Santa Monica Debris Basin, February 14, 2018

Photograph: Lael Wageneck

Santa Barbara County
Flood Control and Water Conservation District

Carpinteria Valley Watershed Project Operation & Maintenance Plan

June, 2024

CARPINTERIA VALLEY WATERSHED PROJECT
OPERATION & MAINTENANCE PLAN

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OPERATION & MAINTENANCE PLAN

Project: Carpinteria Valley Watershed Project
Location: City of Carpinteria, Santa Barbara County, California

INTRODUCTION

BACKGROUND

This Operation and Maintenance (O&M) Plan for the Carpinteria Valley Watershed Project has been prepared and updated by the Santa Barbara County Flood Control & Water Conservation District (District), in conjunction with project partners. This update of the project Operation and Maintenance Plan is in response to events following the 2018 Thomas Fire/Debris Flow, which tested the District and its ability to effectively maintain and repair key project components.

GENERAL INFORMATION

The Carpinteria Valley Watershed Project (CVWP) was conceived to prevent damages from chronic flooding, erosion, and debris within the City of Carpinteria and adjoining agricultural lands. The watersheds protected by the project are Santa Monica and Franklin Creeks [Figure 1]. The CVWP was approved for planning by the USDA Soil Conservation Service (SCS), now the Natural Resources Conservation Service (NRCS), in 1964, and the Work Plan was executed in 1969 [Appendix B-1]. Works of improvement commenced in 1971 with the construction of the two railroad bridges, and was completed in 2005 with the construction of Carpinteria Salt Marsh enhancements [Appendix C-1]. The evaluated life of the CVWP is 100 years.

Following the Thomas Fire in December of 2017, a short-duration, high-intensity rainstorm on January 9, 2018 resulted in a debris flow that filled the Santa Monica Debris Basin and Carpinteria Salt Marsh channels to capacity. The ensuing clean out and repair efforts revealed the extreme challenges and limitations the District faced in accessing and maintaining these facilities [SBCFCD, 2018]. Now almost half-way through the life of the project, the resulting structural and procedural improvements implemented by the District are addressed herein, to

benefit future efforts in performing maintenance in a more expeditious manner, and meet the project objectives of protecting life and property.

AUTHORITIES AND RESPONSIBILITIES

Responsibilities. The planning, design, and construction of the CVWP were federally funded by the SCS/NRCS, through the Watershed Protection and Flood Prevention Program, Public Law 83-566. As the Sponsoring Local Organization of the project, the District assumed sole responsibility for obtaining all land rights and permits, and maintaining and operating the constructed works of improvement since 1972. These responsibilities were legally set forth in the project O&M Agreements, co-signed by SCS and the District [USDA-SCS, 1972], and subsequently amended [USDA-SCS, 1980]. As stipulated therein, the operation and maintenance of the CVWP would be carried out in accordance with an approved O&M Plan. Detailed responsibilities for operation and maintenance of watershed works of improvement are described in the National Operation & Maintenance Manual [USDA-NRCS, 2006].

Co-Sponsors of the CVWP are the City of Carpinteria and the Santa Barbara Resource Conservation District, now the Cachuma Resource Conservation District. The District has entered into a revocable Secondary Use Agreement with the City of Carpinteria, for multi-use pedestrian trails and bike paths adjacent to Santa Monica and Franklin channels. These facilities are owned and maintained by the City of Carpinteria, and shall not conflict with the District's use of the property.

Life of Project. Evaluated life is the intended period of time that the measure will function successfully with only routine maintenance used in the economic evaluation to determine the annualized cost and benefits for the measure. Project life, service life, and design life are normally synonymous with evaluated life. Evaluation period is the number of years used in the Watershed Plan for discounting and amortizing project costs and benefits. The number of years used for the planned evaluated life of the Watershed Plan is also used to determine the duration of O&M Agreements for project measures. The evaluated life of CVWP measures is 100 years [USDA-SCS, 1968].

The District's obligation for O&M on a works of improvement is considered completed when the measures reach their evaluated life. When the evaluated life has been met, NRCS provides a letter to the District indicating that the O&M Agreement with NRCS for the measures has expired, and reminding that the District may have continued O&M responsibilities in order to remain in compliance with applicable Federal, State, and local laws, regulations, and ordinances. Upon request, NRCS may continue to provide technical assistance for measures after their evaluated life.

Remedial Assistance. Proper maintenance of the CVWP is required to maintain eligibility for potential future Public Law 83-566 assistance, especially remedial funds. Remedial Assistance is defined as Federal help needed to correct problems caused as a result of a mistake or misjudgment by NRCS during the installation of measures, or as a result of latent site conditions unknown to NRCS or the District at the time of installation. Changes in policy, technical standards, or engineering concepts developed subsequent to the installation of the original measure are not considered mistakes or misjudgments by NRCS. The following may be considered for remedial assistance: (1) repair of a project components that deteriorate more

rapidly than planned or do not perform as expected because of unusual or latent conditions; (2) reconstruction or repair of completed measures that malfunctioned or failed because of a design or construction deficiency; and (3) modification of a structure, property relocation, or addition of "other measures" that are the most cost-effective way to meet the criteria for a higher hazard classification, where a structure was classified incorrectly before installation. If qualified, Remedial Assistance may be requested from NRCS, and if available, will be provided as Public Law 83-566 funds per the original CVWP Watershed Plan.

Disaster Assistance. Proper maintenance is also required to maintain eligibility for potential future assistance through the NRCS Emergency Watershed Protection (EWP) Program. Public Law 83-566 watershed projects that sustain damage during disaster events, are typically eligible for EWP assistance, if impairment poses a threat to life or property. The clean out of debris basins is typically not considered an eligible practice for EWP assistance.

PROJECT COMPONENTS

As a whole, the CVWP consists of lined channel improvements, debris basin, and salt marsh improvements [Figure 2]. These components, that function together to protect life and property, are listed here separately to allow for the unique O&M requirements pertaining to each [Appendix A].

Santa Monica Creek Channel is a rectangular concrete-lined channel that extends 1.22 miles from the SMDB plunge pool, downstream to the Union Pacific Railroad bridge at the Carpinteria Salt Marsh. The channel passes under Highway 101, and includes 5 public bridges and 2 private bridges.

Santa Monica Debris Basin is located on Santa Monica Creek, in the foothills about 0.60 mile upstream of Foothill Road. The Santa Monica Debris Basin (SMDB) serves to trap and store debris generated from the Santa Monica Creek watershed, and prevent deposition within the lined channel or on adjacent property below. The 102-foot high earthfill dam has a debris storage capacity of 98 acre-feet (158,000 cubic yards). The basin includes a rock-lined plunge pool located immediately below the embankment, that serves to dissipate high-energy emergency spillway flows before transitioning into the downstream Santa Monica Creek Channel. The plunge pool also serves as a secondary sediment basin, with a temporary storage capacity of 9 acre-feet (15,000 cubic yards). The SMDB is classified as a High Hazard Dam, under the jurisdiction of the State of California Division of Safety of Dams (DSOD), and thereby listed in the National Inventory of Dams (NID) [Appendix A-4].

Franklin Creek Channel, consisting of a main concrete-lined channel and tributaries, extends 2.14 miles from the foothills, downstream to the Union Pacific Railroad bridge at the Carpinteria Salt Marsh. The concrete-lined channels are either rectangular or trapezoidal in cross section. The main channel passes under Highway 101, and includes 5 public bridges, 3 public box culverts, 4 private bridges, and 13 private box culverts.

Hog Canyon Diversion conveys flows from the most easterly portion of the Franklin Creek watershed, directly into Carpinteria Creek. The concrete-lined channel extends 0.46 mile above Casitas Pass Road, and includes 1 public box culvert and 1 private box culvert.

Carpinteria Salt Marsh Channels convey flows from the lined-channel outlets of Santa Monica and Franklin Creeks at the Union Pacific Railroad bridges, to the outlet mouth at the Pacific Ocean. These include 1.00 mile of dredged unlined channels, 1.30 miles of dikes, and 2,000 feet of flood wall, located on the eastern side of the Carpinteria Salt Marsh.

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OPERATION

OPERATING PROCEDURES

Operation includes the administration, management, and performance of non-maintenance activities needed to keep a practice safe and functioning as planned. This includes being cognizant of changes in watershed conditions, both upstream and downstream from completed practices, that may alter the overall function of the project, so appropriate actions can be taken in a prompt manner.

EMERGENCY ACTION PLAN

As a component of the CVWP, the SMDB is classified as a High Hazard Dam under the jurisdiction of DSOD. The downstream hazard is based solely on potential impacts to life and property, should the dam fail when operating with a full reservoir.

California Water Code requires dam owners to develop an Emergency Action Plan (EAP) based on the DSOD-approved inundation map and submit the EAP to the California Governor's Office of Emergency Services (Cal-OES) for their review and approval. The EAP outlines a sequential list of contingencies to be followed in the event that the District is subject to potential failure,

according to the notification procedures described therein. It is of extreme importance that each member of the notification team understands all parts of the EAP and exercise extreme diligence in performing their respective duties.

Copies of the EAP will be kept on file at the District, as well as at the Santa Barbara County Office of Emergency Management (OEM) and the City of Carpinteria.

PROJECT MODIFICATION

The District will obtain prior approval from NRCS for any alteration of the construction plans and specifications, or any alteration or improvement to the structural measures of the CVWP. Alteration or modification of the SMDB will require prior approval from DSOD.

RECORD KEEPING

The District will maintain a centralized record of all significant actions taken with respect to operation and maintenance of the CVWP, for the evaluated life of the project. These include reports of inspections conducted, maintenance performed, monitoring recorded, and photographs taken; along with all original construction drawings and documents. As-Built construction drawings are listed by Record Number in the Summary of Construction Contracts & Costs [Appendix C-1]. These records will be available for review by NRCS at any reasonable time.

INSPECTION & MONITORING

GENERAL INFORMATION

Performed on a regular basis, visual inspection is one of the most economic means to assure the safety and longevity of the CVWP, and is essential for identifying potential maintenance problems. This involves careful examination of the surface and all parts of the structures, including the adjacent environment.

Based on the inspection and evaluation protocols by NRCS and DSOD, the District's inspection program for this project involves the following types of inspections:

Routine Inspections can be done on an ongoing basis, through observation when in the vicinity of the project components. These are accomplished by District staff, surrounding landowners, and others who may note unusual conditions at the site. The most likely observers would be District maintenance staff in the performance of their normal duties in and around the project.

Programmatic Inspections are to be performed on all structural components of the project to determine that they are functioning as designed, and to identify at an early stage any developments that may be detrimental to operational capabilities. Annual inspections are required by the project O&M agreement, and should be completed by the District personnel familiar and knowledgeable with the CVWP, and may include NRCS representatives or co-sponsors of the project.

Dam Safety Inspections. The California Water Code provides DSOD with the regulatory authority to supervise maintenance and operation of dams and reservoirs, as necessary to

safeguard life and property from dam failure or uncontrolled release [DWR, 2018]. This is carried out, in part, through periodic dam inspections conducted by DSOD engineers of all dams under state jurisdiction once every fiscal year. This annual inspection of the SMDB dam by DSOD will be coordinated with and include District personnel familiar and knowledgeable of the SMDB.

Low Flow Conduit Inspections. The 48-inch Reinforced Concrete Pipeline, which conveys low flows from Santa Monica Creek through and under the SMDB dam, should be inspected by mechanized remote video camera once every five (5) years, or as deemed necessary. The Low Flow Conduit and stainless-steel lining should be monitored for displacement, cracking, abrasion, or obstruction.

Special Inspections shall be made during or immediately following the occurrence of major events such as floods, wildfires, or earthquakes.

Post-Flood Inspections. Prior to predicted major rainstorms, check channel inlets and SMDB spillways for existing obstructions. During severe rainstorms, monitor SMDB spillways, channel bridges and box culverts, for potential obstructions due to accumulated debris. Following major rainstorm events, check all CVWP structural components for damage or excessive deposition of sediment and debris. The District will provide NRCS with any reports on spillway and channel flows within 30 days of the events.

Post-Wildfire Inspections. Upon the occasion of wildfires burning a significant portion of the Santa Monica Creek or Franklin Creek watersheds, the District will inspect and evaluate the capability of CVWP components to store and convey the predicted increased storm runoff and debris from the hydrologically impaired watersheds. Events may warrant expedited maintenance or precautionary measures in advance of the subsequent rainfall season. Information regarding the status of the CVWP would be of great potential value to the US Forest Service – majority landowner of the Los Padres National Forest portion of the watersheds – and Santa Barbara County OEM.

Post-Earthquake Inspections. Based on the severity of the shaking estimated from a seismic event, DSOD may require the District to make an immediate inspection of the High Hazard SMDB, or to inspect in the next several hours, or to inspect within the next day. The District is then required to report back to DSOD with their inspection findings. DSOD personnel may accompany the District on these inspections, depending on availability and access, or may make a follow-up inspection. The District will provide NRCS with any Post-earthquake inspection reports within 30 days of events. Post-earthquake inspections focus on earthquake-induced damage, signs of structural distress, and any changes to the foundation or dam that could indicate a hidden problem. Embankments are evaluated for cracking, slumping, and other signs of movement. Spillways are checked to verify there are no signs of instability and that they are clear and fully functional. Bridges are to be checked for lateral displacement, a potential sign of shear key failure. The presence of seismic damage at the SMDB may justify a Post-Earthquake Re-evaluation through DSOD [DWR, 2018].

FREQUENCY OF INSPECTIONS

The required frequency of inspection activities as described above for the CVWP, are summarized in Table 1 below:

Table 1. Frequency of Inspections/Reports

Category of Inspection	Frequency	Entity Reported To
Routine	Continuous	SBCFCD
Programmatic	Yearly	NRCS
Dam Safety	Yearly	DSOD
Low Flow Conduit	Five Years	SBCFCD
Post-Flood	As-needed	NRCS
Post-Wildfire	As-needed	SBCFCD
Post-Earthquake	As-needed	DSOD, NRCS

INSPECTION GUIDELINES

The inspection of structural measures should be conducted in an orderly and methodical manner, to ensure the early detection of potential problems. Any observation which, in the opinion of the qualified inspector, raises concerns about the structural integrity should be reported promptly. Suggested guidelines for the inspection of structural components are listed in Table 2.

MONITORING

Monitoring consists of making remote observations, measuring the potential movement of structural components, and quantifying flow rates and debris volumes. The following equipment is used to monitor performance of the CVWP:

Remote Camera is installed at the SMDB, to provide a continuous view of the three basin inlet towers. The camera view is available only during daylight hours, due to solar-powered capability, and can be accessed on-line via the District website.

Embankment Settlement Monuments are installed on the crest of SMDB at the center and lateral limits of the embankment. Monitoring consists of measuring the vertical and horizontal positions of the crest monument, in comparison to permanent benchmarks. This task is carried out by the District Engineering Staff.

Embankment Toe Drain Outlet is monitored to quantify potential changes in seepage through the SMDB embankment dam. Located just inside the 36-inch Corrugated Metal Pipe that conveys v-ditch runoff under the SMDB spillway channel, just upstream of the channel bridge (Station 23+95), this 6-inch Asbestos Cement Pipe collects subsurface flows from the Toe Drain Blanket located under the SMDB embankment.

Flow Rate Monitor is installed at the outlet of the Low Flow Conduit, to provide a continuous record of flow rates through the 48-inch reinforced concrete pipe.

Staff Gauges are installed at the crest of the SMDB emergency spillway, at the crest of the plunge pool outlet weir, and at Santa Monica and Franklin Creek channels upstream and downstream of the Carpinteria Avenue bridges. These devices provide visual depth of flow, and thus estimated peak flow rates of major storm events.

Table 2. Inspection Guidelines for Structures[1]

Indicator	Symptom	Reporting Criteria
Concrete spalling and deterioration	Flaking, peeling, crumbling, loss of large chunks along cracks, joints, corners, or embedment.	Large affected areas with loss of aggregate and mortar; exposed reinforcing; significant loss of mass; offsets at flow surfaces or leakage paths through water stops or joints.
Concrete erosion and cavitation	Abrasive flow erosion at joints of abrupt change; pitted or rough surfaces with missing aggregate; deep holes.	Erosion at base of walls or piers with loss of mass; exposed reinforcing; damage to joints.
Wall movement	Joint opening visible; horizontal or vertical offsets.	Any opening with horizontal offsets on wall $\geq$ 0.10 inch.
Contraction joint movement	Visible opening and/or vertical offsets.	Any opening $\geq$ 0.10 inch or differential offsets $\geq$ 0.05 inch; seepage increasing and $\geq$ 5 gallons per minute; turbid flow.
Differential movement or misalignments	Displacement at joints; tilting or shifting of hardware; joint leakage.	Any movement which raises concern about the potential integrity of the structure.
Movement, settlement, or displacement of earth surfaces	Uneven graded surfaces; cracks in compacted earthfill.	Any movement, settlement, or displacement which raises concerns about the potential integrity of the structure.
Cracking of compacted earthfill	Cracks along earthfill or walls.	Any new or existing cracks that have changed or opened $\geq$ 0.06 inch and or $\geq$ 12 inches deep; cracks showing vertical or lateral effects.
Soil erosion	Erosion of earthen slopes	Large areas of erosion or gullies which are $\geq$ 8 inches deep.
Obstructions	Sediment, rock, or woody Debris in channel or Spillway	Obstruction of channels or spillways where more than 15 percent of the cross sectional area is obstructed.

[1]: National Performance of Dams Program, Guidelines for Reporting and Performance of Dams (1994).

MAINTENANCE

Maintenance includes the recurring activities necessary to retain or restore a project in a safe and functioning condition, including the management of vegetation; the removal of sediment and debris; the repair or replacement of failed components; the prevention or treatment of deterioration; and the repair of damages caused by flooding, earthquakes, or vandalism. Damages to structures installed under Public Law 83-566 caused by catastrophic events, may be repaired with assistance from the NRCS Emergency Watershed Protection Program. Damages to structures installed under Public Law 83-566 caused by design or construction deficiencies, may also be repaired as part of Remedial Assistance.

PRIORITIES

Immediate (Emergency) Maintenance is of the highest priority, and includes problems or situations requiring immediate action to protect life and property. Although the remedy for some critical problems may be obvious (such as clearing an obstructed channel or spillway), urgent actions should be overseen by District personnel familiar with and knowledgeable of the CVWP. If the stability of the SMDB is threatened, the EAP should be activated.

Required (Routine) Maintenance includes problems or situations that should be completed as soon as practical after defective conditions are noted. These conditions typically involve maintenance activities best carried out following the rainfall season, such as structural concrete repairs and removal of sediment and debris.

Continuing Maintenance includes on-going activities which may take place year-round. These conditions include on-going activities such as vegetation control and general maintenance.

MAINTENANCE GUIDELINES FOR COMPLETE WATERSHED PROJECT

Lined Channels. Maintenance should be performed on all concrete or masonry channel structures to maintain designated channel capacity. Concrete repairs to spalled areas, cracks, joints, chipped edges, areas of abrasion, cavitation erosion, or overlays should be completed using an epoxy modified mortar applicable to underwater applications. Obstructions of sub-drain outlets should be removed, and metal grates replaced when deteriorated from severe corrosion.

Bridges, Box Culverts, and Storm Drains. Maintenance should be performed on all concrete or masonry bridges, box culverts, and storm drains, to withstand traffic loads and forces from channel flows. Concrete repairs to spalled areas, cracks, joints, chipped edges, areas of abrasion, cavitation erosion, or overlays should be completed using an epoxy modified mortar applicable to underwater applications.

Fences and Gates. Maintenance should be performed on all metal fences to provide safety and exclusion from hazardous areas. Repair or replace chain-link fencing damaged due to overflow, vegetation, vehicles, or vandalism. To prevent excessive corrosion, remove rust prior to the application of paint or field galvanizing.

Roadways. Maintenance should be performed on all roadways to provide unlimited vehicular passage for operation and maintenance of project components. Regrade unpaved roads to repair rill erosion or settlement. Patch asphalt-paved roads to repair potholes or areas of deterioration. Patch reinforced concrete pavement to repair spalled areas, cracks, joints, or chipped edges.

Vegetation. Maintenance should be performed to cut back or remove vegetative growth threatening integrity, capacity, or function of structural components. Remove all woody plants greater than 1 inch in diameter and within five (5) feet horizontally of channel walls. Remove weeds that prevent the establishment of desirable shrubs or grasses, or allow rodent habitats to develop.

Sediment and Debris Removal. Maintenance should be performed to prevent sediment, rocks, or woody debris from accumulating and obstructing flow within channels. Debris should be removed from channel inlets, outlets, and catch basins, particularly after significant storm events. Remove accumulated sediment within lined channels when more than fifteen (15) percent of the cross-sectional area is obstructed.

MAINTENANCE GUIDELINES FOR SANTA MONICA DEBRIS BASIN

Dam Embankment. Maintenance should be performed to keep the SMDB embankment and toe buttress (aka the Bench) clear of woody vegetation, to enable inspection of the embankment surface for signs of seepage or slope instability. Remove all woody vegetation within ten (10) feet horizontally of dam abutments and emergency spillway walls.

Basin Inlet Towers. Maintenance should be performed to keep the three inlet towers free draining regardless of accumulated debris level. Inlet tower trash racks have 4-inch wide horizontal openings, to trap all rock and woody debris larger than 4 inches in dimension. After significant storm events, remove any large woody debris that floated above the accumulated debris level and would potentially obstruct flows into the exposed portion of the inlet towers. Maintain inlet tower trash racks in place at all times, except for access required to maintain or remove obstructions from within the low flow conduit. Concrete repairs to spalled areas, cracks, chipped edges, areas of abrasion, cavitation erosion, or overlays should be completed using an epoxy modified mortar applicable to underwater applications. Maintain the steel trash racks and armor plating to prevent excessive corrosion, by removing rust prior to the application of paint or field galvanizing.

Low Flow Conduit. Maintenance should be performed on the interior walls of the low flow conduit, to ensure the structural integrity of this reinforced concrete pipe. Concrete repairs to spalled areas, cracks, joints, areas of abrasion, cavitation erosion, or overlays should be completed using an epoxy modified mortar applicable to underwater applications. Access to the interior of the 1,120-foot low flow conduit is available either through manholes on the tops of the three inlet towers, through the in-line maintenance access vault (Station 103+60), or through the conduit outlet.

Sheet Pile Tower Access Pads. Maintenance should be performed on the three tower access pads, located adjacent to the three inlet towers. Repair or replace cable railings damaged due to debris flows or cleanout operations. To prevent excessive corrosion, remove rust prior to the application of paint or field galvanizing. Maintain concrete barrier rails in place, as needed, to prevent risk of equipment over-fall during cleanout operations. Reapply friction coating to the sheet pile edge coping, as needed, for corrosion protection and personnel safety.

Rock Riprap. Maintenance should be performed on the rock riprap covering the slopes of the dam embankment, to prevent rainfall erosion on both upstream and downstream faces. Replace rock riprap that significantly deteriorates due to weathering, or damage during debris cleanout operations. Repair or replace grouted rock riprap located at the basin inlet, the low flow conduit outlet, or the plunge pool outlet, damaged due to major flows or debris cleanout operations.

Plunge Pool By-Pass. Maintenance should be performed on the 15-inch pipeline installed to by-pass low flows during the cleanout of debris accumulated within the plunge pool. Concrete repairs to the by-pass inlet structure exhibiting spalled areas, cracks, areas of abrasion, or overlays, should be completed using an epoxy modified mortar applicable to underwater applications. The slide gate on the inlet structure should be lubricated and exercised on a regular basis (minimum once a year) through full range of motion.

Debris Removal at Basin. Maintenance should be performed at the basin to provide adequate debris storage capacity. Routine maintenance includes District activities to keep the inlet towers and basin floor clear of obstructive vegetation, to minimize trash rack plugging and allow the passage of moderate low flows. After the annual rainfall season, the volume of debris and sediment stored in the basin before generally needing to be cleaned out is twenty-five (25) percent [SBCFCD, 2017]. Special maintenance will take place after a significant wildfire in the Sant Monica watershed, when all vegetation and debris will be removed from the basin in anticipation of expected increased post-wildfire debris flows from the impaired watershed.

Debris Removal at Plunge Pool. Maintenance should be performed at the plunge pool to provide adequate energy dissipation of emergency spillway flows. The plunge pool was designed to dissipate high-velocity flows from the emergency spillway, and turn 42° downstream to the east to align with Santa Monica channel. The plunge pool accepts flows from the low flow conduit, and on occasion, the emergency spillway. During routine storm events, the inlet towers pass 4-inch minus debris-laden flow, sluiced through the low flow conduit, and discharged into the plunge pool. During extreme storm event, the emergency spillway passes debris-laden flow and woody debris into the plunge pool. After the annual rainfall season, the debris and sediment stored in the pool generally needs to be cleaned out when the material accumulated reaches the elevation of the crest of the outlet spillway (205.9 feet MSL) over the upper one-fourth of the plunge pool horizontal length (approximately the upper 100 feet of the total 400 feet length). Special maintenance will take place after a significant wildfire in the Santa Monica watershed, when all debris will be removed from the plunge pool in anticipation of expected increased post-wildfire debris flows from the impaired watershed.

MAINTENANCE GUIDELINES FOR CARPINTERIA SALT MARSH

Sediment Removal. Maintenance should be performed to provide adequate channel hydraulic capacity and tidal circulation. On an as-needed basis (typically every 5 to 10 years), sediment would be removed beginning from the Union Pacific Railroad bridges downstream approximately 1,500 feet, for a width of approximately 45 feet, to establish an in-stream sediment trap, in both Santa Monica and Franklin Creeks. This will be done with a crane rigged with a drag-line, or a hydraulic dredge. The target elevation is -4.0 feet MSL, or approximately 4 feet lower than the invert of the concrete channel immediately upstream of Santa Monica Creek, or approximately 3 feet lower for Franklin Creek. Sediment volumes to be removed range from approximately 3,000 to 20,000 cubic yards from each sediment trap. Sediment would be temporarily stockpiled on the access road for dewatering. Silt fencing would be placed along the access road to contain the recently removed sediment.

A hydraulic dredge would be used to remove accumulated sediments downstream of existing desilting areas within Lower Franklin Creek and the Main Channel, extending to the Marsh mouth. The proposed desilting area is composed of approximately 1,100 feet of Franklin Creek and 2,000 feet of the Main Channel. Equipment and vehicle access would be from Estero Way and Sandyland Cove Road, and existing access roads within the Marsh. Staging of the dredge,

pipe, and related equipment would occur within the existing staging areas, parallel to and west of the creek channels.

Franklin Creek. When sediment begins to accumulate within the concrete lined channel and islands of sediment can be seen breaking the water surface during medium to high tides this indicates that the channel is becoming full and may need to be desilted.

Santa Monica Creek. When sediment begins to accumulate within the concrete lined channel and islands of sediment can be seen breaking the water surface during medium to high tides, this indicates that the channel is becoming full and may need to be desilted. If the visual estimate is close to 9,000 cubic yards in either Santa Monica or Franklin drainage, the District may choose to have them desilted. Once the decision is made that desilting will be needed, the District surveys the areas to be desilted, and the information is provided to resources agencies for their review and approval.

Lower Franklin Creek and Main Channel. When islands of sediment can be seen breaking the water surface during medium to high tides, this indicates that the channel is becoming full and may need to be desilted.

Schedule. The District's maintenance window for channel desilting, beach nourishment, or upland disposal is September 1 to March 1. The District typically conducts routine maintenance in the fall prior to the winter rains therefore the desilting and beach nourishment are most likely to be completed by the end of November.

Triggers. On an annual basis, in April or May, District personnel (mainly the District Maintenance Manager, District Engineer, and Environmental Staff) visually survey Santa Monica and Franklin Creeks within the marsh to determine whether enough sediment has accumulated to warrant routine desilting operations. Staff uses field indicators and overall distribution of the sediment to determine whether routine maintenance is warranted. It should be noted, however, that these are guidelines and sediment can accumulate in other configurations that would warrant routine maintenance.

Tidal Channels. Maintenance should be performed within the South Marsh, to restore and maintain drainage from Avenue Del Mar through the sheet pile flood wall.

Sheet Pile Flood Wall. Maintenance should be performed to preserve the wooden boards covering the sheet pile walls. Repair or replace the sheet pile coverings, as necessary.

Pipe Drains. Maintenance should be performed to ensure full functionality of the pipe drain outlets. Repair or replace damaged or corroded components as necessary.

Vegetation. Maintenance should be performed to protect and improve sensitive native plants within the Salt Marsh. Remove non-native, invasive vegetation that establishes on disturbed areas caused by sediment cleanout activities.

DISPOSAL OF SEDIMENT AND DEBRIS

The major financial impact in operating and maintaining the CVWP is the cost to remove and dispose of accumulated sediment and debris from the SMDB and Carpinteria Salt Marsh. Temporary areas to stockpile sediment and debris are on the bench (embankment berm) below

the SMDB dam [Figure 3], and on designated staging areas along Santa Monica and Franklin channels in the Carpinteria Salt Marsh [Figure 4]. Material dredged from the Carpinteria Salt Marsh may be transported to the surf zone at Carpinteria State Beach at Ash Avenue, as a means of beach nourishment, if sediment testing results meet requirements Following disaster events, the District may propose alternative sediment transport and disposal options. Nearby upland disposal sites are limited to agricultural uses or concurrent construction projects, where landowners or contractors need imported earthfill and are willing to provide for the transport of material [SBCFCD, 2013].

PROJECT INFORMATION

WATERSHED PROJECT SETTING

The Carpinteria Valley Watershed is located in southeastern Santa Barbara County. Approximately three-fourths of the 15,700-acre watershed consists of mountainous forest and chaparral, and the remainder is located on alluvial deposits. The three major streams – Carpinteria, Santa Monica, and Franklin Creeks – convey flood runoff from the Santa Ynez Mountains, over the floodplains and to the Pacific Ocean. The CVWP encompasses the 5,800-acre watershed of Santa Monica and Franklin Creeks, both of which drain into the Carpinteria Salt Marsh, originally known as El Estero de la Carpinteria [USDA-SCS, 1968].

PROJECT HISTORY

Watershed Plan. In 1962, after the community of Carpinteria survived the latest of 22 damaging floods over its past 105 years, the District engaged the SCS, now renamed the NRCS, to conduct a reconnaissance study into the feasibility of a flood prevention project federally funded under Public Law 83-566. The study was completed favorably in 1964, and application was made to authorize planning the CVWP. The watershed Work Plan was published in 1968, based on economic, hydrologic, geologic, and engineering investigations. Following the severe Southern California floods of January, 1969, the United States Congress promptly approved the CVWP, providing the federal funds to SCS for design and construction. The CVWP was sponsored by the District, and co-sponsored by the City of Carpinteria and the Santa Barbara Resource Conservation District. In addition, the US Forest Service provided maintenance of the upper watershed fire-breaks for a period of five years, and SCS funded land treatment projects on agricultural properties within the project watersheds [Appendix B-1].

Design. Detailed engineering design efforts were commenced by District staff, and then assumed fully by SCS in 1970. Federal construction funds were first allocated in 1971, with the design and installation of the railroad bridges over Santa Monica and Franklin Creeks. Santa Monica Creek Channel Units 1 and 2 were designed and built promptly between 1972 and 1974.

The concluding Unit 3 of Santa Monica Creek Watershed entailed the construction of the SMDB. This catchment was vitally needed to protect the Santa Monica Creek Channel from otherwise becoming filled and obstructed by debris. SCS staff refined the hydrologic investigation from the 1968 Watershed Work Plan, and published the SMDB Hydrology Report in 1973. SCS geologists published the SMDB Engineering Geology Report in 1973, which was supplemented in 1974.

Due to the complexity of the project site, and the High Hazard dam safety classification of the proposed SMDB, the SCS engaged the services of the civil engineering firm Koebig Incorporated, assisted by Kariotos & Kesler Structural Engineers and Leroy Crandall & Associates Geotechnical Engineers, to complete the final design and prepare the construction plans and specifications. Following review and approval by SCS, DSOD, and the District, the final design was completed in 1976.

Construction. Following the installation of Santa Monica Channel, the construction of the SMDB commenced in February, 1977, and was completed in April, 1978. The remainder of the federally-funded CVWP included construction of Franklin Creek Channel (1976-1982), Hog Canyon Diversion (1981), and Carpinteria Salt Marsh Enhancements (2005). All construction units up to and including Franklin Channel Line "F" completed in 1982, were federal contracts administered by NRCS. Since then, all construction units have been local contracts, administered by the District [Appendix C-1].

Operation. To date, the SMDB emergency spillway has conveyed storm runoff overflows on five occasions – the storms of 1995, 1998, 2005, 2018, and 2023. The largest recorded overflow occurred on January 9, 2018, when a southern winter rain fell on the SMDB watershed, 87-percent burned by the Thomas Fire a month earlier. The Edison Trail rain gauge (Station No. 252) measured a peak 1-hour depth of 1.45 inches, and a peak 24-hour depth of 3.17 inches. This storm produced debris-laden runoff through the emergency spillway at a maximum depth of 3.5 feet at the crest, corresponding to a peak flow rate of 1,600 cubic feet per second, with the Low Flow Conduit plugged.

The next largest recorded overflow occurred on January 9, 2023, when a northern winter rain fell on the five-year post-fire, partially recovered watershed. The Edison Trail rain gauge measured a peak 24-hour depth of 10.52 inches. This storm produced sediment-laden runoff through the emergency spillway at a maximum depth of 0.8 feet at the crest, corresponding to a peak flow rate of 200 cubic feet per second, with the Low Flow Conduit operational.

The strongest seismic ground motion experienced at the SMDB to date, occurred on August 13, 1978, only four months after completion of original construction. This 5.8 Mw (Movement Magnitude) event was generated from a thrust fault located offshore, beneath the Santa Barbara Channel. Moderate damages were reported along the South Coast, including a derailed freight train in Goleta and landslides closing State Highway 154. No structural damage was observed at the SMDB..

Maintenance. Just prior to design of the watershed project, the severe storm of 1969 (2-percent probability or 50-year event) deposited an estimated 52 acre-feet (84,000 cubic yards) of debris within Santa Monica Creek. Most of that material removed was used to construct a training dike which still stands on the eastern side of Santa Monica Channel. Within the Carpinteria Salt Marsh, District maintenance crews excavated the Santa Monica and Franklin Creek Channels. This action improved tidal circulation within the eastern side of the marsh, and provided specific locations to remove sediment deposited by these watersheds. With construction of debris basins upstream, the course fraction of sediment-laden and debris-laden flows is now trapped, leaving the fine fraction being conveyed to and deposited in the marsh channels.

Just prior to construction of the watershed project, the Romero Fire of 1971 burned the Santa

Monica and Franklin watersheds. In emergency response, the ACOE constructed two debris basins within the Santa Monica watershed (Debris Barriers #7 and #9), and five debris basins within the Franklin watershed (Debris Barriers #10 through #14). Following the post-wildfire seasons of 1972-73, the District removed 15.5 acre-feet (25,000 cubic yards) from the Santa Monica debris barriers alone. Debris Barrier #9 was removed during construction of the embankment for the Santa Monica Debris Basin, but Debris Barrier #7 still serves as the grouted rock inlet structure to the basin.

Since 1972, the District has assumed full responsibility for operation and maintenance of the project, with technical oversight by NRCS and DSOD.

In December, 2017, the Thomas Fire started near the City of Santa Paula in the neighboring County of Ventura, eventually burning into Santa Barbara County, and consuming a total of 282,000 acres. This wildfire burned 87 percent of the Santa Monica Creek watershed, which had not burned since the Romero Fire of 1971. Then on January 9, 2018, a short duration, high intensity rainfall over the impaired watershed resulted in a debris flow that filled SMDB basin to capacity. The debris basin thereby protected the City of Carpinteria from the disaster event that befell the nearby Village of Montecito, where 450 homes were destroyed or damaged, and 23 residents perished. The successful performance of the CVWP in response to this wildfire and debris flow event, and especially the role of Santa Monica Debris Basin, cannot be overstated.

The ensuing cleanout immediately revealed the extreme challenges and limitations in accessing and maintaining the CVWP. The effort to remove 90 percent of the material from SMDB was completed in April 2018, after three months at work 24 hours a day, 7 days a week. The only breaks in construction activity during this cleanout effort involved three rainstorms in the month of March, which prompted mandatory evacuations of the community downstream as well as the SMDB site. A District construction contract to remove the final 10 percent of material from SMDB, mostly large boulders, was started in July and completed by September 2018 [Appendix B-2]. The totality of the eight-month effort required to clean out SMDB and the Salt Marsh channels, is reflected in the combined price tag for the six construction contracts exceeding $23 million [Appendix C-2].

According to District maintenance records since the construction of SMDB, the total volume of debris removed from the SMDB and plunge pool to date, amounts to 429 acre-feet (692,000 cubic yards). This total volume of debris was deposited primarily during seven major storm years (1978, 1983, 1993, 1995, 1998, 2005, 2023), and, most significantly, the Thomas Fire/Debris Flow of 2018. The corresponding average annual clean out rate is approximately 9 acre-feet (15,000 cubic yards) of debris per year [Appendix D].

Personnel History. Since the inception of the CVWP over 60 years ago, the dedicated efforts of many individuals have contributed to the achievement of a great common good. With vision and perseverance, several generations of problem solvers endeavored to protect the community of Carpinteria. Those individuals are too numerous to recognize here in total. However, for the record, a select list of principal staff members from the District and partner agencies are hereby recognized for their significant contributions to this very worthwhile project [Appendix E]. To quote the late Jim Stubchaer, former Director of Flood Control, "Here's a toast, to all of those who have planned, designed, built, and maintained this project!".

REFERENCES

Santa Barbara County Flood Control & Water Conservation District (SBCFCD). 1971-2024. Record of Construction Drawings for the Carpinteria Valley Watershed Project.

SBCFCD. 1973-2023. Record of Annual Inspection Reports for the Carpinteria Valley Watershed Project.

SBCFCD. 2013. Debris Management Plan.

SBCFCD. 2017. Debris Basin Maintenance and Removal Plan.

SBCFCD. 2018. Santa Monica Debris Basin Engineering Report.

SBCFCD. 2020. Final Subsequent Environmental Impact Report, Updated Carpinteria Salt Marsh Enhancement Plan.

SBCFCD. 2022. Emergency Action Plan for the Santa Monica Debris Basin.

Stanford University, National Performance of Dams Program (NPDP). 1994. Guidelines for the Reporting and Performance of Dams.

State of California, Department of Water Resources (DWR). 2018. Division of Safety of Dams (DSOD) Inspection and Re-evaluation Protocols.

U.S. Army Corps of Engineers (ACOE). 2024. National Inventory of Dams Database, Santa Monica Debris Basin, ID No. CA01134.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2006. Title 180, Part 500, National Operation & Maintenance Manual.

USDA-NRCS. 2014. Title 390, Part 500, National Watershed Program Manual.

U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS). 1968. Watershed Work Plan, Carpinteria Valley Watershed.

USDA-SCS. 1972. Operation & Maintenance Agreement for Structural Measures, Carpinteria Valley Watershed Project.

USDA-SCS. 1980. Revised Operation & Maintenance Agreement, Carpinteria Valley Watershed Project.

APPROVAL

ATTRIBUTION

This Operation and Maintenance Plan for the Carpinteria Valley Watershed Project was prepared by Douglas W. Toews, P.E., Civil Engineering Specialist, in collaboration with the Engineering, Environmental, and Maintenance Staffs of the Santa Barbara County Flood Control & Water Conservation District.

APPROVAL

Santa Barbara County Flood Control & Water Conservation District

Concurred by: DocuSigned by: Matt Griffin 2E185D56570A456... Date: 6/30/2024 | 12:04 PM PDT

Matthew Griffin, P.E.
Engineering Manager

Concurred by: DocuSigned by: Walter Rubalcava 2745EDA75D27485... Date: 6/30/2024 | 8:52 PM PDT

Walter Rubalcava, P.E., C.F.M.
Deputy Director – Flood Control

Approved by: _____ Date: 12-10-24

Steve Lavagnino
Board of Directors, Chair

USDA–Natural Resources Conservation Service

Approved by: _____ Date: _____

Carlos Suarez
State Conservationist

APPENDIX A

Structure Data for Carpinteria Valley Watershed Project

CHANNELS

Channel Reach	Reach Junction Station	Reach Stations (from) (to)	Reach Length (mi.)	Drainage Area ($mi.^2$)	Flow Capacity ($ft.^3/sec.$)	Channel Width (ft.)	Channel Depth (ft.)	Side Slope Ratio (z:1)
Santa Monica Creek								
Main Channel	-	9+30–73+70	1.22	3.68	3,100	16-60	7.5-8.8	0
Spillway Channel	-	16+50–26+80	0.20	3.65	5,100	16	8.0	0
Debris Basin Spillway	-	26+80–32+40	0.11	3.65	13,600	16-125	8.0-19.0	0
Franklin Creek								
Main Channel	-	6+50–119+73	2.14	4.06	3,500	4-70	6.0-9.0	0
Line "A" 78″ RCP	12+55	0+00–12+09	0.23	0.19	300	6.5	6.5	Ø
Line "B" 72″ RCP	28+12	0+00–15+61	0.30	0.23	300	6.0	6.0	Ø
Side Channel	42+27	0+00–1+84	0.03	-	-	6	6.2-7.6	0
Line "C"	53+46	0+00–4+07	0.08	0.85	1,050	8-11	4.0-8.0	0
Line "C-1"	3+29	0+00–3+47	0.07	-	430	10	6.0	0
Line "D"	60+30	0+00–20+76	0.39	0.85	1,050	10	6.0-8.5	0
Line "E"	76+38	0+00–10+57	0.20	0.31	400	7-8	6.0-6.5	0
Line "E-1"	9+31	0+00–2+44	0.05	-	40	4	2.5-3.5	1
Line "F"	94+93	0+00–20+45	0.39	0.36	450	6	5.5-6.0	1
Line "F-1" 54″ RCP	8+84	0+00–0+64	0.01	-	-	4.5	4.5	Ø
Line "F-2" 54″ RCP	14+05	0+00–0+70	0.01	-	-	4.5	4.5	Ø
Line "G" part 42″ RCP	113+68	0+00–14+87	0.28	0.39	400	3.5-11	3.5-6.0	Ø
Hog Canyon Diversion	-	5+70–30+20	0.46	0.14	200	4-6	4.0-6.0	0
Carpinteria Salt Marsh								
Main/Outlet Channel	-	0+00–18+00	0.34	9.08	6,900	45	10.0	2
Franklin Channel	-	18+00–37+40	0.37	4.10	3,700	45	10.0	2
Santa Monica Channel	18+00	0+00–15+00	0.28	3.70	3,200	45	10.0	2

APPENDIX A

Structure Data for Carpinteria Valley Watershed Project

BRIDGES

Bridge Location	Station at Center Line	Lanes (#)	Type[1]	Span (ft.)	Width (ft.)	Height[2] (ft.)
Santa Monica Creek						
Union Pacific Railroad	10+00	1	RC	35	16	7.1
Carpinteria Avenue[3]	13+94	2	RC	30	60	8.5
State Highway 101[3]	19+95	6	RC	38	140	6.5
Via Real[3]	23+70	2	RC	40	34	8.0
Via Real Pedestrian[3]	23+96	1	Steel	42	7	8.0
Foothill Road[3]	58+00	2	RC	28	26	10.0
Private Bridge	65+00	1	RC	16	24	12.3
Santa Monica Debris Basin						
Spillway Channel	23+95	1	RC	31	16	10.1
Debris Basin Spillway	30+00	1	RC	94	18	18.7
Franklin Creek						
Main Channel						
Sandyland Cove Road[3]	21+30	2	Steel	78	20	10.0
Nature Park Pedestrian[3]	33+40	1	Steel	95	6	10.0
Union Pacific Railroad	10+00	1	RC	63	16	6.8
7th Street	15+66	2	RC	42	53	8.9
9th Street Pedestrian	21+50	1	Steel	58	7	10.0
Carpinteria Avenue	25+21	2	RC	56	77	9.3
State Highway 101[3]	29+50	6	RC	35	120	10.5
Malibu Drive	41+00	2	RC	36	60	11.0
Franklin Park Pedestrian[3]	42+80	1	Steel	29	6	9.8
Meadow View Lane Bridge #1	49+54	1	RC	32	12	7.0

[1]: RC = Reinforced Concrete; RCB = Reinforced Concrete Box Culvert.

[2]: Vertical distance from channel invert to bridge soffit.

[3]: Bridge not a constructed component of the Carpinteria Valley Watershed Project.

APPENDIX A

Bridge Location	Station at Center Line	Lanes (#)	Type[1]	Span (ft.)	Width (ft.)	Height[2] (ft.)
Main Channel - continued						
Foothill Road[3]	61+64	2	RCB	64	62	6.0
Private Bridge #2	70+68	2	RC	23	19	6.0
Private RCB #1	77+12	1	RCB	14	14	5.7
Private RCB #2	83+46	1	RCB	14	14	5.7
Private RCB #3	88+96	1	RCB	14	14	5.7
Private Bridge #3	94+87	1	RC	28	11	6.5
Private RCB #4	95+61	1	RCB	8	8	5.8
Private RCB #5	101+59	1	RCB	8	8	5.3
Private RCB #6	114+11	1	RCB	4	4	5.3
Private RCB #7	119+54	1	RCB	4	15	5.3
Line "B"						
Triple Box Culvert	15+54	2	RCB	5 (3)	15	3.3
Line "C-1"						
Franklin Trail RCB #8	1+00	1	RC	10	14	5.3
Line "E"						
Private RCB #10	10+15	1	RCB	7	14	5.3
Line "F"						
Private RCB #1	9+09	1	RCB	7	30	4.8
Private RCB #2	12+02	1	RCB	7	35	4.8
Private RCB #3	13+53	1	RCB	9	35	4.8
Line "G"						
Private RCB #16	0+48	1	RCB	11	13	5.3
Hog Canyon Diversion						
Casitas Pass Road	10+00	2	RCB	42	6	3.0
Private RCB	20+47	1	RCB	6	5	4.0

APPENDIX A

Structure Data for Carpinteria Valley Watershed Project

SANTA MONICA DEBRIS BASIN

General

Name: **Santa Monica Debris Basin**
State: **California**
County: **Santa Barbara**
Owner/Operator: **SB Flood Control**
NID Identification No.: **CA01134**
DSOD Identification No.: **2010**
Stream: **Santa Monica Creek**
Nearest Town: **Carpinteria**
Distance to Nearest Town: **1.2 mi.**
Latitude: **34.423152**
Longitude: **119.526630**
Elevation (Top of Dam): **409.3 MSL**
Hazard Classification: **High**
Emergency Action Plan: **2022**
Inspection Frequency: **Annual**
Federally Constructed: **USDA-SCS/NRCS**
Program Authority: **P.L. 83-566**
Year Constructed: **1978**
Service Life: **100 years**

Principal Spillway

Type: **Reinforced Concrete Pipe**
Diameter: **48 in.**
Length: **1,120 ft.**
Inlets: **Towers (3)**
Discharge Capacity: **380 ft.^{3}/sec.**

Dam

Type: **Earthen Embankment**
Drainage Area: **3.65 mi.^{2} (2,337 ac.)**
Embankment Height: **102 ft.**
Dam Height: **92 ft.**
Crest Length: **467 ft.**
Crest Width: **32 ft.**
Upstream Side Slope: **2½:1**
Downstream Side Slope: **2:1**
Reservoir Capacity: **72 ac.-ft.**
Reservoir Surface Area: **5.7 ac.**
Debris Capacity: **98 ac.-ft. (158,000 yd.^{3})**
Debris Surface Area: **7.8 ac.**
Plunge Pool Cap.: **9.0 ac.-ft. (15,000 yd.^{3})**
Plunge Pool Surface Area: **0.8 ac.**

Emergency Spillway

Type: **Reinforced Concrete Chute**
Width at Inlet: **125 ft.**
Width at Crest: **76 ft.**
Depth at Crest: **17 ft.**
Discharge Capacity: **13,600 ft.^{3}/sec.**
Design Precipitation, 24-hr. (1%): **12.4 in.**
Design Precipitation, 24-hr. (PMP): **28.5 in.**
Design Flowrate (1%): **5,100 ft.^{3}/sec.**
Design Flowrate (PMP): **13,600 ft.^{3}/sec.**

APPENDIX B

CHRONOLOGY OF EVENTS LEADING TO CONSTRUCTION OF

CARPINTERIA VALLEY WATERSHED PROJECT UNDER PL 566

January, 1962	California Department of Soil Conservation, Santa Barbara County Flood Control and Water Conservation District and Santa Barbara Soil Conservation District started work on reconnaissance study to determine feasibility of PL566 project in Carpinteria Valley.
February, 1962	Two floods of Franklin Creek heightened interest of Carpinteria citizens in PL566 project.
February, 1964	Reconnaissance study completed by State Department of Soil Conservation indicated flood control work under PL566 in Carpinteria Valley is feasible.
March, 1964	Santa Barbara Soil Conservation District and Santa Barbara County Flood Control and Water Conservation District made application for assistance in planning and carrying out works of improvement for the Carpinteria Valley Watershed Project.
April, 1964	Application was approved by State Soil Conservation Commission.
August, 1964	Carpinteria Valley Watershed Project approved for planning by Soil Conservation Service.
July, 1965	"Steering Committee" of local citizens appointed to help guide project development.
November, 1965	Flooding from Franklin Creek caused renewed interest in Carpinteria Valley Watershed Project.
December, 1965	New City of Carpinteria became a co-sponsor of Carpinteria Valley Watershed Project.
March, 1966	Draft of workplan outlining project presented to steering committee at public meeting and their comments received and considered.
May 1968	Final draft of workplan presented at fifth meeting of steering committee.
December, 1968	Workplan agreement executed by local sponsoring agencies.
January, 1969	Severe floods caused extensive damage in Carpinteria Valley. Citizens urged funding of Carpinteria Valley Watershed Project.
April, 1969	Soil Conservation District executed workplan agreement.
July, 1969	Congressman Teague telegramed that the Agricultural Subcommittee had approved Carpinteria Valley Watershed Project. He advised that there was a long waiting list for construction funds, however.
October, 1969	Detailed design of project started by Flood Control District staff, later assumed by Soil Conservation engineers.
November, 1970	Soil Conservation Service contracted for foundation explorations for bridges and channels.
January, 1971	City and County adopted Flood Hazard zoning ordinances to qualify Carpinteria Valley Watershed Project for State reimbursement of right-of-way costs.
August, 1971	Right-of-ways for Unit I of Santa Monica Creek construction certified to Soil Conservation Service.
September, 1971	Federal funds allocated for new railroad bridges at Santa Monica and Franklin Creeks and for Unit I of channel construction on Santa Monica Creek.
October, 1971	Romero Fire burned watersheds above Carpinteria, greatly increasing threat of flooding.
December, 1971	Contract with Southern Pacific Railroad for replacement of railroad bridges executed.
December, 1971	Moderate rainstorm on burned watersheds caused severe flooding.
April, 1972	Bids opened for Unit I of Santa Monica Creek channel construction
May, 1972	Construction of channel improvements started.

APPENDIX B

CHRONOLOGY OF EVENTS
FOLLOWING THE THOMAS FIRE/DEBRIS FLOWS OF 2018
AT THE SANTA MONICA DEBRIS BASIN

December 4, 2017	Thomas Fire started in the neighboring County of Ventura, eventually burning into Santa Barbara County and consuming a total of 282,000 acres, including 87 percent of the Santa Monica Creek watershed.
January 9, 2018	Rainfall on burned watersheds triggers debris flows in Montecito and Carpinteria, Santa Monica Debris Basin (SMDB) and plunge pool fill to capacity.
January 11, 2018	Santa Barbara County Flood Control District (District) requests Emergency Watershed Protection (EWP) Program assistance from NRCS.
January 15, 2018	FEMA-funded cleanout of Santa Monica Debris Basin commences.
March 10, 2018	Horizontal drilling of Low Flow Conduit reaches Inlet Tower "A", dewatering the basin.
April 18, 2018	FEMA-funded cleanout of SMDB ceases, basin capacity 90 percent of As-Built storage.
June 29, 2018	District requests Watershed and Flood Prevention Operations (PL 83-566) assistance for Remedial Funds to repair and improve SMDB.
July 16, 2018	District-funded cleanout of SMDB commences.
July 17, 2018	NRCS and District complete the Damage Survey Report (DSR) for EWP project to repair SMDB.
September 13, 2018	District-funded cleanout of SMDB completed, basin capacity 100 percent of As-Built storage.
September 21, 2018	District publishes Engineering Report on the SMDB.
September 25, 2018	NRCS assigns Investigation Committee to report on engineering deficiencies at the SMDB.
October 16, 2018	Construction of NRCS-funded SMDB EWP Project commences.
November 5, 2018	District hires Bengal Engineering to perform a structural evaluation of the bridges at the SMDB.

APPENDIX B

April 11, 2019	Construction of NRCS-funded SMDB EWP Project completed.
May 23, 2019	Bengal Engineering publishes Bridge Evaluation Report for SMDB bridges.
June 7, 2019	District advertises Request for Proposals for design of the SMDB Operational Improvements Project.
June 25, 2019	NRCS publishes Engineering Report on the SMDB.
September 30, 2019	NRCS funds the SMDB Operational Improvements Project, allocating $4,000,000 in Financial Assistance and $700,000 in Technical Assistance.
November 5, 2019	District awards contract for design of the SMDB Operational Improvements Project to Bengal Engineering.
March 19, 2022	Bengal Engineering completes Design Documentation Report and Construction Plans & Specifications for the SMDB Operational Improvements Project.
March 23, 2022	District advertises Request for Bids for construction of the SMDB Operational Improvements Project.
June 28, 2022	District awards contract for construction of the SMDB Operational Improvements Project to Lash Construction.
August 15, 2022	Construction of the SMDB Operational Improvements Project commences.
January 9, 2023	Rainfall of 10.5 inches (2-percent event) falls on five-year post-burn Santa Monica Creek watershed, pausing construction contract for three months to perform emergency cleanout of debris from the SMDB and plunge pool.
June 28, 2024	Construction of the SMDB Operational Improvements Project completed.

APPENDIX C

Carpinteria Valley Watershed Project[1]

SUMMARY OF CONSTRUCTION CONTRACTS & COSTS

Unit of Construction	Record No.	Funding Agency	Design Agency/Firm	Construction Contractor	Start	Finish	Cost[3]	Value[4]
Santa Monica Creek, Railroad Bridge[2] Box Girder, 35-ft. Single Span on Piles, 10+00	P-0388	USDA-SCS	Southern Pacific RR	–	1971	1972	$139,676	$1,018,171
Franklin Creek, Railroad Bridge[2] Box Girder, 63-ft. Single Span on Piles, 10+00	P-0389	USDA-SCS	Southern Pacific RR	–	1971	1972	$251,417	$1,938,903
Santa Monica Creek, Unit 1 Lined Channel, 9+30 to 33+00	P-1088	USDA-SCS	USDA-SCS	Kringlen-Lew-Roe	May, 1972	Nov, 1973	$540,307	$3,707,941
Santa Monica Creek, Unit 2 Lined Channel, 33+00 to 73+70	O-0699	USDA-SCS	USDA-SCS	O'Berg Construction	Jun, 1973	Feb, 1974	$974,334	$6,021,937
Franklin Creek, Unit 1 Lined Channel, Lines A & B, 6+50 to 43+20	O-0719 O-0769	USDA-SCS	Martin & Northart Penfield & Smith	Belczak-Sessler	Sep, 1976	Sep, 1977	$1,937,000	$9,739,402
Santa Monica Creek Debris Basin, Unit 3 Embankment Dam, Spillways & Plunge Pool, 11+88 to 32+40	O-0870	USDA-SCS	Koebig Inc.	O'Shaughnessy-Rowe-Lambert	Mar, 1977	Apr, 1978	$2,858,391	$13,358,240
Franklin Creek, Unit 2 Lined Channel & Revegetation, Lines C, D, E & G, 43+20 to 119+73	O-0856	USDA-SCS	Moffat & Nichol	KEC Construction	Oct, 1979	Jan, 1981	$4,511,000	$15,121,130
Hog Canyon Diversion Lined Channel, 5+70 to 30+20	P-0596	USDA-SCS	USDA-SCS	Cushman-Roe	Apr, 1981	Sep, 1981	$759,196	$2,544,868
Franklin Creek, Line F Lined Channel, 0+00 to 20+45	P-0597A	USDA-SCS	USDA-SCS	Blois Construction	May, 1982	Oct, 1982	$479,433	$1,513,825
Santa Monica & Franklin Creeks, Landscaping Revegetation, Santa Monica Units 1 & 2, Franklin Unit 1	P-0597B	USDA-SCS	USDA-SCS	Karleskint-Crum	Oct, 1980	Feb, 1981	$26,327	$97,353
Santa Monica Debris Basin, Towers Reconstruction Repair Towers A & B	O-1016	SBCFCD	SBCFCD	SBCFCD	2003	2004	–	–
Carpinteria Salt Marsh, Enhancement Plan Earthen Berms, Floodwall & Drains	O-0973	USDA-NRCS	SBCFCD	Granite Construction	Sep, 2004	Aug, 2005	$2,850,000	$4,597,145
Franklin Creek, Channel Wall Extension Outlet Channel Wall, 2+00 to 5+65	O-1103	SBCFCD	Bengal Inc.	Brough Construction	2012	2012	$146,621	$196,958
Santa Monica Debris Basin, Thomas Fire Restoration, Phase 1 Repair Rock Slope Protection, Tower Pads & Embankment Road	O-1139	DHS-FEMA	SBCFCD	Granite Construction	Jul, 2018	Sep, 2018	$1,098,200	$1,348,841
Santa Monica Debris Basin, Thomas Fire Restoration, Phase 2 Repair Towers, Side Drains, V-Ditches & Access Roads	O-1140	USDA-NRCS	SBCFCD	Lash Construction	Oct, 2018	Apr, 2019	$343,274	$421,619
Santa Monica Debris Basin, Operational Improvements Replace Bridges, Towers, Access Pads, Side Drains & Roads	O-1165	USDA-NRCS	Bengal Inc.	Lash Construction	Aug, 2022	Jun, 2024	$5,786,797	$5,786,797
						Totals	$22,701,973	$67,413,130

[1]: Watershed Protection & Flood Prevention Project (P.L. 83-566) sponsored by the Santa Barbara County Flood Control District, in cooperation with the City of Carpinteria and the Santa Barbara Soil Conservation District.

[2]: Structure maintained by others.

[3]: Cost of As-Built construction contracts, not including land rights, engineering services, and administrative costs.

[4]: Value of As-Built construction contracts as of May, 2024.

APPENDIX C

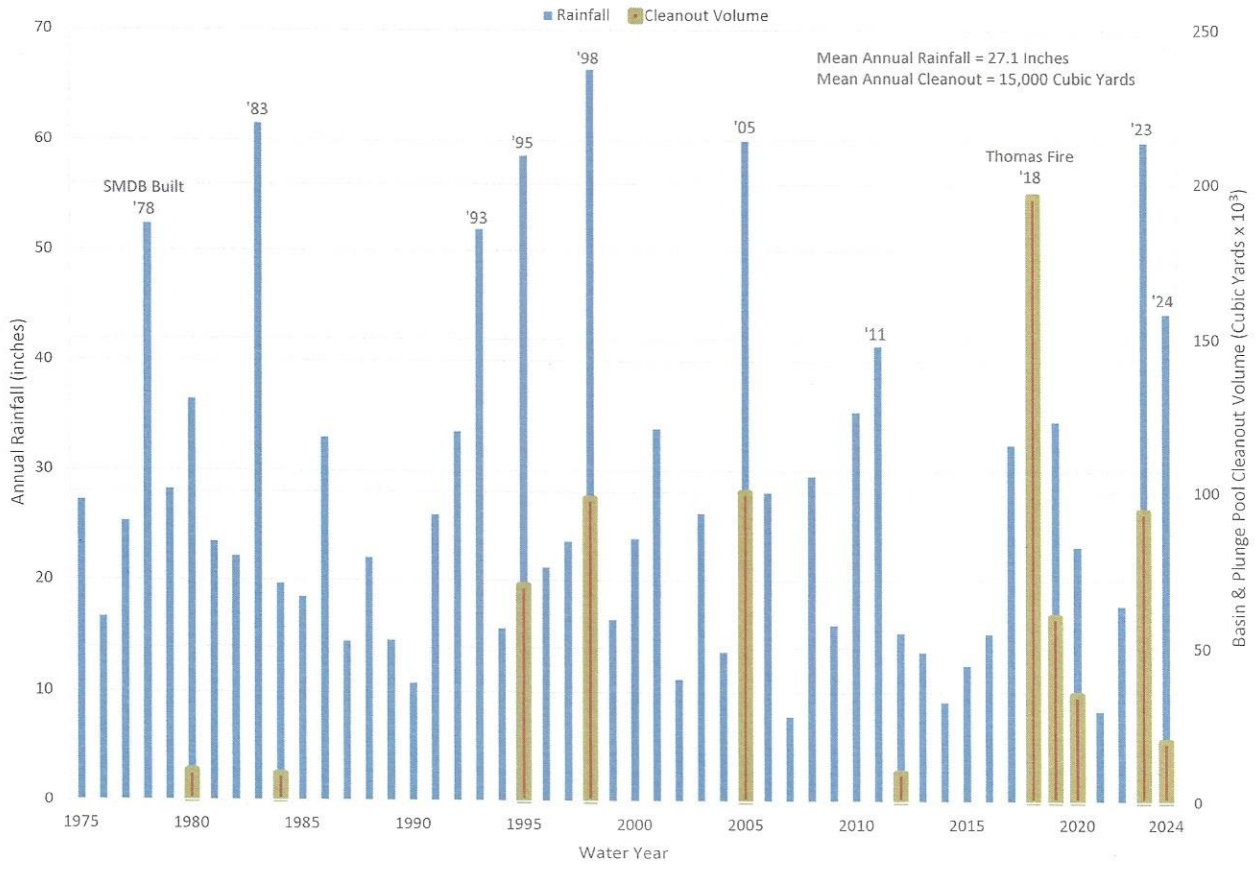
SUMMARY OF CONSTRUCTION CONTRCTS & COSTS
THOMAS FIRE/DEBRIS FLOW OF 2018

Unit of Construction	Funding Agency[2]	Prime Contractor	Start	Finish	Cost[3]	Value [4]
Salt Marsh Channels 1	DHS-FEMA	TNT & OST Crane	Jan, 2018	Feb, 2018	$540,000	$672,000
Debris Basin 1	DHS-FEMA	Lead Builders Inc.	Jan, 2018	Feb, 2018	$3,000,000	$3,731,000
Debris Basin 2	DHS-FEMA	Tribal 1 Construction Inc.	Feb, 2018	Apr, 2018	$17,000,000	$21,145,000
Low Flow Conduit	SBCFCD	Granite Construction Inc.	Mar, 2018	Mar, 2018	$180,000	$223,900
Salt Marsh Channels 2	DHS-FEMA	DSC Dredge, LLC	Mar, 2018	Apr, 2018	$1,380,000	$1,716,000
Debris Basin 3	SBCFCD	Summer Construction Inc.	Jul, 2018	Sep, 2018	$1,140,000	$1,418,000
Debris Basin 4	USDA-NRCS[5]	Lash Construction Inc.	Oct, 2018	Apr, 2019	$343,300	$427,000
				Total	$23,583,300	$29,332,900

[1]: In response to the Thomas Fire/Debris Flow disaster of January 9, 2018.
[2]: Federally-funded emergency projects cost-shared, 75-percent federal and 25-percent local.
[3]: Cost of As-Built construction contracts, not including engineering services and administrative costs.
[4]: Value of As-Built construction contracts, as of 2024.
[5]: Santa Monica Debris Basin Emergency Watershed Protection (EWP) Project.

APPENDIX D

O&M History of the Santa Monica Debris Basin
1978 - 2024



APPENDIX E

Carpinteria Valley Watershed Project

RECORD OF DISRICT AND AGENCY PRINCIPAL STAFF

Santa Barbara County Flood Control & Water Conservation District

Directors/Public Works Deputies

Art Case
Jim Stubchaer
Phil Demery
Tom Fayram
Walter Rubalcava

Engineering Managers

Jim Stubchaer
Will Copeland
Tom Fayram
Steve Wagner
Jon Frye
Matt Griffin

Maintenance Managers

Carl Chappel
Jack Fertig
Larry Fausett
Rick Tomasini
Floyd Holmes

Environmental Managers

Larry Fausett
Maureen Spencer
Andrew Raaf

Santa Barbara/Cachuma Resource Conservation District

Board Members

Bill Catlin
Alois Mauracher
Frank Alegria
Gordon McCloskey
Gary Cavaletto
Anthony Brown

USDA Soil Conservation Service/ Natural Resources Conservation Service

State Conservation Engineers

Hugh Shogren
Bill Evans
Lee Herndon
Ted Gerbaz
Charles Davis
John Harrington
Luis Laracuente
Greg Norris
Ernesto De La Riva

State Design Engineers

Dave Johnson
Charles Davis
Bill Ward
Jim Chapman
Carlos Velasquez
Teresa Velasquez

Project Engineers

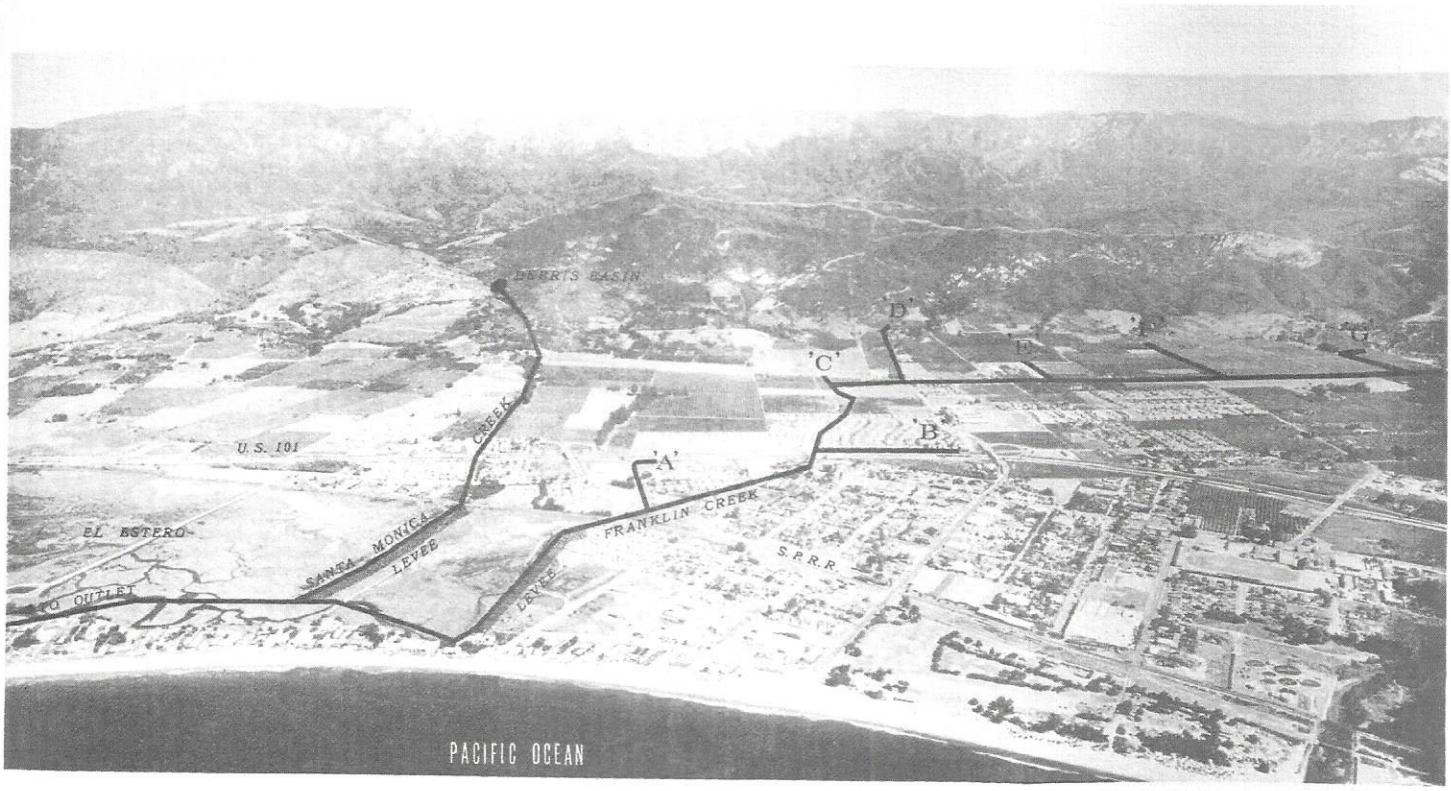
Dennis Hegg
Tim Deming
Mike Simmons
Ed Denton

District Conservationists

Clarence Blakeboro
Don Hansen
Bob Best
Jerry Czarnecki
John Bechtold
Jeff Rodriguez
Emma Chow

Field Office Engineers

Earl Ross
John White
Mike Simmons
Chuck Velasquez
Doug Toews
John Tiedeman
Matthew Pawlek
Phil Durgin
Daniel Little
Abel Villanueva



Photographed by Mark Hurd Aerial Surveys ,Inc.

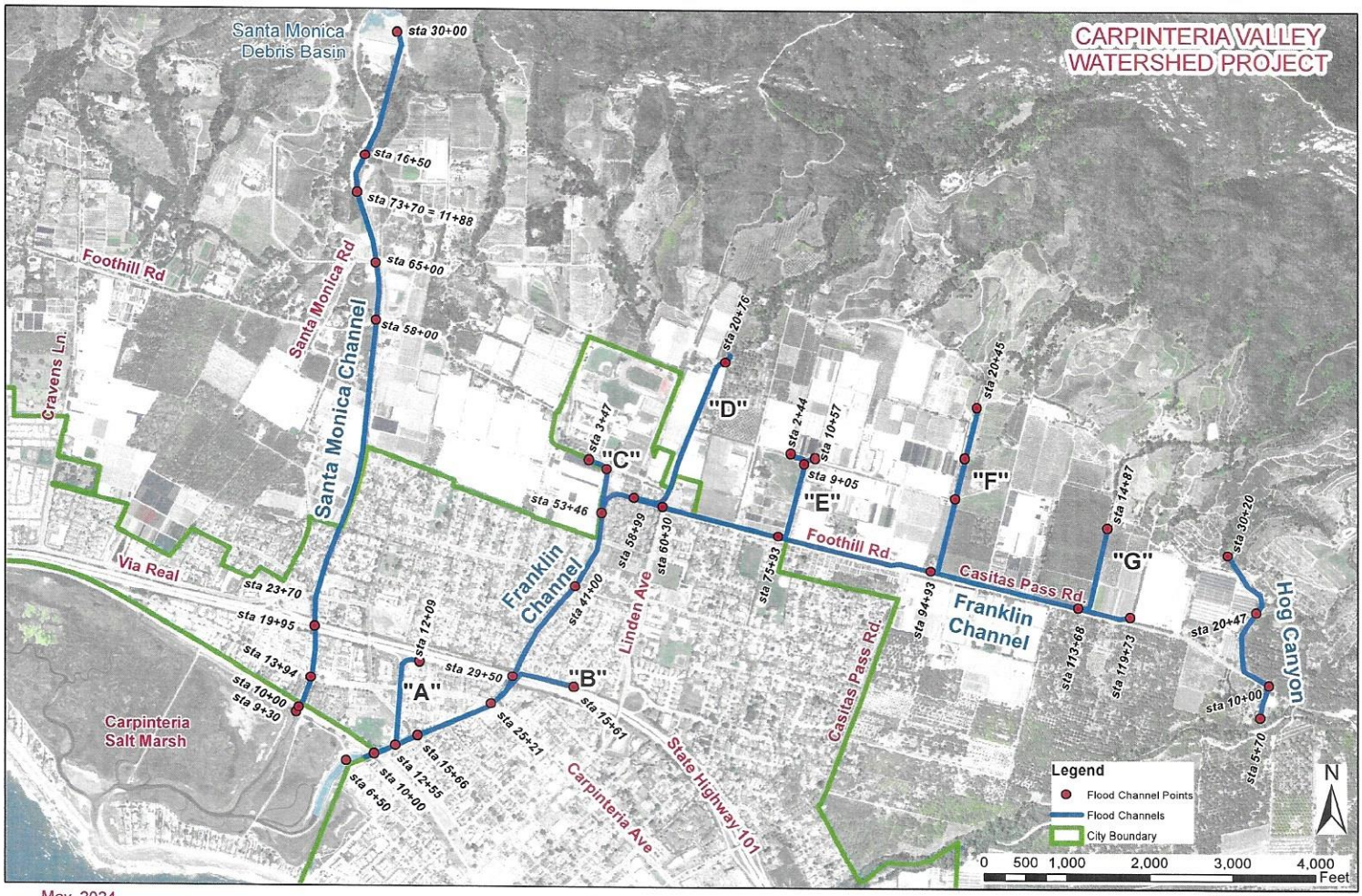
Circa 1968

Note:
Outlet from El Estero and the Hog Canyon
Diversion Channel not shown.

May, 2024

CARPINTERIA VALLEY WATERSHED
SANTA BARBARA COUNTY, CALIFORNIA

Figure 1



May, 2024

Figure 2

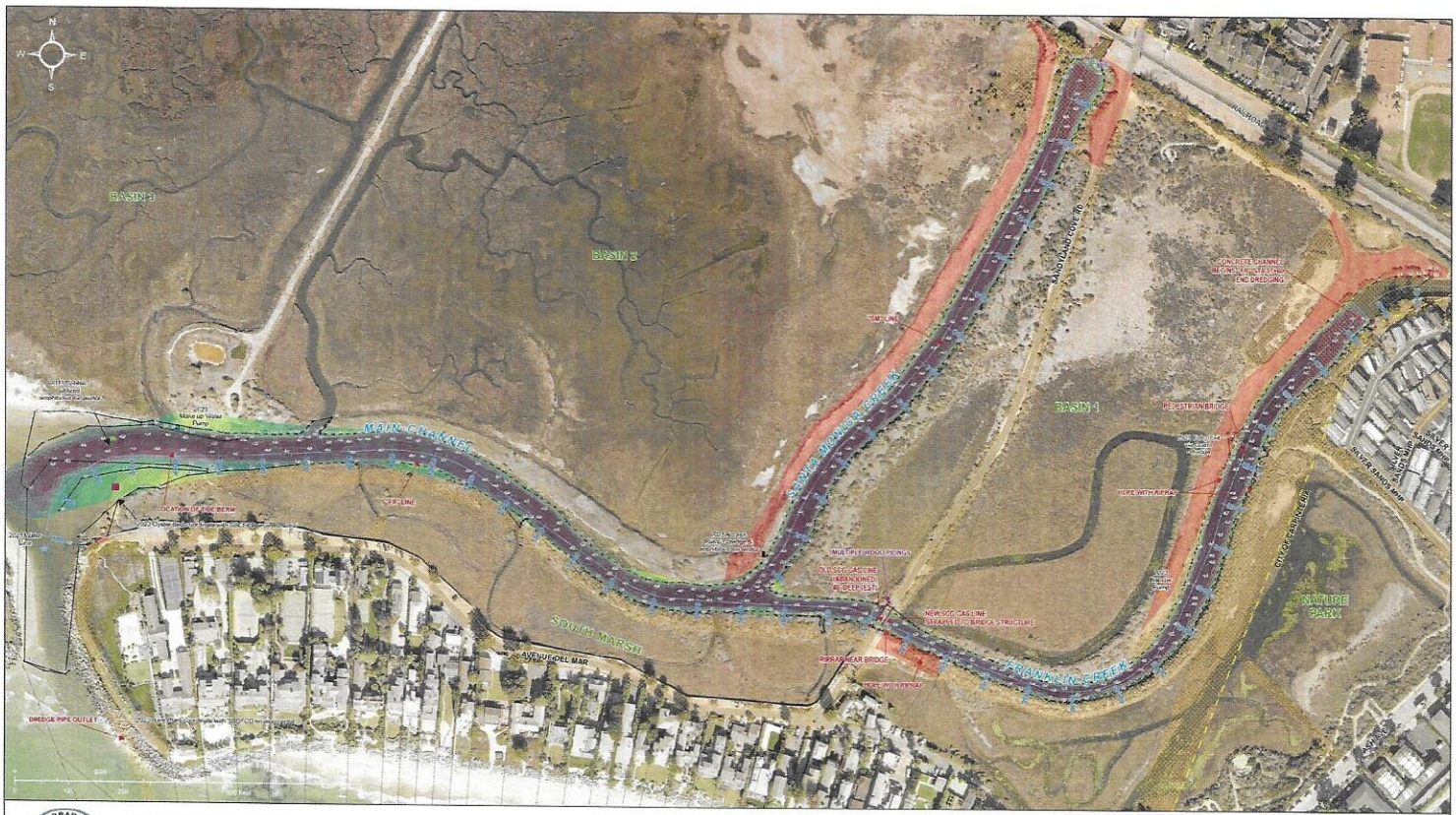
SANTA MONICA CREEK DEBRIS BASIN

200 0 100 200

(IN FEET)
1 inch = 200 ft.

May, 2024

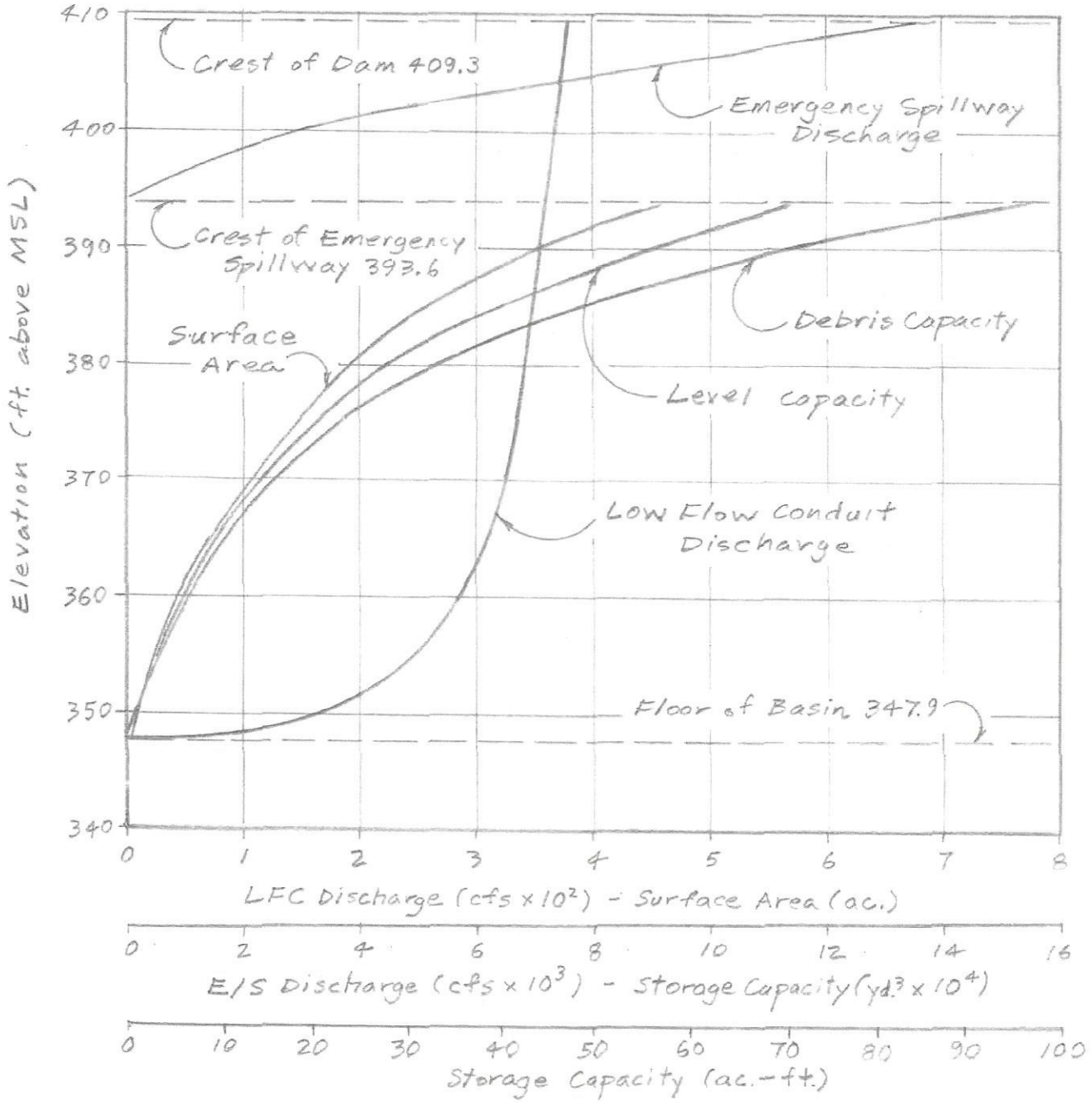
Figure 3



May, 2024

Figure 4

SANTA MONICA DEBRIS BASIN



AREA — CAPACITY CURVES

June, 2024

Figure 5