be stopped until repair operations are complete.

D. **Storage and Disposal of Excavated Material:** During trench excavation, store excavated material only within the Work area. Do not obstruct roadways, streets, bike paths, or sidewalks. CONTRACTOR shall remove and dispose of excess excavated soil material off the Project site at no additional cost to the COUNTY, in accordance with local regulations.

3.4 STRUCTURE, ROADWAY, AND EMBANKMENT EXCAVATION

A. **Excavation Beneath Structures and Embankments:** Except where otherwise indicated for a particular structure or ordered by the COUNTY, excavation shall be carried to the grade of the bottom of the footing or slab. Where indicated or ordered, areas beneath structures or fills shall be over-excavated. The subgrade areas beneath embankments shall be excavated to remove not less than the top 6 inches of native material and where such subgrade is sloped, the native material shall be benched. When such over-excavation

is indicated, both over-excavation and subsequent backfill to the required grade shall be performed by the CONTRACTOR. When such over-excavation is not indicated but is ordered by the COUNTY, such over-excavation and any resulting backfill will be paid for under a separate unit price bid item if such bid item has been established; otherwise payment will be made in accordance with a negotiated price. After the required excavation or over-excavation has been completed, the exposed surface shall be scarified to a depth of 6 inches, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain 95 percent of maximum density.

B. **Excavation Beneath Paved Areas:** Excavation under areas to be paved shall extend to the bottom of the aggregate base or subbase, if such base is called for; otherwise it shall extend to 1 inch below the existing paving thickness. After the required excavation has been completed, the top 6 inches of exposed surface shall be scarified, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain 95 percent of maximum density. The finished subgrade shall be even, self-draining, and in conformance with the slope of the finished pavement. Areas that could accumulate standing water shall be regraded to provide a self-draining subgrade.

C. **Notification of COUNTY:** The CONTRACTOR shall notify the COUNTY at least 3 days in advance of completion of any structure excavation and shall allow the COUNTY a review period of at least one day before the exposed foundation is scarified and compacted or is covered with backfill or with any construction materials.

3.5 PIPELINE AND UTILITY TRENCH EXCAVATION

A. **General:** Unless otherwise indicated or ordered, excavation for pipelines and utilities shall be open-cut trenches with widths as indicated. Trenches shall be excavated to line and grade as shown on the Plans (Construction Drawings). Excavation for water lines shall be made only after pipe and other necessary materials are delivered to the project site and inspected by the COUNTY'S INSPECTOR. Where trenching occurs in paved areas, the pavement shall be saw cut ahead of the trenching operations. The proper tools and equipment shall be used in marking and breaking so that the pavement will be cut accurately and on neat lines parallel to the trench. Material excavated from trenches shall be placed in such a way as not to endanger the health of the workers or the public. Excavated material shall not be stockpiled within the public right-of-way, or placed in areas where it could be hazardous to traffic, or block access to roads or driveways. Excavation within the public right-of-way shall be performed in compliance with the requirements of the County of Santa Barbara Department of Public Works.

B. **Trench Geometry:** Trenches shall be constructed to allow for safe installation of pipe and structures. Trench width shall be in accordance with COUNTY Standard Details except when stated otherwise on the Plans and Specifications. The bottom of the trench shall be excavated uniformly to the grade of the bottom of the pipe bedding. Trench bottom shall consist of firm native soil or imported compacted soil able to evenly support pipe bedding for the full length of the pipe. Excavations for pipe bells and welding shall be made as required.

C. **Abrasive Materials:** When rocks, concrete, or other hard and abrasive materials are encountered during excavation, it may be required that all or a portion of the material be removed to provide a minimum clearance of 12 inches below and on each side of pipe, valves and fittings. If in the opinion of the COUNTY damage to other systems or structures will occur by the removal of material, CONTRACTOR shall not proceed until receiving further instructions from the COUNTY.

D. **Unsuitable Foundation:** If soft, spongy, unstable or other similar material is encountered upon which the pipe bedding material is to be placed, an additional 12 inches in depth of this unsuitable material shall be removed and replaced with bedding material placed in the manner specified for pipe bedding material. Tree roots are to be removed.

E. **Protection of Property:** Tree, shrubs, fences and all other property and surface structures shall be protected during construction unless the Plans and Specifications call for their removal.

F. **Temporary Supports:** When other structures, pipes, conduits, cables, wires or any underground improvements are encountered during excavation they shall be temporarily supported as necessary to

prevent damage to or disturbance of said improvements.

G. Exploratory Excavation

1. The CONTRACTOR shall excavate and expose buried points of connection to existing utilities where indicated on the Drawings. Excavation shall be performed prior to preparation of Shop Drawings for connections and before fabrication of pipe, and the data obtained shall be used in preparing Shop Drawings.

2. Data, including dates, locations excavated, and sketches, shall be submitted to the COUNTY within one week of excavation.

3. Damage to utilities from excavation activities shall be repaired by the CONTRACTOR.

H. **Open Trench:** The maximum amount of open trench permitted in any one location shall be 300 feet, or a length equivalent to the amount of pipe able to be installed in a single day, whichever is less. Trenches shall not remain open overnight. All trenches shall be fully backfilled at the end of each workday, or shall be properly shored and covered by heavy steel plates adequately braced and capable of supporting vehicular traffic in those locations where it is impractical to backfill at the end of each day. The above requirements for backfilling or use of steel plates may be waived at the discretion of the INSPECTOR in cases where the trench is located further than 100 feet from any traveled roadway or occupied structure. In such cases, however, barricades and warning lights meeting safety requirements shall be provided and maintained.

I. Over-Excavation (Not Indicated)

1. When ordered by the COUNTY to over-excavate trenches deeper and/or wider than required by the Contract Documents, the CONTRACTOR shall over-excavate to the dimensions ordered and backfill to the indicated grade of the bottom of the pipe bedding.

2. **Payment.** Over-excavation less than 6-inches more than the indicated trench depth and/or width shall be done at no increase in cost. Additional payment will be made for over-excavation 6 inches or more than the indicated depth and/or width. Additional payment will be based on unit price bid items for over-excavation if such bid items were established; otherwise payment will be based on a negotiated price. Volumes of material will be based on survey measurements of the over-excavated area.

J. Where pipelines are to be installed in embankments, fills, or structure backfills, the fill shall be constructed to a level at least one foot above the top of the pipe before the trench is excavated.

K. If a moveable trench shield is used during excavation operations, the trench width shall be wider than the shield so that the shield is free to be lifted and then moved horizontally without binding against the trench sidewalls. If the trench walls cave in or slough, the trench shall be excavated as an open excavation with sloped sidewalls or with trench shoring, as indicated and as required by the pipe structural design.

3.6 OVER-EXCAVATION NOT ORDERED OR INDICATED

A. Any over-excavation carried below the grade ordered or indicated, shall be backfilled and compacted to the required grade with the indicated material.

3.7 EXCAVATION IN LAWN AND LANDSCAPED AREAS

A. Where excavation occurs in landscaped areas, CONTRACTOR shall protect all trees, shrubs, sidewalk, walls, fences, and other landscape items adjacent to or within the work area unless directed otherwise by the Contract Documents. In the event of damage to landscape items, CONTRACTOR shall replace the damaged items in a manner satisfactory to the COUNTY at no cost to the COUNTY.

B. Where excavation occurs in lawn areas, the sod shall be carefully removed, dampened, and stockpiled to preserve it for replacement. Excavated material may be placed on the lawn; provided, that a drop cloth or

other suitable method is employed to protect the lawn from damage. The lawn shall not remain covered for more than 72 hours. Immediately after completion of backfilling [and testing of the pipeline], the sod shall be replaced and lightly rolled in a manner so as to restore the lawn as near as possible to its original condition. CONTRACTOR shall provide new sod if stockpiled sod has not been replaced within 72 hours.

C. Except where trees are indicated to be removed, trees shall be protected from injury during construction operations. No tree roots over 2 inches in diameter shall be cut without express permission of the COUNTY. Trees shall be supported during excavation by any means previously reviewed by the COUNTY.

3.8 ROCK EXCAVATION

A. **Explosives and Blasting:** Blasting will not be permitted.

3.9 BACKFILL - GENERAL

A. Backfill shall not be dropped directly upon any structure or pipe. Backfill shall not be placed around or upon any structure until the concrete has attained sufficient strength to withstand the loads imposed. Backfill around water retaining structures shall not be placed until the structures have been tested, and the structures shall be full of water while backfill is being placed.

B. Except for drain rock materials being placed in over-excavated areas or trenches, backfill shall be placed after all water is removed from the excavation, and the trench sidewalls and bottom have been dried to a moisture content suitable for compaction.

C. Immediately prior to placement of backfill materials, the bottoms and sidewalls of trenches and structure excavations shall have all loose sloughing, or caving soil and rock materials removed. Trench sidewalls shall consist of excavated surfaces that are in a relatively undisturbed condition before placement of backfill materials.

3.10 PLACING AND SPREADING OF BACKFILL MATERIALS

A. Backfill materials shall be placed and spread evenly in layers. When compaction is achieved using mechanical equipment, the layers shall be evenly spread so that when compacted each layer shall not exceed 6 inches in thickness.

B. During spreading, each layer shall be thoroughly mixed as necessary to promote uniformity of material in each layer. Pipe zone bedding materials shall be manually spread around the pipe so that when compacted the pipe bedding will provide uniform bearing and side support.

C. Where the backfill material moisture content is below the optimum moisture content, water shall be added before or during spreading until the proper moisture content is achieved. Where the backfill material moisture content is too high to permit the specified degree of compaction the material shall be dried until the moisture content is satisfactory.

3.11 COMPACTION OF FILL, BACKFILL, AND EMBANKMENT MATERIALS

A. Each layer of Types A, B, C, G, H, I, and K backfill materials as defined herein, where the material is graded such that 10 percent or more passes a No. 4 sieve, shall be mechanically compacted to the indicated percentage of density. Equipment that is consistently capable of achieving the required degree of compaction shall be used and each layer shall be compacted over its entire area while the material is at the required moisture content.

B. Each layer of Type F backfill materials shall be compacted by means of at least 2 passes from a flat plate vibratory compactor. When such materials are used for pipe zone backfill, vibratory compaction shall be used at the top of the pipe zone or at vertical intervals of 24 inches, whichever is the least distance from the subgrade.

C. Flooding, ponding, or jetting shall not be used for backfill around structures, for final backfill materials, or aggregate base materials.

D. Equipment weighing more than 10,000 pounds shall not be used closer to walls than a horizontal distance equal to the depth of the fill at that time. Hand operated power compaction equipment shall be used where use of heavier equipment is impractical or restricted due to weight limitations.

E. Backfill around and over pipelines that is mechanically compacted shall be compacted using light, hand operated, vibratory compactors and rollers. After completion of at least two feet of compacted backfill over the top of pipeline, compaction equipment weighing no more than 8,000 pounds may be used to complete the trench backfill.

3.12 TESTING FOR COMPACTION

A. **Methods:** Classification of pipe bedding and trench backfill materials shall be determined in accordance with ASTM D 2487. The density of soil in place shall be determined by the sand cone method, ASTM D 1556, or by the nuclear method, ASTM D 2922 or D 3017. When ASTM D 2922 is used and a one-sack slurry in not used to backfill the trench, the calibration curves shall be checked and adjusted using the sand cone method. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 (Nuclear Gauge Method for Water Content) shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks, as described in ASTM D 3017. The calibration checks of both the density and moisture curves shall be made at the beginning of the job and on each different type of material used. Copies of calibration curves, results of calibration tests, and results of laboratory tests shall be furnished to the COUNTY prior to performing any field tests. Field test results shall be furnished to the COUNTY within 48 hours of the testing. Trenches improperly compacted shall be reopened to the depth directed by the COUNTY, then filled and compacted to the density specified at no additional cost to the COUNTY.

B. **Soil Moisture-Density Relationship:** Laboratory moisture-density relations of soils shall be determined per ASTM D 1557.

C. **Cohesionless Materials:** Relative density of cohesionless materials by ASTM D 4253 and D 4254.

D. **Sampling:** Sample backfill materials per ASTM D 75.

E. **Relative Compaction:** "Relative compaction" shall be defined as the ratio, expressed as a percentage, of the in place dry density to the laboratory maximum dry density.

F. **Compaction Compliance:** Compaction shall be deemed to comply with the specifications when none of the tests falls below the specified relative compaction. Notify the COUNTY 24-hours in advance of when backfill lifts are ready for testing to allow inspection by the COUNTY. The CONTRACTOR shall pay the costs of any re-testing of work not conforming to the Specifications.

G. **Testing Frequency:** Testing shall be performed by a certified soils testing service. All tests shall be performed at locations specified by the COUNTY. A minimum of one soil classification and one and trench backfill. These tests shall also be performed for every 1500 cubic yards of material placed. A minimum of one field density test shall be performed for each soil type, and at least one test for each 24" compacted thickness. These test requirements shall be repeated for every 300 feet of trench length.

H. **Compaction Requirements:** The following compaction test requirements shall be in accordance with ASTM D 1557 - Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft - lbf/ft^3) (2,700 kN-m/m^3) for Type A, B, C, G, H, I, K, M, and N materials and in accordance with ASTM D 4253 - Standard Test Method for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table, and D 4254 - Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density, for Type B, E, F, and J materials. Where agency or utility company

requirements govern, the highest compaction standards shall apply.

Location or Use of Fill	Percentage of Maximum Density	Percentage of Relative Density
Pipe bedding and over-excavated zones under bedding for flexible pipe, including trench plugs.	95	70
Pipe bedding and over-excavated zones under bedding for rigid pipe.	90	55
Final backfill, beneath paved areas or structures.	95	70
Final backfill, not beneath paved areas or structures.	90	55
Trench zone backfill, beneath paved areas and structures.	95	70
Trench zone backfill, not beneath paved areas or structures.	90	55
Embankments and fills.	90	55
Embankments and fills beneath paved areas or structures.	95	70
Backfill beneath structures and hydraulic structures.	95	70
Topsoil (Type K material)	80	N.A.
Aggregate base or sub-base (Type G or M material)	95	N.A.

3.13 PIPE AND UTILITY TRENCH BACKFILL

A. Pipe Zone Bedding

1. The pipe zone is defined as that portion of the vertical trench cross-section lying between the trench bottom and a plane 12-inches above the top surface of the pipe as indicated. The pipe bedding is defined as backfill material within the pipe zone. Bedding shall be placed across the entire trench extending from a minimum of four inches below the bottom of the pipe to 12 inches above the top of pipe. Bedding shall be placed in layers not exceeding six inches loose thickness for compaction by hydraulic or hand operated mechanical compactors, and eight inches loose thickness when compacted by other mechanical compactors. Bedding shall be compacted to at least 90% of its maximum dry density as determined by ASTM D 1557. Bell holes in bedding shall be provided for each joint, but shall be no larger than necessary to allow joint assembly and to ensure that pipe will lie flat on the bedding. CONTRACTOR shall ensure that pipe is not being supported by the bell portion of the pipe at any joint and shall ensure that no less than 2 inches of bedding is provided for yokes, restraints, bells and all other extensions of fittings and joints.

2. The pipe zone shall be backfilled with the indicated backfill material. The CONTRACTOR

shall exercise care to prevent damage to the pipeline coating, cathodic bonds, and the pipe itself during the installation and backfill operations.

B. Trench Zone Backfill: After the pipe zone backfill has been placed, backfilling of the trench zone may proceed. The trench zone is defined as that portion of the vertical trench cross-section from 12 inches above the top of the pipe to the bottom of the pavement zone if the trench is under pavement, or to within 12 inches of finished grade if the trench is in an unpaved area. Where slurry backfill is not used, material shall be compacted to at least 95% of maximum dry density as determined by ASTM D 1557. Trench shall be backfilled in lifts not exceeding eight inches, uncompacted depth, and then compacted by mechanical means prior to placement of succeeding lifts. Where the pipeline is located within an existing paved street within the public right of way, trench shall be backfilled with Type L backfill material as described above.

C. Pavement Zone Backfill and Final Backfill: The pavement zone includes the asphalt concrete and aggregate base pavement section. Final backfill applies to trenches not beneath paved areas and is all backfill in the trench cross-sectional area within 12 inches of finished grade.

D. Identification Tape: Install identification tape as indicated.

3.14 FILL AND EMBANKMENT CONSTRUCTION

A. The area where a fill or embankment is to be constructed shall be cleared of all vegetation, roots and foreign material. Following this, the surface shall be moistened, scarified to a depth of six inches, and rolled or otherwise mechanically compacted. Embankment and fill material shall be placed and spread evenly in approximately horizontal layers. Each layer shall be moistened or aerated, as necessary. Unless otherwise approved by the COUNTY, each layer shall not exceed 6 inches of compacted thickness. The embankment, fill, and the scarified layer of underlying ground shall be compacted to 95 percent of maximum density under structures and paved areas, and 90 percent of maximum density elsewhere.

B. When an embankment or fill is to be made and compacted against hillsides or fill slopes steeper than 4:1, the slopes of hillsides or fills shall be horizontally benched to key the embankment or fill to the underlying ground. A minimum of 12 inches normal to the slope of the hillside or fill shall be removed and re-compacted as the embankment or fill is brought up in layers. Material thus cut shall be re-compacted along with the new material. Hillside or fill slopes 4:1 or flatter shall be prepared in accordance with Paragraph A, above.

C. Where embankment or structure fills are constructed over pipelines, the first 4 feet of fill over the pipe shall be constructed using light placement and compaction equipment that does not damage the pipe. Heavy construction equipment shall maintain a minimum distance from the edge of the trench equal to the depth of the trench until at least 4 feet of fill over the pipe has been completed.

3.15 FIELD TESTING

A. **General:** All field soils testing will be done by a testing laboratory of the COUNTY'S choice at the COUNTY'S expense except as indicated below.

B. Where soil material is required to be compacted to a percentage of maximum density, the maximum density at optimum moisture content will be determined in accordance with Method C of ASTM D 1557. Where cohesionless, free draining soil material is required to be compacted to a percentage of relative density, the calculation of relative density will be determined in accordance with ASTM D 4253 and D 4254. Field density in-place tests will be performed in accordance with ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place By Nuclear Methods (Shallow Depth), or by such other means acceptable to the COUNTY.

C. In case the test of the fill or backfill show non-compliance with the required density, the CONTRACTOR shall accomplish such remedy as may be required to insure compliance. Subsequent testing to show compliance shall be by a testing laboratory selected by the COUNTY and paid by the CONTRACTOR.

D. The CONTRACTOR shall provide test trenches and excavations including excavation, trench support, and groundwater removal for the COUNTY'S field soils testing operations. The trenches and excavations shall be provided at the locations and to the depths required by the COUNTY.

3.16 ASPHALT CONCRETE

A. General: Furnishing, placing, shaping, rolling, and finishing asphalt concrete for pavement, berms, dikes, and curbs shall be performed in accordance with local jurisdiction's Standards and Section 39 of the Caltrans Standard Specifications.

B. Wherever required by the governing agency, the Contractor shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said agency before proceeding with the final restoration of improvements.

C. All paved areas, including curbs and berms, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the permit of the governing agency. All temporary and permanent pavement shall conform to the requirements of the governing agency.

D. In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent resurfacing of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines.

E. Pavement and base shall be constructed to the line, grade and thickness shown on the Construction Drawings. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

3.17 BASE AND SUBGRADE BELOW ASPHALT CONCRETE

A. The preparation of the subgrade to receive aggregate base course, and preparation and construction of aggregate base for construction of asphalt concrete paving shall conform to the requirements of the applicable sections of the Caltrans Standard Specifications.

B. Spreading and compacting of base material shall conform to the requirements of Section 26 of the Caltrans Standard Specifications.

C. Base course shall be maintained until asphalt pavement is placed. Areas of base course which are damaged or do not conform to the requirements herein shall be conditioned, reshaped, and recompacted in accordance with the requirements herein.

D. Compaction tests will be performed by the COUNTY, in accordance with the requirements of the applicable sections of the Caltrans Standard Specifications.

3.18 TACK COAT

A. An asphalt tack coat shall be applied to all existing asphalt concrete or concrete surfaces upon or against which asphalt concrete is to be placed. Application of tack coat shall conform to the requirements of Section 39 of the Caltrans Standard Specifications.

3.19 ASPHALT CONCRETE PAVING

A. Asphalt concrete paving shall be constructed in accordance with the requirements of Section 39 of the Caltrans Standard Specifications.

3.20 ASPHALT CONCRETE PAVEMENT MARKING AND STRIPING

A. Asphalt concrete pavement shall be marked and striped to replace all markings and striping disturbed by the paving operation in accordance with Section 84 of the Caltrans Standard Specifications.

3.21 CLSM PREPARATION

A. Subgrade and compacted fill to receive CLSM shall be prepared according to this section.

3.22 BATCHING, MIXING AND DELIVERY OF CLSM

A. Batching, mixing, and delivery of CLSM shall conform to ASTM C 94. CLSM shall be mixed at a batch plant acceptable to the COUNTY and shall be delivered in standard transit mix trucks.

3.23 PLACEMENT OF CLSM

A. CLSM shall be placed by tailgate discharge, conveyor belts, pumped, or other means acceptable to the COUNTY. CLSM shall be directed in place by vibrator, shovel, or rod to fill all crevices and pockets. Avoid over-consolidation which causes separation of aggregate sizes.

B. CLSM shall be continuously placed against fresh material unless otherwise approved by the COUNTY. When new material is placed against existing CLSM, the placement area shall be free from all loose and foreign material. The surface of the existing material shall be soaked a minimum of one hour before placement of fresh material but no standing water shall be allowed when placement begins.

C. Temperature of the CLSM shall be between 50 and 90 degrees F, when placed. CLSM shall not be placed when the air temperature is below 40 degrees F. No CLSM shall be placed against frozen subgrade or other materials having temperature less than 32 degrees F.

3.24 FINISHING OF CLSM

A. The finish surface shall be smooth and to the grade indicated or directed by the COUNTY. Surfaces shall be free from fins, bulges, ridges, offsets, and honeycombing. Finishing by wood float, steel trowel, or similar methods is not required.

3.25 CURING OF CLSM

A. CLSM shall be kept damp for a minimum of 7 days or until final backfill is placed.

3.26 PROTECTION OF CLSM

A. CLSM shall be protected from freezing for 72 hours after placement.

B. No fill or loading shall be placed on CLSM until probe penetration resistance, as measured in accordance with ASTM C 803 - Standard Test Method for Penetration Resistance of Hardened Concrete, exceeds 650 psi.

C. CLSM shall be protected from running water, rain, and other damage until the material has been accepted and final fill completed.

END OF SECTION

SECTION 330110

WATERLINE DISINFECTION & TESTING

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall perform flushing, disinfection, and testing of all waterlines, services, and appurtenances, complete, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 330509 – Piping, General
Section 330519 – Ductile Iron Pipe (AWWA C151, Modified)
Section 330524 – Steel Pipe (AWWA C200, Modified)
Section 330531 – PVC Pressure Pipe (ACCA C900, Modified)

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

ANSI/AWWA B300	Hypochlorites.
ANSI/AWWA B301	Liquid Chlorine.
ANSI/AWWA C651	Disinfecting Water Mains.

1.4 CONTRACTOR SUBMITTALS

A. A proposed plan and schedule for water conveyance, cleaning, disinfection, flushing and water disposal, and pressure testing shall be submitted in writing for approval a minimum of two weeks before testing is to start. The plan shall demonstrate that personnel are experienced and prepared to resolve problems which may arise.

PART 2 - PRODUCTS

2.1 MATERIALS REQUIREMENTS

A. All test equipment, chemicals for chlorination, temporary valves, bulkheads, or other water control equipment and materials shall be selected and furnished by the CONTRACTOR subject to the COUNTY'S review. No materials shall be used which would be injurious to the construction or its future function.

B. Chlorine for disinfection may be in the form of liquid chlorine or sodium hypochlorite solution.

C. Liquid chlorine shall be in accordance with the requirements of ANSI/AWWA B301. Liquid chlorine shall be used only:

1. In combination with appropriate gas flow chlorinators and ejectors;
2. Under the direct supervision of an experienced technician;
3. When appropriate safety practices are observed.

D. Sodium hypochlorite and calcium hypochlorite shall be in accordance with the requirements of ANSI/AWWA B300.

PART 3 - EXECUTION

3.1 GENERAL

A. All waterlines, services, and appurtenances shall be disinfected prior to pressure and leakage testing. Unless otherwise indicated, water for disinfecting and testing waterlines shall be furnished by the CONTRACTOR on private contracts and by COUNTY contracts. In both cases the CONTRACTOR shall make all necessary provisions for conveying the water from the COUNTY -designated source to the points of use. The CONTRACTOR shall furnish all equipment and materials for disinfection and testing of waterlines.

B. Disinfection shall be accomplished by chlorination. All disinfection and testing operations shall be performed in the presence of the COUNTY. All pressure waterlines, services, and appurtenances shall be disinfected and tested.

C. Disinfection operations shall be scheduled by the CONTRACTOR as late as possible during the contract time period so as to assure the maximum degree of sterility of the facilities at the time the WORK is accepted by the COUNTY.

3.2 DISINFECTING PIPELINES

A. **General:** All potable waterlines, services, and appurtenances shall be disinfected in accordance with the requirements of ANSI/AWWA C651. Prior to disinfecting, waterlines shall be flushed or blown out as appropriate.

B. **Chlorine-water solution method:** A chlorine-water solution shall be uniformly introduced into the waterline by means of a solution-feed chlorinating device. The chlorine solution shall be introduced at one end of the pipeline through a tap such that the concentration of free chlorine in the water entering the pipe is a minimum of 25 mg/l. Care shall be taken to prevent the strong chlorine solution in the waterline being disinfected from flowing back into the line supplying the water. The table below provides the quantity of chlorine required to produce 25 mg/L concentration in 100 feet of pipe – by diameter.

Pipe Diameter (inches)	12.5 % Chlorine Solution (ounces)
4	0.16
6	0.36
8	0.65
10	1.02
12	1.44
16	2.60

C. Tablet Method: The tablet method may be used only when all foreign materials have been kept out of the waterline during construction. If groundwater has entered the pipe during installation and tablets havebeen installed, CONTRACTOR shall flush main and use chlorine-water solution method. Do not use this method if the temperature is below 41 degrees Fahrenheit. Tablets shall be secured with non-toxic adhesive in each pipe length in top of pipe. The table below provides the number of 5-g hypochlorite tablets required for a minimum dose of 25 mg/L, based on 3.25g available chlorine per tablet.

Pipe Diameter	Length of pipe section				
	13 ft	18 ft	20 ft	30 ft	40 ft
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

D. **Disinfection:** Assure valves are closed on existing system to prevent chlorine solution flowing into water supply system. Chlorinated water shall be retained in the waterline long enough to destroy all non-spore-forming bacteria. This period shall be at least 24 hours. After the chlorine-treated water has been retained for the required time, the free chlorine residual at the waterline extremities and at other representative points shall be at least 10 mg/l. Should the chlorine level drop below 10 mg/l at the end of 24 hours, the waterline shall be flushed and the disinfection procedure repeated until 10 mg/l residual is achieved.

E. **Chlorinating Valves:** During the disinfection process of chlorinating the waterline, all valves, hydrants, and other appurtenances shall be operated while the pipeline is filled with the heavily-chlorinated water.

F. **Sampling Ports:** The CONTRACTOR shall provide sampling ports along the waterline as defined in AWWA C651.

G. **Preliminary Flushing:** Prior to chlorinating, waterlines shall be filled to eliminate air pockets and flushed to remove particulates.

H. **Final Flushing:** After disinfection is successfully completed, the heavily chlorinated water shall be flushed from the pipeline using fresh potable water until chlorine measurements show that the concentration in the water leaving the pipeline is no higher than 2 mg/l. The CONTRACTOR shall notify the COUNTY that final flushing will be required. The COUNTY will then send personnel to operate COUNTY valves and assist the CONTRACTOR with the final flushing. If there is any question that the chlorinated discharge will cause damage to the environment, a reducing agent shall be applied to the water to neutralize thoroughly the chlorine residual remaining in the water.

I. **Bacteriological Testing:** After final flushing and before the waterline is placed in service, two consecutive sets of samples, taken at least 24 hours apart shall be collected from the ends and intermediate points of the line. Samples shall be tested for bacteriological quality in accordance with the requirements of the State Department of Health Services. For this purpose, for the first set of samples, the pipe shall be re-filled with fresh potable water and left for a period of 24 hours before any sample is collected, for the second set of samples, wait at least 24 hours after the first set of samples were collected and tested before any sample is collected. CONTRACTOR shall contact the COUNTY a minimum of 3 working days prior to requested date of sampling. The COUNTY will collect samples and perform bacteriological tests. Should the initial disinfection treatment fail to produce satisfactory bacteriological test results, the disinfection procedure shall be repeated until acceptable results are obtained.

3.3 PRESSURE AND LEAKAGE TESTING OF WATERLINES

A. Prior to pressure and leakage testing, waterlines shall be flushed or blown out as appropriate. The CONTRACTOR shall test all waterlines either in sections or as a unit. Test sections shall not exceed 1000 feet in length. No section of waterline shall be tested until all field-placed concrete or mortar has attained an age of

14 days, or the waterline has been fully restrained against thrust forces. The test shall be made by closing valves when available, or by placing temporary bulkheads in the pipe and filling the line slowly with water. The CONTRACTOR shall be responsible for ascertaining that all test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, the adjacent pipe. Any unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test, to avoid movement and damage to piping and equipment. The CONTRACTOR shall utilize waterline appurtenances or provide sufficient temporary air tappings in the waterline to allow for evacuation of all entrapped air in each pipe segment to be tested. After completion of the tests, such taps shall be permanently plugged. Care shall be taken to see that all air vents are open during filling.

B. The waterline shall be filled at a rate which will not cause any surges or exceed the rate at which the air can be released through the air valves at a reasonable velocity and all the air within the pipeline shall be properly purged. For steel and ductile iron pipe, after the waterline has been filled, it shall be allowed to stand under a slight pressure for at least 24 hours to allow the mortar lining to absorb what water it will and to allow air to escape from any air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures shall be taken.

C. **Pressure Test:** The hydrostatic test shall consist of holding the test pressure (+/- 5 psi) on the waterline for a period of 2 hours. The test pressure at the low point of the section being tested shall be 1.5 times the working pressure or 100 psi, whichever is greater. At the end of the pressure test period, the amount of water used to maintain the test pressure shall be determined.

D. **Leakage Test:** The leakage test shall be conducted concurrently with the pressure test. Leakage is defined as the quantity of water that must be supplied to a section of pipe to maintain the pressure within 5 psi of the specified test pressure after the pressure test has begun. The maximum allowable leakage shall be according to the following formula:

$$L = S \times D \times P^{1/2} / 133{,}200$$

where:
L = leakage (gallons per hour)
S = length (feet), the lessor of the actual length being tested or the maximum length for determining leakage. Maximum length for determining leakage is [2000 feet].
D = pipe diameter (inches)
P = test pressure (psi)

Pipe with welded joints shall have no leakage.

E. Waterlines, services, and appurtenances that fail to pass the prescribed pressure and leakage test shall be considered defective WORK. The CONTRACTOR shall determine the cause of the failure/leakage, repair the leaks, and shall retest the waterline.

3.4 CONNECTIONS TO EXISTING SYSTEM

A. Where connections are to be made to an existing potable water system, the interior surfaces of all pipe and fittings used in making the connections shall be swabbed or sprayed with a one percent hypochlorite solution before they are installed. Thorough flushing shall be started as soon as the connection is completed and shall be continued until discolored water is eliminated.

END OF SECTION

SECTION 330509

PIPING, GENERAL

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide all piping systems indicated, complete and operable, including pipe supports, hangers, guides, anchors, and connection to and abandonment of existing water facilities in accordance with these Standards & Specifications and Contract Documents.

B. The provisions of this Section shall apply to all piping sections in Divisions 2 and 33.

C. The drawings define the general layout, configuration, routing, method of support, pipe size, and pipe type. The drawings are not pipe construction or fabrication drawings. It is the CONTRACTOR's responsibility to develop the details necessary to construct all piping systems, to accommodate the specific equipment provided, and to provide all spools, spacers, adapters, and connectors for a complete and functional system.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 028200 – Asbestos Cement Pipe Removal and Disposal
Section 055000 – Miscellaneous Metalwork
Section 099000 – Protective Coatings
Section 312316 – Trenching, Backfill, and Compaction
Section 330110 – Waterline Disinfection and Testing

1.3 CONTRACTOR SUBMITTALS

A. **General:** Submittals shall be furnished in accordance with Section 013300 - Contractor Submittals.

B. **Shop Drawings:** Shop Drawings shall contain the following information:

1. Drawings: Layout drawings including all necessary dimensions, details, pipe joints, fittings, specials, bolts and nuts, gaskets, valves, appurtenances, anchors, guides, and material lists. Fabrication drawings shall indicate all spool pieces, spacers, adapters, connectors, fittings, and supports to accommodate the equipment and valves in a complete and functional system.

2. Drawings of pipe supports, hangers, anchors, and guide rails.

3. Calculations for special supports and anchors

C. **Samples:** Performing and paying for sampling and testing as necessary for certifications are the CONTRACTOR'S responsibility.

D. Certifications

1. All necessary certificates, test reports, and affidavits of compliance shall be obtained by the CONTRACTOR.

2. A certification from the pipe fabricator that all pipes will be manufactured subject to the fabricator's or other recognized Quality Control Program.

1.4 EXISTING FACILITIES

A. **Location:** As the Contractor's first order of work, the various connection points to the existing waterlines shall be potholed to identify depth, diameter and pipe material. Pothole information shall be immediately provided to the COUNTY for review. The COUNTY will not review any other Contractor Submittals until after the pothole data is received.

B. **Leak-By:** The Contractor shall note that existing COUNTY valves do not close drip tight. Existing valves in many areas are known to allow significant leak-by when fully closed. The Contractor shall expect leak-by conditions and provide the necessary labor, materials, and equipment to address this condition such that the connection can be made under safe conditions for personnel and contaminated water is prevented from entering the open ends of the existing and new mains. The Contractor shall not operate any COUNTY valves. Only COUNTY personnel shall operate existing system valves to facilitate the Contractors connection work. Also, only COUNTY personnel shall operate valves connecting new mains to the existing in-service mains

PART 2 - PRODUCTS

2.1 GENERAL

A. **Extent of Work:** Pipes, fittings, and appurtenances shall be provided in accordance with the requirements of the applicable Sections of Divisions 2 and 33 and as indicated.

B. **Pipe Supports:** Pipes shall be adequately supported, restrained, and anchored in accordance with this Section and as indicated.

C. **Coating:** Pipes above ground or in structures shall be field-coated in accordance with Section 099000 - Protective Coatings.

D. **Pressure Rating:** Piping systems shall be designed for the maximum expected pressure as defined in Section 330110 - Water Pipeline Testing and Disinfection, or as indicated on the Piping Schedule. Minimum pressure rating shall be 200 psi, which corresponds to a working pressure of 133 psi when pressure tested at 1.5 times the working pressure. Where there is a working pressure greater the 133 psi, the minimum pressure rating shall be 305 psi.

E. **Inspection:** Pipe shall be subject to inspection at the place of manufacture. During the manufacture of the pipe, the COUNTY shall be given access to all areas where manufacturing is in progress and shall be permitted to make all inspections necessary to confirm compliance with requirements.

F. **Tests:** Except where otherwise indicated, materials used in the manufacture of the pipe shall be tested in accordance with the applicable specifications and standards. The CONTRACTOR shall be responsible for performing material tests.

H. **Welder Qualifications:** Welding shall be done by skilled welders and welding operators who have adequate experience in the methods and materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 by an independent local, approved testing agency not more than 6 months prior to commencing work on the pipeline. Machines and electrodes similar to those used in the work shall be used in qualification tests. Qualification testing of welders and materials used during testing are part of the work.

2.2 PIPE FLANGES

A. **General:** Flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe (2-holed) unless otherwise indicated. Attachment of the flanges to the pipe shall conform to the applicable requirements of ANSI/AWWA C207. Flange faces shall be perpendicular to the axis of the adjoining pipe. Flanges for miscellaneous small pipes shall be in accordance with the standards indicated for these pipes.

B. Pressure Ratings

1. **150 psi or less:** Flanges shall conform to either ANSI/AWWA C207 - Steel Pipe Flanges for Waterworks Service--Sizes 4 In. Through 144 In., Class D, or ANSI/ASME B16.5 - Pipe Flanges and Flanged Fittings, 150-lb class.

2. **150 psi to 275 psi:** Flanges shall conform to ANSI/ASME B16.5, 300-lb class.

3. **275 psi to 700 psi:** Flanges shall conform to ANSI/ASME B16.5, 300-lb class.

4. **Selection based on test pressure:** AWWA flanges shall not be exposed to test pressures grater than 125 percent of rated capacity. For higher test pressures, the next higher rated AWWA flange or an ANSI-rated flange shall be selected.

C. **Blind Flanges:** Blind flanges shall be in accordance with ANSI/AWWA C207, or as indicated for miscellaneous small pipes. Blind flanges for pipe sizes 12 inches and greater shall be provided with lifting eyes in form of welded or screwed eye bolts.

D. **Flange Coating:** Machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.

E. **Flange Bolts:** Bolts and nuts shall conform to Section 055000 - Miscellaneous Metalwork.

Studs and bolts shall extend through the nuts a minimum of 1/4-inch. All-thread studs shall be used on all valve flange connections, where space restrictions preclude the use of regular bolts.

F. **Insulating Flanges:** Insulated flanges shall have bolt holes 1/4-inch diameter greater than the bolt diameter.

G. **Insulating Flange Sets:** Insulating flange sets shall be provided where indicated. Each insulating flange set shall consist of an insulating gasket, insulating sleeves and washers and a steel washer. Insulating sleeves and washers shall be one piece when flange bolt diameter is 1-1/2-inch or smaller and shall be made of acetal resin. For bolt diameters larger than 1-1/2-inch, insulating sleeves and washers shall be 2-piece and shall be made of polyethylene or phenolic material. Steel washers shall be in accordance with ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength. Insulating gaskets shall be full-face.

H. Insulating Flange Manufacturers, or equal

JM Red Devil, Type E
Maloney Pipeline Products Co., Houston
PSI Products, Inc.

I. Flange Gaskets: Gaskets for flanged joints shall be ring type, with material and thickness in accordance with ANSI/AWWA C207, suitable for temperatures to 700 degrees F, a pH of one to eleven, and pressures to 1000 psig. Blind flanges shall have gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange.

J. Flange Gasket Manufacturers, or equal

John Crane, Style 2160
Garlock, Style 3000

2.3 THREADED INSULATING CONNECTIONS

A. **General:** Threaded insulating bushings, unions, or couplings, as appropriate, shall be used for joining threaded pipes of dissimilar metals and for piping systems where corrosion control and cathodic protection are involved.

B. **Materials:** Threaded insulating connections shall be of nylon, Teflon, polycarbonate, polyethylene, or other non-conductive materials, and shall have ratings and properties to suit the service and loading conditions.

2.4 MECHANICAL-TYPE COUPLINGS & MECHANICAL JOINT ADAPTERS

A. **Mechanical-type Couplings:** Cast mechanical-type couplings (grooved or banded pipe) shall be provided where indicated. The couplings shall conform to the requirements of ANSI/AWWA C606 - Grooved and Shouldered Joints. Bolts and nuts shall conform to the requirements of Section 055000 - Miscellaneous Metalwork. Gaskets for mechanical-type couplings shall be compatible with the piping service and fluid utilized, in accordance with the coupling manufacturer's recommendations. The wall thickness of grooved piping shall conform with the coupling manufacturer's recommendations to suit the highest expected pressure. To avoid stress on equipment, equipment connections with mechanical-type couplings shall have rigid-grooved couplings or flexible type coupling with harness in sizes where rigid couplings are not available, unless thrust restraint is provided by other means. Mechanical-type couplings shall be bonded. Have the coupling manufacturer's service representative verify the correct choice and application of couplings and gaskets, and the workmanship, to assure a correct installation. To assure uniform and compatible piping components, all grooved fittings, couplings, and valves shall be from the same manufacturer.

B. Manufacturers of Couplings for Steel Pipe, or equal

Aeroquip Corp. (banded or grooved)
Victaulic Style 41 or 44 (banded, flexible)
Victaulic Style 77 (grooved, flexible)
Victaulic Style 07 or HP-70 (grooved, rigid)

C. Manufacturers of Ductile Iron Pipe Couplings, or equal

Aeroquip Corp.
Victaulic Style 31 (flexible or rigid grooving)

Note: Ductile iron pipe couplings shall be furnished with flush seal gaskets.

D. Manufacturers of Couplings for PVC Pipe, or equal

Aeroquip Corp
Victaulic Style 77

Note: Couplings for PVC pipe shall be furnished with radius cut or standard roll grooved pipe ends.

E. **Mechanical Joint Adapters:** The direct connection of mechanical joint (MJ) fittings shall be made using MJ restraint adapters where indicated on the Construction Drawings. The MJ restraint adapters shall be constructed of ductile iron and comply with applicable AWWA Standards. Bolts and nuts shall conform to the requirements of Section 055000 - Miscellaneous Metalwork. The MJ restraint adapters shall be designed for a working pressure of 200 psi and to withstand a test pressure of 250 psi. MJ restraint adapters shall be lined and coated in accordance with AWWA C104 and C110. Manufacturer shall be Infact Corporation, Foster Adaptor, or approved equal.

2.5 SLEEVE-TYPE COUPLINGS

A. **Construction:** Sleeve-type couplings shall be provided where indicated, in accordance with ANSI/AWWA C219 - Standard for Bolted Sleeve-Type Couplings for Plain-End Pipe. Couplings shall be steel with steel bolts, without pipe stop. Couplings shall be of sizes to fit the pipe and fittings indicated. The middle ring shall be not less than 1/4-inch in thickness and shall be either 5 or 7 inches long for sizes up to and including 30 inches and 10 inches long for sizes greater than 30 inches, for standard steel couplings, and 16 inches long for

long-sleeve couplings. The followers shall be single-piece contoured mill sections welded and cold-expanded as required for the middle rings, and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket. Bolts and nuts shall conform to the requirements of Section 055000 – Miscellaneous Metal Work. Buried sleeve-type couplings shall be epoxy-coated at the factory as indicated.

B. **Pipe Preparation:** Where indicated, the ends of the pipe shall be prepared for flexible steel couplings. Plain ends for use with couplings shall be smooth and round for a distance of 12 inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe. The middle ring shall be tested by cold-expanding a minimum of one percent beyond the yield point, to proof-test the weld to the strength of the parent metal. The weld of the middle ring shall be subjected to air test for porosity.

C. Gaskets

1. Gaskets for sleeve-type couplings shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. Gaskets for wastewater and sewerage applications shall be Buna "N," Grade 60, or equivalent suitable elastomer. The rubber in the gasket shall meet the following specifications:

a. Color - Jet Black
b. Surface - Non-blooming
c. Durometer Hardness - 74 plus or minus 5
d. Tensile Strength - 1000 psi Minimum
e. Elongation - 175 percent Minimum

2. The gaskets shall be immune to attack by impurities normally found in water or wastewater. All gaskets shall meet the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above. Gaskets shall be compatible with the piping service and fluid utilized.

D. **Insulating Couplings:** Where insulating couplings are required, both ends of the coupling shall have a wedge-shaped gasket which assembles over a rubber sleeve of an insulating compound in order to obtain insulation of all coupling metal parts from the pipe.

E. **Restrained Joints:** Sleeve-type couplings on pressure lines shall be harnessed unless thrust restraint is provided by other means. Harnesses shall be designed by the pipe manufacturer in accordance with Manual M11, or as indicated. Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed.

F. Manufacturers, or equal

Dresser
Ford Meter Box Co.
Smith-Blair
Romac

2.6 FLANGED COUPLING ADAPTERS

A. **Construction:** Flanged coupling adapters (FCA's) shall be provided where indicated, in accordance with the applicable provisions of ANSI/AWWA C219 - Standard for Bolted Sleeve-Type Couplings for Plain-End Pipe. FCA's shall be steel with steel bolts, and sized to fit the pipe and fittings indicated. The middle ring shall be not less than 1/4-inch in thickness and shall be a minimum of 5 inches long for sizes up to and including 30 inches. The followers shall be single-piece contoured mill sections welded and cold-expanded as required for the middle ring, and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket. Bolts and nuts shall be stainless steel. FCA's shall be epoxy-coated at the factory as indicated.

B. **Pipe Preparation:** Where indicated, the end of the pipe shall be prepared for use with the FCA and shall be smooth and round for a distance of 12 inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe.

C. Gaskets:

1. Gaskets for FCA's shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. The rubber in the gasket shall meet the following specifications:

Color - Jet Black
Surface - Non-blooming
Durometer Hardness - 74 plus or minus 5
Tensile Strength - 1000 psi Minimum
Elongation - 175 percent Minimum

2. The gaskets shall be immune to attack by impurities normally found in water or wastewater. All gaskets shall meet the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above. Gaskets shall be compatible with the piping service and fluid utilized.

D. **Restrained Joints:** FCA's shall be restrained by the use of thrust blocks, harnesses, or other means. Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed. For PVC and ductile iron pipe, EBAA Iron Sales, Mega-Flange may be substituted for restrained FCA's.

E. Manufacturers, or equal

Dresser, Style 127 & 128W
Smith-Blair, Style 911
Romac, Style FC400 & FCA501
EBAA Iron Sales, Mega-Flange

2.7 EXPANSION JOINTS

A. Piping subject to expansion and contraction shall be provided with sufficient means to compensate for such movement without exertion of undue forces to equipment or structures. This may be accomplished with expansion loops, bellow-type expansion joints, or sliding-type expansion joints. Expansion joints shall be of stainless steel, monel, rubber, or other materials best suited for each individual service. Submit detailed calculations and manufacturer's Shop Drawings of all proposed expansion joints, piping layouts, and anchors and guides, including information on materials, temperature and pressure ratings.

2.8 PIPE THREADS

A. Pipe threads shall be in accordance with ANSI/ASME B1.20.1 - Pipe Threads, General Purpose (inch), and be made up with Teflon tape unless otherwise indicated.

2.9 RESTRAINING GLANDS AND JOINT HARNESSES

A. Restraining glands shall be of a model and type designed for the intended pipe material and service conditions, and shall be EBAA Iron Sales, Romac, or approved equal. Joint harnesses shall be of a model and type designed for the intended pipe material and service conditions, and shall be EBAA Iron Sales, Romac, Star, Sigma, or approved equal.

2.10 THRUST BLOCKS

A. Thrust blocks and anchor blocks shall be constructed of Portland Cement Concrete with a minimum compressive strength of 2500 psi. Anchor rods for anchor blocks shall be #5 rebar or 5/8 inch diameter steel rods, and shall be epoxy coated.

2.11 TAPE WRAPPING AND CATHODIC PROTECTION

A. All nuts and bolts on all pipe fittings shall be primered and single tape wrapped with Trenton Wax Tape #1 to fully encapsulate the nuts and bolts without any air voids. The nuts and bolts should broadcast through the wax tape . Manufacturer shall be Polyken or approved equal.

B. Existing buried steel piping shall be cathodically protected by welding a sacrificial anode to the pipe and flat strap jumpers across couplers whenever uncovered for work,

2.12 TRACER WIRE

A. For non-metallic pipelines, 12 gauge continuous location wire shall be placed on all water mains and brought up in valve can per County direction. Underground detectable warning tape shall also be used.

2.13 PIPE HANGERS AND SUPPORTS

A. **Code Compliance:** All piping systems and pipe connections to equipment shall be properly anchored and supported to prevent undue deflection, vibration, dislocation due to seismic events and line pressures, and stresses on piping, equipment, and structures. All supports and parts thereof shall conform to the requirements of ANSI/ASME B31.1 - Power Piping, except as supplemented or modified below. Supports for plumbing piping shall be in accordance with the latest edition of the applicable plumbing code or local administration requirements.

B. **Structural Members:** Wherever possible, pipes shall be supported from structural members. Where it is necessary to frame structural members between existing members, such supplementary members shall be provided. All supplementary members shall be in accordance with the requirements of the building code and the American Institute of Steel Construction and shall be acceptable to the COUNTY.

C. **Pipe Hangers:** Pipe hangers shall be capable of supporting the pipe in all conditions of operation, allowing free expansion and contraction of the piping, and preventing excessive stress on equipment. All hangers shall have a means of vertical adjustment after erection. Hangers shall be designed to prevent becoming disengaged by any movement of the supported pipe. Hangers subject to shock, seismic disturbances, or thrust imposed by the actuation of safety valves, shall include hydraulic shock suppressors. All hanger rods shall be subject to tensile loading only.

D. **Hangers Subject to Horizontal Movements:** At hanger locations where lateral or axial movement is anticipated, suitable linkage shall be provided to permit such movement. Where horizontal pipe movement is greater than 1/2-inch, or where the hanger rod deflection from the vertical is greater than 4 degrees from the cold to the hot position of the pipe, the hanger rod and structural attachment shall be offset in such a manner that the rod is vertical in the hot position.

E. **Spring-Type Hangers:** Spring-type pipe hangers shall be provided for piping subject to vibration or vertical expansion and contraction, such as engine exhausts and similar piping. All spring-type hangers shall be sized to the manufacturer's printed recommendations and the loading conditions encountered. Variable spring supports shall be provided with means to limit misalignment, buckling, eccentric loading, or to prevent overstressing of the spring, and with means to indicate at all times the compression of the spring. Supports shall be capable of accommodating at least 4 times the maximum travel due to thermal expansion.

F. **Thermal Expansion:** Wherever expansion and contraction of piping is expected, a sufficient number of expansion loops or joints shall be provided, together with the necessary rolling or sliding supports, anchors, guides, pivots, and restraints permitting the piping to expand and contract freely in directions away from the anchored points. All components shall be structurally suitable to withstand all loads imposed.

G. **Heat Transmission:** Supports, hangers, anchors, and guides shall be so designed and insulated, that excessive heat will not be transmitted to the structure or to other equipment.

H. **Riser Supports:** Where practical, risers shall be supported on each floor with riser clamps and lugs, independent of the connected horizontal piping.

I. **Freestanding Piping:** Free-standing pipe connections to equipment such as chemical feeders and pumps shall be firmly attached to steel frames fabricated from angles, channels, or I-beams anchored to the structure. Exterior, free-standing overhead piping shall be supported on fabricated pipe stands consisting of pipe columns anchored to concrete footings, with horizontal, welded steel angles and U-bolts or clamps securing the pipes.

J. Materials of Construction:

1. **General:** All pipe support assemblies, including framing, hardware, and anchors, shall be steel construction, galvanized after fabrication, unless otherwise indicated.

2. **Submerged Supports:** All submerged piping, as well as piping, conduits, and equipment in hydraulic structures within 24 inches of the water level, shall be supported with support assemblies, including framing, hardware, and anchors, constructed of Type 316 stainless steel, unless otherwise indicated.

K. **Point Loads:** Any meters, valves, heavy equipment, and other point loads on PVC, FRP, and other plastic pipes, shall be supported on both sides, according to manufacturer's recommendations to avoid undue pipe stresses and failures. To avoid point loads, all supports on PVC, FRP, and other plastic piping shall be equipped with extra wide pipe saddles or galvanized steel shields.

L. **Noise Reduction:** To reduce transmission of noise in piping systems, all copper tubes in buildings and structures shall be wrapped with a 2-inch wide strip of rubber fabric or similar, suitable material at each pipe support, bracket, clip, or hanger.

2.14 SUPPORT SPACING

A. Supports for piping with the longitudinal axis in approximately a horizontal position shall be spaced to prevent excessive sag, bending, and shear stresses in the piping, with special consideration given where components such as flanges and valves impose concentrated loads. Pipe support spacing shall not exceed the maximum spans in the tables below. For temperatures other than ambient temperatures, or those listed, and for other piping materials or wall thicknesses, the pipe support spacings shall be modified in accordance with the pipe manufacturer's recommendations. Vertical supports shall be provided to prevent the pipe from being overstressed from the combination of all loading effects.

1. Support Spacing for Schedule 40 and Schedule 80 Steel Pipe:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
1/2	6
3/4 and 1	8
1-1/4 to 2	10
3	12
4	14
6	17
8 and 10	19
12 and 14	23
16 and 18	25
20 and greater	30

2. Support Spacing for Welded Fabricated Steel Pipe:

Maximum Spans for Pipe Supported in Minimum 120 degree Contact Saddles (feet)

Nominal Pipe Diameter (inches)	Wall Thickness (inches)							
	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
24	33	37	41	43	45	47		
26	34	38	41	44	46	48		
28	34	38	41	44	47	49		
30	34	38	42	45	48	49		
32	34	39	42	45	48	50		
34	35	39	43	46	48	50		
36	35	39	43	46	49	51	55	
38	35	39	43	46	49	51	55	
40	35	40	43	47	49	52	56	
42	35	40	44	47	50	52	56	
45	--	40	44	47	50	53	57	
48	--	40	44	47	50	53	58	61

For steel pipe sizes not presented in this table, the support spacing shall be designed so that the stress on the pipe does not exceed 5,000 psi. Maximum deflection of pipe shall be limited to 1/360th of the span and shall be calculated by using the formula:

$$L = (7500tD/(32t+D))^{1/2}$$

where:
- t = Thickness (inches)
- D = Diameter (inches)
- L = Maximum span (feet)

3. Support Spacing for Ductile-Iron Pipe:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
All Diameters	Two supports per pipe length or 10 feet (one of the 2 supports located at joint)

4. Support Spacing for Copper Tubing:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
1/2 to 1-1/2	4
2 to 4	6
6 and greater	8

5. Support Spacing for Schedule 80 PVC Pipe:

Nominal Pipe Diameter (inches)	Maximum Span (at 100 degrees F) (feet)
1/2	4
3/4	4.5
1	5
1-1/4	5.5
1-1/2	5.75
2	6.25
3	7.5
4	8.25
6	10
8	11
10	12.25
12	13.25

2.15 MANUFACTURED SUPPORTS

A. **Stock Parts:** Where not specifically indicated, designs which are generally accepted as exemplifying good engineering practice and use stock or production parts, shall be utilized wherever possible. Such parts shall be locally available, new, of best commercial quality, designed and rated for the intended purpose.

B. Manufacturers, or Equal:

Basic-PSA, Johnstown, PA;
Bergen-Paterson Pipesupport Corp., Woburn, MA;
Power Piping Company, Pittsburgh, PA.
Standon, Model S89 &S92
Pipeline Products

2.16 COATING

A. **Galvanizing:** Unless otherwise indicated, all fabricated pipe supports other than stainless steel or non-ferrous supports shall be blast-cleaned after fabrication and hot-dip galvanized in accordance with ASTM A 123 - Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. **Other Coatings:** Other than stainless steel or non-ferrous supports, all supports shall receive Protective Coatings in accordance with the requirements of Section 099000 - Protective Coatings.

2.17 CONNECTIONS TO EXISTING FACILITIES

A. All materials used in making the connection or removing the facility from service shall conform to the applicable sections of these Standards & Specifications and the Construction Drawings.

PART 3 - EXECUTION

3.1 MATERIAL DELIVERY, STORAGE, AND PROTECTION

A. Pipe and pipe appurtenances such as fittings, valves, etc. shall be delivered in a clean and undamaged condition. The CONTRACTOR shall be responsible for unloading and loading of pipe and pipe appurtenances at the job site in accordance with the manufacturer's printed instructions and recommendations. All pipe shall be unloaded at the site with care using a double padded sling or as specified in the applicable Sections. Pipe appurtenances shall be unloaded at the site with care using hoists or skids to avoid damage to materials. Under no circumstances shall materials be dropped. When unloading pipe, trucks shall be parked on level ground. All pipe and pipe appurtenances shall be kept in a safe storage area where they can be protected from heat, dirt, weather, or other detrimental factors. Cement mortar lined pipe shall be stored with proper stulling per the manufacturer's recommendations. Pipe shall be stored in such a way as not to inflict loading which may cause bending, cracking or other damage. Pipe appurtenances shall be stored off the ground for protection against oxidation caused by ground contact. Defective or damaged materials shall be replaced with new materials at the CONTRACTORs expense.

3.2 GENERAL

A. Pipes, fittings, and appurtenances shall be installed in accordance with the requirements of the applicable Sections of Divisions 2 and 33.

B. **Corrosion Protection:** All nuts and bolts on flanges, fittings, couplings, joint harnesses, etc. for buried service shall be tape wrapped, after installation is completed, using heavy duty joint wrap, in accordance with Section 099000 – Protective Coatings. Entire length of bolts and all hardware shall be fully encapsulated with tape wrapping.

C. **Core Drilling:** Where core drilling is required for pipes passing through existing concrete, core drilling locations shall be determined by radiograph of concrete construction to avoid damage to embedded raceways and rebar.

D. **Cleanup:** After completion of the WORK, cuttings, joining and wrapping materials, and other scattered debris shall be removed from the Site. The entire piping system shall be handed over in a clean and functional condition.

3.3 THRUST RESTRAINT

A. **General**: Thrust restraint shall be provided at all vertical and horizontal bends, tees, crosses, dead ends, hydrants, reducers, valves, and fittings. Thrust restraint shall be accomplished by the use of restraining glands and joint harnesses, or thrust blocks. Restraining Glands shall be used where specified on mechanical joint fittings for PVC and ductile iron pipe.

B. **Restraining Glands and Joint Harnesses:** Restraining glands and joint harnesses shall be installed in accordance with manufacturer recommendations. After installation, all nuts and bolts shall be primered and wrapped with 2 layers of 35 mil adhesive pipe wrap. Joint harnesses shall be used in conjunction with retainer glands wherever retainer glands are to be used to provide thrust restraint.

C. **Thrust Blocks:** Thrust and anchor blocks shall be formed out of concrete meeting requirements of Section 033000 – Cast-in-Place Concrete. Blocks shall be sized and configured in accordance with Section

2.04 C and Standard Detail 2-08 of these Standards & Specifications. Concrete shall be poured against undisturbed ground.

D. Epoxy coated number 5 reinforcement bar shall be embedded and wrapped around appurtenance as shown in Standard Detail 2-08. Care shall be taken not to cover fittings, valves, bolts, nuts, or other appurtenances with concrete. Blocks shall be cured 24 hours prior to backfill, and shall be cured a minimum of 7 days or have 75% of the 28-day strength before the water line can be filled and pressurized.

3.4 TRACER WIRE

A. Continuous tracer wire shall be placed directly on the top surface of all water mains. Where detectable warning tape is also used, place it no less than 1 foot above the top of the water main.

3.5 INSTALLATION OF PIPE SUPPORTS

A. **General:** All pipe supports, hangers, brackets, anchors, guides, and inserts shall be fabricated and installed in accordance with the manufacturer's printed instructions and ANSI/ASME B31.1 - Power Piping. All concrete inserts for pipe hangers and supports shall be coordinated with the formwork.

B. **Appearance:** Pipe supports and hangers shall be positioned to produce an orderly, neat piping system. All hanger rods shall be vertical, without offsets. Hangers shall be adjusted to line up groups of pipes at the proper grade for drainage and venting, as close to ceilings or roofs as possible, without interference with other work.

3.6 FABRICATION

A. **Quality Control:** Pipe hangers and supports shall be fabricated and installed by experienced welders and fitters, using the best welding procedures available. Fabricated supports shall be neat in appearance without sharp corners, burrs, and edges.

3.6 CONNECTION TO EXISTING WATER LINES

A. **Shutdown Request:** The Contractor shall submit a written request to the COUNTY a minimum of ten (10) working days before the time of any desired shutdown of existing waterlines or services. The written request shall include the date of the proposed shutdown and the estimated number of hours required to complete the work. The COUNTY will review the request and determine the actual time and date of the shutdown based on the availability of COUNTY staff.

B. **Authorization:** Connections shall be made only by the COUNTY. No connection work shall be performed prior to authorization by the COUNTY.

C. **Time Schedule:** Work which will require disruption of service in water mains shall be planned and executed so that it will not disrupt service before 8:30 A.M. and insure restoration of service before 4:00 P.M. each day, unless an exception in writing is obtained from the COUNTY prior to the shutdown. To comply with this schedule the Contractor must consider the time required to:

1. Turn off customer services and isolation valves;
2. Drain and dispose the water from the isolated section of the water line to be cut;
3. Perform cut-in operations; and
4. Flush the water line prior to service restoration.

Note: If the COUNTY determines that the disruption of service may exceed the time limitations, the Contractor shall re-plan the work for more than one day of operation to ensure service is restored by 4:00 P.M. each day.

D. **Material:** The Contractor shall provide the COUNTY with verification that all materials are on hand a minimum of five working days in advance of the proposed shutdown date. The Contractor shall furnish all pipe

and materials as may be required for connections the day before of the shutdown date the Contractor shall be fully prepared for the planned work with all required materials, tools, equipment, dewatering equipment, lights, barricades, permits, skilled personnel, and supervision. If adequate preparations have not been made by the Contractor, the COUNTY will cancel the shutdown and the Contractor shall be responsible for all costs associated with the cancelled shutdown.

E. **Inadequate Progress:** If progress is inadequate during the connection operations to complete the connection in the time specified, the COUNTY shall order necessary corrective measures. All costs for corrective measures shall be paid by the Contractor.

F. **Connections:** New mains shall be connected to existing in-service mains against a closed valve prior to disinfection, flushing and pressure testing of the new mains. The Contractor shall not operate the closed valve. Only COUNTY field personnel shall operate and/or open existing system valves and valves connecting new mains to the existing in-service mains. Connections shall be made with as little change as possible in the grade of new main. If the grade of the existing pipe is below that of the new pipeline, a sufficient length of the new line shall be deepened so as to prevent the creation of any high spot or abrupt changes in grade of the new line. Where the grade of the existing pipe is above that of the new pipeline, the new line shall be laid at specified depth, except for the first joint adjacent to the connection, which shall be deflected as necessary to meet the grade of the existing pipe. If sufficient change in direction cannot be obtained by the limited deflection of the first joint, a fitting of the proper angle shall be installed. Where the connection creates a high or low spot in the line, a combination air valve or blowoff assembly shall be installed as directed by the COUNTY.

G. **Testing:** The new pipeline shall be disinfected and pressure tested in accordance with Section 02643 – Waterline Disinfection & Testing.

3.7 REMOVAL OF EXISTING MAINS AND APPURTENANCES FROM SERVICE

A. **General:** Existing waterlines, conduits, or structures shall be abandoned and removed from service at the locations shown on the Construction Drawings or as directed by the COUNTY, in accordance with the COUNTY'S Standards & Specifications. At all locations where new waterlines are to be connected to existing waterlines and where portions of the existing waterlines are to be abandoned, the existing waterlines to be abandoned shall be removed for a minimum distance of five feet clear from any waterlines to remain in service. Conduits to be abandoned in place shall be plugged with concrete to form a 2 foot long plug at all openings. Existing valves removed from service due to the abandonment of a waterline shall be closed, the valve can removed, and the hole backfilled with concrete slurry and patched with asphalt.

B. **Removed Material:** Removed pipe and appurtenances may be temporarily stockpiled on the job in a location that will not disrupt traffic or be a safety hazard per restrictions and requirements of the County of Santa Barbara. Materials from abandoned facilities shall be salvaged as shown on the Construction Drawings or as indicated in the COUNTY'S Standards & Specifications. Removed appurtenances to be salvaged shall be delivered to the COUNTY'S storage yard as directed by the COUNTY. Removed pipe shall be disposed of by the CONTRACTOR in accordance with State and local regulations.

C. **Maintenance of Service:** Before excavating for laying mains that are to replace existing pipes and/or services, the Contractor shall make provisions for maintaining continuous service as directed by the COUNTY.

END OF SECTION

SECTION 330531
PVC PRESSURE PIPE (AWWA C900, MODIFIED)

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide 305 psi or Class 235 polyvinyl chloride (PVC) pressure pipe, complete in place, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 312316 –Trenching, Backfill and Compaction
Section 330110 – Waterline Disinfection & Testing
Section 330509 – Piping, General
Section 330519 – Ductile Iron Pipe
Section 331216 – Valves and Appurtenances
Section 331417 – Service Connections

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. **Commercial Standards:**

ANSI/AWWA C104/A21.5	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
ANSI/AWWA C110/A21.10	Ductile-Iron and Gray-Iron Fittings 3-inch Through 48-inch for Water and Other Liquids
ANSI/AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
ANSI/AWWA C153/A21.53	Ductile-Iron Compact Fittings, 3 in. Through 12 in. for Water and Other Liquids
ANSI/AWWA C600	Installation of Ductile-Iron Water Mains and Appurtenances
ANSI/AWWA C900	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inch (100 mm) Through 60-inch (1,500 mm)
AWWA Manual M23	PVC Pipe - Design and Installation
ASTM D 2584	Test Method for Ignition Loss of Cured Reinforced Resins
PPI Technical Report TR 3	Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB) Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe
PPI Technical Report TR 4	PPI Listing of Hydrostatic Design Basis (HDB), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe

1.4 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 013300 - Contractor Submittals.

B. **Shop Drawings:** Design calculations to demonstrate compliance of pipe and fittings with this Section. Manufacturer's literature for metallic locating tape.

C. **Certifications:** A certified affidavit of compliance for pipe and other products or materials under this Section and the following supplemental requirements:

1. Hydrostatic proof test reports.
2. Sustained pressure test reports.
3. Burst strength test reports.

D. The CONTRACTOR shall be responsible for performing and paying for sampling and testing as necessary for the certifications.

PART 2 - PRODUCTS

2.1 GENERAL

A. All PVC pressure pipe (4-inch through 12-inch) shall be Class 200, and shall conform to the applicable requirements of ANSI/AWWA C900 subject to additional requirements herein. All large diameter PVC pressure pipe (14-inch through 36-inch) shall be Class 235, and shall conform to the applicable requirements of AWWA C900 and the additional requirements herein. Materials used in manufacture of the pipe shall be tested in accordance with the requirements of this Section and the referenced standards, as applicable.

2.2 PIPE DESIGN CRITERIA

A. **General:** PVC pressure pipe shall be designed in accordance with the requirements of Appendix A of ANSI/AWWA C900, Large PVC pressure pipe shall be designed in accordance with the requirements of Manual M23, as applicable, and the supplemental requirements in this Section.

B. **Pipe Wall Thickness for Internal Pressure:** The pipe shall be designed with a minimum thickness (t) or dimension ratio (DR) in accordance with paragraph A.3 of the above referenced Appendix A.

C. **Determination of External Loads:** Instead of the equations in paragraph A.4 of the above referenced Appendix A, the dead (earth) loads shall be computed using the following 2 equations for trench or embankment conditions as applicable:

D. In lieu of the equations in the Manual, the dead (earth) loads shall be computed using the following 2 equations for trench or embankment conditions as applicable:

1. Trench Condition:

$$W_d = C_d w B_d^2$$

Where: W_d = Earth load in pounds per linear foot
C_d = Calculation coefficient
Ku' = [0.13]
w = [130] lb/ft^3
B_d = Trench width at top of pipe, feet

2. Positive Projecting Embankment Condition:

$$W_c = C_c w B_c^2$$

Where:

W_c	=	Earth load in pounds per linear foot
C_c	=	Calculation coefficient (based on $r_{sd}P$ of 0.75)
C_c	=	Calculation coeff. for lg dia. (based on $r_{sd}p$ = 0.25)
Ku	=	[0.19]
w	=	[130] lb/ft^3
B_c	=	Outside diameter of pipe, feet

D. Instead of the equations in paragraph A.4, the truck live loads shall be determined using the method recommended by AASHTO in "Standard Specifications for Highway Bridges." For depths of cover less than 10 feet HS-20 live loads shall be added to the earth loads to determine the total load. For depths of cover 3 feet or less, HS-20 live load plus impact shall be included.

E. **Pipe Deflection:** With reference to paragraph A.5, the deflection of the pipe after installation shall not exceed 0.03 times the outside diameter.

2.3 PIPE

A. The pipe shall be Class 200 or 235 (diameter 14 inch and greater) and of the diameter specified or shown, shall be furnished complete with rubber gaskets, and all specials and fittings shall be provided as required in the Contract Documents. The dimensions and pressure classes for PVC pressure pipe with Cast-Iron Pipe Equivalent O.D.'s shall conform to the requirements of AWWA C900.

B. **Additives and Fillers:** Unless otherwise allowed in alternate qualification procedures of PPI-TR3, compounds which have a Hydrostatic Design Basis (HDB) of 4000 psi at 73.4 degrees F and for water shall not contain additives and fillers that exceed the recommended values in Table 1, Part Y of PPI-TR3 (e.g., allowable content range for calcium carbonate is 0.0-5.0 parts per hundred of resin). If requested by the COUNTY, the additive and filler content shall be determined using the pyrolysis method as specified in ASTM D 2584.

C. **Joints and Deflection:** Joints for the buried PVC pipe shall be integral bell and spigot push–on joints employing a rubber gasket. The bell and coupling shall be the same thickness as of the pipe barrel, or greater thickness. Deflection at the joint shall not exceed 1.5 degrees or the maximum deflection recommended by the manufacturer. No deflection of the joint shall be allowed for joints which are over-belled or not belled to the stop mark.

2.4 FITTINGS

A. Fittings shall be ductile iron and shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3-inch through 48-inch and shall have a minimum pressure rating of 250 psi. PVC pipe fittings shall be mechanical joint or flanged as indicated on the plans. Each fitting shall be clearly labeled to identify its size and pressure class.

B. All fittings shall be lined and coated in accordance with AWWA Standards and the requirements of Section 099000 - Protective Coatings.

C. All mechanical joint fittings shall be supplied with restraining glands for thrust restraint unless otherwise specified on the Construction Drawings.

D. Couplings shall be Romac 501 straight, Romac XR501, or Smith-Blair.

PART 3 - EXECUTION

3.1 GENERAL

A. Installation shall conform to the requirements of AWWA M23, instructions furnished by the pipe manufacturer, and to the supplementary requirements herein. Wherever the provisions of this Section and the aforementioned requirements are in conflict, the more stringent provision shall apply.

B. Laying, jointing, testing for defects and for leakage shall be performed in the presence of the COUNTY, and shall be subject to approval before acceptance. Material found to have defects will be rejected and the CONTRACTOR shall promptly remove such defective materials from the Site.

C. The CONTRACTOR shall determine the location of existing underground utility structures in the vicinity of proposed pipe installation prior to excavation. All existing above and below ground structures within the work area shall be protected in place unless indicated otherwise on the Construction Drawings.

D. Whenever the WORK is not actively in progress, the open ends of all installed pipe shall be plugged or capped with bulkhead mechanical joint end cap to prevent the entry of animals, water, or other undesirable substances.

3.2 HANDLING AND STORAGE

A. **Handling:** Pipe, fittings and accessories shall be carefully inspected before and after installation and those found defective will be rejected. Pipe and fittings shall be free from fins and burrs. Before being placed in position, pipe, fittings, and accessories shall be cleaned, and shall be maintained in a clean condition. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe, fittings or any other material be dropped or dumped into trenches.

B. **Storage:** Pipe should be stored, if possible, at the Site in unit packages provided by the manufacturer. Caution should be exercised to avoid compression damage or deformation to bell ends of the pipe. Pipe should be stored in such a way as to prevent sagging or bending and be protected from exposure to direct sunlight by covering with an opaque material while permitting adequate air circulation above and around the pipe. Gaskets should be stored in a cool, dark place out of the direct rays of the sun, preferably in original cartons.

3.3 TRENCHING AND BACKFILL

A. Trench excavation and backfill shall conform to the requirements of Section 312316 –Trenching, Backfill and Compaction.

3.4 INSTALLATION

A. Bell-and-spigot pipe shall be laid with the bell end pointing in the direction work is progressing. Pipe shall be graded in straight lines, taking care to avoid the formation of any dips or low points. Pipe shall not be laid when the conditions of trench or weather are unsuitable. Pipe shall be laid uphill on grades 10% or greater.

B. Pipe shall be supported at its proper elevation and grade, care being taken to secure firm and uniform support. Wood support blocking will not be permitted. The full length of each section of pipe and fittings shall rest solidly on the pipe bed, with recessed excavation to accommodate bells, joints, and couplings. Anchors and supports shall be provided where indicated and where necessary for fastening work into place. Fittings shall be independently supported.

C. Short lengths of pipe shall be used in and out of each rigid joint or rigid structure. Piping that does not allow sufficient space for proper installation of jointing material shall be replaced by one of proper dimensions. Blocking or wedging between bells and spigots will not be permitted. Pipe alignment shall be checked after each length of pipe is installed to insure the downstream pipe did not deflect. Pipe shall not deflect at the joints more than 75% of manufacturer's printed recommendations. Trench shall not be backfilled prior to

pipeline inspection by the COUNTY. Any pipeline buried prior to inspection shall be uncovered by the CONTRACTOR, at his own expense, for the COUNTY to inspect.

D. Joints shall be installed according to manufacturer's recommendations. The surfaces of the pipe spigot end, bell and gasket shall be cleaned just prior to joining pipes. The spigot end of the pipe shall be beveled and checked for proper fit in the bell end without causing damage to the gasket. A lubricant, approved by the pipe manufacturer, shall be applied to the spigot end prior to joining pipes. The spigot shall penetrate bell completely as indicated by penetration line. Trenches shall be kept free of water until joints have been properly made. The maximum combined deflection at any coupling shall be in accordance with the manufacturer's recommendations.

E. Pipe shall be cut by means of saws, power driven abrasive wheels, or pipe cutters, which will produce a square cut. No wedge-type roller cutters will be permitted. After cutting, the end of the pipe shall be beveled using a beveling tool, portable type sander, or abrasive disc. The pipe shall be remarked with a penetration line at the required penetration depth.

F. **Work Stoppage:** At the end of each working day, CONTRACTOR shall plug or cap the open ends of all unfinished pipelines with securely bolted mechanical joint plugs, mechanical joint end caps, or blind flanges. If pipe is subject to flooding, pipe shall be anchored as precaution against flotation. Trenches shall be backfilled in accordance with the COUNTY Standards and Specifications.

3.5 SERVICE CONNECTIONS

A. **Service Connections:** Direct tapping will not be permitted. Bronze service clamps shall be used for all service connections. Service clamps shall have a bearing area of sufficient width along the axis of the pipe, so that the pipe will not be distorted when the saddle is made tight. An internal shell cutter shall be used to drill through the corporation stop to minimize PVC shavings, retain the coupon, and reduce stress. Single fluted shell cutters or twist drills are not acceptable. Lubricate the cutting and tapping edges of the tool with cutting lubricant. Make the cuts slowly and use the follower very lightly - do not force cutter through pipe wall. Shell cutter shall have sufficient throat depth to handle the heavy wall PVC pipe. Maximum outlet size permitted with service clamps or saddle is 2 inches.

B. Tapping sleeves and valves shall be used for all outlet sizes greater than 2 inches in diameter. Tapping sleeves shall be assembled and installed in accordance with the manufacturer's recommendations.

3.6 CONNECTIONS TO EXISTING PIPELINES

A. The CONTRACTOR shall locate all underground improvements and install the pipelines to the depths indicated. Where the new work is to be connected to existing pipelines, the CONTRACTOR shall make its arrangements with the COUNTY well in advance of the connections, to allow adequate time for dewatering of the existing line, if necessary, and shall expedite the work to minimize water outages to the users. Where sections of existing distribution mains are taken permanently out of service and abandoned in place, the cut ends shall be plugged solid with concrete to a depth of not less than two pipe diameters.

3.7 FIELD TESTING AND DISINFECTION

A. Field testing and disinfection and water mains shall conform to the requirements of Section 330110 - Waterline Disinfection & Testing.

END OF SECTION

SECTION 331216

VALVES AND APPURTENANCES

PART 1 - GENERAL

1.1 DESCRIPTION

This section describes the materials and installation procedures gate valves, butterfly valves, ball valves, combination air valves (CAV), pressure reducing valves, pressure relief valves, check valves, stainless steel tapping sleeves, pressure gauges, and appurtenances (valve cans, extensions, CAV enclosures).

1.2 REQUIREMENTS

A. The CONTRACTOR shall provide all valves, actuators, valve cans, and appurtenances, complete and operable, in accordance with the Contract Documents.

B. The provisions of this Section shall apply to all valves and valve actuators except where otherwise indicated. Valves and actuators in particular locations may require a combination of units, sensors, limit switches, and controls indicated in other Sections of the Specifications.

C. Where a valve is to be supported by means other than the piping to which it is attached, the CONTRACTOR shall obtain from the valve manufacturer a design for support and foundation. The design, including drawings and calculations sealed by the PROJECT ENGINEER, shall be submitted with the Shop Drawings. When the design is approved, the support shall be provided.

D. **Unit Responsibility:** A single manufacturer shall be made responsible for coordination of design, assembly, testing, and furnishing of each valve, sleeve, and actuator; however, the CONTRACTOR shall be responsible to the COUNTY for compliance with the requirements of each valve section or sleeve. Unless indicated otherwise, the responsible manufacturer shall be the manufacturer of the valve or sleeve.

E. **Single Manufacturer:** Where two or more valves of the same type and size are required, the valves and actuators shall be furnished by the same manufacturer. Where indicated, valves may be provided with actuators manufactured by the valve manufacturer. Where actuators are furnished by different manufacturers, the CONTRACTOR shall coordinate selection to have the fewest number of manufacturers possible. Where two or more tapping sleeves of the same type or size are required, the sleeves shall be produced by the same Manufacturer.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 033000 – Cast-in-Place Concrete
Section 099000 – Protective Coatings
Section 312316 –Trenching, Backfill and Compaction
Section 330110 – Waterline Disinfection & Testing
Section 330509 – Piping, General

1.3 CONTRACTOR SUBMITTALS

A. **General:** Submittals shall be furnished in accordance with Section 013300 – Contractor Submittals.

B. Submit shop drawings. Submit manufacturer's catalog data. Show dimensions, materials of construction by ASTM reference and grade, and coatings. A cavitation study shall be submitted for pressure reducing valves.

C. Shop Drawings of all tapping sleeves and service saddles shall be submitted as a completed package. Shop Drawings shall contain the following information:

1. Valve name, size, Manufacturer, model number, pressure rating, identification number (if any), and specification section number.

2. Assembly drawings with part nomenclature, materials, dimensions, and weights.

3. Tapping Sleeve Labeling: A schedule of sleeves to be labeled, indicating in each case the sleeve location and the proposed wording for the label.

D. Shop Drawings. The CONTRACTOR shall submit complete Shop Drawings of butterfly valves and actuators, with drawings showing valve port diameter complete with dimensions, part numbers and materials of construction. Certification of proof-of-design test from the valve manufacturer shall also be provided.

E. Manufacturer's Certification that the valve complies with all applicable provisions of AWWA C504 – Rubber-Seated Butterfly Valves.

F. **Technical Manual and Spare parts List:** The Technical Manual shall contain the required information for each valve. A Spare Parts List

1.4 QUALITY ASSURANCE

A. Valves shall be subjected to performance, leakage, and hydrostatic tests in accordance with procedures and acceptance criteria established by AWWA C504.

PART 2 – PRODUCTS

2.1 GENERAL

A. **General:** Valves and actuators shall be new and of current manufacture. Shut-off valves 6-inches and larger within vaults and above ground shall have actuators with position indicators. Buried valves shall be provided with valve cans and lids, and valve stem extensions.

B. **Protective Coatings:** The exterior surfaces of all valves and the wet interior surfaces of ferrous valves of sizes 4 inches and larger shall be coated in accordance with Section 099000-Protective Coatings. The valve Manufacturer shall certify in writing that the required coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with these Specifications.

C. **Valve Labeling:** Except when such requirement is waived by the COUNTY in writing, a label shall be provided on all shut-off valves and control valves except for hose bibs. The label shall be of 1/16-inch plastic or stainless steel, minimum 2 inches by 4 inches in size, and shall by permanently attached to the valve or on the wall adjacent to the valve as directed by the COUNTY.

D. **Valve Testing:** As a minimum, unless otherwise indicated or recommended by the reference Standards, valves 3 inches in diameter and smaller shall be tested in accordance with manufacturer's standard and 4 inches in diameter and larger shall be factory tested as follows:

1. **Hydrostatic Testing:** Valve bodies shall be subjected to internal hydrostatic pressure equivalent to twice the water rated pressure of the valve. Metallic valves rating pressures shall be at 100 degrees F and plastic valves shall be 73 degrees, or at higher temperature according to type of material. During the hydrostatic test, there shall be no leakage through the valve body, end joints, or shaft seals, nor shall any part of the valve be permanently deformed. The duration shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes.

2. **Seat Testing:** Valves shall be tested for leaks in the closed position with the pressure differential across the seat equal to the water rated pressure of the valve. The duration of test shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes. Leakage past the closed valve shall not exceed 1 fluid ounce per hour per inch diameter for metal seated valves and drop-tight for resilient seated valves.

3. **Performance Testing:** All valves shall be shop operated from fully closed to fully open position and reverse under no-flow conditions in order to demonstrate the valve assembly operates properly.

E. **Certification:** Prior to shipment, the CONTRACTOR shall submit for valves over 12 inches in size, certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, or ASTM.

F. **Valve Marking:** Valve bodies shall be permanently marked in accordance with MSS SP25 - Standard Marking Systems for Valves, Fittings, Flanges, and Unions.

2.2 MATERIALS

A. **General:** Materials shall be suitable for the intended application. Materials not indicated shall be high-grade standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended. Actuators shall be current models of the best commercial quality materials and liberally-sized for the required torque. Unless otherwise indicated, valve and actuator bodies shall conform to the following requirements:

1. **Cast Iron:** Close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Castings, Class 30, or to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

2. **Ductile Iron:** ASTM A 536 - Ductile Iron Castings, or to ASTM A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

3. **Bronze:** ASTM B 62 - Composition Bronze or Ounce Metal Castings, and valve stems not subject to dezincification shall conform to ASTM B 584 - Copper Alloy Sand Castings for General Applications.

4. **Stainless Steel:** Stainless steel valve and operator bodies and trim shall conform to ASTM A 351 - Steel Castings, Austenitic, for High-Temperature Service Pressure- Containing Parts, Grade CF8M, or shall be Type 316 stainless steel.

5. **NSF Standard 61:** All materials shall be listed for use in contact with potable water.

2.3 VALVE CONSTRUCTION

A. **Bodies:** Valve bodies shall be cast, molded (in the case of plastic valves), forged, or welded of the materials indicated, with smooth interior passages. Wall thicknesses shall be uniform in agreement with the applicable standards for each type of valve, without casting defects, pinholes, or other defects that could weaken the body. Welds on welded bodies shall be done by certified welders and shall be ground smooth. Valve ends shall be as indicated, and be rated for the maximum

temperature and pressure to which the valve will be subjected.

B. **Bonnets:** Valve bonnets shall be clamped, screwed, or flanged to the body and shall be of the same material, temperature, and pressure rating as the body. The bonnets shall have provision for the stem seal with the necessary glands, packing nuts, or yokes.

C. **Stems:** Valve stems shall be of the materials indicated, or, if not indicated, of the best commercial material for the specific service, with adjustable stem packing, O-rings, Chevron V-type packing, or other suitable seal. Where subject to dezincification, bronze valve stems shall conform to ASTM B 62, containing not more than 5 percent of zinc or more than 2 percent of aluminum, with a minimum tensile strength of 30,000 psi, a minimum yield strength of 14,000 psi, and an elongation of at least 10 percent in 2 inches. Where dezincification is not a problem, bronze conforming to ASTM B 584 may be used, except that zinc content shall not exceed 16 percent.

E. **Internal Parts:** Internal parts and valve trim shall be as indicated for each individual valve. Where not indicated, valve trim shall be of Type 316 stainless steel or other best suited material.

F. **Operating Nuts:** Buried operating nuts shall comply with AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.

G. **Nuts and Bolts:** Nuts and bolts on valve flanges and supports shall be in accordance with Section 05500 - Miscellaneous Metalwork.

2.4 ACTUATORS

A. **General:** Unless otherwise indicated, valves and gates shall be furnished with manual actuators. Valves in sizes up to and including 4 inches shall have direct acting lever or handwheel actuators of the Manufacturer's best standard design. Larger valves and gates shall have gear- assisted manual actuators, with an operating pull of maximum 60 pounds on the rim of the handwheel. Buried and submerged gear-assisted valves, valves 30 inches in diameter and larger, and where so indicated, shall have worm-gear actuators, hermetically-sealed and grease-packed, where buried or submerged. All other valves 6 inches to 24 inches in diameter may have traveling- nut actuators, worm-gear actuators, spur- or bevel-gear actuators, as appropriate for each valve. The CONTRACTOR shall furnish actuators complete and operable with mounting hardware, handwheels, levers, and extensions, as applicable. Actuators shall have the torque ratings equal to
or greater than required for valve seating and dynamic torques, whichever is greater and shall be capable of holding the valve in any intermediate position between fully-open and fully-closed without creeping or fluttering.

B. **Mounting:** Actuators shall be securely mounted by means of brackets or hardware specially designed and sized for this purpose and of ample strength. The word "open" shall be cast on each valve or actuator with an arrow indicating the direction to open in the counter-clockwise direction. Non-buried gear and power actuators shall be equipped with position indicators.

C. **Manual Worm-Gear Actuator:** The actuator shall consist of a single or double reduction gear unit contained in a weather-proof cast-iron or steel body with cover and minimum 12-inch diameter handwheel. The actuator shall be capable of 90-degree rotation and shall be equipped with travel stops capable of limiting the valve opening and closing. The actuator shall consist of spur or helical gears and worm-gearing. The spur or helical gears shall be of hardened alloy steel and the worm-gear shall be alloy bronze. The worm-gear shaft and the handwheel shaft shall be of 17-4 PH or similar stainless steel. All gearing shall be accurately cut with hobbing machines. Ball or roller bearings shall be used throughout. Actuator output gear changes shall be mechanically possible by simply changing the exposed or helical gearset ratio without further disassembly of the actuator. All gearing shall be designed for a 100 percent overload.

D. **Traveling-Nut Actuator:** The actuator shall consist of a traveling-nut with screw (Scotch yoke) contained in a weather-proof cast-iron or steel housing with spur gear and minimum 12-inch diameter handwheel. The screw shall run in 2 end bearings, and the actuator shall be self-locking to maintain the valve position under any flow condition. The screw and gear shall be of hardened alloy steel or stainless steel, and the nut and bushings shall be of alloy bronze. The bearings and gear shall be grease-lubricated by means of grease nipples. All gearing shall be designed for a 100 percent overload.

2.5 VALVE CANS AND LIDS

A. Unless otherwise indicated, buried valves shall be in cast iron valve cans with lids permanently labeled "WATER" for potable waterlines and "RW" for recycled waterlines. Valves shall have extension stems with square nuts or floor stands, position indicators, and PVC pipe extensions for valve cans. Size and type of valve cans and lids shall match existing valve cans and lids so as to be interchangeable. Valve cans shall be the 3-piece adjustable type. All materials used in manufacturing shall conform to ASTM 48-30. Frame and Cover shall exceed H-20 wheel loading. Castings shall be dipped in black bituminous coating. Valve cans shall be Parkson "Buffalo" style, South Bay Foundry, Sigma, or approved equal.

2.6 VALVE STEM EXTENSIONS AND ACCESSORIES

A. **Extensions**: Unless otherwise indicated, buried valves shall be furnished complete with valve stem extensions and other accessories required to provide a functional system. Buried valves shall have valve stem extensions extending to 12 inches below finished grade. Valve stem extensions shall be fabricated steel or fiberglass as indicated in GWD Standard Detail 3-08. The maximum length of fiberglass valve stem extensions shall be 8 feet. Fiberglass valve stem extensions shall be manufactured by Pipeline Products, San Marcos, CA, or approved equal.

B. **Stem Guides:** Stem guides shall be provided, spaced 10-feet on centers unless the manufacturer can demonstrate by calculation that a different spacing is acceptable. Submerged stem guides shall be 304 stainless steel.

2.7 SPARE PARTS

A. The CONTRACTOR shall furnish the required spare parts suitably packaged and labeled with the valve name, location, and identification number. The CONTRACTOR shall also furnish the name, address, and telephone number of the nearest distributor for the spare parts of each valve. Spare parts are intended for use by the COUNTY, after expiration of the warranty period.

D. Manufacturers, or Equal

De Zurik Corporation
Clow Valve Company
M & H Valve Company
Mueller Company
Henry Pratt Company
Rodney Hunt Company (24 inches and larger)

2.8 COMBINATIONS AIR VALVES, CLASS 250

A. CAV's 3-inches and smaller shall have ½-inch threaded outlets with bronze plugs in the top cover and near the bottom of the valve body. Valves larger than 3-inches shall have a 1-inch threaded

drain outlet with bronze plug near the bottom of the valve body and a 1-inch threaded outlet with bronze plug on the side of the valve body above the minimum water level in the valve which forces the float against the valve seat. Valves shall be designed for an operating pressure of 250 psi.

B. Valves smaller than 3-inches shall have threaded ends. Valves 3-inches and larger shall have flanged ends. Flanges for Class 250 valves shall comply with AWWA Class E250. Threaded ends shall comply with ANSI B1.20.1. The minimum CAV size shall be 1-inch.

Valves manufacturer shall be:

APCO, Model 143C or 145C
Valmatic, Model 201C or 202C
Crispin, Model UL10 or UL20
Cla-Val, Model 361CAV or 362CAV, or equal.

C.. CAV's shall be equipped with schedule 40 PVC venting system and insect screen as shown in GWD Standard Detail 3-03. Insect screen shall be Northtown Company, Hytech Air Vac Screen, McMaster-Carr, Suction Screen with Nylon Base, or approved equal.

2.9 METAL BALL VALVES (4-INCH AND SMALLER)

A. **General:** Unless otherwise indicated, general purpose metal ball valves in sizes up to 4-inch shall have direct acting lever actuators in accordance with this Specification.

B. **Body:** Ball valves up to 1-1/2-inch (incl.) in size shall have stainless steel 2-or 3- piece bodies with screwed ends for a pressure rating of not less than 600 psi WOG. Valves 2-inch to 4-inch in size shall have stainless steel 2-or 3-piece bodies with flanged ends for a pressure rating of ANSI 125 psi or 150 psi unless otherwise indicated.

C. **Balls:** The balls shall be solid stainless steel, with standard port (single reduction) or full port openings.

D. **Stems:** The valve stems shall be of the blow-out proof stainless steel, or other acceptable construction, with reinforced Teflon seal.

E. **Seats:** The valve seats shall be of Teflon or Buna-N, for bi-directional service and easy replacement.

F. Manufacturers, or Equal

Conbraco Industries, Inc. (Apollo)
ITT engineered Valves
Neles-Jamesbury, Inc.
NIBCO, Inc.
Watts Regulator
Worcester Controls

2.10 RESILIENT-SEATED GATE VALVES – GENERAL

A. Buried valves shall be of the inside screw, non-rising stem type. The valve actuators shall be as indicated, with counter-clockwise opening stems, shall be marked with manufacturers name, size, pressure rating, and year manufactured.

2.11 RESILIENT-SEATED GATE VALVES (4 to 10-inch)

A. **General:** All gate valves shall be resilient-wedge gate valves unless directed otherwise by the COUNTY.

B. **Construction:** Resilient-wedge gate valves shall conform to ANSI/AWWA C509 - Resilient-Seated Gate Valves for Water and Sewerage Systems. The valves shall be suitable for a design working water pressure of 200 psig, with flanged, bell and spigot, or mechanical joint ends. The valve body, bonnet, and disc shall be of cast iron or ductile iron and the disc or body shall be rubber-coated. Body and bonnet wall thickness shall be equal to or greater than the minimum wall thickness as listed in Table 2 of ANSI/AWWA C509. The stem, stem nuts, glands, and bushings shall be of bronze, with the stem seal per ANSI/AWWA C 509. Valves shall be internally coated in accordance with AWWA C550.

C. **Actuators:** Unless otherwise indicated, resilient-wedge gate valves shall have manual actuators in accordance with this Section.

D. Manufacturers: Unless otherwise indicated, resilient wedge gate valves shall be Mueller 2360 Series.

2.12 HARDWARE AND MISCELLANEOUS MATERIALS

A. **Indoor Use:** Bolts and nuts for flanged valves located indoors shall be carbon steel, ASTM A 307, Grade B.

B. **Exposed Use:** Bolts and nuts for flanged valves located outdoors above ground and flanges located in underground vaults and structures shall be Type 316 stainless steel conforming to ASTM A 193, Grade B8M, for bolts and ASTM A 194, Grade 8M, for nuts.

C. Washers: Washers shall be provided for each nut. Washers shall be of the same material as the nuts.

D. Gaskets for flanged end valves shall be as specified in Section 330509 – Piping, General.

PART 3 - EXECUTION

3.1 VALVE INSTALLATION

A. **General:** Valves, actuating units, stem extensions, valve cans, and accessories shall be installed in accordance with the Manufacturer's written instructions and as indicated. CONTRACTOR shall carefully inspect valves and operate valves before installation to verify all parts are in proper working order. If a valve is found to be defective no attempt shall be made to repair it. The defective valve shall be returned to the manufacturer and replaced with a new properly working valve.

B. **Access:** Valves shall be installed with easy access for actuation, removal, and maintenance and to avoid interference between valve actuators and structural members, handrails, or other equipment. Valves shall be firmly supported to avoid undue stresses on the pipe. Mainline valves shall be set plumb and securely braced into place using concrete anchor blocks as shown in Std. Detail 2-08. Non-buried actuators shall be located to be readily accessible for operation and maintenance, and shall not be mounted where shock or vibrations will impair their operation, nor shall the support systems be attached to handrails, process piping, or mechanical equipment.

C. **Valve Accessories:** All buried valves shall be provided with valve cans as indicated in GWD Standard Detail 2-06. Valve cans shall be installed centered and plumb over the operating nut. Valve cans shall be supported on bonnet of valve. In areas where road construction is not completed, set PVC sleeve to pavement subgrade level to prevent damage during construction of road base and AC pavement. After road construction is complete, CONTRACTOR is to return and set cans to grade.

D. **Corrosion Protection:** All nuts and bolts on valves for buried service shall be tape wrapped, after valve installation is completed Trenton Wax Tape #1, in accordance with Section 330509 – Piping General.

3.2 SERVICES OF MANUFACTURER

A. Field representatives of manufacturers of valves with pneumatic, hydraulic, or electric actuators shall adjust actuator controls and limit-switches in the field for the required function.

3.3 INSTALLATION OF GATE VALVES

A. Care shall be taken when installing valves on plastic pipe. Valve shall be supported at each end of the valve.

END OF SECTION

SECTION 331219

FIRE HYDRANTS

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide fire hydrants and end drains, complete and operable, including all appurtenances and accessories, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 033000 – Cast-in-Place Concrete
Section 099000 – Protective Coatings
Section 330509 – Piping, General
Section 331316 – Valves and Appurtenances

PART 2 - PRODUCTS

2.1 WET-BARREL FIRE HYDRANTS

A. Unless shown otherwise, all fire hydrants shall be of the wet-barrel type, in accordance with ANSI/AWWA C503.

B. Where a hydrant is installed it shall have the number, size and type of pumper connections required by the County of Santa Barbara Fire Department. The hydrant head shall have a minimum of one 4-inch pumper connection and one 2-1/2-inch hose connection. Operating nuts and caps shall be 1-1/8 inch pentagonal nuts measured "point to flat". Caps shall be bronze and shall be attached to hydrant with chains. Cap shall have 1/8-inch diameter weep hole drilled through its center adjacent to operating nut. The hydrant inlet shall be 6-inch in diameter. Hydrant shall be isolated by a buried gate valve. Hydrant bury shall be 6-inch diameter ductile iron conforming to the requirements of AWWA C502 with a 6-inch diameter flanged break-away spool connected to the hydrant head. Breakaway spool shall be 12-inch minimum length, 125-pound class, cast iron, 6 bolt-breakaway spool with breakaway (hallow) bolts on top flange. All bolts, nuts, and washers shall be 307A zinc plated steel with standard HEX head and machined per ASTM A325.

C. The hydrants shall be tested to 300 psig and they shall be suitable for a working pressure of 150 psig. All interior and exterior surfaces shall be coated in accordance with AWWA C550 and Section 099000 - Protective Coatings. Color of finish coat shall be COUNTY approved "Safety Yellow" on fire hydrants in the public right of way while fire hydrants not in the public right of way (e.g., on private property) shall be factory painted red in accordance with Santa Barbara County requirements. Prior to final inspection of the water system improvements, the CONTRACTOR shall conduct fire flow tests at all new hydrants in accordance with section 3.02.03, Fire Hydrant Flow Tests.

D. Unless otherwise specified, hydrant bury shall be 6-inch diameter, 6-hole wet barrel fire hydrant bury with mechanical joint

E. **Fire Hydrant Manufacturers, or Equal:**

MANUFACTURER	*SINGLE FAMILY RESIDENCE*		MULTI-FAMILY RESIDENCE, COMMERCIAL & INDUSTRIAL	
	Size	**Model**	**Size**	**Model**
Jones	6"x4"x2 ½ "	J-3700	6"x4"x2 ½"x2 ½"	J-3765R
	6"x4"x2 ½"x2 ½"	J-3765R		
Clow	6"x4"x2 ½ "	2050	6"x4"x2 ½"x2 ½"	2060
	6"x4"x2 ½"x2 ½"	2060		
American AVK Co	6"x4"x2 ½ "	2442	6"x4"x2 ½"x2 ½"	2452
	6"x4"x2 ½"x2 ½"	2452		

F. Bury Manufacturers, or Equal:

Clow Valve Company
US Pipe and Foundry
Star
Sigma/Napco
South Bay Foundry

PART 3 - EXECUTION

3.1 INSTALLATION

A. All fire hydrants shall be installed in strict accordance with the manufacturer's published recommendations, applicable sections of AWWA Standard C600, AWWA Manual M17, and GWD Standard Detail 3-01. Hydrants shall be installed plumb and shall be installed before the construction of curb and gutter, and sidewalk where possible. All installations shall be to the satisfaction of the COUNTY and the County of Santa Barbara Fire Department.

B. Hydrants located on roads where no sidewalk exists or where sidewalk and curb are separated by a parkway, shall be located 18 inches from the back of the curb to the fire hydrant centerline. Hydrants located on roads with sidewalk at the back of curb shall be located 18 inches from the back of sidewalk to the fire hydrant centerline and shall comply with the requirements of the Americans with Disabilities Act. Hydrants located where no curb exists shall be located a minimum of 36 inches from the edge of pavement and shall be protected by guard posts as shown in GWD Standard Detail 4-03.

C. A minimum of 18 inches and a maximum of 24 inches clearance shall be maintained between finished grade and the lowest operating nut on the hydrant. The center of the breakaway spool shall be at grade with the top of curb unless the hydrant is set in concrete in which case a 3-inch minimum clearance shall be maintained between the finished sidewalk surface and the top flange of the breakaway spool. Breakaway bolts shall be installed with tips pointing up and filled with silicone caulking. . Hydrant isolation valve shall be connected to the hydrant piping by means of a retainer gland. Hydrant shall be installed with a concrete thrust block, calculated for the maximum expected water pressure.

D. All end drains shall be installed in accordance with GWD Standard Detail 2-12 and applicable sections of AWWA Standards. End drains shall be installed before the construction of curb and gutter, and sidewalk where possible. End drains located on roads where no sidewalk exists or where sidewalk and curb are separated by a parkway, shall be located 18 inches from the back of the curb. End drains located on roads with sidewalk at the back of curb shall be located per the Santa Barbara County Department of Public Works requirements. End drains located where no curb exists shall be located a minimum of 36 inches from the edge of pavement.

END OF SECTION

SECTION 331234

COUNTY SUB METERS
MODEL M-5000
ELECTROMAGNETIC FLOW METER, LIQUID, SINGLE-CHANNEL

PART 1 - GENERAL

1.1 SCOPE

A. This section describes the requirements for a flow sensor.

B. Under this item, the contractor shall furnish and install the flow measurement equipment and accessories as indicated on the plans and as herein specified.

1.2 QUALITY ASSURANCE

A. Referenced Standards and Guidelines - Complies with applicable portions of ANSI/AWWA Standards and NSF/ANSI Standard 61, Annex G. There are currently no AWWA standards that specifically address electromagnetic metering.

1. Flow measurement function complies with Industry Standards

a. ANSI B16.5 Class 150 RF
b. AWWA Class B
c. NEMA 4X/6P (IP66/IP67)

1.3 SUBMITTALS

A. The following information shall be included in the submittal for this section:

1. Outline dimensions, conduit entry locations and weight

2. Customer connection and power wiring diagrams

3. Data sheets and catalog literature for microprocessor-based transmitter and transducer

4. Interconnection drawings

5. Installation and operations manual

6. List of spare parts

7. Complete technical product description including a complete list of options provided

8. Any portions of this specification not met must be clearly indicated or the supplier and contractor shall be liable to provide all additional components required to meet this specification

1.4 SYSTEM DESCRIPTION

A. Electromagnetic flow meter is intended for fluid metering in industries including water, wastewater, food and beverage, pharmaceutical and chemical. Measures fluid flow of water or fluids which are highly corrosive, very viscous, contain a moderate amount of solids, or require special handling. No moving parts

are in the flow stream. Amplifier can be integrally mounted to the detector or can be remote-mounted. Unit is ideally suited for measuring dynamic, non-continuous flow. In applications where a minimum and/or maximum flow rate must be tracked and monitored, the unit provides pulse signals that can be fed to dedicated batch controllers, PLCs and other more specialized instrumentation.

1.5 DEFINITIONS

A. Amplifier – Device used for increasing the power of a signal. It does this by taking energy from a power supply and controlling the output to match the input signal shape but with larger amplitude.

B. ANSI – (American National Standards Institute) A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates U.S. standards with international standards so that American products can be used worldwide.

C. AWWA – (American Water Works Association) An international non-profit professional organization founded to improve water quality and supply.

D. Detector Coils – Also called an "induction loop", an electromagnetic communication or detection system which uses a moving magnet to induce an electrical current in a nearby wire.

E. Electrode – An electrical conductor used to make contact with a nonmetallic part of a circuit (e.g. a semiconductor, an electrolyte or a vacuum).

F. Modbus RTU – a serial communications protocol published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). This is used in serial communication & makes use of a compact, binary representation of the data for protocol communication.

G. NEMA – (National Electrical Manufacturers Association) Is the 'Association of Electrical Equipment and Medical Imaging Manufacturers' in the United States. Its approximately 450 member companies manufacture products used in the generation, transmission, distribution, control, and end use of electricity. These products are used in utility, industrial, commercial, institutional, and residential applications.

H. NSF International – An independent, accredited organization that develops standards, and tests and certifies products and systems. They provide auditing, education and risk management solutions for public health and the environment.

I. PLCs – (Programmable Logic Controller) A digital computer used for automation of electromechanical processes, such as control of machinery on factory assembly lines, amusement rides, or light fixtures. PLCs are used in many industries and machines.

J. PTFE – (Polytetrafluoroethylene) A synthetic flouropolymer of tetrafluoroethylene that finds numerous applications. The best known brand name of PTFE is Teflon by DuPont Co.

K. Serial Communications – In telecommunication and computer science, serial communication is the process of sending data one bit at a time, sequentially, over a communication channel or computer bus. This is in contrast to parallel communication, where several bits are sent as a whole, on a link with several parallel channels.

PART 2 – PRODUCTS

1.1 APPROVED MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with specifications, provide flow measurement equipment by one of the following:

1. Badger Meter

1.2 OPERATING CONDITIONS

A. System Components

1. Metering Tube (Detector)

a. Consists of stainless steel tube lined with a non-conductive material. Energized detector coils around tube create a magnetic field across the diameter of the pipe. As a conductive fluid flows through the magnetic field, a voltage is induced across two electrodes; this voltage is proportional to the average flow velocity of the fluid.

2. Signal Amplifier

a. Consists of unit which receives, amplifies, and processes the detector's analog signal. Signal is converted to both analog and digital signals that are used to display rate of flow and totalization. Processor controls zero-flow stability, analog and frequency outputs, serial communications and a variety of other parameters. Integrated LCD display indicates rate of flow, forward and reverse totalizers and diagnostic messages. Display guides user through programmable routines.

B. Operational Requirements

1. Electromagnetic Flow Meter

a. The flow meter system shall operate with a pulsed DC excitation frequency, and shall produce a signal output that is directly proportional and linear with the volumetric flow rate of the liquid flowing through the metering tube. The metering system shall include a metering sensor tube (detector), a signal amplifier, and the necessary connecting wiring. The metering system shall have the ability to incorporate a meter mounted or remote mounted amplifier.

b. Engineering Units:

1) The signal amplifier shall be program selectable to display the following units of measure: U.S. gallons, imperial gallons, million gallons (U.S.), cubic feet, cubic meters, liters, hector-liters, oil barrels, ounces or acre feet.

c. Operating Principle: Electromagnetic Induction

d. Metering Tube (Detector)

1) The metering tube (detector) shall be constructed of 316 stainless steel, and rated for a maximum allowable non-shock pressure and temperature for steel pipe flanges, according to ANSI B16.5.

2) The metering tube (detector) shall be available in line size from 1/2" to 24" [12.7 to 600 mm]

3) The metering tube (detector) end connections shall be carbon steel or 316 stainless steel flanged, according to ANSI B16, Class 150 and AWWA Class B standards.

4) The insulating liner material of the metering tube (detector) shall be made of a hard rubber elastomer and NSF-listed for meter sizes 4" and above, in conformance with manufacturer's recommendation for the intended service or an NSF-listed meter option with PTFE liner.

5) The metering tube (detector) shall include two self-cleaning measuring electrodes. The electrode material shall be corrosion resistant and available in Alloy C or 316 stainless steel.

6) The metering tube (detector) shall include a third "empty pipe detection" electrode located in the upper portion of the inside diameter of the flow tube in order to detect an empty pipe condition when the flow tube is running partially empty. Empty pipe detection that is not activated until the pipe is 50% empty is not acceptable.

7) The metering tube (detector) housing shall be constructed of carbon steel, welded at all joints, and rated to meet NEMA 4X/6P (IP66/IP67) ratings.

8) For remote amplifier applications, the metering tube (detector) junction box enclosure shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X/6P (IP66/IP67) ratings.

9) When installed in non-metallic or internally lined piping, the metering tube (detector) shall be provided with a pair of corrosion resistant grounding rings. The grounding ring material shall be 316 stainless steel.

10) Fluid Temperature Range

NOTE TO SPECIFIER: Select the appropriate application and liner material:

i. For remote amplifier applications, the fluid temperature range shall be 32°F to 178°F [0°C to 80°C] at a maximum ambient temperature of 122°F [50°C] for the hard rubber liner material.

ii. For remote amplifier applications, the fluid temperature range shall be -4°F to 302°F [-20°C to 150°C] at a maximum ambient temperature of 122°F [50°C] for the PTFE liner material.

iii. For meter-mounted amplifier applications, the fluid temperature range shall be 32°F to 178°F [0°C to 80°C] at a maximum ambient temperature of 122°F [50°C] for the hard rubber liner material.

iv. For meter-mounted amplifier applications, the fluid temperature range shall be -4°F to 212°F [-20°C to 100°C] at a maximum ambient temperature of 122°F [50°C] for the PTFE liner material.

e. Signal Amplifier

1) The signal amplifier shall be microprocessor based, and shall energize the detector coils with a digitally controlled pulsed DC. The sampling rate shall be programmable from ¼, 1 to 99 seconds.

2) Power shall be supplied by internal battery with life of 10 years.

3) The signal amplifier shall have an ambient temperature rating of -4°F to 140°F [-20°C to 60°C].

4) The signal amplifier shall include non-volatile memory capable of storing all programmable data and accumulated totalizer values in the event of a power interruption.

5) Automatic zero stability, low flow cut-off, empty pipe detection and bi-directional flow measurement shall be inherent capabilities of the signal amplifier.

6) All signal amplifier outputs shall be galvanically isolated to 50 volts.

7) The signal amplifier and remote junction enclosures shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X/6P (IP66/IP67) ratings.

8) Inputs/Outputs:

The signal amplifier shall provide a total of four digital outputs and one digital input.

i. Up to four open collector digital outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, high/low flow alarm, empty pipe alarm, flow direction, and error alarm.

ii. One digital input: ADE

iii. Advanced protocol support using Modbus/RTU.

f. Control and Programming

1) The signal amplifier shall be programmed via three function buttons. The programming functions shall be available in a user-friendly, menu driven software through the two-line LCD interface. The signal amplifier shall accommodate the following languages: English, German, Czech, French, Italian or Spanish.

2) Programmable parameters of the amplifier include, but are not limited to: calibration factors, totalizer resets, unit of measure, pulse output scaling and ADE, flow-alarm functions, language selection, low-flow cutoff, noise dampening factor and sampling frequency selection.

3) The signal amplifier shall have a programming option allowing entry of a selected numeric password value for tamper protection.

g. System Performance

1) The metering system shall operate over a flow range of 0.10 to 32.8 ft/s [0.03 to 10 m/s].

2) The metering system shall perform to an accuracy ±0.4 percent of rate ±0.0065 ft/s [±2 mm/s].
The accuracy for zero straight run with a single elbow up and/or a single elbow down stream shall be 1% or better in the flow range 1.2 ft/s (0.35 m/s) and up.

3) The metering system shall be capable of measuring the volumetric flow rate of liquids having an electrical conductivity as low as 20 micromhos per centimeter.

4) The system measuring repeatability shall be <0.10% of full scale.

h. Indication

1) The signal amplifier shall include a two-line, 15-character, LCD interface to display the following values:

i. Flow rate in selectable rate units
ii. Forward totalizer in selectable volume units
iii. Reverse totalizer in selectable volume units
iv. Net totalizer in selectable volume units
v. Error or alarm messages
vi. Software revision level
vii. Flow velocity
viii. % of full scale flow

PART 3 - EXECUTION

1.1 INSTALLATION

A. Follow manufacturer's recommendation for installation. Installation will conform to the guidelines provided by the Installation & Operation Manual.

B. Straight pipe requirement shall be an equivalent of three diameters on the inlet (upstream) side, and two diameters on the outlet (downstream) side.

C. For best performance, place meter vertically, with liquid flowing upward and meter electrodes in a closed, full pipe.

1.2 CALIBRATION

A. Each meter shall be hydraulically calibrated in an ISO 9000-certified testing facility, which utilizes a computerized gravimetric testing method with a measuring uncertainty of 0.1%.

B. Each meter shall be provided with a calibration certificate indicating the measured error (percent deviation) at three different flows, respectively equivalent to 25%, 50% and 75% of the nominal flow rate for each size.

1.3 MANUFACTURER'S WARRANTY

A. Terms

1. The manufacturer of the above specified equipment warrants the Product to be free from defects in materials and workmanship appearing within the earlier of either: One (1) year after installation; or one (1) year and six (6) months after shipment from manufacturer.

END OF SECTION

SECTION 331417
SERVICE CONNECTIONS (1" SIZE ONLY)

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide water service connections, complete and in place, in accordance with the Contract Documents. The requirements of Section 330509 - Piping, General apply to the WORK of this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE Section 015526 – Traffic Control & Access
Section 330110 – Waterline Disinfection & Testing
Section 330509 – Piping, General
Section 312316 – Trenching, Backfill and Compaction
Section 331233 – Meters Large and Small
Section 331423 – Manholes, Vaults, & Meter Boxes

PART 2 - PRODUCTS

2.1 COPPER WATER TUBE

A. Copper water tube shall conform to the requirements of ASTM B 88 - Seamless Copper Water Tube. All 1" copper water tube for buried locations shall be soft temper tube in rolls. All above ground installations, and 2" copper water tube for buried locations shall be hard drawn lengths. Unless otherwise indicated, all copper water tube shall be of Type K wall thickness. The minimum copper service size shall be 1 inch. Copper service size for service run-outs of 50 feet or greater, for ¾-inch and 1-inch meters, shall be increased to 2 inches. Service connections 4 inches in diameter and larger shall be constructed of C900 PVC DR-18 pressure rated to 235 psi in accordance with AWWA C900.

B. **Joints:** Copper water tube shall have either brazed joints, or flared ends and fittings. Brazed joints shall be made with silver brazing alloy metal filler. Brazing alloy metal filler shall contain a minimum of 15% silver and no lead. Brazing alloy metal filler shall be STAY SILV 15 Brazing Metal Filler manufactured by The Harris Products Group, SIL-CAN 15 manufactured by Canfield Technologies, or approved equal.

C. **Fittings:** Brazed fittings shall conform to ANSI/ASME B 16.18 - Cast Copper Alloy Solder Joint Pressure Fittings, or to ANSI/ASME B 16.22 - Wrought Copper and Copper Alloy Solder - Joint Pressure Fittings. The brazing flux shall be the Manufacturer's approved type for the fitting and brazing used. Compression fittings shall conform to ANSI/ASME B 16.26 - Cast Copper Alloy Fittings for Copper Tubes. Cast copper alloy flanges and flanged fittings shall be in accordance with ANSI/ASME B 16.24 - Cast Copper Alloy Pipe Flanges and Flanged Fittings, and ASTM B 62 - Standard Specification for Composition Bronze or Ounce Metal Castings, with 150 lb ratings, or as indicated.

2.2 SERVICE FITTINGS

A. **Saddles and Tapping Sleeves:** Saddles shall be bronze with female iron pipe threads. On PVC pipe, saddles shall be secured by single flat strap. On steel and ductile iron pipe, service saddles shall be with two flat straps up to 2-inches. On all service connections 4-inch and larger, tapping sleeves shall be used. Manufacturer shall be as indicated on the COUNTY Approved Materials List.

B. **Corporation Stops:** Corp stops shall be bronze with male iron pipe threads to match saddle threads. Connection to service line shall be compression fitting (pack joint) outlet connection. Manufacturer shall be as indicated on COUNTY Approved Materials List.

C. **Angle Ball Meter Stops:** Angle ball meter valves shall be bronze, equipped with padlock wings, and

provide for 360 degree rotation of the tee head. Padlock wings for dedicated firelines shall have the ability be locked off in the open position Angle ball meter valves for ¾-inch and 1-inch meters shall have 1-inch compression fitting (pack joint) copper inlet and meter swivel nut outlet to match meter size. Angle ball meter valves for 1-1/2-inch and 2-inch meters shall have compression fitting (pack joint) copper inlets and flanged meter connection outlets. Angle ball meter valve manufacturers and model numbers shall be as indicated on COUNTY Approved Materials List.

D. **Curb Stops:** Ball valve curb stops shall be bronze. Size, connection type and manufacturer shall be as indicated on COUNTY Approved Materials List.

E. **Couplings and Adapters:** Manufacturers of couplings and adapters shall be as indicated on COUNTY Approved Materials List.

F. **Other Brass Fitting:** Manufacturers of couplings and adapters shall be as indicated on COUNTY Approved Materials List.

PART 3 - EXECUTION

3.1 INSTALLATION

A. **General:** Service runouts shall be installed perpendicular to the waterline. The configuration of the services shall be as shown on the applicable COUNTY standard details. Meters shall be installed in accordance with COUNTY Standards & Specifications. All copper tubes shall be installed in a neat and workmanlike manner, properly aligned, and cut from measurements taken at the site, to avoid interference's with structures or equipment. Exposed tubing shall afford maximum access to equipment, and where necessary all tubing shall be installed with sufficient slopes for venting or drainage of liquids. For 1-inch copper tubing, tubing may be curved around a minimum radius of 12 inches. For 1-1/2-inch and 2-inch copper tubing, copper fittings shall be silver brazed where bends are required. All installations shall be acceptable to the COUNTY. There shall be a minimum of two feet in spacing between service saddles.

B. **Valves and Unions:** Unless otherwise indicated, tubing to fixtures, groups of fixtures, and equipment shall be provided with a shutoff valve and union, unless the valve has flanged ends. Low points in water systems shall have drainage valves. Unions shall be provided at threaded valves, equipment, and other devices requiring occasional removal or disconnection.

3.2 PREPARATION

A. Prior to installation, each tube length shall be carefully inspected, flushed clean of any debris or dust, and be straightened, if not true. Ends of tubes shall be reamed and filed smooth. All fittings shall be equally cleaned before assembly.

3.3 JOINTS

A. **Brazed and Soldered Joints:** Brazed and soldered joints shall conform to the Manufacturer's recommendations and to the specifications and recommendations of ANSI/ASME B 31.1 - Power Piping. All brazing shall be done by skilled and qualified welders per Section 330509 - Piping, General. Prior to the application of flux, the end of all tubes shall be thoroughly dried and cleaned.3.4 INSPECTION AND FIELD TESTING

A. **Inspection:** All finished installations shall be carefully inspected for proper joints and supports, anchoring, interferences, and damage to tubing, fittings, and coating. Damage shall be repaired to the satisfaction of the COUNTY.

B. **Field Testing:** When constructed independent of the COUNTY distribution system, all copper service connections shall be pressure tested in conjunction with new water mains for a period of not less than two hours, without exceeding the following tolerance: pipes shall show zero leakage for unburied pipe, and not more than 0.02 gallons per hour per inch diameter per 100 feet of buried pipe. Copper pipe shall be subject

to 100 psi or 1-1/2 times the maximum working pressure, whichever is greater. The CONTRACTOR shall furnish all test equipment, labor, materials, and devices at no extra cost to the COUNTY. .For additional testing requirements refer to Section 330110 – Waterline Disinfection & Testing.

C. Leakage is determined by the change in incremental volume markings on the site reservoir on the test pressure pump. All fixtures, devices, or other accessories which are to be connected to the lines and which would be damaged if subjected to the test pressure shall be disconnected and ends of the branch lines be plugged or capped as required during the testing procedures.

D. Leaks shall be repaired to the satisfaction of the COUNTY, and the system shall be re-tested until no leaks are found.

END OF SECTION

SECTION 331423

VAULTS AND METER BOXES

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide precast meter boxes, complete and in place, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 312316 –Trenching, Backfill and Compaction
Section 330509 – Piping, General

PART 2 - PRODUCTS

2.1 METER BOXES

A. The CONTRACTOR shall provide meter boxes for the indicated applications and of the sizes indicated. Meter boxes shall be sized in accordance with the table below. All replacement and retrofit meters shall be located in the appropriate meter box as shown. Any exceptions shall be approved in advance by the COUNTY. Meter box and vault manufacturers and product numbers shall be as indicated on COUNTY approved materials list.

B. Where specified by the COUNTY, meter boxes shall be provided with single piece polymer concrete cover with appropriate hole for an Invensys (Sensus) Touch-Read device.

2.2 BLOW-OFF VAULTS

A. The CONTRACTOR shall provide precast or prefabricated circular vaults designed for the indicated application and of the size indicated. Blow-off vaults shall be reinforced concrete or fiber reinforced polymer.

B. **Design Loading:** Vaults in areas subject to vehicular traffic shall be designed for H-20 traffic loading. Vaults in other areas shall be designed for a vertical live load of 300 psf.

C. The full clear space opening indicated shall be provided, without obstructions from brackets or supports, and covers for access openings shall be provided. Covers shall be cast iron or reinforced polymer. All lids shall be tight fitting to prevent the entrance of dirt and debris. All covers, except round, heavy-weight, cast iron manhole covers, shall have securing mechanisms to hold the covers firmly in place against the effects of repetitious live loads such as pedestrian or vehicle traffic.

PART 3 - EXECUTION

3.1 GENERAL

A. Meter Boxes shall be assembled and placed in excavations on properly compacted soil foundations as indicated. Meter boxes shall be set to grade and oriented to provide the required dimensions and clearances from pipes and other structures.

B. Prior to backfilling, all cracks and voids in meter boxes shall be filled with non-shrink grout. Around pipe and conduit penetrations, openings shall be sealed with non-shrink grout

END OF SECTION

BID No. 19012.2

Calle Real Water Loop, Phase 2 Project

ADDENDUM #1

May 6, 2024

The following information is hereby incorporated into Bid #19012.2. All addenda shall be acknowledged in vendor bid form. Unless specifically changed via addenda, the proposal date for this Bid shall remain unchanged per this addenda.

LISTING OF CHANGES

Item 1.1: Incorporates the following changes to the **Notice to Bidders**:

1. Cover Sheet:
   a. Modified Bid Due date time to Thursday, May 16, 2024, at 3:00 P.M. PST.
   b. Modified Virtual Bid Opening to Thursday, May 16, 2024, at 3:30 P.M. PST.
   c. Updated Cover Sheet(s) attached (2 pages).

2. Notice to Bidders:
   a. Modified Bid Due date time to Thursday, May 16, 2024, at 3:00 P.M PST.
   b. Modified Virtual Bid Opening to Thursday, May 16, 2024, at 3:30 P.M. PST.
   c. Modified (RFI) Questions due date May 9, 2024.
   d. Updated Notice to Bidders attached (2 pages).

3. Bid Form:
   a. Modified Bid Due date time to Thursday, May 16, 2024, at 3:00 P.M. PST.
   b. Added Allowance #1, 2, and 3 under section 2 of the Bid Form. Note that Allowance values are included in the **TOTAL LUMP SUM BASE BID.**
   c. Updated Bid Form attached (3 pages).

4. Designation of Subcontractors:
   a. Modified Bid Due date time to Thursday, May 16, 2024, at 3:00 P.M. PST. Updated Form attached (1 page).

5. Anti-Fraud Certification:
   a. Modified Bid Due date time to Thursday, May 16, 2024, at 3:00 P.M. PST. Updated Form attached (1 page).

6. Bidders Bond:
   a. Modified Bid Due date time to Thursday, May 16, 2024, at 3:00 P.M. PST. Updated Form attached (2 pages).

END OF ADDENDUM #1

County of Santa Barbara
Calle Real Water Loop Project
Phase 2 #19012-2
Calle Real County Campus

Project No. #19012-2

MANDATORY JOB WALK:
Wednesday, April 24, 2024
10:30am

BID DUE DATE:
Thursday, May 16, 2024
3:00 P.M.

VIRTUAL BID OPENING:
Thursday, May 16, 2024
3:30 P.M.

TABLE OF CONTENTS

NOTICE TO BIDDERS

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

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2

Calle Real County Campus
Project No. #19012-2

MANDATORY JOB WALK:
Wednesday, April 24,2024
10:30am

BID DUE DATE:
Thursday, May 16, 2024
3:00 P.M.

VIRTUAL BID OPENING:
Thursday, May 16, 2024
3:30 P.M.

CONSTRUCTION COST ESTIMATE: Estimated cost of construction is $1,000,000.00

PROJECT LOCATION: The Project Site is located off Calle Real between San Antonio Road and Camino del Remedio in Santa Barbara.

MANDATORY JOB WALK: The job walk is MANDATORY on **April 24, 2024 at 10:30am** to start at 267 Camino del Remedio in the parking lot at the corner of Calle Real and Camino del Remedio.

Only those prime contractors attending a job walk shall be qualified to bid the work.

PROJECT DESCRIPTION: The construction of a new water line system to replace the old, antiquated water system for the County of Santa Barbara Calle Real Campus. Project new water line system with all appurtenances, such as valves, tees, crosses, meters, restraints, thrust blocks, etc., the necessary tie-ins to existing services to buildings. Contractor is to maintain water service and provide portable toilets as needed to assure continued service to each building with little to no interruption during construction. The Contractor will be required to coordinate all work with County Facilities/Maintenance to assure all occupants, staff and clients are duly notified of impending construction in the vicinity of their building. All shutdowns will be coordinated with and managed by County Facilities/Maintenance.

CONTRACTOR'S LICENSE: The CONTRACTOR shall possess either a Class A, B or a C-34 license.

QUESTIONS: All questions MUST be submitted electronically through the Public Purchase Portal (www.publicpurchase.com) on or before **May 9, 2024**. 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 **Thursday, May 16, 2024 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 proposal 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 proposal 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.—The lowest responsible bidder will be determined in accordance with Public Contract Code Division II, Part 3, Chapter 1, Section 20103.8, Subdivision (c) and as follows:

1. The project funding amount will be disclosed before the first bid is opened.
2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

BID PROTEST: The County of Santa Barbara Bid Protest Procedures are described in Item 10 of the BID FORM, which is included in the bid documents.

CONSTRUCTION TIME: The successful CONTRACTOR (after receiving the Notice to Proceed) shall have **150** calendar days to complete all work called for under the Contract Documents. Subsequent A subsequent 30 calendar days for each included with the Base Bid and accepted by the County

LIQUIDATED DAMAGES: The liquidated damages will be **$250 (Two Hundred Fifty 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: **Join the meeting now** or call in (audio only) 805-724-0311 and use Phone Conference ID: 994 811 154#

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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2

Bid Due Date: Thursday, May 16, 2024 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:** Construction of new water main piping and valves, including tie-in with the Goleta Water District Main service connection located at the southeast corner of the Campus, an approximate 1,950 linear feet and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ ☐☐ , ☐☐☐ , ☐☐☐ . ☐☐

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #1: Construction of additional piping and valves to extend the water main loop approximately 1,375 linear feet, to complete the lower water main loop, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ ☐☐ , ☐☐☐ , ☐☐☐ . ☐☐

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #2: Construction of additional piping and valves to extend the water main loop approximately 1,730 linear feet, along the west and north reaches of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [ ][ ][ ] , [ ][ ][ ] . [ ][ ]

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #3: Construction of additional piping and valves to extend the water main loop approximately 1,530 linear feet, along the east reach of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [ ][ ][ ] , [ ][ ][ ] . [ ][ ]

(Place figures in appropriate boxes.)

Estimated number of work days: _____

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 (c) and as follows:
    1. The project funding amount will be disclosed before the first bid is opened.
    2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
    3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

4. It is understood that Owner reserves the right to reject the proposal and that it shall remain open and not be withdrawn for a period of ninety (90) 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 proposal is mailed or delivered personally to the undersigned bidder within thirty (30) calendar days after the opening of the proposal, 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 proposal 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 **150 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 proposal 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 proposal 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 proposal 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 of any bid(s) received must be in writing, must specify all grounds for the protest, and must be filed within ten working days after the opening of bids.

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 proposal 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Thursday, May 16, 2024 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 Subcontract

ANTI-FRAUD CERTIFICATION

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Thursday, May 16, 2024 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date:
May 16, 2024 at 3:00 P.M.

for which bids are due on Thursday, May 16, 2024 at 3:00 P.M. 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 Principal
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.

BID No. 19012.2

Calle Real Water Loop, Phase 2 Project

ADDENDUM #2

May 15, 2024

The following information is hereby incorporated into Bid #19012.2. ALL PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS REMAIN UNCHANGED EXCEPT SECTIONS OR PARTS ADDED TO, REVISED, DELETED OR CLARIFIED BY THIS ADDENDUM.

LISTING OF CHANGES

Item 2.1: Incorporates the following changes to the **Notice to Bidders**:

1. Cover Sheet:
   a. Modified Bid Due date time to Thursday, May 30, 2024, at 3:00 P.M. PST.
   b. Modified Virtual Bid Opening to Thursday, May 30, 2024, at 3:30 P.M. PST.
   c. Updated Cover Sheet(s) attached (2 pages).

2. Notice to Bidders:
   a. Modified Bid Due date time to Thursday, May 30, 2024, at 3:00 P.M PST.
   b. Modified Virtual Bid Opening to Thursday, May 30, 2024, at 3:30 P.M. PST.
   c. Modified (RFI) Questions due date to Wednesday, May 22, 2024 by 5:00 PM PST.
   d. Modified **CONSTRUCTION COST ESTIMATE:** Cost of construction estimated at $1,970,000.00. Updated Notice to Bidders attached.
   e. Modify the Notice to Bidders to include requirements for the CALIFORNIA AIR RESOURCE BOARD (CARB) CERTIFICATES.
   f. Updated Notice to Bidders attached (3 pages).

3. Bid Form:
   a. Modified Bid Due date time to Thursday, May 30, 2024, at 3:00 P.M. PST.
   b. Add ALLOWANCE No.1 to Bid Form for a qualified licensed archaeologist. Limit to be established at $20,000.00.
   c. Updated Bid Form attached (4 pages).

4. Designation of Subcontractors:
   a. Modified Bid Due date time to Thursday, May 30, 2024, at 3:00 P.M. PST. Updated Form attached (1 page).

5. Anti-Fraud Certification:
   a. Modified Bid Due date time to Thursday, May 30, 2024, at 3:00 P.M. PST. Updated Form attached (1 page).

6. Bidders Bond:
   Modified Bid Due date time to Thursday, May 30, 2024, at 3:00 P.M. PST. Updated Form attached (2 pages).

Item 2.2: Incorporates the following changes to CONTRACT FORMS:

Modify COUNTY OF SANTA BARBARA AGREEMENT FOR: **General Services Project No. 19012-2** to add Paragraph 29. FLEET REQUIREMENTS in compliance with the California Air Resources Board ("CARB") Advanced Clean Fleets regulations and renumber all subsequent paragraphs accordingly (6 pages).

Item 2.3: Incorporates the following changes to the Special Conditions:

Modified **Bid Opening Date** time to Thursday, May 30, 2024, at 3:00 P.M PST (1 page).

Item 2.4: Incorporates the following changes to the Construction Drawings:

1. **Reference to SHEET 2 of 18:** Update sheet as shown in the Civil Drawings as attached. Provide new water meters with long-life batteries as specified in Section 331234 - County Sub Meters of the Technical Specifications with remote terminal cellular communications technology capabilities in lieu of construction of Construction Notes 42-44.

2. **Reference to SHEET 15 of 18:** Update sheet as shown in the Civil Drawings as attached. Make new waterline service connection to Casa Omega as part of ADDITIVE BID ITEM #2 work and abandon old connection.

Item 2.5: Incorporates the following changes to the Technical Specifications:

1. AMEND: **Section 330509 – PIPING, GENERAL, Paragraph 3.6C – Time Schedule** to be modified to include the following Building shutdown protocol, unless approved otherwise by the COUNTY:

   SEE ATTACHMENT #1

2. Add specification section 01 21 00 ALLOWANCES dated May 13, 2024 (2 pages).

END OF ADDENDUM #2

County of Santa Barbara
Calle Real Water Loop Project
Phase 2 #19012-2
Calle Real County Campus

Project No. #19012-2

MANDATORY JOB WALK:
Wednesday, April 24, 2024
10:30am

BID DUE DATE:
Thursday, May 30, 2024
3:00 P.M.

VIRTUAL BID OPENING:
Thursday, May 30, 2024
3:30 P.M.

NOTICE TO BIDDERS

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

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2

Calle Real County Campus
Project No. #19012-2

MANDATORY JOB WALK:
Wednesday, April 24,2024
10:30am

BID DUE DATE:
Thursday, May 30, 2024
3:00 P.M.

VIRTUAL BID OPENING:
Thursday, May 30, 2024
3:30 P.M.

CONSTRUCTION COST ESTIMATE: Estimated cost of construction is $1,970,000.00

PROJECT LOCATION: The Project Site is located off Calle Real between San Antonio Road and Camino del Remedio in Santa Barbara.

MANDATORY JOB WALK: The job walk is MANDATORY on **April 24, 2024 at 10:30am** to start at 267 Camino del Remedio in the parking lot at the corner of Calle Real and Camino del Remedio.

Only those prime contractors attending a job walk shall be qualified to bid the work.

PROJECT DESCRIPTION: The construction of a new water line system to replace the old, antiquated water system for the County of Santa Barbara Calle Real Campus. Project new water line system with all appurtenances, such as valves, tees, crosses, meters, restraints, thrust blocks, etc., the necessary tie-ins to existing services to buildings. Contractor is to maintain water service and provide portable toilets as needed to assure continued service to each building with little to no interruption during construction. The Contractor will be required to coordinate all work with County Facilities/Maintenance to assure all occupants, staff and clients are duly notified of impending construction in the vicinity of their building. All shutdowns will be coordinated with and managed by County Facilities/Maintenance.

CONTRACTOR'S LICENSE: The CONTRACTOR shall possess either a Class A, B or a C-34 license.

QUESTIONS: All questions MUST be submitted electronically through the Public Purchase Portal (www.publicpurchase.com) on or before **Wednesday, May 22 2024 by 5:00 P.M. PST**. 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 **Thursday, May 30, 2024 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 proposal 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 proposal 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.

CALIFORNIA AIR RESOURCE BOARD (CARB) CERTIFICATES: Bidder must provide to the County, currently with the submission of Bidder's Bid, 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.

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.—The lowest responsible bidder will be determined in accordance with Public Contract Code Division II, Part 3, Chapter 1, Section 20103.8, Subdivision (c) and as follows:

1. The project funding amount will be disclosed before the first bid is opened.
2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2

Bid Due Date: Thursday, May 30, 2024 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:** Construction of new water main piping and valves, including tie-in with the Goleta Water District Main service connection located at the southeast corner of the Campus, an approximate 1,950 linear feet and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ ☐☐ , ☐☐☐ , ☐☐☐ . ☐☐

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #1: Construction of additional piping and valves to extend the water main loop approximately 1,375 linear feet, to complete the lower water main loop, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ ☐☐ , ☐☐☐ , ☐☐☐ . ☐☐

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #2: Construction of additional piping and valves to extend the water main loop approximately 1,730 linear feet, along the west and north reaches of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [ ][ ][ ] , [ ][ ][ ] . [ ][ ]

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #3: Construction of additional piping and valves to extend the water main loop approximately 1,530 linear feet, along the east reach of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [ ][ ][ ] , [ ][ ][ ] . [ ][ ]

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ALLOWANCE No. 1: Lump Sum Allowance to provide a qualified archaeologist to conform to the Special Conditions.

$ [ ][ ] , [ ][2][0] , [0][0][0] . [0][0]

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 (c) and as follows:
    1. The project funding amount will be disclosed before the first bid is opened.
    2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
    3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

4. It is understood that Owner reserves the right to reject the proposal and that it shall remain open and not be withdrawn for a period of ninety (90) 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 proposal is mailed or delivered personally to the undersigned bidder within thirty (30) calendar days after the opening of the proposal, or at any

DESIGNATION OF SUBCONTRACTORS

The bidder agrees if this proposal 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Thursday, May 30, 2024 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 Subcontract

ANTI-FRAUD CERTIFICATION

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Thursday, May 30, 2024 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date:
May 30, 2024 at 3:00 P.M.

for which bids are due on Thursday, May 30, 2024 at 3:00 P.M. 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.

25. 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.

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

27. 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 31, 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.

28. EXECUTION OF COUNTERPARTS: This Contract may be executed 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.

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. SUBCONTRACTORS: CONTRACTOR is authorized to subcontract with only the subcontractor(s) identified in the Proposal 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.

31. CHANGE ORDERS: No Change Order shall be valid or enforceable against the COUNTY unless duly authorized by the COUNTY in accordance with Article 6 of the General Conditions.

32. ORDER OF PRECEDENCE: In the event of conflict between the provisions contained in the numbered Sections 1 through 32 of this Agreement and the provisions contained in the Exhibits, the provisions contained in the numbered Sections 1 through 32 of this Agreement shall prevail over those in the Exhibits other than Exhibit C. CONTRACTOR agrees that in the event of any discrepancy, inconsistency, gap, ambiguity, or conflicting language between 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 1 through 31 of this Agreement, Exhibit A, and Exhibit C) other than Exhibit B shall take precedence and control and prevail over the provisions of Exhibit B.

SPECIAL CONDITIONS

COUNTY OF SANTA BARBARA
Calle Real Water Loop Replacement Phase 2
Calle Real, Santa Barbara, CA

Project No. 19012

Bid Opening Date: 3:00 P.M., Thursday, May 30, 2024

Mandatory Job Walk: 10:30 A.M., Wednesday April 10, 2024

NOTE: ONLY THOSE GENERAL CONTRACTORS ATTENDING THE JOB WALK SHALL BE QUALIFIED TO BID THIS WORK.

Environmental Stewardship-Cultural Resources

Cultural Monitoring is required per Section 011001. Monitoring must be coordinated through the Coastal Band of Chumash Nation Representative:

Gabriel Frausto, Chairman
Director of Cultural Resources
Coastal Band of the Chumash Nation
(805) 568-8063
Fraustogabriel28@gmail.com

If archaeological resources are encountered or suspected, the Contractor shall halt or redirect work immediately and notify the Designated Representative. The Contractor must retain a qualified archaeologist. The archaeologist shall assess the nature, extent, and significance of any discoveries, and shall develop appropriate management recommendations for archaeological resource treatment. Work in the area shall only resume with authorization of the Designated Representative.

DISPOSITION NOTES:

LEGEND:

CONSTRUCTION NOTES:

REMOVE FROM SCOPE OF WORK

GENERAL NOTES

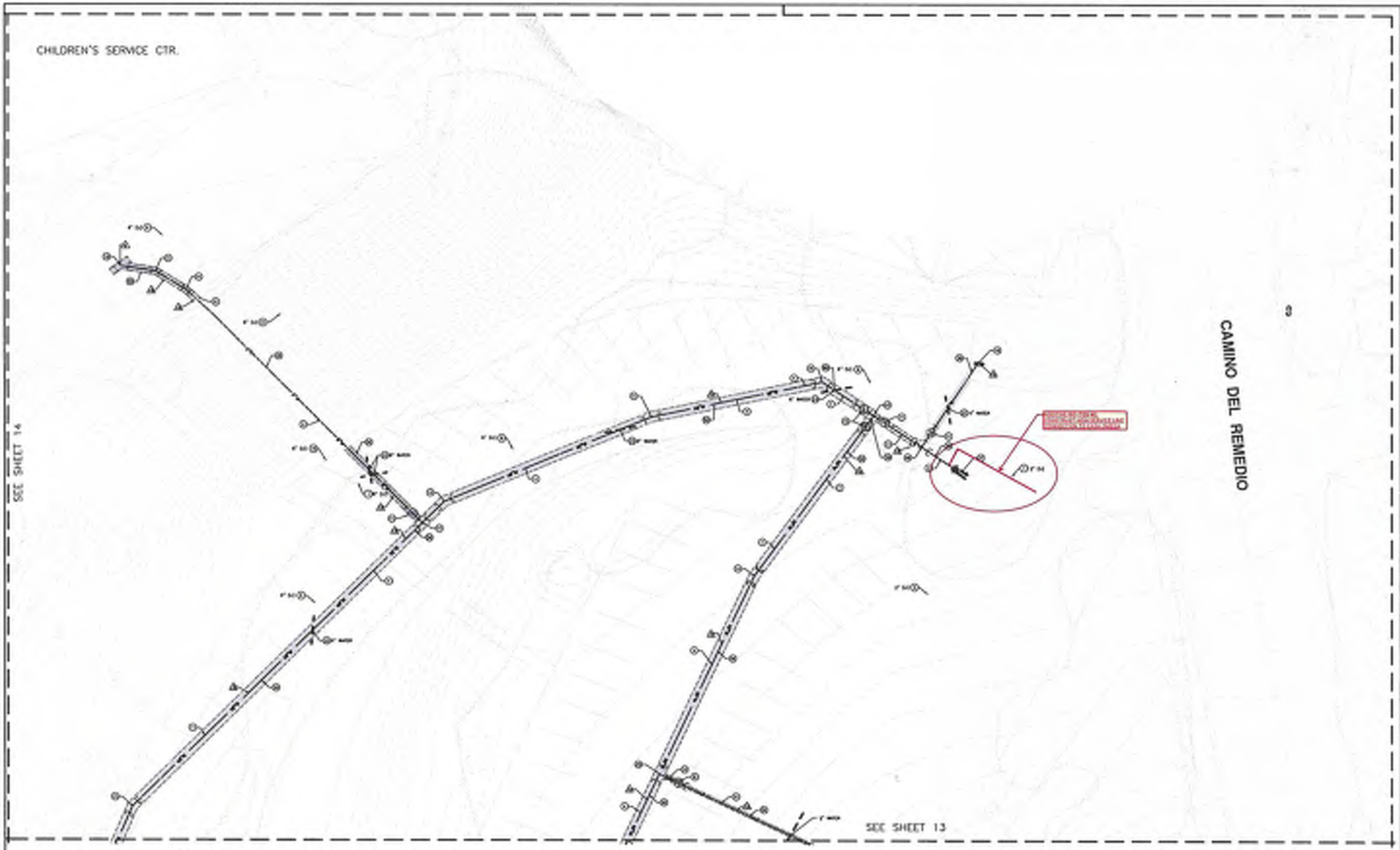
ABBREVIATIONS

WATER GENERAL NOTES

ADDENDUM # 2

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

2



NOTE TO CONTRACTOR:

1. THE INFORMATION SHOWN ON THE THESE PLANS IS BASED ON AVAILABLE RECORD INFORMATION AND SITE OBSERVATION. CONTRACTOR SHALL VERIFY ALL INFORMATION, INCLUDING PIPE SIZE, MATERIAL, ETC. BEFORE BEGINNING WORK OR ORDERING ANY MATERIAL.
2. LOCATION OF MOST EXISTING UTILITIES ARE NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES THAT MAY BE IN CONFLICT WITH THE PROPOSED IMPROVEMENTS. REPAIR OF ANY DAMAGE TO EXISTING UTILITIES WILL BE SOLELY AT THE CONTRACTOR'S EXPENSE.
3. PROPOSED WATER LINE LOCATIONS SHOWN ON THIS PLAN ARE BASED ON THE EXISTING TOPOGRAPHIC AND UTILITY INFORMATION AVAILABLE. PROPOSED LOCATIONS MAY NEED TO BE FIELD FIT BASED ON ACTUAL SITE CONDITIONS. CONTRACTOR SHALL LAY OUT ALL PROPOSED LINES TO ENSURE THEY CAN BE ADEQUATELY CONSTRUCTED PRIOR TO ORDERING ANY MATERIAL OR BREAKING GROUND.

ADDENDUM # 2

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

15

19012-2 CALLE REAL WATER LOOP PROJECT, PHASE 2

COUNTY SB CALLE REAL CAMPUS - BUILDING WATER SERVICE SHUTDOWN SPECIFICS

ADDENDUM #2

For "CONNECTION TO EXISTING WATERLINES" refer to Paragraph 3.6 of Section 330509 - Piping, General of the Technical Specifications

COUNTY BUILDING	SHUTDOWN	ALLOWED	NOT ALLOWED
Main Jail	Allowed during week after 10:00 AM	10:00 AM - 5:00 PM	5:00 PM - 10:00 AM
Hospital	Requires 10 working days min. written notification; Allowed early morning before 8:00 AM; No shutdowns before 5:00 PM	5:00 PM - 7:30 AM	7:30 AM - 5:00 PM
Pediatrics	Requires 10 working days min. written notification; Allowed early morning before 8:00 AM; No shutdowns before 5:00 PM	7:30 AM - 4:00 PM	
Bldg 4440 - VA Clinic	Allowed early morning before 8:00 AM; No shutdowns before 5:00 PM	5:00 PM - 7:30 AM	7:30 AM - 5:00 PM
Bldg 4444 - Be-Well Clinic	Allowed early morning before 8:00 AM; No shutdowns before 5:00 PM	5:00 PM - 7:30 AM	7:30 AM - 5:00 PM
Social Services	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Tecolote (Casa Omega)	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
24/7 Buildings:			
Casa Mural (Mental Health)	Requires advance coordination with Administrator & Staff; Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
315 Camino del Remedio (Psyc Ward)	Requires advance coordination with Administrator & Staff; Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
CSU (Critial Stabilization Clinic) - 305 Calle Real (Boiler Room)	Requires advance coordination with Administrator & Staff; Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Employee University	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Agricultural Commission	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Casa Nueva	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
San Antonio Bldg	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Health Care Services	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Residence (off San Antonio Road)	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Children's Service Center	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Abandoned Building; (2) Storage Buildings	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Storage	Requires 10 working days min. written notification	7:30 AM - 4:00 PM	
Storage (Surv)	(No written notification required)		

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.
5. Testing and inspecting allowances.

C. Related Requirements:

1. Section 5.8 'Allowances' of the General Conditions to determine how allowances are built into the contract costs.
2. Section 13 'Changes in Work' of the General Conditions for procedures for submitting and handling Change Orders.

1.2 DEFINITIONS

A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise COUNTY of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the COUNTY OF SANTA BARBARA to avoid delaying the Work.

B. At COUNTY's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Engineer from the designated supplier or approved equal.

1.4 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to COUNTY OF SANTA BARBARA, after installation has been completed and accepted.

1. If requested by Engineer, retain, and prepare unused material for storage by COUNTY OF SANTA BARBARA. Deliver unused material to COUNTY OF SANTA BARBARA's storage space as directed.

1.7 UNIT-COST ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to COUNTY OF SANTA BARBARA, after installation has been completed and accepted.

1. If requested by Engineer, retain and prepare unused material for storage by COUNTY OF SANTA BARBARA. Deliver unused material to COUNTY OF SANTA BARBARA's storage space as directed.

1.8 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to COUNTY OF SANTA BARBARA, after installation has been completed and accepted.

1. If requested by Engineer, retain and prepare unused material for storage by COUNTY OF SANTA BARBARA. Deliver unused material to COUNTY OF SANTA BARBARA's storage space as directed.

1.9 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Engineer for COUNTY OF SANTA BARBARA's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by COUNTY OF SANTA BARBARA under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to COUNTY OF SANTA BARBARA by Change Order.

1.10 TESTING AND INSPECTING ALLOWANCES

A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.

B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.

C. Costs of testing and inspection services not specifically required by the Contract Documents are Contractor responsibilities and are not included in the allowance.

D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to COUNTY OF SANTA BARBARA by Change Order.

1.11 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.

2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.

3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.

4. COUNTY OF SANTA BARBARA reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.

2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Provide a qualified licensed archaeologist if archaeological resources are encountered or suspected during construction excavation and trenching, as specified in the Special Conditions.

END OF SECTION 01 21 00

BID No. 19012.2

Calle Real Water Loop, Phase 2 Project

ADDENDUM NO. 3

May 17, 2024

The following information is hereby incorporated into Bid #19012.2:

ALL PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS REMAIN UNCHANGED EXCEPT SECTIONS OR PARTS ADDED TO, REVISED, DELETED OR CLARIFIED BY THIS ADDENDUM.

Addendum No. 2 was issued to add, clarify and revise the contract documents solicited on April 24, 2024. Due to the material changes to the original bid solicitation, Addendum No. 2 also extended the Bid Due Date and Virtual Bid Opening Date.

This Addendum No. 3 is being issued to require that Addendum 2 and 3 be accepted and acknowledge on your Bid Form and attached to your Bid.

END OF ADDENDUM NO. 3

BID No. 19012.2

Calle Real Water Loop, Phase 2 Project

ADDENDUM NO. 4

May 23, 2024

The following information is hereby incorporated into Bid #19012.2:

ALL PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS REMAIN UNCHANGED EXCEPT SECTIONS OR PARTS ADDED TO, REVISED, DELETED OR CLARIFIED BY THIS ADDENDUM.

LISTING OF CHANGES

Item 4.1: Incorporates the following changes to the Construction Drawings:

1. Attached to this Addendum a complete set of the updated **Civil Drawings** with the revisions made on May 20, 2024, identified in **Addendum No. 2**.

Item 4.2: Incorporates the following changes to the Technical Specifications:

2. Attached to this Addendum a complete set of the updated **Technical Specifications** with the addition of **Section 012100 - Allowances** made on May 20, 2024 and identified in **Addendum No. 2**.

END OF ADDENDUM NO. 4

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
COUNTY OF SANTA BARBARA, CALIFORNIA

DRAWING INDEX	
[illegible]	[illegible]
1	TITLE SHEET
2	NOTES SHEET
3	KEY MAP
4	NOTES Plate 1
5	NOTES Plate 2
6	NOTES Plate 3
7	NOTES Plate 4
8	NOTES Plate 5
9	NOTES Plate 6
10	NOTES Plate 7
11	NOTES Plate 8
12	NOTES Plate 9
13	NOTES Plate 10
14	NOTES Plate 11
15	NOTES Plate 12
16	DETAIL SHEET
17	DETAIL SHEET

SITE PLAN MAP

VICINITY MAP

PROJECT CONTACTS:

SITE INFORMATION

BENCHMARK

BASIS OF BEARINGS

UNDERGROUND UTILITY STATEMENT

DECLARATION OF RESPONSIBLE CHARGE

COUNTY OF SANTA BARBARA
GENERAL SERVICES DEPARTMENT

APPROVED _____ DATE _____

DIGALERT

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA.

SHEET 1

DISPOSITION NOTES:

[illegible]

LEGEND:

[illegible]

CONSTRUCTION NOTES:

[illegible]

GENERAL NOTES

[illegible]

WATER GENERAL NOTES

[illegible]

ABBREVIATIONS

[illegible]

DIGALERT

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

2

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

3

LEGEND:

TRANSFER STATION ROAD

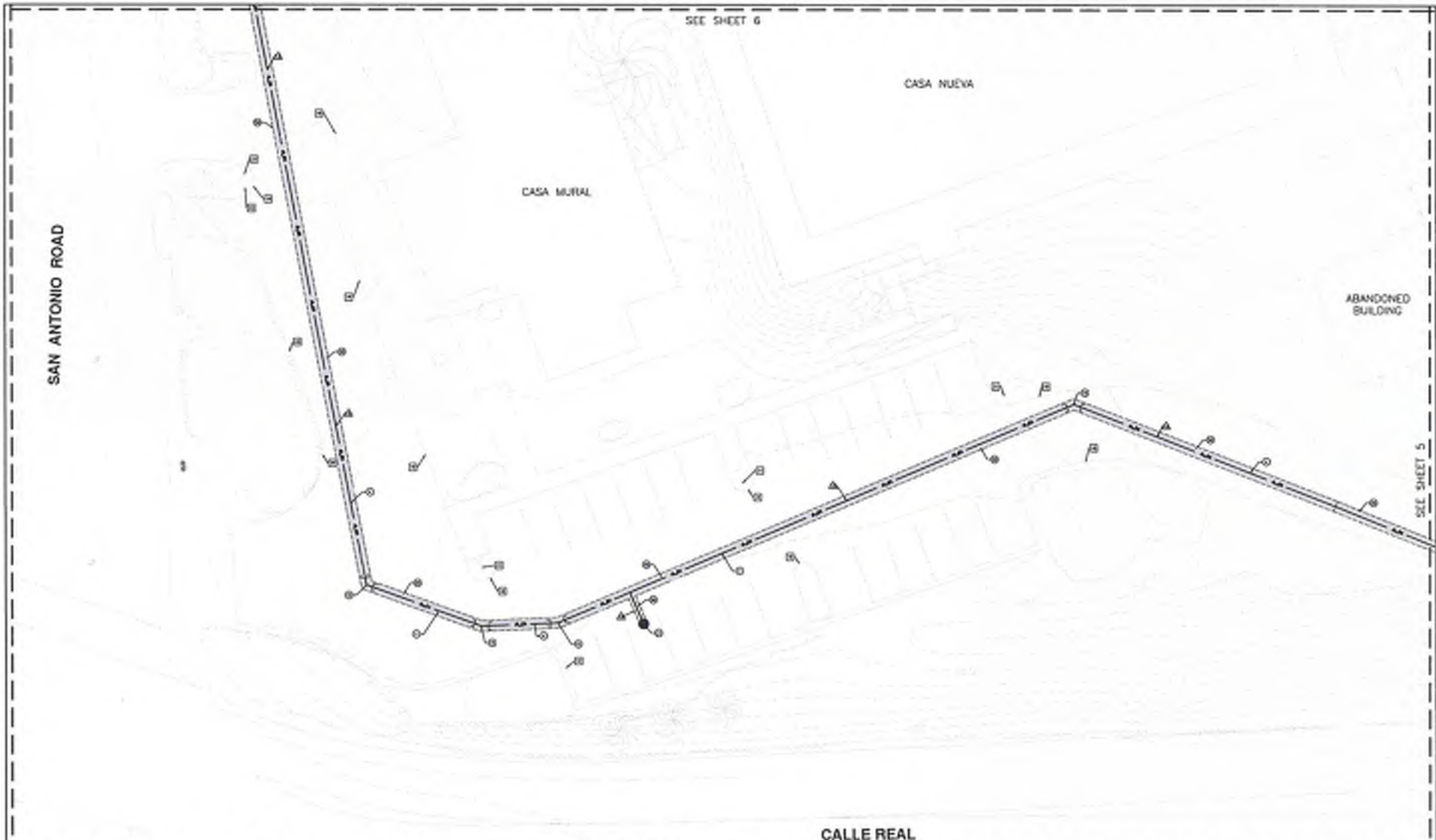
HOMER FARM ROAD

CALLE REAL

CAMINO DEL REMEDIO

SAN ANTONIO ROAD

SHEET 4
SHEET 5
SHEET 6
SHEET 7
SHEET 8
SHEET 9
SHEET 10
SHEET 11
SHEET 12
SHEET 13
SHEET 14



NOTE TO CONTRACTOR:

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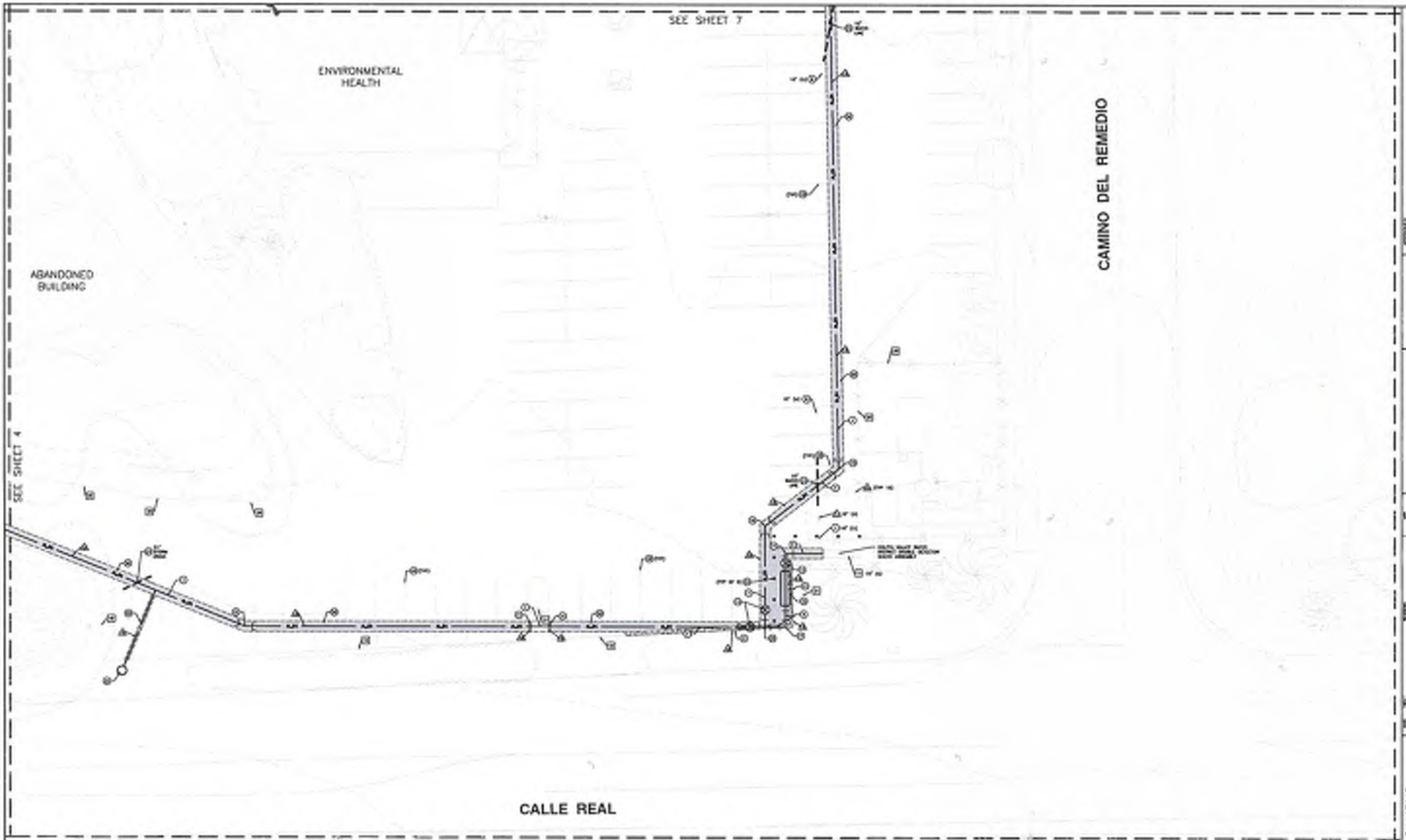
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

4



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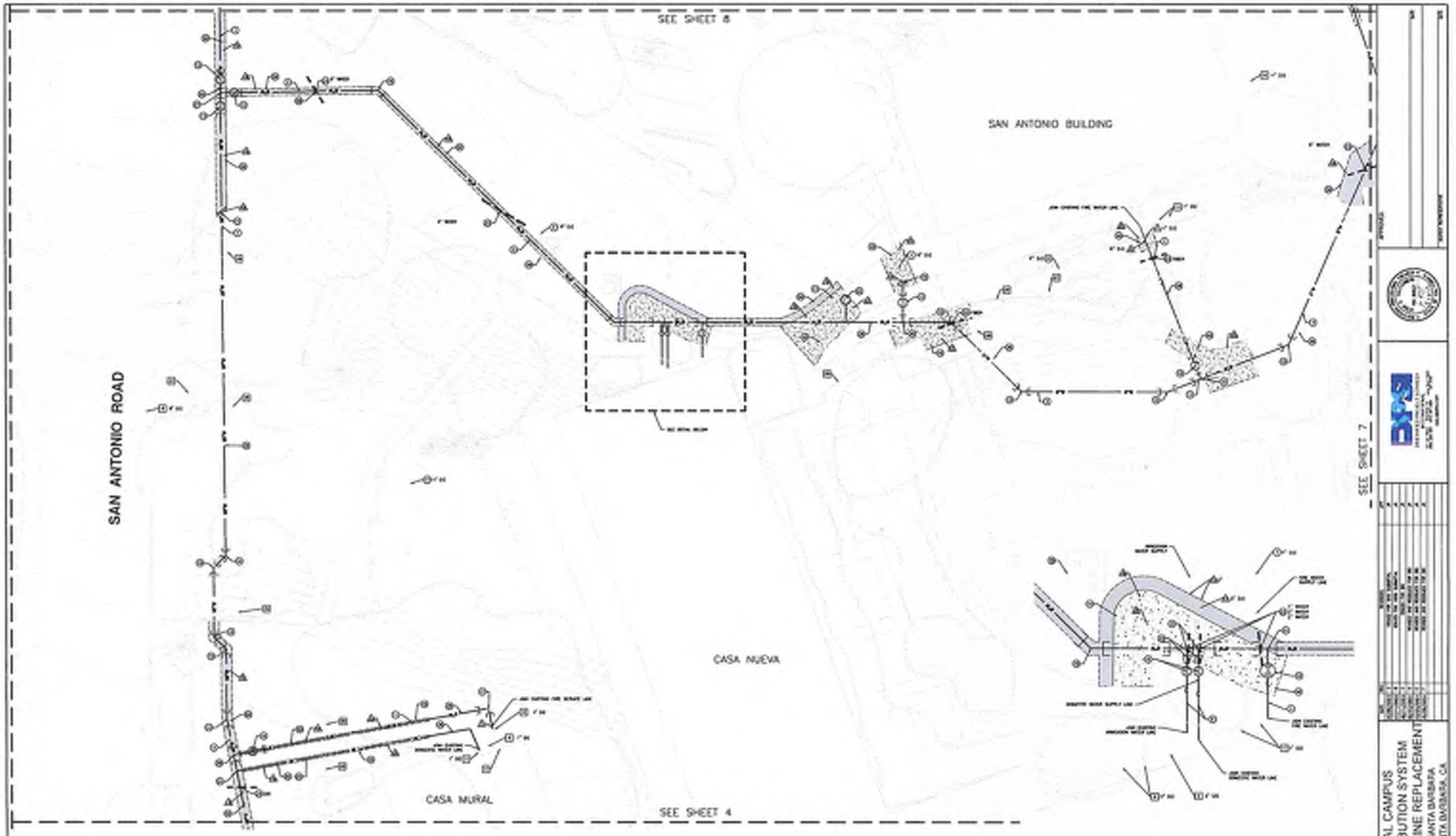
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

5



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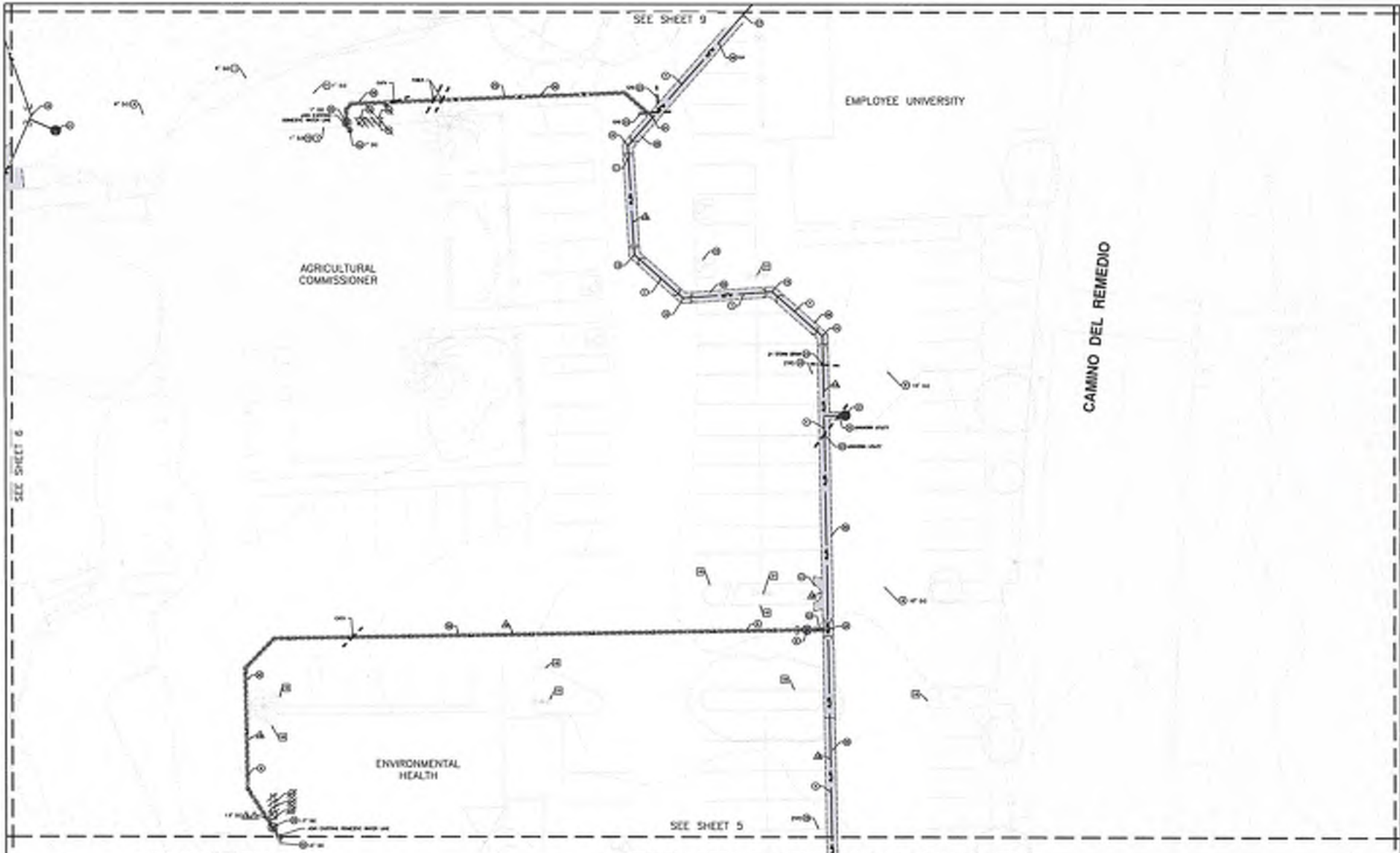
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

SHEET 6



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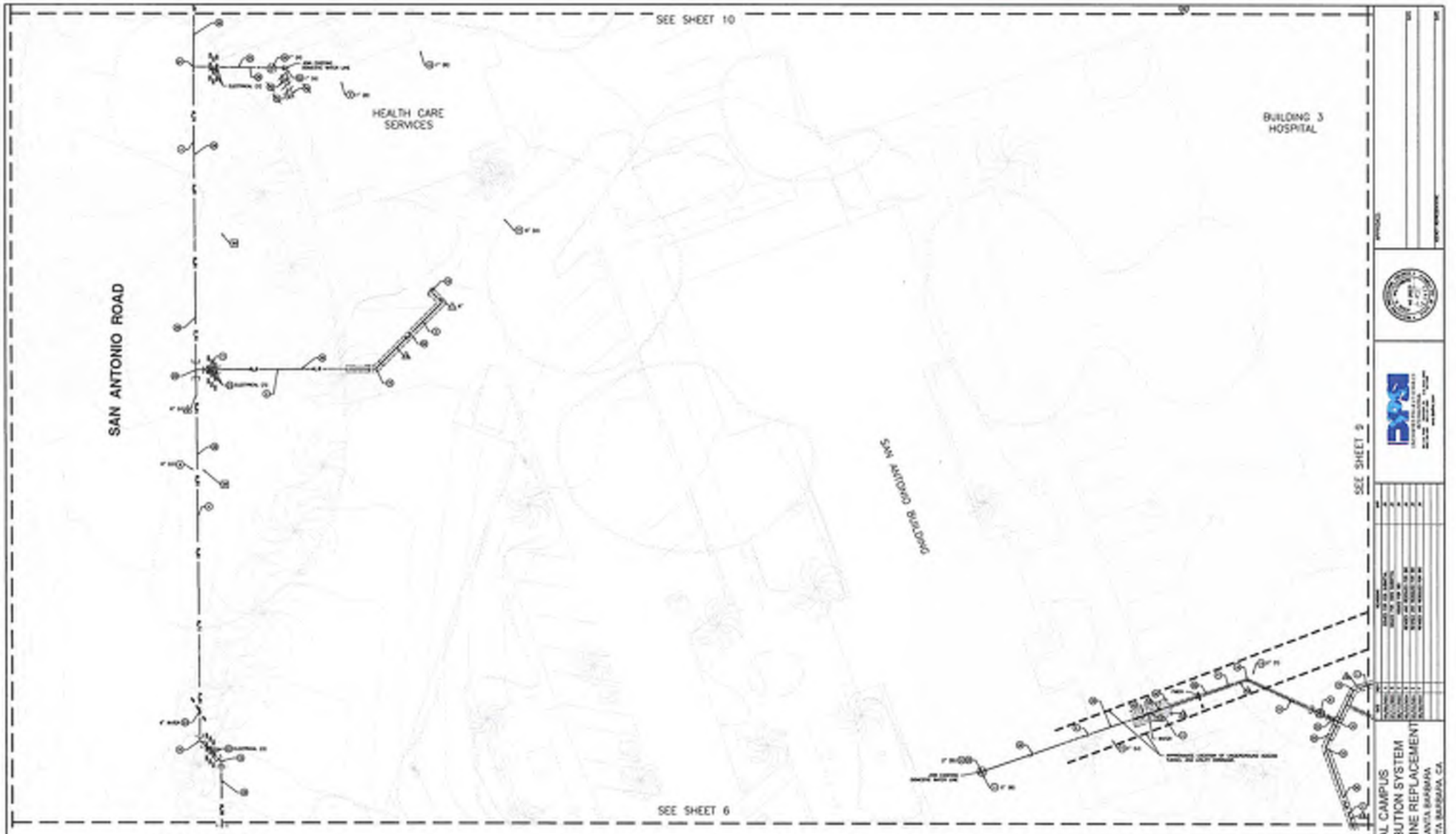
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

7



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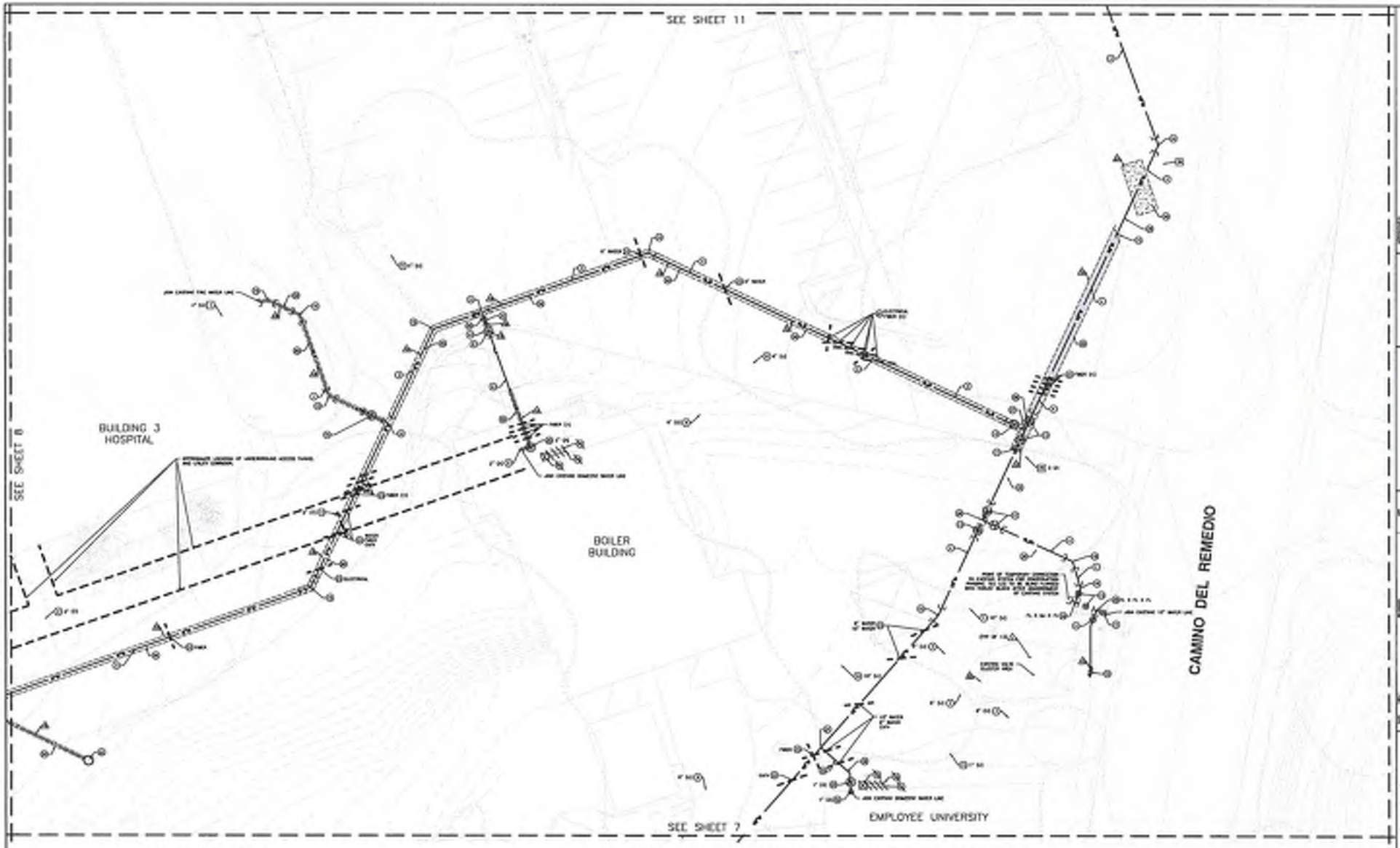
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA



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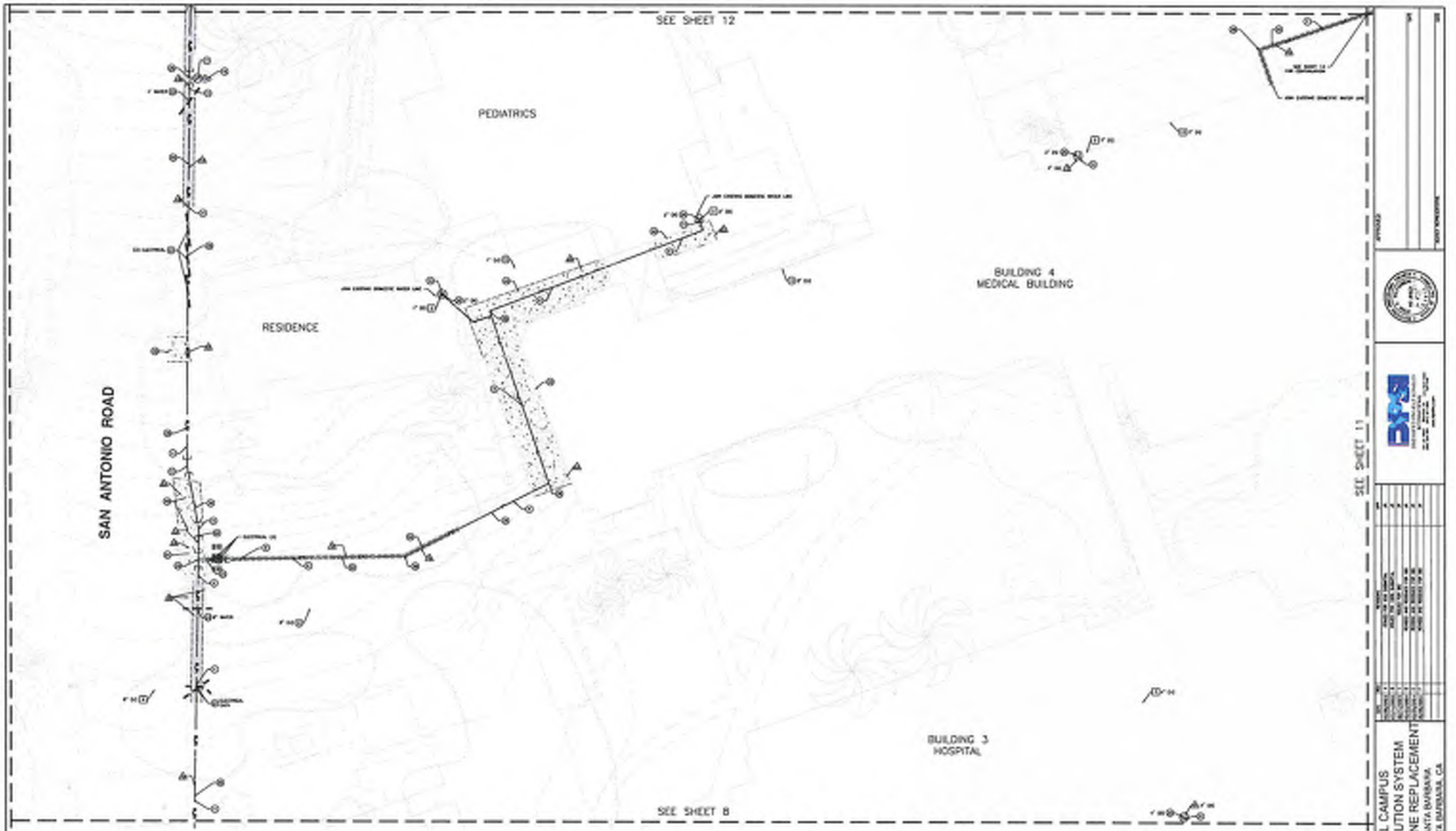
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

SHEET 9



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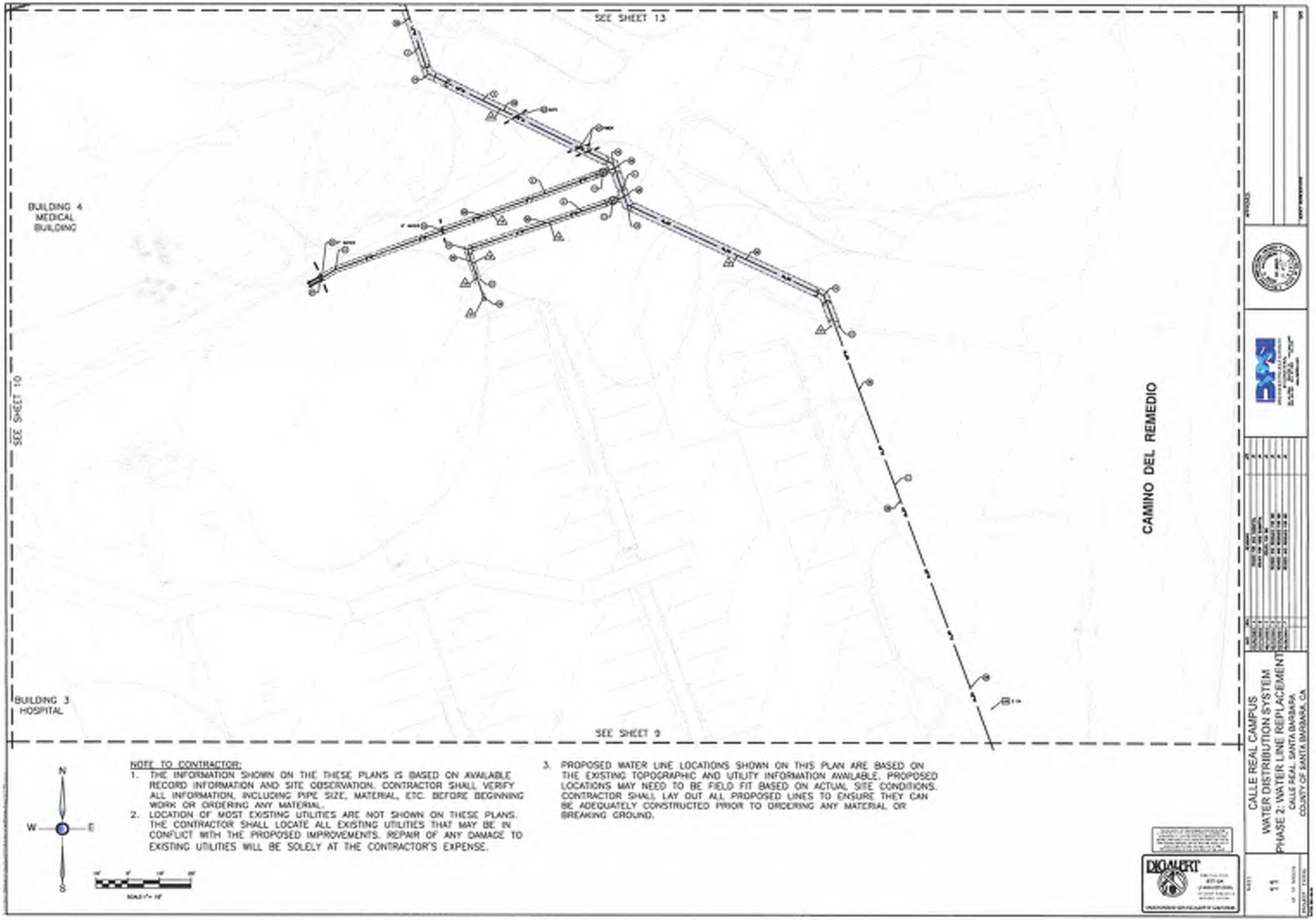
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

10



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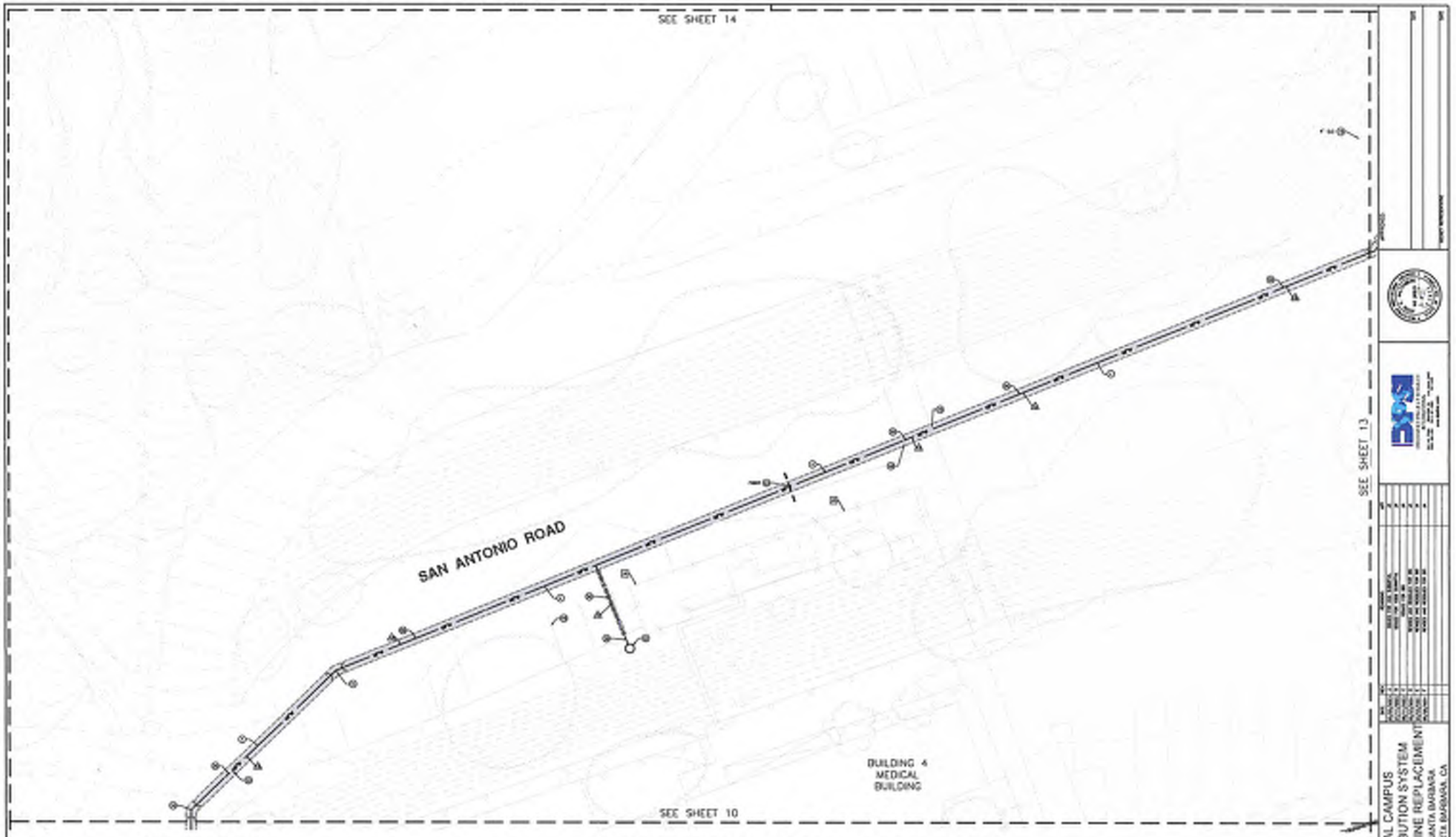
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

SHEET 11



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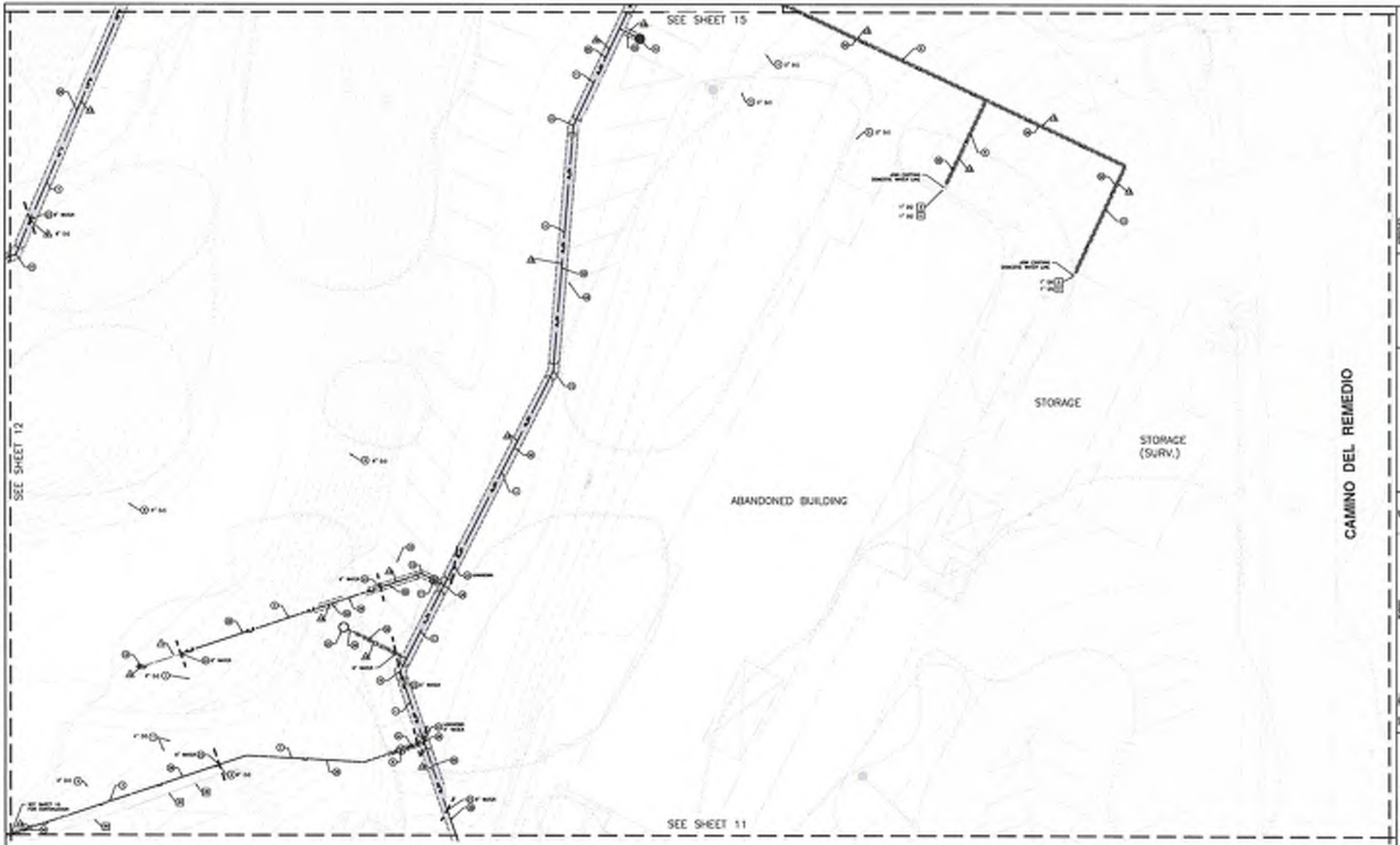
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

12



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CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

SHEET 13

CHILDREN'S SERVICE CTR.

NO WORK THIS SHEET

SEE SHEET 15

SEE SHEET 12

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CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

14

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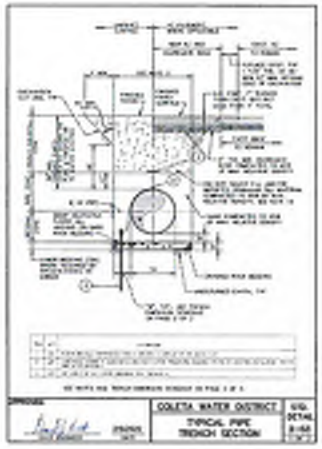
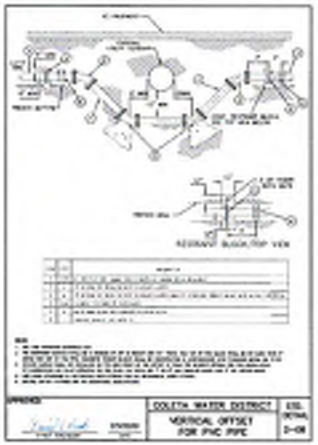
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

15

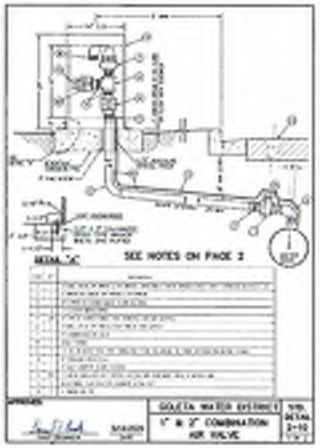


COLETA WATER DISTRICT	STD. DETAIL
TYPICAL PIPE TRENCH SECTION	2-02

COLETA WATER DISTRICT	STD. DETAIL
TYPICAL PIPE TRENCH SECTION	2-02

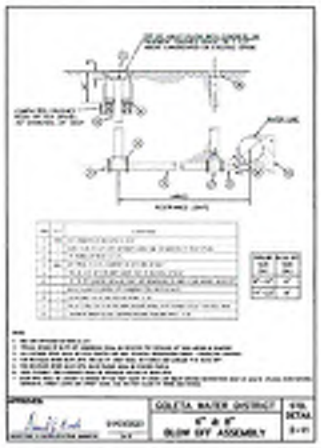


COLETA WATER DISTRICT	STD. DETAIL
VERTICAL OFFSET FOR PVC PIPE	2-08

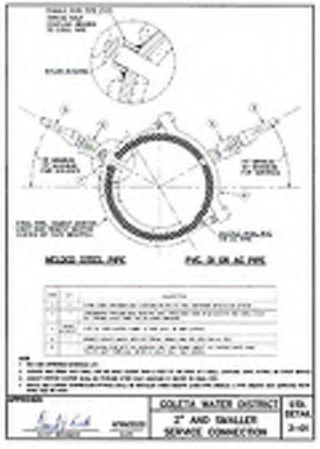


COLETA WATER DISTRICT	STD. DETAIL
1" & 2" COMBINATION AIR VALVE	2-10

COLETA WATER DISTRICT	STD. DETAIL
1" & 2" COMBINATION AIR VALVE	2-10

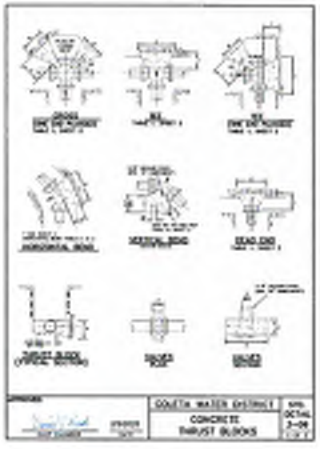


COLETA WATER DISTRICT	STD. DETAIL
6" & 8" BLOW OFF ASSEMBLY	2-01



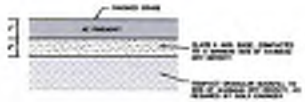
COLETA WATER DISTRICT	STD. DETAIL
2" AND SMALLER SERVICE CONNECTION	2-04

COLETA WATER DISTRICT	STD. DETAIL
ADJUSTABLE VALVE CAN	2-07



COLETA WATER DISTRICT	STD. DETAIL
CONCRETE THRUST BLOCKS	2-09

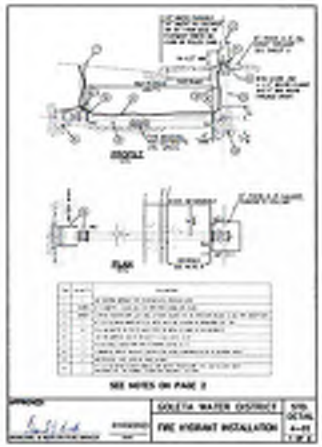
COLETA WATER DISTRICT	STD. DETAIL
CONCRETE THRUST BLOCKS	2-09



1 ASPHALT PAVEMENT SECTION
None #3

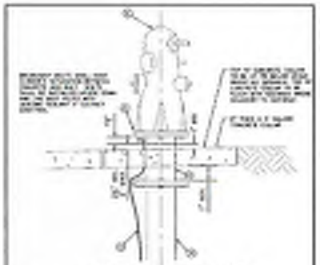
CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

16



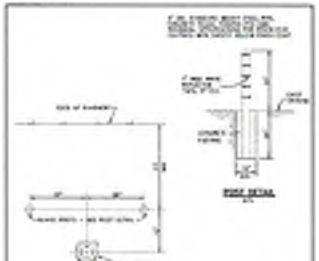
SEE NOTES ON PAGE 2

APPROVED	GOLETA WATER DISTRICT	STD. DETAIL
01/01/2023	FIRE HYDRANT INSTALLATION	4-01 1 OF 2



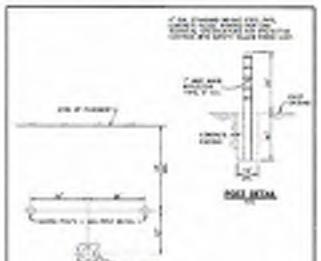
BREAK OFF SPOOL/CONCRETE COLLAR DETAIL

APPROVED	GOLETA WATER DISTRICT	STD. DETAIL
01/01/2023	FIRE HYDRANT INSTALLATION	4-01 2 OF 2



APPROVED	GOLETA WATER DISTRICT	STD. DETAIL
01/01/2023	FIRE HYDRANT GUARD POSTS	4-03

APPROVED	GOLETA WATER DISTRICT	STD. DETAIL
01/01/2023	4" DDC LARSEN DOUBLE CHECK DETECTOR ASSEMBLY (WITH FIRE CONNECTION)	5-03



APPROVED	GOLETA WATER DISTRICT	STD. DETAIL
01/01/2023	FIRE HYDRANT GUARD POSTS	4-03

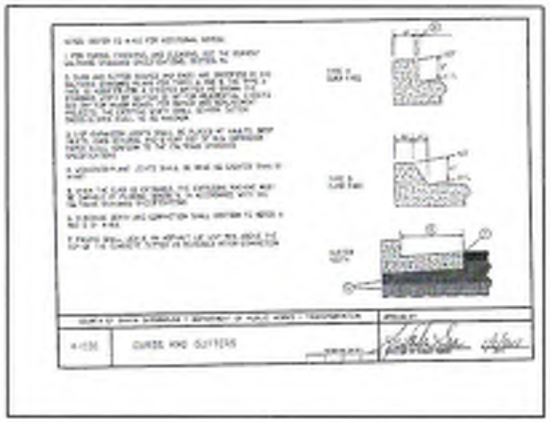
BASIC SEPARATION STANDARDS

- [illegible]
- [illegible]
- [illegible]

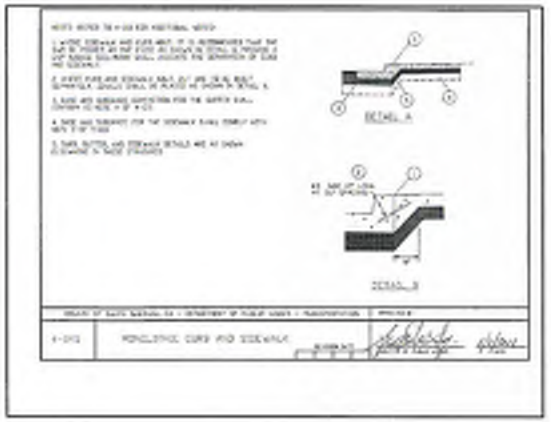
SPECIAL CROSSING GENERAL NOTES

1. [illegible]
2. [illegible]
3. [illegible]

APPROVED	GOLETA WATER DISTRICT	STD. DETAIL
01/01/2023	WATER SEPARATION STANDARDS FOR DOMESTIC WATER, RECYCLED WATER, SANITARY SEWER FORCEMAIN, AND GAS LATERALS	2-01



4-05	CURBS AND GUTTERS



4-04	MONOLITHIC CURB AND SIDEWALK

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

17

CALLE REAL CAMPUS

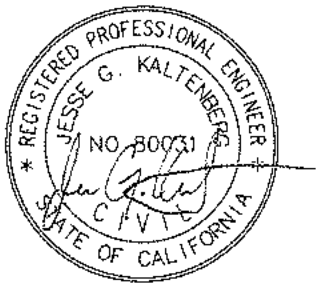
WATER DISTRIBUTION SYSTEM

PHASE 2: WATER LINE REPLACEMENT

COUNTY OF SANTA BARBARA

TECHNICAL SPECIFICATIONS

May 20, 2024



TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS

SECTION 011000

GENERAL

PART 1 - GENERAL

1.1 COORDINATION AND COOPERATION WITH OTHERS

A. During the course of the work to be performed under this contract, it is expected that public agencies, utility companies, and other contractors will be performing work in the immediate vicinity. The Contractor shall notify the other public agencies, utilities, and contractors affected at least five (5) working days prior to beginning construction. The Contractor under this contract shall schedule his work and coordinate his operation with others so as to minimize conflicts and interference between his operations and those of other contractors.

B. Agencies that may be performing work in the immediate vicinity may include, but are not limited to:

1. County of Santa Barbara
2. Santa Barbara County Sanitary District
3. Goleta Water District
4. Southern California Edison
5. Southern California Gas
6. Frontier (Telephone)
7. AT&T (Telephone)
8. Mobil Oil Company
9. Santa Barbara Flood Control District
10. Cox Communications

1.2 QUALITY CONTROL

A. The Contractor shall verify all dimensions in the field and shall check all field conditions continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work.

B. The Contractor shall inspect related and appurtenant work and shall report in writing to the Engineer any conditions that may prevent proper completion of the Work. Any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor at its sole expense.

C. The Work shall be conducted under the general observation of the Engineer and shall be subject to intermittent or continuous inspection by representatives of the County to assure strict compliance with the requirements of the Contract Documents.

D. The work hereunder shall be under the general direction of the Engineer, acting directly and through his or her authorized representatives. The presence of an inspector, however, shall not relieve the Contractor of the responsibility for the proper execution of the Work in accordance with all requirements of the Contract Documents. Compliance is distinctly a duty of the Contractor, and said duty shall not be avoided by any act or omission on the part of an inspector.

E. All materials and articles furnished by the Contractor shall be subject to rigid inspection, and no material or articles shall be used in the Work until it has been inspected and accepted by the Engineer for the County.

F. Unless otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM or other specified published standards, as applicable to the class and nature of the article or materials considered. However, the County reserves the right to

use any generally-accepted system of sampling and testing which, in the opinion of the Engineer will assure the County that the quality of the workmanship is in full accord with the Contract Documents.

G. Samples and test specimens required under the Contract Documents shall be furnished by the Contractor and prepared for testing in ample time for the completion of the necessary tests and analyses before the subject materials or articles are to be used. The Contractor shall furnish all required test specimens at its own expense. Except as otherwise provided in the Contract Documents, performance of the required tests will be by the County, and all costs therefor will be borne by the County; except, that the cost of any test which shows unsatisfactory results shall be borne by the Contractor.

H. Whenever the Contractor is ready to backfill, bury, cast in concrete, hide, or otherwise cover or make inaccessible any work under the Contract, the Contractor shall notify the Engineer not less than 24 hours in advance of beginning any such work so that the required inspections can be scheduled and performed. Failure of the Contractor to notify the Engineer at least 24 hours in advance of any such work shall be reasonable cause for the Engineer to require sufficient delay in the Contractor's schedule to allow time for such inspections and any remedial or corrective work required. All costs of such delays, including its impact or effect upon other portions of the Work shall be borne by the Contractor.

1.3 TEMPORARY UTILITIES

A. The Contractor shall provide, at its own expense, all necessary power required for its operations under the Contract, and shall provide and maintain all temporary power lines required to perform the work in a safe and satisfactory manner. All temporary connections for electricity shall be subject to the approval of the Engineer and the power company representative, and shall be removed in the like manner at the Contractor's expense prior to final acceptance of the work.

B. The Contractor shall provide, at its own expense, all necessary water required for construction of the project, including disinfecting of the pipelines, valving, and appurtenances. The Contractor shall not make connection to, or draw water from any fire hydrant or pipeline without first making application for and obtaining a temporary water meter for construction from the County. For each such connection made, the Contractor shall first attach to the fire hydrant or pipeline a valve, meter, and backflow prevention device of a size and type acceptable to the County. The backflow prevention device shall be tested and certified prior to use of the temporary meter with a copy of the certification provided to the County.

C. Before final acceptance of the work on the project, all temporary connections and piping installed by the Contractor shall be entirely removed, and all affected improvements shall be restored to their original condition, or better, to the satisfaction of the County and to the agency owning the affected utility.

1.4 PROTECTION OF EXISTING FACILITIES

A. All oil, gasoline, power, telephone, communication, gas, water, irrigation, sewer, and storm drain facilities, both underground and overhead, encountered along the line of the Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the owner of said facilities.

B. Prior to any construction in the vicinity of existing underground facilities, the Contractor shall notify the Underground Service Alert agency and the authorized representatives of such utility owners or agencies not less than 3 days nor more than 7 days prior to construction so that a representative of said owners or agencies can be present during such work if they so desire.

C. The right is reserved to the County and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this Contract.

D. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

E. The Contractor shall not perform any work that would affect oil, gas, sewer, or water pipelines, telephone, communications, or electric lines, fences or other structures, nor shall the Contractor enter upon the right-of-way involved until notified by the Engineer that the County has secured the necessary authorization from the proper party. After authorization has been obtained, the Contractor shall give said party due notice of its intention to begin work, and shall give said party convenient access and every facility for removing, shoring, supporting, or otherwise protecting such pipeline, line, or structure, and for replacing same.

F. Existing utility lines that are discovered during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the Contractor. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary. When utility lines that are to be removed are encountered, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of service

G. In the event that the Contractor damages any existing utility lines that are not shown or the locations of which are not made known to the Contractor prior to excavation, a written report thereof shall be made immediately to the Engineer. If directed by the Engineer, repairs shall be made by the Contractor under the provisions for changes and extra work contained in Articles 10, 11, and 12 of the General Conditions. All costs of locating, repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the work which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such work will be paid for as extra work in accordance with the provisions of Articles 10, 11, and 12 of the General Conditions.

H. The Contractor shall be responsible for and shall repair all damage caused by its operations even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling. All repairs to a damaged improvement are subject to inspection and approval by an authorized representative of the improvement owner before being concealed by backfill or other work.

I. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown, the Contractor, without unnecessary delay, shall temporarily replace or relocate such utility or the facility. Restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

J. The Contractor shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced for easy and accurate restoration. All survey markers or points disturbed by the Contractor shall be accurately restored by the Contractor at the Contractor's expense after all street or roadway resurfacing has been completed.

K. All paved areas, including curbs and berms, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the permit of the governing agency. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

L. Wherever sidewalks, driveways, or private roads have been removed for purposes of

construction, the Contractor shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the governing agency before proceeding with the final restoration or, if no such period of times is so fixed, the Contractor shall maintain temporary sidewalks or roadways until the final restoration has been made.

1.5 POTHOLING AND LOCATING EXISTING UNDERGROUND UTILITIES

A. The Contractor shall notify Underground Service Alert (USA) at least 48 hours in advance of any construction or potholing and make arrangements for the existing utilities to be marked by the affected utility companies.

B. The Contractor shall verify the exact location, depth, alignment, and grade of all utilities shown on the construction drawings and marked as part of the USA procedure. The Contractor shall make exploratory excavations (potholing) of all utilities that may interfere with the Work. All such exploratory excavations shall be performed as soon as practicable after award of contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor's work. When such exploratory excavations show the utility location as shown to be in error, the Contractor shall immediately notify the Engineer.

C. **The Contractor shall pothole and locate the existing underground utilities at locations where connections will be made to existing utilities or where proposed facilities cross existing utilities and as shown on the drawings prior to submitting shop drawings.** The Contractor shall submit the pothole data to the engineer for review. The Engineer will not review any submittals by the Contractor until the potholing is completed and the pothole data has been submitted to the Engineer for review. No extension of time or additional compensation will be made for delays caused by the failure of the Contractor to complete the potholing in a timely manner.

D. All costs incurred in exposing and locating the existing utilities including all labor, tools, equipment for excavation, backfill and restoring existing surface improvements, shall be borne by the Contractor. The Contractor shall bear the cost of repairing or replacing any existing utility damaged by his potholing work.

1.6 TEMPORARY ENVIRONMENTAL CONTROLS

A. The use of explosives on the Work will NOT be permitted.

B. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for any damage resulting from any dust originating from its operations. The Contractor's dust abatement measures shall be in accordance with the Santa Barbara County Air Pollution Control District standard dust mitigation measures and any other appropriate agency's dust abatement measures.

C. During the progress of the Work, the Contractor shall keep the site of the Work and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Work site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with all applicable laws and regulations.

D. Fixed or portable chemical toilets shall be provided by the Contractor wherever needed for the use of employees. The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away

from the site in a manner satisfactory to the Engineer and in accordance with all applicable laws and regulations.

E. The Contractor's attention is directed to the Federal Clean Water Act (1977) which requires a Corps of Engineers permit under Section 404 of the Act, for the discharge of one cubic yard or more of any dredged or fill material into "navigable waters" as defined in "Permits for Activities in Navigable Waters or Ocean Waters, Paragraph (d)(2), Federal Register of 25 July 1975, page 3134.

F. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.7 COSTS OF OVERTIME INSPECTION AND OTHER SERVICES

A. Inspection of the work as well as other required services will be provided by the County between the hours of 7:30 a.m. and 4:00 p.m. on Monday through Friday only except County holidays. Any inspections or other services by the County requested by or made necessary as a result of the actions of the Contractor beyond the hours stated above shall be paid for by the Contractor at the prevailing rate of 1-1/2 times the regular hourly rate plus equipment charges.

B. Inspections or other services by the County requested by or made necessary as a result of the actions of the Contractor on Saturdays, Sundays, or holidays, must be scheduled and approved by the County and paid for by the Contractor in advance, at the prevailing rate for overtime and/or holiday work. Unless determined otherwise, the following holidays are observed by the County: New Year's Day, Martin Luther King, Jr. Day, Presidents Day, Cesar Chavez Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the day after Thanksgiving, and Christmas. Contact the County for specific dates and days holidays will be observed prior to scheduling any construction operations. . The need for overtime inspection or other services by the County shall be determined by the Engineer, and his decision shall be final.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION
011001

CULTURAL MONITORING

PART 1 - GENERAL

1.1 REQUIREMENTS

The CONTRACTOR shall provide a qualified Barbareño Chumash Site Monitor and perform the WORK in accordance with the following requirements for the duration of the project:

A. Onsite monitoring shall be provided by a qualified Barbareño Chumash Site Monitor for all grading, excavation, trenching, vegetation or paving removal, ground clearance, and site preparation that involves earthmoving operations;

B. All contractors, subcontractors and construction personnel shall be alerted to the possibility of uncovering unanticipated subsurface archaeological features or artifacts associated with past human occupation of the parcel;

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 312316 –Trenching, Backfill and Compaction
Section 311000 – Site Preparation

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. If cultural resources are encountered or suspected, work shall immediately be halted or redirected to an area with no known archaeological resources, and the qualified Barbareño Chumash Site Monitor notified.

Work that may impact these resources shall not resume without written authorization from the COUNTY project manager.

B. If a discovery consists of possible human remains, all work in the area shall be immediately halted, and the Santa Barbara County Coroner shall be contacted. The qualified Barbareño Chumash Site Monitor shall be present for all further subsurface disturbance in the area of the find.

Work that may impact these resources shall not resume without written authorization from the COUNTY project manager.

END OF SECTION

SECTION
012100

ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.
5. Testing and inspecting allowances.

C. Related Requirements:

1. Section 5.8 'Allowances' of the General Conditions to determine how allowances are built into the contract costs.
2. Section 13 'Changes in Work' of the General Conditions for procedures for submitting and handling Change Orders.

1.2 DEFINITIONS

A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise COUNTY of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the COUNTY OF SANTA BARBARA to avoid delaying the Work.

B. At COUNTY's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Engineer from the designated supplier or approved equal.

1.4 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to COUNTY OF SANTA BARBARA, after installation has been completed and accepted.

1. If requested by Engineer, retain, and prepare unused material for storage by COUNTY OF SANTA BARBARA. Deliver unused material to COUNTY OF SANTA BARBARA's storage space as directed.

1.7 UNIT-COST ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to COUNTY OF SANTA BARBARA, after installation has been completed and accepted.

1. If requested by Engineer, retain and prepare unused material for storage by COUNTY OF SANTA BARBARA. Deliver unused material to COUNTY OF SANTA BARBARA's storage space as directed.

1.8 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by COUNTY OF SANTA BARBARA or selected by Engineer under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to COUNTY OF SANTA BARBARA, after installation has been completed and accepted.

1. If requested by Engineer, retain and prepare unused material for storage by COUNTY OF SANTA BARBARA. Deliver unused material to COUNTY OF SANTA BARBARA's storage space as directed.

1.9 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Engineer for COUNTY OF SANTA BARBARA's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by COUNTY OF SANTA BARBARA under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to COUNTY OF SANTA BARBARA by Change Order.

1.10 TESTING AND INSPECTING ALLOWANCES

A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and reporting results.

B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.

C. Costs of testing and inspection services not specifically required by the Contract Documents are Contractor responsibilities and are not included in the allowance.

D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to COUNTY OF SANTA BARBARA by Change Order.

1.11 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.

2. If requested, prepare explanation and documentation to substantiate distribution of overhead

costs and other markups.

3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.

4. COUNTY OF SANTA BARBARA reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.

2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Provide a qualified licensed archaeologist if archaeological resources are encountered or suspected during construction excavation and trenching, as specified in the Special Conditions.

END OF SECTION

SECTION 013300

CONTRACTOR SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL

A. **Submittals are required for all tapping sleeves, vaults, vault lids, combination air valve covers, and where called for in the COUNTY Technical Specifications.** Submittals are also required for all materials not otherwise specified in the COUNTY Technical Specifications, or whenever an "or equal" item is requested for use by the CONTRACTOR. Wherever submittals are required, they shall be submitted to the COUNTY.

B. Frequently Used Specification Sections include but are not necessarily limited to:
   a. Division 00 - Procurement and Contracting Requirements.
   b. Division 01 - General Requirements.
   c. Technical Specification Sections identifying required submittals.

1.2 PRECONSTRUCTION CONFERENCE SUBMITTALS

A. At the preconstruction conference, the CONTRACTOR shall submit the following items to the COUNTY for review:

1. A preliminary schedule of Shop Drawing, Sample, and proposed Substitute ("Or-Equal") submittals.

2. A list of all permits and licenses the CONTRACTOR shall obtain indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit.

3. A project overview bar chart.

1.3 SHOP DRAWINGS

A. Wherever called for in the Contract Documents, or where required by the COUNTY, the CONTRACTOR shall furnish to the COUNTY for review, two (2) physical copies of each Shop Drawing submittal and one (1) electronic copy. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop-prepared drawings, fabrication and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and similar items. Whenever the CONTRACTOR is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an engineer registered in the State of California in the appropriate area of expertise.

B. Organization

1. A single submittal transmittal form shall be used for each technical specification section or item or class of material or equipment for which a submittal is required. A single submittal covering multiple sections will not be acceptable, unless the primary specification references other sections for components. Example: if a pump section references other section for the motor, Protective Coatings, anchor bolts, local control panel, and variable frequency drive, a single submittal would be accepted; a single submittal covering vertical turbine pumps and horizontal split case pumps would not be acceptable.

2. On the transmittal form, index the components of the submittal and insert tabs in the submittal to match the components. Relate the submittal components to Technical Specification paragraph and

subparagraph, Drawing number, detail number, schedule title, as applicable.

3. Unless indicated otherwise, terminology and equipment names and numbers used in submittals shall match the Contract Documents.

D. Format

1. Minimum sheet size shall be 8.5 inches by 11 inches. Maximum sheet size shall be 24 inches by 36 inches. Every page in a submittal shall be numbered in sequence. Each copy of a submittal shall be collated and stapled or bound, as appropriate.

2. Where product data from a manufacturer is submitted, clearly mark which model is proposed, with all pertinent data, capacities, dimensions, clearances, diagrams, controls, connections, anchorage, and supports. Sufficient level of detail shall be presented for assessment of compliance with the Contract Documents.

3. Each submittal shall be assigned a unique number. Submittals shall be numbered sequentially. The submittal numbers shall be clearly noted on the transmittal. Original submittals shall be assigned a numeric submittal number. Resubmittals shall bear an alpha-numeric system which consists of the number assigned to the original submittal for that item followed by a letter of the alphabet to represent that it is a subsequent submittal of the original. For example, if submittal 25 requires a resubmittal, the first resubmittal will bear the designation "25-A" and the second resubmittal will bear the designation "25-B" and so on.

4. A submittal log will be maintained by the CONTRACTOR and submitted to the COUNTY that includes, at a minimum, the unique number, subject, anticipated date of submittal, date submitted, date returned by the COUNTY, and COUNTY response.

E. Disorganized submittals that do not meet the requirements above will be returned without review.

F. Except as may otherwise be indicated herein, the COUNTY will return prints of each submittal to the CONTRACTOR with its comments noted thereon, within 14 calendar days following receipt by the COUNTY. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the COUNTY by the second submission of a submittal item. The COUNTY maximum review period for each submittal, including all resubmittals, will be 14 days per submittal.

G. If a submittal is returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal is not required.

H. If a submittal is returned marked "MAKE CORRECTIONS NOTED," CONTRACTOR shall make the corrections on the submittal, but formal revision and resubmission of said submittal is not required.

I. If a submittal is returned marked "AMEND-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the COUNTY for review.

J. If a submittal is returned marked "REJECTED-RESUBMIT," it shall mean that the submitted material or product does not satisfy the specification, the submittal is so incomplete that it cannot be reviewed, or is a substitution request not submitted in accordance with Section 016000 - Products, Materials, Equipment, and Substitutions. The CONTRACTOR shall prepare a new submittal and shall resubmit the required number of copies of said revised submittal to the COUNTY for review.

K. Fabrication of an item shall be commenced only after the COUNTY has reviewed the pertinent submittals and returned copies to the CONTRACTOR marked either "NO EXCEPTIONS TAKEN" or MAKE CORRECTIONS NOTED." Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as changes to the contract requirements.

L. The COUNTY's review of submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits due to any errors in submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

1.4 SAMPLES

A. Whenever in the Specifications samples are required, the CONTRACTOR shall submit not less than two samples of each item or material to the COUNTY for acceptance. Unless otherwise indicated, samples, shall be submitted a minimum of 14 days prior to ordering such material.

B. Samples shall be individually and indelibly labeled or tagged, indicating thereon all specified physical characteristics and Manufacturer's name. Upon receiving acceptance of the COUNTY, one set of the samples will be stamped and dated by the COUNTY and returned to the CONTRACTOR, and one set of samples will be retained by the COUNTY.

C. Unless indicated otherwise, all colors and textures of items presented in sample submittals shall be from the manufacturer's standard colors and standard materials, products, or equipment lines.

D. The CONTRACTOR shall schedule sample submittals such that:

1. Samples are submitted in an orderly sequence which allows the COUNTY 14 days to assemble color panels and select color and texture dependent products and materials without delay to the construction schedule.

2. The CONTRACTOR has sufficient time after approval or selection of color or texture to provide the products or materials without delay to the construction schedule. The Contract Times will not be extended for the CONTRACTOR's failure to allow enough review and approval or selection time, failure to submit all samples requiring color or texture selection, or failure to submit complete samples.

1.5 OPERATIONS & MAINTENANCE MANUAL

A. When so specified in the Contract documents, the CONTRACTOR shall submit technical operation and maintenance information for each item of mechanical and electrical equipment in an organized manner in the Operations & Maintenance (O&M) Manual. It shall be written so that it can be used and understood by the COUNTY'S operation and maintenance staff.

B. The O&M Manual shall be subdivided first by specification section number; second, by equipment item; and last, by "Category" with the following information provided for each item of equipment (as applicable):

1. Category 1 - Equipment Summary: A summary table shall indicate the equipment name, equipment number, and location in which the equipment is installed.

2. Category 2 - Operational Procedures: Manufacturer-recommended procedures shall be included covering: Installation, Adjustment, Operation procedures, Troubleshooting, Disassembly, Re-assembly; and Tabulation of proper settings for all pressure relief valves, low and high pressure switches, and other protection devices.

3. Category 3 - Preventative Maintenance Procedures: Preventative maintenance procedures shall include all manufacturer-recommended procedures to be performed and recommended frequency of preventative maintenance procedures shall be included.

4. Category 4 - Parts List and Drawings: A complete parts list shall be furnished, including a generic description and manufacturer's identification number for each

part. Addresses and telephone numbers of the nearest supplier and parts warehouse shall be included. Cross-sectional or exploded view drawings shall accompany the parts list.

5. Category 5 – Safety Procedures: Engineering, industry, and manufacturer-recommended safety procedures shall be provided covering the safety precautions to be taken when operating and maintaining the equipment or working near it.

6. Category 6 - Documentation: All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be placed in this category.

7. Spare Parts List: The spare parts list shall include those spare parts which each manufacturer recommends be maintained by the COUNTY in inventory at the plant site. The CONTRACTOR shall cross-reference all spare parts lists to the equipment numbers designated in the Contract Documents. Each manufacturer or supplier shall indicate the name, address, and telephone number of its nearest outlet of spare parts to assist the COUNTY in ordering spare parts. The list shall include the current list price of each spare part.

C. The CONTRACTOR shall furnish to the COUNTY 3 identical physical O&M Manuals and one (1) electronic copy. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, 3-ring, loose leaf, vinyl plastic hard cover binder suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches. A table of contents indicating all equipment in the manuals shall be included.

D. Manuals shall be submitted in final form to the COUNTY not later than the 75 percent of construction completion date. All discrepancies found by the COUNTY shall be corrected within 30 days from the date of written notification by the COUNTY.

1.6 RECORD DRAWINGS

A. The CONTRACTOR shall maintain one record set of Drawings at the Site. On these, it shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the information represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. The CONTRACTOR shall provide supplemental detailed sketches as necessary or directed to fully indicate the WORK as actually constructed. These master record drawings of the CONTRACTOR's representation of record drawing conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the WORK. Red ink shall be used for alterations and notes.

B. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the record drawings shall be updated by indicating those portions which are superseded by change order drawings or final Shop Drawings, and by including appropriate reference information describing the change orders by number and the Shop Drawings by manufacturer, drawing, and revision numbers.

C. Record drawings shall be accessible to the COUNTY at all times during the construction period. Said up-to-date record drawings shall be in the form of a set of prints with carefully plotted information overlaid.

D. Upon Substantial Completion of the WORK and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of record drawings to the PROJECT ENGINEER or COUNTY as applicable. This set of drawings shall consist of corrected Drawings showing the reported location of the WORK. The information submitted by the CONTRACTOR and incorporated by the PROJECT ENGINEER into the record drawings will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information, and for any errors or omissions which may appear on the record drawings as a result.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 014200

REFERENCE STANDARDS

PART 1 – GENERAL

1.1 GENERAL

A. **Titles of Sections and Paragraphs:** Titles and subtitles accompanying specification sections and paragraphs are for convenience and reference only, and do not form a part of the Specifications.

B. **Applicable Publications:** Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that construction is started shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth in the Standards & Specifications or shown on the Construction Drawings will be waived because of any provision of, or omission from, said standards or requirements.

C. **Specialists, Assignments:** In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the CONTRACTOR.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. The CONTRACTOR shall construct the WORK in accordance with the Contract Documents and the referenced portions of those referenced codes, standards, and specifications.

B. References herein to "Building Code" or "Uniform Building Code" shall mean Uniform Building Code of the International Conference of Building Officials (ICBO). Similarly, references to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electrical Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the COUNTY for clarification and directions prior to ordering or providing any materials or furnishing labor. The CONTRACTOR shall bid for the most stringent requirements.

D. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

E. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

F. References herein to Caltrans Standards and Specifications Shall mean State of California Department of Transportation Standards and Specifications, current revision.

G. **Applicable Safety Standards:** References herein to "Cal-OSHA" shall mean State of California, Department of Industrial Relations, Construction Safety Orders, as amended to date, and all changes and amendments thereto.

H. References herein to County Standards and Specifications Shall mean County of Santa Barbara, Department of Public Works, Standards and Specifications.

I. References herein to Santa Barbara County Standards and Specifications Shall mean Santa Barbara County, Department of Public Works, Standards and Specifications.

1.3 REGULATIONS RELATED TO HAZARDOUS MATERIALS

A. The CONTRACTOR shall be responsible that all work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015526

TRAFFIC CONTROL & ACCESS

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide traffic control and access in accordance with these Specifications, Caltrans Standard Specifications and Plans, and the standards contained in the "Work Area Traffic Control Handbook" (WATCH) published by Building News, Inc. The CONTRACTOR shall take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall prepare and submit Traffic Control plans and comply with special safety regulations relating to traffic control as may be required by the County of Santa Barbara or other public authorities within their respective jurisdiction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EQUIPMENT TRAVEL ROUTE

A. The CONTRACTOR shall make its own investigation of the condition of available access routes to and from the site of the Work. If suitable access is not available, it shall be the CONTRACTOR's responsibility to construct and maintain any access or haul roads required for its construction operations. The travel route for the CONTRACTOR's equipment shall follow the safest route possible and minimize inconvenience to motorists and pedestrians.

3.2 TEMPORARY STREET USE

A. Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alley, way, or parking area during the performance of the Work hereunder. The CONTRACTOR shall conduct its operations as not to interfere unnecessarily with the authorized work of the COUNTY, utility companies, or other agencies in such streets, alleys, ways, or parking areas.

B. No Street shall be closed to the public without first obtaining the permission of the City of Santa Barbara, the COUNTY, and other proper governmental authority, where applicable. Where excavation is being performed in primary streets or highways, at least one lane of traffic shall be kept open in each direction at all times unless otherwise provided in the Contract Documents or under the terms of the permits issued by the County of Santa Barbara, City of Santa Barbara or other public agencies, as required.

C. Toe boards shall be provided to restrict movement of excavated material if required by the County, or other agency having jurisdiction over the affected street or highway. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, drainage inlets, and other drainage facilities.

3.3 TRAFFIC CONTROL

A. For the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of Caltrans "Manual of Traffic Controls - Warning Signs, Lights, and Devices for Use in Performance of Work Upon Highways."

B. Provide, place and maintain all necessary barricades, traffic cones, warning signs, lights and other safety devices. Post and maintain adequate detour signs at all applicable approaches to forewarn and direct traffic. Use

illuminated and/or reflective warning/construction signs at appropriate locations for the project. Use solar powered flashing arrow boards for each lane closure taper in addition to other delineation. Provide safe and effective work areas and warn, control, protect and expedite vehicular and pedestrian traffic through the construction project.

C. Provide temporary traffic re-striping at the conclusion of any working day for any centerline or lane line which is obliterated by construction. Use temporary asphalt surfacing at the CONTRACTOR's own expense as required to maintain traffic in a safe and non-disruptive manner. Provide temporary delineation as required which includes sandblasting of conflicting markings, installation and removal of temporary centerlines or lane lines, detour signing, barricading, and replacement of traffic lines, and markings in their proper locations upon termination of the detour. Provide any temporary pavement marking. Provide for removal of existing markings and the later removal of temporary markings to restore the permanent markings.

D. Through traffic shall be maintained in both directions during working hours. Reopen all traffic lanes for the traffic circulation at the end of each working day, and during non-working hours including holidays, Saturdays, and Sundays. Provide traffic re-striping and markings prior to opening street traffic.

E. Where required, the CONTRACTOR shall furnish, install, and maintain in-place "No Parking – Tow Away" signs (even if streets have posted "No Parking" signs) which shall be posted at least two (2) working days prior to commencement of work. On the sign, CONTRACTOR shall print the hours, day(s) and date of closure in two-inch-high letters and numbers. The signs shall be spaced at a maximum of 50 feet from street intersection and/or from each adjacent sign.

F. The CONTRACTOR shall be responsible for the project safety on a 24-hours basis each calendar day for the entire duration of the project.

3.4 ACCESS

A. Wherever necessary or required for the convenience of the public or individual residents or business places at street or highway crossings, private driveways, or elsewhere, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges or steel plates. Such written consent shall be delivered to the COUNTY prior to beginning the excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation.

B. Temporary bridges or steel plates for street and highway crossings shall conform to the requirements of the County of Santa Barbara or authority having jurisdiction in each case. The CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

C. Maintain adjacent streets open for ingress and egress and for parking; Provide emergency access for fire trucks, police cars, and other emergency vehicles at all times. The CONTRACTOR shall notify each agency in writing at least three (3) working days prior to work, and submit a copy of notice to COUNTY. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times.

D. Construct temporary AC ramps to provide safe and drivable access to residents and businesses and safe pedestrian crossing paths at all times. Provide alternate crossing areas with appropriate signing and other devices where construction prohibits pedestrian and bicycle access. Provide safe and adequate pedestrian zones and public transportation stops, as well as reasonable pedestrian crossings of the work at frequent intervals. Keep the areas through and adjacent to the construction site clear of any objects that may be hazardous to pedestrians.

3.5 WORKING HOURS

A. Construction work operations shall be performed Monday through Friday except COUNTY observed holidays unless otherwise noted. The CONTRACTOR work hours shall be at COUNTY discretion Monday through Friday except that work within the street right-of-way that effects the flow of traffic shall only be allowed in accordance with the issued encroachment permit.

3.6 NOTIFICATION

A. The CONTRACTOR shall provide notification in writing to affected residences, schools, churches, and businesses informing them of the pending project. A draft notification letter shall be submitted to the COUNTY five working days in advance of required notification date for verification and approval. The CONTRACTOR shall hand deliver copies of the approved notification letter to the affected residences, school, churches, and businesses at least 14 days prior to the scheduled construction on each block. The notification letter shall state the project name, scope of work, date and time of restricted travel on the affected streets, and the CONTRACTOR's and COUNTY's contact persons and phone numbers. Failure to meet the approved schedule requires that the CONTRACTOR immediately notify residents of the cancellation for that day's work and reschedule construction of the affected area at a later date. Notification of rescheduled work shall follow this same procedure.

3.7 TRAFFIC CONTROL PLANS

A. Traffic control plans shall be provided by the CONTRACTOR and submitted to the County of Santa Barbara, City of Santa Barbara or other agencies having jurisdiction as may be required. Traffic control plans shall conform to the requirements of the County of Santa Barbara or City of Santa Barbara as applicable and shall include the location and wording of all signs, barricades, delineators. lights, warning devices, and temporary parking restrictions; separate plan for each stage of construction; and separate detour routing plan.

3.8 TEMPORARY STREET CLOSURE

A. If closure of any street is required during construction, a formal application for a street closure shall be made to the County of Santa Barbara or other authority having jurisdiction at least 30 days prior to the required street closure to allow them to determine the necessary signing and detour requirements to be provided by the CONTRACTOR.

END OF SECTION

SECTION 016000

PRODUCTS, MATERIALS, EQUIPMENT & SUBSTITUTIONS

PART 1 - GENERAL

1.1 DEFINITIONS

A. The word "Products," as used in the Contract Documents, is defined to include purchased items for incorporation into the WORK, regardless of whether specifically purchased for the project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form WORK. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying, and erection of the WORK.

1.2 QUALITY ASSURANCE

A. **Source Limitations:** To the greatest extent possible for each unit of WORK, the CONTRACTOR shall provide products, materials, and equipment of a singular generic kind from a single source.

B. **Compatibility of Options:** Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, the CONTRACTOR shall select an option which is compatible with other products, materials, or equipment. Compatibility is a basic general requirement of product, material and equipment selections.

1.3 SUBSTITUTIONS

A. The CONTRACTOR shall, to the greatest extent possible, provide the materials as specified in these Contract Documents. Where procurement of the material as specified is not possible or the CONTRACTOR would like to submit for consideration an alternative, the CONTRACTOR shall submit shop drawings in accordance Section 013300 and shall clearly indicate the product being substituted.

1.4 PRODUCT DELIVERY AND STORAGE

A. The CONTRACTOR shall deliver and store the products, materials and equipment in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at the Site and overcrowding of construction spaces. In particular, the CONTRACTOR shall ensure coordination to ensure minimum holding or storage times for flammable, hazardous, easily damaged, or sensitive materials to deterioration, theft, and other sources of loss.

1.5 TRANSPORTATION AND HANDLING

A. Products shall be transported by methods to avoid damage and shall be delivered in undamaged condition in manufacturer's unopened containers and packaging.

B. The CONTRACTOR shall provide equipment and personnel to handle products, materials, and equipment including those furnished by COUNTY, by methods to prevent soiling and damage.

C. The CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.6 STORAGE AND PROTECTION

A. Products shall be stored in accordance with manufacturer's written instructions and with seals and labels intact and legible. Sensitive products shall be stored in weather-tight climate controlled enclosures and temperature.

B. Loose granular materials shall be stored on solid flat surfaces in a well-drained area and shall be prevented from mixing with foreign matter.

C. Storage shall be arranged in a manner to provide access for maintenance of stored items and for inspection.

1.7 MAINTENANCE OF PRODUCTS IN STORAGE

A. The CONTRACTOR shall comply with manufacturer's product storage requirements and recommendations. The CONTRACTOR shall maintain a log of inspections and shall make the log available on request. The CONTRACTOR shall periodically inspect products to assure they are undamaged and are maintained under required conditions. The CONTRACTOR shall maintain manufacturer-required environmental conditions continuously.

B. The CONTRACTOR shall ensure that surfaces of products exposed to the elements are not adversely affected and that weathering of finishes does not occur.

C. For mechanical and electrical equipment, the CONTRACTOR shall provide a copy of the manufacturer's service instructions with each item and the exterior of the package shall contain notice that instructions are included.

D. Products shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document prior to final acceptance by the COUNTY.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 028200

ASBESTOS CEMENT PIPE REMOVAL & DISPOSAL

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR may encounter asbestos cement pipe (ACP) during the prosecution of this work. The CONTRACTOR shall remove and dispose of ACP in accordance with State of California requirements, and the Contract Documents. Removal of ACP shall be performed by a CONTRACTOR licensed and certified by Cal/OSHA for such removal.

B. The CONTRACTOR shall follow the AWWA guidelines for handling, removing and disposing of ACP as stated in the applicable sections of AWWA Standards C400, C401, C402, and C403 covering Asbestos-Cement Transmission and Distribution Pipe.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 312316 – Trenching, Backfill and Compaction
Section 330509 – Piping, General

1.3 SUBMITTALS

A. **Asbestos Cement Pipe Removal and Disposal Plan:** The CONTRACTOR shall complete and submit to the COUNTY INSPECTOR an "Asbestos Cement Pipe Removal and Disposal Plan." The CONTRACTOR shall clearly describe his proposed methods for the removal and disposal of ACP that ensures no exposure to airborne asbestos by the CONTRACTOR'S personnel. The written plan shall be submitted to the COUNTY INSPECTOR for review and approval at least one week in advance of the proposed date of removal.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Snap cutting tools shall be used for the removal of asbestos cement pipe whenever the removal of intact pipe sections is not possible. Power "Cut-Off" saws, hand-saws, and other devices and methods that result in the release of asbestos fibers into the air shall not be used for the removal of ACP.

2.2 ENCAPSULANT

A. If during the removal of ACP broken edges occur, the broken edges shall be encapsulated with Certane 1000 Post Removal Encapsulant, or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall perform all cutting and handling of asbestos cement pipe in accordance with State of California requirements. The CONTRACTOR shall provide sufficient supervision and perform monitoring to assure conformance with State requirements. Under no circumstances shall the CONTRACTOR utilize methods of removal that result in the release of asbestos fibers into the air.

3.2 REMOVAL

A. The CONTRACTOR shall, whenever possible, accomplish the removal of ACP by removing intact pipe sections. Where connections are to be made to existing ACP waterlines, the ACP shall be removed in sections back to the nearest ACP coupling. The CONTRACTOR shall pothole and expose the pipe and ACP couplings prior to developing his proposed "Asbestos Cement Pipe Removal and Disposal Plan".

B. Snap cutting tools shall be used for the removal of asbestos cement pipes whenever the removal of intact pipe sections is not possible. The pipe shall be wetted prior to the snapping operation being performed. Use of a hammer and chisel to gradually split an ACP coupling lengthwise may only be performed if the "Asbestos Cement Pipe Removal and Disposal Plan" developed by the CONTRACTOR incorporates measures to prevent the release of asbestos fibers into the air, and is approved by the COUNTY. Power "Cut-Off" saws, hand-saws, and other devices and methods that result in the release of asbestos fibers into the air shall not be used for the removal of ACP.

C. The CONTRACTOR shall continuously wet the ACP around the snap cutting tool during the removal operation. All personnel handling the ACP shall wear properly fitted respirators during the removal and bagging operation, and shall be trained in the use of the respirator equipment. All pedestrian traffic shall be rerouted to maintain 30 feet clear of the ACP work area.

D. All removed sections or pieces of ACP shall be bagged and prepared for disposal immediately after removal as described below. If during the removal of ACP broken edges occur, the broken edges shall be encapsulated with Certane 1000 Post Removal Encapsulant, prior to bagging, in accordance with the manufacturers' recommendations.

3.3 DISPOSAL

A. The CONTRACTOR shall transport all sections and pieces of ACP in accordance with State requirements and shall be delivered to the County yard for disposal. All sections or pieces of ACP shall be wetted and double wrapped or bagged with polyethylene wrap immediately after removal. The minimum thickness of polyethylene wrap shall be 6 mils. The outer wrap shall be securely held in place with tape in a manner to prevent the release of airborne asbestos fibers.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall furnish all materials for concrete in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished concrete, in accordance with the requirements of the Contract Documents.

B. The following types of concrete are covered in this Section:

1. **Structural Concrete:** Concrete to be used in all cases except where indicated otherwise in the Contract Documents.

2. **Sitework Concrete:** Concrete to be used for curbs, gutters, catch basins, sidewalks, pavements, fence and guard post embedment, underground pipe encasement, underground duct bank encasement and all other concrete appurtenant to electrical facilities unless otherwise indicated.

3. **Lean Concrete:** Concrete to be used for thrust blocks, pipe trench cut-off blocks and cradles that are detailed on the Drawings as unreinforced. Lean concrete shall be used as protective cover for dowels intended for future connection.

C. The term "hydraulic structure" used in these specifications means environmental engineering concrete structures for the containment, treatment, or transmission of water, wastewater, or other fluids.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. **Federal Specifications:**

UU-B-790A (1) (2)	Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellant and Fire Resistant)

B. **Commercial Standards:**

ACI 117	Tolerances for Concrete Construction and Materials
ACI 214R-11	Guide to Evaluation of Strength Test Results of Concrete
ACI 301	Structural Concrete
ACI 306.1	Cold Weather Concreting
ACI 309	Consolidation of Concrete
ACI 315	Details and Detailing of Concrete Reinforcement
ACI 318	Building Code Requirements for Structural Concrete
ASTM C 31	Practices for Making and Curing Concrete Test Specimens in the Field
ASTM C 33	Concrete Aggregates

ASTM C 39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 94	Ready-Mixed Concrete
ASTM C 136	Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 143	Test Method for Slump of Hydraulic Cement Concrete
ASTM C 150	Portland Cement
ASTM C 156	Test Methods for Water Loss Through Liquid Membrane Forming Curing Compounds for Concrete
ASTM C 157	Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete
ASTM C 192	Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 260	Air-Entraining Admixtures for Concrete
ASTM C 309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	Chemical Admixtures for Concrete
ASTM C 1077	Practice for Agencies Testing Concrete and Concrete Aggregates for use in Construction & Criteria for Testing Agency Evaluation
ASTM D 448	Classification for Sizes of Aggregate for Road and Bridge Construction
ASTM D 2419	Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM E 119	Method for Fire Tests of Building Construction and Materials
ASTM E 1643	Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
ASTM E 1745	Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs

1.4 CONTRACTOR SUBMITTALS

A. **Mix Designs:** Prior to beginning the WORK and within 14 days of the notice to proceed, the CONTRACTOR shall submit to the COUNTY, for review, preliminary concrete mix designs which shall show the proportions and gradations of all materials proposed for each class and type of concrete specified herein in accordance with Section 013300 - Contractor Submittals.

B. **Delivery Tickets:** Where ready-mix concrete is used, the CONTRACTOR shall furnish delivery tickets at the time of delivery of each load of concrete. Each ticket shall show the state certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, and the amounts of water in the aggregate added at the batching plant, and the amount allowed to be added at the site for the specific design mix. In addition, each ticket shall state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to the times when the batch was dispatched, when it left the plant, when it arrived at the site, when unloading began, and when unloading was finished.

C. Furnish the following submittals in accordance with ACI 301:

1. Mill tests for cement.
2. Admixture certification. Chloride ion content must be included.
3. Aggregate gradation test results and certification.
4. Materials and methods for curing.
5. Reinforcing steel certification.

1.5 QUALITY ASSURANCE

A. General

1. Tests on component materials and for compressive strength and shrinkage of concrete shall be performed as indicated herein. Test for determining slump will be in accordance with the requirements of ASTM C 143.

2. Testing for aggregate shall include sand equivalence, reactivity, organic impurities, abrasion resistance, and soundness, according to ASTM C 33.

3. The cost of all laboratory tests on cement, aggregates, and concrete, will be borne by the COUNTY. However, the CONTRACTOR shall pay the cost of any additional tests and investigation on WORK performed which does not meet the specifications. The laboratory will meet or exceed the requirements of ASTM C 1077.

4. Concrete for testing shall be supplied by the CONTRACTOR, and the CONTRACTOR shall assist the COUNTY in obtaining samples, and disposal and cleanup of excess material.

B. **Field Compression Tests:**

1. Compression test specimens will be taken during construction from the first placement of each class of concrete specified herein and at intervals thereafter as selected by the COUNTY to insure continued compliance with these specifications. Each set of test specimens will be a minimum of 5 cylinders.

C. **Evaluation and Acceptance of Concrete:**

1. Evaluation and acceptance of the compressive strength of concrete will be according to the requirements of ACI 318, Chapter 5 "Concrete Quality," and as indicated herein.

2. A statistical analysis of compression test results will be performed according to the requirements of ACI 214. The standard deviation of the test results shall not exceed 640 psi, when ordered at equivalent water content as estimated by slump.

3. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for all subsequent batches of the type of concrete affected.

4. When the standard deviation of the test results exceeds 640 psi, the average strength for which the mix is designed shall be increased by an amount necessary to satisfy the statistical requirement that the probability of any test being more than 500 psi below or the average of any 3 consecutive tests being below the required compressive strength is 1 in 100. The required average strength shall be calculated by Criterion No. 3 of ACI 214 using the actual standard of deviation.

5. All concrete which fails to meet the ACI requirements and these specifications, is subject to removal and replacement.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. **General:**

1. All materials shall be classified as acceptable for potable water use according to NSF Standard 61.

2. Cement for concrete which will contact potable water shall not be obtained from kilns which burn metal rich hazardous waste fuel.

3. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Cement reclaimed from cleaning bags or leaking containers shall not be used. All cement shall be used in the sequence of receipt of shipments.

B. All materials shall comply with the requirements of Section 4 of ACI 301.

C. Storage of materials shall conform to the requirements of Section 4 of ACI 301.

D. Materials for concrete shall conform to the following requirements:

1. Cement shall be standard brand Portland cement conforming to ASTM C 150 for Type II or Type V, including Table 2 optional requirements. A minimum of 85 percent of cement by weight shall pass a 325 screen. A single brand of cement shall be used throughout the work, and prior to its use, the brand shall be acceptable to the COUNTY. The cement shall be suitably protected from exposure to moisture until used. Cement that has become lumpy shall not be used. Sacked cement shall be stored in such a manner so as to permit access for inspection and sampling. Certified mill test reports, including fineness, for each shipment of cement to be used shall be submitted to the COUNTY, if requested, regarding compliance with these Specifications.

2. Water for mixing and curing shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts, and other impurities. The water shall be considered potable, for the purposes of this Section only, if it meets the requirements of the local governmental agencies. Agricultural water with high total dissolved solids (over 1000 mg/l TDS) shall not be used.

3. Aggregates shall be obtained from pits acceptable to the COUNTY, shall be non-reactive, and shall conform to ASTM C 33. Maximum size of coarse aggregate shall be as indicated herein. Lightweight sand for fine aggregate will not be permitted.

a. Coarse aggregates shall consist of clean, hard, durable gravel, crushed gravel, crushed rock, or a combination thereof. The coarse aggregates shall be prepared and handled in two or more size groups for combined aggregates with a maximum size greater than 3/4-inch. When the aggregates are proportioned for each batch of concrete, the two size groups shall be combined. See the Paragraph in Part 2 entitled "Trial Batch and Laboratory Tests" for the use of the size groups.

b. Fine aggregates shall be natural sand or a combination of natural and manufactured sand that are hard and durable. When tested in accordance with ASTM D 2419, the sand equivalency shall not be less than 75 percent for an average of three samples, nor less than 70 percent for an individual test. Gradation of fine aggregate shall conform to ASTM C 33. The fineness modulus of sand used shall not be over 3.00.

c. Combined aggregates shall be well graded from coarse to fine sizes and shall be uniformly graded between screen sizes to produce a concrete that has optimum workability and consolidation characteristics. Where a trial batch is required for a mix design, the final combined aggregate gradations will be established during the trial batch process.

4. Ready-mix concrete shall conform to the requirements of ASTM C 94.

5. Admixtures: All admixtures shall be compatible and be furnished by a single manufacturer capable of providing qualified field service representation. Admixtures shall be used in accordance with manufacturer's recommendations. If the use of an admixture is producing an inferior end result, the CONTRACTOR shall discontinue use of the admixture. Admixtures shall not contain thiocyanates nor more than 0.05 percent chloride ion, and shall be non-toxic after 30 days.

a. Air-entraining agent meeting the requirements of ASTM C 260 shall be used. Sufficient air-entraining agent shall be used to provide a total air content of 3 to 5 percent. The COUNTY reserves the right, at any time, to sample and test the air-entraining agent. Air entraining agent shall be at the COUNTY's discretion.

b. Set controlling and water reducing admixtures: Admixtures may be added at the CONTRACTOR's option, subject to the COUNTY's approval, to control the set, effect water reduction, and increase workability. The addition of an admixture shall be at the CONTRACTOR's expense. Concrete containing an admixture shall be first placed at a location determined by the COUNTY. Admixtures shall conform to the requirements of ASTM C 494. The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used.

1. Concrete shall not contain more than one water reducing admixture.

7. **Flyash:** Flyash shall not be used.

2.2 REINFORCEMENT STEEL

A. Reinforcement steel for cast-in-place reinforced concrete construction shall conform to the following requirements:

1. Bar reinforcement shall conform to the requirements of ASTM A 615 - Deformed and Plain Billet - Steel Bars, for Grade 60 reinforcement unless otherwise indicated.

2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A 1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete, and the details indicated. Welded wire fabric with longitudinal wire of W4 size wire and smaller shall be in flat sheets or in rolls with a core diameter of not less than 10 inches. Welded wire fabric with longitudinal wires larger than W4 size shall be in flat sheets only.

3. Spiral reinforcement shall be cold-drawn steel wire conforming to the requirements of ASTM A 1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

B. Accessories

1. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcement during concrete placement. Bar supports shall meet the requirements of the CRSI Manual of Standard Practice including special requirements for supporting epoxy coated reinforcing bars. Wire bar supports shall be CRSI Class 1 for maximum protection with a 1/8-inch minimum thickness of plastic coating which extends at least 1/2-inch from the concrete surface. Plastic shall be gray in color.

2. Concrete blocks (dobies) used to support and position reinforcement steel shall have the same or higher compressive strength as required for the concrete in which they are located. Wire ties shall be embedded in concrete block bar supports.

C. Epoxy coating for reinforcing and accessories, where indicated, shall conform to ASTM A 775 - Epoxy - Coated Reinforcing Steel Bars.

2.3 CURING MATERIALS

A. Materials for curing concrete as indicated herein shall conform to the following requirements and ASTM C 309:

1. All curing compounds shall be white pigmented and resin based. Sodium silicate compounds shall not be allowed.

2. Polyethylene sheet for use as concrete curing blanket shall be white and shall have a nominal thickness of 6 mils. The loss of moisture when determined in accordance with the requirements of ASTM C 156 shall not exceed 0.055 grams per square centimeter of surface.

3. Polyethylene-coated waterproof paper sheeting for use as concrete curing blanket shall consist of white polyethylene sheeting free of visible defects, uniform in appearance, have a nominal thickness of 2 mils, and be permanently bonded to waterproof paper conforming to the requirements of Federal Specification UU-B-790A (1) (2). The loss of moisture, when determined in accordance with the requirements of ASTM C 156, shall not exceed 0.055 gram per square centimeter of surface.

4. Polyethylene-coated burlap for use as concrete curing blanket shall be 4-mil thick, white opaque polyethylene film impregnated or extruded into one side of the burlap. Burlap shall weigh not less than 9 ounces per square yard. The loss of moisture, when determined in accordance with the requirements of ASTM C 156, shall not exceed 0.055 grams per square centimeter of surface.

5. Curing mats for use in Curing Method 6 as indicated in Section 3.9, shall be heavy shag rugs or carpets or cotton mats quilted at 4 inches on center. Curing mats shall weigh a minimum of 12 ounces per square yard when dry.

6. Evaporation retardant shall be a material such as MasterKure ER 50 as manufactured by Master Builders Solutions; Eucobar as manufactured by Euclid Chemical Company; E-CON as manufactured by L & M Construction Chemicals, Inc. or equal.

2.4 NON-WATERSTOP JOINT MATERIALS

A. Materials for non-waterstop joints in concrete shall conform to the following requirements:

1. Preformed joint filler shall be a non-extruding, neoprene sponge or polyurethane type

3. Mastic joint sealer shall be a material that does not contain evaporating solvents; that will tenaciously adhere to concrete surfaces; that will remain permanently resilient and pliable; that will not be affected by continuous presence of water and will not in any way contaminate potable water; and that will effectively seal the joints against moisture infiltration even when the joints are subject to movement due to expansion and contraction. The sealer shall be composed of special asphalts or similar materials blended with lubricating and plasticizing agents to form a tough, durable mastic substance containing no volatile oils or lubricants and shall be capable of meeting the test requirements set forth below, if testing is required by the COUNTY.

2.5 CONCRETE DESIGN REQUIREMENTS

A. **General:** Concrete shall be composed of cement, admixtures, aggregates, and water of the qualities indicated. The exact proportions in which these materials are to be used for different parts of the work will be

determined during the trial batch. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage, and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items. The proportions shall be changed whenever necessary or desirable to meet the required results. All changes shall be subject to review by the COUNTY.

C. **Water-Cement Ratio and Compressive Strength:** Concrete shall have the following minimum properties:

Type of Work	Min. 28-Day Compressive Strength (psi)	Max. Size Aggregate	Cement per cu. yd. (lbs)	Max W/C Ratio (by weight)
Structural Concrete:				
Roof, floor slabs, columns, walls and all other concrete items not specified elsewhere.	4,000	1	564-600	0.45
12-inch and thicker walls, slabs on grade and footings. (optional)	4,000	1-1/2	564-600	0.45
Pea Gravel Mix. Thin sections and areas with congested reinforcing at the CONTRACTOR'S option and with the written approval of the COUNTY for the specific location. Maximum fine aggregate 50% by weight of aggregate	4,000	3/8	752-786	0.40
Other Concretes:				
Sitework Concrete	3,000	1	470 (min)	0.50
Lean concrete	2,000	1	470(min	0.60

NOTE: The CONTRACTOR is cautioned that the limiting parameters above are not a mix design. Additional cement or water reducing agent may be required to achieve workability required by the CONTRACTOR'S construction methods and aggregates. The CONTRACTOR is responsible for providing concrete with the required workability.

D. **Adjustments to Mix Design:** The mixes shall be changed whenever such change is necessary or desirable to secure the required strength, density, workability, and surface finish, and the CONTRACTOR shall be entitled to no additional compensation because of such changes.

2.6 CONSISTENCY

A. The quantity of water in a batch of concrete shall be just sufficient, with a normal mixing period, to produce a concrete which can be worked properly into place without segregation and which can be compacted by vibratory methods to give the desired density, impermeability, and smoothness of surface. The quantity of water shall be changed as necessary, with variations in the nature or moisture content of the aggregates, to maintain uniform production of a desired consistency. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143. The slumps shall be as follows:

Part of Work	Slump (in)
All concrete, unless indicated otherwise	3 inches plus or minus 1 inch
With high range water reducer added	7 inches plus or minus 2 inches
Pea gravel mix	7 inches plus or minus 2 inches
Ductbank and pipe encasement	5 inches plus or minus 1 inch

2.9 READY-MIXED CONCRETE

A. At the CONTRACTOR's option, ready-mixed concrete may be used if it meets the requirements as to materials, batching, mixing, transporting, and placing as indicated herein and is in accordance with ASTM C 94, including the following supplementary requirements.

B. Ready-mixed concrete shall be delivered to the site of the work, and discharge shall be completed within one hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first.

PART 3 - EXECUTION

3.1 PROPORTIONING AND MIXING

A. **Proportioning:** Proportioning of the mix shall conform to the requirements of Chapter 4.2.3 "Proportioning" of ACI 301.

B. **Mixing:** Mixing shall conform to the requirements of Chapter 4.3.1of said ACI 301 Specifications.

C. **Slump:** Slumps shall be as indicated herein.

D. **Retempering:** Retempering of concrete or mortar which has partially hardened shall not be permitted.

3.2 PREPARATION OF SURFACES FOR CONCRETING

A. **General:** Earth surfaces shall be thoroughly wetted by sprinkling prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. Vapor Retarder Sheet

2. Sand base shall be at least 2 inches thick within the foundation line after moistening and compaction by mechanical means. Sand surface shall be flat and level within a tolerance of plus 0 inches to minus 3/4-inch.

3. Place, protect, and repair defects in sheet according to ASTM E 1643 and the manufacturer's written instructions. Seams shall be lapped and sealed in accordance with ASTM E 1643.

4. Granular material above the sheet shall be moistened and compacted to 2 inches thickness within the same flatness criteria as the sand base.

C. **Joints in Concrete:** Concrete surfaces upon or against which concrete is to be placed, where the placement of the concrete has been stopped or interrupted so that, as determined by the COUNTY, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bonding. Except where the Drawings call for joint surfaces to be coated, the joint surfaces shall be cleaned of all laitance, loose or defective concrete, foreign material, and be roughened to a minimum 1/4-inch amplitude. Such cleaning and roughening shall be accomplished by hydro-blasting or sandblasting (exposing aggregate) followed by thorough

washing. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

D. After the surfaces have been prepared, all approximately horizontal construction joints shall be covered with a 6-inch lift of a pea gravel mix. The mix shall be placed and spread uniformly. Wall concrete shall follow immediately and shall be placed upon the fresh pea gravel mix.

E. **Placing Interruptions:** When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means, that will secure proper union with subsequent work; provided that construction joints shall be made only where acceptable to the COUNTY.

F. **Embedded Items:** No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the COUNTY at least 4 hours before placement of concrete. All surfaces of forms and embedded items that have become encrusted with dried grout from previous work shall be cleaned before the surrounding or adjacent concrete is placed.

G. All inserts or other embedded items shall conform to the requirements herein.

H. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms at locations indicated on the Drawings or shown by shop drawings and shall be acceptable to the COUNTY before any concrete is placed. Accuracy of placement is the responsibility of the CONTRACTOR.

I. **Casting New Concrete Against Old:** Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydro-blasting or sandblasting (exposing aggregate). The joint surface shall be coated with an epoxy bonding agent unless indicated otherwise by the COUNTY.

J. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the WORK. No concrete shall be deposited underwater nor shall the CONTRACTOR allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, shall be subject to the review of the COUNTY.

K. **Corrosion Protection:** Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2 inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.

L. Openings for pipes, inserts for pipe hangers and brackets, and anchors shall, where practicable, be provided during the placing of concrete.

M. Anchor bolts shall be accurately set and shall be maintained in position by templates while being embedded in concrete.

N. **Cleaning:** The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

O. Reinforcement steel shall be accurately positioned as indicated, and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. Reinforcement steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcement steel. Where concrete is to be

placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. Concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the CONTRACTOR shall provide concrete, metal, plastic, or other acceptable bar chairs and spacers.

P. Limitations on the use of bar support materials shall be as follows.

1. Concrete Dobies: permitted at all locations except where architectural finish is required.
2. Wire Bar Supports: permitted only at slabs over dry areas, interior dry wall surfaces, and exterior wall surfaces.
3. Plastic Bar Supports: permitted at all locations except on grade.

3.3 HANDLING, TRANSPORTING, AND PLACING

A. **General:** Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section. No aluminum materials shall be used in conveying any concrete.

B. **Non-Conforming Work or Materials:** Concrete which during or before placing is found not to conform to the requirements indicated herein shall be rejected and immediately removed from the work. Concrete which is not placed in accordance with these Specifications or which is of inferior quality shall be removed and replaced.

C. **Unauthorized Placement:** No concrete shall be placed except in the presence of a duly authorized representative of the COUNTY. The CONTRACTOR shall notify the COUNTY in writing at least 24 hours in advance of placement of any concrete.

D. **Placement in Wall and Column Forms:** Concrete shall not be dropped through reinforcement steel or into any deep form, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, means such as hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4 feet in walls and 8 feet in columns below the ends of ducts, chutes, or buggies. Concrete shall be uniformly distributed during the process of depositing and in no case after depositing shall any portion be displaced in the forms more than 6 feet in horizontal direction. Concrete in wall forms shall be deposited in uniform horizontal layers not deeper than 2 feet; and care shall be taken to avoid inclined layers or inclined construction joints except where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in wall forms shall not exceed 5 feet of vertical rise per hour. Sufficient illumination shall be provided in the interior of all forms so that the concrete at the places of deposit is visible from the deck or runway.

E. **Casting New Concrete Against Old:** Epoxy adhesive bonding agent shall be applied to the old surfaces according to the manufacturer's written recommendations. This provision shall not apply to joints where waterstop is provided.

G. **Placement in Slabs:** Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement. As the work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screeded in an up-slope direction.

I. **Cold Weather Placement:**

1. Placement of concrete shall conform to ACI 306.1 - Cold Weather Concreting,
3. Maintain the concrete temperature above 50 degrees F for at least 3 days after placement.

3.4 PUMPING OF CONCRETE

A. **General:** If the pumped concrete does not produce satisfactory end results, the CONTRACTOR shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

B. **Pumping Equipment:** The pumping equipment shall have 2 cylinders and be designed to operate with one cylinder in case the other one is not functioning. In lieu of this requirement, the CONTRACTOR may have a standby pump on the site during pumping.

C. The minimum diameter of the hose conduits shall be in accordance with ACI 304.2R.

D. Pumping equipment and hose conduits that are not functioning properly shall be replaced.

E. Aluminum conduits for conveying the concrete shall not be permitted.

F. **Field Control:** Concrete samples for slump, air content, and test cylinders will be taken at the placement end of the hose.

3.5 ORDER OF PLACING CONCRETE

A. The order of placing concrete in all parts of the WORK shall be acceptable to the COUNTY.

3.6 FINISHING CONCRETE SURFACES

A. **General:** Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions shown are defined as tolerances and are indicated in Part 1, above. These tolerances are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.

B. **Formed Surfaces:** No treatment is required after form removal except for curing, repair of defective concrete, and treatment of surface defects. Where architectural finish is required, it shall be as indicated.

1. Surface holes larger than [1/2]-inch in diameter or deeper than [1/4]-inch are defined as surface defects in basins and exposed walls.]

C. **Unformed Surfaces:** After proper and adequate vibration and tamping, all unformed top surfaces of slabs, floors, walls, and curbs shall be brought to a uniform surface with suitable tools. Immediately after the concrete has been screeded, it shall be treated with a liquid evaporation retardant. The retardant shall be used again after each work operation as necessary to prevent drying shrinkage cracks. The classes of finish specified for unformed concrete surfaces are designated and defined as follows:

1. Finish U1 - Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8-inch. No further special finish is required.

2. Finish U2 - After sufficient stiffening of the screeded concrete, surfaces shall be float finished with wood or metal floats or with a finishing machine using float blades. Excessive floating of surfaces while the concrete is plastic and dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted. Floating shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Surface irregularities shall not exceed 1/4-inch. Joints and edges shall be tooled where indicated or as determined by the COUNTY.

3. Finish U3 - After the finish U2 surface has hardened sufficiently to prevent excess of fine material from being drawn to the surface, steel troweling shall be performed with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense, uniform surface free from blemishes, ripples, and trowel marks. The finish shall be smooth and free of all irregularities.

4. Finish U4 - Trowel the Finish U3 surface to remove local depressions or high points. In addition, the surface shall be given a light hairbroom finish with brooming perpendicular to drainage unless otherwise indicated. The resulting surface shall be rough enough to provide a nonskid finish.

D. Unformed surfaces shall be finished according to the following schedule:

UNFORMED SURFACE FINISH SCHEDULE

Area	Finish
Grade slabs and foundations to be covered with concrete or fill material	U1
Floors to be covered with grouted tile or topping grout	U2
Water bearing slabs with slopes 10 percent and less	U3
Water bearing slabs with slopes greater than 10 percent	U4
Slabs not water bearing	U4
Slabs to be covered with built-up roofing	U2
Interior slabs and floors to receive architectural finish	U3
Top surface of walls	U3

E. Floor Hardener (Surface Applied)

1. The following additional requirements apply to the substrate concrete in areas indicated to be under floor hardener:

a. Slump shall be no greater than 4 inches when peak ambient temperatures are expected to exceed 65 degrees F and no greater than 3 inches when temperatures will not exceed 65 degrees F.
b. Air content shall not exceed 3 percent.
c. No calcium chloride or set accelerating admixture containing calcium chloride shall be used.
d. Do not use admixtures that increase bleeding.
e. Do not use fly ash.

2. The CONTRACTOR shall finish areas indicated to receive hardener in conformance with the manufacturer's recommendations and the following. After leveling the concrete surface and as soon as the concrete will support an operator and machine without disturbing the level or working up excessive fines, the CONTRACTOR shall float the surface of the slab with a mechanical float fitted with detachable float shoes. Then apply 1/2 to 2/3 of the total amount of dry shake surface hardener uniformly to the surface. A mechanical spreader is recommended. Float the surface once the shake has absorbed sufficient moisture, as indicated by darkening of the shake. Immediately apply the remainder of the shake and allow it to absorb moisture. Do not apply shake when bleed water is present.

3. Perform a third floating if time and setting characteristics of the concrete will allow, but do not add water to the surface.

4. As the surface stiffens further and loses sheen, trowel with blades set relatively flat, using hand or mechanical methods. Remove all marks and pinholes in a final raised trowel operation.

5. Cure the finished surface using the fill-forming curing compound recommended by the manufacturer at a coverage rate which will provide moisture retention in excess of the requirements of ASTM C 309. Maintain ambient temperatures above 50 degrees F during the curing period.

6. Keep floors covered and prohibit traffic and loads for 10 days minimum after completion.

3.7 CURING AND DAMPPROOFING

A. **General:** All concrete shall be cured for not less than 7 days after placing, in accordance with the methods indicated below for the different parts of the WORK.

Surface to be Cured or Dampproofed	Method
Unstripped forms	1
Wall sections with forms removed	6
Construction joints between footings and walls, and between floor slab and columns	2
Encasement concrete and thrust blocks	3
All concrete surfaces not specifically indicated in this Paragraph	4
Floor slabs on grade in hydraulic structures	5
Slabs not on grade	6

B. **Method 1:** Wooden forms shall be wetted immediately before concrete has been placed and shall be kept wet with water until removal. If steel forms are used the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed within 7 days of placing the concrete, curing shall be continued in accordance with Method 6 below.

C. **Method 2:** The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.

D. **Method 3:** The surface shall be covered with moist earth not less than 4 hours nor more than 24 hours after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 days after placement of concrete.

E. **Method 4:** The surface shall be sprayed with a liquid curing compound.

1. It shall be applied in accordance with the manufacturer's printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film which will seal thoroughly.

2. Where the curing compound method is used, care shall be exercised to avoid damage to the seal during the 7-day curing period. If the seal is damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.

3. Wherever curing compound has been applied by mistake to surfaces against which concrete subsequently is to be placed and to which it is to adhere, compound shall be entirely removed by wet sandblasting just prior to the placing of new concrete.

4. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on unformed surfaces and within 2 hours after removal of forms. Repairs to formed surfaces shall be made within the 2-hour period; provided, however, that any such repairs which cannot be made within the said 2-hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, the area involved shall first be wet-sandblasted to remove the curing compound.

5. At all locations where concrete is placed adjacent to a panel which has been coated with curing compound, the panel shall have curing compound reapplied to an area within 6 feet of the joint and to any other location where the curing membrane has been disturbed.

6. Prior to final acceptance of the WORK, all visible traces of curing compound shall be removed from all surfaces in such a manner that does not damage the surface finish.

F. **Method 5:**

1. Until the concrete surface is covered with curing compound, the entire surface shall be kept damp by applying water using nozzles that atomize the flow so that the surface is not marred or washed. The concrete shall be given a coat of curing compound in accordance with Method 4 above. Not less than one hour nor more than 4 hours after the curing compound has been applied, the surface shall be wetted with water delivered through a fog nozzle, and concrete-curing blankets shall be placed on the slabs. The curing blankets shall be polyethylene sheet, polyethylene-coated waterproof paper sheeting, or polyethylene-coated burlap. The blankets shall be laid with the edges butted together and with the joints between strips sealed with 2-inch wide strips of sealing tape or with edges lapped not less than 3 inches and fastened together with a waterproof cement to form a continuous watertight joint.

2. The curing blankets shall be left in place during the 7-day curing period and shall not be removed until after concrete for adjacent work has been placed. If the curing blankets become torn or otherwise ineffective, the CONTRACTOR shall replace damaged sections. During the first 3 days of the curing period, no traffic of any nature and no depositing, temporary or otherwise, of any materials shall be permitted on the curing blankets. During the remainder of the curing period, foot traffic and temporary depositing of materials that impose light pressure will be permitted only on top of plywood sheets 5/8-inch minimum thickness, laid over the curing blanket. The CONTRACTOR shall add water under the curing blanket as often as necessary to maintain damp concrete surfaces at all times.

G. **Method 6:** This method applies to both walls and slabs.

1. The concrete shall be kept continuously wet by the application of water for a minimum period of at least 7 consecutive days beginning immediately after the concrete has reached final set or forms have been removed.

2. Until the concrete surface is covered with the curing medium, the entire surface shall be kept damp by applying water using nozzles that atomize the flow so that the surface is not marred or washed.

3. Heavy curing mats shall be used as a curing medium to retain the moisture during the curing period. The curing medium shall be weighted or otherwise held substantially in contact with the concrete surface to prevent being dislodged by wind or any other causes. All edges shall be continuously held in place.

4. The curing blankets and concrete shall be kept continuously wet by the use of sprinklers or other means both during and after normal working hours.

5. Immediately after the application of water has terminated at the end of the curing period, the curing medium shall be removed, any dry spots shall be rewetted, and curing compound shall be immediately applied in accordance with Method 4 above.

6. The CONTRACTOR shall dispose of excess water from the curing operation to avoid damage to the work.

H. **Dampproofing**

1. The exterior surface of all buried roof slabs shall be dampproofed as follows.

2. Immediately after completion of curing the surface shall be sprayed with a dampproofing agent consisting of an asphalt emulsion. Application shall be in 2 coats. The first coat shall be diluted to one-half strength by the addition of water and shall be sprayed on so as to provide a maximum coverage rate of 100 square feet per gallon of dilute solution. The second coat shall consist of an application of the undiluted material, and shall be sprayed on so as to provide a maximum coverage rate of 100 square feet per gallon. Dampproofing material shall be as indicated above.

3. As soon as the material has taken an initial set, the entire area thus coated shall be coated with whitewash. Any formula for mixing the whitewash may be used if it produces a uniformly coated white surface and remains until placing of the backfill. If the whitewash fails to remain on the surface until the backfill is placed, the CONTRACTOR shall apply additional whitewash.

3.08 PROTECTION

A. The CONTRACTOR shall protect all concrete against injury until final acceptance.

B. Fresh concrete shall be protected from damage due to rain, hail, sleet, or snow. The CONTRACTOR shall provide such protection while the concrete is still plastic and whenever precipitation is imminent or occurring.

3.09 TREATMENT OF SURFACE DEFECTS

A. As soon as forms are removed, all exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the COUNTY. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall be repaired as indicated below. Concrete containing extensive voids, holes, honeycombing, or similar depression defects shall be completely removed and replaced. Repairs and replacements shall be performed promptly.

3.10 PATCHING HOLES IN CONCRETE

A. **Patching Small Holes:**

1. Holes which are less than 12 inches in the least dimension and extend completely through concrete members shall be filled.

2. Small holes in members which are water-bearing or in contact with soil or other fill material shall be filled with non-shrink grout. Where a face of the member is exposed to view, the non-shrink grout shall be held back 2 inches from the finished surface. The remaining 2 inches shall then be patched according to the Paragraph entitled "Treatment of Surface Defects."

3. Small holes through all other concrete members shall be filled with non-shrink grout, with exposed faces treated as above.

B. **Patching Large Holes:**

1. Holes which are larger than 12 inches in the least dimension shall have a keyway chipped into the edge of the opening all around, unless a formed keyway exists. The holes shall then be filled with concrete as indicated herein.

2. Holes which are larger than 24 inches in the least dimension and which do not have reinforcing steel extending from the existing concrete, shall have reinforcing steel set in grout in drilled holes. The reinforcing added shall match the reinforcing in the existing wall unless indicated otherwise.

3. Large holes in members which are water bearing or in contact with soil or other fill shall have a hydrophilic type waterstop material placed around the perimeter of the hole in accordance with Section 033500 - Joints in Concrete, unless there is an existing waterstop in place.

3.14 CARE AND REPAIR OF CONCRETE

A. The CONTRACTOR shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed WORK, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete.

END OF SECTION

SECTION 055000

MISCELLANEOUS METALWORK

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide miscellaneous metalwork and appurtenances, complete and in place, in accordance with the Standards & Specifications, and Santa Barbara County Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 099000 – Protective Coatings

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards

ASTM A 123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 193	Alloy Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A 194	Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
ASTM A 307	Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength
ASTM A 325	Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

1.4 CONTRACTOR SUBMITTALS

A. General: Furnish submittals in accordance with Section 013300 - Contractor Submittals.

B. Product Information: An ICBO report listing the ultimate load capacity in tension and shear for each size and type of concrete anchor. CONTRACTOR shall submit manufacturer's recommended installation instructions, and procedures for adhesive anchors. Upon review, by COUNTY, these instructions shall be followed specifically.

1.5 QUALITY ASSURANCE

A. No substitution for the indicated adhesive anchors will be considered unless accompanied with ICBO report verifying strength and material equivalency, including temperature at which load capacity is reduced to 90 percent of that determined at 75 degrees F.

PART 2 – PRODUCTS

2.01 BOLTS AND ANCHORS

A. **Bolt, Nut and Washer Requirements:** Unless otherwise indicated, bolts, anchor bolts, washers, and nuts shall be steel as indicated herein. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series. The bolt and nut material shall be free-cutting steel. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the Unified Thread Standard (UTS). Where galvanized bolts are specified, threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing.

1. Except as otherwise indicated, steel for bolt material, anchor bolts and cap screws shall be in accordance with the following:

a. Structural Connections: ASTM A 307 - Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength Grade A or B, hot-dip galvanized.

b. Anchor Bolts: ASTM A 307, Grade A or B, or ASTM A 36, hot-dip galvanized.

c. High Strength Bolts (where indicated): ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

d. Pipe and Equipment Flange Bolts: ASTM A 193 - Alloy Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications , Grade B-7.

2. Washers shall be installed wherever bolts are used to fasten plastic items, or wherever the corrosion protection coating of an item may be damaged when the bolt is tightened. Washers shall be fabricated of material matching the bolts, except that hardened washers for high strength bolts shall conform to the requirements of the AISC Specification. Lock washers and Nylock bolts shall be installed where indicated and shall be fabricated of material matching the bolts.

3. The length of each bolt shall be such that after the joint is made up, the bolt extends a minimum of 1/8-inch beyond the nut, but in no case more than 5/8-inch beyond the nut.

B. **Standard and Above Ground Service (Non-Corrosive Service):** All bolts, nuts, and washers in standard/above ground service on factory assembled items shall be stainless steel or in accordance with the manufacturers recommendations for such exposure. All field installed bolts, nuts, and washers in standard/above ground service shall be Cadmium or Zinc coated unless specified otherwise. Where exposed to moisture or other corrosive conditions, bolts shall be epoxy coated after installation in accordance with Section 099000- Protective Coatings, or as otherwise specified.

C. **Buried Service (Corrosive Service):** All bolts, nuts, and washers in buried service on factory assembled items shall be stainless steel unless specified otherwise. All field installed bolts, nuts, and washers in buried service shall be Cadmium or Zink coated unless specified otherwise. Buried bolts shall be coated/wrapped with #1 Wax-Tape by Trenton Corporation, Ann Arbor, MI 48103.

D. **Vault and Submerged Service (Corrosive Service):** Bolts shall be epoxy coated after installation in accordance with Section 099000- Protective Coatings. All bolts, nuts, and washers in the locations listed below shall be stainless steel unless specified otherwise.

1. Inside vaults, manholes, and buried structures.
2. Submerged locations.
3. Locations subject to seasonal or occasional flooding.
4. Inside hydraulic structures below the top of the structure.

5. Chemical handling areas.
6. Locations indicated by the Contract Documents, the COUNTY Standards & Specifications, or designated by the COUNTY to be provided with stainless steel bolts.

E. **Stainless Steel Bolts:** Unless otherwise indicated, stainless steel bolts, anchor bolts, nuts, and washers shall be Type 316 stainless steel, class 2. Bolts shall conform to ASTM A 193. Nuts shall conform to ASTM A 194 - Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service or Both. All bolt threads shall be protected with an antiseize lubricant suitable for submerged service conforming to government specification MIL-A-907E - Antiseize Thread Compound, High Temperature. Antiseize lubricant shall be NSF-61 approved for use with potable water. Antiseize lubricant shall be "PURE WHITE" by Anti-Seize Technology, Franklin Park, IL, 60131, AS-470 by Dixon Ticonderoga Company, Lakehurst, NJ, 08733 or equal.

END OF SECTION

SECTION 099000

PROTECTIVE COATINGS

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide Protective Coatings, complete and in place, in accordance with the Contract Documents.

B. Definitions

1. The term "paint," "coatings," or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, tape wraps, and all other Protective Coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.

2. The term "DFT" means minimum dry film thickness, without any negative tolerance.

C. The following surfaces shall not be protective coated:

1. Concrete, unless specifically indicated to be coated.
2. Brass fittings, Stainless Steel, and Copper.
3. Machined surfaces.
4. Grease fittings.
5. Glass.
6. Equipment nameplates.
7. Platform gratings, stair treads, door thresholds, and other walk surfaces, unless specifically indicated to be coated.

D. The coating system schedules summarize the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the Construction Drawings are used to show the limits of coating requirements, to show exceptions to the requirements, or to clarify or show details for application of the coating systems.

E. Where Protective Coatings are to be performed by a subcontractor, the subcontractor shall possess a valid state license as required for performance of the painting and coating work called for in this specification and shall provide 2 references which show that the painting subcontractor has previous successful experience with the indicated or comparable coating systems. Include the name, address, and the telephone number for the COUNTY of each installation for which the painting subcontractor provided the Protective Coatings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 330509 – Piping, General

1.3 CONTRACTOR SUBMITTALS

A. **General:** Submittals shall be furnished in accordance with Section 013300 - Contractor Submittals, unless indicated otherwise below.

B. Submittals shall include the following information and be submitted at least 21 calendar days prior to Protective Coatings work:

1. Coating Materials List: Four copies of a coating materials list showing the Manufacturer and

the coating number, keyed to the coating systems herein. The list shall be submitted prior to or at the time of submittal of samples.

2. Paint Manufacturer's Information: For each coating system to be used, the following data:

a. Paint Manufacturer's data sheet for each product proposed, including statements on the suitability of the material for the intended use.
b. Technical and performance information that demonstrates compliance with the system performance and material requirements.
c. Paint Manufacturer's instructions and recommendations on surface preparation and application.
d. Colors available for each product (where applicable).
e. Compatibility of shop and field applied coatings (where applicable).
f. Material Safety Data Sheet for each product used.

1.4 SPECIAL CORRECTION OF DEFECTS REQUIREMENTS

A. **Warranty Inspection:** A warranty inspection will be conducted during the eleventh month following completion of all coating and painting work. The CONTRACTOR and a representative of the coating material Manufacturer may attend this inspection. All defective work shall be repaired in accordance with these specifications and to the satisfaction of the COUNTY.

PART 2 - PRODUCTS

2.1 GENERAL

A. **Suitability:** The CONTRACTOR shall use suitable coating materials as recommended by the Manufacturer.

B. **Compatibility:** In any coating system only compatible materials from a single Manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.

C. **Containers:** Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, and name of manufacturer, all of which shall be plainly legible at the time of use.

D. **Colors:** All colors and shades of colors of all coats of paint shall be as indicated or selected by the PROJECT ENGINEER and approved by the COUNTY. Each coat shall be of a different shade, to facilitate inspection of surface coverage of each coat. Colors for exterior (visible) surfaces shall be as follows unless specified otherwise. Finish color shall be ICI Devoe Car Blue, or equal, for all piping and isolation valves. Finish color shall be ICI Devoe Safety Blue, or equal, for all automatic control valves, pumps, and motors. Finish color shall be ICI Devoe Safety Yellow, or equal, for fire hydrants, and bollards.

E. Substitute or "Or-Equal" Products

1. To establish equality under Section 016000 - Products, Materials, Equipment and Substitutions, the CONTRACTOR shall furnish satisfactory documentation from the manufacturer of the proposed substitute or "or-equal" product that the material meets the indicated requirements and is equivalent or better than the specified product.

2. Protective Coatings Materials shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions.

3. If a proposed substitution requires changes in the WORK, the CONTRACTOR shall bear all

such costs involved.

2.2 MATERIAL SOURCES

A. Each of the following manufacturers is capable of supplying many of the industrial coating materials indicated herein. Proposed substitute materials will be considered as indicated above. All industrial coating materials shall be materials that have a record of satisfactory performance in water and wastewater treatment plants, and under the service conditions to which they will be subjected.

ICI Devoe Coatings
Tnemec Company
Ameron
Trenton Corporation
Carboline Coatings Company
Polyken Technologies
Sherwin Williams

2.3 INDUSTRIAL COATING SYSTEMS

A. **System 1 – Epoxy/Aliphatic Polyurethane:** Two component aliphatic acrylic polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering and with a minimum solids content of 63 percent by volume. Primer and intermediate coats shall be a two component rust inhibitive epoxy coating material with a minimum solids content of 65 percent by volume.

1. Prime coat (field or shop applied) DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

2. Intermediate coat DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

3. Finish coats (one or two coats, DFT = 3 mils), Devoe 379UVA, Tnemec 740, Ameron Amershield, or equal.

4. Total system DFT = 11 mils.

5. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.

B. **System 2 - Inorganic Zinc/Epoxy/Aliphatic Polyurethane:** The inorganic zinc primer shall be a water or solvent based, self-curing, two-component zinc silicate inorganic coating material containing at least 65 percent of metallic zinc by weight in the dried film. This coating material shall be recommended by the coating manufacturer as a primer for this system. The intermediate coat shall be a two component high-build epoxy coating material with a minimum solids content of 56 percent by volume. Finish coats shall be a 2-component aliphatic acrylic or polyester polyurethane coating material that provides superior color and gloss retention, resistance to chemical fumes and severe weathering, and a minimum solids content of 63 percent by volume.

1. Prime coat DFT = 3 mils, Devoe 302H, Tnemec 90-96, Ameron 21-5, or equal.

2. Intermediate coat DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

3. Finish coats (one or two coats, DFT = 3 mils), Devoe 379UVA, Tnemec 740, Ameron Amershield, or equal.

4. Total system DFT = 10 mils.

5. Intermediate coat shall be applied in excess of 4 mils DFT or in more than one coat as

necessary to completely cover the inorganic zinc primer and prevent application bubbling of the polyurethane finish coat.

6. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.

7. If the inorganic zinc primer is used as a pre-construction or shop applied primer, all damaged and uncoated areas shall be spot abrasive blasted and coated after construction using the indicated material.

C. **System 3 – Epoxy(x3):** Two component, rust inhibitive polyamide cured epoxy coating material shall provide a recoatable finish that is available in a wide selection of colors. The coating material shall have a minimum solids content of 65 percent by volume and be resistant to service conditions of condensing moisture, splash and spillage of lubricating oils, and frequent washdown and cleaning.

1. Prime coat (field or shop applied) DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

2. Intermediate and finish coats (2 coats, DFT = 8 mils), Devoe 224HS, Tnemec N69, Ameron 385, or equal.

3. Total system DFT = 12 mils.

2.4 SUBMERGED AND SEVERE SERVICE COATING SYSTEMS

A. **System 101 - Amine Cured Epoxy(x3):** High build, amine cured, epoxy coating material shall have a minimum solids content of 80 percent by volume, and shall be suitable for long-term immersion service in potable water and municipal wastewater. For potable water service, the coating material shall be listed by the NSF International as in compliance with NSF Standard 61 - Drinking Water System Components - Health Effects.

1. Prime, intermediate, and finish coats (three coats, DFT = 18 mils), Devoe 233H, Tnemec 141, Ameron 395FD, or equal.

B. **System 102 - Polyamide Cured Epoxy(x3):** High build, polyamide cured epoxy coating material shall have a minimum solids content of 64 percent by volume, and shall be suitable for long-term immersion service in potable water and municipal wastewater. For potable water service, the coating material shall be listed by the NSF International as in compliance with NSF Standard 61.

1. Prime, intermediate, and finish coats (three coats, DFT = 12 mils), Devoe 233H, Tnemec N140, Ameron 90HS, or equal.

C. **System 103 - Fusion Bonded Epoxy:** The coating material shall be a 100 percent powder epoxy, certified as compliant with NSF Standard 61, applied in accordance with the ANSI/AWWA C213 - Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines, except that the surface preparation shall be as specified in the coating system schedule of this Section. The coating shall be applied using the electrostatic spray or fluidized bed process.

1. Powder coat DFT = 16 mils, Scotchkote 134 or 206N, or equal.

2. For coating of valves, DFT = 12 mils.3. Liquid Epoxy: For field repairs. the use of a liquid epoxy will be permitted. applied to provide a DFT of 15 mils. The liquid epoxy shall be a 100 percent solids epoxy, ScotchKote 323, or equal.

4. For indoors or covered conditions, or inside hydraulic structures and vaults: Field applied finish coat DFT = 4 mils, Devoe 224HS, Tnemec N69, Ameron 385, or equal.

5. For outdoors or exposed conditions: Field applied finish coats (one or two coats, DFT = 3 mils), Devoe 379UVA, Tnemec 740, Ameron Amershield, or equal. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.

6. Total system DFT = 16-20 mils.

2.5 SPECIAL COATING SYSTEMS

A. **System 201 – Joint Wrap:** Prior to wrapping the pipe, nuts and bolts, fittings, flanges or other surfaces with heavy duty joint wrap, the items or surface shall be coated with a liquid adhesive primer. The items or surface shall be wrapped with a 35-mil adhesive joint wrap, half-lapped, to achieve a total thickness of 70 mils. Joint wrap shall be Polyken Technologies, Heavy Duty Joint Wrap, Product No. 930-35, or approved equal. Liquid adhesive primer shall be Polyken Technologies, Liquid Adhesive No. 1027, or approved equal.

B. **System 202 - Cement Mortar Coating:** A 1-1/2-inch minimum thickness mortar coating reinforced with 3/4-inch galvanized welded wire fabric shall be provided. The cement mortar shall contain no less than one part Type V cement to 3 parts sand. The cement mortar shall be cured by a curing compound meeting the requirements of "Liquid Membrane Forming Compounds for Curing Concrete," ASTM C 309, Type II, white pigmented, or by enclosure in an 8-mil thick polyethylene sheet with all edges and joints lapped by at least 6 inches.

C. **System 203 - Polyethylene Encasement:** Application of polyethylene encasement shall be in accordance with ANSI/AWWA C105 using Method C.

2.6 MUELLER RESILIENT WEDGE GATE VALVE COATINGS

The coating shall be a fusion bonded (thermosetting) epoxy protective coating and shall function as a physical, chemical and electrical barrier between the base metal to which it is applied and the surroundings.

The coating shall comply with AWWA C550 and shall be certified to NSF 61. The coating shall be non-toxic and shall not impart taste or odor to water.

The coating shall have a gloss finish and shall be suitable for field over-coating and touch-up without sanding or special surface preparation, or application of heat in excess of room temperature.

The coating shall have a successful record of performance on gate valves for a minimum of five (5) years.

The coating adhesion to the substrate shall exceed cohesion of the coating film as demonstrated by the following test:

1. Prepare test panel and apply coating per manufacturer's recommendation.

2. After sample has properly cured per manufacturer's recommendation, scribe an "X" using a sharp knife or scalpel through the coating to the metal substrate.

3. With the point of the knife at the juncture of two scribes, attempt to lift off the coating. Coating should not lift off substrate or between coats readily, but should break up leaving coating material on the substrate of this damaged area.

4. No disbondment of the film shall be noted as tested above after immersion in tap water for 1500 hours at 100°F.

A Tabor Abrader Test per ASTM D 4060 resulting in a maximum .041 grams coating loss per 1000 cycles when using a CF-17 wheel (1000 gram weight).

Epoxy coating shall be Mueller Pro-Gard™ Epoxy or approved equivalent.

PART 3 - EXECUTION

3.1 MANUFACTURER'S SERVICES

A. The CONTRACTOR shall require the Protective Coatings manufacturer to furnish a qualified technical representative to visit the project site for technical support as may be necessary to resolve field problems attributable or associated with the manufacturer's products.

3.2 WORKMANSHIP

A. Skilled craftsmen and experienced supervision shall be used on all WORK.

B. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure thorough cleaning and an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given to insure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other precautionary measures.

3.3 STORAGE, MIXING, AND THINNING OF MATERIALS

A. Unless otherwise indicated, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed. Coating materials shall be stored under the conditions recommended by the Material Safety Data Sheets, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings of different manufacturers shall not be mixed together. All Protective Coatings materials shall be used within the manufacturer's recommended shelf life.

3.4 PREPARATION FOR COATING

A. **General:** All surfaces to receive Protective Coatings shall be cleaned as indicated prior to application of coatings. The CONTRACTOR shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application. Surfaces to be coated shall be dry and free of visible dust.

B. **Protection of Surfaces Not to be Coated:** Surfaces which are not to receive Protective Coatings shall be protected during surface preparation, cleaning, and coating operations.

C. All hardware, lighting fixtures, switchplates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be painted shall be removed, masked or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.

D. Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The CONTRACTOR shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.

E. **Protection of Painted Surfaces:** Cleaning and coating shall be coordinated so that dust and other

contaminants from the cleaning process will not fall on wet, newly-coated surfaces.

3.5 SURFACE PREPARATION STANDARDS

A. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification:

1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil, salts, and other soluble contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.

2. White Metal Blast Cleaning (SSPC-SP5): Removal of all visible rust, oil, grease, soil, dust, mill scale, paint, oxides, corrosion products and foreign matter by blast cleaning.

3. Commercial Blast Cleaning (SSPC-SP6): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 33 percent of each square inch of surface area.

4. Brush-Off Blast Cleaning (SSPC-SP7): Removal of all visible oil, grease, soil, dust, loose mill scale, loose rust, and loose paint.

5. Near-White Blast Cleaning (SSPC-SP10): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 5 percent of each square inch of surface area.

3.6 METAL SURFACE PREPARATION

A. The minimum abrasive blasting surface preparation shall be as indicated in the coating system schedules included at the end of this Section. Where there is a conflict between these specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.

B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this Section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion Engineers, NACE Standard SSPC-SP - Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive and SSPC-SP - Visual Standard for Surfaces of New Steel Centrifugally Blast Cleaned with Steel Grit.

C. All oil, grease, welding fluxes, and other surface contaminants shall be removed by solvent cleaning per SSPC-SP1 - Solvent Cleaning prior to blast cleaning.

D. All sharp edges shall be rounded or chamfered and all burrs, and surface defects and weld splatter shall be ground smooth prior to blast cleaning.

E. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions.

F. The CONTRACTOR shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.

G. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming, or another approved method prior to painting.

H. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.

I. If the specified abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, then SSPC-SP2 or SSPC-SP3 shall be

used.

J. Shop primed equipment shall be solvent cleaned in the field before finish coats are applied.

3.7 SURFACE PREPARATION AND APPLICATION OF JOINT WRAP

A. Nuts and bolts, couplings, valves, fittings, flanges, and steel pipe to receive heavy duty joint wrap shall be cleaned to remove all visible oil, grease, soil, dust, rust, and other foreign matter. Surfaces to receive joint wrap shall be coated with liquid adhesive primer in accordance with the manufacturer's recommendations, prior to application of joint wrap.

B. After being primed, the items or surface to be protected shall be wrapped with the 35-mil joint wrap, half-lapped, to achieve a total thickness of 70 mils. Care shall be taken to completely encapsulate all nuts and bolts.

3.8 SHOP COATING REQUIREMENTS

A. Unless otherwise indicated, all items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the indicated or selected color. The methods, materials, application equipment and all other details of shop painting shall comply with this section. If the shop primer requires top-coating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.

B. For certain pieces of equipment it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switch-gear or main control boards, submerged parts of pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the indicated quality in the field. Such equipment shall be primed and finish coated in the shop and touched up in the field with the identical material after installation. The coating material data sheet shall be submitted with the shop drawings for the equipment.

C. For certain small pieces of equipment the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals.

D. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 2 months before being top-coated, or less time if recommended by the coating manufacturer. Damage to shop-applied coatings shall be repaired in accordance with this Section and the coating manufacturer's printed instructions.

E. The CONTRACTOR shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment shop drawings.

3.9 APPLICATION OF COATINGS

A. The application of Protective Coatings to steel substrates shall be in accordance with SSPC-PA1 – Shop, Field, and Maintenance Painting of Steel.

B. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The CONTRACTOR shall schedule such inspection with the COUNTY in advance.

C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day.

D. Coatings shall be applied in accordance with the manufacturer's instructions and recommendations,

and this Section, whichever has the most stringent requirements.

E. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe painting for these areas.

F. Special attention shall be given to materials which will be joined so closely that proper surface preparation and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.

G. Finish coats, including touch-up and damage repair coats shall be applied in a manner which will present a uniform texture and color matched appearance.

H. Coatings shall not be applied under the following conditions:

1. Temperature exceeding the manufacturer's recommended maximum and minimum allowable.
2. Dust or smoke laden atmosphere.
3. Damp or humid weather.
4. When the substrate or air temperature is less than 5 degrees F above dewpoint.
5. When air temperature is expected to drop below 40 degrees F or less than 5 degrees F above the dewpoint within 8 hours after application of coating.
6. When wind conditions are not calm.

I. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Dept. of Commerce, Weather Bureau psychometric tables.

J. Unburied steel piping shall be abrasive blast cleaned and primed before installation.

K. The finish coat on all work shall be applied after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust free.

3.10 CURING OF COATINGS

A. The CONTRACTOR shall maintain curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section, whichever is the most stringent, prior to placing the completed coating system into service. In the case of enclosed areas, forced air ventilation, using heated air if necessary, may be required until the coatings have fully cured.

3.11 FIELD INSPECTION AND TESTING

A. **General:** The CONTRACTOR shall give the COUNTY a minimum of 3 days advance notice of the start of any field surface preparation work or coating application work.

B. Inspection by the COUNTY, or the waiver of inspection of any particular portion of the WORK, shall not relieve the CONTRACTOR of its responsibility to perform the work in accordance with these Specifications.

C. **Inspection Devices:** The CONTRACTOR shall furnish, until final acceptance of such coatings, inspection devices in good working condition for the detection of holidays and measurement of dry-film thicknesses of Protective Coatings. Dry-film thickness gages shall be made available for the COUNTY'S use at all times while coating is being done, until final acceptance of such coatings. The CONTRACTOR shall furnish the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of the COUNTY.

D. **Holiday Testing:** The CONTRACTOR shall holiday test all coated surfaces which will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures and surfaces coated with any of the submerged and severe service coating systems. Areas which contain holidays shall be marked and

repaired or recoated in accordance with the coating manufacturer's printed instructions and then retested.

1. Coatings With Thickness Exceeding 20 Mils: For surfaces having a total dry film coating thickness exceeding 20 mils: pulse-type holiday detector such as Tinker & Rasor Model AP-W, D.E. Stearns Co. Model 14/20, or equal shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.

2. Coatings With Thickness of 20 Mils or Less: For surfaces having a total dry film coating thickness of 20 mils or less: Tinker & Rasor Model M1 non-destructive type holiday detector, K-D Bird Dog, or equal shall be used. The unit shall operate at less than 75-volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as Kodak Photo-Flo, or equal, shall be added to the water prior to wetting the detector sponge.

E. **Film Thickness Testing:** On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC -PA 2 "Procedure for Determining Conformance to Dry Coating Thickness Requirements" using a magnetic-type dry film thickness gage such as Mikrotest model FM, Elcometer model 111/1EZ, or equal. Each coat shall be tested for the correct thickness. No measurements shall be made until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gage.

F. **Surface Preparation:** Evaluation of blast cleaned surface preparation work will be based upon comparison of the blasted surfaces with the standard samples available from the NACE, using NACE standards SSPC-SP.

3.12 COATING SYSTEM SCHEDULES

A. **Coating System Schedule, Ferrous Metal - Not Galvanized:**

	Item	Surface Prep.	System No.
FM-1	Piping and miscellaneous surfaces indoors or covered, except those included below.	Commercial Blast Cleaning SSPC-SP6	(3) Epoxy(x3)
FM-2	Miscellaneous surfaces outdoors or exposed, except those included below.	Commercial Blast Cleaning SSPC-SP6	(1) Epoxy/Aliphatic Polyur ethane
FM-3	Piping outdoors or exposed, except as indicated below.	Near White Metal Blast Cleaning SSPC-SP10	(2) Inorganic Zinc/Epoxy/A liphatic Polyurethane
FM-4	Piping and miscellaneous surfaces inside hydraulic structures and vaults.	Near White Metal Blast Cleaning SSPC-SP10	(3) Epoxy(x3)
FM-5	Piping and miscellaneous surfaces inside hydraulic structures and vaults where subject to frequent immersion.	Solvent Cleaning SSPC-SP1 followed by Near White Metal Blast Cleaning SSPC-SP10	(103) Fusion Bonded Epo xy
FM-6	Buried ductile iron pipe.	Removal of oil, grease, soil and salts	(203) Polyethylene Encase ment
FM-7	Buried steel pipe where not mortar-coated, or coal-tar enamel coated.	Removal of oil, grease, soil and salts	(201) Joint Wrap
FM-8	Ferrous surfaces of valves and couplings.	Solvent Cleaning SSPC-SP1 followed by Near White Metal Blast Cleaning SSPC-SP10	(103) Fusion Bonded Epo xy
FM-9	Buried valves, couplings, fittings, and joints, including epoxy-coated surfaces (where piping is mortar-coated steel).	Removal of oil, grease, soil and salts	(202) Cement Mortar Coat ing
FM-10	Buried nuts and bolts, valves, couplings, fittings, and flanged joints (where piping is **not** mortar-coated steel).	Removal of oil, grease, soil and salts	(201) Joint Wrap
FM-11	Buried surfaces that are not indicated to be coated elsewhere.	Near White Metal Blast Cleaning SSPC-SP10	(101) Amine Cured Epoxy (x3)
FM-12	Piping and miscellaneous surfaces submerged in water (excluding shop coated valves, couplings, and pumps).	Near White Metal Blast Cleaning SSPC-SP10	(102) Polyamide Cured Epo xy(x3)
FM-13	Ferrous surfaces in water passages and submerged surfaces of pumps.	Near White Metal Blast Cleaning SSPC-SP10	(101) Amine Cured Epoxy(x3)

B. **Coating System Schedule, Ferrous Metal - Galvanized:** Pretreatment coatings, barrier coatings, or washes shall be applied as recommended by the coating manufacturer. All galvanized surfaces shall be coated except for the following items which shall be coated only if required by other Sections: Floor Gratings and Frames, Ladders, Handrails, Stair Treads, and Chain Link Fencing and Hardware.

	Item	Surface Prep.	System No.
FMG-1	Miscellaneous surfaces indoors or covered, except those included below.	Solvent Cleaning SSPC-SP1	(3) Epoxy(x3)
FMG-2	Miscellaneous surfaces outdoors or exposed, except those included below.	Solvent Cleaning SSPC-SP1	(1) Epoxy/Aliphatic Polyur ethane
FMG-3	Buried steel piping.	Removal of oil, grease, soil and salts	(201) Joint Wrap
FMG-4	Miscellaneous buried surfaces.	Solvent Cleaning SSPC-SP1 followed by Brush-Off Blast Cleaning SSPC-SP7	(3) Epoxy(x3)
FMG-5	Surfaces submerged in water.	Solvent Cleaning SSPC-SP1 followed by Brush-Off Blast Cleaning SSPC-SP7	(102) Polyamide Cured Epoxy(x3)

C. **Coating System Schedule, Fire Hydrants, and Combination Air Valves:**

	Item	Surface Prep.	System No.
FH-1	Fire Hydrants.	Solvent Cleaning SSPC-SP1	(1) Epoxy/Aliphatic Polyur ethane
FAV-1	Combination Air Valves.	SSPC-SP6 Commercial Blast Cleaning	Epoxy/Aliphatic Polyurethane (1)

END OF
SECTION

SECTION 134713

CORROSION MONITORING / CATHODIC PROTECTION

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes installation of bonding across insulating devices, test stations, deep anode wells and rectifiers, as indicated in the plans and details, including electrical connections, installation of test stations, bond cables, exothermic welds, anodes, test leads, rectifiers, conduit, AC service to rectifiers, and all accessories required for a complete operable system, including testing the system after installation.

B. The WORK also includes coordination of assembly, installation and testing.

1.2 CODES AND STANDARDS

A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the COUNTY:

1. National Electric Code

B. The CONTRACTOR shall install each system component in a workmanlike manner and in strict conformance with the latest edition of the following standards:

1.	NEMA	National Electrical Manufacturers Association
2.	ASTM	American Society for Testing and Materials
3.	IEEE	Institute of Electrical and Electronic Engineers
4.	ANSI	American National Standard Institute
5.	ICEA	Insulated Cable Engineers Association
6.	OSHA	Occupational Safety and Health Administration
7.	NACE	National Association of Corrosion Engineers
8.	UL	Underwriters Laboratories

C. Where the drawings or these Specifications require a higher degree of workmanship or better quality of material than implied by the above codes and standards, these drawings and Specifications shall prevail.

1.3 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted to the COUNTY, prior to installation:

1. Catalog cuts, bulletins, brochures or data sheets for all equipment including test stations, wire/cable/test leads, exothermic welding equipment, anode assemblies, rectifiers, test station hardware and test boards, wire identifiers and any other equipment to be installed.

2. Certification that the equipment and materials proposed meets the Specifications and the intent of the Specifications.

1.4 OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL:

1. Operations and maintenance instructions.

2. List of spare parts recommended for 2 years' successful operation.

1.5 INTERFERENCE AND EXACT LOCATIONS

A. The locations of corrosion monitoring/cathodic protection equipment, devices, outlets and appurtenances as indicated are approximate only. The CONTRACTOR, subject to approval of the ENGINEER, shall determine exact locations.

B. The CONTRACTOR shall verify in the field, all data and final locations of work done under other Sections of the Specifications required for placing of the corrosion monitoring/cathodic protection, including installation of A.C. service or other electrical work.

C. In case of interference with other work or erroneous locations with respect to equipment or structures, the CONTRACTOR shall furnish all labor and materials necessary to complete the WORK in an acceptable manner.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials to be installed must be new and of a quality generally accepted by the industry and must comply with the codes and standards as specified in Section 1.2. Nothing in the drawings or Specifications is to be construed as permitting work not conforming to these codes and standards. Where larger size or better grade materials than required by the above-mentioned regulations and codes are specified, these drawings and Specifications shall have precedence. All equipment and materials supplied shall be similar to that which has been in satisfactory service for at least 5 years.

2.2 CONDUIT AND FITTINGS

A. The minimum conduit size shall be 3/4-inch unless otherwise indicated. Rigid steel conduit shall be galvanized conforming to UL 6. Rigid nonmetal conduit shall be PVC schedule 40 conduit approved for underground use.

B. Fittings for use with rigid steel conduit shall be galvanized cast ferrous metal, with gasketed covers, Crouse Hinds Condulets, Appleton Unilets, or equal. Rigid metallic conduit fittings shall be galvanized conforming to UL 514B.

C. Fittings for use with either rigid nonmetallic conduit or duct shall be PVC and shall have solvent weld type conduit connections. If such are not available, then the Specification for rigid steel fittings shall apply except in corrosive locations where PVC coating shall be provided.

D. Union couplings for conduits shall be the Ericson or Appleton type EC or O-Z Gedney 3-piece Type 4, or equal.

2.3 TEST STATION HOUSINGS - POST MOUNTED TEST STATIONS

A. The test station housings shall be made from 3-inch diameter, schedule 80 PVC pipe, 6 feet in length. The test head shall be a "Fink" test head, mounted at the top of the PVC post, as shown in the details.

2.4 TRAFFIC VALVE BOXES - FLUSH MOUNTED TEST STATIONS

A. The traffic valve box for test stations shall be G05 Traffic Box as manufactured by Christy Concrete Products, Inc., No. 1-RT Traffic Valve Box as manufactured by Brooks Products or approved equal. Traffic box covers for anode beds and test stations shall be cast iron with welded bead legend "CP TEST" or "ANODE".

2.5 TERMINAL BOARDS - FLUSH MOUNTED TEST STATIONS

A. Terminal boards for flush mounted test stations shall be "Fink" test heads, as shown in the details. Test boards shall be labeled as required to identify the piping to which the leads are connected. All hardware installed on the test boards shall be brass or bronze.

2.6 WIRE

A. Conductors shall consist of solid or stranded copper of the gauge indicated. Wire sizes shall be based on American Wire Gage (AWG). Copper wire shall be in conformance with ASTM Designations B3 and B8.

B. All wires terminating in a junction box or test station shall have a wire identifier attached within 4 inches of end of wire at terminal board, prior to backfill, as specified under "Wire Identification".

2.7 ANODE WIRES

A. The wire attached to the anodes shall be (AWG) stranded, single conductor, copper and insulated for 600 volts. Wire size shall be minimum No. 6 AWG Kynar for deep anode wells and shall conform to the requirements of ASTM D1248 Type 1, Class C, Grade 5. Connection of wire to the anode shall have a pulling strength, which shall exceed the tensile strength of the wire. Any damage to the wire insulation or anode shall require complete replacement of the wire and anode.

B. The anode supplier shall mark the reel holding the anode wire for shipment to the job site with the same anode numbering system used on the test records and the total length of attached anode wire.

C. Anode wires shall be of one continuous length from the anode connection to rectifier or anode splice box. Anode wires with the attached anode shall be shipped to the job site with the wire wound on a reel. The minimum core diameter of the reel shall be 5-1/2 inches. The anode wire insulation shall be free of surface damage such as nicks, abrasions, scratches, etc., in all respects throughout the entire length of the wire. Precaution shall be taken during fabrication, transportation and installation of the anodes to see that the wire is not kinked or sharply bent. Bends sharper than 2-1/2 inches in radius are not permissible.

D. All wires used for corrosion monitoring/cathodic protection systems shall be visually inspected for any damage to the insulation prior to and after installation by the CONTRACTOR. Any damage to the insulation will require replacement of the cable. Splicing of cables will not be permitted.

2.8 WIRE IDENTIFICATION

A. All test lead and drain cables shall be coded with circular brass stamped or engraved identifier or wrap around marker. The letters and numbers shall be printed, minimum 3/16-inch in size, and shall identify the piping to which the lead is connected.

B. Wire identifiers for anodes shall be the wrap around type with a high resistance to oils, solvents and mild acids. Marker shall fully encircle wire with imprinted alpha-numeric characters for pipe identification.

C. The following colors and minimum wire gauges have been used:

1.	Test Leads: Impressed Current System	#10 THHN	White
2.	Drain Cable: Impressed Current System	#6 HMWPE	Black
3.	Anode Leads: Impressed Current System	#6 Kynar	Black

4. Bond Cables:

At AC Insulators	#4 HMWPE	Black

2.9 EXOTHERMIC WELDS

A. Exothermic welds shall be provided for connecting cables to structures in strict accordance with the manufacturers' recommendations. Connections shall be made at locations indicated. Exothermic welds shall be Cadweld, as manufactured by Erico Products, Inc. or Thermoweld, or approved equal. Duxseal packing as manufactured by JM Clipper or approved equal shall be used where necessary to prevent leakage of molten weld metal.

B. The shape and charge of the exothermic weld shall be chosen based on the following parameters:

1. Pipe material
2. Pipe size
3. Wire material
4. Number of strands to be welded
5. Orientation of weld (vertical or horizontal)

C. All exothermic weld locations shall be coated with a coating, which is compatible with the pipeline coating. The area of the weld shall be coated with a suitable epoxy, as shown in the details, to provide protection to the area of the cadweld and any metal surface exposed during the welding.

2.10 MIXED METAL OXIDE CONTINUOUS ANODE FOR DEEP ANODE WELL

A. Active anode area shall be mixed metal oxide coated titanium, installed in a preassembled unit, including anode lead cables, attached to either end of the active area of the anode, using a waterproof connection. The active area of the anode shall be equipped with a perforated vent pipe. The assembly shall be equipped with a lowering rope and supplied with sufficient coke breeze to fill the annular space between the anode assembly and the drilled hole for the active area of the anode. The active area shall be 100-feet.

2.11 CALCINED COKE BREEZE

A. Backfill material for impressed current system anodes shall be calcined coke breeze with a resistivity of 25 ohm-cm or less when tested with an applied pressure of 2 pounds per square inch. The material shall conform to the following gradation requirements:

Sieve Size	Percent Passing
3/8	100 minimum
1/8	5 maximum

B. The impressed current system anode backfill shall have the following chemical properties:

Fixed carbon	98.0% minimum
Ash	0.5% maximum
Sulfur	5.0% maximum
Volatile matter	1.0% maximum
Moisture	1.0% maximum

2.12 PEDESTAL MOUNTED AIR COOLED RECTIFIERS

A. Rectifiers shall have a minimum 120 Volt Single-phase AC input and have a minimum rated DC output of 20 volts-20 amperes. Rectifiers shall be pedestal mounted. Rectifiers shall be manufactured by Matcor, Inc., or an approved equal.

B. Rectifier shall be supplied with a set of slide out racks for the transformer and stacks.

C. Rectifiers shall meet with the following specifications: NEMA Pub. No. MR-20-1958, reaffirmed by NEMA 1971 and 1975. Rectifiers shall be capable of operating continuously at the rated output current at any voltage from zero to 100 percent without damaging any rectifier components. Full rated DC output voltage shall be adjustable by not less than 20 equal steps from approximately 5 percent of rated voltage to full rated output. This adjustment may be accomplished with studs and link-bars or tap switches. If tap switches are used, they shall not carry over 50 percent of the nominal current rating assigned by the manufacturer. Rectifiers shall be designed to operate continuously at rated maximum voltage and current in ambient temperature of 45 degrees C without damage to the rectifier components. Cooling shall be accomplished by natural convection. Fan cooling is not acceptable for unattended equipment.

D. All rectifiers shall have overload protection. Protection from overload on the input shall be accomplished by molded case, fully magnetic circuit breakers on the incoming power lines. These circuit breakers shall hold at 100 percent of load and may trip between 101 percent and 125 percent of rated load. They shall trip at 125 percent of rated load. The trip point shall be unaffected by changes in ambient temperature. Trip handles of individual pole breakers shall be mechanically linked to open all lines when an overload occurs. Units shall be equipped with silicon stacks, overload protection shall be provided by a quick opening fuse in the transformer secondary.

E. Voltage surge protection for units equipped with silicon stacks shall be supplied by AC and DC lightning arresters and metal oxides varistors across all secondary lines to the stack and across the DC output of the rectifier. The metal oxide varistors must fire before the voltage surge reaches the peak inverse voltage rating of the diodes used in the stack. Transformers shall be isolation type with a grounded electrostatic shield between the primary and secondary windings. Dielectric strength of all insulating materials shall not be less than 2,000 volts RMS as tested for one minute and applied between windings and the transformer core. Magnetic wire insulation and layer insulation shall be rated no less than 155 degrees C. Magnetic wire insulation shall not show signs of softening or crazing after 24 hours immersion in any of the following chemicals: Naptha, Toluene, Ethyl Alcohol, Trichloro-Ethylene, Styrene Polyester, Butyl Acetate, Mild Acids, or Acetone. Impregnating varnish used shall meet the standards for 155 degrees C when tested according to AIEE test procedures. The transformer shall be preheated before dipping and baked after dipping. The transformer temperature rise, as measured by thermocouples within the transformer, shall not exceed 85 degrees C. The transformer efficiency shall not be less than 85 percent. The transformer voltage regulation shall not exceed 3 percent from full rated load to 1/4 of rated load when measured in accordance with the procedure described in MR-20-1958. Chokes and reactors shall meet the requirements listed for transformers.

F. Silicon stacks shall be equipped with silicon diodes rated a minimum of 800 peak inverse volts. Heat sinks shall be sized to keep diode junction and case temperatures from exceeding 100 degrees C under 45 degrees C ambient temperature conditions.

G. Separate voltmeter and ammeter shall be provided for monitoring rectifier output. Minimum meter width shall be 3-1/2 inches round or rectangular with minimum scale length of 2-7/8 inches. Meter movement shall be jewel and pivot D'Arsonval type. Taut band meters are not acceptable because of a tendency to break when jolted during shipment. Meter accuracy shall be a minimum of plus or minus 2 percent of full scale at 80 degrees F and shall be temperature compensated to vary no more than 1 percent per 10 degrees F temperature variation. Scale faces shall be metal or plastic. Ammeter shunt shall be block type mounted on the front panel for easy access. Current and millivolt ratings shall be clearly stamped on the shunt. Shunt accuracy shall be at least plus or minus 1 percent.

H. Electrical tests shall be performed by the manufacturer and recorded as listed below:

- AC Volts Input
- DC Amperes Input

- Apparent Watts Input
- True Watts Input
- Power Factor
- DC Volts Output
- DC Amperes Output
- DC Watts Output
- Conversion Efficiency
- Dielectric Strength
- Transformer Primary to Ground
- Transformer Secondary to Ground
- Transformer Primary to Secondary
- Stack AC to Ground
- Stack DC to Ground
- Ripple Voltage at Full Output

I. Rectifier shall be heavy steel or anodized aluminum swing open case, with white baked-enamel finish, and 10-inch standard leg support, or shall be suitable for post mounting.

PART 3 - EXECUTION

3.1 GENERAL

A. Upon completion of installation of all components as shown on the drawings and in accordance with these specifications, testing shall be performed to demonstrate that the installation has been completed and is in working order in conformance with the Contract Documents. In no case shall the testing be less than that outlined herein unless requested in writing by the CONTRACTOR and approved by the ENGINEER. The interim testing described herein shall be in addition to and not substitution for any required testing of individual items at the manufacturers' plant. CONTRACTOR shall provide testing of the system. The test data shall be submitted to the ENGINEER for acceptance to demonstrate that the system is in proper working order.

3.2 EXCAVATION AND BACKFILL

A. Buried wires shall have a minimum cover of 24 inches. The bottom of the trenches shall be covered with 1 inch of mortar sand prior to placing wires, insulation, anodes, coatings or other underground appurtenances.

B. Wire identification tags shall be placed on the wires prior to placing wire in conduit or backfilling.

3.3 TEST STATIONS

A. Test stations shall be placed at the locations indicated. The CONTRACTOR shall field verify final location of the test stations. Wire identifiers shall be placed on all wire prior to backfill and installation of test stations.

3.4 WIRES

A. Wires buried in the ground shall be laid straight, without kinks. Each wire run shall be continuous in length and free of joints or splices, unless otherwise approved. Care shall be taken during installation to avoid punctures, cuts or other damage to the wire insulation. Damage to insulation shall require replacement of the entire length of wire at the CONTRACTOR'S expense.

B. At least 18 inches of slack (coiled) shall be left for each conductor, at each test station housing. Slack in the wire shall be sufficient to allow removal of wire extension for testing. Wire shall not be bent into a radius of less than 8 times the diameter of the wire. Copper split bolts or other appropriate connection hardware shall be used for all test station connections.

C. Where buried cable is to be placed in existing conduit, the conduit must be of sufficient diameter to accommodate the additional cable. This shall be determined by the number and size of both the existing and new cable in accordance with all applicable codes and standards. This shall also apply where new cable is to be installed in new PVC conduit. PVC conduit shall be installed to a minimum depth of 24 inches below grade.

D. Red caution tape, 3 inches in width, or colorized slurry shall be installed above buried wire and conduits at a maximum depth of 18 inches below grade over the wire and conduit location.

3.5 WIRE IDENTIFICATION

A. Brass wire identifiers or wrap around cable markers shall be placed on the wires prior to backfill.

3.6 EXOTHERMIC WELD CONNECTIONS

A. Exothermic weld connections shall be installed in the manner and at the locations indicated. Coating materials shall be removed from the surface over an area of sufficient size to make the connection. The steel surface shall be cleaned to white metal by grinding or filing prior to welding the conductor. The use of resin impregnated grinding wheels will not be allowed. The conductor shall be welded to the pipe by the exothermic welding process with a copper sleeve fitted over the conductor. Only enough insulation shall be removed such that the copper conductor can be placed in the welding mold.

B. After the weld has cooled, all slag shall be removed and the metallurgical bond shall be tested for adherence to the pipe or casing. All defective welds shall be removed and replaced. All exposed surfaces of the copper and steel shall be covered with insulating materials as indicated. No connections to the piping shall be buried prior to inspection and approval of the ENGINEER.

3.7 COATING OF WELDS

A. The CONTRACTOR shall furnish all materials, clean surfaces and repair any damage to protective coatings and linings damaged as a result of the welding.

B. A coating shall be applied to all exothermic weld locations. The coating shall be an epoxy, as shown in the details. All surfaces must be clean and dry and free of oil, dirt, loose particles and all other foreign materials prior to application of the coating.

3.8 JOINT BONDS

A. Bond cables shall be provided across flexible couplings, A/C insulators and nonwelded joints on steel pipe, on cement mortar coated steel cylinder pipe joints and ductile iron pipe joints as necessary to ensure electrical continuity. Joint bonds shall be installed as indicated. A minimum of two bonds shall be installed per joint. Joint bonds shall not be installed immediately across dielectric flange kits but shall be required around appurtenances, which are isolated, in order to provide electrical continuity along the main pipeline.

3.9 DEEP ANODE WELL INSTALLATION

A. The CONTRACTOR shall obtain and pay for all fees and permits required for well drilling. CONTRACTOR shall log the well in accordance with local and State agency requirements.

B. Anodes shall be installed in the deep anode well at the approximate location indicated. All drilling shall be done in strict conformance to California State Bulletin Number 74 regulating the classification, construction and sealing of wells. In addition, a well permit shall be obtained by the CONTRACTOR from the local, state or federal agency, as required prior to well construction. The CONTRACTOR shall provide a grout seal for a minimum of 50 feet.

C. The impressed current system anode holes shall be drilled by means of a rotary drill rig using circulating water based drilling mud or air, as required. Holes shall be drilled to obtain a nominal 8-inch diameter anode well at a minimum. The well shall be drilled to the minimum depth indicated and shall be essentially straight and plumb. Drilling mud may be circulated through a portable sump or through a sump dug in the ground at the drill site. If a "dug sump" is used, it shall be emptied and backfilled upon completion. Backfilling shall be such that the sump is safe for vehicle traffic without settling. Drilling mud and cuttings shall be disposed by the CONTRACTOR at a suitable disposal site at no additional cost to the OWNER, unless it is determined that the cuttings contain hazardous materials. If hazardous materials are suspected, the cuttings will be tested and disposal and chain of custody would be the responsibility of the COUNTY.

D. When the hole has been drilled to specified depth, and in the presence of the ENGINEER, fresh water shall be circulated from the bottom of the hole to clear the hole of drilling mud and cuttings. The hole shall be flushed until fluid is thinned as much as possible without danger of cave-in. The ENGINEER shall determine the degree to which the hole is flushed. The hole shall be maintained full to the top with fresh water throughout the entire loading operations. Preparation of the impressed current system anode hole and loading of anodes and other equipment in the hole shall be done in the presence of the ENGINEER. Loading of the anode hole shall be begun early enough in the day to insure completion of all loading, including backfilling, to accommodate inspection by County Health inspectors.

E. Anode assemblies shall be lowered into the hole supported by the attached lead wires. The ENGINEER shall visually inspect the insulation on the anode lead wire for abrasion or other damage to the insulation and wire as the anode is lowered into place. Splices and/or any form of wire repair shall not be allowed on the anode lead wire from the point of connection at the anode to the top of the deep well anode bed hole. In the event that an anode must be retrieved after it has been lowered into the hole, the entire length of the anode lead wire shall be inspected by the ENGINEER for abrasion or other forms of damage to the insulation and wire. Anodes with damaged wires shall be rejected by the ENGINEER and shall not be reinstalled.

F. When an anode has been placed at specified depth, it shall be securely fixed in that position by tying the anode lead wire to a rack, sawhorse, etc., placed over or adjacent to the anode hole.

G. All anodes shall be loaded prior to coke breeze backfill. No anodes shall be buried until the ENGINEER has inspected the placement of the anodes and given permission to backfill.

H. Coke breeze shall be placed in the hole by pouring directly from the bag into the anode hole or by pumping. Pouring shall be at a steady rate and shall be slow enough to insure that the coke breeze does not bridge or block in the hole. The hole shall be kept completely full of water during placement of backfill. The top of the hole shall be kept free of floating coke breeze particles.

I. Settling of the backfill and coverage of the anode shall be determined by observing the measurement of anode current output or circuit resistance through a 12V DC power source circuit.

J. Backfill of the hole above the coke breeze column shall be sealed with 5 feet of sand. Following placement of the sand, the hole shall be sealed within 3 feet of the top with premixed grout or bentonite as specified in California State Bulletin Number 74. Backfill of the uppermost 3-foot portion of the anode hole shall consist of round drain rock as indicated. Round drain rock used for backfill shall be 3/4-inch to 1/2-inch diameter thoroughly washed to insure removal of sand and fines.

K. A concrete traffic box shall be set near the top of the anode hole for termination of the vent pipe. From the top of the anode hole, the anode leads shall be run to the rectifier location. Anode leads shall be permanently marked with cable identifiers.

3.10 WIRE CONNECTIONS

A. After installation, all wire connections shall be tested at the test station, junction box locations, or at rectifiers to ensure that they meet the requirements of the Contract Documents.

3.11 EXOTHERMIC WELDS

A. Exothermic welds shall be tested by the CONTRACTOR for adherence to the pipe or casing and for electrical continuity between the pipe or casing and wires. A 22-ounce hammer shall be used for adherence testing by striking a blow to the weld. Care shall be taken to avoid hitting the wires.

3.12 JOINT BOND TESTING

A. After installation, all joint bonds shall be tested for effectiveness. The testing shall be performed prior to backfill of the pipe and shall be verified upon completion of backfilling operations. Prior to backfilling, resistance shall be measured along the pipe segment to ensure electrical continuity of the piping.

3.13 SYSTEM CHECK-OUT

A. Upon completion of the installation, the CONTRACTOR shall provide testing of the system by a qualified corrosion engineer to ensure compliance with the Contract Documents. The testing shall include, but not be limited to the following, at the discretion of the ENGINEER, measurement of all anode currents and potentials, potentials of metallic pipelines prior to and after connection of anodes. Measurements shall be made at all test station locations. Any deficiencies of systems tested shall be reported to the ENGINEER and retesting of systems and repairs to the systems shall be at no additional cost to the COUNTY.

END OF SECTION

SECTION 311000

SITE PREPARATION

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The WORK of this Section includes measures required during the CONTRACTOR's initial move onto the Site to protect existing fences, houses, and associated improvements, streets, and utilities down-slope of construction areas from damage due to boulders, trees, or other objects dislodged during the construction process; clearing, grubbing and stripping; and regrading of certain areas to receive embankment fill.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 015526 – Traffic Control & Access

1.3 SITE INSPECTION

A. Prior to moving onto the Site, the CONTRACTOR shall inspect the Site conditions and review maps of the project site and off-site pipeline routes and facilities delineating the COUNTY's property and right-of-way lines.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRIMARY PROJECT SITE ACCESS

A. The CONTRACTOR shall develop any necessary access to the Site, including access barriers to prohibit entry of unauthorized persons.

B. Utility Interference: Where existing utilities interfere with the WORK, notify the utility owner and the PROJECT ENGINEER before proceeding in accordance with the General Conditions.

3.2 CLEARING, GRUBBING, AND STRIPPING

A. Construction areas shall be cleared of grass and weeds to at least a depth of six inches and cleared of structures, pavement, sidewalks, concrete or masonry debris, trees, logs, upturned stumps, loose boulders, and any other objectionable material of any kind which would interfere with the performance or completion of the WORK, create a hazard to safety, or impair the subsequent usefulness of the WORK, or obstruct its operation. Loose boulders within 10 feet of the top of cut lines shall be incorporated in landscaping or removed from the Site. Trees and other natural vegetation outside the actual lines of construction shall be protected from damage during construction, as directed by the COUNTY.

B. Within the limits of clearing, the areas below the natural ground surface shall be grubbed to a depth necessary to remove all stumps, roots, buried logs, and all other objectionable material. Septic tanks, drain fields, and connection lines and any other underground structures, debris or waste shall be removed if found on the Site. All objectionable material from the clearing and grubbing process shall be removed from the Site and wasted in approved safe locations.

C. The entire area to be affected by construction shall be stripped to a depth of 1.0 foot below the existing ground contours. The stripped materials shall be stockpiled and incorporated into landscaped

areas or other non-structural embankments.

D. Unless otherwise indicated, native trees larger than three inches in diameter at the base shall not be removed without the COUNTY'S approval. The removal of any trees, shrubs, fences, or other improvements outside of rights-of-way, if necessary for the CONTRACTOR's choice of means and methods, shall be arranged with the owner of the property, and shall be removed and replaced at no additional cost to the COUNTY.

3.3 OVEREXCAVATION, REGRADING, AND BACKFILL UNDER FILL AREAS

A. After the fill areas have been cleared, grubbed, and excavated, the areas to receive fill will require over-excavation, regrading, and backfill, consisting of the removal and/or stockpiling of undesirable soils. The ground surface shall be re-contoured for keying the fill and removing severe or abrupt changes in the topography of the Site. The overexcavated volumes to a level 1.0 foot below the existing ground contours shall be backfilled.

B. Any undesirable topsoil and colluvium shall be removed to the level designated by the COUNTY and stockpiled for subsequent use as the first material to be placed in the compacted fill.

END OF SECTION

SECTION 330524

STEEL PIPE (AWWA C200, MODIFIED)

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide mortar-lined and mortar-coated steel pipe, and/or mortar-lined and enamel/tape-coated steel pipe, and/or mortar lined-epoxy coated, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials, complete in place, in accordance with the Contract Documents.

B. A single pipe manufacturer shall be made responsible for furnishing all steel pipe and smaller diameter appurtenant steel pipe and specials, as required by the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 099000 – Protective Coatings
Section 312316 –Trenching, Backfill and Compaction
Section 330110 – Waterline Disinfection & Testing
Section 330509 – Piping, General
Section 331216 – Valves and Appurtenances
Section 331417 – Service Connections

1.3 CONTRACTOR SUBMITTALS

A. **Shop Drawings:** The CONTRACTOR shall submit Shop Drawings and laying diagrams of pipe, joints, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials in accordance with the requirements in Section 013300 - Contractor Submittals, and the following supplemental requirements:

1. Certified dimensional drawings of all fittings and appurtenances.

2. Joint and pipe/fitting wall construction details which indicate the type and thickness of cylinder; the position, type, size, and area of reinforcement; coating and lining holdbacks, manufacturing tolerances; and all other pertinent information required for the manufacture of the product. Joint details shall be submitted where deep bell or butt strap joints are required for control of temperature stresses.

3. Fittings and specials details such as elbows, wyes, tees, outlets, connections, test bulkheads, and nozzles or other specials which indicate amount and position of all reinforcement. All fittings and specials shall be properly reinforced to withstand the internal pressure, both circumferential and longitudinal, and the external loading conditions as indicated in the Contract Documents.

4. Material lists and steel reinforcement schedules which describe all materials to be utilized.

5. Line layout and marking diagrams which indicate the specific number of each pipe and fitting and the location of each pipe and the direction of each fitting in the completed line. In addition, the line layouts shall include: the pipe station and invert elevation at all changes in grade or horizontal alignment; the station and invert elevation to which the bell end of each pipe will be laid; all elements of curves and bends, both in horizontal and vertical alignment; and the limits within each reach of restrained and/or welded joints or of concrete encasement.

6. Full and complete information regarding location, type, size, and extent of all welds shall be shown on the Shop Drawings. The Shop Drawings shall distinguish between shop and field welds. Shop drawings shall indicate by welding symbols or sketches the details of the welded joints, and the

preparation of parent metal required to make them. Joints or groups of joints in which welding sequence or technique are especially important shall be carefully controlled to minimize shrinkage stresses and distortion.

7. Rubber gasket joint design and details

8. Drawings showing the location, design, and details of bulkheads (test plates) for hydrostatic testing of the pipeline, and details for removal of test bulkheads and repair of the lining.

9. Details and locations of closures for length adjustment and for construction convenience.

10. Detail drawings indicating the type, number, and other pertinent details of the slings, strutting, and other methods proposed for pipe handling during manufacturing, transport, and installation.

11. Manufacturer's written Quality Assurance/Control Program.

B. Design calculations shall be submitted to the PROJECT ENGINEER for review prior to manufacture of pipe specials.

C. **Certifications:** A certified affidavit of compliance shall be furnished for all steel plate specials and other products or materials furnished under this Section.

D. **Manufacturer's Qualifications:** Furnish a copy of manufacturer's certification by SPFA or LRQA and documentation of manufacturer's experience in fabricating AWWA C200 pipe.

E. **Certifications:** The CONTRACTOR shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, as specified in ANSI/AWWA C200 - Steel Water Pipe 6-inch and Larger, C203 - Coal Tar Protective Coatings and Linings for Steel Water Pipelines-Enamel and Tape-Hot Applied, and C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe – 4-inch and Larger-Shop Applied, respectively, and the following supplemental requirements:

1. Physical and chemical properties of all steel.
2. Hydrostatic test reports.
3. Results of production weld tests.
4. Sand, cement, and mortar tests.
5. Rubber gasket tests.

F. Performing and paying for sampling and testing necessary for certification are the CONTRACTOR'S responsibility.

1.4 QUALITY ASSURANCE

A. **Pipe and Specials Manufacturer Qualifications:** The pipe manufacturer shall be certified by the Steel Plate Fabricator's Association (SPFA) or Lloyd's Register Quality Assurance (LRQA) and shall be experienced in fabrication of AWWA C200 pipe of similar diameters, lengths, and wall thickness to this WORK. Experience shall be in the production facilities and personnel, not the name of the company that owns the production facility or employs the personnel.

B. **Tests:** Except as modified herein, materials used in the manufacture of the pipe shall be tested in accordance with the requirements of ANSI/AWWA C200 and C205, as applicable.

1. Joint gaskets shall be tested in accordance with ANSI/AWWA C200.

2. After the joint configuration is completed and prior to lining with-cement-mortar, each length of pipe of each diameter and pressure class shall be shop-tested and certified to a pressure of at least 80 percent of the yield strength of the steel.

C. Shop Testing of Steel Pipe Specials

1. If any special has been fabricated from straight pipe not previously tested and is of the type listed below, the special shall be hydrostatically tested with a pressure equal to 1-1/2 times the design working pressure: all bends, wyes, crosses, tees with side outlet diameter greater than 30 percent of the main pipe diameter, and manifolds.

2. All specials not required to be hydrostatically tested shall be tested by liquid dye penetrant inspection method in accordance with ASTM E 165 - Standard Test Methods for Liquid Penetrant Examination, Method A or the magnetic particle method in ASME Section VIII, Division 1, Appendix VI.

3. Reinforcing plates shall be tested by the solution method using approximately 40 psi air pressure introduced between the plates through a threaded test hole. Test hole shall be properly plugged following successful testing.

4. Any weld defects, cracks, leaks, distortion, or signs of distress during testing shall require corrective measures. Weld defects shall be gouged out and re-welded. After corrections, the special shall be retested.

5. Where welded test heads or bulkheads are used, extra length shall be provided to each opening of the special. After removal of each test head, the special shall be trimmed back to the design points with all finished plate edges ground smooth, straight, and prepared for the field joint.

6. Testing shall be performed before joints have been coated or lined.

D. The CONTRACTOR shall be responsible for performing and paying for said material tests. The COUNTY shall have the right to witness all testing conducted by the CONTRACTOR; provided, that the CONTRACTOR's schedule is not delayed for the convenience of the COUNTY.

E. Ultrasonic Examination

1. Steel plate that will be in welded joints or welded stiffener elements shall be examined ultrasonically for laminar discontinuities where both of the following conditions exist:

   a. Any plate in the welded joint has a thickness exceeding 1/4 inch.

   b. Any plate in the welded joint is subject to transverse tensile stress through its thickness during the welding or service.

2. Ultrasonic examination may be waived where joints are designated to minimize potential laminar tearing.

3. The ultrasonic examination shall be in accordance with ASTM A 578 - Straight Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications with a Level I acceptance standard.

4. Plates that are not in conformance with the acceptance criteria in ASTM A 578 may be used in the WORK if the areas that contain the discontinuities are a distance at least four times the greatest dimension of the discontinuity away from the weld joint.

F. In addition to those tests specifically required, the COUNTY may request additional samples of any material including lining and coating for testing by the COUNTY. The additional samples shall be furnished as part of the WORK.

G. **Field Testing:** Field testing shall conform to the requirements of Section 330110 – Waterline Disinfection & Pressure Testing.

H. **Welding Requirements:** Welding procedures used to fabricate and install pipe shall be prequalified under the provisions of ANSI/AWS D1.1 - Structural Welding Code-Steel or the ASME Boiler and Pressure Vessel Code, Section 9. Welding procedures shall be required for longitudinal and girth or spiral welds for pipe cylinders, spigot and bell ring attachments, reinforcing plates and ring flange welds, and plates for lug connections.

I. **Welder Qualifications:** Welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the methods and materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 or the ASME Boiler and Pressure Vessel Code, Section 9 by an independent local, approved testing agency not more than 6 months prior to commencing work on the pipeline. Machines and electrodes similar to those used in the WORK shall be used in qualification tests.

PART 2 - PRODUCTS

2.1 GENERAL

A. Mortar-lined and mortar-coated steel pipe shall conform to ANSI/AWWA C200 and C205 and mortar-lined and epoxy coated steel pipe shall conform to ANSI/AWWA C200 and C203, subject to the following supplemental requirements. The pipe shall be of the diameter and class indicated, shall be provided complete with rubber gaskets or welded joints, as indicated in the Contract Documents. For pipe 14 inches in diameter and larger, the nominal inside diameter after lining shall not be less than the diameter shown on the Drawings, allowing for tolerances according to ANSI/AWWA C200, C203 and C205. Pipe smaller than 14 inches in diameter may be furnished in standard outside diameters. When indicated as a minimum, wall thickness shall include zero minus tolerance.

B. Specials are defined as fittings, closure pieces, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials wherever located, and all piping above ground or in structures.

C. **Markings:** The manufacturer shall legibly mark all pipes and specials in accordance with the laying schedule and marking diagram. Each pipe shall be numbered in sequence and said number shall appear on the laying schedule and marking diagram in its proper location for installation. All pipe sections and fittings shall be marked at each end with top field centerline.

D. **Handling and Storage:** The pipe shall be handled as a minimum at the 1/3 points by use of wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe coating/exterior. The use of chains, hooks, or other equipment which might injure the pipe coating/exterior will not be permitted. Stockpiled pipe shall be suitably supported on padded skids, sand or earth berms free of rock exceeding 3 inches in diameter, sand bags, or suitable means so that the coating will not be damaged. The pipe shall not be rolled and shall be secured to prevent accidental rolling.

E. Handling of coal tar enamel/tape-coated pipe shall have the following additional requirements:

1. It shall be the responsibility of the CONTRACTOR and manufacturer of coal tar enamel/tape coated steel pipe to prevent damage of the coating which might be caused by handling and/or storage of the completed pipe at low temperature.

2. In no case shall coal tar enamel/tape coated steel pipe be handled when the ambient air temperature is below 0 degrees F. When the temperature is between 0 and 25 degrees F, the pipe may be handled, provided the pipe is heated to a temperature of 25 degrees F, as approved by the COUNTY.

3. In no case shall coal tar enamel/tape coated steel pipe be transported when the ambient air temperature is below 30 degrees F. When the ambient air temperature is between 25 degrees F and

30 degrees F, the pipe may be transported, provided special padded supports are used to absorb and minimize impact, as approved by the COUNTY.

F. The CONTRACTOR shall replace or repair damaged pipe.

G. **Strutting:** Adequate strutting shall be provided on all specials, fittings, and straight pipe so as to avoid damage to the pipe and fittings during handling, storage, hauling, and installation. For mortar-lined or mortar-coated steel pipe, the following requirements shall apply:

1. The strutting shall be placed as soon as practicable after the mortar lining has been applied and shall remain in place while the pipe is loaded, transported, unloaded, installed, and backfilled at the Site.

2. The strutting materials, size and spacing shall be adequate to support the earth backfill plus any greater loads which may be imposed by the backfilling and compaction equipment.

3. Any pipe damaged during handling, hauling, storage, or installation due to improper strutting shall be repaired or replaced.

H. **Laying Lengths:** Maximum pipe laying lengths shall be 40 ft with shorter lengths provided as required.

I. **Lining:** The pipe lining shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing, and roughness.

J. **Closures and Correction Pieces:** Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing indicated.

2.2 MATERIALS

A. **Mortar:** Materials for mortar shall conform to the requirements of ANSI/AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4-inch and Larger - Shop Applied; provided, that cement for mortar coating shall be Type II and mortar lining shall be Type II or V. Cement in mortar lining and/or coating shall not originate from kilns which burn metal-rich hazardous waste fuel, nor shall a fly ash or pozzolan be used as a cement replacement. Admixtures shall contain no calcium chloride.

B. **Steel for Cylinder and Fittings:** Pipe manufactured under ANSI/AWWA C200 shall satisfy the following requirements:

1. Minimum yield strength of steel is 42,000 psi.
2. Be manufactured by a continuous casting process
3. Be fully kilned
4. Be fine grain practice
5. Have maximum carbon content of 0.25 percent
6. Have maximum sulfur content of 0.015 percent
7. Have minimum elongation of 22 percent in a 2-inch gauge length.
8. Be in accordance with one of the following:

ASTM A 570 - Steel Sheet and Strip, Hot-Rolled, Structural Quality
ASTM A 36 - Carbon Structural Steel
ASTM A 283 - Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A 572 - High Strength Low-Alloy Columbium-Vanadium Structural Steel

C. **Coal Tar Enamel/Tape Coating:** Coal tar protective coatings shall be a coal tar enamel fibrous

glass mat and mineral glass felt wrap conforming to the requirements of ANSI/AWWA C203, Section 2, as modified by Appendix A, Section A1.5, thereto. The coal tar enamel coating system shall include:

1. Blasting
2. Priming
3. Coal tar enamel (finish coat)
4. Fibrous glass wrapping consisting of fibrous glass mat 0.018 inches thick placed in enamel while enamel is hot
5. Coal tar enameling, second coat
6. Fibrous glass or felt wrapping
7. Whitewashing, latex painting, or Kraft paper

2.3 DESIGN

A. **Design:** Except as otherwise indicated, materials, fabrication and shop testing of straight pipe shall conform to the requirements of ANSI/AWWA C200 - Steel Water Pipe 6 in and Larger, and shall conform to the dimensions of ANSI/AWWA C208 - Dimensions for Fabricated Steel Water Pipe Fittings. The minimum thickness of plate for pipe from which specials are to be fabricated shall be the greatest of those determined by the following 4 criteria:

1. Working and Transient Pressure Design

$$TT = \frac{P_w \times D/2}{Y/SS_{WW}} \qquad TT = \frac{P_t \times D/2}{Y/S_t}$$

Where: T = Steel cylinder thickness in inches
D = Outside diameter of steel cylinder in inches
P_w = Design working pressure in psi
P_t = Design transient pressure in psi
Y = Specified minimum yield point of steel in psi
S_w = Safety factor of 2.5 at design working pressure
S_t = Safety factor at design transient pressure; for elbows 1.875, and 2.0 for other specials

2. **Mainline Pipe Thickness:** Plate thickness for specials shall not be less than for the adjacent mainline pipe.

3. **Thickness based on Pipe Diameter:**

Nominal Pipe Diameter (in)	**Pipe Manifolds Piping Above Ground Piping Structures**	**Elbows Bends Reducers**
24 and under	3/16-in	10-ga
25 to 48	1/4-in	1/4-in
over 48	5/16-in	5/16-in

B. Specials installed on saddle supports shall be designed to limit the longitudinal bending stress to a maximum of 10,000 psi. Design shall be in accordance with the provisions of Chapter 7 of AWWA M-11.

2.4 SPECIALS AND FITTINGS

A. General

1. **Mortar:** Materials for mortar shall conform to the requirements of ANSI/AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4-inch and Larger - Shop Applied; provided, that cement for mortar coating shall be Type [II] [V], and mortar lining shall be Type II or V. Cement in mortar lining and coating shall not originate from kilns which burn metal-rich hazardous waste fuel, nor shall a fly ash or pozzolan be used as a cement replacement. Admixtures shall contain no calcium chloride.

2. Reinforcement for wyes, tees, outlets, and nozzles shall be designed in accordance with AWWA Manual M-11. Reinforcement shall be designed for the design pressure indicated and shall be in accordance with the Drawings. Specials and fittings shall be equal in pressure design strength and shall have the same lining and coating as the adjoining pipe. Unless otherwise indicated, the minimum radius of elbows shall be 2.5 times the pipe diameter and the maximum miter angle on each section of the elbow shall not exceed 11-1/4 degrees.

B. Specials and fittings that cannot be mechanically lined and coated shall be lined and coated by hand-application using the same materials as used for the pipe and in accordance with the applicable AWWA or ASTM Standards, as modified by the applicable pipe section in these Specifications. Coating and lining applied in this manner shall provide protection equal to that for the pipe. Fittings may be fabricated from pipe that has been mechanically lined and/or coated. Areas of lining and coating that have been damaged by such fabrication shall be repaired by hand-applications.

C. Access manholes with covers shall be as indicated. Threaded outlets shall be forged steel suitable for 3000 psi service, and shall be as manufactured by Vogt or equal.

D. Moderate deflections and long radius curves may be made by means of beveled joint rings, by pulling standard joints, by using short lengths or pipe, or a combination of these methods; provided that pulled joints shall not be used in combination with bevels. The maximum total allowable angle for beveled joints shall be 5 degrees per pipe joint. Bevels shall be provided on the bell ends. Mitering of the spigot ends will not be permitted. The maximum allowable angle for pulled joints shall be in accordance with the manufacturer's recommendations or the angle which results from a 3/4-inch pull out from normal joint closure, whichever is less. All horizontal deflections or fabricated angles shall fall on the alignment. In congested city streets or at other locations where underground obstructions may be encountered, the chord produced by deflecting the pipe shall be no further than 6 inches from the alignment indicated.

E. Vertical deflections shall fall on the alignment and at locations adjacent to underground obstructions, points of minimum earth cover, and pipeline outlets and structures. The pipe angle points shall match the angle points indicated.

F. Outlets, Tees, Wyes, and Crosses

1. Outlets 12-inch and smaller may be fabricated from Schedule 30 or heavier steel pipe in the standard outside diameters, i.e., 12-3/4-inch, 10-3/4-inch, 8-5/8-inch, 6-5/8-inch, and 4-1/2-inch. Minimum plate thickness for reinforcements shall be 10-gauge.

2. The design of outlet reinforcement shall be in accordance with the procedures given in Chapter 13 of AWWA Manual M-11, and the design pressures and factors of safety above.

3. In lieu of saddle or wrapper reinforcement as provided by the design procedure in Manual M-11, pipe or specials with outlets may be fabricated in their entirety of steel plate having a thickness equal to the sum of the pipe wall plus the required reinforcement.

4. Where Manual M-11 requires the design procedure for crotch plate reinforcement, such reinforcement shall be provided.

5. Outlets shall be fabricated so that there is always at least a 12-inch distance between the outer edge of the reinforcing plate and any field welded joints. For outlets without reinforcing plates, outlets shall penetrate the steel cylinders so that there is at least a 12-inch clearance between the outlet and any field welded joints.

G. Tees, wyes, crosses, elbows, and manifolds shall be fabricated so that the outlet clearances and reinforcing plates from any weld joints are a minimum of 5 times cylinder thickness or 2 inches, whichever is greater. Longitudinal weld joints in adjacent cylinder sections shall be oriented so that there is a minimum offset of 5 times cylinder thickness or 2 inches, whichever is greater.

H. **Steel Welding Fittings:** Steel welding fittings shall conform to ASTM A 234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

I. **Ends for Mechanical-Type Couplings:** Except as otherwise indicated, where mechanical-type couplings are indicated, the ends of pipe shall be banded with Type C collared ends using double fillet welds. Where pipe 12-inch and smaller is furnished in standard schedule thicknesses, and where the wall thickness equals or exceeds the coupling manufacturer's minimum wall thickness, the pipe ends may be grooved.

J. Lining shall conform to the requirements of ANSI/AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 in and Larger - Shop Applied, for lining of specials.

K. **Coating:** All requirements pertaining to thickness and application of coating of adjacent straight pipe shall apply to specials. Unless otherwise indicated, the coating on the buried portion of a pipe section passing through a structure wall shall extend to the center of the wall, or to a wall flange, if one is indicated. Pipe above ground or in structures shall be field-painted in accordance with Section 099000 - Protective Coatings.

L. **Marking:** A mark indicating the true vertical axis of the special shall be placed on the top and bottom of the special.

2.5 PIPE

A. **General:** The pipe shall be steel pipe, mortar-lined and mortar-coated, tape-coated, with rubber gasketed or field welded joints as indicated. The pipe shall consist of a steel cylinder, either shop-lined or lined-in-place with portland cement-mortar with an exterior coating of cement-mortar.

B. The pipe shall be designed, manufactured, tested, inspected, and marked according to applicable requirements previously stated and, except as hereinafter modified, shall conform to ANSI/AWWA C200. Flanged joints shall conform to the requirements of AWWA C207.

C. **Pipe Dimensions:** The pipe shall be of the diameter and minimum wall thickness indicated. In no case shall the wall thickness be less than 0.125 inch. Minimum wall thickness shall include zero minus mill tolerance.

D. **Fitting Dimensions:** The fittings shall be of the diameter and class indicated.

E. Joint Design.

1. Unless indicated otherwise, the standard field joint for cement mortar lined and coated steel pipe shall be a lap welded joint. Single-butt welded or butt-strap joints shall be used only where required for closures or where indicated.

2. Unless indicated otherwise, the standard field joint for mortar lined and coal tar enamel/tape coated pipe shall be a rubber gasket joint. Welded joints shall be provided where indicated. Butt-strap joints shall be used only where required for closures or where indicated.

F. Lap joints prepared for field welding shall be in accordance with ANSI/AWWA C200. The method

used to form, shape, and size bell ends shall be such that the physical properties of the steel are not substantially altered. Unless otherwise approved by the COUNTY, bell ends shall be formed by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. Faying surfaces of the bell and spigot shall be essentially parallel, but in no case shall the bell slope vary more than 2 degrees from the longitudinal axis of the pipe.

G. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself, it will provide watertight joints under all operating conditions when properly installed. The CONTRACTOR shall require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted. Unless otherwise approved by the COUNTY, bell ends shall be formed by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. No process will be permitted in which the bell is formed by rolling.

H. Shop-applied interior linings and exterior coatings shall be held back from the ends of the pipe as indicated or as otherwise acceptable to the COUNTY.

I. **Restrained Joints:** Located where indicated, restrained joints shall be field-welded joints, either single, or inside and outside lap-weld, or butt-weld, or butt-straps as indicated. Designs shall include stresses created by the greater of:

1. Temperature differential of 40 degrees F plus poisson's effect in combination with hoop stress, or;

2. Thrust due to bulkheads, bends, reducers, and line valves resulting from working pressure in combination with hoop stress.

For field welded joints on cement mortar lined and coated pipe, design hoop stresses shall not exceed 50 percent of the allowable yield stress of the material or 18,000 psi, whichever is smaller. For mortar lined and coal tar enamel/tape coated pipe, design hoop stresses shall not exceed 50 percent of the allowable yield stress of the material or 21,000 psi, whichever is smaller. At the CONTRACTOR's option, the steel cylinder area may be progressively reduced from the point of maximum thrust to the end of the restrained length.

2.5 CEMENT-MORTAR LINING

A. **Cement-Mortar Lining for Shop Application:** Unless indicated otherwise, interior surfaces of all pipe, shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C205. During the lining operation and thereafter, the pipe shall be maintained in a round condition by suitable bracing or strutting. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found defective at the Site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.

B. The minimum lining thickness and tolerance shall be in accordance with ANSI/AWWA C205.

C. The pipe shall be left bare as indicated where field joints occur. Ends of the linings shall be left square and uniform. Feathered or uneven edges will not be permitted.

D. Defective linings, as determined by the COUNTY, shall be removed from the pipe wall and shall be replaced to the full thickness required. Defective linings shall be cut back to a square shoulder in order to avoid feather edged joints.

E. The progress of the application of mortar lining shall be regulated in order that all hand work, including the repair of defective areas is cured in accordance with the provisions of ANSI/AWWA C205. Cement-mortar

for patching shall be the same materials as the mortar for machine lining, except that a finer grading of sand and mortar richer in cement shall be used when field inspection indicates that such mix will improve the finished lining of the pipe.

F. **Cement-Mortar Lining for Field Application:** The materials and design of in-place cement-mortar lining shall be in accordance with ANSI/AWWA C602 - Cement-Mortar Lining of Water Pipeline-4in and Larger-Shop Applied. The minimum lining thickness and finished inside diameter shall be as indicated for shop-applied cement-mortar lining.

G. Protection of Pipe Lining/Interior: For all pipe and fittings with plant-applied or cement-mortar linings, the CONTRACTOR shall provide a 12 mil polyethylene sheet or other suitable bulkhead on the ends of the pipe and on all special openings to prevent drying out of the lining. All bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

2.6 EXTERIOR COATING OF PIPE

A. **Exterior Coating of Exposed Piping:** The exterior surfaces of pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of primer compatible with the finish coating required by Section 099000 - Protective Coatings.

B. **Exterior Cement Mortar Coating of Buried Piping:** Pipe for buried service, including bumped heads, shall be coated with a 1-inch minimum thickness of reinforced cement-mortar coating. Unless otherwise indicated, exterior surfaces of pipe or fittings passing through structure walls shall be cement-mortar coated from the center of the wall or from the wall flange to the end of the underground portion of pipe or fitting. The coating shall be reinforced with a spiral wire reinforcement or welded wire fabric in accordance with ANSI/AWWA C205. The welded wire fabric shall be securely fastened to the pipe with welded clips or strips of steel. The wire spaced 2 inches on centers shall extend around the circumference of the pipe. The ends of reinforcement strips shall be lapped 4 inches and the free ends tied or looped to assure continuity of the reinforcement.

C. **Exterior Coal Tar Enamel/Tape Coating of Buried Piping:** Coal tar enamel/tape coating of pipe for buried service shall be applied in accordance 099000- Protective Coatings with ANSI/AWWA C203 as modified herein. Unless otherwise indicated, exterior surfaces of pipe or fittings passing through structure walls shall be coated from the center of the wall or from the wall flange to the end of the underground portion of pipe or fitting. Coal tar enamel/tape coating of pipe for buried service shall be applied in accordance with ANSI/AWWA C203 as modified herein.

2.7 PIPE APPURTENANCES

A. Pipe appurtenances shall be in accordance with the requirements of applicable sections of the specifications. Access manholes with covers shall be as indicated, installed during fabrication, not in the field. Threaded outlets shall be forged steel suitable for 3000 psi service, and shall be as manufactured by Vogt, or equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Installation shall conform to the requirements of AWWA M23, instructions furnished by the pipe manufacturer, and to the supplementary requirements herein. Wherever the provisions of this Section and the aforementioned requirements are in conflict, the more stringent provision shall apply.

B. The CONTRACTOR shall provide all fittings, closure pieces, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials, bolts, nuts, gaskets, jointing materials, and all other appurtenances as required to provide a complete and workable installation. Where pipe support details are indicated, the supports shall conform thereto and shall be placed as indicated; provided, that the support for all

exposed piping shall be complete and adequate regardless of whether or not supporting devices are specifically indicated. Where indicated, concrete thrust blocks and welded joints shall be provided. At all times when the WORK of installing pipe is not in progress, openings into the pipe and the ends of the pipe in trenches or structures shall be kept tightly closed to prevent entrance of animals and foreign materials. The CONTRACTOR shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source, shall assume full responsibility for any damage due to this cause, and shall at its own expense restore and replace the pipe to its required condition and grade if it is displaced due to floating. The CONTRACTOR shall maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until acceptance by the COUNTY.

C. Laying, jointing, testing for defects and for leakage shall be performed in the presence of the COUNTY, and shall be subject to approval before acceptance. Material found to have defects will be rejected and the CONTRACTOR shall promptly remove such defective materials from the Site.

D. The CONTRACTOR shall determine the location of existing underground utility structures in the vicinity of proposed pipe installation prior to excavation. All existing above and below ground structures within the work area shall be protected in place unless indicated otherwise on the Construction Drawings.

E. Whenever the WORK is not actively in progress, the open ends of all installed pipe shall be plugged or capped with bulkhead mechanical joint end cap to prevent the entry of animals, water, or other undesirable substances.

3.2 HANDLING AND STORAGE

A. Pipe and fittings shall be carefully handled and protected against damage to lining and coating/interior and exterior surfaces, impact shocks, and free fall. The pipe shall be handled as a minimum at the 1/3 points by use of wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe coating/exterior. The use of chains, hooks, or other equipment which might injure the pipe coating/exterior will not be permitted Pipe shall not be placed directly on rough ground but shall be supported in a manner which will protect the pipe against injury whenever stored at the Site or elsewhere. Pipe shall be stored at the Site in accordance with the requirements stated: Stockpiled pipe shall be suitably supported on padded skids, sand or earth berms free of rock exceeding 3 inches in diameter, sand bags, or suitable means so that the coating will not be damaged. The pipe shall not be rolled and shall be secured to prevent accidental rolling.. No pipe shall be installed when the lining or coating/interior or exterior surfaces show cracks that may be harmful as determined by the COUNTY. Such damaged lining and coating/interior and exterior surfaces, shall be repaired or a new undamaged pipe shall be provided.

B. The CONTRACTOR, shall inspect each pipe and fitting to insure that there are no damaged portions of the pipe. The CONTRACTOR shall remove or smooth out any burrs, gouges, weld splatter, or other small defects prior to laying the pipe. Pipe damaged prior to Substantial Completion shall be repaired or replaced.

3.3 INSTALLATION OF PIPE AND SPECIALS

A. Trenches shall be in a reasonably dry condition when the pipe special is laid. Necessary facilities including slings shall be provided for lowering and properly placing the pipe sections in the trench without damage. The pipe and specials shall be laid to the line and grade indicated and shall be closely jointed to form a smooth flow line. Immediately before placing each section of pipe in final position for jointing, the bedding shall be checked for firmness and uniformity of surface.

B. Pipe shall be laid directly on the imported bedding material. No blocking will be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid. Bell holes shall be formed at the ends of the pipe to prevent point loading at the bells or couplings. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.

C. **Installation Tolerances:** Each section of pipe shall be laid in the order and position shown on the laying diagram and in accordance with the following:

1. Each section of pipe having a nominal diameter less than 48 inches shall be laid to line and grade, within plus or minus 2 inches horizontal deviation and plus or minus 1-inch vertical deviation.

2. Each section of pipe having nominal diameter 48 inches and larger shall be laid to line and grade, within plus or minus 5 percent of diameter horizontal deviation and plus or minus 2.5 percent of diameter vertical deviation.

3. In addition to the horizontal and vertical tolerances above, lay the pipe so that no high or low points other than those on the laying diagram are introduced.

D. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the COUNTY may change the alignment and/or the grades. Such change shall be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 75 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misfit any amount which will be detrimental to the strength and water tightness of the finished joint. In all cases the joint opening, before finishing with the protective mortar inside the pipe, or prior to applying in-place mortar lining, shall be the controlling factor.

E. Except for short runs which may be permitted by the COUNTY, pipes shall be laid uphill on grades that exceed 10 percent. Pipe that is laid on a downhill grade shall be blocked and held in place until sufficient support is furnished by the following pipe to prevent movement. Bends shall be installed as indicated.

F. Pipe struts shall be left in place until backfilling operations have been completed for pipe 42 inches in diameter and larger. Struts in pipe smaller than 42 inches may be removed immediately after laying. A laboratory selected and paid by the COUNTY may monitor pipe deflection by measuring pipe inside diameter before struts are removed and 24 hours after struts are removed. Pipe deflection shall not exceed 2 percent 24 hours after the struts are removed. After the backfill has been placed, the struts shall be removed and shall remain the property of the CONTRACTOR.

G. **Work Stoppage:** At the end of each working day, CONTRACTOR shall plug or cap the open ends of all unfinished pipelines with securely bolted mechanical joint plugs, mechanical joint end caps, or blind flanges. If Pipe is subject to flooding, pipe shall be anchored as precaution against flotation. Trenches shall be backfilled in accordance with the COUNTY Standards and Specifications.

H. **Pipe and Specials Protection:** The openings of pipe and specials where the pipe and specials have been mortar lined in the shop shall be protected with suitable bulkheads to maintain a moist atmosphere and to prevent unauthorized access by persons, animals, water, or any undesirable substance. The bulkheads shall be so designed to prevent drying out of the interior of the pipe. The CONTRACTOR shall introduce water into the pipe to keep the mortar moist where moisture has been lost due to damaged bulkheads. At all times, means shall be provided to prevent the pipe from floating due to water in the trench from any source. Pipe which has floated shall be repaired, including restoration to original condition and grade.

I. **Pipe Cleanup:** As pipe laying progresses, the CONTRACTOR shall keep the pipe interior free of all debris. The CONTRACTOR shall completely clean the interior of the pipe of all sand, dirt, mortar splatter, and any other debris following completion of pipe laying, pointing of joints, and any necessary interior repairs prior to testing and disinfecting the completed pipeline.

3.2 RUBBER GASKETED JOINTS

A. **Rubber Gasketed Joints:** Immediately before jointing pipe, the spigot end of the pipe shall be thoroughly cleaned, and a clean rubber gasket lubricated with a non-toxic vegetable-based lubricant shall be placed in the spigot groove. The lubricant shall be a compound listed as in compliance with NSF Standard 61.

The volume of the gasket shall be "equalized" by moving a metal rod between the gasket and the spigot ring around the full circumference of the spigot ring. The bell of the pipe already in place shall be carefully cleaned and lubricated. The spigot of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper position. Tilting of the pipe to insert the spigot into the bell will not be permitted. After the pipe units have been joined, a feeler gage shall be inserted into the recess and moved around the periphery of the joint to detect any irregularity in the position of the rubber gasket. If the gasket cannot be "felt" all around, the joint shall be disassembled. The joint shall be reassembled with a new gasket.

3.3 WELDED JOINTS

A. **General:** Field welded joints shall be in accordance with ANSI/AWWA C206 - Field Welding of Steel Water Pipe.

B. Where exterior welds are performed, adequate space shall be provided for welding and inspection of the joints.

C. Butt straps shall be as indicated.

D. After the pipe and joint are properly positioned in the trench, the length of pipe between joints shall be backfilled to at least one foot above the top of the pipe. Care shall be exercised during the initial backfilling to prevent movement of the pipe and to prevent any backfill material from being deposited on the joint.

E. For coal tar enamel/tape coated pipe, a heat resistant shield shall be draped over at least 24 inches of coating beyond the holdback on both sides of the weld during welding to avoid damage to the coating by hot weld splatter. Welding grounds shall not be attached to the coated part of the pipe

F. To control temperature stresses, the unbackfilled joint areas of the pipe shall be shaded from the direct rays of the sun by the use of properly supported awnings, umbrellas, tarpaulins, or other suitable materials for a minimum period of 2 hours prior to the beginning of the welding operation and until the weld has been completed. Shading materials at the joint area shall not rest directly on the pipe but shall be supported to allow air circulation around the pipe. Shading of the pipe joints need not be performed when the ambient air temperature is below 45 degrees F.

G. **Shrinkage Control Joints:** At intervals not exceeding 250 feet along welded reaches of the pipeline and at the first regular lap-welded field joints outside concrete encasements and structures, the pipe shall be laid with an initial lap of not less than 1-inch greater than the minimum lap dimension. The welding of each such shrinkage control joint shall be performed when the temperature is approximately the lowest during the 24-hour day, after at least 250 feet of pipe have been laid and the joints have been welded ahead of and in back of the shrinkage control joint, and after backfill has been completed to at least 1-foot above the top of the pipe ahead of and in back of the shrinkage control joint. Where shrinkage control joints occur in a traveled roadway or other inconvenient location, the location of the shrinkage control joint may be adjusted, as acceptable to the COUNTY.

H. Prior to the beginning of the welding procedure, any tack welds used to position the pipe during laying shall be removed. Any annular space between the faying surfaces of the bell and spigot shall be equally distributed around the circumference of the joint by shimming, jacking, or other suitable means. The weld shall then be made in accordance with ANSI/AWWA C206. Where more than one pass is required, each pass except the first and final one shall be peened to relieve shrinkage stresses; and all dirt, slag, and flux shall be removed before the succeeding bead is applied.

I. Prior to butt welding, the pipe and joint shall be properly positioned in the trench using line up clamps so that, in the finished joint, the abutting pipe sections shall not be misaligned more than 1/16-inch.

J. **Joints:** The pipe ends shall be cut straight on joints where butt straps are used for realignment, adjustment, or deflection, and fillet welds shall be made as indicated.

K. Full circumference lap joint welds shall be performed inside and outside for steel pipe 24-inches and larger. Joints shall be either single-butt welded or lap welded on the outside of pipe for steel pipe less than 24 inches in diameter. Unless double fillet welds are indicated, field welded lap joints shall be made on the outside of the pipe.

L. Unless double fillet welds are indicated, field welded lap joints may, at the CONTRACTOR option, be made on either the inside or the outside of the pipe.

M. **Inspection of Field Welded Joints:** An independent testing laboratory acceptable to the COUNTY but paid by the CONTRACTOR shall inspect the joints. Inspection shall be as soon as practicable after the welds are completed.

1. Fillet welds shall be tested by the Magnetic Particle Inspection Method in accordance with ASME Section VIII, Division 1, Appendix VI.

2. In addition, double fillet welds on butt strap joints shall be tested by the soap solution method using approximately 40 psi air pressure introduced between the plates through a threaded hole as indicated. Test holes shall be plugged by a threaded plug or welding following successful testing.

3. Butt welds shall be inspected by radiographic methods in accordance with API Standard 1104.

N. Following tests of the joint, the exterior joint spaces shall be coated in accordance with these specifications after which backfilling may be completed.

O. **Repair of Welds:** Welds that are defective shall be repaired by the CONTRACTOR to meet the requirements of the applicable sections of these specifications. Defects in welds or defective welds shall be removed, and that section of the joint shall then be re-welded. Only sufficient removal of defective material that is necessary to correct the defect is required. After the repair is made, the joint shall be checked by repeating the original test procedure. Welds deficient in size shall be repaired by adding weld metal.

3.4 JOINT COATING AND LINING

A. **General:** The interior and exterior joint recesses shall be thoroughly wiped clean and all water, loose scale, dirt, and other foreign material shall be removed from the inside surface of the pipe. The grout for joint coating and lining for cement mortar coated pipe shall be cement grout in accordance with Section 036000 - Grout, except that composition shall be one part cement to two parts sand and sufficient water for dry-pack consistency for joint linings and thick cream consistency for joint coatings. Cement, sand, and water shall comply with Section 036000 - Grout.

B. **Joint Coating of Cement Mortar Coated Pipe:** After the pipe has been laid and after sufficient backfill has been placed between the joints to hold the pipe securely in place, the outside annular space between pipe sections shall be completely filled with grout formed by the use of polyethylene foam-lined fabric bands. The grout space shall be flushed with water prior to filling so that the surface of the joint to be in contact with the grout will be thoroughly moistened when the grout is poured. The joint shall be filled with grout by pouring from one side only, and shall be rodded with a wire or other flexible rod or vibrated so that the grout completely fills the joint recess by moving down one side of the pipe, around the bottom of the pipe and up the opposite side. Pouring and rodding the grout shall be continued to allow completion of the filling of the entire joint recess in one operation. Care shall be taken to leave no unfilled space. Grouting of the outside joint spaces shall be kept as close behind the laying of the pipe as possible except that in no case shall grouting be closer than 3 joints of the pipe being laid.

C. **Joint Coating of Shop-Applied Coal Tar Enamel/Tape Coated Pipe:** Joints shall be coated using heavy duty joint wrap in accordance with Section 099000 - Protective Coatings.

D. All joints will be tested by the with an electrical flaw detector capable of at least a 12,000

volt output, furnished by the CONTRACTOR. The tests will be made using a voltage of 6,000 to 7,000 volts. Holidays shall be repaired by the CONTRACTOR at no expense to the COUNTY.

E. **Coating Repair:** Coating repair shall be made using heavy duty joint wrap and primer in accordance with Section 099000 - Protective Coatings.

F. **Coating of Fittings and Specials:** Fittings and specials shall be coated using heavy duty joint wrap in accordance with Section 099000 - Protective Coatings.

G. **Grout Bands (Diapers):** The grout bands or heavy-duty diapers shall be polyethylene foam-lined fabric with steel strapping of sufficient strength to hold the fresh mortar, resist rodding of the mortar, and allow excess water to escape. The foam plastic shall be 100 percent closed cell, chemically inert, insoluble in water and resistant to acids alkalies and solvents, and shall be Dow Chemical Company, Ethafoam 222, or equal.

H The fabric backing shall be cut and sewn into 9-inch wide strips with slots for the steel strapping on the outer edges. The polyethylene foam shall be cut into strips 6 inches wide and slit to a thickness of 1/4-inch which will expose a hollow or open cell surface on one side. The foam liner shall be attached to the fabric backing with the open or hollow cells facing towards the pipe. The foam strip shall cover the full interior circumference of the grout band with sufficient length to permit an 8-inch overlap of the foam at or near the top of the pipe joint. Splices to provide continuity of the material will be permitted. The polyethylene foam material shall be protected from direct sunlight.

I. The polyethylene foam-lined grout band shall be centered over the joint space with approximately equal widths extending over each pipe end and securely attached to the pipe with the steel straps. After filling the exterior joint space with grout, the flaps shall be closed and overlapped in a manner that fully encloses the grout with polyethylene foam. The grout band shall remain in position on the pipe joint.

J. **Joint Lining:** After the backfill has been completed to final grade, the interior joint recess shall be filled with grout. The grout shall be tightly packed into the joint recess and troweled flush with the interior surface. All excess shall be removed. At no point shall there be an indentation or projection of the mortar exceeding 1/16-inch. With pipe smaller than 24 inches in diameter, before the spigot is inserted into the bell, the bell shall be daubed with grout. The joint shall be completed and excess mortar on the inside of the joint shall be swabbed out.

3.5 INSTALLATION OF PIPE APPURTENANCES

A. **Protection of Appurtenances:** Where the joining pipe is concrete or coated with cement mortar, buried appurtenances shall be coated with a minimum thickness of one inch of cement mortar having one part cement to not more than 2 parts plaster sand. Where the joining pipe is coal tar enamel/tape coated, buried appurtenances shall be coated with Trenton Wax Tape #1 in accordance with Section 330509-Piping General.

B. **Installation of Valves:** Valves shall be handled in a manner to prevent any injury or damage to any part of the valve. Joints shall be thoroughly cleaned and prepared prior to installation. The CONTRACTOR shall adjust stem packing and operate each valve prior to installation to insure proper operation. Valves shall be installed so that the valve stems are plumb and in the location indicated.

C. Buried valves and flanges shall be coated and protected in accordance with Section 099000 - Protective Coatings.

D. **Installation of Flanged Joints:** Before the joint is assembled, the flange faces shall be thoroughly cleaned of all foreign material with a power wire brush. The gasket shall be centered and the connecting flanges drawn up watertight without unnecessarily stressing the flanges. Gaskets shall be 1/8 inch thick for steel pipe 14 inches in diameter and greater. Bolts shall be tightened in a progressive diametrically opposite sequence and torqued with a suitable, approved, and calibrated torque wrench. Clamping torque shall be applied to the nuts only. Ring type non-asbestos gaskets shall be applied to the inside face of blind flanges with adhesive.

E. **Insulated Joints:** Insulated joints and appurtenant features shall be provided as indicated. The CONTRACTOR shall exercise special care when installing these joints to prevent electrical conductivity across the joint. After the insulated joint is completed, an electrical resistance test shall be performed by the CONTRACTOR. Should the resistance test indicate a short circuit, the CONTRACTOR shall remove the insulating units to inspect for damage, replace all damaged portions, and reassemble the insulating joint. The insulated joint shall then be retested to assure proper insulation.

F. **Flexible Coupled Joints:** When installing flexible couplings, care shall be taken that the connecting pipe ends, couplings and gaskets are clean and free of all dirt and foreign matter with special attention being given to the contact surfaces of the pipe, gaskets, and couplings. The couplings shall be assembled and installed in conformity with the recommendation and instruction of the coupling manufacturer.

G. Wrenches used in bolting couplings shall be of a type and size recommended by the coupling manufacturer. Coupling bolts shall be tightened so as to secure a uniform annular space between the follower rings and the body of the pipe with all bolts tightened approximately the same amount. Diametrically opposite bolts shall be tightened progressively and evenly. Final tightening shall be done with a suitable, approved, and calibrated torque wrench set for the torque recommended by the coupling manufacturer. Clamping torque shall be applied to the nut only.

3.6 CORROSION CONTROL

A. **Joint Bonding/Electrolysis Test Stations:** Except where otherwise indicated, all joints shall be bonded with a minimum of one steel jumper rod, cad-welded to each pipe, or as shown on the Construction Drawings. Jumper rods shall a minimum length of 3", and a minimum diameter of ¼" with a minimum welded contact length of 1" on each pipe. Plastic coated steel jumper wire (8 gauge minimum) shall also be installed across all valves and fittings. The pipe shall be cleaned to bare bright metal at the point where the bond is installed. In addition, electrolysis test stations shall be installed where indicated.

B. **Cathodic Protection:** Corrosion mitigation and testing materials, such as an impressed current cathodic protection system, magnesium anodes. reference electrodes. and test lead wires shall be provided where indicated on the Construction Drawings and in accordance with Section 134713 Cathodic Protection for Underground and Submerged Piping.

END OF SECTION

SECTION 331213

BACKFLOW PREVENTION DEVICES

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall furnish and install all lead-free backflow prevention devices with associated valves, piping, instrumentation, and controls as shown on the Construction Drawings and specified herein, complete and operable, for backflow prevention. For fire lines, a double check detector assembly shall be used unless there is secondary source of pressurized water or recycled water on site, in which case a Reduced Pressure (RP) Zone Backflow device shall be used.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 330509 – Piping, General
Section 331417 – Service Connections
Section 331423 – Manholes, Vaults, & Meter Boxes

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. **Codes:** All codes, as referenced herein, are specified in Section 014200 - Reference Standards.

B. **Commercial Standards:**

ISA - S 5.1	Instrumentation Symbols and Identification
ANSI - B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800
ANSI/AWWA C207	Steel Pipe Flanges for Waterworks Service - Sizes 4 In Through 144 In.
ANSI/AWWA C510	Double Check Valve Backflow Prevention Assembly
ANSI/AWWA C511	Reduced Pressure Principle Backflow Prevention Assembly

1.4 CONTRACTOR SUBMITTALS

A. The CONTRACTOR shall submit complete shop drawings of backflow prevention devices for review in accordance with Section 013300 - Contractor Submittals. With the shop drawings, the CONTRACTOR shall also furnish certified curves indicating flow versus differential pressure.

PART 2 - PRODUCTS

2.1 BACKFLOW PREVENTION DEVICES

A. Approved devices shall be lead-free and shall be as outlined in Part III of these Standards & Specifications. Devices shall conform to the requirements of the COUNTY, the County of Santa Barbara Environmental Health Services Division, the State of California Department of Drinking Water, and AWWA Standards C510 and C511.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The CONTRACTOR shall assemble and install all equipment specified herein, in strict accordance with the manufacturer's published instructions, under the supervision of the manufacturer's representative, under the general review of the COUNTY. All installations shall be accomplished by competent craftsmen in a workmanlike manner. At a minimum testing and certifications shall be completed after meter installation and before it is unlocked for permanent use. Ongoing testing shall be performed on an annual basis.

3.2 BACKFLOW PREVENTION DEVICES

A. Backflow Prevention devices shall be installed as required by the signed Plans, these Standards & Specifications and the County of Santa Barbara Environmental Health Services Division.

3.3 TESTING

A. Equipment shall be prepared for operational use in accordance with manufacturer's instructions, including bench test and calibration, where required. Each item shall be subjected to an operating test over the total range of capability of the equipment. Where applicable, tests shall be conducted in accordance with the Test Code of the Standards of the Hydraulic Institute.

3.4 ACCEPTANCE BY AGENCY

A. Final acceptance of the equipment is contingent on satisfactory operation after installation and certification of backflow prevention device.

END OF SECTION

SECTION 312316

TRENCHING, BACKFILL, AND COMPACTION

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall dewater trench and structure excavations, perform all earthwork and trenching operations indicated and required for construction of the WORK, mobilize for pavement work, provide advance notification of the affected residents, perform preparation work, construct all asphalt concrete pavements, furnish and apply all prime coats and tack coats as required, and replace pavement markings and striping complete and in place, in accordance with Santa Barbara County or City of Santa Barbara Standards & Specifications and the Contract Documents. The CONTRACTOR shall secure all necessary permits to complete the requirements of this Section of the Specifications.

B. Where indicated and approved by the COUNTY, the CONTRACTOR shall provide Controlled Low Strength Material (CLSM), complete and in place, in accordance with the Contract Documents for the following purposes:

1. Normal CLSM with high slump, non-segregating consistency that readily flows and fills voids and difficult to reach places: trench zone fill, pipe abandonment, structure backfill, and structure cavity fill.

2. Foundation CLSM is used where higher early strengths are required and future excavation is not likely to be required.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 015526 – Traffic Control & Access
Section 330507 – Boring & Jacking

1.3 CONTRACTOR SUBMITTALS

A. Prior to commencement of excavation, the CONTRACTOR shall submit a detailed plan and operation schedule for dewatering of excavations. The CONTRACTOR may be required to demonstrate the system proposed and to verify that adequate equipment, personnel, and materials are provided to dewater the excavations at all locations and times. The CONTRACTOR's dewatering plan is subject to review by the COUNTY and PROJECT ENGINEER.

B. The CONTRACTOR's attention is directed to the provisions for "Shoring and Bracing Drawings" in Section 6705 of the California Labor Code. The CONTRACTOR, prior to beginning any trench or structure excavation 5 feet deep or over shall submit to the COUNTY and shall be in receipt of the COUNTY'S written acceptance of the CONTRACTOR's detailed plan showing design of all shoring, bracing, sloping of the sides of excavation, or other provisions for worker protection against the hazard of caving ground during the excavation of such trenches or structure excavation. If such plan varies from the shoring system standards established in the Construction Safety Orders of the State of California, such alternative systems plans shall be prepared by a civil or structural engineer licensed in the State of California.

C. The CONTRACTOR shall submit a copy of the excavation permit issued by the California Department of Industrial Safety.

D. The CONTRACTOR shall submit samples of all materials as well as the asphalt concrete mix design and associated materials proposed to be used in the work in accordance with the requirements in Section 013300.

E. Submit CLSM mix designs which show the proportions and gradations of all materials proposed for each type of CLSM indicated. Each mix design shall be accompanied by independent laboratory test results of the indicated properties.

1.4 QUALITY CONTROL

A. It shall be the sole responsibility of the CONTRACTOR to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the CONTRACTOR.

B. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals to detect any settlement which may develop. The responsibility for conducting the dewatering operation in a manner that will protect adjacent structures and facilities rests solely with the CONTRACTOR. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the CONTRACTOR.

C. At the option of the COUNTY INSPECTOR, asphalt mix, subgrade, aggregate base course, and asphalt pavement may be tested by the COUNTY testing laboratory and paid for by the COUNTY in accordance with Section 014200 – Reference Standards. Sample sizes shall be as determined by the testing laboratory.

D. All CLSM testing will be done by a testing laboratory selected by the COUNTY at the COUNTY'S expense, except as otherwise indicated.

E. If tests of the CLSM show non-compliance with the specifications, the CONTRACTOR shall make changes as may be required to achieve compliance. Performing and paying for subsequent testing to show compliance shall be the CONTRACTOR's responsibility.

PART 2 - PRODUCTS

2.1 DEWATERING EQUIPMENT

A. Dewatering, where required, may include the use of well points, sump pumps, temporary pipelines for water disposal, rock or gravel placement, and other means. Standby pumping equipment shall be maintained on the job site.

2.2 SUITABLE FILL AND BACKFILL MATERIAL REQUIREMENTS

A. **General:** Fill, backfill, and embankment materials shall be suitable selected or processed clean, fine earth, rock, or sand, free from grass, roots, brush, or other vegetation.

B. Fill and backfill materials to be placed within 6 inches of any structure or pipe shall be free of rocks or unbroken masses of earth materials having a maximum dimension larger than 3 inches.

C. **Suitable Materials:** Materials not defined as unsuitable in Section 2.3 shall be reviewed by the COUNTY and may be used in fills, backfilling, and embankment construction subject to the indicated limitations and at the COUNTY'S discretion. In addition, when acceptable to the COUNTY, some of the material listed as unsuitable may be used when thoroughly mixed with suitable material to form a stable composite.

D. Suitable materials may be obtained from on-site excavations (if applicable), may be processed on-site materials, or may be imported. If imported materials are required by this Section or to meet the quantity requirements of the project, the CONTRACTOR shall provide the imported materials at no additional expense to the COUNTY, unless a unit price item is included for imported materials in the bidding schedule.

E. The following types of suitable materials are defined:

1. **Type A (three-quarters inch minus granular backfill):** Crushed rock or gravel, and sand

with the gradation requirements below. The material shall have a minimum sand equivalent value of 28 and a minimum R-value of 78. If the sand equivalent value exceeds 35 the R-value requirement is waived.

Sieve Size	Percentage Passing
3/4-inch	100
No. 4	30 - 50
No. 200	0 - 12

2. **Type B (Class I crushed stone):** Manufactured angular, crushed stone, crushed rock, or crushed slag with the following gradation requirements. The material shall have a minimum sand equivalent value of 75.

Sieve Size	Percentage Passing
3/4-inch	100
No. 4	30 - 50
No. 200	0 - 5

3. **Type C (sand backfill):** Sand with the following gradation requirements, and with a sand equivalent value not less than 30.

Sieve Size	Percentage Passing
1/2-inch	100
No. 4	85 - 100
No. 8	70 - 95
No. 200	0 - 10

4. **Type F (coarse drainrock):** Crushed rock or gravel with the size gradation for Size Number 4 in ASTM C 33

5. **Type G (aggregate base):** Crushed rock aggregate base material of such nature that it can be compacted readily by watering and rolling to form a firm, stable base for pavements. At the option of the CONTRACTOR, the grading for either the 1-1/2-inch maximum size or 3/4-inch maximum size gradation shall be used. The sand equivalent value shall be not less than 22, and the material shall meet the following gradation requirements:

	Percentage Passing	
Sieve Size	1-1/2-inch Max Gradation	3/4-inch Max. Gradation
2-inch	100	-
1-1/2-inch	90 - 100	-
1-inch	-	100
3/4-inch	50 - 85	90 - 100
No. 4	25 - 45	35 - 55
No. 30	10 - 25	10 - 30
No. 200	2 - 9	2 - 9

6. **Type H (graded drainrock):** Drainrock shall be crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying. The material shall be uniformly graded and shall meet the gradation requirements for Size Number 57 in ASTM C 33. The drainrock shall have a sand equivalent value not less than 75. The finish graded surface of the drainrock immediately beneath hydraulic structures shall be stabilized to provide a firm, smooth

surface upon which to construct reinforced concrete floor slabs.

7. **Type I:** Not Used.

8. **Type K (topsoil):** Stockpiled topsoil material which has been obtained at the site by removing soil to a depth not exceeding 1 foot. Removal of the topsoil shall be done after the area has been stripped of vegetation and debris.

9. **Type L (controlled low strength material):** Controlled low strength material shall be in accordance with this section.

2.3 UNSUITABLE FILL MATERIAL

A. Unsuitable materials include the materials listed below.

1. Soils which, when classified under ASTM D 2487 - Standard Classification of Soils for engineering Purposes (Unified Soil Classification System), fall in the classifications of Pt, OH, CH, MH, or OL.

2. Soils which cannot be compacted sufficiently to achieve the density specified for the intended use.

3. Materials that contain hazardous or designated waste materials including petroleum hydrocarbons, pesticides, heavy metals, and any material which may be classified as hazardous or toxic according to applicable regulations.

4. Soils that contain greater concentrations of chloride or sulfate ions, or have a soil resistivity or pH less than the existing on-site soils.

5. Topsoil, except as allowed by Section 2.4.

2.4 USE OF FILL, BACKFILL, AND EMBANKMENT MATERIAL TYPES

A. The CONTRACTOR shall use the types of materials as designated herein for all required fill, backfill, and embankment construction hereunder.

B. Where these Specifications conflict with the requirements of any local agency having jurisdiction or with the requirements of a pipe material manufacturer, the COUNTY shall be immediately notified. In case of conflict between types of pipe zone bedding, the CONTRACTOR shall use the agency-specified bedding material if that material provides a greater degree of structural support to the pipe, as determined by the COUNTY. In case of conflict between types of trench or final backfill types, the CONTRACTOR shall use the agency-specified backfill material if that material provides the greater in-place density after compaction.

C. Fill and backfill types shall be used in accordance with the following provisions:

1. Embankment fills shall be constructed of Type I material, as defined herein, or any mixture of Type I and Type A through Type H materials.

2. Pipe zone bedding for mortar coated steel pipe, ductile iron pipe, and PVC pipe shall be Type C backfill (pipe bedding) material. Pipe zone bedding for PVC pipe, coal tar enamel coated or tape wrapped steel pipe, and polyethylene encased ductile iron pipe shall be Type C backfill (pipe bedding) material.

3. Trench zone and final backfill for pipelines under paved areas, as defined under "Pipe and Utility Trench Backfill," shall be Type L backfill material unless otherwise shown or specified. Trench zone and final backfill under areas not paved shall be select native material free of rocks larger than 3-inches and free of deleterious material, or Types A, C or G, backfill materials or any mixture thereof.

In agricultural or landscaped areas Type K material shall be used for final backfill unless otherwise indicated.

4. Trench backfill and final backfill for pipelines under structures shall be the same material as used in the pipe zone, except where concrete encasement is required by the Contract Documents.

5. Backfill around structures shall be Type A through Type H materials, or any mixture thereof, except as shown.

6. Backfill materials beneath structures shall be as follows:

   a. Drain rock materials under hydraulic structures or other water retaining structures with underdrain systems shall be Type H material.

   b. Under concrete hydraulic structures or other water retaining structures without underdrain systems, Types G or H materials shall be used.

   c. Under structures where groundwater must be removed to allow placement of concrete, Type F material shall be used. Before the Type F material is placed, filter fabric shall be placed over the exposed foundation.

   d. Under all other structures, Type G or H material shall be used.

7. Backfill used to replace pipeline trench over-excavation shall be a layer of Type F material with a top layer of filter fabric to prevent migration of fines for wet trench conditions or the same material as used for the pipe zone bedding if the trench conditions are not wet.

8. The top 6 inches of embankment fills around hydraulic structures, and all other embankment fills shall consist of Type K material, topsoil.

9. Filter fabric shall be per COUNTY direction.

2.5 SOIL MATERIALS TESTING

A. All soils testing of samples submitted by the CONTRACTOR will be done by a testing laboratory of the COUNTY'S choice and at the COUNTY'S expense. At its discretion, the COUNTY may request that the CONTRACTOR supply samples for testing of any material used in the work.

B. Particle size analysis of soils and aggregates will be performed using ASTM D 422 - Standard Test Method for Particle-Size Analysis of Soils.

C. Determination of sand equivalent value will be performed using ASTM D 2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

D. **Unified Soil Classification System:** References in this Section to soil classification types and standards shall have the meanings and definitions indicated in ASTM D 2487. The CONTRACTOR shall be bound by all applicable provisions of said ASTM D 2487 in the interpretation of soil classifications.

E. The testing for chloride, sulfate, resistivity, and pH will be done in accordance with California Test Methods 417, 422 and 643 of the California Department of Transportation.

2.6 ASPHALT CONCRETE PAVING MATERIALS

A. All materials required for asphalt concrete pavement construction as specified herein shall conform to the Caltrans Standard Specifications:

B. Asphalt concrete for roadway pavement shall be Type B, Grade AR-4000 as specified in Section

39 with ½" mix, unless specified otherwise. Asphalt concrete for construction of sidewalks, berms, dikes, or curbs shall be Type B, Grade AR-4000 as specified in Section 39 with 3/8" mix, unless specified otherwise. Paint binder shall be SS-1h emulsified asphalt conforming requirements of Section 94. Base course shall be treated Class 2 aggregate base material. Paint for traffic stripes and pavement markings shall conform to Section 84.

2.7 CONTROLLED LOW STRENGTH MATERIAL

A. CLSM shall be a mixture of cement, pozzolan, coarse and fine aggregate, admixtures, and water, mixed in accordance with ASTM C 94 - Ready Mixed Concrete.

B. **Composition:** The following parameters shall be within the indicated limits and as necessary to produce the indicated compressive strengths.

1. Mix proportions as necessary

2. Entrained air content shall be between [0][20] percent minimum and [6][30] percent maximum.

3. Water reducing agent content as necessary

C. Properties

1. Density shall be between 120 PCF minimum and 145 PCF maximum

2. Slump shall be as required by the CONTRACTOR's methods, but shall not promote segregation nor shall slump exceed 9 inches.

3. Compressive strength at 28 days: **300** psi

a. Normal CLSM: Between 100 psi minimum and 300 psi maximum (1 sack of cement per cubic yard). Unless specifically indicated otherwise, all CLSM shall be Normal CLSM.

b. Foundation CLSM: 1,000 psi minimum.

D. Cement

1. Cement shall be Type I or II in accordance with ASTM C 150 - Portland Cement.

E. Pozzolan

1. Pozzolan shall be Type F or C in accordance with ASTM C 618 – Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete. Pozzolan content, by weight, in Normal CLSM shall not be greater than cement content.

F. Aggregate

1. Aggregate shall consist of a well graded mixture of crushed rock, soil, or sand, with a nominal maximum size of 3/8-inch. One hundred percent shall pass the 3/4-inch sieve; no more than 30 percent shall be retained on the 3/8-inch sieve; and no more than 12 percent shall pass the number 200 sieve. If more than 5 percent of the aggregate passes the number 200 sieve, the material passing the number 200 sieve shall have a plasticity index of less than 0.73 (liquid limit-20), when tested in accordance with ASTM D 4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils. All aggregate shall be free from organic matter and shall not contain more alkali, sulfates, or salts than the native materials at the Site.

G. Admixtures

1. Air entraining admixtures shall be in accordance with ASTM C 260 - Air-Entraining Admixtures for Concrete.

2. Water reducing admixtures shall be in accordance with ASTM C 494 - Chemical Admixtures for Concrete.

H. Water

1. Water shall be potable, clean and free from objectionable quantities of silt, organic matter, alkali, salt, and other impurities.

PART3 - EXECUTION

3.1 DEWATERING GENERAL REQUIREMENTS

A. The CONTRACTOR shall provide all equipment necessary for dewatering. It shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all times, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failure.

B. Dewatering for structures and pipelines shall commence when groundwater is first encountered, and shall be continuous until such times as water can be allowed to rise in accordance with the provisions of this Section or other requirements. Water shall be kept from entering the open ends of newly installed pipe or the cut end of a waterline where a connection is to occur.

C. At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and be pumped or drained by gravity from the excavation to maintain a bottom free from standing water.

D. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

E. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with drain rock.

F. The CONTRACTOR shall remove water that accumulates in the excavation during the progress of the WORK so that work occurs in a substantially dry trench. The CONTRACTOR shall maintain trenches or other excavations free from water while the pipe or structures are being installed, while concrete is setting, and until backfill has progressed to a sufficient height to anchor the WORK against possible flotation or leakage. All loose material shall be removed from the bottom of the trench prior to placement of any pipe bedding material.

G. The CONTRACTOR shall prevented flotation by maintaining positive and continuous removal of water. The CONTRACTOR shall be fully responsible and liable for all damages which may result from failure to adequately keep excavations dewatered.

H. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sand packed and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the CONTRACTOR shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.

I. The CONTRACTOR shall dispose of water from the WORK in a safe manner without damage to adjacent properties in accordance with COUNTY direction. CONTRACTOR shall be responsible for obtaining any permits that may be necessary to dispose of water. No water shall be drained into work built or under

construction without prior consent of the COUNTY. Water shall be filtered using an approved method to remove sand and fine-sized soil particles before disposal into any drainage system.

J. When making connection to the domestic water system, if greater than 25% of the water within a trench or excavation is caused by leakage of a system isolation valve from the domestic water system, the CONTRACTOR shall dechlorinate the water before disposal into any drainage system.

K. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures, pipelines, and sewers.

L. Dewatering of trenches and other excavations shall be considered as incidental to the construction of the WORK and all costs thereof shall be included in the various items of work, unless a separate bid item has been established for dewatering.

3.2 EXCAVATION - GENERAL

A. **General:** Except when specifically provided to the contrary, excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the WORK. The removal of said materials shall conform to the lines and grades indicated or ordered.

B. **Sheeting, Shoring and Bracing:** The CONTRACTOR shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations and trenches. Excavations and trenches shall be sloped or otherwise supported in a safe manner in accordance with applicable CAL/OSHA requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926). As a minimum, lateral pressures for design of trench sheeting, shoring, and bracing shall be based on type of soil exposed in the trench, groundwater conditions, surcharge loads adjacent to the trench, and type of shoring that will be used in the trench.

3.3 PROTECTION OF EXISTING UTILITIES AND FACILITIES

A. **General:** The CONTRACTOR shall be responsible for the care and protection of all existing sewer pipelines, water pipelines, gas mains, electrical and communications conduits, cables, storm drains, culverts, or other facilities and structures that may be encountered in or near the area of Work.

B. **Notification:** It shall be the duty of the CONTRACTOR to notify each agency having jurisdiction and make arrangements for locating each agency's facilities prior to beginning construction.

C. **Damage:** In the event of damage to any existing facilities during the progress of the work due to the failure of the CONTRACTOR to exercise the proper precautions, the CONTRACTOR shall be responsible for the cost of all repairs and protection to said facilities. The CONTRACTOR's work may be stopped until repair operations are complete.

D. **Storage and Disposal of Excavated Material:** During trench excavation, store excavated material only within the Work area. Do not obstruct roadways, streets, bike paths, or sidewalks. CONTRACTOR shall remove and dispose of excess excavated soil material off the Project site at no additional cost to the COUNTY, in accordance with local regulations.

3.4 STRUCTURE, ROADWAY, AND EMBANKMENT EXCAVATION

A. **Excavation Beneath Structures and Embankments:** Except where otherwise indicated for a particular structure or ordered by the COUNTY, excavation shall be carried to the grade of the bottom of the footing or slab. Where indicated or ordered, areas beneath structures or fills shall be over-excavated. The subgrade areas beneath embankments shall be excavated to remove not less than the top 6 inches of native material and where such subgrade is sloped, the native material shall be benched. When such over-excavation

is indicated, both over-excavation and subsequent backfill to the required grade shall be performed by the CONTRACTOR. When such over-excavation is not indicated but is ordered by the COUNTY, such over-excavation and any resulting backfill will be paid for under a separate unit price bid item if such bid item has been established; otherwise payment will be made in accordance with a negotiated price. After the required excavation or over-excavation has been completed, the exposed surface shall be scarified to a depth of 6 inches, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain 95 percent of maximum density.

B. **Excavation Beneath Paved Areas:** Excavation under areas to be paved shall extend to the bottom of the aggregate base or subbase, if such base is called for; otherwise it shall extend to 1 inch below the existing paving thickness. After the required excavation has been completed, the top 6 inches of exposed surface shall be scarified, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain 95 percent of maximum density. The finished subgrade shall be even, self-draining, and in conformance with the slope of the finished pavement. Areas that could accumulate standing water shall be regraded to provide a self-draining subgrade.

C. **Notification of COUNTY:** The CONTRACTOR shall notify the COUNTY at least 3 days in advance of completion of any structure excavation and shall allow the COUNTY a review period of at least one day before the exposed foundation is scarified and compacted or is covered with backfill or with any construction materials.

3.5 PIPELINE AND UTILITY TRENCH EXCAVATION

A. **General:** Unless otherwise indicated or ordered, excavation for pipelines and utilities shall be open-cut trenches with widths as indicated. Trenches shall be excavated to line and grade as shown on the Plans (Construction Drawings). Excavation for water lines shall be made only after pipe and other necessary materials are delivered to the project site and inspected by the COUNTY'S INSPECTOR. Where trenching occurs in paved areas, the pavement shall be saw cut ahead of the trenching operations. The proper tools and equipment shall be used in marking and breaking so that the pavement will be cut accurately and on neat lines parallel to the trench. Material excavated from trenches shall be placed in such a way as not to endanger the health of the workers or the public. Excavated material shall not be stockpiled within the public right-of-way, or placed in areas where it could be hazardous to traffic, or block access to roads or driveways. Excavation within the public right-of-way shall be performed in compliance with the requirements of the County of Santa Barbara Department of Public Works.

B. **Trench Geometry:** Trenches shall be constructed to allow for safe installation of pipe and structures. Trench width shall be in accordance with COUNTY Standard Details except when stated otherwise on the Plans and Specifications. The bottom of the trench shall be excavated uniformly to the grade of the bottom of the pipe bedding. Trench bottom shall consist of firm native soil or imported compacted soil able to evenly support pipe bedding for the full length of the pipe. Excavations for pipe bells and welding shall be made as required.

C. **Abrasive Materials:** When rocks, concrete, or other hard and abrasive materials are encountered during excavation, it may be required that all or a portion of the material be removed to provide a minimum clearance of 12 inches below and on each side of pipe, valves and fittings. If in the opinion of the COUNTY damage to other systems or structures will occur by the removal of material, CONTRACTOR shall not proceed until receiving further instructions from the COUNTY.

D. **Unsuitable Foundation:** If soft, spongy, unstable or other similar material is encountered upon which the pipe bedding material is to be placed, an additional 12 inches in depth of this unsuitable material shall be removed and replaced with bedding material placed in the manner specified for pipe bedding material. Tree roots are to be removed.

E. **Protection of Property:** Tree, shrubs, fences and all other property and surface structures shall be protected during construction unless the Plans and Specifications call for their removal.

F. **Temporary Supports:** When other structures, pipes, conduits, cables, wires or any underground improvements are encountered during excavation they shall be temporarily supported as necessary to

prevent damage to or disturbance of said improvements.

G. Exploratory Excavation

1. The CONTRACTOR shall excavate and expose buried points of connection to existing utilities where indicated on the Drawings. Excavation shall be performed prior to preparation of Shop Drawings for connections and before fabrication of pipe, and the data obtained shall be used in preparing Shop Drawings.

2. Data, including dates, locations excavated, and sketches, shall be submitted to the COUNTY within one week of excavation.

3. Damage to utilities from excavation activities shall be repaired by the CONTRACTOR.

H. **Open Trench:** The maximum amount of open trench permitted in any one location shall be 300 feet, or a length equivalent to the amount of pipe able to be installed in a single day, whichever is less. Trenches shall not remain open overnight. All trenches shall be fully backfilled at the end of each workday, or shall be properly shored and covered by heavy steel plates adequately braced and capable of supporting vehicular traffic in those locations where it is impractical to backfill at the end of each day. The above requirements for backfilling or use of steel plates may be waived at the discretion of the INSPECTOR in cases where the trench is located further than 100 feet from any traveled roadway or occupied structure. In such cases, however, barricades and warning lights meeting safety requirements shall be provided and maintained.

I. Over-Excavation (Not Indicated)

1. When ordered by the COUNTY to over-excavate trenches deeper and/or wider than required by the Contract Documents, the CONTRACTOR shall over-excavate to the dimensions ordered and backfill to the indicated grade of the bottom of the pipe bedding.

2. **Payment.** Over-excavation less than 6-inches more than the indicated trench depth and/or width shall be done at no increase in cost. Additional payment will be made for over-excavation 6 inches or more than the indicated depth and/or width. Additional payment will be based on unit price bid items for over-excavation if such bid items were established; otherwise payment will be based on a negotiated price. Volumes of material will be based on survey measurements of the over-excavated area.

J. Where pipelines are to be installed in embankments, fills, or structure backfills, the fill shall be constructed to a level at least one foot above the top of the pipe before the trench is excavated.

K. If a moveable trench shield is used during excavation operations, the trench width shall be wider than the shield so that the shield is free to be lifted and then moved horizontally without binding against the trench sidewalls. If the trench walls cave in or slough, the trench shall be excavated as an open excavation with sloped sidewalls or with trench shoring, as indicated and as required by the pipe structural design.

3.6 OVER-EXCAVATION NOT ORDERED OR INDICATED

A. Any over-excavation carried below the grade ordered or indicated, shall be backfilled and compacted to the required grade with the indicated material.

3.7 EXCAVATION IN LAWN AND LANDSCAPED AREAS

A. Where excavation occurs in landscaped areas, CONTRACTOR shall protect all trees, shrubs, sidewalk, walls, fences, and other landscape items adjacent to or within the work area unless directed otherwise by the Contract Documents. In the event of damage to landscape items, CONTRACTOR shall replace the damaged items in a manner satisfactory to the COUNTY at no cost to the COUNTY.

B. Where excavation occurs in lawn areas, the sod shall be carefully removed, dampened, and stockpiled to preserve it for replacement. Excavated material may be placed on the lawn; provided, that a drop cloth or

other suitable method is employed to protect the lawn from damage. The lawn shall not remain covered for more than 72 hours. Immediately after completion of backfilling [and testing of the pipeline], the sod shall be replaced and lightly rolled in a manner so as to restore the lawn as near as possible to its original condition. CONTRACTOR shall provide new sod if stockpiled sod has not been replaced within 72 hours.

C. Except where trees are indicated to be removed, trees shall be protected from injury during construction operations. No tree roots over 2 inches in diameter shall be cut without express permission of the COUNTY. Trees shall be supported during excavation by any means previously reviewed by the COUNTY.

3.8 ROCK EXCAVATION

A. **Explosives and Blasting:** Blasting will not be permitted.

3.9 BACKFILL - GENERAL

A. Backfill shall not be dropped directly upon any structure or pipe. Backfill shall not be placed around or upon any structure until the concrete has attained sufficient strength to withstand the loads imposed. Backfill around water retaining structures shall not be placed until the structures have been tested, and the structures shall be full of water while backfill is being placed.

B. Except for drain rock materials being placed in over-excavated areas or trenches, backfill shall be placed after all water is removed from the excavation, and the trench sidewalls and bottom have been dried to a moisture content suitable for compaction.

C. Immediately prior to placement of backfill materials, the bottoms and sidewalls of trenches and structure excavations shall have all loose sloughing, or caving soil and rock materials removed. Trench sidewalls shall consist of excavated surfaces that are in a relatively undisturbed condition before placement of backfill materials.

3.10 PLACING AND SPREADING OF BACKFILL MATERIALS

A. Backfill materials shall be placed and spread evenly in layers. When compaction is achieved using mechanical equipment, the layers shall be evenly spread so that when compacted each layer shall not exceed 6 inches in thickness.

B. During spreading, each layer shall be thoroughly mixed as necessary to promote uniformity of material in each layer. Pipe zone bedding materials shall be manually spread around the pipe so that when compacted the pipe bedding will provide uniform bearing and side support.

C. Where the backfill material moisture content is below the optimum moisture content, water shall be added before or during spreading until the proper moisture content is achieved. Where the backfill material moisture content is too high to permit the specified degree of compaction the material shall be dried until the moisture content is satisfactory.

3.11 COMPACTION OF FILL, BACKFILL, AND EMBANKMENT MATERIALS

A. Each layer of Types A, B, C, G, H, I, and K backfill materials as defined herein, where the material is graded such that 10 percent or more passes a No. 4 sieve, shall be mechanically compacted to the indicated percentage of density. Equipment that is consistently capable of achieving the required degree of compaction shall be used and each layer shall be compacted over its entire area while the material is at the required moisture content.

B. Each layer of Type F backfill materials shall be compacted by means of at least 2 passes from a flat plate vibratory compactor. When such materials are used for pipe zone backfill, vibratory compaction shall be used at the top of the pipe zone or at vertical intervals of 24 inches, whichever is the least distance from the subgrade.

C. Flooding, ponding, or jetting shall not be used for backfill around structures, for final backfill materials, or aggregate base materials.

D. Equipment weighing more than 10,000 pounds shall not be used closer to walls than a horizontal distance equal to the depth of the fill at that time. Hand operated power compaction equipment shall be used where use of heavier equipment is impractical or restricted due to weight limitations.

E. Backfill around and over pipelines that is mechanically compacted shall be compacted using light, hand operated, vibratory compactors and rollers. After completion of at least two feet of compacted backfill over the top of pipeline, compaction equipment weighing no more than 8,000 pounds may be used to complete the trench backfill.

3.12 TESTING FOR COMPACTION

A. **Methods:** Classification of pipe bedding and trench backfill materials shall be determined in accordance with ASTM D 2487. The density of soil in place shall be determined by the sand cone method, ASTM D 1556, or by the nuclear method, ASTM D 2922 or D 3017. When ASTM D 2922 is used and a one-sack slurry in not used to backfill the trench, the calibration curves shall be checked and adjusted using the sand cone method. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 (Nuclear Gauge Method for Water Content) shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks, as described in ASTM D 3017. The calibration checks of both the density and moisture curves shall be made at the beginning of the job and on each different type of material used. Copies of calibration curves, results of calibration tests, and results of laboratory tests shall be furnished to the COUNTY prior to performing any field tests. Field test results shall be furnished to the COUNTY within 48 hours of the testing. Trenches improperly compacted shall be reopened to the depth directed by the COUNTY, then filled and compacted to the density specified at no additional cost to the COUNTY.

B. **Soil Moisture-Density Relationship:** Laboratory moisture-density relations of soils shall be determined per ASTM D 1557.

C. **Cohesionless Materials:** Relative density of cohesionless materials by ASTM D 4253 and D 4254.

D. **Sampling:** Sample backfill materials per ASTM D 75.

E. **Relative Compaction:** "Relative compaction" shall be defined as the ratio, expressed as a percentage, of the in place dry density to the laboratory maximum dry density.

F. **Compaction Compliance:** Compaction shall be deemed to comply with the specifications when none of the tests falls below the specified relative compaction. Notify the COUNTY 24-hours in advance of when backfill lifts are ready for testing to allow inspection by the COUNTY. The CONTRACTOR shall pay the costs of any re-testing of work not conforming to the Specifications.

G. **Testing Frequency:** Testing shall be performed by a certified soils testing service. All tests shall be performed at locations specified by the COUNTY. A minimum of one soil classification and one and trench backfill. These tests shall also be performed for every 1500 cubic yards of material placed. A minimum of one field density test shall be performed for each soil type, and at least one test for each 24" compacted thickness. These test requirements shall be repeated for every 300 feet of trench length.

H. **Compaction Requirements:** The following compaction test requirements shall be in accordance with ASTM D 1557 - Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft - lbf/ft^3) (2,700 kN-m/m^3) for Type A, B, C, G, H, I, K, M, and N materials and in accordance with ASTM D 4253 - Standard Test Method for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table, and D 4254 - Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density, for Type B, E, F, and J materials. Where agency or utility company

requirements govern, the highest compaction standards shall apply.

Location or Use of Fill	Percentage of Maximum Density	Percentage of Relative Density
Pipe bedding and over-excavated zones under bedding for flexible pipe, including trench plugs.	95	70
Pipe bedding and over-excavated zones under bedding for rigid pipe.	90	55
Final backfill, beneath paved areas or structures.	95	70
Final backfill, not beneath paved areas or structures.	90	55
Trench zone backfill, beneath paved areas and structures.	95	70
Trench zone backfill, not beneath paved areas or structures.	90	55
Embankments and fills.	90	55
Embankments and fills beneath paved areas or structures.	95	70
Backfill beneath structures and hydraulic structures.	95	70
Topsoil (Type K material)	80	N.A.
Aggregate base or sub-base (Type G or M material)	95	N.A.

3.13 PIPE AND UTILITY TRENCH BACKFILL

A. Pipe Zone Bedding

1. The pipe zone is defined as that portion of the vertical trench cross-section lying between the trench bottom and a plane 12-inches above the top surface of the pipe as indicated. The pipe bedding is defined as backfill material within the pipe zone. Bedding shall be placed across the entire trench extending from a minimum of four inches below the bottom of the pipe to 12 inches above the top of pipe. Bedding shall be placed in layers not exceeding six inches loose thickness for compaction by hydraulic or hand operated mechanical compactors, and eight inches loose thickness when compacted by other mechanical compactors. Bedding shall be compacted to at least 90% of its maximum dry density as determined by ASTM D 1557. Bell holes in bedding shall be provided for each joint, but shall be no larger than necessary to allow joint assembly and to ensure that pipe will lie flat on the bedding. CONTRACTOR shall ensure that pipe is not being supported by the bell portion of the pipe at any joint and shall ensure that no less than 2 inches of bedding is provided for yokes, restraints, bells and all other extensions of fittings and joints.

2. The pipe zone shall be backfilled with the indicated backfill material. The CONTRACTOR

shall exercise care to prevent damage to the pipeline coating, cathodic bonds, and the pipe itself during the installation and backfill operations.

B. Trench Zone Backfill: After the pipe zone backfill has been placed, backfilling of the trench zone may proceed. The trench zone is defined as that portion of the vertical trench cross-section from 12 inches above the top of the pipe to the bottom of the pavement zone if the trench is under pavement, or to within 12 inches of finished grade if the trench is in an unpaved area. Where slurry backfill is not used, material shall be compacted to at least 95% of maximum dry density as determined by ASTM D 1557. Trench shall be backfilled in lifts not exceeding eight inches, uncompacted depth, and then compacted by mechanical means prior to placement of succeeding lifts. Where the pipeline is located within an existing paved street within the public right of way, trench shall be backfilled with Type L backfill material as described above.

C. Pavement Zone Backfill and Final Backfill: The pavement zone includes the asphalt concrete and aggregate base pavement section. Final backfill applies to trenches not beneath paved areas and is all backfill in the trench cross-sectional area within 12 inches of finished grade.

D. Identification Tape: Install identification tape as indicated.

3.14 FILL AND EMBANKMENT CONSTRUCTION

A. The area where a fill or embankment is to be constructed shall be cleared of all vegetation, roots and foreign material. Following this, the surface shall be moistened, scarified to a depth of six inches, and rolled or otherwise mechanically compacted. Embankment and fill material shall be placed and spread evenly in approximately horizontal layers. Each layer shall be moistened or aerated, as necessary. Unless otherwise approved by the COUNTY, each layer shall not exceed 6 inches of compacted thickness. The embankment, fill, and the scarified layer of underlying ground shall be compacted to 95 percent of maximum density under structures and paved areas, and 90 percent of maximum density elsewhere.

B. When an embankment or fill is to be made and compacted against hillsides or fill slopes steeper than 4:1, the slopes of hillsides or fills shall be horizontally benched to key the embankment or fill to the underlying ground. A minimum of 12 inches normal to the slope of the hillside or fill shall be removed and re-compacted as the embankment or fill is brought up in layers. Material thus cut shall be re-compacted along with the new material. Hillside or fill slopes 4:1 or flatter shall be prepared in accordance with Paragraph A, above.

C. Where embankment or structure fills are constructed over pipelines, the first 4 feet of fill over the pipe shall be constructed using light placement and compaction equipment that does not damage the pipe. Heavy construction equipment shall maintain a minimum distance from the edge of the trench equal to the depth of the trench until at least 4 feet of fill over the pipe has been completed.

3.15 FIELD TESTING

A. **General:** All field soils testing will be done by a testing laboratory of the COUNTY'S choice at the COUNTY'S expense except as indicated below.

B. Where soil material is required to be compacted to a percentage of maximum density, the maximum density at optimum moisture content will be determined in accordance with Method C of ASTM D 1557. Where cohesionless, free draining soil material is required to be compacted to a percentage of relative density, the calculation of relative density will be determined in accordance with ASTM D 4253 and D 4254. Field density in-place tests will be performed in accordance with ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place By Nuclear Methods (Shallow Depth), or by such other means acceptable to the COUNTY.

C. In case the test of the fill or backfill show non-compliance with the required density, the CONTRACTOR shall accomplish such remedy as may be required to insure compliance. Subsequent testing to show compliance shall be by a testing laboratory selected by the COUNTY and paid by the CONTRACTOR.

D. The CONTRACTOR shall provide test trenches and excavations including excavation, trench support, and groundwater removal for the COUNTY'S field soils testing operations. The trenches and excavations shall be provided at the locations and to the depths required by the COUNTY.

3.16 ASPHALT CONCRETE

A. General: Furnishing, placing, shaping, rolling, and finishing asphalt concrete for pavement, berms, dikes, and curbs shall be performed in accordance with local jurisdiction's Standards and Section 39 of the Caltrans Standard Specifications.

B. Wherever required by the governing agency, the Contractor shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said agency before proceeding with the final restoration of improvements.

C. All paved areas, including curbs and berms, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the permit of the governing agency. All temporary and permanent pavement shall conform to the requirements of the governing agency.

D. In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent resurfacing of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines.

E. Pavement and base shall be constructed to the line, grade and thickness shown on the Construction Drawings. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

3.17 BASE AND SUBGRADE BELOW ASPHALT CONCRETE

A. The preparation of the subgrade to receive aggregate base course, and preparation and construction of aggregate base for construction of asphalt concrete paving shall conform to the requirements of the applicable sections of the Caltrans Standard Specifications.

B. Spreading and compacting of base material shall conform to the requirements of Section 26 of the Caltrans Standard Specifications.

C. Base course shall be maintained until asphalt pavement is placed. Areas of base course which are damaged or do not conform to the requirements herein shall be conditioned, reshaped, and recompacted in accordance with the requirements herein.

D. Compaction tests will be performed by the COUNTY, in accordance with the requirements of the applicable sections of the Caltrans Standard Specifications.

3.18 TACK COAT

A. An asphalt tack coat shall be applied to all existing asphalt concrete or concrete surfaces upon or against which asphalt concrete is to be placed. Application of tack coat shall conform to the requirements of Section 39 of the Caltrans Standard Specifications.

3.19 ASPHALT CONCRETE PAVING

A. Asphalt concrete paving shall be constructed in accordance with the requirements of Section 39 of the Caltrans Standard Specifications.

3.20 ASPHALT CONCRETE PAVEMENT MARKING AND STRIPING

A. Asphalt concrete pavement shall be marked and striped to replace all markings and striping disturbed by the paving operation in accordance with Section 84 of the Caltrans Standard Specifications.

3.21 CLSM PREPARATION

A. Subgrade and compacted fill to receive CLSM shall be prepared according to this section.

3.22 BATCHING, MIXING AND DELIVERY OF CLSM

A. Batching, mixing, and delivery of CLSM shall conform to ASTM C 94. CLSM shall be mixed at a batch plant acceptable to the COUNTY and shall be delivered in standard transit mix trucks.

3.23 PLACEMENT OF CLSM

A. CLSM shall be placed by tailgate discharge, conveyor belts, pumped, or other means acceptable to the COUNTY. CLSM shall be directed in place by vibrator, shovel, or rod to fill all crevices and pockets. Avoid over-consolidation which causes separation of aggregate sizes.

B. CLSM shall be continuously placed against fresh material unless otherwise approved by the COUNTY. When new material is placed against existing CLSM, the placement area shall be free from all loose and foreign material. The surface of the existing material shall be soaked a minimum of one hour before placement of fresh material but no standing water shall be allowed when placement begins.

C. Temperature of the CLSM shall be between 50 and 90 degrees F, when placed. CLSM shall not be placed when the air temperature is below 40 degrees F. No CLSM shall be placed against frozen subgrade or other materials having temperature less than 32 degrees F.

3.24 FINISHING OF CLSM

A. The finish surface shall be smooth and to the grade indicated or directed by the COUNTY. Surfaces shall be free from fins, bulges, ridges, offsets, and honeycombing. Finishing by wood float, steel trowel, or similar methods is not required.

3.25 CURING OF CLSM

A. CLSM shall be kept damp for a minimum of 7 days or until final backfill is placed.

3.26 PROTECTION OF CLSM

A. CLSM shall be protected from freezing for 72 hours after placement.

B. No fill or loading shall be placed on CLSM until probe penetration resistance, as measured in accordance with ASTM C 803 - Standard Test Method for Penetration Resistance of Hardened Concrete, exceeds 650 psi.

C. CLSM shall be protected from running water, rain, and other damage until the material has been accepted and final fill completed.

END OF SECTION

SECTION 330110

WATERLINE DISINFECTION & TESTING

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall perform flushing, disinfection, and testing of all waterlines, services, and appurtenances, complete, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 330509 – Piping, General
Section 330519 – Ductile Iron Pipe (AWWA C151, Modified)
Section 330524 – Steel Pipe (AWWA C200, Modified)
Section 330531 – PVC Pressure Pipe (ACCA C900, Modified)

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

ANSI/AWWA B300	Hypochlorites.
ANSI/AWWA B301	Liquid Chlorine.
ANSI/AWWA C651	Disinfecting Water Mains.

1.4 CONTRACTOR SUBMITTALS

A. A proposed plan and schedule for water conveyance, cleaning, disinfection, flushing and water disposal, and pressure testing shall be submitted in writing for approval a minimum of two weeks before testing is to start. The plan shall demonstrate that personnel are experienced and prepared to resolve problems which may arise.

PART 2 - PRODUCTS

2.1 MATERIALS REQUIREMENTS

A. All test equipment, chemicals for chlorination, temporary valves, bulkheads, or other water control equipment and materials shall be selected and furnished by the CONTRACTOR subject to the COUNTY'S review. No materials shall be used which would be injurious to the construction or its future function.

B. Chlorine for disinfection may be in the form of liquid chlorine or sodium hypochlorite solution.

C. Liquid chlorine shall be in accordance with the requirements of ANSI/AWWA B301. Liquid chlorine shall be used only:

1. In combination with appropriate gas flow chlorinators and ejectors;
2. Under the direct supervision of an experienced technician;
3. When appropriate safety practices are observed.

D. Sodium hypochlorite and calcium hypochlorite shall be in accordance with the requirements of ANSI/AWWA B300.

PART 3 - EXECUTION

3.1 GENERAL

A. All waterlines, services, and appurtenances shall be disinfected prior to pressure and leakage testing. Unless otherwise indicated, water for disinfecting and testing waterlines shall be furnished by the CONTRACTOR on private contracts and by COUNTY contracts. In both cases the CONTRACTOR shall make all necessary provisions for conveying the water from the COUNTY -designated source to the points of use. The CONTRACTOR shall furnish all equipment and materials for disinfection and testing of waterlines.

B. Disinfection shall be accomplished by chlorination. All disinfection and testing operations shall be performed in the presence of the COUNTY. All pressure waterlines, services, and appurtenances shall be disinfected and tested.

C. Disinfection operations shall be scheduled by the CONTRACTOR as late as possible during the contract time period so as to assure the maximum degree of sterility of the facilities at the time the WORK is accepted by the COUNTY.

3.2 DISINFECTING PIPELINES

A. **General:** All potable waterlines, services, and appurtenances shall be disinfected in accordance with the requirements of ANSI/AWWA C651. Prior to disinfecting, waterlines shall be flushed or blown out as appropriate.

B. **Chlorine-water solution method:** A chlorine-water solution shall be uniformly introduced into the waterline by means of a solution-feed chlorinating device. The chlorine solution shall be introduced at one end of the pipeline through a tap such that the concentration of free chlorine in the water entering the pipe is a minimum of 25 mg/l. Care shall be taken to prevent the strong chlorine solution in the waterline being disinfected from flowing back into the line supplying the water. The table below provides the quantity of chlorine required to produce 25 mg/L concentration in 100 feet of pipe – by diameter.

Pipe Diameter (inches)	12.5 % Chlorine Solution (ounces)
4	0.16
6	0.36
8	0.65
10	1.02
12	1.44
16	2.60

C. Tablet Method: The tablet method may be used only when all foreign materials have been kept out of the waterline during construction. If groundwater has entered the pipe during installation and tablets havebeen installed, CONTRACTOR shall flush main and use chlorine-water solution method. Do not use this method if the temperature is below 41 degrees Fahrenheit. Tablets shall be secured with non-toxic adhesive in each pipe length in top of pipe. The table below provides the number of 5-g hypochlorite tablets required for a minimum dose of 25 mg/L, based on 3.25g available chlorine per tablet.

Pipe Diameter	Length of pipe section				
	13 ft	18 ft	20 ft	30 ft	40 ft
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

D. **Disinfection:** Assure valves are closed on existing system to prevent chlorine solution flowing into water supply system. Chlorinated water shall be retained in the waterline long enough to destroy all non-spore-forming bacteria. This period shall be at least 24 hours. After the chlorine-treated water has been retained for the required time, the free chlorine residual at the waterline extremities and at other representative points shall be at least 10 mg/l. Should the chlorine level drop below 10 mg/l at the end of 24 hours, the waterline shall be flushed and the disinfection procedure repeated until 10 mg/l residual is achieved.

E. **Chlorinating Valves:** During the disinfection process of chlorinating the waterline, all valves, hydrants, and other appurtenances shall be operated while the pipeline is filled with the heavily-chlorinated water.

F. **Sampling Ports:** The CONTRACTOR shall provide sampling ports along the waterline as defined in AWWA C651.

G. **Preliminary Flushing:** Prior to chlorinating, waterlines shall be filled to eliminate air pockets and flushed to remove particulates.

H. **Final Flushing:** After disinfection is successfully completed, the heavily chlorinated water shall be flushed from the pipeline using fresh potable water until chlorine measurements show that the concentration in the water leaving the pipeline is no higher than 2 mg/l. The CONTRACTOR shall notify the COUNTY that final flushing will be required. The COUNTY will then send personnel to operate COUNTY valves and assist the CONTRACTOR with the final flushing. If there is any question that the chlorinated discharge will cause damage to the environment, a reducing agent shall be applied to the water to neutralize thoroughly the chlorine residual remaining in the water.

I. **Bacteriological Testing:** After final flushing and before the waterline is placed in service, two consecutive sets of samples, taken at least 24 hours apart shall be collected from the ends and intermediate points of the line. Samples shall be tested for bacteriological quality in accordance with the requirements of the State Department of Health Services. For this purpose, for the first set of samples, the pipe shall be re-filled with fresh potable water and left for a period of 24 hours before any sample is collected, for the second set of samples, wait at least 24 hours after the first set of samples were collected and tested before any sample is collected. CONTRACTOR shall contact the COUNTY a minimum of 3 working days prior to requested date of sampling. The COUNTY will collect samples and perform bacteriological tests. Should the initial disinfection treatment fail to produce satisfactory bacteriological test results, the disinfection procedure shall be repeated until acceptable results are obtained.

3.3 PRESSURE AND LEAKAGE TESTING OF WATERLINES

A. Prior to pressure and leakage testing, waterlines shall be flushed or blown out as appropriate. The CONTRACTOR shall test all waterlines either in sections or as a unit. Test sections shall not exceed 1000 feet in length. No section of waterline shall be tested until all field-placed concrete or mortar has attained an age of

14 days, or the waterline has been fully restrained against thrust forces. The test shall be made by closing valves when available, or by placing temporary bulkheads in the pipe and filling the line slowly with water. The CONTRACTOR shall be responsible for ascertaining that all test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, the adjacent pipe. Any unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test, to avoid movement and damage to piping and equipment. The CONTRACTOR shall utilize waterline appurtenances or provide sufficient temporary air tappings in the waterline to allow for evacuation of all entrapped air in each pipe segment to be tested. After completion of the tests, such taps shall be permanently plugged. Care shall be taken to see that all air vents are open during filling.

B. The waterline shall be filled at a rate which will not cause any surges or exceed the rate at which the air can be released through the air valves at a reasonable velocity and all the air within the pipeline shall be properly purged. For steel and ductile iron pipe, after the waterline has been filled, it shall be allowed to stand under a slight pressure for at least 24 hours to allow the mortar lining to absorb what water it will and to allow air to escape from any air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures shall be taken.

C. **Pressure Test:** The hydrostatic test shall consist of holding the test pressure (+/- 5 psi) on the waterline for a period of 2 hours. The test pressure at the low point of the section being tested shall be 1.5 times the working pressure or 100 psi, whichever is greater. At the end of the pressure test period, the amount of water used to maintain the test pressure shall be determined.

D. **Leakage Test:** The leakage test shall be conducted concurrently with the pressure test. Leakage is defined as the quantity of water that must be supplied to a section of pipe to maintain the pressure within 5 psi of the specified test pressure after the pressure test has begun. The maximum allowable leakage shall be according to the following formula:

$$L = S \times D \times P^{1/2} / 133{,}200$$

where:
L = leakage (gallons per hour)
S = length (feet), the lessor of the actual length being tested or the maximum length for determining leakage. Maximum length for determining leakage is [2000 feet].
D = pipe diameter (inches)
P = test pressure (psi)

Pipe with welded joints shall have no leakage.

E. Waterlines, services, and appurtenances that fail to pass the prescribed pressure and leakage test shall be considered defective WORK. The CONTRACTOR shall determine the cause of the failure/leakage, repair the leaks, and shall retest the waterline.

3.4 CONNECTIONS TO EXISTING SYSTEM

A. Where connections are to be made to an existing potable water system, the interior surfaces of all pipe and fittings used in making the connections shall be swabbed or sprayed with a one percent hypochlorite solution before they are installed. Thorough flushing shall be started as soon as the connection is completed and shall be continued until discolored water is eliminated.

END OF SECTION

SECTION 330509

PIPING, GENERAL

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide all piping systems indicated, complete and operable, including pipe supports, hangers, guides, anchors, and connection to and abandonment of existing water facilities in accordance with these Standards & Specifications and Contract Documents.

B. The provisions of this Section shall apply to all piping sections in Divisions 2 and 33.

C. The drawings define the general layout, configuration, routing, method of support, pipe size, and pipe type. The drawings are not pipe construction or fabrication drawings. It is the CONTRACTOR's responsibility to develop the details necessary to construct all piping systems, to accommodate the specific equipment provided, and to provide all spools, spacers, adapters, and connectors for a complete and functional system.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 028200 – Asbestos Cement Pipe Removal and Disposal
Section 055000 – Miscellaneous Metalwork
Section 099000 – Protective Coatings
Section 312316 – Trenching, Backfill, and Compaction
Section 330110 – Waterline Disinfection and Testing

1.3 CONTRACTOR SUBMITTALS

A. **General:** Submittals shall be furnished in accordance with Section 013300 - Contractor Submittals.

B. **Shop Drawings:** Shop Drawings shall contain the following information:

1. Drawings: Layout drawings including all necessary dimensions, details, pipe joints, fittings, specials, bolts and nuts, gaskets, valves, appurtenances, anchors, guides, and material lists. Fabrication drawings shall indicate all spool pieces, spacers, adapters, connectors, fittings, and supports to accommodate the equipment and valves in a complete and functional system.

2. Drawings of pipe supports, hangers, anchors, and guide rails.

3. Calculations for special supports and anchors

C. **Samples:** Performing and paying for sampling and testing as necessary for certifications are the CONTRACTOR'S responsibility.

D. Certifications

1. All necessary certificates, test reports, and affidavits of compliance shall be obtained by the CONTRACTOR.

2. A certification from the pipe fabricator that all pipes will be manufactured subject to the fabricator's or other recognized Quality Control Program.

1.4 EXISTING FACILITIES

A. **Location:** As the Contractor's first order of work, the various connection points to the existing waterlines shall be potholed to identify depth, diameter and pipe material. Pothole information shall be immediately provided to the COUNTY for review. The COUNTY will not review any other Contractor Submittals until after the pothole data is received.

B. **Leak-By:** The Contractor shall note that existing COUNTY valves do not close drip tight. Existing valves in many areas are known to allow significant leak-by when fully closed. The Contractor shall expect leak-by conditions and provide the necessary labor, materials, and equipment to address this condition such that the connection can be made under safe conditions for personnel and contaminated water is prevented from entering the open ends of the existing and new mains. The Contractor shall not operate any COUNTY valves. Only COUNTY personnel shall operate existing system valves to facilitate the Contractors connection work. Also, only COUNTY personnel shall operate valves connecting new mains to the existing in-service mains

PART 2 - PRODUCTS

2.1 GENERAL

A. **Extent of Work:** Pipes, fittings, and appurtenances shall be provided in accordance with the requirements of the applicable Sections of Divisions 2 and 33 and as indicated.

B. **Pipe Supports:** Pipes shall be adequately supported, restrained, and anchored in accordance with this Section and as indicated.

C. **Coating:** Pipes above ground or in structures shall be field-coated in accordance with Section 099000 - Protective Coatings.

D. **Pressure Rating:** Piping systems shall be designed for the maximum expected pressure as defined in Section 330110 - Water Pipeline Testing and Disinfection, or as indicated on the Piping Schedule. Minimum pressure rating shall be 200 psi, which corresponds to a working pressure of 133 psi when pressure tested at 1.5 times the working pressure. Where there is a working pressure greater the 133 psi, the minimum pressure rating shall be 305 psi.

E. **Inspection:** Pipe shall be subject to inspection at the place of manufacture. During the manufacture of the pipe, the COUNTY shall be given access to all areas where manufacturing is in progress and shall be permitted to make all inspections necessary to confirm compliance with requirements.

F. **Tests:** Except where otherwise indicated, materials used in the manufacture of the pipe shall be tested in accordance with the applicable specifications and standards. The CONTRACTOR shall be responsible for performing material tests.

H. **Welder Qualifications:** Welding shall be done by skilled welders and welding operators who have adequate experience in the methods and materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 by an independent local, approved testing agency not more than 6 months prior to commencing work on the pipeline. Machines and electrodes similar to those used in the work shall be used in qualification tests. Qualification testing of welders and materials used during testing are part of the work.

2.2 PIPE FLANGES

A. **General:** Flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe (2-holed) unless otherwise indicated. Attachment of the flanges to the pipe shall conform to the applicable requirements of ANSI/AWWA C207. Flange faces shall be perpendicular to the axis of the adjoining pipe. Flanges for miscellaneous small pipes shall be in accordance with the standards indicated for these pipes.

B. Pressure Ratings

1. **150 psi or less:** Flanges shall conform to either ANSI/AWWA C207 - Steel Pipe Flanges for Waterworks Service--Sizes 4 In. Through 144 In., Class D, or ANSI/ASME B16.5 - Pipe Flanges and Flanged Fittings, 150-lb class.

2. **150 psi to 275 psi:** Flanges shall conform to ANSI/ASME B16.5, 300-lb class.

3. **275 psi to 700 psi:** Flanges shall conform to ANSI/ASME B16.5, 300-lb class.

4. **Selection based on test pressure:** AWWA flanges shall not be exposed to test pressures grater than 125 percent of rated capacity. For higher test pressures, the next higher rated AWWA flange or an ANSI-rated flange shall be selected.

C. **Blind Flanges:** Blind flanges shall be in accordance with ANSI/AWWA C207, or as indicated for miscellaneous small pipes. Blind flanges for pipe sizes 12 inches and greater shall be provided with lifting eyes in form of welded or screwed eye bolts.

D. **Flange Coating:** Machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.

E. **Flange Bolts:** Bolts and nuts shall conform to Section 055000 - Miscellaneous Metalwork.

Studs and bolts shall extend through the nuts a minimum of 1/4-inch. All-thread studs shall be used on all valve flange connections, where space restrictions preclude the use of regular bolts.

F. **Insulating Flanges:** Insulated flanges shall have bolt holes 1/4-inch diameter greater than the bolt diameter.

G. **Insulating Flange Sets:** Insulating flange sets shall be provided where indicated. Each insulating flange set shall consist of an insulating gasket, insulating sleeves and washers and a steel washer. Insulating sleeves and washers shall be one piece when flange bolt diameter is 1-1/2-inch or smaller and shall be made of acetal resin. For bolt diameters larger than 1-1/2-inch, insulating sleeves and washers shall be 2-piece and shall be made of polyethylene or phenolic material. Steel washers shall be in accordance with ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength. Insulating gaskets shall be full-face.

H. Insulating Flange Manufacturers, or equal

JM Red Devil, Type E
Maloney Pipeline Products Co., Houston
PSI Products, Inc.

I. Flange Gaskets: Gaskets for flanged joints shall be ring type, with material and thickness in accordance with ANSI/AWWA C207, suitable for temperatures to 700 degrees F, a pH of one to eleven, and pressures to 1000 psig. Blind flanges shall have gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange.

J. Flange Gasket Manufacturers, or equal

John Crane, Style 2160
Garlock, Style 3000

2.3 THREADED INSULATING CONNECTIONS

A. **General:** Threaded insulating bushings, unions, or couplings, as appropriate, shall be used for joining threaded pipes of dissimilar metals and for piping systems where corrosion control and cathodic protection are involved.

B. **Materials:** Threaded insulating connections shall be of nylon, Teflon, polycarbonate, polyethylene, or other non-conductive materials, and shall have ratings and properties to suit the service and loading conditions.

2.4 MECHANICAL-TYPE COUPLINGS & MECHANICAL JOINT ADAPTERS

A. **Mechanical-type Couplings:** Cast mechanical-type couplings (grooved or banded pipe) shall be provided where indicated. The couplings shall conform to the requirements of ANSI/AWWA C606 - Grooved and Shouldered Joints. Bolts and nuts shall conform to the requirements of Section 055000 - Miscellaneous Metalwork. Gaskets for mechanical-type couplings shall be compatible with the piping service and fluid utilized, in accordance with the coupling manufacturer's recommendations. The wall thickness of grooved piping shall conform with the coupling manufacturer's recommendations to suit the highest expected pressure. To avoid stress on equipment, equipment connections with mechanical-type couplings shall have rigid-grooved couplings or flexible type coupling with harness in sizes where rigid couplings are not available, unless thrust restraint is provided by other means. Mechanical-type couplings shall be bonded. Have the coupling manufacturer's service representative verify the correct choice and application of couplings and gaskets, and the workmanship, to assure a correct installation. To assure uniform and compatible piping components, all grooved fittings, couplings, and valves shall be from the same manufacturer.

B. Manufacturers of Couplings for Steel Pipe, or equal

Aeroquip Corp. (banded or grooved)
Victaulic Style 41 or 44 (banded, flexible)
Victaulic Style 77 (grooved, flexible)
Victaulic Style 07 or HP-70 (grooved, rigid)

C. Manufacturers of Ductile Iron Pipe Couplings, or equal

Aeroquip Corp.
Victaulic Style 31 (flexible or rigid grooving)

Note: Ductile iron pipe couplings shall be furnished with flush seal gaskets.

D. Manufacturers of Couplings for PVC Pipe, or equal

Aeroquip Corp
Victaulic Style 77

Note: Couplings for PVC pipe shall be furnished with radius cut or standard roll grooved pipe ends.

E. **Mechanical Joint Adapters:** The direct connection of mechanical joint (MJ) fittings shall be made using MJ restraint adapters where indicated on the Construction Drawings. The MJ restraint adapters shall be constructed of ductile iron and comply with applicable AWWA Standards. Bolts and nuts shall conform to the requirements of Section 055000 - Miscellaneous Metalwork. The MJ restraint adapters shall be designed for a working pressure of 200 psi and to withstand a test pressure of 250 psi. MJ restraint adapters shall be lined and coated in accordance with AWWA C104 and C110. Manufacturer shall be Infact Corporation, Foster Adaptor, or approved equal.

2.5 SLEEVE-TYPE COUPLINGS

A. **Construction:** Sleeve-type couplings shall be provided where indicated, in accordance with ANSI/AWWA C219 - Standard for Bolted Sleeve-Type Couplings for Plain-End Pipe. Couplings shall be steel with steel bolts, without pipe stop. Couplings shall be of sizes to fit the pipe and fittings indicated. The middle ring shall be not less than 1/4-inch in thickness and shall be either 5 or 7 inches long for sizes up to and including 30 inches and 10 inches long for sizes greater than 30 inches, for standard steel couplings, and 16 inches long for

long-sleeve couplings. The followers shall be single-piece contoured mill sections welded and cold-expanded as required for the middle rings, and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket. Bolts and nuts shall conform to the requirements of Section 055000 – Miscellaneous Metal Work. Buried sleeve-type couplings shall be epoxy-coated at the factory as indicated.

B. **Pipe Preparation:** Where indicated, the ends of the pipe shall be prepared for flexible steel couplings. Plain ends for use with couplings shall be smooth and round for a distance of 12 inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe. The middle ring shall be tested by cold-expanding a minimum of one percent beyond the yield point, to proof-test the weld to the strength of the parent metal. The weld of the middle ring shall be subjected to air test for porosity.

C. Gaskets

1. Gaskets for sleeve-type couplings shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. Gaskets for wastewater and sewerage applications shall be Buna "N," Grade 60, or equivalent suitable elastomer. The rubber in the gasket shall meet the following specifications:

a. Color - Jet Black
b. Surface - Non-blooming
c. Durometer Hardness - 74 plus or minus 5
d. Tensile Strength - 1000 psi Minimum
e. Elongation - 175 percent Minimum

2. The gaskets shall be immune to attack by impurities normally found in water or wastewater. All gaskets shall meet the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above. Gaskets shall be compatible with the piping service and fluid utilized.

D. **Insulating Couplings:** Where insulating couplings are required, both ends of the coupling shall have a wedge-shaped gasket which assembles over a rubber sleeve of an insulating compound in order to obtain insulation of all coupling metal parts from the pipe.

E. **Restrained Joints:** Sleeve-type couplings on pressure lines shall be harnessed unless thrust restraint is provided by other means. Harnesses shall be designed by the pipe manufacturer in accordance with Manual M11, or as indicated. Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed.

F. Manufacturers, or equal

Dresser
Ford Meter Box Co.
Smith-Blair
Romac

2.6 FLANGED COUPLING ADAPTERS

A. **Construction:** Flanged coupling adapters (FCA's) shall be provided where indicated, in accordance with the applicable provisions of ANSI/AWWA C219 - Standard for Bolted Sleeve-Type Couplings for Plain-End Pipe. FCA's shall be steel with steel bolts, and sized to fit the pipe and fittings indicated. The middle ring shall be not less than 1/4-inch in thickness and shall be a minimum of 5 inches long for sizes up to and including 30 inches. The followers shall be single-piece contoured mill sections welded and cold-expanded as required for the middle ring, and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket. Bolts and nuts shall be stainless steel. FCA's shall be epoxy-coated at the factory as indicated.

B. **Pipe Preparation:** Where indicated, the end of the pipe shall be prepared for use with the FCA and shall be smooth and round for a distance of 12 inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe.

C. Gaskets:

1. Gaskets for FCA's shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. The rubber in the gasket shall meet the following specifications:

Color - Jet Black
Surface - Non-blooming
Durometer Hardness - 74 plus or minus 5
Tensile Strength - 1000 psi Minimum
Elongation - 175 percent Minimum

2. The gaskets shall be immune to attack by impurities normally found in water or wastewater. All gaskets shall meet the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above. Gaskets shall be compatible with the piping service and fluid utilized.

D. **Restrained Joints:** FCA's shall be restrained by the use of thrust blocks, harnesses, or other means. Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed. For PVC and ductile iron pipe, EBAA Iron Sales, Mega-Flange may be substituted for restrained FCA's.

E. Manufacturers, or equal

Dresser, Style 127 & 128W
Smith-Blair, Style 911
Romac, Style FC400 & FCA501
EBAA Iron Sales, Mega-Flange

2.7 EXPANSION JOINTS

A. Piping subject to expansion and contraction shall be provided with sufficient means to compensate for such movement without exertion of undue forces to equipment or structures. This may be accomplished with expansion loops, bellow-type expansion joints, or sliding-type expansion joints. Expansion joints shall be of stainless steel, monel, rubber, or other materials best suited for each individual service. Submit detailed calculations and manufacturer's Shop Drawings of all proposed expansion joints, piping layouts, and anchors and guides, including information on materials, temperature and pressure ratings.

2.8 PIPE THREADS

A. Pipe threads shall be in accordance with ANSI/ASME B1.20.1 - Pipe Threads, General Purpose (inch), and be made up with Teflon tape unless otherwise indicated.

2.9 RESTRAINING GLANDS AND JOINT HARNESSES

A. Restraining glands shall be of a model and type designed for the intended pipe material and service conditions, and shall be EBAA Iron Sales, Romac, or approved equal. Joint harnesses shall be of a model and type designed for the intended pipe material and service conditions, and shall be EBAA Iron Sales, Romac, Star, Sigma, or approved equal.

2.10 THRUST BLOCKS

A. Thrust blocks and anchor blocks shall be constructed of Portland Cement Concrete with a minimum compressive strength of 2500 psi. Anchor rods for anchor blocks shall be #5 rebar or 5/8 inch diameter steel rods, and shall be epoxy coated.

2.11 TAPE WRAPPING AND CATHODIC PROTECTION

A. All nuts and bolts on all pipe fittings shall be primered and single tape wrapped with Trenton Wax Tape #1 to fully encapsulate the nuts and bolts without any air voids. The nuts and bolts should broadcast through the wax tape . Manufacturer shall be Polyken or approved equal.

B. Existing buried steel piping shall be cathodically protected by welding a sacrificial anode to the pipe and flat strap jumpers across couplers whenever uncovered for work,

2.12 TRACER WIRE

A. For non-metallic pipelines, 12 gauge continuous location wire shall be placed on all water mains and brought up in valve can per County direction. Underground detectable warning tape shall also be used.

2.13 PIPE HANGERS AND SUPPORTS

A. **Code Compliance:** All piping systems and pipe connections to equipment shall be properly anchored and supported to prevent undue deflection, vibration, dislocation due to seismic events and line pressures, and stresses on piping, equipment, and structures. All supports and parts thereof shall conform to the requirements of ANSI/ASME B31.1 - Power Piping, except as supplemented or modified below. Supports for plumbing piping shall be in accordance with the latest edition of the applicable plumbing code or local administration requirements.

B. **Structural Members:** Wherever possible, pipes shall be supported from structural members. Where it is necessary to frame structural members between existing members, such supplementary members shall be provided. All supplementary members shall be in accordance with the requirements of the building code and the American Institute of Steel Construction and shall be acceptable to the COUNTY.

C. **Pipe Hangers:** Pipe hangers shall be capable of supporting the pipe in all conditions of operation, allowing free expansion and contraction of the piping, and preventing excessive stress on equipment. All hangers shall have a means of vertical adjustment after erection. Hangers shall be designed to prevent becoming disengaged by any movement of the supported pipe. Hangers subject to shock, seismic disturbances, or thrust imposed by the actuation of safety valves, shall include hydraulic shock suppressors. All hanger rods shall be subject to tensile loading only.

D. **Hangers Subject to Horizontal Movements:** At hanger locations where lateral or axial movement is anticipated, suitable linkage shall be provided to permit such movement. Where horizontal pipe movement is greater than 1/2-inch, or where the hanger rod deflection from the vertical is greater than 4 degrees from the cold to the hot position of the pipe, the hanger rod and structural attachment shall be offset in such a manner that the rod is vertical in the hot position.

E. **Spring-Type Hangers:** Spring-type pipe hangers shall be provided for piping subject to vibration or vertical expansion and contraction, such as engine exhausts and similar piping. All spring-type hangers shall be sized to the manufacturer's printed recommendations and the loading conditions encountered. Variable spring supports shall be provided with means to limit misalignment, buckling, eccentric loading, or to prevent overstressing of the spring, and with means to indicate at all times the compression of the spring. Supports shall be capable of accommodating at least 4 times the maximum travel due to thermal expansion.

F. **Thermal Expansion:** Wherever expansion and contraction of piping is expected, a sufficient number of expansion loops or joints shall be provided, together with the necessary rolling or sliding supports, anchors, guides, pivots, and restraints permitting the piping to expand and contract freely in directions away from the anchored points. All components shall be structurally suitable to withstand all loads imposed.

G. **Heat Transmission:** Supports, hangers, anchors, and guides shall be so designed and insulated, that excessive heat will not be transmitted to the structure or to other equipment.

H. **Riser Supports:** Where practical, risers shall be supported on each floor with riser clamps and lugs, independent of the connected horizontal piping.

I. **Freestanding Piping:** Free-standing pipe connections to equipment such as chemical feeders and pumps shall be firmly attached to steel frames fabricated from angles, channels, or I-beams anchored to the structure. Exterior, free-standing overhead piping shall be supported on fabricated pipe stands consisting of pipe columns anchored to concrete footings, with horizontal, welded steel angles and U-bolts or clamps securing the pipes.

J. Materials of Construction:

1. **General:** All pipe support assemblies, including framing, hardware, and anchors, shall be steel construction, galvanized after fabrication, unless otherwise indicated.

2. **Submerged Supports:** All submerged piping, as well as piping, conduits, and equipment in hydraulic structures within 24 inches of the water level, shall be supported with support assemblies, including framing, hardware, and anchors, constructed of Type 316 stainless steel, unless otherwise indicated.

K. **Point Loads:** Any meters, valves, heavy equipment, and other point loads on PVC, FRP, and other plastic pipes, shall be supported on both sides, according to manufacturer's recommendations to avoid undue pipe stresses and failures. To avoid point loads, all supports on PVC, FRP, and other plastic piping shall be equipped with extra wide pipe saddles or galvanized steel shields.

L. **Noise Reduction:** To reduce transmission of noise in piping systems, all copper tubes in buildings and structures shall be wrapped with a 2-inch wide strip of rubber fabric or similar, suitable material at each pipe support, bracket, clip, or hanger.

2.14 SUPPORT SPACING

A. Supports for piping with the longitudinal axis in approximately a horizontal position shall be spaced to prevent excessive sag, bending, and shear stresses in the piping, with special consideration given where components such as flanges and valves impose concentrated loads. Pipe support spacing shall not exceed the maximum spans in the tables below. For temperatures other than ambient temperatures, or those listed, and for other piping materials or wall thicknesses, the pipe support spacings shall be modified in accordance with the pipe manufacturer's recommendations. Vertical supports shall be provided to prevent the pipe from being overstressed from the combination of all loading effects.

1. Support Spacing for Schedule 40 and Schedule 80 Steel Pipe:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
1/2	6
3/4 and 1	8
1-1/4 to 2	10
3	12
4	14
6	17
8 and 10	19
12 and 14	23
16 and 18	25
20 and greater	30

2. Support Spacing for Welded Fabricated Steel Pipe:

Maximum Spans for Pipe Supported in Minimum 120 degree Contact Saddles (feet)

Nominal Pipe Diameter (inches)	Wall Thickness (inches)							
	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
24	33	37	41	43	45	47		
26	34	38	41	44	46	48		
28	34	38	41	44	47	49		
30	34	38	42	45	48	49		
32	34	39	42	45	48	50		
34	35	39	43	46	48	50		
36	35	39	43	46	49	51	55	
38	35	39	43	46	49	51	55	
40	35	40	43	47	49	52	56	
42	35	40	44	47	50	52	56	
45	--	40	44	47	50	53	57	
48	--	40	44	47	50	53	58	61

For steel pipe sizes not presented in this table, the support spacing shall be designed so that the stress on the pipe does not exceed 5,000 psi. Maximum deflection of pipe shall be limited to 1/360th of the span and shall be calculated by using the formula:

$$L = (7500tD/(32t+D))^{1/2}$$

where: t = Thickness (inches)
D = Diameter (inches)
L = Maximum span (feet)

3. Support Spacing for Ductile-Iron Pipe:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
All Diameters	Two supports per pipe length or 10 feet (one of the 2 supports located at joint)

4. Support Spacing for Copper Tubing:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
1/2 to 1-1/2	4
2 to 4	6
6 and greater	8

5. Support Spacing for Schedule 80 PVC Pipe:

Nominal Pipe Diameter (inches)	Maximum Span (at 100 degrees F) (feet)
1/2	4
3/4	4.5
1	5
1-1/4	5.5
1-1/2	5.75
2	6.25
3	7.5
4	8.25
6	10
8	11
10	12.25
12	13.25

2.15 MANUFACTURED SUPPORTS

A. **Stock Parts:** Where not specifically indicated, designs which are generally accepted as exemplifying good engineering practice and use stock or production parts, shall be utilized wherever possible. Such parts shall be locally available, new, of best commercial quality, designed and rated for the intended purpose.

B. Manufacturers, or Equal:

Basic-PSA, Johnstown, PA;
Bergen-Paterson Pipesupport Corp., Woburn, MA;
Power Piping Company, Pittsburgh, PA.
Standon, Model S89 &S92
Pipeline Products

2.16 COATING

A. **Galvanizing:** Unless otherwise indicated, all fabricated pipe supports other than stainless steel or non-ferrous supports shall be blast-cleaned after fabrication and hot-dip galvanized in accordance with ASTM A 123 - Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. **Other Coatings:** Other than stainless steel or non-ferrous supports, all supports shall receive Protective Coatings in accordance with the requirements of Section 099000 - Protective Coatings.

2.17 CONNECTIONS TO EXISTING FACILITIES

A. All materials used in making the connection or removing the facility from service shall conform to the applicable sections of these Standards & Specifications and the Construction Drawings.

PART 3 - EXECUTION

3.1 MATERIAL DELIVERY, STORAGE, AND PROTECTION

A. Pipe and pipe appurtenances such as fittings, valves, etc. shall be delivered in a clean and undamaged condition. The CONTRACTOR shall be responsible for unloading and loading of pipe and pipe appurtenances at the job site in accordance with the manufacturer's printed instructions and recommendations. All pipe shall be unloaded at the site with care using a double padded sling or as specified in the applicable Sections. Pipe appurtenances shall be unloaded at the site with care using hoists or skids to avoid damage to materials. Under no circumstances shall materials be dropped. When unloading pipe, trucks shall be parked on level ground. All pipe and pipe appurtenances shall be kept in a safe storage area where they can be protected from heat, dirt, weather, or other detrimental factors. Cement mortar lined pipe shall be stored with proper stulling per the manufacturer's recommendations. Pipe shall be stored in such a way as not to inflict loading which may cause bending, cracking or other damage. Pipe appurtenances shall be stored off the ground for protection against oxidation caused by ground contact. Defective or damaged materials shall be replaced with new materials at the CONTRACTORs expense.

3.2 GENERAL

A. Pipes, fittings, and appurtenances shall be installed in accordance with the requirements of the applicable Sections of Divisions 2 and 33.

B. **Corrosion Protection:** All nuts and bolts on flanges, fittings, couplings, joint harnesses, etc. for buried service shall be tape wrapped, after installation is completed, using heavy duty joint wrap, in accordance with Section 099000 – Protective Coatings. Entire length of bolts and all hardware shall be fully encapsulated with tape wrapping.

C. **Core Drilling:** Where core drilling is required for pipes passing through existing concrete, core drilling locations shall be determined by radiograph of concrete construction to avoid damage to embedded raceways and rebar.

D. **Cleanup:** After completion of the WORK, cuttings, joining and wrapping materials, and other scattered debris shall be removed from the Site. The entire piping system shall be handed over in a clean and functional condition.

3.3 THRUST RESTRAINT

A. **General**: Thrust restraint shall be provided at all vertical and horizontal bends, tees, crosses, dead ends, hydrants, reducers, valves, and fittings. Thrust restraint shall be accomplished by the use of restraining glands and joint harnesses, or thrust blocks. Restraining Glands shall be used where specified on mechanical joint fittings for PVC and ductile iron pipe.

B. **Restraining Glands and Joint Harnesses:** Restraining glands and joint harnesses shall be installed in accordance with manufacturer recommendations. After installation, all nuts and bolts shall be primered and wrapped with 2 layers of 35 mil adhesive pipe wrap. Joint harnesses shall be used in conjunction with retainer glands wherever retainer glands are to be used to provide thrust restraint.

C. **Thrust Blocks:** Thrust and anchor blocks shall be formed out of concrete meeting requirements of Section 033000 – Cast-in-Place Concrete. Blocks shall be sized and configured in accordance with Section

2.04 C and Standard Detail 2-08 of these Standards & Specifications. Concrete shall be poured against undisturbed ground.

D. Epoxy coated number 5 reinforcement bar shall be embedded and wrapped around appurtenance as shown in Standard Detail 2-08. Care shall be taken not to cover fittings, valves, bolts, nuts, or other appurtenances with concrete. Blocks shall be cured 24 hours prior to backfill, and shall be cured a minimum of 7 days or have 75% of the 28-day strength before the water line can be filled and pressurized.

3.4 TRACER WIRE

A. Continuous tracer wire shall be placed directly on the top surface of all water mains. Where detectable warning tape is also used, place it no less than 1 foot above the top of the water main.

3.5 INSTALLATION OF PIPE SUPPORTS

A. **General:** All pipe supports, hangers, brackets, anchors, guides, and inserts shall be fabricated and installed in accordance with the manufacturer's printed instructions and ANSI/ASME B31.1 - Power Piping. All concrete inserts for pipe hangers and supports shall be coordinated with the formwork.

B. **Appearance:** Pipe supports and hangers shall be positioned to produce an orderly, neat piping system. All hanger rods shall be vertical, without offsets. Hangers shall be adjusted to line up groups of pipes at the proper grade for drainage and venting, as close to ceilings or roofs as possible, without interference with other work.

3.6 FABRICATION

A. **Quality Control:** Pipe hangers and supports shall be fabricated and installed by experienced welders and fitters, using the best welding procedures available. Fabricated supports shall be neat in appearance without sharp corners, burrs, and edges.

3.6 CONNECTION TO EXISTING WATER LINES

A. **Shutdown Request:** The Contractor shall submit a written request to the COUNTY a minimum of ten (10) working days before the time of any desired shutdown of existing waterlines or services. The written request shall include the date of the proposed shutdown and the estimated number of hours required to complete the work. The COUNTY will review the request and determine the actual time and date of the shutdown based on the availability of COUNTY staff.

B. **Authorization:** Connections shall be made only by the COUNTY. No connection work shall be performed prior to authorization by the COUNTY.

C. **Time Schedule:** Work which will require disruption of service in water mains shall be planned and executed so that it will not disrupt service before 8:30 A.M. and insure restoration of service before 4:00 P.M. each day, unless an exception in writing is obtained from the COUNTY prior to the shutdown. To comply with this schedule the Contractor must consider the time required to:

1. Turn off customer services and isolation valves;
2. Drain and dispose the water from the isolated section of the water line to be cut;
3. Perform cut-in operations; and
4. Flush the water line prior to service restoration.

Note: If the COUNTY determines that the disruption of service may exceed the time limitations, the Contractor shall re-plan the work for more than one day of operation to ensure service is restored by 4:00 P.M. each day.

D. **Material:** The Contractor shall provide the COUNTY with verification that all materials are on hand a minimum of five working days in advance of the proposed shutdown date. The Contractor shall furnish all pipe

and materials as may be required for connections the day before of the shutdown date the Contractor shall be fully prepared for the planned work with all required materials, tools, equipment, dewatering equipment, lights, barricades, permits, skilled personnel, and supervision. If adequate preparations have not been made by the Contractor, the COUNTY will cancel the shutdown and the Contractor shall be responsible for all costs associated with the cancelled shutdown.

E. **Inadequate Progress:** If progress is inadequate during the connection operations to complete the connection in the time specified, the COUNTY shall order necessary corrective measures. All costs for corrective measures shall be paid by the Contractor.

F. **Connections:** New mains shall be connected to existing in-service mains against a closed valve prior to disinfection, flushing and pressure testing of the new mains. The Contractor shall not operate the closed valve. Only COUNTY field personnel shall operate and/or open existing system valves and valves connecting new mains to the existing in-service mains. Connections shall be made with as little change as possible in the grade of new main. If the grade of the existing pipe is below that of the new pipeline, a sufficient length of the new line shall be deepened so as to prevent the creation of any high spot or abrupt changes in grade of the new line. Where the grade of the existing pipe is above that of the new pipeline, the new line shall be laid at specified depth, except for the first joint adjacent to the connection, which shall be deflected as necessary to meet the grade of the existing pipe. If sufficient change in direction cannot be obtained by the limited deflection of the first joint, a fitting of the proper angle shall be installed. Where the connection creates a high or low spot in the line, a combination air valve or blowoff assembly shall be installed as directed by the COUNTY.

G. **Testing:** The new pipeline shall be disinfected and pressure tested in accordance with Section 02643 – Waterline Disinfection & Testing.

3.7 REMOVAL OF EXISTING MAINS AND APPURTENANCES FROM SERVICE

A. **General:** Existing waterlines, conduits, or structures shall be abandoned and removed from service at the locations shown on the Construction Drawings or as directed by the COUNTY, in accordance with the COUNTY'S Standards & Specifications. At all locations where new waterlines are to be connected to existing waterlines and where portions of the existing waterlines are to be abandoned, the existing waterlines to be abandoned shall be removed for a minimum distance of five feet clear from any waterlines to remain in service. Conduits to be abandoned in place shall be plugged with concrete to form a 2 foot long plug at all openings. Existing valves removed from service due to the abandonment of a waterline shall be closed, the valve can removed, and the hole backfilled with concrete slurry and patched with asphalt.

B. **Removed Material:** Removed pipe and appurtenances may be temporarily stockpiled on the job in a location that will not disrupt traffic or be a safety hazard per restrictions and requirements of the County of Santa Barbara. Materials from abandoned facilities shall be salvaged as shown on the Construction Drawings or as indicated in the COUNTY'S Standards & Specifications. Removed appurtenances to be salvaged shall be delivered to the COUNTY'S storage yard as directed by the COUNTY. Removed pipe shall be disposed of by the CONTRACTOR in accordance with State and local regulations.

C. **Maintenance of Service:** Before excavating for laying mains that are to replace existing pipes and/or services, the Contractor shall make provisions for maintaining continuous service as directed by the COUNTY.

END OF SECTION

SECTION 330531
PVC PRESSURE PIPE (AWWA C900, MODIFIED)

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide 305 psi or Class 235 polyvinyl chloride (PVC) pressure pipe, complete in place, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 312316 –Trenching, Backfill and Compaction
Section 330110 – Waterline Disinfection & Testing
Section 330509 – Piping, General
Section 330519 – Ductile Iron Pipe
Section 331216 – Valves and Appurtenances
Section 331417 – Service Connections

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. **Commercial Standards:**

ANSI/AWWA C104/A21.5	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
ANSI/AWWA C110/A21.10	Ductile-Iron and Gray-Iron Fittings 3-inch Through 48-inch for Water and Other Liquids
ANSI/AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
ANSI/AWWA C153/A21.53	Ductile-Iron Compact Fittings, 3 in. Through 12 in. for Water and Other Liquids
ANSI/AWWA C600	Installation of Ductile-Iron Water Mains and Appurtenances
ANSI/AWWA C900	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inch (100 mm) Through 60-inch (1,500 mm)
AWWA Manual M23	PVC Pipe - Design and Installation
ASTM D 2584	Test Method for Ignition Loss of Cured Reinforced Resins
PPI Technical Report TR 3	Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB) Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe
PPI Technical Report TR 4	PPI Listing of Hydrostatic Design Basis (HDB), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe

1.4 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 013300 - Contractor Submittals.

B. **Shop Drawings:** Design calculations to demonstrate compliance of pipe and fittings with this Section. Manufacturer's literature for metallic locating tape.

C. **Certifications:** A certified affidavit of compliance for pipe and other products or materials under this Section and the following supplemental requirements:

1. Hydrostatic proof test reports.
2. Sustained pressure test reports.
3. Burst strength test reports.

D. The CONTRACTOR shall be responsible for performing and paying for sampling and testing as necessary for the certifications.

PART 2 - PRODUCTS

2.1 GENERAL

A. All PVC pressure pipe (4-inch through 12-inch) shall be Class 200, and shall conform to the applicable requirements of ANSI/AWWA C900 subject to additional requirements herein. All large diameter PVC pressure pipe (14-inch through 36-inch) shall be Class 235, and shall conform to the applicable requirements of AWWA C900 and the additional requirements herein. Materials used in manufacture of the pipe shall be tested in accordance with the requirements of this Section and the referenced standards, as applicable.

2.2 PIPE DESIGN CRITERIA

A. **General:** PVC pressure pipe shall be designed in accordance with the requirements of Appendix A of ANSI/AWWA C900, Large PVC pressure pipe shall be designed in accordance with the requirements of Manual M23, as applicable, and the supplemental requirements in this Section.

B. **Pipe Wall Thickness for Internal Pressure:** The pipe shall be designed with a minimum thickness (t) or dimension ratio (DR) in accordance with paragraph A.3 of the above referenced Appendix A.

C. **Determination of External Loads:** Instead of the equations in paragraph A.4 of the above referenced Appendix A, the dead (earth) loads shall be computed using the following 2 equations for trench or embankment conditions as applicable:

D. In lieu of the equations in the Manual, the dead (earth) loads shall be computed using the following 2 equations for trench or embankment conditions as applicable:

1. Trench Condition:

$$W_d = C_d w B_d^2$$

Where: W_d = Earth load in pounds per linear foot
C_d = Calculation coefficient
Ku' = [0.13]
w = [130] lb/ft^3
B_d = Trench width at top of pipe, feet

2. Positive Projecting Embankment Condition:

$$W_c = C_c w B_c^2$$

Where:	W_c	=	Earth load in pounds per linear foot
	C_c	=	Calculation coefficient (based on $r_{sd}P$ of 0.75)
	C_c	=	Calculation coeff. for lg dia. (based on $r_{sd}p$ = 0.25)
	Ku	=	[0.19]
	w	=	[130] lb/ft^3
	B_c	=	Outside diameter of pipe, feet

D. Instead of the equations in paragraph A.4, the truck live loads shall be determined using the method recommended by AASHTO in "Standard Specifications for Highway Bridges." For depths of cover less than 10 feet HS-20 live loads shall be added to the earth loads to determine the total load. For depths of cover 3 feet or less, HS-20 live load plus impact shall be included.

E. **Pipe Deflection:** With reference to paragraph A.5, the deflection of the pipe after installation shall not exceed 0.03 times the outside diameter.

2.3 PIPE

A. The pipe shall be Class 200 or 235 (diameter 14 inch and greater) and of the diameter specified or shown, shall be furnished complete with rubber gaskets, and all specials and fittings shall be provided as required in the Contract Documents. The dimensions and pressure classes for PVC pressure pipe with Cast-Iron Pipe Equivalent O.D.'s shall conform to the requirements of AWWA C900.

B. **Additives and Fillers:** Unless otherwise allowed in alternate qualification procedures of PPI-TR3, compounds which have a Hydrostatic Design Basis (HDB) of 4000 psi at 73.4 degrees F and for water shall not contain additives and fillers that exceed the recommended values in Table 1, Part Y of PPI-TR3 (e.g., allowable content range for calcium carbonate is 0.0-5.0 parts per hundred of resin). If requested by the COUNTY, the additive and filler content shall be determined using the pyrolysis method as specified in ASTM D 2584.

C. **Joints and Deflection:** Joints for the buried PVC pipe shall be integral bell and spigot push–on joints employing a rubber gasket. The bell and coupling shall be the same thickness as of the pipe barrel, or greater thickness. Deflection at the joint shall not exceed 1.5 degrees or the maximum deflection recommended by the manufacturer. No deflection of the joint shall be allowed for joints which are over-belled or not belled to the stop mark.

2.4 FITTINGS

A. Fittings shall be ductile iron and shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3-inch through 48-inch and shall have a minimum pressure rating of 250 psi. PVC pipe fittings shall be mechanical joint or flanged as indicated on the plans. Each fitting shall be clearly labeled to identify its size and pressure class.

B. All fittings shall be lined and coated in accordance with AWWA Standards and the requirements of Section 099000 - Protective Coatings.

C. All mechanical joint fittings shall be supplied with restraining glands for thrust restraint unless otherwise specified on the Construction Drawings.

D. Couplings shall be Romac 501 straight, Romac XR501, or Smith-Blair.

PART 3 - EXECUTION

3.1 GENERAL

A. Installation shall conform to the requirements of AWWA M23, instructions furnished by the pipe manufacturer, and to the supplementary requirements herein. Wherever the provisions of this Section and the aforementioned requirements are in conflict, the more stringent provision shall apply.

B. Laying, jointing, testing for defects and for leakage shall be performed in the presence of the COUNTY, and shall be subject to approval before acceptance. Material found to have defects will be rejected and the CONTRACTOR shall promptly remove such defective materials from the Site.

C. The CONTRACTOR shall determine the location of existing underground utility structures in the vicinity of proposed pipe installation prior to excavation. All existing above and below ground structures within the work area shall be protected in place unless indicated otherwise on the Construction Drawings.

D. Whenever the WORK is not actively in progress, the open ends of all installed pipe shall be plugged or capped with bulkhead mechanical joint end cap to prevent the entry of animals, water, or other undesirable substances.

3.2 HANDLING AND STORAGE

A. **Handling:** Pipe, fittings and accessories shall be carefully inspected before and after installation and those found defective will be rejected. Pipe and fittings shall be free from fins and burrs. Before being placed in position, pipe, fittings, and accessories shall be cleaned, and shall be maintained in a clean condition. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe, fittings or any other material be dropped or dumped into trenches.

B. **Storage:** Pipe should be stored, if possible, at the Site in unit packages provided by the manufacturer. Caution should be exercised to avoid compression damage or deformation to bell ends of the pipe. Pipe should be stored in such a way as to prevent sagging or bending and be protected from exposure to direct sunlight by covering with an opaque material while permitting adequate air circulation above and around the pipe. Gaskets should be stored in a cool, dark place out of the direct rays of the sun, preferably in original cartons.

3.3 TRENCHING AND BACKFILL

A. Trench excavation and backfill shall conform to the requirements of Section 312316 –Trenching, Backfill and Compaction.

3.4 INSTALLATION

A. Bell-and-spigot pipe shall be laid with the bell end pointing in the direction work is progressing. Pipe shall be graded in straight lines, taking care to avoid the formation of any dips or low points. Pipe shall not be laid when the conditions of trench or weather are unsuitable. Pipe shall be laid uphill on grades 10% or greater.

B. Pipe shall be supported at its proper elevation and grade, care being taken to secure firm and uniform support. Wood support blocking will not be permitted. The full length of each section of pipe and fittings shall rest solidly on the pipe bed, with recessed excavation to accommodate bells, joints, and couplings. Anchors and supports shall be provided where indicated and where necessary for fastening work into place. Fittings shall be independently supported.

C. Short lengths of pipe shall be used in and out of each rigid joint or rigid structure. Piping that does not allow sufficient space for proper installation of jointing material shall be replaced by one of proper dimensions. Blocking or wedging between bells and spigots will not be permitted. Pipe alignment shall be checked after each length of pipe is installed to insure the downstream pipe did not deflect. Pipe shall not deflect at the joints more than 75% of manufacturer's printed recommendations. Trench shall not be backfilled prior to

pipeline inspection by the COUNTY. Any pipeline buried prior to inspection shall be uncovered by the CONTRACTOR, at his own expense, for the COUNTY to inspect.

D. Joints shall be installed according to manufacturer's recommendations. The surfaces of the pipe spigot end, bell and gasket shall be cleaned just prior to joining pipes. The spigot end of the pipe shall be beveled and checked for proper fit in the bell end without causing damage to the gasket. A lubricant, approved by the pipe manufacturer, shall be applied to the spigot end prior to joining pipes. The spigot shall penetrate bell completely as indicated by penetration line. Trenches shall be kept free of water until joints have been properly made. The maximum combined deflection at any coupling shall be in accordance with the manufacturer's recommendations.

E. Pipe shall be cut by means of saws, power driven abrasive wheels, or pipe cutters, which will produce a square cut. No wedge-type roller cutters will be permitted. After cutting, the end of the pipe shall be beveled using a beveling tool, portable type sander, or abrasive disc. The pipe shall be remarked with a penetration line at the required penetration depth.

F. **Work Stoppage:** At the end of each working day, CONTRACTOR shall plug or cap the open ends of all unfinished pipelines with securely bolted mechanical joint plugs, mechanical joint end caps, or blind flanges. If pipe is subject to flooding, pipe shall be anchored as precaution against flotation. Trenches shall be backfilled in accordance with the COUNTY Standards and Specifications.

3.5 SERVICE CONNECTIONS

A. **Service Connections:** Direct tapping will not be permitted. Bronze service clamps shall be used for all service connections. Service clamps shall have a bearing area of sufficient width along the axis of the pipe, so that the pipe will not be distorted when the saddle is made tight. An internal shell cutter shall be used to drill through the corporation stop to minimize PVC shavings, retain the coupon, and reduce stress. Single fluted shell cutters or twist drills are not acceptable. Lubricate the cutting and tapping edges of the tool with cutting lubricant. Make the cuts slowly and use the follower very lightly - do not force cutter through pipe wall. Shell cutter shall have sufficient throat depth to handle the heavy wall PVC pipe. Maximum outlet size permitted with service clamps or saddle is 2 inches.

B. Tapping sleeves and valves shall be used for all outlet sizes greater than 2 inches in diameter. Tapping sleeves shall be assembled and installed in accordance with the manufacturer's recommendations.

3.6 CONNECTIONS TO EXISTING PIPELINES

A. The CONTRACTOR shall locate all underground improvements and install the pipelines to the depths indicated. Where the new work is to be connected to existing pipelines, the CONTRACTOR shall make its arrangements with the COUNTY well in advance of the connections, to allow adequate time for dewatering of the existing line, if necessary, and shall expedite the work to minimize water outages to the users. Where sections of existing distribution mains are taken permanently out of service and abandoned in place, the cut ends shall be plugged solid with concrete to a depth of not less than two pipe diameters.

3.7 FIELD TESTING AND DISINFECTION

A. Field testing and disinfection and water mains shall conform to the requirements of Section 330110 - Waterline Disinfection & Testing.

END OF SECTION

SECTION 331216

VALVES AND APPURTENANCES

PART 1 - GENERAL

1.1 DESCRIPTION

This section describes the materials and installation procedures gate valves, butterfly valves, ball valves, combination air valves (CAV), pressure reducing valves, pressure relief valves, check valves, stainless steel tapping sleeves, pressure gauges, and appurtenances (valve cans, extensions, CAV enclosures).

1.2 REQUIREMENTS

A. The CONTRACTOR shall provide all valves, actuators, valve cans, and appurtenances, complete and operable, in accordance with the Contract Documents.

B. The provisions of this Section shall apply to all valves and valve actuators except where otherwise indicated. Valves and actuators in particular locations may require a combination of units, sensors, limit switches, and controls indicated in other Sections of the Specifications.

C. Where a valve is to be supported by means other than the piping to which it is attached, the CONTRACTOR shall obtain from the valve manufacturer a design for support and foundation. The design, including drawings and calculations sealed by the PROJECT ENGINEER, shall be submitted with the Shop Drawings. When the design is approved, the support shall be provided.

D. **Unit Responsibility:** A single manufacturer shall be made responsible for coordination of design, assembly, testing, and furnishing of each valve, sleeve, and actuator; however, the CONTRACTOR shall be responsible to the COUNTY for compliance with the requirements of each valve section or sleeve. Unless indicated otherwise, the responsible manufacturer shall be the manufacturer of the valve or sleeve.

E. **Single Manufacturer:** Where two or more valves of the same type and size are required, the valves and actuators shall be furnished by the same manufacturer. Where indicated, valves may be provided with actuators manufactured by the valve manufacturer. Where actuators are furnished by different manufacturers, the CONTRACTOR shall coordinate selection to have the fewest number of manufacturers possible. Where two or more tapping sleeves of the same type or size are required, the sleeves shall be produced by the same Manufacturer.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 033000 – Cast-in-Place Concrete
Section 099000 – Protective Coatings
Section 312316 –Trenching, Backfill and Compaction
Section 330110 – Waterline Disinfection & Testing
Section 330509 – Piping, General

1.3 CONTRACTOR SUBMITTALS

A. **General:** Submittals shall be furnished in accordance with Section 013300 – Contractor Submittals.

B. Submit shop drawings. Submit manufacturer's catalog data. Show dimensions, materials of construction by ASTM reference and grade, and coatings. A cavitation study shall be submitted for pressure reducing valves.

C. Shop Drawings of all tapping sleeves and service saddles shall be submitted as a completed package. Shop Drawings shall contain the following information:

1. Valve name, size, Manufacturer, model number, pressure rating, identification number (if any), and specification section number.

2. Assembly drawings with part nomenclature, materials, dimensions, and weights.

3. Tapping Sleeve Labeling: A schedule of sleeves to be labeled, indicating in each case the sleeve location and the proposed wording for the label.

D. Shop Drawings. The CONTRACTOR shall submit complete Shop Drawings of butterfly valves and actuators, with drawings showing valve port diameter complete with dimensions, part numbers and materials of construction. Certification of proof-of-design test from the valve manufacturer shall also be provided.

E. Manufacturer's Certification that the valve complies with all applicable provisions of AWWA C504 – Rubber-Seated Butterfly Valves.

F. **Technical Manual and Spare parts List:** The Technical Manual shall contain the required information for each valve. A Spare Parts List

1.4 QUALITY ASSURANCE

A. Valves shall be subjected to performance, leakage, and hydrostatic tests in accordance with procedures and acceptance criteria established by AWWA C504.

PART 2 – PRODUCTS

2.1 GENERAL

A. **General:** Valves and actuators shall be new and of current manufacture. Shut-off valves 6-inches and larger within vaults and above ground shall have actuators with position indicators. Buried valves shall be provided with valve cans and lids, and valve stem extensions.

B. **Protective Coatings:** The exterior surfaces of all valves and the wet interior surfaces of ferrous valves of sizes 4 inches and larger shall be coated in accordance with Section 099000-Protective Coatings. The valve Manufacturer shall certify in writing that the required coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with these Specifications.

C. **Valve Labeling:** Except when such requirement is waived by the COUNTY in writing, a label shall be provided on all shut-off valves and control valves except for hose bibs. The label shall be of 1/16-inch plastic or stainless steel, minimum 2 inches by 4 inches in size, and shall by permanently attached to the valve or on the wall adjacent to the valve as directed by the COUNTY.

D. **Valve Testing:** As a minimum, unless otherwise indicated or recommended by the reference Standards, valves 3 inches in diameter and smaller shall be tested in accordance with manufacturer's standard and 4 inches in diameter and larger shall be factory tested as follows:

1. **Hydrostatic Testing:** Valve bodies shall be subjected to internal hydrostatic pressure equivalent to twice the water rated pressure of the valve. Metallic valves rating pressures shall be at 100 degrees F and plastic valves shall be 73 degrees, or at higher temperature according to type of material. During the hydrostatic test, there shall be no leakage through the valve body, end joints, or shaft seals, nor shall any part of the valve be permanently deformed. The duration shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes.

2. **Seat Testing:** Valves shall be tested for leaks in the closed position with the pressure differential across the seat equal to the water rated pressure of the valve. The duration of test shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes. Leakage past the closed valve shall not exceed 1 fluid ounce per hour per inch diameter for metal seated valves and drop-tight for resilient seated valves.

3. **Performance Testing:** All valves shall be shop operated from fully closed to fully open position and reverse under no-flow conditions in order to demonstrate the valve assembly operates properly.

E. **Certification:** Prior to shipment, the CONTRACTOR shall submit for valves over 12 inches in size, certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, or ASTM.

F. **Valve Marking:** Valve bodies shall be permanently marked in accordance with MSS SP25 - Standard Marking Systems for Valves, Fittings, Flanges, and Unions.

2.2 MATERIALS

A. **General:** Materials shall be suitable for the intended application. Materials not indicated shall be high-grade standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended. Actuators shall be current models of the best commercial quality materials and liberally-sized for the required torque. Unless otherwise indicated, valve and actuator bodies shall conform to the following requirements:

1. **Cast Iron:** Close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Castings, Class 30, or to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

2. **Ductile Iron:** ASTM A 536 - Ductile Iron Castings, or to ASTM A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

3. **Bronze:** ASTM B 62 - Composition Bronze or Ounce Metal Castings, and valve stems not subject to dezincification shall conform to ASTM B 584 - Copper Alloy Sand Castings for General Applications.

4. **Stainless Steel:** Stainless steel valve and operator bodies and trim shall conform to ASTM A 351 - Steel Castings, Austenitic, for High-Temperature Service Pressure- Containing Parts, Grade CF8M, or shall be Type 316 stainless steel.

5. **NSF Standard 61:** All materials shall be listed for use in contact with potable water.

2.3 VALVE CONSTRUCTION

A. **Bodies:** Valve bodies shall be cast, molded (in the case of plastic valves), forged, or welded of the materials indicated, with smooth interior passages. Wall thicknesses shall be uniform in agreement with the applicable standards for each type of valve, without casting defects, pinholes, or other defects that could weaken the body. Welds on welded bodies shall be done by certified welders and shall be ground smooth. Valve ends shall be as indicated, and be rated for the maximum

temperature and pressure to which the valve will be subjected.

B. **Bonnets:** Valve bonnets shall be clamped, screwed, or flanged to the body and shall be of the same material, temperature, and pressure rating as the body. The bonnets shall have provision for the stem seal with the necessary glands, packing nuts, or yokes.

C. **Stems:** Valve stems shall be of the materials indicated, or, if not indicated, of the best commercial material for the specific service, with adjustable stem packing, O-rings, Chevron V-type packing, or other suitable seal. Where subject to dezincification, bronze valve stems shall conform to ASTM B 62, containing not more than 5 percent of zinc or more than 2 percent of aluminum, with a minimum tensile strength of 30,000 psi, a minimum yield strength of 14,000 psi, and an elongation of at least 10 percent in 2 inches. Where dezincification is not a problem, bronze conforming to ASTM B 584 may be used, except that zinc content shall not exceed 16 percent.

E. **Internal Parts:** Internal parts and valve trim shall be as indicated for each individual valve. Where not indicated, valve trim shall be of Type 316 stainless steel or other best suited material.

F. **Operating Nuts:** Buried operating nuts shall comply with AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.

G. **Nuts and Bolts:** Nuts and bolts on valve flanges and supports shall be in accordance with Section 05500 - Miscellaneous Metalwork.

2.4 ACTUATORS

A. **General:** Unless otherwise indicated, valves and gates shall be furnished with manual actuators. Valves in sizes up to and including 4 inches shall have direct acting lever or handwheel actuators of the Manufacturer's best standard design. Larger valves and gates shall have gear- assisted manual actuators, with an operating pull of maximum 60 pounds on the rim of the handwheel. Buried and submerged gear-assisted valves, valves 30 inches in diameter and larger, and where so indicated, shall have worm-gear actuators, hermetically-sealed and grease-packed, where buried or submerged. All other valves 6 inches to 24 inches in diameter may have traveling- nut actuators, worm-gear actuators, spur- or bevel-gear actuators, as appropriate for each valve. The CONTRACTOR shall furnish actuators complete and operable with mounting hardware, handwheels, levers, and extensions, as applicable. Actuators shall have the torque ratings equal to
or greater than required for valve seating and dynamic torques, whichever is greater and shall be capable of holding the valve in any intermediate position between fully-open and fully-closed without creeping or fluttering.

B. **Mounting:** Actuators shall be securely mounted by means of brackets or hardware specially designed and sized for this purpose and of ample strength. The word "open" shall be cast on each valve or actuator with an arrow indicating the direction to open in the counter-clockwise direction. Non-buried gear and power actuators shall be equipped with position indicators.

C. **Manual Worm-Gear Actuator:** The actuator shall consist of a single or double reduction gear unit contained in a weather-proof cast-iron or steel body with cover and minimum 12-inch diameter handwheel. The actuator shall be capable of 90-degree rotation and shall be equipped with travel stops capable of limiting the valve opening and closing. The actuator shall consist of spur or helical gears and worm-gearing. The spur or helical gears shall be of hardened alloy steel and the worm-gear shall be alloy bronze. The worm-gear shaft and the handwheel shaft shall be of 17-4 PH or similar stainless steel. All gearing shall be accurately cut with hobbing machines. Ball or roller bearings shall be used throughout. Actuator output gear changes shall be mechanically possible by simply changing the exposed or helical gearset ratio without further disassembly of the actuator. All gearing shall be designed for a 100 percent overload.

D. **Traveling-Nut Actuator:** The actuator shall consist of a traveling-nut with screw (Scotch yoke) contained in a weather-proof cast-iron or steel housing with spur gear and minimum 12-inch diameter handwheel. The screw shall run in 2 end bearings, and the actuator shall be self-locking to maintain the valve position under any flow condition. The screw and gear shall be of hardened alloy steel or stainless steel, and the nut and bushings shall be of alloy bronze. The bearings and gear shall be grease-lubricated by means of grease nipples. All gearing shall be designed for a 100 percent overload.

2.5 VALVE CANS AND LIDS

A. Unless otherwise indicated, buried valves shall be in cast iron valve cans with lids permanently labeled "WATER" for potable waterlines and "RW" for recycled waterlines. Valves shall have extension stems with square nuts or floor stands, position indicators, and PVC pipe extensions for valve cans. Size and type of valve cans and lids shall match existing valve cans and lids so as to be interchangeable. Valve cans shall be the 3-piece adjustable type. All materials used in manufacturing shall conform to ASTM 48-30. Frame and Cover shall exceed H-20 wheel loading. Castings shall be dipped in black bituminous coating. Valve cans shall be Parkson "Buffalo" style, South Bay Foundry, Sigma, or approved equal.

2.6 VALVE STEM EXTENSIONS AND ACCESSORIES

A. **Extensions**: Unless otherwise indicated, buried valves shall be furnished complete with valve stem extensions and other accessories required to provide a functional system. Buried valves shall have valve stem extensions extending to 12 inches below finished grade. Valve stem extensions shall be fabricated steel or fiberglass as indicated in GWD Standard Detail 3-08. The maximum length of fiberglass valve stem extensions shall be 8 feet. Fiberglass valve stem extensions shall be manufactured by Pipeline Products, San Marcos, CA, or approved equal.

B. **Stem Guides:** Stem guides shall be provided, spaced 10-feet on centers unless the manufacturer can demonstrate by calculation that a different spacing is acceptable. Submerged stem guides shall be 304 stainless steel.

2.7 SPARE PARTS

A. The CONTRACTOR shall furnish the required spare parts suitably packaged and labeled with the valve name, location, and identification number. The CONTRACTOR shall also furnish the name, address, and telephone number of the nearest distributor for the spare parts of each valve. Spare parts are intended for use by the COUNTY, after expiration of the warranty period.

D. Manufacturers, or Equal

De Zurik Corporation
Clow Valve Company
M & H Valve Company
Mueller Company
Henry Pratt Company
Rodney Hunt Company (24 inches and larger)

2.8 COMBINATIONS AIR VALVES, CLASS 250

A. CAV's 3-inches and smaller shall have ½-inch threaded outlets with bronze plugs in the top cover and near the bottom of the valve body. Valves larger than 3-inches shall have a 1-inch threaded

drain outlet with bronze plug near the bottom of the valve body and a 1-inch threaded outlet with bronze plug on the side of the valve body above the minimum water level in the valve which forces the float against the valve seat. Valves shall be designed for an operating pressure of 250 psi.

B. Valves smaller than 3-inches shall have threaded ends. Valves 3-inches and larger shall have flanged ends. Flanges for Class 250 valves shall comply with AWWA Class E250. Threaded ends shall comply with ANSI B1.20.1. The minimum CAV size shall be 1-inch.

Valves manufacturer shall be:

APCO, Model 143C or 145C
Valmatic, Model 201C or 202C
Crispin, Model UL10 or UL20
Cla-Val, Model 361CAV or 362CAV, or equal.

C.. CAV's shall be equipped with schedule 40 PVC venting system and insect screen as shown in GWD Standard Detail 3-03. Insect screen shall be Northtown Company, Hytech Air Vac Screen, McMaster-Carr, Suction Screen with Nylon Base, or approved equal.

2.9 METAL BALL VALVES (4-INCH AND SMALLER)

A. **General:** Unless otherwise indicated, general purpose metal ball valves in sizes up to 4-inch shall have direct acting lever actuators in accordance with this Specification.

B. **Body:** Ball valves up to 1-1/2-inch (incl.) in size shall have stainless steel 2-or 3- piece bodies with screwed ends for a pressure rating of not less than 600 psi WOG. Valves 2-inch to 4-inch in size shall have stainless steel 2-or 3-piece bodies with flanged ends for a pressure rating of ANSI 125 psi or 150 psi unless otherwise indicated.

C. **Balls:** The balls shall be solid stainless steel, with standard port (single reduction) or full port openings.

D. **Stems:** The valve stems shall be of the blow-out proof stainless steel, or other acceptable construction, with reinforced Teflon seal.

E. **Seats:** The valve seats shall be of Teflon or Buna-N, for bi-directional service and easy replacement.

F. Manufacturers, or Equal

Conbraco Industries, Inc. (Apollo)
ITT engineered Valves
Neles-Jamesbury, Inc.
NIBCO, Inc.
Watts Regulator
Worcester Controls

2.10 RESILIENT-SEATED GATE VALVES – GENERAL

A. Buried valves shall be of the inside screw, non-rising stem type. The valve actuators shall be as indicated, with counter-clockwise opening stems, shall be marked with manufacturers name, size, pressure rating, and year manufactured.

2.11 RESILIENT-SEATED GATE VALVES (4 to 10-inch)

A. **General:** All gate valves shall be resilient-wedge gate valves unless directed otherwise by the COUNTY.

B. **Construction:** Resilient-wedge gate valves shall conform to ANSI/AWWA C509 - Resilient-Seated Gate Valves for Water and Sewerage Systems. The valves shall be suitable for a design working water pressure of 200 psig, with flanged, bell and spigot, or mechanical joint ends. The valve body, bonnet, and disc shall be of cast iron or ductile iron and the disc or body shall be rubber-coated. Body and bonnet wall thickness shall be equal to or greater than the minimum wall thickness as listed in Table 2 of ANSI/AWWA C509. The stem, stem nuts, glands, and bushings shall be of bronze, with the stem seal per ANSI/AWWA C 509. Valves shall be internally coated in accordance with AWWA C550.

C. **Actuators:** Unless otherwise indicated, resilient-wedge gate valves shall have manual actuators in accordance with this Section.

D. Manufacturers: Unless otherwise indicated, resilient wedge gate valves shall be Mueller 2360 Series.

2.12 HARDWARE AND MISCELLANEOUS MATERIALS

A. **Indoor Use:** Bolts and nuts for flanged valves located indoors shall be carbon steel, ASTM A 307, Grade B.

B. **Exposed Use:** Bolts and nuts for flanged valves located outdoors above ground and flanges located in underground vaults and structures shall be Type 316 stainless steel conforming to ASTM A 193, Grade B8M, for bolts and ASTM A 194, Grade 8M, for nuts.

C. Washers: Washers shall be provided for each nut. Washers shall be of the same material as the nuts.

D. Gaskets for flanged end valves shall be as specified in Section 330509 – Piping, General.

PART 3 - EXECUTION

3.1 VALVE INSTALLATION

A. **General:** Valves, actuating units, stem extensions, valve cans, and accessories shall be installed in accordance with the Manufacturer's written instructions and as indicated. CONTRACTOR shall carefully inspect valves and operate valves before installation to verify all parts are in proper working order. If a valve is found to be defective no attempt shall be made to repair it. The defective valve shall be returned to the manufacturer and replaced with a new properly working valve.

B. **Access:** Valves shall be installed with easy access for actuation, removal, and maintenance and to avoid interference between valve actuators and structural members, handrails, or other equipment. Valves shall be firmly supported to avoid undue stresses on the pipe. Mainline valves shall be set plumb and securely braced into place using concrete anchor blocks as shown in Std. Detail 2-08. Non-buried actuators shall be located to be readily accessible for operation and maintenance, and shall not be mounted where shock or vibrations will impair their operation, nor shall the support systems be attached to handrails, process piping, or mechanical equipment.

C. **Valve Accessories:** All buried valves shall be provided with valve cans as indicated in GWD Standard Detail 2-06. Valve cans shall be installed centered and plumb over the operating nut. Valve cans shall be supported on bonnet of valve. In areas where road construction is not completed, set PVC sleeve to pavement subgrade level to prevent damage during construction of road base and AC pavement. After road construction is complete, CONTRACTOR is to return and set cans to grade.

D. **Corrosion Protection:** All nuts and bolts on valves for buried service shall be tape wrapped, after valve installation is completed Trenton Wax Tape #1, in accordance with Section 330509 – Piping General.

3.2 SERVICES OF MANUFACTURER

A. Field representatives of manufacturers of valves with pneumatic, hydraulic, or electric actuators shall adjust actuator controls and limit-switches in the field for the required function.

3.3 INSTALLATION OF GATE VALVES

A. Care shall be taken when installing valves on plastic pipe. Valve shall be supported at each end of the valve.

END OF SECTION

SECTION 331219

FIRE HYDRANTS

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide fire hydrants and end drains, complete and operable, including all appurtenances and accessories, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 033000 – Cast-in-Place Concrete
Section 099000 – Protective Coatings
Section 330509 – Piping, General
Section 331316 – Valves and Appurtenances

PART 2 - PRODUCTS

2.1 WET-BARREL FIRE HYDRANTS

A. Unless shown otherwise, all fire hydrants shall be of the wet-barrel type, in accordance with ANSI/AWWA C503.

B. Where a hydrant is installed it shall have the number, size and type of pumper connections required by the County of Santa Barbara Fire Department. The hydrant head shall have a minimum of one 4-inch pumper connection and one 2-1/2-inch hose connection. Operating nuts and caps shall be 1-1/8 inch pentagonal nuts measured "point to flat". Caps shall be bronze and shall be attached to hydrant with chains. Cap shall have 1/8-inch diameter weep hole drilled through its center adjacent to operating nut. The hydrant inlet shall be 6-inch in diameter. Hydrant shall be isolated by a buried gate valve. Hydrant bury shall be 6-inch diameter ductile iron conforming to the requirements of AWWA C502 with a 6-inch diameter flanged break-away spool connected to the hydrant head. Breakaway spool shall be 12-inch minimum length, 125-pound class, cast iron, 6 bolt-breakaway spool with breakaway (hallow) bolts on top flange. All bolts, nuts, and washers shall be 307A zinc plated steel with standard HEX head and machined per ASTM A325.

C. The hydrants shall be tested to 300 psig and they shall be suitable for a working pressure of 150 psig. All interior and exterior surfaces shall be coated in accordance with AWWA C550 and Section 099000 - Protective Coatings. Color of finish coat shall be COUNTY approved "Safety Yellow" on fire hydrants in the public right of way while fire hydrants not in the public right of way (e.g., on private property) shall be factory painted red in accordance with Santa Barbara County requirements. Prior to final inspection of the water system improvements, the CONTRACTOR shall conduct fire flow tests at all new hydrants in accordance with section 3.02.03, Fire Hydrant Flow Tests.

D. Unless otherwise specified, hydrant bury shall be 6-inch diameter, 6-hole wet barrel fire hydrant bury with mechanical joint

E. **Fire Hydrant Manufacturers, or Equal:**

MANUFACTURER	*SINGLE FAMILY RESIDENCE*		**MULTI-FAMILY RESIDENCE, COMMERCIAL & INDUSTRIAL**	
	Size	**Model**	**Size**	**Model**
Jones	6"x4"x2 ½ "	J-3700	6"x4"x2 ½"x2 ½"	J-3765R
	6"x4"x2 ½"x2 ½"	J-3765R		
Clow	6"x4"x2 ½ "	2050	6"x4"x2 ½"x2 ½"	2060
	6"x4"x2 ½"x2 ½"	2060		
American AVK Co	6"x4"x2 ½ "	2442	6"x4"x2 ½"x2 ½"	2452
	6"x4"x2 ½"x2 ½"	2452		

F. Bury Manufacturers, or Equal:

Clow Valve Company
US Pipe and Foundry
Star
Sigma/Napco
South Bay Foundry

PART 3 - EXECUTION

3.1 INSTALLATION

A. All fire hydrants shall be installed in strict accordance with the manufacturer's published recommendations, applicable sections of AWWA Standard C600, AWWA Manual M17, and GWD Standard Detail 3-01. Hydrants shall be installed plumb and shall be installed before the construction of curb and gutter, and sidewalk where possible. All installations shall be to the satisfaction of the COUNTY and the County of Santa Barbara Fire Department.

B. Hydrants located on roads where no sidewalk exists or where sidewalk and curb are separated by a parkway, shall be located 18 inches from the back of the curb to the fire hydrant centerline. Hydrants located on roads with sidewalk at the back of curb shall be located 18 inches from the back of sidewalk to the fire hydrant centerline and shall comply with the requirements of the Americans with Disabilities Act. Hydrants located where no curb exists shall be located a minimum of 36 inches from the edge of pavement and shall be protected by guard posts as shown in GWD Standard Detail 4-03.

C. A minimum of 18 inches and a maximum of 24 inches clearance shall be maintained between finished grade and the lowest operating nut on the hydrant. The center of the breakaway spool shall be at grade with the top of curb unless the hydrant is set in concrete in which case a 3-inch minimum clearance shall be maintained between the finished sidewalk surface and the top flange of the breakaway spool. Breakaway bolts shall be installed with tips pointing up and filled with silicone caulking. . Hydrant isolation valve shall be connected to the hydrant piping by means of a retainer gland. Hydrant shall be installed with a concrete thrust block, calculated for the maximum expected water pressure.

D. All end drains shall be installed in accordance with GWD Standard Detail 2-12 and applicable sections of AWWA Standards. End drains shall be installed before the construction of curb and gutter, and sidewalk where possible. End drains located on roads where no sidewalk exists or where sidewalk and curb are separated by a parkway, shall be located 18 inches from the back of the curb. End drains located on roads with sidewalk at the back of curb shall be located per the Santa Barbara County Department of Public Works requirements. End drains located where no curb exists shall be located a minimum of 36 inches from the edge of pavement.

END OF SECTION

SECTION 331234

COUNTY SUB METERS
MODEL M-5000
ELECTROMAGNETIC FLOW METER, LIQUID, SINGLE-CHANNEL

PART 1 - GENERAL

1.1 SCOPE

B. This section describes the requirements for a flow sensor.

C. Under this item, the contractor shall furnish and install the flow measurement equipment and accessories as indicated on the plans and as herein specified.

1.2 QUALITY ASSURANCE

A. Referenced Standards and Guidelines - Complies with applicable portions of ANSI/AWWA Standards and NSF/ANSI Standard 61, Annex G. There are currently no AWWA standards that specifically address electromagnetic metering.

1. Flow measurement function complies with Industry Standards

a. ANSI B16.5 Class 150 RF
b. AWWA Class B
c. NEMA 4X/6P (IP66/IP67)

1.3 SUBMITTALS

A. The following information shall be included in the submittal for this section:

1. Outline dimensions, conduit entry locations and weight

2. Customer connection and power wiring diagrams

3. Data sheets and catalog literature for microprocessor-based transmitter and transducer

4. Interconnection drawings

5. Installation and operations manual

6. List of spare parts

7. Complete technical product description including a complete list of options provided

8. Any portions of this specification not met must be clearly indicated or the supplier and contractor shall be liable to provide all additional components required to meet this specification

1.4 SYSTEM DESCRIPTION

A. Electromagnetic flow meter is intended for fluid metering in industries including water, wastewater, food and beverage, pharmaceutical and chemical. Measures fluid flow of water or fluids which are highly corrosive, very viscous, contain a moderate amount of solids, or require special handling. No moving parts

are in the flow stream. Amplifier can be integrally mounted to the detector or can be remote-mounted. Unit is ideally suited for measuring dynamic, non-continuous flow. In applications where a minimum and/or maximum flow rate must be tracked and monitored, the unit provides pulse signals that can be fed to dedicated batch controllers, PLCs and other more specialized instrumentation.

1.5 DEFINITIONS

A. Amplifier – Device used for increasing the power of a signal. It does this by taking energy from a power supply and controlling the output to match the input signal shape but with larger amplitude.

B. ANSI – (American National Standards Institute) A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates U.S. standards with international standards so that American products can be used worldwide.

C. AWWA – (American Water Works Association) An international non-profit professional organization founded to improve water quality and supply.

D. Detector Coils – Also called an "induction loop", an electromagnetic communication or detection system which uses a moving magnet to induce an electrical current in a nearby wire.

E. Electrode – An electrical conductor used to make contact with a nonmetallic part of a circuit (e.g. a semiconductor, an electrolyte or a vacuum).

F. Modbus RTU – a serial communications protocol published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). This is used in serial communication & makes use of a compact, binary representation of the data for protocol communication.

G. NEMA – (National Electrical Manufacturers Association) Is the 'Association of Electrical Equipment and Medical Imaging Manufacturers' in the United States. Its approximately 450 member companies manufacture products used in the generation, transmission, distribution, control, and end use of electricity. These products are used in utility, industrial, commercial, institutional, and residential applications.

H. NSF International – An independent, accredited organization that develops standards, and tests and certifies products and systems. They provide auditing, education and risk management solutions for public health and the environment.

I. PLCs – (Programmable Logic Controller) A digital computer used for automation of electromechanical processes, such as control of machinery on factory assembly lines, amusement rides, or light fixtures. PLCs are used in many industries and machines.

J. PTFE – (Polytetrafluoroethylene) A synthetic flouropolymer of tetrafluoroethylene that finds numerous applications. The best known brand name of PTFE is Teflon by DuPont Co.

K. Serial Communications – In telecommunication and computer science, serial communication is the process of sending data one bit at a time, sequentially, over a communication channel or computer bus. This is in contrast to parallel communication, where several bits are sent as a whole, on a link with several parallel channels.

PART 2 – PRODUCTS

1.1 APPROVED MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with specifications, provide flow measurement equipment by one of the following:

1. Badger Meter

1.2 OPERATING CONDITIONS

A. System Components

1. Metering Tube (Detector)

a. Consists of stainless steel tube lined with a non-conductive material. Energized detector coils around tube create a magnetic field across the diameter of the pipe. As a conductive fluid flows through the magnetic field, a voltage is induced across two electrodes; this voltage is proportional to the average flow velocity of the fluid.

2. Signal Amplifier

a. Consists of unit which receives, amplifies, and processes the detector's analog signal. Signal is converted to both analog and digital signals that are used to display rate of flow and totalization. Processor controls zero-flow stability, analog and frequency outputs, serial communications and a variety of other parameters. Integrated LCD display indicates rate of flow, forward and reverse totalizers and diagnostic messages. Display guides user through programmable routines.

B. Operational Requirements

1. Electromagnetic Flow Meter

a. The flow meter system shall operate with a pulsed DC excitation frequency, and shall produce a signal output that is directly proportional and linear with the volumetric flow rate of the liquid flowing through the metering tube. The metering system shall include a metering sensor tube (detector), a signal amplifier, and the necessary connecting wiring. The metering system shall have the ability to incorporate a meter mounted or remote mounted amplifier.

b. Engineering Units:

1) The signal amplifier shall be program selectable to display the following units of measure: U.S. gallons, imperial gallons, million gallons (U.S.), cubic feet, cubic meters, liters, hector-liters, oil barrels, ounces or acre feet.

c. Operating Principle: Electromagnetic Induction

d. Metering Tube (Detector)

1) The metering tube (detector) shall be constructed of 316 stainless steel, and rated for a maximum allowable non-shock pressure and temperature for steel pipe flanges, according to ANSI B16.5.

2) The metering tube (detector) shall be available in line size from 1/2" to 24" [12.7 to 600 mm]

3) The metering tube (detector) end connections shall be carbon steel or 316 stainless steel flanged, according to ANSI B16, Class 150 and AWWA Class B standards.

4) The insulating liner material of the metering tube (detector) shall be made of a hard rubber elastomer and NSF-listed for meter sizes 4" and above, in conformance with manufacturer's recommendation for the intended service or an NSF-listed meter option with PTFE liner.

5) The metering tube (detector) shall include two self-cleaning measuring electrodes. The electrode material shall be corrosion resistant and available in Alloy C or 316 stainless steel.

6) The metering tube (detector) shall include a third "empty pipe detection" electrode located in the upper portion of the inside diameter of the flow tube in order to detect an empty pipe condition when the flow tube is running partially empty. Empty pipe detection that is not activated until the pipe is 50% empty is not acceptable.

7) The metering tube (detector) housing shall be constructed of carbon steel, welded at all joints, and rated to meet NEMA 4X/6P (IP66/IP67) ratings.

8) For remote amplifier applications, the metering tube (detector) junction box enclosure shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X/6P (IP66/IP67) ratings.

9) When installed in non-metallic or internally lined piping, the metering tube (detector) shall be provided with a pair of corrosion resistant grounding rings. The grounding ring material shall be 316 stainless steel.

10) Fluid Temperature Range

NOTE TO SPECIFIER: Select the appropriate application and liner material:

i. For remote amplifier applications, the fluid temperature range shall be 32°F to 178°F [0°C to 80°C] at a maximum ambient temperature of 122°F [50°C] for the hard rubber liner material.

ii. For remote amplifier applications, the fluid temperature range shall be -4°F to 302°F [-20°C to 150°C] at a maximum ambient temperature of 122°F [50°C] for the PTFE liner material.

iii. For meter-mounted amplifier applications, the fluid temperature range shall be 32°F to 178°F [0°C to 80°C] at a maximum ambient temperature of 122°F [50°C] for the hard rubber liner material.

iv. For meter-mounted amplifier applications, the fluid temperature range shall be -4°F to 212°F [-20°C to 100°C] at a maximum ambient temperature of 122°F [50°C] for the PTFE liner material.

e. Signal Amplifier

1) The signal amplifier shall be microprocessor based, and shall energize the detector coils with a digitally controlled pulsed DC. The sampling rate shall be programmable from ¼, 1 to 99 seconds.

2) Power shall be supplied by internal battery with life of 10 years.

3) The signal amplifier shall have an ambient temperature rating of -4°F to 140°F [-20°C to 60°C].

4) The signal amplifier shall include non-volatile memory capable of storing all programmable data and accumulated totalizer values in the event of a power interruption.

5) Automatic zero stability, low flow cut-off, empty pipe detection and bi-directional flow measurement shall be inherent capabilities of the signal amplifier.

6) All signal amplifier outputs shall be galvanically isolated to 50 volts.

7) The signal amplifier and remote junction enclosures shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X/6P (IP66/IP67) ratings.

8) Inputs/Outputs:

The signal amplifier shall provide a total of four digital outputs and one digital input.

i. Up to four open collector digital outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, high/low flow alarm, empty pipe alarm, flow direction, and error alarm.

ii. One digital input: ADE

iii. Advanced protocol support using Modbus/RTU.

f. Control and Programming

1) The signal amplifier shall be programmed via three function buttons. The programming functions shall be available in a user-friendly, menu driven software through the two-line LCD interface. The signal amplifier shall accommodate the following languages: English, German, Czech, French, Italian or Spanish.

2) Programmable parameters of the amplifier include, but are not limited to: calibration factors, totalizer resets, unit of measure, pulse output scaling and ADE, flow-alarm functions, language selection, low-flow cutoff, noise dampening factor and sampling frequency selection.

3) The signal amplifier shall have a programming option allowing entry of a selected numeric password value for tamper protection.

g. System Performance

1) The metering system shall operate over a flow range of 0.10 to 32.8 ft/s [0.03 to 10 m/s].

2) The metering system shall perform to an accuracy ±0.4 percent of rate ±0.0065 ft/s [±2 mm/s].
The accuracy for zero straight run with a single elbow up and/or a single elbow down stream shall be 1% or better in the flow range 1.2 ft/s (0.35 m/s) and up.

3) The metering system shall be capable of measuring the volumetric flow rate of liquids having an electrical conductivity as low as 20 micromhos per centimeter.

4) The system measuring repeatability shall be <0.10% of full scale.

h. Indication

1) The signal amplifier shall include a two-line, 15-character, LCD interface to display the following values:

i. Flow rate in selectable rate units
ii. Forward totalizer in selectable volume units
iii. Reverse totalizer in selectable volume units
iv. Net totalizer in selectable volume units
v. Error or alarm messages
vi. Software revision level
vii. Flow velocity
viii. % of full scale flow

PART 3 - EXECUTION

1.1 INSTALLATION

A. Follow manufacturer's recommendation for installation. Installation will conform to the guidelines provided by the Installation & Operation Manual.

B. Straight pipe requirement shall be an equivalent of three diameters on the inlet (upstream) side, and two diameters on the outlet (downstream) side.

C. For best performance, place meter vertically, with liquid flowing upward and meter electrodes in a closed, full pipe.

1.2 CALIBRATION

A. Each meter shall be hydraulically calibrated in an ISO 9000-certified testing facility, which utilizes a computerized gravimetric testing method with a measuring uncertainty of 0.1%.

B. Each meter shall be provided with a calibration certificate indicating the measured error (percent deviation) at three different flows, respectively equivalent to 25%, 50% and 75% of the nominal flow rate for each size.

1.3 MANUFACTURER'S WARRANTY

A. Terms

1. The manufacturer of the above specified equipment warrants the Product to be free from defects in materials and workmanship appearing within the earlier of either: One (1) year after installation; or one (1) year and six (6) months after shipment from manufacturer.

END OF SECTION

SECTION 331417
SERVICE CONNECTIONS (1" SIZE ONLY)

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide water service connections, complete and in place, in accordance with the Contract Documents. The requirements of Section 330509 - Piping, General apply to the WORK of this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE Section 015526 – Traffic Control & Access
Section 330110 – Waterline Disinfection & Testing
Section 330509 – Piping, General
Section 312316 –Trenching, Backfill and Compaction
Section 331233 – Meters Large and Small
Section 331423 – Manholes, Vaults, & Meter Boxes

PART 2 - PRODUCTS

2.1 COPPER WATER TUBE

A. Copper water tube shall conform to the requirements of ASTM B 88 - Seamless Copper Water Tube. All 1" copper water tube for buried locations shall be soft temper tube in rolls. All above ground installations, and 2" copper water tube for buried locations shall be hard drawn lengths. Unless otherwise indicated, all copper water tube shall be of Type K wall thickness. The minimum copper service size shall be 1 inch. Copper service size for service run-outs of 50 feet or greater, for ¾-inch and 1-inch meters, shall be increased to 2 inches. Service connections 4 inches in diameter and larger shall be constructed of C900 PVC DR-18 pressure rated to 235 psi in accordance with AWWA C900.

B. **Joints:** Copper water tube shall have either brazed joints, or flared ends and fittings. Brazed joints shall be made with silver brazing alloy metal filler. Brazing alloy metal filler shall contain a minimum of 15% silver and no lead. Brazing alloy metal filler shall be STAY SILV 15 Brazing Metal Filler manufactured by The Harris Products Group, SIL-CAN 15 manufactured by Canfield Technologies, or approved equal.

C. **Fittings:** Brazed fittings shall conform to ANSI/ASME B 16.18 - Cast Copper Alloy Solder Joint Pressure Fittings, or to ANSI/ASME B 16.22 - Wrought Copper and Copper Alloy Solder - Joint Pressure Fittings. The brazing flux shall be the Manufacturer's approved type for the fitting and brazing used. Compression fittings shall conform to ANSI/ASME B 16.26 - Cast Copper Alloy Fittings for Copper Tubes. Cast copper alloy flanges and flanged fittings shall be in accordance with ANSI/ASME B 16.24 - Cast Copper Alloy Pipe Flanges and Flanged Fittings, and ASTM B 62 - Standard Specification for Composition Bronze or Ounce Metal Castings, with 150 lb ratings, or as indicated.

2.2 SERVICE FITTINGS

A. **Saddles and Tapping Sleeves:** Saddles shall be bronze with female iron pipe threads. On PVC pipe, saddles shall be secured by single flat strap. On steel and ductile iron pipe, service saddles shall be with two flat straps up to 2-inches. On all service connections 4-inch and larger, tapping sleeves shall be used. Manufacturer shall be as indicated on the COUNTY Approved Materials List.

B. **Corporation Stops:** Corp stops shall be bronze with male iron pipe threads to match saddle threads. Connection to service line shall be compression fitting (pack joint) outlet connection. Manufacturer shall be as indicated on COUNTY Approved Materials List.

C. **Angle Ball Meter Stops:** Angle ball meter valves shall be bronze, equipped with padlock wings, and

provide for 360 degree rotation of the tee head. Padlock wings for dedicated firelines shall have the ability be locked off in the open position Angle ball meter valves for ¾-inch and 1-inch meters shall have 1-inch compression fitting (pack joint) copper inlet and meter swivel nut outlet to match meter size. Angle ball meter valves for 1-1/2-inch and 2-inch meters shall have compression fitting (pack joint) copper inlets and flanged meter connection outlets. Angle ball meter valve manufacturers and model numbers shall be as indicated on COUNTY Approved Materials List.

D. **Curb Stops:** Ball valve curb stops shall be bronze. Size, connection type and manufacturer shall be as indicated on COUNTY Approved Materials List.

E. **Couplings and Adapters:** Manufacturers of couplings and adapters shall be as indicated on COUNTY Approved Materials List.

F. **Other Brass Fitting:** Manufacturers of couplings and adapters shall be as indicated on COUNTY Approved Materials List.

PART 3 - EXECUTION

3.1 INSTALLATION

A. **General:** Service runouts shall be installed perpendicular to the waterline. The configuration of the services shall be as shown on the applicable COUNTY standard details. Meters shall be installed in accordance with COUNTY Standards & Specifications. All copper tubes shall be installed in a neat and workmanlike manner, properly aligned, and cut from measurements taken at the site, to avoid interference's with structures or equipment. Exposed tubing shall afford maximum access to equipment, and where necessary all tubing shall be installed with sufficient slopes for venting or drainage of liquids. For 1-inch copper tubing, tubing may be curved around a minimum radius of 12 inches. For 1-1/2-inch and 2-inch copper tubing, copper fittings shall be silver brazed where bends are required. All installations shall be acceptable to the COUNTY. There shall be a minimum of two feet in spacing between service saddles.

B. **Valves and Unions:** Unless otherwise indicated, tubing to fixtures, groups of fixtures, and equipment shall be provided with a shutoff valve and union, unless the valve has flanged ends. Low points in water systems shall have drainage valves. Unions shall be provided at threaded valves, equipment, and other devices requiring occasional removal or disconnection.

3.2 PREPARATION

A. Prior to installation, each tube length shall be carefully inspected, flushed clean of any debris or dust, and be straightened, if not true. Ends of tubes shall be reamed and filed smooth. All fittings shall be equally cleaned before assembly.

3.3 JOINTS

A. **Brazed and Soldered Joints:** Brazed and soldered joints shall conform to the Manufacturer's recommendations and to the specifications and recommendations of ANSI/ASME B 31.1 - Power Piping. All brazing shall be done by skilled and qualified welders per Section 330509 - Piping, General. Prior to the application of flux, the end of all tubes shall be thoroughly dried and cleaned.3.4 INSPECTION AND FIELD TESTING

A. **Inspection:** All finished installations shall be carefully inspected for proper joints and supports, anchoring, interferences, and damage to tubing, fittings, and coating. Damage shall be repaired to the satisfaction of the COUNTY.

B. **Field Testing:** When constructed independent of the COUNTY distribution system, all copper service connections shall be pressure tested in conjunction with new water mains for a period of not less than two hours, without exceeding the following tolerance: pipes shall show zero leakage for unburied pipe, and not more than 0.02 gallons per hour per inch diameter per 100 feet of buried pipe. Copper pipe shall be subject

to 100 psi or 1-1/2 times the maximum working pressure, whichever is greater. The CONTRACTOR shall furnish all test equipment, labor, materials, and devices at no extra cost to the COUNTY. .For additional testing requirements refer to Section 330110 – Waterline Disinfection & Testing.

C. Leakage is determined by the change in incremental volume markings on the site reservoir on the test pressure pump. All fixtures, devices, or other accessories which are to be connected to the lines and which would be damaged if subjected to the test pressure shall be disconnected and ends of the branch lines be plugged or capped as required during the testing procedures.

D. Leaks shall be repaired to the satisfaction of the COUNTY, and the system shall be re-tested until no leaks are found.

END OF SECTION

SECTION 331423

VAULTS AND METER BOXES

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide precast meter boxes, complete and in place, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 312316 –Trenching, Backfill and Compaction
Section 330509 – Piping, General

PART 2 - PRODUCTS

2.1 METER BOXES

A. The CONTRACTOR shall provide meter boxes for the indicated applications and of the sizes indicated. Meter boxes shall be sized in accordance with the table below. All replacement and retrofit meters shall be located in the appropriate meter box as shown. Any exceptions shall be approved in advance by the COUNTY. Meter box and vault manufacturers and product numbers shall be as indicated on COUNTY approved materials list.

B. Where specified by the COUNTY, meter boxes shall be provided with single piece polymer concrete cover with appropriate hole for an Invensys (Sensus) Touch-Read device.

2.2 BLOW-OFF VAULTS

A. The CONTRACTOR shall provide precast or prefabricated circular vaults designed for the indicated application and of the size indicated. Blow-off vaults shall be reinforced concrete or fiber reinforced polymer.

B. **Design Loading:** Vaults in areas subject to vehicular traffic shall be designed for H-20 traffic loading. Vaults in other areas shall be designed for a vertical live load of 300 psf.

C. The full clear space opening indicated shall be provided, without obstructions from brackets or supports, and covers for access openings shall be provided. Covers shall be cast iron or reinforced polymer. All lids shall be tight fitting to prevent the entrance of dirt and debris. All covers, except round, heavy-weight, cast iron manhole covers, shall have securing mechanisms to hold the covers firmly in place against the effects of repetitious live loads such as pedestrian or vehicle traffic.

PART 3 - EXECUTION

3.1 GENERAL

A. Meter Boxes shall be assembled and placed in excavations on properly compacted soil foundations as indicated. Meter boxes shall be set to grade and oriented to provide the required dimensions and clearances from pipes and other structures.

B. Prior to backfilling, all cracks and voids in meter boxes shall be filled with non-shrink grout. Around pipe and conduit penetrations, openings shall be sealed with non-shrink grout

END OF SECTION

BID No. 19012.2

Calle Real Water Loop, Phase 2 Project

ADDENDUM NO. 5

May 28, 2024

The following information is hereby incorporated into Bid #19012.2:

ALL PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS REMAIN UNCHANGED EXCEPT SECTIONS OR PARTS ADDED TO, REVISED, DELETED OR CLARIFIED BY THIS ADDENDUM.

LISTING OF CHANGES

Item 5.1: Incorporates the following changes to the **Notice to Bidders**:

1. Cover Sheet:
   a. Modified Bid Due date time to Thursday, June 6, 2024, at 3:00 P.M. PST.
   b. Modified Virtual Bid Opening to Thursday, June 6, 2024, at 3:30 P.M. PST.
   c. Updated Cover Sheet(s) attached (2 pages).

2. Notice to Bidders:
   a. Modified Bid Due date time to Thursday, June 6, 2024, at 3:00 P.M PST.
   b. Modified Virtual Bid Opening to Thursday, June 6, 2024, at 3:30 P.M. PST.
   c. Modified (RFI) Questions due date to Friday, May30, 2024 by 5:00 PM PST.
   d. Updated Notice to Bidders attached (3 pages).

3. Bid Form:
   a. Modified Bid Due date time to Thursday, June 6, 2024, at 3:00 P.M. PST.
   b. Updated Bid Form attached (4 pages).

4. Designation of Subcontractors:
   a. Modified Bid Due date time to Thursday, June 6, 2024, at 3:00 P.M. PST. Updated Form attached (1 page).

5. Anti-Fraud Certification:
   a. Modified Bid Due date time to Thursday, June 6, 2024, at 3:00 P.M. PST. Updated Form attached (1 page).

6. Bidders Bond:
   Modified Bid Due date time to Thursday, June 6, 2024, at 3:00 P.M. PST. Updated Form attached (2 pages).

Item 5.2: Incorporates the following changes to the **Construction Drawings**:

1. **Modified SHEET 1 of 18:** Correction to Title Sheet as shown in the **Civil Drawings** updated in **Addendum No.4**. Add Sheet 3A to the Drawing Index (attached 1 sheet).

2. **Reference to SHEET 3A of 18:** Add Sheet 3A to the **Civil Drawings** updated in **Addendum No.4** (attached 1 sheet).

END OF ADDENDUM NO. 5

County of Santa Barbara
Calle Real Water Loop Project
Phase 2 #19012-2
Calle Real County Campus

Project No. #19012-2

MANDATORY JOB WALK:
Wednesday, April 24, 2024
10:30am

BID DUE DATE:
Thursday, June 6, 2024
3:00 P.M.

VIRTUAL BID OPENING:
Thursday, June 6, 2024
3:30 P.M.

NOTICE TO BIDDERS

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

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2

Calle Real County Campus
Project No. #19012-2

MANDATORY JOB WALK:
Wednesday, April 24,2024
10:30am

BID DUE DATE:
Thursday, June 6, 2024
3:00 P.M.

VIRTUAL BID OPENING:
Thursday, June 6, 2024
3:30 P.M.

CONSTRUCTION COST ESTIMATE: Estimated cost of construction is $1,970,000.00

PROJECT LOCATION: The Project Site is located off Calle Real between San Antonio Road and Camino del Remedio in Santa Barbara.

MANDATORY JOB WALK: The job walk is MANDATORY on **April 24, 2024 at 10:30am** to start at 267 Camino del Remedio in the parking lot at the corner of Calle Real and Camino del Remedio.

Only those prime contractors attending a job walk shall be qualified to bid the work.

PROJECT DESCRIPTION: The construction of a new water line system to replace the old, antiquated water system for the County of Santa Barbara Calle Real Campus. Project new water line system with all appurtenances, such as valves, tees, crosses, meters, restraints, thrust blocks, etc., the necessary tie-ins to existing services to buildings. Contractor is to maintain water service and provide portable toilets as needed to assure continued service to each building with little to no interruption during construction. The Contractor will be required to coordinate all work with County Facilities/Maintenance to assure all occupants, staff and clients are duly notified of impending construction in the vicinity of their building. All shutdowns will be coordinated with and managed by County Facilities/Maintenance.

CONTRACTOR'S LICENSE: The CONTRACTOR shall possess either a Class A, B or a C-34 license.

QUESTIONS: All questions MUST be submitted electronically through the Public Purchase Portal (www.publicpurchase.com) on or before **Friday, May 31 2024 by 5:00 P.M. PST**. 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 **Thursday, June 6, 2024 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 proposal 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 proposal 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.

CALIFORNIA AIR RESOURCE BOARD (CARB) CERTIFICATES: Bidder must provide to the County, currently with the submission of Bidder's Bid, 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.

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.—The lowest responsible bidder will be determined in accordance with Public Contract Code Division II, Part 3, Chapter 1, Section 20103.8, Subdivision (c) and as follows:

1. The project funding amount will be disclosed before the first bid is opened.
2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

BID PROTEST: The County of Santa Barbara Bid Protest Procedures are described in Item 10 of the BID FORM, which is included in the bid documents.

CONSTRUCTION TIME: The successful CONTRACTOR (after receiving the Notice to Proceed) shall have **150** calendar days to complete all work called for under the Contract Documents. Subsequent A subsequent 30 calendar days for each included with the Base Bid and accepted by the County

LIQUIDATED DAMAGES: The liquidated damages will be **$250 (Two Hundred Fifty 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: **Join the meeting now** or call in (audio only) 805-724-0311 and use Phone Conference ID:994 811 154#

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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2

Bid Due Date: Thursday, June 6, 2024 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:** Construction of new water main piping and valves, including tie-in with the Goleta Water District Main service connection located at the southeast corner of the Campus, an approximate 1,950 linear feet and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ ☐☐ , ☐☐☐ , ☐☐☐ . ☐☐

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #1: Construction of additional piping and valves to extend the water main loop approximately 1,375 linear feet, to complete the lower water main loop, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ ☐☐ , ☐☐☐ , ☐☐☐ . ☐☐

(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #2: Construction of additional piping and valves to extend the water main loop approximately 1,730 linear feet, along the west and north reaches of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [ ][ ][ ] , [ ][ ][ ] . [ ][ ]
(Place figures in appropriate boxes.)

Estimated number of work days: _____

ADDITIVE BID ITEM #3: Construction of additional piping and valves to extend the water main loop approximately 1,530 linear feet, along the east reach of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [ ][ ][ ] , [ ][ ][ ] . [ ][ ]
(Place figures in appropriate boxes.)

Estimated number of work days: _____

ALLOWANCE No. 1: Lump Sum Allowance to provide a qualified archaeologist to conform to the Special Conditions.

$ [ ][ ] , [ ][2][0] , [0][0][0] . [0][0]

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 (c) and as follows:
    1. The project funding amount will be disclosed before the first bid is opened.
    2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
    3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

4. It is understood that Owner reserves the right to reject the proposal and that it shall remain open and not be withdrawn for a period of ninety (90) 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 proposal is mailed or delivered personally to the undersigned bidder within thirty (30) calendar days after the opening of the proposal, 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 proposal 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 **150 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 proposal 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 proposal 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 proposal 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 of any bid(s) received must be in writing, must specify all grounds for the protest, and must be filed within ten working days after the opening of bids.

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 proposal 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Thursday, June 6, 2024 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 Subcontract

ANTI-FRAUD CERTIFICATION

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Thursday, June 6, 2024 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date:
June 6, 2024 at 3:00 P.M.

for which bids are due on Thursday, June 6, 2024 at 3:00 P.M. 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 Principal
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.

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
COUNTY OF SANTA BARBARA, CALIFORNIA

DRAWING INDEX	
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SITE PLAN MAP

VICINITY MAP

PROJECT CONTACTS:

SITE INFORMATION

BENCHMARK

BASIS OF BEARINGS

UNDERGROUND UTILITY STATEMENT

DECLARATION OF RESPONSIBLE CHARGE

COUNTY OF SANTA BARBARA
GENERAL SERVICES DEPARTMENT

APPROVED ______________________

DIGALERT

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

3 A

LEGEND:

TRANSFER STATION ROAD

HOMOR FARM ROAD

CALLE REAL

SAN ANTONIO ROAD

SHEET 1
SHEET 2
SHEET 3
SHEET 4
SHEET 5
SHEET 6
SHEET 7
SHEET 8
SHEET 9
SHEET 10
SHEET 11
SHEET 13
SHEET 14

BID No. 19012.2

Calle Real Water Loop, Phase 2 Project

ADDENDUM NO. 6

May 31, 2024

The following information is hereby incorporated into Bid #19012.2:

ALL PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS REMAIN UNCHANGED EXCEPT SECTIONS OR PARTS ADDED TO, REVISED, DELETED OR CLARIFIED BY THIS ADDENDUM.

LISTING OF CHANGES

Item 6.1: Incorporates the following changes to the **Construction Drawings**:

1. **Modified SHEET 2 of 18:** Correction to Note Sheet as shown in the **Civil Drawings**. Add TREE PROTECTION NOTES (attached 1 sheet).

END OF ADDENDUM NO. 6

DISPOSITION NOTES:

LEGEND:

ABBREVIATIONS

CONSTRUCTION NOTES:

GENERAL NOTES

WATER GENERAL NOTES

TREE PROTECTION NOTES

CALLE REAL CAMPUS
WATER DISTRIBUTION SYSTEM
PHASE 2: WATER LINE REPLACEMENT
CALLE REAL, SANTA BARBARA
COUNTY OF SANTA BARBARA, CA

2

EXHIBIT B

Contractor's Proposal

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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2

Bid Due Date: Thursday, June 6, 2024 at 3:00 P.M.

including Addendum No(s). 1, 2, 3, 4, 5, 6, ___, 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:** Construction of new water main piping and valves, including tie-in with the Goleta Water District Main service connection located at the southeast corner of the Campus, an approximate 1,950 linear feet and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [7][4][4] , [2][3][4] . [0][0]

(Place figures in appropriate boxes.)

Estimated number of work days: 50

ADDITIVE BID ITEM #1: Construction of additional piping and valves to extend the water main loop approximately 1,375 linear feet, to complete the lower water main loop, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [7][9][6] , [3][7][6] . [0][0]

(Place figures in appropriate boxes.)

Estimated number of work days: 64

ADDITIVE BID ITEM #2: Construction of additional piping and valves to extend the water main loop approximately 1,730 linear feet, along the west and north reaches of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [7][8][6] , [6][9][6] . [0][0]
(Place figures in appropriate boxes.)

Estimated number of work days: 57

ADDITIVE BID ITEM #3: Construction of additional piping and valves to extend the water main loop approximately 1,530 linear feet, along the east reach of the Campus, and construct new building service lines as shown on Sheet 3A of the Construction Documents.

$ [ ][ ] , [5][8][2] , [8][0][0] . [0][0]
(Place figures in appropriate boxes.)

Estimated number of work days: 46

ALLOWANCE No. 1: Lump Sum Allowance to provide a qualified archaeologist to conform to the Special Conditions.

$ [ ][ ] , [ ][2][0] , [0][0][0] . [0][0]

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 (c) and as follows:
    1. The project funding amount will be disclosed before the first bid is opened.
    2. The lowest responsible bidder will be determined on the basis of the Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups, if any.
    3. In the event that all bids including Total Base Bid plus Total Additive Items or Total Base Bid plus Total Additive Groups exceeds the project funding amount, the lowest bid will be determined on the basis of the Total Base Bid plus those additive items or Total Base Bid plus those additive groups that, when taken in numerical order from the additive list, and added to the Total Base Bid are less than or equal to the funds available.

4. It is understood that Owner reserves the right to reject the proposal and that it shall remain open and not be withdrawn for a period of ninety (90) 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 proposal is mailed or delivered personally to the undersigned bidder within thirty (30) calendar days after the opening of the proposal, 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 proposal 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 **150 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 proposal 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 proposal 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 proposal 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 of any bid(s) received must be in writing, must specify all grounds for the protest, and must be filed within ten working days after the opening of bids.

CONTRACTOR

TIERRA CONTRACTING
Company

IRS No.: 95-3635984

5484 OVERPASS ROAD
Street Address

License Classification(s): A- GENERAL ENGINEERING

SANTA BARBARA
City

Phone Number: 805-964-8747

BY: Blair Douglas
Signature

BLAIR DOUGLAS, PRESIDENT
Printed Name, Title

DESIGNATION OF SUBCONTRACTORS

The bidder agrees if this proposal 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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Thursday, June 6, 2024 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
Directional Drilling	Ventura Directional Drilling	83182	Ventura
Tree Pruning	Pederson Tree Care	841648	Santa Barbara
Utility Locating	Spear Head Locating Service	NA	Ventura
Striping	Interstate Striping	838618	Semi Valley

COMPANY: Tierra Contracting Inc BY: _____
Bidder's Signature

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

NONCOLLUSION AFFIDAVIT

In accordance with Public Contract Code § 7106, Blair Douglas
(Bidder's full name)

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

of Tierra Contracting Inc
(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: Blair Douglas **Date:** 6/6/24

Bidder's Name & Title (Print): Blair Douglas – PRESIDENT

At CITY: Santa Barbara STATE: CA

CERTIFICATE OF COMPLIANCE

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

6/6/24
Dated

Blair Douglas
Signature of Principal

Blair Douglas, President
Printed Name, Title of Principal

Tierra Contracting Inc
Company

5484 Overpass Road
Address

Santa Barbara, CA 93111
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 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 proposal)

6/6/24
Date

Blair Douglas
Signature of Principal

Blair Douglas, President
Printed Name, Title of Principal

Tierra Contracting Inc
Company

5484 Overpass Road
Address

Santa Barbara, CA 9311
City, State & Zip

ANTI-FRAUD CERTIFICATION

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date: Thursday, June 6, 2024 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.

6/6/24
Date

Blair Douglas
Signature of Principal

BLAIR DOUGLAS PRESIDENT
Printed Name, Title of Principal

TIERRA CONTRACTING
Company

5484 OVERPASS ROAD
Address

SANTA BARBARA, CA 93111
City, State & Zip

BIDDER'S BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, Tierra Contracting Inc. as Principal, and Travelers Casualty and Surety Company of America 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 10% of Amount Bid in DOLLARS ($ 10% of Bid). The condition of this obligation is such that a bid to Owner for certain construction specifically described as follows:

COUNTY OF SANTA BARBARA
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No. #19012-2
Bid Due Date:
~~May 16~~, 2024 at 3:00 P.M.

BID BID
JUNE 6TH JUNE 6TH

for which bids are due on Thursday, ~~May 16~~, 2024 at 3:00 P.M. 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.

Tierra Contracting Inc.
Name of Principal

Dated 5/16/2024

Blair Dayton (Seal)
Signature of Principal

Travelers Casualty and Surety Company of America
Name of Surety

21688 Gateway Center Drive
Address

Diamond Bar, CA 91765
City, State & Zip

Dated May 9, 2024

Judy Pearen (Seal)
Signature of Principal Judy Pearen, Attorney-In-Fact
Signature of Surety's Attorney-in-fact

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

HUB International
Name of Agent

40 E. Alamar Ave.
Address

Santa Barbara, CA 93105
City, State & Zip

909-612-3270 / 805-879-9575
Telephone Number

909-612-3678
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.

CALIFORNIA ACKNOWLEDGMENT CIVIL CODE § 1189

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
County of Santa Barbara }

On May 9, 2024 before me, Michelle L. Pearen, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Judy Pearen
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.

MICHELLE L. PEAREN
Notary Public - California
Santa Barbara County
Commission # 2480806
My Comm. Expires Feb 28, 2028

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.

Signature Michelle L Pearen
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: Bid Bond
Document Date: May 9, 2024 Number of Pages:
Signer(s) Other Than Named Above:

Capacity(ies) Claimed by Signer(s)

Signer's Name: Judy Pearen	Signer's Name:
☐ Corporate Officer – Title(s):	☐ Corporate Officer – Title(s):
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☒ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other:	☐ Other:
Signer is Representing: Travelers Casualty and Surety Company of America	Signer is Representing:

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint Judy Pearen of Santa Barbara, California, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this 3rd day of February, 2017.

State of Connecticut

City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the 3rd day of February, 2017, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.

My Commission expires the 30th day of June, 2021

Marie C Tetreault
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 9th day of May, 2024

Kevin E. Hughes
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney-in-Fact and the details of the bond to which the power is attached.

EXHIBIT C

Indemnification & Insurance Requirements

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 $2,000,000 per occurrence and $4,000,000 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 higher limits than the minimums shown above, the COUNTY requires and shall be entitled to coverage for the 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.

CERTIFICATE OF INSURANCE TRANSMITTAL FORM

FOR THE FOLLOWING DESCRIBED PROJECT:

County of Santa Barbara
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No 19012-2

CONTRACTOR:

Tierra Contracting
Name

5484 Overpass Road
Address

Santa Barbara, CA 93111
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
Calle Real Water Loop Project, Phase 2
Calle Real County Campus
Project No 19012-2

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

DocuSigned by:
Shaeley Nespor

Authorized Insurance Company Representative's Signature

This form may be reproduced as required.

Docusign Envelope ID: 173FBEDC-F6E5-4925-B95F-3FD9E4271CDE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 07/26/2024

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	CONTACT NAME: Misty Baker
AssuredPartners of California Ins Services, LLC	PHONE (A/C, No, Ext): (805) 585-6740 FAX (A/C, No): (805) 585-6740
196 S. Fir Street	E-MAIL ADDRESS: misty.baker@assuredpartners.com
P.O. Box 1388	
Ventura CA 93002-1388	

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Zurich American Ins Co	16535
INSURER B: Travelers Property Casualty of America	25674
INSURER C: Star Insurance Company	18023
INSURER D:	
INSURER E:	
INSURER F:	

INSURED

Tierra Contracting, Inc.
5484 Overpass Road
Santa Barbara CA 93111

COVERAGES **CERTIFICATE NUMBER:** 24/25 GL/AU/UMB/WC/ **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 [ ] LOC [ ] OTHER	Y		GLO 2930586-01	05/01/2024	05/01/2025	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
A	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY	Y		BAP 2930587-01	05/01/2024	05/01/2025	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
B	[X] UMBRELLA LIAB [X] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $			CUP-8X600602-24-NF - GL/AU	04/01/2024	04/01/2025	EACH OCCURRENCE AGGREGATE	$ 9,000,000 $ 9,000,000 $
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [ ] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		WC 2930585-01	05/01/2024	05/01/2025	[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
C	POLLUTION			10000065534231	04/01/2023	04/01/2025	OCCURRENCE AGGREGATE	4,000,000 4,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: Job #: 19012-2; Project: Calle Real Water Loop Project, Phase 2 - Calle Real County Campus, GL/AU: Certificate Holder, its officers, employees, and agents are Additional Insured as respects to referenced project per forms (GL) UGL2162ACW0219 and (AU) CA20481013. This Insurance is Primary & Non-Contributory to any other insurance per forms (GL) UGL1327BCW0413 and (AU) CA20481013. Endorsements apply only as required by current written contract on file. **GL: EXCLUDES ALL WRAP/OCIP PROJECTS

CERTIFICATE HOLDER

County of Santa Barbara
123 East Anapamu
Santa Barbara CA 93101

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

POLICY NUMBER: BAP 2930587 - 01

COMMERCIAL AUTO
CA 20 48 10 13

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

DESIGNATED INSURED FOR COVERED AUTOS LIABILITY COVERAGE

This endorsement modifies insurance provided under the following:

AUTO DEALERS COVERAGE FORM
BUSINESS AUTO COVERAGE FORM
MOTOR CARRIER COVERAGE FORM

With respect to coverage provided by this endorsement, the provisions of the Coverage Form apply unless modified by this endorsement.

This endorsement identifies person(s) or organization(s) who are "insureds" for Covered Autos Liability Coverage under the Who Is An Insured provision of the Coverage Form. This endorsement does not alter coverage provided in the Coverage Form.

This endorsement changes the policy effective on the inception date of the policy unless another date is indicated below.

Named Insured:	Tierra Contracting, Inc.
Endorsement Effective Date:	

SCHEDULE

Name Of Person(s) Or Organization(s):	Any person or organization to whom or which you are required to provide additional insured status or additional insured status on a primary, non-contributory basis, in a written contract or written agreement executed prior to loss, except where such contract or agreement is prohibited by law
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

Each person or organization shown in the Schedule is an "insured" for Covered Autos Liability Coverage, but only to the extent that person or organization qualifies as an "insured" under the Who Is An Insured provision contained in Paragraph **A.1.** of Section **II** – Covered Autos Liability Coverage in the Business Auto and Motor Carrier Coverage Forms and Paragraph **D.2.** of Section **I** – Covered Autos Coverages of the Auto Dealers Coverage Form.

ZURICH

Limited Operations Coverage – Work Excluded Under A Controlled (Wrap-Up) Insurance Program

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.	
Policy No. GLO 2930586-01	Effective Date: 05/01/2024

This endorsement modifies insurance provided under the:

Commercial General Liability Coverage Part

SCHEDULE

Description and Location of Operation(s):
Any location where the insured has, or had, operations insured by a consolidated (wrap-up) insurance program.
(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

A. The following exclusion is added to Paragraph **2. Exclusions** of **SECTION I – COVERAGE A – BODILY INJURY AND PROPERTY DAMAGE LIABILITY:**

This insurance does not apply to "bodily injury" or "property damage":

1. Arising out of your ongoing operations; or
2. Included in the "products-completed operations hazard";

at the location(s) described in the Schedule of this endorsement, but only if you are enrolled in a "controlled (wrap-up) insurance program" with respect to the "bodily injury" or "property damage" described in Paragraphs **A.1.** and **A.2.** above at such location(s).

This exclusion applies whether or not the "controlled (wrap-up) insurance program":

a. Provides coverage identical to that provided by this Coverage Part;

b. Has limits adequate to cover all claims; or

c. Remains in effect.

B. The exclusion in **A.** above shall not apply to your ongoing operations at the location shown in the Schedule for your service, maintenance, correction, repair or replacement of the original work performed and insured under the "controlled (wrap-up) insurance program".

However, this extension of coverage does not apply to damages because of "bodily injury" or "property damage" due to any service, maintenance, correction, repair or replacement work:

1. Included in the "products-completed operations hazard"; or
2. For which coverage is afforded under the "controlled (wrap-up) insurance program".

C. For the application of the coverage provided by this endorsement in Paragraph **B**. above, **SECTION IV – COMMERCIAL GENERAL LIABILITY CONDITIONS** Paragraph **4. Other Insurance** is replaced with the following:

This insurance is excess over any other insurance, whether primary, excess, contingent or on any other basis. If any other insurance responds or can respond to this loss, we shall have the right but not the duty to defend any "suit".

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 may apply and that was not bought specifically to apply in excess of the Limits of Insurance shown in the Declarations of this Coverage Part.

D. Solely with respect to this endorsement, the following definition is added to **SECTION V – DEFINITIONS**:

"Controlled (wrap-up) insurance program" means a centralized insurance program under which one party has secured either insurance or self-insurance covering some or all of the contractors or subcontractors performing work on one or more specific project(s).

All other terms, conditions, provisions and exclusions of this policy remain the same.

Other Insurance Amendment – Primary And Non-Contributory

ZURICH

Policy No.	Eff. Date of Pol.	Exp. Date of Pol.	Eff. Date of End.	Producer No.	Add'l Prem.	Return Prem.
GLO 2930586 - 01	05/01/2024	05/01/2025		71059000		

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

Named Insured: Tierra Contracting, Inc.

Address (including ZIP Code): 5484 Overpass Road
Santa Barbara, CA 93111-4031

This endorsement modifies insurance provided under the:

Commercial General Liability Coverage Part

1. The following paragraph is added to the Other Insurance Condition of Section **IV – Commercial General Liability Conditions**:

   This insurance is primary insurance to and will not seek contribution from any other insurance available to an additional insured under this policy provided that:

   a. The additional insured is a Named Insured under such other insurance; and

   b. You are required by a written contract or written agreement that this insurance would be primary and would not seek contribution from any other insurance available to the additional insured.

2. The following paragraph is added to Paragraph **4.b.** of the Other Insurance Condition of Section **IV – Commercial General Liability Conditions**:

   This insurance is excess over:

   Any of the other insurance, whether primary, excess, contingent or on any other basis, available to an additional insured, in which the additional insured on our policy is also covered as an additional insured on another policy providing coverage for the same "occurrence", offense, claim or "suit". This provision does not apply to any policy in which the additional insured is a Named Insured on such other policy and where our policy is required by written contract or written agreement to provide coverage to the additional insured on a primary and non-contributory basis.

All other terms and conditions of this policy remain unchanged.

Additional Insured – Automatic – Owners, Lessees Or Contractors

ZURICH

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.	
Policy No. GLO 2930586 - 01	Effective Date: 05/01/2024

This endorsement modifies insurance provided under the:

Commercial General Liability Coverage Part

A. Section **II – Who Is An Insured** is amended to include as an additional insured any person or organization whom you are required to add as an additional insured under a written contract or written agreement executed by you, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" and subject to the following:

1. If such written contract or written agreement specifically requires that you provide that the person or organization be named as an additional insured under one or both of the following endorsements:

a. The Insurance Services Office (ISO) ISO CG 20 10 (10/01 edition); or

b. The ISO CG 20 37 (10/01 edition),

such person or organization is then an additional insured with respect to such endorsement(s), but only to the extent that "bodily injury", "property damage" or "personal and advertising injury" arises out of:

(1) Your ongoing operations, with respect to Paragraph **1.a.** above; or

(2) "Your work", with respect to Paragraph **1.b.** above,

which is the subject of the written contract or written agreement.

However, solely with respect to this Paragraph **1.**, insurance afforded to such additional insured:

(a) Only applies if the "bodily injury", "property damage" or "personal and advertising injury" offense occurs during the policy period and subsequent to your execution of the written contract or written agreement; and

(b) Does not apply to "bodily injury" or "property damage" caused by "your work" and included within the "products-completed operations hazard" unless the written contract or written agreement specifically requires that you provide such coverage to such additional insured.

2. If such written contract or written agreement specifically requires that you provide that the person or organization be named as an additional insured under one or both of the following endorsements:

a. The Insurance Services Office (ISO) ISO CG 20 10 (07/04 edition); or

b. The ISO CG 20 37 (07/04 edition),

such person or organization is then an additional insured with respect to such endorsement(s), but only to the extent that "bodily injury", "property damage" or "personal and advertising injury" is caused, in whole or in part, by:

(1) Your acts or omissions; or

(2) The acts or omissions of those acting on your behalf,

in the performance of:

(a) Your ongoing operations, with respect to Paragraph **2.a.** above; or

(b) "Your work" and included in the "products-completed operations hazard", with respect to Paragraph **2.b.** above,

which is the subject of the written contract or written agreement.

However, solely with respect to this Paragraph **2.**, insurance afforded to such additional insured:

(i) Only applies if the "bodily injury", "property damage" or "personal and advertising injury" offense occurs during the policy period and subsequent to your execution of the written contract or written agreement; and

(ii) Does not apply to "bodily injury" or "property damage" caused by "your work" and included within the "products-completed operations hazard" unless the written contract or written agreement specifically requires that you provide such coverage to such additional insured.

3. If neither Paragraph **1.** nor Paragraph **2.** above apply and such written contract or written agreement requires that you provide that the person or organization be named as an additional insured:

a. Under the ISO CG 20 10 (04/13 edition, any subsequent edition or if no edition date is specified); or

b. With respect to ongoing operations (if no form is specified),

such person or organization is then an additional insured only to the extent that "bodily injury", "property damage" or "personal and advertising injury" is caused, in whole or in part by:

(1) Your acts or omissions; or

(2) The acts or omissions of those acting on your behalf,

in the performance of your ongoing operations, which is the subject of the written contract or written agreement.

However, solely with respect to this Paragraph **3.**, insurance afforded to such additional insured:

(a) Only applies to the extent permitted by law;

(b) Will not be broader than that which you are required by the written contract or written agreement to provide for such additional insured; and

(c) Only applies if the "bodily injury", "property damage" or "personal and advertising injury" offense occurs during the policy period and subsequent to your execution of the written contract or written agreement.

4. If neither Paragraph **1.** nor Paragraph **2.** above apply and such written contract or written agreement requires that you provide that the person or organization be named as an additional insured:

a. Under the ISO CG 20 37 (04/13 edition, any subsequent edition or if no edition date is specified); or

b. With respect to the "products-completed operations hazard" (if no form is specified),

such person or organization is then an additional insured only to the extent that "bodily injury" or "property damage" is caused, in whole or in part by "your work" and included in the "products-completed operations hazard", which is the subject of the written contract or written agreement.

However, solely with respect to this Paragraph **4.**, insurance afforded to such additional insured:

(1) Only applies to the extent permitted by law;

(2) Will not be broader than that which you are required by the written contract or written agreement to provide for such additional insured;

(3) Only applies if the "bodily injury" or "property damage" occurs during the policy period and subsequent to your execution of the written contract or written agreement; and

(4) Does not apply to "bodily injury" or "property damage" caused by "your work" and included within the "products-completed operations hazard" unless the written contract or written agreement specifically requires that you provide such coverage to such additional insured.

B. Solely with respect to the insurance afforded to any additional insured referenced in Section **A.** of this endorsement, 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 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 architectural, engineering or surveying services.

C. Solely with respect to the coverage provided by this endorsement, the following is added to Paragraph **2. Duties In The Event Of Occurrence, Offense, Claim Or Suit** of Section **IV – Commercial General Liability Conditions**:

The additional insured must see to it that:

(1) We are notified as soon as practicable of an "occurrence" or offense that may result in a claim;

(2) We receive written notice of a claim or "suit" as soon as practicable; and

(3) A request for defense and indemnity of the claim or "suit" will promptly be brought against any policy issued by another insurer under which the additional insured may be an insured in any capacity. This provision does not apply to insurance on which the additional insured is a Named Insured if the written contract or written agreement requires that this coverage be primary and non-contributory.

D. Solely with respect to the coverage provided by this endorsement:

1. The following is added to the **Other Insurance** Condition of Section **IV – Commercial General Liability Conditions**:

Primary and Noncontributory insurance

This insurance is primary to and will not seek contribution from any other insurance available to an additional insured provided that:

a. The additional insured is a Named Insured under such other insurance; and

b. You are required by written contract or written agreement that this insurance be primary and not seek contribution from any other insurance available to the additional insured.

2. The following paragraph is added to Paragraph **4.b.** of the **Other Insurance** Condition under Section **IV – Commercial General Liability Conditions**:

This insurance is excess over:

Any of the other insurance, whether primary, excess, contingent or on any other basis, available to an additional insured, in which the additional insured on our policy is also covered as an additional insured on another policy providing coverage for the same "occurrence", offense, claim or "suit". This provision does not apply to any policy in which the additional insured is a Named Insured on such other policy and where our policy is required by a written contract or written agreement to provide coverage to the additional insured on a primary and non-contributory basis.

E. This endorsement does not apply to an additional insured which has been added to this Coverage Part by an endorsement showing the additional insured in a Schedule of additional insureds, and which endorsement applies specifically to that identified additional insured.

F. Solely with respect to the insurance afforded to an additional insured under Paragraph **A.3.** or Paragraph **A.4.** of this endorsement, the following is added to Section **III – Limits Of Insurance**:

Additional Insured – Automatic – Owners, Lessees Or Contractors Limit

The most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the written contract or written agreement referenced in Section **A.** of this endorsement; or

2. Available under the applicable Limits of Insurance shown in the Declarations,

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

All other terms, conditions, provisions and exclusions of this policy remain the same.

Bond Number: 108-072-851

Premium Included in Performance

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 Tierra Contracting Inc. (hereinafter referred to as Principal) have by written agreement dated July 19, 2024, entered into a contract identified as:

Project Title: County of Santa Barbara
Calle Real Water Loop Project, Phase 2
Project No. 19012-2

(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 _____

Travelers Casualty and Surety Company of America

as corporate surety (hereinafter referred to as Surety), are held firmly bound unto the County in the amount of $1,550,930.00, 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.

Tierra Contracting Inc.
Principal

By: _____

DATED: 7/29/24

Travelers Casualty and Surety Company of America
Surety

_____
Signature of Attorney-in-fact Judy Pearen

Travelers Casualty and Surety Company of America

21688 Gateway Center Drive
Address

Diamond Bar, CA 91765
City, State & Zip Code

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

HUB International
Name of Agent

40 E. Alamar Ave.
Address

Santa Barbara, CA 93105
City, State & Zip Code

909-612-3270 / 805-879-9575
Telephone Number

909-612-3678
FAX Number

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

CALIFORNIA ACKNOWLEDGMENT CIVIL CODE § 1189

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
County of Santa Barbara }

On July 24, 2024 before me, Michelle L. Pearen, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Judy Pearen
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.

MICHELLE L. PEAREN
Notary Public - California
Santa Barbara County
Commission # 2480806
My Comm. Expires Feb 28, 2028

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.

Signature Michelle L Pearen
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: Payment Bond
Document Date: July 24, 2024 Number of Pages:
Signer(s) Other Than Named Above:

Capacity(ies) Claimed by Signer(s)

Signer's Name: Judy Pearen	Signer's Name:
☐ Corporate Officer – Title(s):	☐ Corporate Officer – Title(s):
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☒ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other:	☐ Other:
Signer is Representing: Travelers Casualty and Surety Company of America	Signer is Representing:

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint Judy Pearen of Santa Barbara, California, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this 3rd day of February, 2017.

State of Connecticut

City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the 3rd day of February, 2017, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.

My Commission expires the 30th day of June, 2021

Marie C. Tetreault
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 26th day of July, 2024

Kevin E. Hughes
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney-in-Fact and the details of the bond to which the power is attached.

Bond Number: 108-072-851
Premium: $12,974.00

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 Tierra Contracting Inc. (hereinafter referred to as Principal) have by written agreement dated July 19,2024, entered into a contract identified as:

Project Title: County of Santa Barbara
Calle Real Water Loop Project, Phase 2
Project No. 19012-2

(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

Travelers Casualty and Surety Company of America

as corporate surety (hereinafter referred to as Surety), are held firmly bound unto the County in the amount of $1,550,930.00, 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.

Tierra Contracting Inc.
Principal

By: Blair Dayton

DATED: 7/29/24

Travelers Casualty and Surety Company of America
Surety

Judy Pearen
Signature of Attorney-in-fact Judy Pearen

Travelers Casualty and Surety Company of America

21688 Gateway Center Drive
Address

Diamond Bar, CA 91765
City, State & Zip Code

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

HUB International
Name of Agent

40 E. Alamar Ave.
Address

Santa Barbara, CA 93105
City, State & Zip Code

909-612-3270 / 805-879-9575
Telephone Number

909-612-3678
FAX Number

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

CALIFORNIA ACKNOWLEDGMENT CIVIL CODE § 1189

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
County of Santa Barbara }

On July 24, 2024 before me, Michelle L. Pearen, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Judy Pearen
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.

MICHELLE L. PEAREN
Notary Public - California
Santa Barbara County
Commission # 2480806
My Comm. Expires Feb 28, 2028

Place Notary Seal and/or Stamp Above

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.

Signature _____
Signature of Notary Public

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: Performance Bond
Document Date: July 24, 2024 Number of Pages: _____
Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: Judy Pearen	Signer's Name:
☐ Corporate Officer – Title(s):	☐ Corporate Officer – Title(s):
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☒ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other:	☐ Other:
Signer is Representing: Travelers Casualty and Surety Company of America	Signer is Representing:

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint Judy Pearen of Santa Barbara, California, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this 3rd day of February, 2017.

State of Connecticut

City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the 3rd day of February, 2017, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.

My Commission expires the 30th day of June, 2021

Marie C. Tetreault
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 26th day of July, 2024

Kevin E. Hughes
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney-in-Fact and the details of the bond to which the power is attached.