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SAN FRANCISCO DISTRICT

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Regulatory Division
1455 Market Street
San Francisco, CA 94103-1398

PROJECT MANAGER: Bob Smith Phone: (415) 503-6792/E-mail: robert.f.smith@usace.army.mil

1. **INTRODUCTION:** The San Francisco Public Utilities Commission (SFPUC), 1155 Market street, Suite 600, San Francisco, California 94103 (Contact: Debbie Craven-Green, [415] 934-5756) has applied for a Department of the Army permit to construct the Crystal Springs/San Andreas Transmission System Upgrade (CS/SA) which includes the upgrade, repair, and seismic retrofit of their water delivery system structure from the Upper Crystal Springs Reservoir (UCSR) to the San Andreas Reservoir (SAR) in San Mateo County, California. The project would result in the temporary filling of 2.72 acres of wetlands and waters, and the permanent filling of 6.43 acres of wetlands and waters. This application is being processed pursuant to the provisions of Section 404 of the Clean Water Act (33 U.S.C. Section 1344).

2. **PROPOSED PROJECT:** The CSSA project boundary encompasses approximately 146 acres, including 24 acres of reservoir, located predominantly within SFPUC Peninsula Watershed lands, and entirely within unincorporated San Mateo County (Figures 1 and 2). The project area is approximately 7 miles long (north to south), bordered on its southern end by Upper Crystal Springs Reservoir and on its northern end by the San Andreas Reservoir and the Harry Tracy Water Treatment Plant.

The project is proposed to reduce facility vulnerability to earthquakes and increase water delivery reliability to meet the overall goals of their Water System Improvement Program (WSIP). As such, the proposed project's objectives are to:

- Improve the seismic reliability of the CS/SA Transmission System by reducing its vulnerability to earthquake-related damage to ensure continued operation following a seismic event.
- Ensure that the CS/SA Transmission System provides transmission flexibility to the regional water system in a manner that will enable the SFPUC to meet its water supply and delivery reliability goals in the event of an emergency or during major water system maintenance.
- Ensure delivery reliability of the CS/SA Transmission System by providing a means to access and repair the CS/SA Transmission System facilities.
- Meet California Division of Safety of Dams requirements for dam facilities in an emergency drawdown scenario.

SFPUC proposes to upgrade, repair, and seismically retrofit their water delivery system structures from the UCSR to the SAR. Figure 2 provides an overview of the project area which contains five components: Upper Crystal Springs Dam, Crystal Springs Outlet Structures, Crystal Springs Pump Station, Crystal Springs/San Andreas Pipeline, and the San Andreas Outlet Structures described below. The project area is defined as the limit of work and is also referred to as the project boundary on figures and in this text. Work within the project boundary includes the following activities.

• Seismic upgrade and rehabilitation of system facilities, including reservoir inlets and outlets.

• Construction of a new pump station, including dissipation and outfall structure at San Mateo Creek.

• Create new access roads or improve existing access roads

- Clearing: mowing vegetation and shrubs (when necessary) to within a few inches of existing ground to create staging areas and create/improve vegetated vehicle and foot paths and vegetated access roads.

- Grading: clearing, grubbing, and grading vegetated areas to create gravel or grassy access roads over steep or uneven terrain.

• Streambank Improvements: reducing channel bank slopes, applying erosion control fabrics and/ or rock and coir rolls, and revegetation with typical native species.

• Pipeline repair and rehabilitation: relining and/or recoating the delivery pipeline, replacing blowoff and air vacuum valves, repairing support foundations (saddle repair), and constructing a new pipeline inlet to SAR

• Habitat restoration, including conversion of invasive and nonnative vegetation communities to native vegetation communities. The applicant states restoration activities within all areas affected by clearing and grading, except areas displaced by new gravel roads, would create a net benefit for endangered and threatened species including San Francisco garter snake *(Thamnophis sirtalis tetrataenia)* (endangered), California red-legged

A total of 2.71 acres of Waters of the US would be temporarily affected and 6.43 acres would be permanently filled through the implementation of the proposed project. Of the 2.71 acres of temporary impacts, 2.23 acres of reservoir bottom (200 linear feet of shoreline), 0.37 acre of wetlands, and 0.12 acre (958 linear feet) of drainages would be disturbed. Of the 6.43 acres of permanent impacts, approximately 6.25 acres of reservoir bottom (250 linear feet of shoreline), 0.12 acre of wetlands, and 0.05 acre (504 linear feet) of drainages would be permanently altered.

Descriptions of the general construction activities associated with each of the five project components are discussed below.

Upper Crystal Springs Dam

The Upper Crystal Springs Dam (UCSD), located where State Route 92 crosses the reservoir (Figure 3a) is the proposed project's southernmost component. Figures 3a through 3e show the plan profile and sectional views of the project elements described below.

The first project component includes seismic and functional upgrades to the UCSD upper and lower culverts, i.e., the culvert near the surface of the reservoir and the culvert near the bottom of the reservoir, respectively) that connect the reservoirs. Proposed improvements include installation of isolation devices at both the Upper Culvert and Lower Culvert, and seismic improvements to assure continued integrity and operability of the culverts following an earthquake. In addition, existing boat ramps in the Upper and Lower Crystal Springs Reservoirs would be upgraded as needed to accommodate on-water construction (i.e., deployment and use of barges in the reservoir). Temporary staging areas would be constructed at both the Upper and Lower Culvert and the boat ramps to allow offloading and storage of materials and loading of the barges. The gravel road leading to the boat ramp at LCSR would be improved and the existing metal culvert would be replaced with a concrete culvert.

The following activities encompass the proposed improvements at the Upper and Lower Culverts.

- Improve the access road to the LCSR boat ramp (R&R culvert).
- Reline the downstream portion of the Lower Culvert and construct a new vertical portal within the Lower Crystal

Springs Reservoir (downstream side of UCSD).

- Construct an isolation valve and trash rack at the inlet portal on the Lower Culvert (upstream side of UCSD).
- Install isolation slide gates and an operating platform on the upstream side of the Upper Culvert.

Lower Culvert Relining and New Vertical Portal

The entire Lower Culvert outlet portal would be relined with a new high-density polyethylene liner from approximately 22 feet downstream of the existing gate shaft to the outlet in Lower Crystal Springs Reservoir (approximately 328 feet). In addition, a portion of the liner would be encased in low-strength concrete to reduce the potential for collapse of the brick tunnel during a major seismic event.

The relined outlet portal would cross the San Andreas Fault rupture zone. In order to minimize the potential for failure of the improved outlet portal following a major seismic event, a new vertical portal would be added to the outlet portal on the east side of the San Andreas Fault rupture zone. The vertical portal would release water into the Lower Crystal Springs Reservoir east of the fault rupture zone and would ensure that water could continue to be transferred through the UCSD following an earthquake should the portion of the outlet portal crossing the fault rupture zone be damaged.

Construction of the new vertical portal (Figure 3c) would require excavating approximately 17,000 cubic yards cubic yards (cy) of material within the reservoir below the normal maximum water level, and approximately 5,000 cy of dry material removal from along the shoreline. The wet spoils would be redeposited in deeper locations within the Lower Crystal Springs Reservoir (Figure 3a) and the dry material would either be deposited in an adjacent upland area, deposited in Lower Crystal Springs Reservoir, or be utilized elsewhere for the proposed project (e.g. CS Pump Station or CSSA Pipeline) in the event there is a shortfall in acceptable local cut material.

Upper Culvert Isolation Valve Gates and Operating Platform

Isolation valve gates would be installed on the Upper Culvert inlet. Additionally, a 16-foot-by-25-foot steel operating platform and walkway, approximately 70 feet long by 3.8 feet wide, would be constructed on top of the Upper Culvert approximately 17.5 feet above the existing Upper Culvert inlet. The operating platform and walkway would allow above-water access to the valve gates for manual operation and for maintenance. Excavation would be limited to that necessary for construction of the platform and walkway footings.

Construction at the UCSD is expected to last approximately 120 days during which time the reservoir levels would be lowered to elevation 276 feet. For approximately 90 days within the 120 day construction period, the water level would be lowered further to elevation 265. This would coincide to the period of channel excavation. During construction at UCSD, both reservoirs would remain in operation. Water diversion would be used to dewater construction areas as necessary. Some temporary, intermittent restrictions on overflow at the Pulgas Reservoir and operation of the Crystal Springs Pump Station (CSPS) may be required to maintain velocities through the culverts below 2 feet per second (fps) during construction. The lower culvert would be shut down for 100 days in order to complete the structural modifications. The upper culvert would likely remain in service during this time.

Crystal Springs Outlet Structures 1 and 2

The second component is the seismic upgrade of the Crystal Springs Outlet Structures (CSOS) 1

and 2 located next to the Lower Crystal Springs Dam (LCSD). Figures 4a through 4d show the plan profile and sectional views of this project component. The outlet structures supply the pump station and direct delivery system. The project would upgrade the control system that is used to selectively withdraw water from different depths to restrict flow from different elevations/depths in the reservoir in order to avoid poor water quality. The seismic retrofit of the outlet towers and tunnels would ensure their continued operation following an earthquake.

Each outlet structure has three inlet adits (a horizontal tunnel) attached to a tower that extends 25 to 35 feet above the average water surface elevation and contains the adit valving and a connecting tunnel and pipeline to the CSPS. A maintenance access bridge spans between the shore and each tower and a connecting tunnel and pipeline to the CSPS. The existing tower structures extend approximately 25 to 35 feet above the average reservoir waterline. For both structures, water is drawn through the adits, into the tower and through the tunnel to the CSPS. The towers also serve as access points during outlet operation, maintenance, and repair activities. Figure 4b is profile views of each outlet structure.

The following construction elements would occur at the CSOS 1 and 2.

- Install turbidity screen around the CSOS to be upgraded.
- Excavate a 1.5:1 slope to the base of each adit (CSOS 1 only).
- Remove cylindrical iron fish screens from adits.
- Install new 40-inch liner pipe in all adits and 72-inch liner pipe in each tunnel to the pump station. Grout all annular space between the liner pipe and walls.
- Install new 42-inch butterfly valves and fish screens on all adits.
- Install new submerged hydraulic control lines to each butterfly valve.
- Remove interior platforms; ladders; ventilation system; and lighting, gate valves, and piping from towers.
- Apply reinforced concrete liner to inside of each tower.
- Remove upper section of each tower and dispose of in reservoir.

Improvements to both outlet structures are shown on Figures 4c (plan view) and 4d (profile views). In order to maintain system operation, one outlet structure would be worked on while the other would remain in operation. It is estimated that 8 months will be required to complete work on one tower, and work at both CSOS 1 and 2 will last a total of approximately 2 years.

The following sequence describes the process in more detail.

1. *Site preparation:* Prior to beginning any work the work site will be fenced off with exclusion fencing and construction fencing. Prior to in water work, a turbidity screen would be installed around the outlet structure to be worked on and would remain in place until the work is complete. All existing monuments, survey markers, and utilities would be protected; and shutdown of the pumps and pipeline would be coordinated with the SFPUC.
2. *Demolition:* Prior to beginning demolition, a total of approximately 115 cy of soil would be excavated from around the adits (CSOS 1) to create 1.5:1 slope. Divers with hydraulic dredges would conduct the work, and the material would be deposited within the turbidity screen area and away from the adit intakes. Divers would also remove

the existing underwater fish screens and all equipment from the towers.

The tower access bridges and piers would be removed, leaving pier footings in place. The upper 40 feet of CSOS1 tower and the upper 30 feet of the CSOS2 tower would be removed and deposited in the reservoir. The bridge structures would be disposed of offsite, except for the concrete portion on CSOS1 which may be used to repair existing riprap.

3. *New hydraulic control system:* A replacement upstream control system would be installed to provide a means to selectively withdraw water from different depths from the LCSR for water transfer to the CSPS and ultimately the San Andreas Reservoir. The new hydraulic valve control lines would be attached to submerged fence rails anchored with concrete anchors submerged in the reservoir bed (shown on Figure 4c). The rail system would run along and be anchored to the reservoir bed from the adits to the new utility control building located on shore. Hydraulically activated butterfly valves with actuator cylinders would be installed over the adit inlets and attached to the hydraulic valve control lines to operate the butterfly valves. The hydraulic system will be a water filled system (not oil filled) to ensure that any breaks in the system would not result in a contaminant spill into the water supply.

4. *Other upgrades:* New fish screens, and a new removable steel top with hatch to each tower would be installed. Access to the fish screens would occur while reservoir water levels are lowered.

5. *Hydraulic control building:* The small building will likely be prefabricated to minimize onsite construction activities; otherwise, the building will be built onsite. Power to the utility building would be supplied via a new buried conduit from the CSPS routed over LCSD (beneath the Skyline Boulevard bridge overpass). A new 15-foot-wide gravel access road (approximately 75 feet in length) would be constructed adjacent to the utility building. This construction has no impact in Corps jurisdiction.

6. *Tower equipment removal:* The interior platforms; ladders; ventilation system; lighting, gate valves; and piping would be removed and disposed of offsite. Rehabilitation work within the towers and pipelines would occur completely within the interior of the towers and pipelines, and would not affect the surrounding areas beyond the creation of the staging areas and access roads.

Crystal Springs Pump Station

The CSPS is the third component of the project and includes construction of a new 120 million gallon per day (mgd) pump station and related facility upgrades. The CSPS is located below the LCSD near the intersection of Skyline Boulevard and Crystal Springs Road (Figure 4a). The CSPS site consists of a small flat valley with slopes to the north and west. San Mateo Creek runs along the southern edge. To the north, a quarter-mile-long narrow access road off of Crystal Springs Road provides access to the CSPS through a gated entrance.

All major facilities, pipelines, and pipeline connections at the CSPS would be replaced with the exception of the existing CSPS building, which would be retained as an unoccupied storage structure. All other existing on-site structures and appurtenances would be

demolished and replaced (Figure 5a). All work would be completed within the existing footprint of the CSPS facility. Existing roads within the CS PS site would be modified and/or relocated around the proposed new pump station building. Access to the CS Pump Station would remain in its current location off Crystal Springs Road.

The following three project components would involve excavation and/or fill below the ordinary high water mark (OHWM) of San Mateo Creek and are shown on Figure 5b.

Air Gap Outfall Structure

A new 42-inch pipe would be installed using conventional cut and cover technique on the bank of San Mateo Creek. The pipe would discharge onto a 12-foot by 4-foot by 4 feet high concrete outfall structure constructed on the creek bank below Pool 2.[1] The pipe would discharge releases from two air gap pipes intermittently to the creek. The air gap pipes prevent backflow into the potable water system and would each discharge approximately 2,000 cubic feet of water once per year to San Mateo Creek. The work required to construct the outfall structure would include removal of approximately 50 square feet of riparian vegetation along 15 feet of the creek, excavation of approximately 8 cy of the bank, and backfilling the excavated area with approximately 3 cy of concrete. Work is not expected to occur in the active channel and is estimated to require 14 days to complete.

Stormwater Outfall Structure

A new 42-inch pipe would be installed using conventional cut and cover technique on the bank of San Mateo Creek. The pipe would discharge onto a 12-foot by 4-foot concrete outfall structure constructed similar to the air gap outfall and on the creek bank below Pool 2. The pipe would discharge stormwater from the CSPS site. The work required to construct the outfall structure would include removal of approximately 50 square feet of riparian vegetation along 15 feet of the creek, excavation of approximately 8 cy of the bank, and backfilling the excavated area with approximately 3 cy of concrete. Work is not expected to occur in the active channel and is estimated to require 14 days to complete.

Outlet Dissipation Structure and Outfall

At Pool 2, the seven existing facility outfall pipes would be removed and a new concrete energy dissipater, and outfall would be constructed in their place and affecting the top of bank, bank, and bed of San Mateo Creek. The new dissipater would measure approximately 55 feet long and 30 feet wide, with two 25 by 25 foot chambers. Each chamber would be approximately 30 feet deep. The walls of each chamber would be made of 18 to 30-inch-thick reinforced concrete. Each chamber would receive a new 60-inch reservoir discharge pipe that would be fitted to a sleeve valve with an electric actuator. Within the chamber, each pipe would bend 90 degrees and discharge at the bottom of the chamber. Water filling the chambers would flow out of the top of the structure and down the bank to the creek. Riprap slope protection would be placed on the bank and keyed into the creek bed to provide erosion protection.

Construction of the dissipation structure would consist of the following activities.

- SFPUC would draw down the surface water level of Pool 2.
- A 70-foot-long temporary cofferdam would be constructed in Pool 2 approximately 5 feet out from the outfall construction area. The cofferdam would be constructed of

[1] San Mateo Creek within the CSPS site contains two pools where the creek widens and deepens. Pool 1 is located near the base of the LCSD where the 60-inch reservoir outlet pipe discharges and Pool 2 is located downstream.

approximately 50 cy of imported clean fill material over approximately 420 square feet of creek bed or it would be constructed of sheet piles. Upon completion, all temporary fill would be removed and the creek would be restored to preconstruction contours.

- Water within the cofferdam would be pumped to an upland sump or Baker tank and treated[2] before discharging it back to the creek. The dewatered area would be approximately 2,200 square feet (0.05 acre).
- Approximately 750 square feet of riparian vegetation along 75 feet of the creek would be cleared of vegetation (vegetation in this area consists of relatively sparse riparian shrubs and understory, including approximately three trees greater than 4 inches in diameter at breast height).
- Approximately 150 cy of the bank material, including the existing outfall pipes, would be excavated and removed. The excavated area would extend to the toe of the bank and affect an area approximately 0.03 acres below the OHWM of San Mateo Creek.
- Rock slope protection would be placed on the excavated streambank and keyed into the stream bed at the toe of the slope. Approximately 125 cy of rock would be placed on the bank below OHWM.
- Construction of the energy dissipater structure would occur on the top of bank above the rock outfall and out of the stream channel. Work would involve excavating approximately 1,300 cy of soil to create a large pit. The excavated area would be shored up with interlocking sheet piles to reduce groundwater infiltration. Groundwater that does infiltrate would be pumped from the pit to an upland sump or tank and treated as necessary to meet water quality standards prior to being discharged back to the creek. At the proper elevation, the excavation would be sealed and forms would be constructed within. Concrete would be poured into the forms. Soil excavated to create the pit would be stockpiled out of the stream zone where it cannot enter the stream. Approximately 400 cy of concrete would be used to construct the energy dissipater. After the concrete is cured, the structure would be fitted with two 60-inch pipes, sleeve valves, and electric actuators. Construction of the entire dissipation structure is expected to last approximately 365 days. The cofferdam would be used for approximately 6 months, and work on the bank is expected to take approximately 60 days.

The following component would involve minor riparian vegetation removal above the OHWM of San Mateo Creek.

Abandon 60-Inch Discharge Pipe

At Pool 1 the existing reservoir outlet pipe that discharges low flow to Pool 1 would be cut and removed or capped (Figure 5a). A low-flow valve would be incorporated into the new dissipation structure to maintain the pre-project stream flow condition. Because the low-flow valve would be incorporated into the design of the dissipation structure, installation of the low-flow valve would not result in any additional impacts on San Mateo Creek than would occur as a result of construction of the dissipation structure. Rock slope protection installed as part of the dissipation structure would prevent the release of water from the low-flow valve from causing erosion of the streambed and bank.

Work will require the use of a backhoe in the riparian fringe and possibly the creek channel in order to reach the end of the pipe, which extends approximately 3 feet beyond the bank of the creek. Prior to entering the riparian area or creek

[2] The dewatered effluent would be treated to comply with the San Francisco Regional Water Quality Control Board's water quality standards for turbidity, etc.

channel, SFPUC will draw down the water level in Pool 1 so equipment will not have to enter the active stream. Approximately 20 linear feet of the riparian vegetation located along the creek would be removed to allow equipment access to the work area. One tree may be trimmed or removed. Work is expected to last approximately 2 days and would involve cutting and removing 3 to 10 feet of pipe in the creek bank and then restoring the bank. The rest of the work would be outside the creek.

If the pipe is to be left it place, work would include installing a form and filling the pipeline with grout. The form would be left in place. Upon completion, the affected riparian area would be allowed to restore naturally. If necessary, SFPUC will plant native cuttings within the disturbed area to promote rapid restoration of the disturbed area back to pre-project functions and value.

Crystal Springs/San Andreas Pipeline

The fourth project component includes seismic upgrades to the CS/SA Pipeline. Figures 6a through 6i show the plan views of this component. The CS/SA Pipeline is an existing 60-inch steel pipe that conveys water approximately 25,000 feet (4.7 miles) from the CSPS north to the San Andreas Reservoir. The CS/SA Pipeline component of the project has three elements.

- Rehabilitation and replacement of pipeline and appurtenances.
- Replacement of approximately 1,100 feet of pipeline leading from the CSPS
- Construction of approximately 1,500 feet of new pipeline leading to new inlet to the SAR.
- Expansion and upgrade of the existing access road system to allow vehicle access to seismically vulnerable sections of the pipeline and appurtenances.

Pipeline Improvements

Repairs are proposed along the entire length of the CS/SA Pipeline. At 19 locations, air vacuum/air release valves would be removed and replaced. At 18 locations, blowoff valves would be removed and replaced. The new or retrofitted replacement valve assemblies would be of similar size and designed with special attention to avoid failures between the valve assembly and the main pipe during severe ground motion or deformation. The manhole risers containing each valve assembly also would be replaced with new risers meeting current SFPUC standards.

At 17 locations, new flexible expansion joints would be installed to replace connections from the existing pipeline to valves, fire hydrants, and service connections. Corrosion protection (protection from corrosive soils and stray electrical currents) would be added to the entire pipeline; at eight locations, the existing pipeline exterior coating would be repaired; and at 32 locations, the interior cement mortar lining would be repaired. At three pipeline stream crossings, the support structures would be repaired and strengthened to meet seismic standards.

New Pipeline Construction

Two sections of pipeline would be replaced: A 1,100-foot section of the CS/SA Pipeline downstream (northwest) of the CS Pump Station would be replaced with new 60-inch single-lap welded steel pipe to tolerate the higher pumping pressures from the new CS Pump Station; and the last 1,500 feet of existing pipeline would be abandoned and a new 60-inch steel pipeline would be constructed to direct flows to a new inlet structure and rock channel constructed in the SAR (Figure 6i and 6j). The old inlet and pipeline would be abandoned.

Pipeline Construction Methods

New pipeline construction would occur primarily through an open trench construction method, and trench excavations would generally be 9 feet deep (see Figure 6j for typical trench section), but could be upwards of 20 feet in some limited areas due to existing topography at the site. Pipeline installation would also require vegetation removal (within 30 feet of the pipeline alignment, or 15 feet on either side of the centerline) prior to construction. Vegetation removal may include the removal of trees, shrubs, and grassland. Shrubs and grassland vegetation would be restored, but trees would not be replanted over the pipeline.

Additional earthwork, such as compaction and a temporary gravel roadway, may be required at the staging area to allow proper construction access. The CS/SA Pipeline replacement would require two 45-day and two 30-day shutdowns, for a total of four required tie-ins between the old and new facilities, relining the pipeline, and placement of seismic connections for services off the pipeline. No waters of the United States would be affected during pipeline construction.

San Andreas Reservoir Inlet Structure

The terminus of the CS/SA pipeline would be at a new inlet structure and rock channel constructed below the OHWM of the SAR (Figure 6i). The new inlet structure would consist of a 9-foot-diameter steel stilling well encased in 2-feet of concrete and a 20-foot-wide, 110-foot-long riprap channel. The top of the stilling well would be at an elevation of 437 feet (SAR spillway elevation = 451.5 feet) and covered with a steel grate (Figure 6j). To install the stilling well, an area slightly larger than the structure would be excavated to approximately 422 feet using a backhoe. A 4-inch mud slab would be placed on the bottom of the excavation and then the prefabricated stilling well would be placed atop the mud slab. The void space between the stilling well and existing ground would be backfilled with native soil. In order to reduce erosion and scour below and around the new inlet, a 2-foot-thick, 20-foot-wide rock channel would be created using 8- to 12-inch-diameter rock. The rocked area would begin approximately 8 feet above the stilling well and extend approximately 125 feet down the reservoir slope.

During construction of the San Andreas Reservoir Inlet Structure (SARIS), the reservoir level would be drawn down to between 433 feet and 438 feet elevations. If necessary, a temporary cofferdam would be installed around the lowest work areas to allow work in the dry. Upon completion all temporary fills would be removed and the disturbed areas with the reservoir would be returned to pre-construction contours. The entire structure would be underwater after the reservoir level is returned to its normal elevations.

Access Road Construction

Current access to the pipeline alignment is provided through vegetation management practices (i.e., mowing, clearing, and grubbing) for emergency repair and maintenance activities. However the existing grassland roads do not provide adequate vehicle access to approximately half of the existing pipeline. Under the proposed project, approximately 21,890 feet of 15-foot-wide vehicle access roads would be created or improved; 10,814 feet would be new gravel roads and 11,076 feet would be new or rehabilitated grassland roads. The grassland roads would be maintained according to current vegetation management practices for existing access roads (i.e., annual or biannual mowing and clearing). An additional 9,507 feet of 10-foot-wide vegetated paths would be created to allow foot travel or small utility truck access to maintenance sites in difficult locations.

See Figures 6a–6i for the locations, and Figure 6k for section views of gravel roads, vegetated access roads, vegetated paths, and drainage crossings. Use of the existing roads as maintenance access roads will be employed where feasible.

Drainage Crossings

In order to access all the pipeline appurtenances requiring maintenance, and the LCSR boat ramp, gravel or vegetated access roads or vegetated paths would need to cross 36 drainages. Gravel and vegetated roads would be 12 to 15 feet wide and vegetated paths would be 10 feet wide. Vegetated paths would only be used by small utility trucks or foot travel. Eighteen drainages already have culvert crossings and one has a bridge. Seven of the existing drainages with culverts would be left and not improved. Three of the existing culverts only require cleaning out, six culverts would be replaced with reinforced concrete pipe culverts (RCPs), and two culverts would be integrated into gravel ford crossings. Of the remaining 18 drainages, four would receive RCP, six would receive gravel fords, one would be bridged, and seven would remain undisturbed except for vegetation clearing to create vegetated path crossings. Additional non-crossing related work within drainages includes bank stabilization and pipe saddle repair and is described below.

Culvert Removal and Installation

At six locations, existing culverts would be removed prior to new RCP installation. The old culverts would be removed using an excavator or other heavy excavation equipment and placed outside of the channel. Following removal of the old culvert and prior to new RCP placement, a trench would be excavated using a back hoe or other piece of excavation equipment to a depth that would allow a minimum 3 feet of cover between the top of the culvert and the top of the road.

Excavation of material would be minimized by trenching no more than 1.5 feet wider than the RCP diameter. Excess fill would be used onsite for road fill, as needed. Excess fill not used onsite would be loaded into dump trucks and hauled offsite. Prior to placing the new RCP into the trench, a minimum of 6 inches of aggregate base material would be placed in the bottom of the trench. The new culvert would be placed into the trench on top of the aggregate and the trench would be backfilled and compacted.

For 24-inch RCP culverts (minor pipe crossings), the upstream and downstream ends of the pipe would be fitted with flared ends set at the natural channel elevation. The upstream end would gather inflowing water and the downstream end would help to dissipate the energy of the flow and reduce its erosive potential. Additional energy dissipation and scour protection would be placed upstream and downstream of the flared ends in the form of riprap (See Figure 6l).

For 36-inch RCP culverts (major pipe crossings), the upstream and downstream ends of the pipe would be fitted with concrete headwalls instead of flared ends. Additional energy dissipation and scour protection would be placed upstream and downstream of the headwalls in the form of riprap (See Figure 6m).

Fill material placed over the new culverts would be stabilized using erosion control fabric and hydroseeded to protect water quality. Other areas of surface soil disturbance would be stabilized with mulch, hydroseed, fiber rolls, and other measures. Trees and shrubby vegetation removed during construction would be replanted onsite with vegetation native to the general landscape immediately following completion.

Gravel Ford Installation

At eight locations where the drainage crossings are shallow (not incised) and the slope of the drainages do not exceed 7%, gravel fords would be constructed within the drainages to allow vehicle passage. A typical gravel ford design is shown on Figure 6n. To construct the ford, clean rock aggregate is placed into the drainage to form a stable and drivable surface that water flows can overtop easily. The upstream and downstream shoulders of the ford are lined with riprap (12 to 15 inches typically) to reduce transportation of the rock aggregate downstream during storm events.

Other Work Affecting Drainages

Bank Stabilization

At eight locations, bank stabilization would be implemented to control erosion and sedimentation of the drainage. Bank stabilization would begin with excavators reducing the banks slopes to 2 to 1. The excavated material would be removed from the channel used as road base material or elsewhere onsite as fill. The reduced bank would be stabilized with erosion control fabric (Rolanka Biod-ocf 30, North American Green Bionec SC 150BN or equivalent) and coir logs would be placed along the toe of the bank to reduce sedimentation. Native riparian or typical species of the area would be seeded or transplanted to the newly graded drainage slopes and maintained until established. Figure 6o provides the typical plan and cross section of a drainage bank stabilization (streambank improvement).

Saddle Repair

At three locations where the existing pipeline daylights across drainages, the supports (saddle) for the pipe have deteriorated and are in need of replacement. To complete a saddle repair, temporary supports would be constructed to hold the pipe. Then, an excavator or similar piece of equipment would be used to remove the existing pipe support and complete excavation of a trench for the installation of a new support. The trench would be sized to approximately 8 by 5 feet and a minimum of 4 feet deep (Figure 6p). The new saddle would be fabricated within the trench or brought in pre-fabricated and positioned within the trench. Native material would be backfilled around the concrete and steel saddle foundation and compacted. The top of the foundation would rise at least 3 inches above existing ground and the pipeline would rest on a curved “saddle’ with neoprene pad. Saddle repair is not expected to affect waters of the United States, although vegetation clearing on the bank would be required. Areas of surface soil disturbance would be stabilized with mulch, hydroseed, fiber rolls, and other measures. Trees and shrubby vegetation removed during construction would be replanted onsite with vegetation native to the general landscape immediately following completion.

The majority of the construction activities within drainages will occur from the access road and within the clearing boundary. Equipment is not expected to have to enter waters of the U.S., but if equipment cannot complete all project related activities from the road (e.g. bank stabilization and/or saddle repair) and equipment has to enter a water of the U.S., then construction mats or other suitable measures would be taken to minimize soil disturbance.

Table 1 provides a summary of project activities within drainages along the CS/SA Pipeline.

San Andreas Outlet Structures 2 and 3

The SAR currently collects flows via pipeline from Pilarcitos Reservoir, the Crystal Springs Reservoirs and local runoff. Water from these sources is conveyed through the CS/SA Pipeline into the reservoir and then transported to the Harry Tracy Water Treatment Plant (HTWTP) through the two San Andreas outlet structures

(SAOS). SAOS 2 and 3 are located approximately 2,000 feet apart on the northeastern shore of the SAR (above the OHWM) (Figures 7a and 7b). Water is generally drawn through the adits, into the tower, and through the tunnel to the HTWTP.

The major seismic improvements to the towers would require excavation of the shoreline for a proposed retaining wall about 10 feet out from each of the structures to retain the shoreline and provide structural stability. Related improvements consist of excavating the reservoir bank and stabilizing the excavated side slopes to form a water-side approach to the new retaining walls. Excavated materials in dry condition will be off-hauled to reuse as fill materials as appropriate. Excavated reservoir soil will be disposed of within SAR at the proposed spoils disposal location identified in Figure 7c.

Other work within waters includes constructing a new boat ramp, removing the upper adits, replacing the lower adits (with new valves and flexible, ductile piping that would lie on the bottom of the reservoir), and installing new fish screens at the ends of the active adits. The removal of the equipment from the tower, replacement of the pipelines within the tunnel, and replacement of the controls are described in *Appurtenant Features*.

The sequence of activities for towers 2 and 3 is described in more detail below and shown on Figures 7d–7h.

1. Prior to beginning any work, install a turbidity screen around the functioning outlet to remain in place throughout the duration of work on the other outlet. Protect all existing monuments, survey markers, and utilities. Coordinate shutdown of the pumps and pipeline with SFPUC operations.
2. Excavate materials adjacent to the shoreline (except for the portion in front of the tower) in order to install a secant pile retaining wall to retain the shoreline prior to dredging.
3. Lower the reservoir to the predetermined elevation.
4. Construct 108-foot-long concrete boat ramp.
5. Dredge the remaining shoreline to the approach channel, and construct a reinforced concrete retaining wall in front of the tower.
6. Leave a berm as a temporary cofferdam.
7. Excavate to and remove the adits, including the existing underwater fish screens, concrete wingwalls, aprons, and all foundations necessary for grading. Remove the existing rock riprap between the top and toe of bank.
8. Replace lower adits; install fish screens and their supports.
9. Raise the reservoir.
10. Place riprap along the shoreline and construct access road improvements.
11. Upgrade the pipelines from the towers to the HTWTP. (This activity would not affect waters of the United States; the description is included under *Appurtenant Facilities* below).

SAOS 2 and 3 would be shut down at separate times in concurrence with the construction activities taking place. SAOS 2 would be shut down first for 318 days, while SAOS 3 remained functional. After completion of SAOS 2 modifications and start-up, construction activities for SAOS 3 would commence. During this time, SAOS 3 would be shut down for 313 days.

Appurtenant Facilities

Remove and replace all mechanical, electrical, pipes, valves, platform, and roof frame inside the tower. For SAOS 2, approximately 800 feet of the steel pipeline within the connector tunnel

to the HTWTP and related appurtenances (e.g. pressure gages) would be replaced. In addition, to increase capacity of SAOS 2, a single emergency shutoff valve at the tunnel inlet would provide upstream shutoff for safety. Upon completion of the improvements to the adits and tunnels, the tower structure would remain dry and accessible for valve operation and maintenance. The aboveground portion of SAOS 3 is surrounded by steeply (2:1) sloped areas and would be stabilized above the tunnel portal and upslope towards HTWTP.

Construction Equipment

Construction equipment may include water trucks, fuel and lube cranes, barges, boats, decompression chambers, rigging and winches, dive equipment, remotely-operated vehicles, hydraulic jacks, cement trucks, stationary cement pumps and hoses, Baker tanks, drill rigs, lighting, crane trucks, flat bed trailer, low-boy trailer, dump trucks, bulldozers, backhoes, excavators, front loaders, graders, dewatering pumps, welding machines, multipurpose saws, wood saws, towable light stand/generator, drills (pneumatic), compressors, and jackhammers.

Temporary Flow Diversions on Perennial Streams, Including San Mateo Creek

In the event that water is flowing within the drainage work areas, flow would be diverted around the project area. To divert the flows, a temporary cofferdam will be constructed, using sandbags or sheet piles upstream of, or completely around, the project area. If the temporary dam is constructed upstream, then water will be pumped via a flexible hose through the work area and back into the stream below the project area. Though the exact volume of sandbags or sheet piles required or how many drainages would require these cofferdams is not known, temporary fill volumes are expected to be less than 6 cy where check dams are required.

Initiating the stream diversion will occur immediately prior to work and will remain in place until all instream work is completed, at which time natural flow will be restored to the channel. The coffer dam will be constructed with sandbags, vibration driven, or driven sheet piles and will be situated as close to the work area as practical to minimize impacts on the project area. Water would flow by force of gravity through the diversion pipe and return to the channel immediately below the work area.

The upper reach of lower San Mateo Creek adjacent to the Crystal Springs Pump Station may be electrofished to remove fish prior to commencing work following guidelines of the NMFS in *Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act* (2000) if deemed appropriate as part of the NMFS Section 7 consultation for the proposed project. Fish caught would be counted, measured and released in appropriate habitat downstream of the project area. The flexible diversion pipe would be screened to prevent any intake of fish into the pipe upstream of the diversion.

Avoidance Measures

SFPUC states that, in consultation with USFWS, USACE, SFRWQCB, and CDFG, they will incorporate the following measures to avoid impacts to wetlands and other waters:

- Access roads to pipeline appurtenances will include existing roads and the Sawyer Camp Trail where possible to avoid the need for drainage crossings at thirteen drainages along the pipeline corridor.
- The access road plans have been modified and 10 foot wide vegetated paths have replaced roads down the banks of nine drainages to avoid impacts to the drainages.
- Road alignments will be “field adjusted” to avoid wetlands occurring near proposed access routes, as feasible.

- At least one drainage would be avoided by installation of a bridge or bottomless culvert.
- Work within non-fish bearing streams (i.e., intermittent or ephemeral drainages) would occur when the channels are dry. In the event of sudden thunderstorms or other unusual rain events, temporary dewatering may be used to avoid siltation of the channel.
- Riparian areas and wetland areas within 50 feet of designated work areas would be designated as Environmentally Sensitive Areas (ESAs) and clearly indicated as such on project construction plans. Project specifications would include a requirement that ESAs are clearly delineated with brightly colored fencing, rope, or equivalent prior to beginning of construction.
- Work areas within perennial streams will be dewatered to avoid work in flowing water, which could result in water quality impacts.
- Staging areas have been located outside of wetland boundaries where practicable.
- The use of floating barges will avoid shoreline impacts to reservoirs and minimize adverse water quality affects.

Minimization Measures

- Gravel fords will be used to cross drainages where possible to minimize the use of culverts.
- Culverts have been appropriately sized and placed to accommodate expected storm flows and to minimize morphological changes to drainages.
- Reservoir elevations will be lowered to reduce in-water work.
- A Storm Water Pollution Prevention Plan (SWPPP) will be developed and implemented that identifies all pollutant sources, including sediments, that may affect waters and Best Management Practices (BMPs) to reduce or eliminate the pollutants from entering any water body.
- Drainage crossing work will be performed when the drainages are dry whenever possible to avoid minimize sedimentation.
- Sediment control devices would include placing silt fencing, straw waddles, check dams, and gravel bag berms below areas of planned disturbance.
- A sampling and analysis strategy will be implemented to monitor turbidity during excavation and deposition of materials in the reservoirs.
- ESA fencing for wetlands will be placed a minimum of 10 feet from wetland boundaries, when feasible.

Restoration of Temporary Impacts

On-site and in-kind mitigation would consist of restoring 0.37 acres of wetlands and 0.12 acres (1,078 linear feet) of drainages to preconstruction condition by restoring original contour and if necessary, planting both wetland and riparian vegetation (as applicable). Temporarily affected areas would be restored or replaced at a ratio of at least 1:1. Revegetation guidelines are outlined below. The success criteria and monitoring schedule will be addressed in a restoration and monitoring plan developed specifically for the project.

Improvement of Habitats

Approximately 74 acres would be either cleared or cleared and grubbed (grading areas). Clearing vegetation involves removing non-native trees, brush, and mowing vegetation to within a few inches of the ground surface to create staging areas and vegetated access roads. Native trees would not be removed within “clear only” areas. Clearing and grubbing involves the removal of all vegetation, native and non-native, and their roots. Clearing and grubbing vegetation is necessary in areas that require grading (cut and

fill), including areas to become permanent gravel roads, on steep terrain, or where fill material is needed to create grassland roads over uneven terrain.

Compensatory Mitigation

To ensure that implementation of the proposed project results in no net loss of wetland and aquatic resource functions and values, the SFPUC states they will compensate for the permanent loss of 0.18 acres and temporary loss of 0.49 acres of wetlands, thru offsite creation/enhancement of wetland habitats at the San Andreas Reservoir Wetland Creation or Adobe Gulch Grassland Enhancement mitigation sites or through a similar feasible project. The SFPUC proposes to create/enhance a minimum of 0.30 acre to compensate for the permanent loss of wetlands due to the proposed project.

3. **COMPLIANCE WITH VARIOUS FEDERAL LAWS:**

National Environmental Policy Act of 1969 (NEPA): The Corps will assess the environmental impacts of the proposed action in accordance with the requirements of the National Environmental Policy Act of 1969 (42 U.S.C. Section 4371 et. seq.), the Council on Environmental Quality's Regulations (40 C.F.R. Parts 1500-1508), and the Corps' Regulations (33 C.F.R. Part 230 and Part 325, Appendix B). Unless otherwise stated, the Environmental Assessment will describe only the impacts (direct, indirect, and cumulative) resulting from activities within the Corps' jurisdiction. The documents used in the preparation of the Environmental Assessment will be on file with the U.S. Army Corps of Engineers, San Francisco District, Regulatory Division, 1455 Market Street, San Francisco, California 94103-1398.

Endangered Species Act of 1973 (ESA): Section 7 of the Endangered Species Act requires formal consultation with the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS) if a Corps permitted project may adversely affect any Federally listed threatened or endangered species or its designated critical habitat. The Corps is currently conducting Section 7 consultations with both agencies since the project may affect five federally-listed species or their habitat:

- Mission blue butterfly (*Icaricia icarioides missionensis*) (E)
- California red-legged frog (*Rana aurora draytonii*) (T)
- San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) (E)
- Marin dwarf-flax (=western flax) (*Hesperolinon congestum*) (T)
- steelhead–Central Valley (T) and Central California Coast (T) (*Oncorhynchus mykiss*)

Clean Water Act of 1972 (CWA):

a. Water Quality: Under Section 401 of the Clean Water Act (33 U.S.C. Section 1341), an applicant for a Corps permit must first obtain a State water quality certification before a Corps permit may be issued. No Corps permit will be granted until the applicant obtains the required water quality certification. The Corps may assume a waiver of water quality certification if the State fails or refuses to act on a valid request for certification within 60 days after the receipt of a valid request, unless the District Engineer determines a shorter or longer period is reasonable for the State to act.

Those parties concerned with any water quality issue that may be associated with this project should write to the Executive Officer, California Regional Water Quality Control Board, San Francisco Bay Region, 1515 Clay Street, Suite 1400, Oakland, California 94612 by the close of the comment period of this Public Notice.

b. Alternatives: Evaluation of this proposed activity's impact includes application of the guidelines promulgated by the Administrator of the Environmental Protection Agency under Section 404(b)(1) of the Clean Water Act (33 U.S.C. Section 1344(b)). An evaluation has been made by this office under the guidelines and it was determined that the proposed project is water dependent.

National Historic Preservation Act of 1966 (NHPA) A Corps of Engineers archaeologist is currently conducting a cultural resources assessment of the permit area, involving review of published and unpublished data on file with city, State, and Federal agencies. If, based upon assessment results, a field investigation of the permit area is warranted, and cultural properties listed or eligible for listing on the National Register of Historic Places are identified during the inspection, the Corps of Engineers will coordinate with the State Historic Preservation Officer to take into account any project effects on such properties.

4. **PUBLIC INTEREST EVALUATION:** The decision whether to issue a permit will be based on an evaluation of the probable impact, including cumulative impact, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits that reasonably may be expected to accrue from the proposed activity must be balanced against its reasonably foreseeable detriments. All factors that may be relevant to the proposal will be considered, including its cumulative effects. Among those factors are: conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people.

5. **CONSIDERATION OF COMMENTS:** The Corps of Engineers is soliciting comments from the public, Federal, State and local agencies and officials, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest in the proposed activity.

6. **SUBMISSION OF COMMENTS:** Interested parties may submit, in writing, any comments concerning this activity. Comments should include the applicant's name and the number and the date of this Public Notice, and should be forwarded so as to reach this office within the comment period specified on Page 1. Comments should be sent to the U.S. Army Corps of Engineers, San Francisco District, Regulatory Division, 1455 Market Street, San Francisco, California 94103-1398. It is the Corps' policy to forward any such comments that include objections to the applicant for resolution or rebuttal. Any person may also request, in writing, within the comment period of this Public Notice that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing. Additional details may be obtained by contacting the applicant whose name and address are indicated in the first paragraph of this Public Notice or by contacting Bob Smith of our office at telephone (415) 503-6792 or E-mail: robert.f.smith@usace.army.mil. Details on any changes of a minor nature that are made in the final permit action will be provided upon request.