Draft

Environmental Impact Report

Chabot Dam Seismic Upgrade

Prepared for:

East Bay Municipal Utility District

EBMUD

December 2013

SCH#: 2013042075

EBMUD

December 6, 2013

NOTICE OF AVAILABILITY
Chabot Dam Seismic Upgrade Project
San Leandro, Oakland, Alameda County
Draft Environmental Impact Report
SCH # 2013042075

Notice is hereby given that a Draft Environmental Impact Report (EIR) is available for public review. The project proponent is the East Bay Municipal Utility District (EBMUD, 375 Eleventh Street, Oakland, California 94607-4240). EBMUD is also the Lead Agency, pursuant to the California Environmental Quality Act (CEQA).

Project Description: The East Bay Municipal Utility District (EBMUD) proposes to prepare a project level Environmental Impact Report (EIR) for the seismic upgrade of Chabot Dam. The proposed project involves two components: improvement of the dam embankment and improvement to the outlet works. The project, including haul routes and stockpile areas, is located within EBMUD property, which reduces truck traffic in nearby neighborhoods.

The dam embankment toe would be improved through one of two options: Conventional Earthwork or Cement Deep Soil Mixing (CDSM). The Conventional Earthwork option would require excavating between 100,000 and 140,000 cubic yards of soil and treating soils at the nearby Filter Pond and Park Stockpile sites by mixing and moisture-conditioning then hauling, placing and compacting the treated material back in the excavated area. Under the CDSM option, 60,000 to 80,000 cubic yards of soils would be mixed with cement and water in-place and 24,000 to 32,000 cubic yards of material (soil and solidified mixture of cement and soil) would be hauled and temporarily stockpiled at the nearby Filter Pond and/or Park Stockpile. The 2.5-acre Filter Pond Stockpile is located at the former water treatment filter ponds at the site. The 4-acre Park Stockpile is located at Chabot Park, which is located at the end of Estudillo Avenue in San Leandro, and is leased to and operated by the City of San Leandro. Chabot Park would be closed for the duration of construction under either option. Either or both stockpile locations may be used under either construction option; however, the CDSM option would require smaller stockpile areas than the Conventional Earthwork option. Tree removal would be required at either stockpile location. In addition, the laydown, parking, and trailer areas also may be used for stockpiles.

Two potential haul routes are proposed within the project site. The Upper Haul Route starts at the gate at the east side of the dam crest, make a turnaround loop east of the dam, and follows the West Shore trail to the West Shore trailhead located in Chabot Park. The West Shore Trail is part of Lake Chabot Regional Park, which is leased to and operated by the East Bay Regional Park District. This segment of the West Shore Trail within the limits of work will be closed for the duration of construction. The Lower Haul Route starts at the bottom of the dam and follows an EBMUD maintenance path to Chabot Park

The outlet works would be improved by lining the vertical masonry shaft located behind the tower, moving the valves and controls from the tower to the vertical shaft, relining or installing new outlet pipes from the vertical shaft to the reservoir, and removing the tower and deteriorated pavilion.

Significant Impacts: Analysis of environmental impacts associated with the Chabot Dam Seismic Upgrade Project identified potentially significant impacts in the following areas: Geology and Soils; Biological Resources; Cultural Resources; Transportation and Traffic; Air Quality; Hydrology and Water Quality; Hazards and Hazardous Materials; Greenhouse Gas Emissions; Aesthetics; Recreation; and Noise and Vibration. Except for Cultural Resources, Air Quality, and Recreation, impacts would be mitigated to less-than-significant levels by implementation of mitigation measures. Except for Air Quality, cumulative impacts are either found not to be significant or are mitigated to less than significant levels with implementation of mitigation measures. Once the project is constructed and operational, all impacts would be less than significant.

Public Review: Persons interested in reviewing the Draft EIR, receiving a copy of the Draft EIR or in reviewing documents referenced in the Draft EIR should contact Bill Maggiore, Senior Civil Engineer, EBMUD, at Chabot.Dam.EIR@ebmud.com. The Draft EIR and all documents referenced in the EIR are available for public review at the EBMUD office located at 375 Eleventh Street in Oakland. The Draft EIR is available for public review at the libraries listed below, or by download at the EBMUD website www.ebmud.com under "Construction Projects and Project Updates".

San Leandro Library
300 Estudillo Avenue
San Leandro, CA 94577

Castro Valley Library
3600 Norbridge Avenue
Castro Valley, CA 94546

Oakland Main Public Library
125 14th Street
Oakland, CA 94612

Public Meetings: A public meeting is scheduled to review the Draft EIR on January 16, 2014, at 6:30 p.m. at the San Leandro Library located at 300 Estudillo Avenue, San Leandro, CA. Other meetings may be scheduled, if required.

Deadlines: The public review period is from December 6, 2013 through February 4, 2014. Comments must be received by 4:30 p.m. on February 4, 2014. Written comments should be submitted to Bill Maggiore, Senior Civil Engineer, MS #701, 375 Eleventh Street, Oakland, California 94607-4240 or e-mailed to Chabot.Dam.EIR@ebmud.com. Action on the Draft EIR is currently scheduled to be taken by the EBMUD Board of Directors at a regularly scheduled board meeting in June 2014, at 375 Eleventh Street, Oakland, California.

Draft
Environmental Impact Report

Chabot Dam Seismic Upgrade

Prepared for:

East Bay Municipal Utility District
375 11th Street,
Oakland, CA 94607
866/403.2683

SCH#: 2013042075

Prepared by:

AECOM
300 California Street, Suite 400
San Francisco, CA 94104
415/796.8100

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AB	Assembly Bill
AC Transit	Alameda–Contra Costa Transit District
ACCMA	Alameda County Congestion Management Agency
ACM	asbestos-containing material
ACTIA	Alameda County Transportation Improvement Authority
ACTM	Asbestos Airborne Toxic Control Measure
ADT	average daily traffic
Alameda CTC	Alameda County Transportation Commission
API	Area of Primary Importance
APS	Alternative Planning Strategy
B.P.	Before Present
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BATA	Bay Area Toll Authority
bgs	below ground surface
BMP	best management practice
CAA	Clean Air Act
CAFE	corporate average fuel economy
Cal/EPA	California Environmental Protection Agency
Cal/OSHA	California Division of Occupational Safety and Health
CalARP	California Accidental Release Program
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCAT	California Climate Action Team
CCMP	Comprehensive Conservation and Management Plan
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDSM	Cement Deep Soil Mixing
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFCs	chlorofluorocarbons
CH_4	methane

CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO2-equivalency
CPUC	California Public Utilities Commission
crest	top of the dam
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
cy	cubic yards
dB	decibel
dBA	A-weighted decibel
dbh	diameter at breast height
diesel PM	diesel particulate matter
DPR	Department of Parks and Recreation
DPS	Distinct Population Segment
DSOD	California Division of Safety of Dams
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EIR	Environmental Impact Report
EISA	Energy and Independence Security Act
EPA	U.S. Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
ESA	Endangered Species Act
FR	Federal Register
freeboard	distance between the crest of the dam and the maximum water level
g	gravity
GHG	greenhouse gas
GVW	gross vehicle weight
GWP	global warming potential
H_2SO_4	sulfuric acid
HAER	Historic American Engineering Record
HCFC	hydrochlorofluorocarbons
HCP	Hazard Communication Plan
HCP	Habitat Conservation Plan

HFC	hydrofluorocarbons
high-GWP	high global warming potential
HMA	Hazardous Materials Assessment
HMBP	hazardous materials business plans
HOV	high-occupancy vehicles
I-238	Interstate 238
I-580	Interstate 580
I-880	Interstate 880
ID	identification
IIPP	Injury and Illness Prevention Plan
IPCC	Intergovernmental Panel on Climate Change
LBP	lead-based paint
LCFS	Low Carbon Fuel Standard
L_{dn}	day-night sound level rating
LEHCP	Low Effect East Bay Habitat Conservation Plan
L_{eq}	equivalent sound pressure level
LID	Low Impact Development
Local Register	Local Register of Historical Resources
LOS	level of service
LVW	loaded vehicle weight
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
MMRP	Mitigation Monitoring and Reporting Program
MMT	million metric tons
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
msl	mean sea level
MT	metric tons
MTC	Metropolitan Transportation Commission
MTU	Mining and Tunnel Unit
Mw	maximum magnitude
MY	model year
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NFIP	National Flood Insurance Program
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide

NOA	naturally occurring asbestos
NOP	Notice of Preparation
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
ODS	ozone depleting substance
OEHHA	California Office of Environmental Health Hazard Assessment
OPR	California Office of Planning and Research
PCB	polychlorinated biphenyl
PeMS	Caltrans' Freeway Performance Measurement System
PERP	Portable Equipment Registration Program
PFC	perfluorocarbons
PM	particulate matter
PM_{10}	respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$	fine particulate matter 2.5 microns or less in diameter
PP	pumping plant
ppm	parts per million
PPV	peak particle velocity
PRC	California Public Resources Code
PRHC	Parks, Recreation, and Historical Commission
proposed project	Chabot Dam Seismic Upgrade Project
RCRA	Resource Conservation and Recovery Act
RMP	risk management plan
RNHA	Regional Housing Needs Allocation
ROG	reactive organic gases
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SAFE	Service Authority for Freeways and Expressways
SB	Senate Bill
SCS	Sustainable Communities Strategy
SF_6	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_3	sulfur trioxide
State Water Board	State Water Resources Control Board
SWANCC	Solid Waste Agency of Northwestern Cook County
SWPPP	Storm Water Pollution Prevention Plan

TAC	toxic air contaminant
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VMT	vehicle miles traveled
WDR	waste discharge requirement
WGCEP	Working Group on California Earthquake Probabilities
WQO	water quality objective
WRE	Water Resources Engineering

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Summary

S.1 Introduction

This Draft Environmental Impact Report (Draft EIR) assesses the potential impacts of the Chabot Dam Seismic Upgrade Project (proposed project) proposed by the East Bay Municipal Utility District (EBMUD). **Figure S-1** identifies the project location, as well as nearby cities and major roadways in the project vicinity. This document has been prepared in accordance with the California Environmental Quality Act (CEQA) statutes and guidelines. EBMUD is the lead agency for this CEQA process. Written comments about the proposed project or Draft EIR should be directed to:

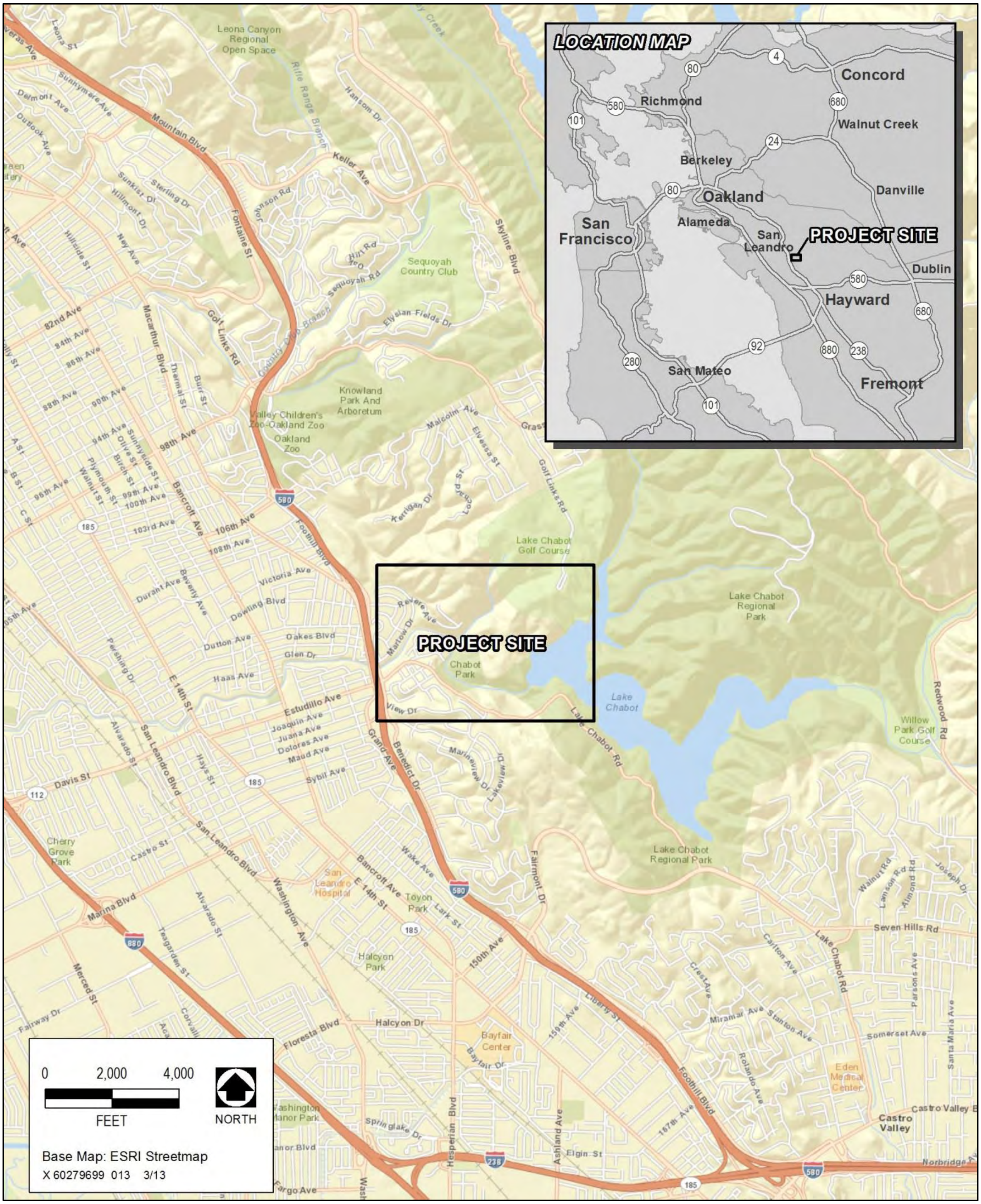
Bill Maggiore, Senior Civil Engineer
East Bay Municipal Utility District
375 Eleventh Street (Mail Slot 701)
Oakland, CA 94607-4240
e-mail: Chabot.Dam.EIR@ebmud.com

S.2 Background

In 2005, at the request of the California Division of Safety of Dams (DSOD), EBMUD prepared a report on the seismic stability of Chabot Dam and a report on a seismic evaluation of the outlet works tower. The stability analysis indicated that local displacements of several feet could occur in the sluiced fill buttress at the toe of the dam in the direction of the downstream channel. The outlet works tower was evaluated for a maximum design earthquake. The results indicated that the reinforced concrete pavilion would suffer severe damage and probably would collapse. The results also showed that the masonry tower would experience cracking and could separate completely from the rock it is built on. Although the tower may not collapse, the cracking and separation could diminish its load-resisting capabilities. The valve shafts or shaft supports could be damaged, causing accidental blockage of the sluice valves, and thus blocking release of water from the lake, which could become a safety concern. In light of these findings, DSOD requires seismic upgrades to the dam and outlet works. DSOD has reviewed EBMUD's proposed project approach at the conceptual level and found it to be acceptable.

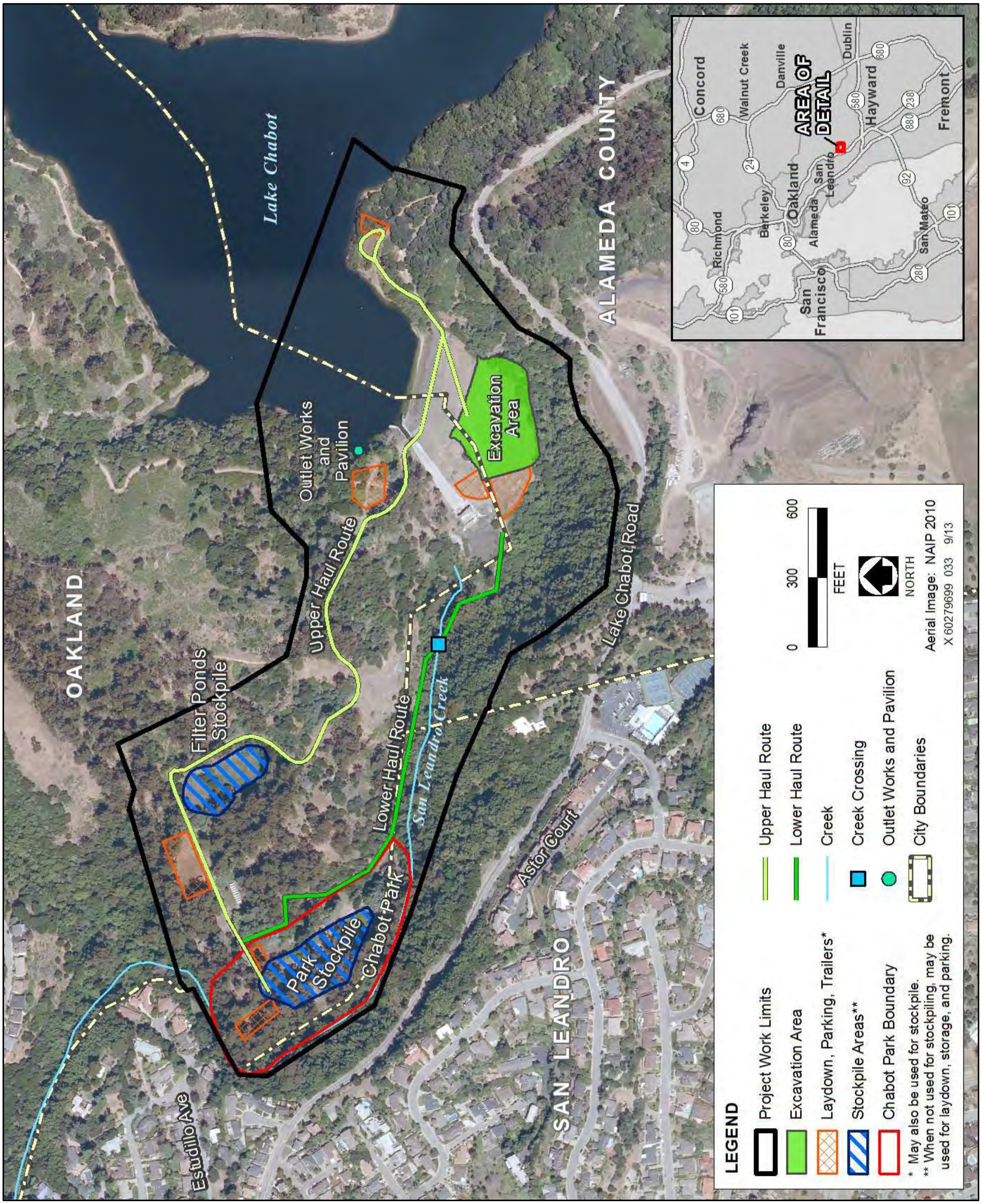
S.3 Project Description

The proposed project includes two optional methods to upgrade the dam: a Cement Deep Soil Mixing (CDSM) option, and a Conventional Earthwork option. The proposed project also includes a retrofit of the outlet works that would occur under either the CDSM option or Conventional Earthwork option for upgrading the dam. Project area features, including stockpiles, laydown areas, haul routes (roads along which construction materials and excavated soil would be carried), outlet works, and the dam excavation work site are shown in **Figure S-2**. Following the EIR certification, the preferred project, including the preferred construction method for the dam (CDSM or Conventional Earthwork) will be selected and recommended to the EBMUD Board of Directors. Depending on whether the outlet works seismic upgrades are completed concurrent with the seismic upgrade to the dam or not, construction is scheduled to begin in fall 2015 or spring 2016 and is expected to be complete at the end of 2016.



Source: Compiled by AECOM in 2013

Figure S-1: Project Location and Vicinity Map



Sources: Terra Engineers 2013, EBMUD 2013, compiled by AECOM in 2013

Figure S-2: Project Area Features

S.3.1 Outlet Works

The outlet works retrofit layout is shown conceptually in **Figure S-3**. The outlet works would be improved by lining the shaft behind the tower, moving the valves and controls from the tower to the shaft, relining or installing new outlet pipes from the shaft to the lake, and removing the tower and pavilion, as shown in **Figure S-3**. Some demolition and construction activities would take place underwater and would require use of divers and a barge. Relining or replacing the outlet pipes would provide continued operation after a maximum design earthquake. The seismic hazard would be reduced by removing the tower and pavilion. The outlet works construction work would take approximately 15 weeks to complete.

S.3.2 CDSM Option

The CDSM option for upgrading the dam is shown conceptually in **Figure S-4**. In this option, cement slurry would be injected through drilling augers and mixed with the existing sluice fill in-place to form a system of interconnected, non-liquefiable walls that would strengthen the sluice fill, and thereby would improve the seismic performance of the dam. For this option, construction activities at the outlet works potentially could begin concurrently with dam excavation work. CDSM construction activities concurrent with the outlet works would take from 26 to 38 weeks to complete (depending on use of a night shift and use of one or two CDSM rigs). If outlet works construction is not concurrent with CDSM work, the total construction duration would be from 46 to 58 weeks (also depending on use of a night shift and use of one or two CDSM rigs).

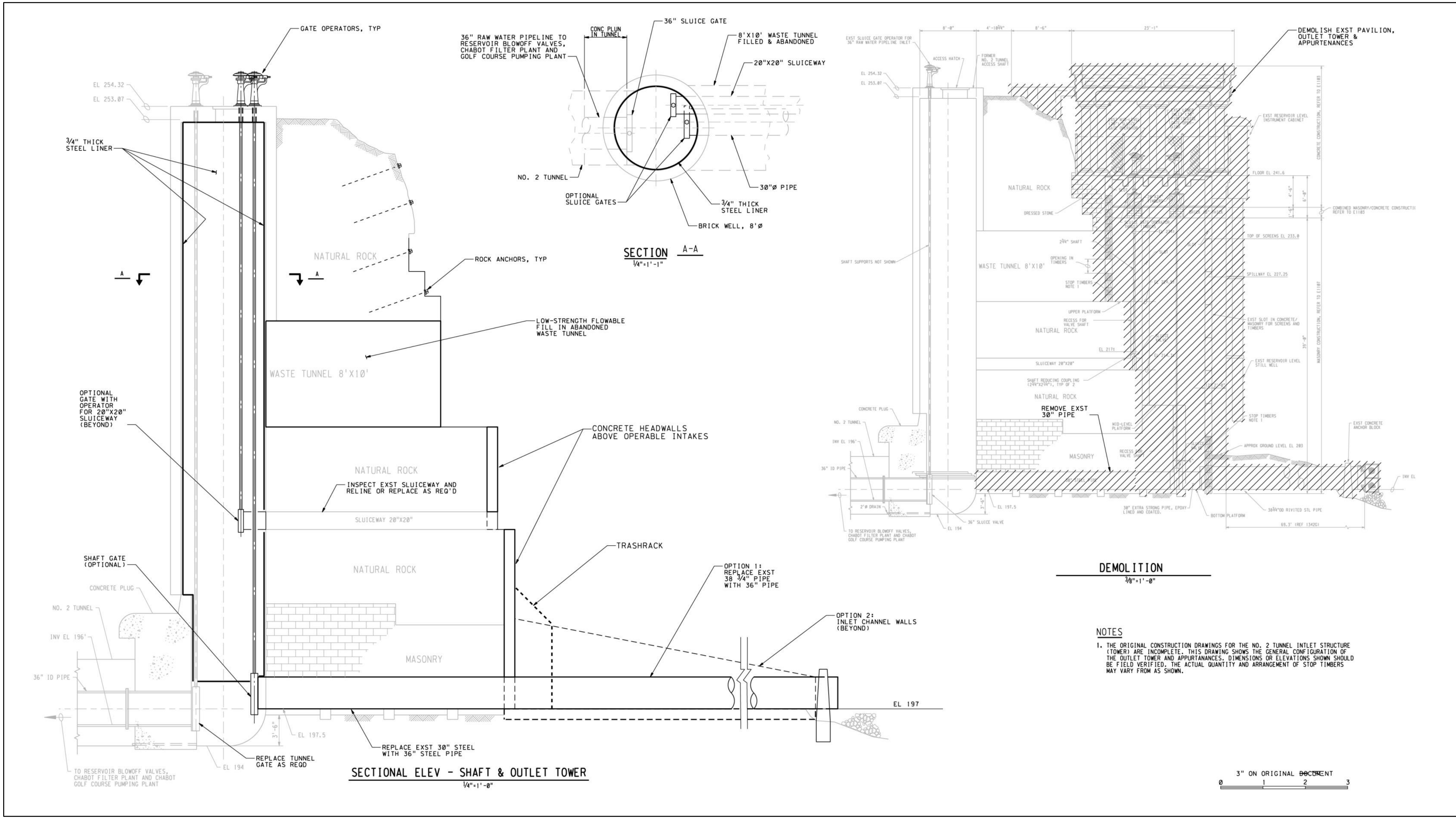
S.3.3 Conventional Earthwork Option

The Conventional Earthwork option is shown conceptually on the cross section in **Figure S-5**. The dam would be improved by excavating most of the sluiced fill, mixing and moisture conditioning the excavated soil to near optimal water content, and then placing and compacting it in the excavated area. This would improve the strength of the soil, and thereby would improve the seismic performance of the dam. The Conventional Earthwork option would require installation of a temporary dewatering system to maintain safe slope stability during excavation. For the Conventional Earthwork option, DSOD would require that work at the outlet works is completed before work at the dam commences, to ensure that water can be released from the reservoir during dam construction. The Conventional Earthwork construction activities would take approximately 40 weeks to complete. As outlet works construction would not be able to occur concurrently with Conventional Earthwork construction, the total construction duration would be approximately 60 weeks.

S.3.4 Stockpiles

Both construction methods require soil excavation at the dam and temporarily stockpiling excavated soil, however the CDSM option requires a relatively smaller excavation and stockpile area. Two main potential stockpile locations (areas where excavated soil material would be stored and manipulated) are proposed: the Filter Pond Stockpile and the Park Stockpile, as shown in **Figure S-2**. Either or both stockpile locations may be used under either construction option. For the Conventional Earthwork option, both stockpile locations are required. For the CDSM option, potentially only one of the two stockpile locations would need to be used. In addition, the laydown, parking, and trailer areas also may be used for stockpiles.

The Filter Pond Stockpile would be located at the former filter ponds, which are on EBMUD property in the project area. The maximum capacity of the Filter Pond Stockpile would be approximately 60,000 cubic yards (cy), and would be a maximum of 50 feet high.



Source: EBMUD 2013

Figure S-3: Outlet Works Retrofit Layout

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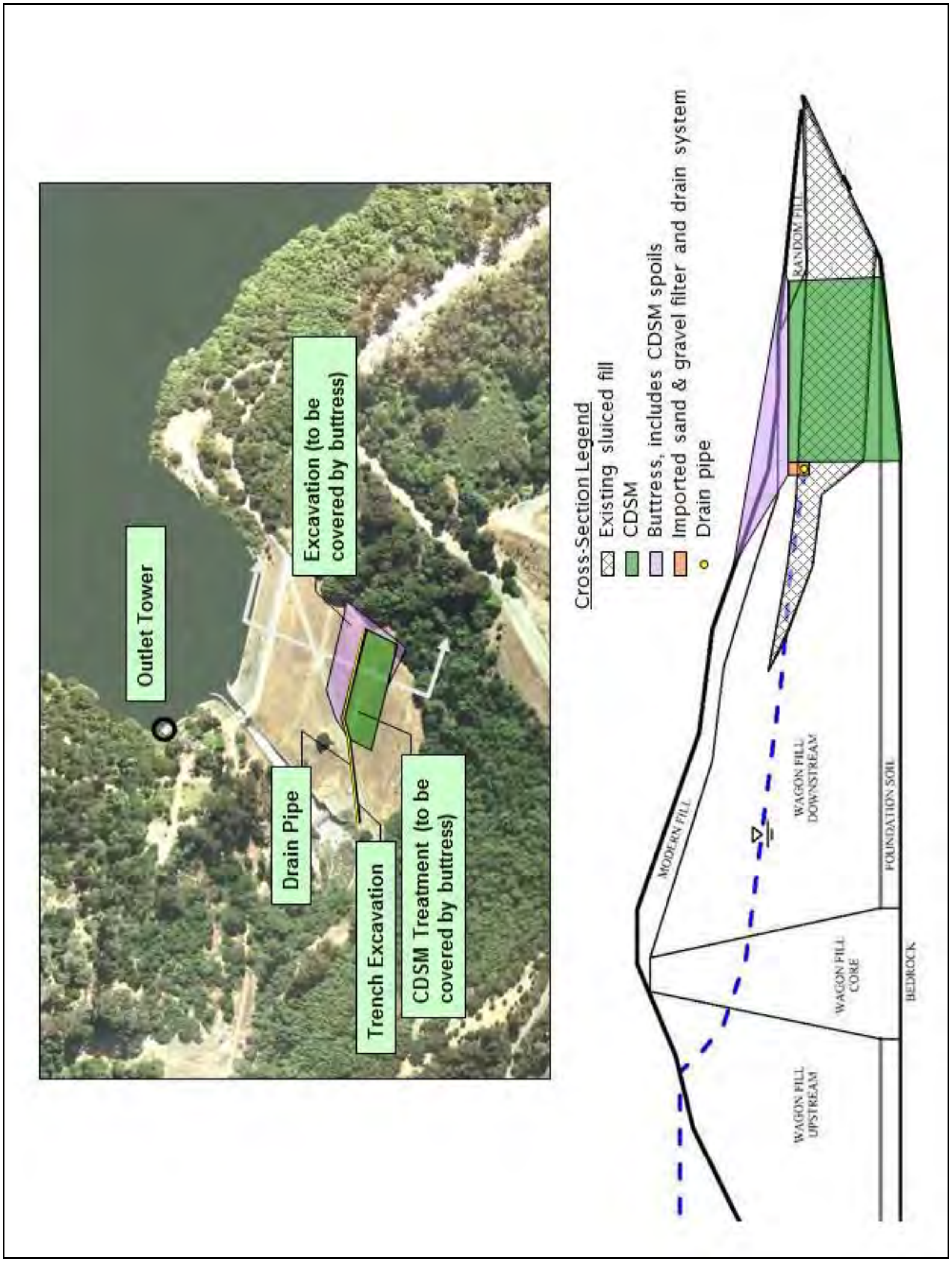
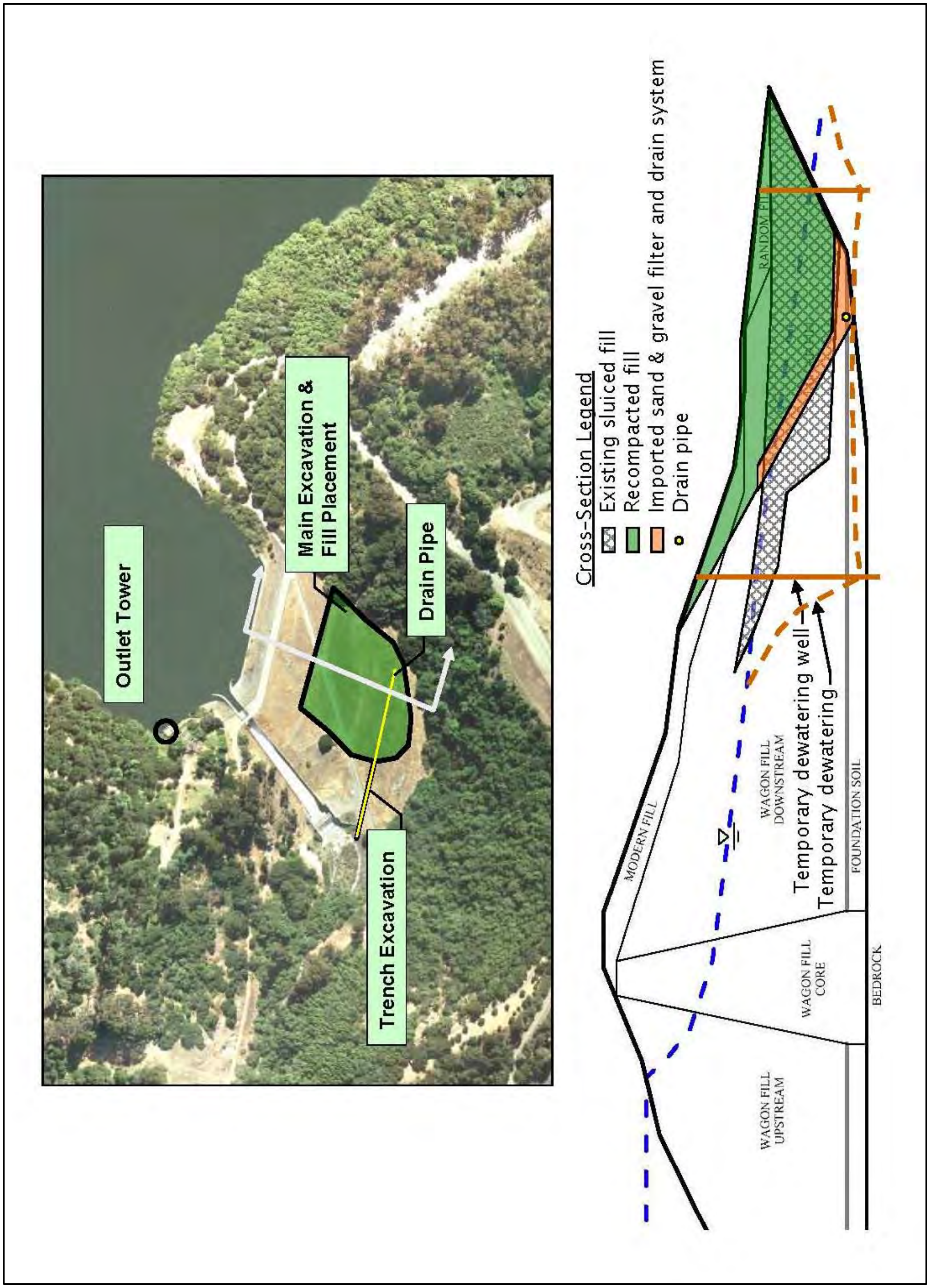


Source: EBMUD 2013

Figure S-4: CDSM Option



Source: EBMUD 2013

Figure S-5: Conventional Earthwork Option

The Filter Pond Stockpile would require clearing, grubbing, and grading for approximately 2.5 acres of currently fenced-off land, and require removal of trees.

The Park Stockpile would be located at Chabot Park. The property is owned by EBMUD and is leased to the City of San Leandro, which operates the park. The maximum capacity of the Park Stockpile would be approximately 110,000 cy, and would be a maximum of 60 feet high. The Park Stockpile would require clearing, grubbing, and grading for approximately 4 acres of land, and would require removal of trees. Existing electric transmission lines would be temporarily relocated, and recreational facilities would be removed before construction and reinstalled after construction.

S.3.5 Haul Routes

Two potential haul routes are proposed: the Upper Haul Route and the Lower Haul Route, both shown in **Figure S-2**. Either or both haul routes may be used for project construction, and each would require some improvements. The Upper Haul Route is approximately 4,740 feet long, starts at the gate at the east side of the dam crest (the top of the dam), and ends at the trailhead of the West Shore Trail. The 3,500-foot segment west of the gate is part of the West Shore Trail, which is open to the public. The West Shore Trail is part of Lake Chabot Regional Park, which is property owned by EBMUD and leased to the East Bay Regional Park District, which operates the park. The Upper Haul Route also includes an unpaved 1,240-foot segment, starting at the gate and running east to a turnaround. Use of the turnaround area would allow trucks to avoid the hairpin turn between the Upper Haul Route and the steep road running diagonally across the downstream face of the dam. The Upper Haul Route is entirely paved with asphalt, except for the turnout at the lake. Because it is a moderately steep one-lane road with several small-radius turns, project construction-related haul trucks would be limited to 10 cy capacity on the Upper Haul Route.

The Lower Haul Route is approximately 2,380 feet long, starts at the bottom of the dam, and ends at the park road near the proposed Park Stockpile location. The roadway is mostly flat, with no sharp turns along its alignment. It is unpaved, bordered by vegetation on either side, and covered by a canopy of trees in most locations. It would have to be improved (temporarily widened and stabilized) for construction use. The Lower Haul Route is currently closed to the public and is used only by EBMUD service vehicles or emergency vehicles. Because it is essentially flat and straight, project construction-related haul trucks with a capacity up to 20 cy could use the Lower Haul Route.

S.3.6 Dam Operation

For construction activities, the lake would remain in service at a surface water level of 211 feet or greater. After completion of construction, operation, maintenance, and monitoring of the dam, lake, and appurtenant facilities would be the same as the existing operation.

S.3.7 Site Restoration

After completion of the dam upgrade and outlet works retrofit, construction work sites at the dam and stockpiles would be regraded, contoured, and seeded with native plant species. Native trees removed for project construction at the Park and Filter Pond stockpiles as well as along the haul routes would be replaced. The haul routes would be restored to a similar appearance as their preconstruction conditions. Equipment and facilities removed at Chabot Park as a result of project construction would be temporarily stored and reinstalled at their original locations at end of construction, in consultation with the City of San Leandro. Any equipment that was demolished or damaged beyond repair would be replaced in kind.

S.4 Summary of Impacts

Table S-1 presents a summary comparison of the differences in potential impacts, if any, between the CDSM and Conventional Earthwork options for all resources, as well as the applicable mitigation measures for each option. Because both construction options could use any of the haul route and stockpile options, the impacts to those project components would be the same under both options. Thus the focus of the summary is on the differentiating factor—the construction method.

Peak period impacts for the CDSM option are higher for Noise and Vibration for nighttime work (up to 12 weeks) and Traffic and Transportation if the outlet works construction is concurrent with CDSM construction. The average daily Air Quality impacts for the CDSM option are also higher if the outlet works construction is concurrent with CDSM construction. This represents the highest concentration of activity and a conservative estimate. However, the overall impact for the CDSM option is smaller for all resource areas because the areas of disturbance (stockpile and excavation) and stockpile volume are approximately one third smaller. The CDSM option construction duration also has the potential to be substantially shorter than the Conventional Earthwork option. The Conventional Earthwork option construction duration is 60 weeks. The CDSM option construction duration can be 26 weeks if any or a combination of the following are performed: outlet works construction is concurrent with CDSM construction, two CDSM rigs are operated concurrently over day and night shifts.

Table S-2 summarizes all the potentially significant impacts and required mitigation measures identified for the proposed project, as well as the potentially less-than-significant impacts and impacts with "no impact" potential (for which mitigation would not be required). For all potentially significant impacts, the significance after mitigation is shown.

S.5 Analysis of Alternatives

The alternatives analysis and screening phase followed a systematic process that examined the overall project objectives and identified a range of alternatives for review before selection of a specific project for detailed analysis in the Draft EIR. Project objectives were used to evaluate alternatives, including the following:

- improve the sluice fill buttress at the embankment toe to withstand shaking generated by the maximum credible earthquake on the Hayward Fault without substantial strength loss;
- prevent damage to the outlet works from the design level earthquake so that the outlet works remain operational following the earthquake; and
- continue the existing uses of Lake Chabot (for non-potable water supply, emergency water supply, conservation/storage of local runoff, and recreation) and outlet works operation during project construction.

Screening of alternatives also included project construction considerations, such as feasibility, schedule, risk, permitting requirements, and other related efforts that would be required to be implemented for a given alternative. Furthermore, the alternatives were screened against the potential to generate impacts on the same key environmental resources as those analyzed in Chapter 3, Environmental Setting, Impacts and Mitigation Measures (i.e., Aesthetics, Geology and Soils, Biological Resources, Cultural Resources, Transportation and Circulation, Air Quality, Greenhouse Gas Emissions, Noise and Vibration, Recreation, Hydrology and Water Quality, and Hazards and Hazardous Materials).

Table S-1
Comparison of the CDSM Option and the Conventional Earthwork Option

Resource Area	Comparison[1]	Applicable Mitigation Measures for:	
		CDSM Option	Conventional Earthwork Option
Aesthetics	Both construction options have impacts that are less than significant and would require most of the same mitigation measures. The CDSM option would require an additional mitigation measure to reduce nighttime lighting impacts to a less-than-significant level. The CDSM option would require a stockpile area to accommodate 38,000 to 46,500 cubic yards of material, whereas the Conventional Earthwork would require areas to accommodate115,000 to 170,000 cubic yards. The CDSM option would require a smaller excavation and stockpile area, resulting in less disturbed areas.	AE-1.1, AE-4.1, BR-4.1, BR-4.2, BR-4.3	AE-1.1, , BR-4.1, BR-4.2, BR-4.3
Geology and Soils	Both construction options have impacts that are less than significant and would require the same mitigation measures. The Conventional Earthwork option would have greater impacts than the CDSM option because it would require a larger excavation and stockpile area. The CDSM option would result in a lower potential for streambank and streambed erosion and sedimentation impacts compared to the Conventional Earthwork option because a smaller quantity of water would be generated.	GE-2.1, GE-2.2, HY-1.1, HY-3.1, HZ-2.1	GE-2.1, GE-2.2, HY-1.1, HY-3.1, HZ-2.1
Biological Resources	Both construction options have impacts that are less than significant and would require the same mitigation measures. Depending on the project component combination, the CDSM option overall would disturb a smaller area (8.5- 11.1 acres) and would remove fewer trees (75-200) than the Conventional Earthwork option, which would disturb up to 12.3-14.0 acres and remove 210- 265 trees.. The Conventional Earthwork option would disturb between 0.26-0.80 acres of riparian habitat, which is greater than the CDSM option which would disturb 0.19-0.76 acres of riparian habitat. Both construction options would disturb between 0.01-0.04 acres of wetlands.	BR-1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.1, 2.2, 4.1, 4.2, 4.3, HY-1.1, and HZ-1.1	BR-1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.1, 2.2, 4.1, 4.2, 4.3, HY-1.1, and HZ-1.1

Table S-1
Comparison of the CDSM Option and the Conventional Earthwork Option

Resource Area	Comparison[1]	Applicable Mitigation Measures for:	
		CDSM Option	Conventional Earthwork Option
Cultural Resources	Both construction options have a significant and unavoidable impact associated with the removal of the outlet tower and would require the same mitigation measures. Impacts to cultural resources would be similar for both options.	CR-1.1, 1.2, and 4.1	CR-1.1, 1.2, and 4.1
Transportation and Circulation	Both construction options have impacts that are less than significant and would require the same mitigation measures. Depending on the project component combinations, the Conventional Earthwork option would result in 220 peak daily vehicle trips, while the CDSM (concurrent with outlet works, two rigs, and day and night shifts) would result in 283 peak daily vehicle trips. Although the CDSM option would have the greatest peak daily vehicle trips, it would be for a shorter duration (6 weeks) compared to the Conventional Earthwork (7 weeks). The CDSM option would also have a substantially shorter overall timeframe under the worst case scenario (26 weeks) than the Conventional Earthwork option (60 weeks).	TR-1.1	TR-1.1

Table S-1
Comparison of the CDSM Option and the Conventional Earthwork Option

Resource Area	Comparison[1]	Applicable Mitigation Measures for:	
		CDSM Option	Conventional Earthwork Option
Air Quality	Both construction options would have a significant and unavoidable impact associated with the NOx emissions and require the same mitigation measures. The two construction options are similar in that they would both require the same type and intensity of outlet works construction. The CDSM option would have greater potential impacts than the Conventional Earthwork option because the day and night shifts associated with the CDSM option would result in more intensive daily construction activities such as vehicle trips and construction equipment use, which would generate higher average daily construction emissions. Thus, the CDSM option would generate higher average daily construction emissions. However, the CDSM option total construction emissions would be substantially lower than the Conventional Earthwork option (i.e., approximately 65 percent of the Conventional Earthwork option's total NOX emissions). The CDSM option requires substantially less material hauling (i.e., less than half of the Conventional Earthwork option) and construction equipment use, and the total diesel PM emissions from construction equipment would be 61 percent of the Conventional Earthwork option. Therefore, although the CDSM option would result in higher average daily emissions, the duration of construction activities as well as the total mass emissions would be substantially less than those associated with the Conventional Earthwork option.	AQ-2.1	AQ-2.1

Table S-1
Comparison of the CDSM Option and the Conventional Earthwork Option

Resource Area	Comparison[1]	Applicable Mitigation Measures for:	
		CDSM Option	Conventional Earthwork Option
GHG Emissions	Both construction options have impacts that are less than significant and would require the same mitigation measures. The Conventional Earthwork option would have greater potential impacts than the CDSM option because of more on-road truck hauling requirements and construction worker-generated emissions (i.e., more days of construction, and more worker vehicle trips to/from work sites over a longer period) due to the larger excavation/stockpile volumes, and additional construction equipment use. The CDSM option would generate approximately 33 percent less overall GHG emissions than the Conventional Earthwork option.	None	None
Noise and Vibration	Both construction options have impacts that are less than significant and would require the same mitigation measures. The CDSM and Conventional Earthwork options would require a maximum of 228 and 583 daily internal haul truck round trips, respectively. While the CDSM work may require nighttime construction, noise levels at the nearest residence would be mitigated to a less-than-significant level. The Conventional Earthwork option would have greater potential impacts during the day than the CDSM option because approximately three times as much fill (170,000 cubic yards vs. 46,500 cubic yards) would be transported, requiring three times as many haul trips. The CDSM option would also have a substantially shorter timeframe under the worst case scenario (26 weeks) than the Conventional Earthwork option (40 weeks).	NO-1.1, 1.2, 1.3, 1.4	NO-1.1, 1.2, 1.3, 1.4
Recreation	Both construction options would have a significant and unavoidable impact associated with park/trail closures and lake level drawdown and would require the same mitigation measures. Potential recreation-related impacts would be similar for both options. Both options would require temporary closure of Chabot Park and portions of Bass Cove and West Shore trails, but the total construction duration and park/trail closure duration for the CDSM option would be shorter.	TR-1.1, RE-1.1, BR-4.1, 4.2, 4.3, AE-1.1	TR-1.1, RE-1.1, BR-4.1, 4.2, 4.3, AE-1.1

Table S-1
Comparison of the CDSM Option and the Conventional Earthwork Option

Resource Area	Comparison[1]	Applicable Mitigation Measures for:	
		CDSM Option	Conventional Earthwork Option
Hydrology and Water Quality	Both construction options have impacts that are less than significant and would require the same mitigation measures. The Conventional Earthwork option would have greater potential impacts because of a larger amount of ground disturbance.	HY-1.1, 1.2, 1.3, 1.4, 1.5	HY-1.1, 1.2, 1.3, 1.4, 1.5
Hazards and Hazardous Materials	Both construction options would require the same mitigation measures. The Conventional Earthwork option would disturb a larger area than the CDSM option and would therefore result in a potentially greater volume of Naturally Occurring Asbestos to be disturbed.	HZ-1.1, 1.2, 1.3, 2.1, 4.1, 5.1	HZ-1.1, 1.2, 1.3, 2.1, 4.1, 5.1

Note:
[1] The comparisons assume that the same haul route(s) and stockpile location(s) would be used for both options.
Source: Data compiled by AECOM in 2013

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Aesthetics			
Impact AE-1: The proposed project would have a substantial adverse effect on a scenic vista.	Potentially Significant	Implement **Mitigation Measures BR-4.1, BR-4.2, and BR-4.3.** **Mitigation Measure AE-1.1: Restoration of construction areas to existing topography.** Areas that are disturbed by construction will be re-graded and hydroseeded to result in landforms that are consistent with existing site topography. Restoration work in Chabot Park will be done in consultation with the City of San Leandro.	Less than Significant
Impact AE-2: The proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.	No Impact	**None required.**	
Impact AE-3: The proposed project would substantially degrade the existing visual character or quality of the site and its surroundings.	Potentially Significant	Implement **Mitigation Measures BR-4.1, BR-4.2, BR-4.3,** and **AE-1.1.**	Less than Significant
Impact AE-4: The proposed project would introduce new source of substantial light or glare which would adversely affect day or nighttime views in the area.	Potentially Significant	**Mitigation Measure AE-4.1: Direct nighttime lighting away from residential areas.** To the extent possible, lighting used during nighttime construction will be directed downward and oriented toward project features so that no light source is directly visible from the neighboring residential area.	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Geology and Soils			
Impact GE-1: The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; or landslides.	Less than Significant	**None required.**	
Impact GE-2: The proposed project would result in substantial soil erosion or the loss of topsoil.	Potentially Significant	Implement **Mitigation Measures HY-1.1 and HZ-2.1.** **Mitigation Measure GE-2.1: Include provisions for topsoil and soil stockpiling in the SWPPP.** The SWPPP will include the following provisions, applicable to topsoil and soil stockpiling: • Topsoil will be excavated (to approximately 6 inches depth) and stockpiled for later restoration. • To the extent practicable, aboveground vegetation, including plant debris, will be mixed or otherwise incorporated into the topsoil before excavation. • The topsoil will be placed into designated topsoil-only stockpiles at locations designated in project construction plans. • All stockpiles of soils (i.e., topsoil, imported fill materials, and non-topsoil excavated soils) will be treated with temporary soil stabilization and erosion control measures. If soil binders are used, they will be nontoxic to plant and	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		animal life and will not be applied during or immediately before rainfall. Topsoil will be covered to prevent infestation with weeds. • When using stockpiled topsoil for restoration, the top 1 foot of the stockpile material will be mixed with the remainder of the topsoil stockpile so that living organisms are distributed throughout the topsoil material at the time of final placement. The use of microorganism inoculates will be used to reestablish microorganisms in topsoil material if it has been stockpiled for more than 9 months. **Mitigation Measure GE-2.2: Include provisions for site restoration and rainy season and long-term erosion control in the SWPPP.** The SWPPP will include the following provisions, applicable to site restoration and rainy season and long-term erosion control: • grading and contouring of soils following completion of construction; • seeding with native plant mixes; • installation of additional erosion and runoff control measures if construction activities continue into the rainy season; • installation of permanent erosion control measures, as appropriate, following completion of construction; • no use of monofilament plastic for erosion control; and • repair and restoration of roadways.	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact GE-3: The proposed project would be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse.	Potentially Significant	**Mitigation Measure GE-3.1: Conduct a geotechnical evaluation of the stockpile locations to determine their suitability for stockpiling.** The geotechnical evaluation during design will focus on the identification and evaluation of landslide hazards and soil stability hazards, including slope stability hazards associated with stockpiling of soils. The evaluation will identify the maximum size and distribution of stockpiling permissible at the stockpile locations to prevent landslides or other slope instabilities and excessive land settlement. The results of the evaluation will be used during design to specify appropriate preventative efforts in the design drawings.	Less than Significant
Impact GE-4: The proposed project would not be located on expansive soil that would create substantial risks to life or property.	Less than Significant	**None required.**	
Biological Resources			
Impact BR-1: The proposed project would have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW or USFWS; or would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or could	Potentially Significant	Implement **Mitigation Measures HY-1.1** and **HZ-1.1.** **Mitigation Measure BR-1.1: Conduct pre-construction surveys for California red-legged frog and western pond turtle.** Within 48 hours before any construction activities that involve ground disturbance or vegetation removal a USFWS approved biologist will conduct pre-construction surveys, for California red-legged frog and Western pond turtle. The survey area will include all habitats suitable for these species within the construction work limits and a 300-foot buffer surrounding the work limits. Whenever a lapse in project-related construction	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
impede the use of native wildlife nursery sites.		activity of 2 weeks or greater has occurred, these areas will be re-inspected. If California red-legged frog(s) (including eggs, larvae, or adult forms) is/are found during pre-construction surveys, the biologist will contact USFWS and/or CDFW to determine whether their relocation is appropriate and if additional measures are necessary. If Western pond turtle is found during pre-construction surveys, a qualified biologist, in coordination with CDFW, will move the turtle(s) that may be affected by construction activities to the nearest suitable habitat outside the project construction area. If Western pond turtle nests are found during pre-construction activities, CDFW will be consulted to determine a course of action. Construction activities will not proceed until consultation and/or relocation activities are complete. **Mitigation Measure BR-1.2: Conduct biological monitoring during initial ground disturbance.** A qualified wildlife biologist will be present at all times during initial ground disturbance or vegetation removal activities. The biologist will remain on-site until initial ground disturbance is completed (after clearing and grubbing. The biologist will have the authority to stop work if a listed species is encountered or a violation of any regulatory permit issued for the project occurs. After coordination with the appropriate regulatory agencies, a biologist who is qualified to handle the listed species on-site will relocate any individuals that may be affected by construction activities. If work is stopped, the biologist or on-site monitor will notify the regulatory agencies in accordance with permit requirements.	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		Mitigation Measure BR-1.3: Erect temporary exclusion fencing. Temporary exclusion fencing will be erected around active work areas (including the work limits at dam face, the stockpile location(s), and the staging areas) before clearing and grubbing activities and before pre-construction surveys for California red-legged frog and Western pond turtle. The purpose of this fencing will be to prevent wildlife from entering the work area during project activities. Wildlife exclusion fencing may be constructed of various materials but will be buried deep enough (6–8 inches) and will be tall enough (at least 24 inches aboveground) to prevent the passage of target species. During all construction activities, the condition of the fencing will be assessed at least weekly by construction personnel and monthly by a qualified biologist to determine if repairs are required. As necessary, repairs will be conducted within 2 working days of being noted by construction workers. All exclusion fencing will be removed at the end of construction activities. **Mitigation Measure BR-1.4: Implement and track a worker awareness education program.** Before beginning construction, all construction personnel including site supervisors and project managers will attend a worker education awareness program conducted by a qualified biologist or by watching a video of the first training. This program will be used to describe all sensitive habitats and sensitive species that may occur within the project work limits. Descriptions of the potentially occurring sensitive species, their habitats, legal status, and required protection will be included. All applicable mitigation measures will be reviewed. The responsibilities of project personnel and applicable mitigation	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		measures including observing speed limits, adhering to project work limits, maintaining exclusion fencing, and notification requirements will be included. Documentation of training attendance by construction personnel will be tracked by EBMUD. **Mitigation Measure BR-1.5: Restrict construction-related vehicle traffic.** During ground-disturbing activities, construction-related vehicle traffic will be restricted to within the designated construction work limits, to established roads, and other designated areas needed to complete the work. Construction equipment will be stored in staging areas designated on the construction plans. All personnel will observe a 15 mile-per-hour speed limit for construction areas to minimize the potential of construction equipment striking wildlife species. If a sensitive species is encountered during construction, all construction activities will cease in the immediate area until appropriate corrective measures have been completed or it has been determined by the biologist that the species will not be harmed. For federally protected species, USFWS will be contacted within 24 hours, and for state protected species, CDFW will be contacted within 24 hours. All access roads and construction areas will be marked on construction drawings. **Mitigation Measure BR-1.6: Remove potential nesting habitat in the project area outside the nesting bird season.** Removal of potential nesting habitat (e.g., trees and shrubs) as necessary for construction activities will be conducted before the nesting bird season (February 1–August 31), to the extent feasible and practicable, to minimize the potential for loss of active nests.	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		Mitigation Measure BR-1.7: Conduct pre-construction surveys for nesting birds and delineate no-disturbance buffer zones for active nests. If construction activities including vegetation clearing and grading are scheduled during the nesting bird season (February 1–August 31), a focused survey for active nests will be conducted by a qualified biologist no more than 10 days before beginning construction activities. During this survey, the biologist will inspect all trees and other potential nesting habitats in and within 100 feet of the edge of construction limits for nesting passerines and within 500 feet of the edge of construction limits for nesting raptors. If an active nest is found and it is determined that it potentially could be disturbed by construction, a biologist, in consultation with CDFW, will determine the extent of a no-disturbance buffer zone to be established around the nest to protect the nest, eggs and young. The size of the buffer may vary, depending on the nest location, nest stage, construction activity, and monitoring results. If implementation of the buffer becomes infeasible or construction activities result in an unanticipated nest disturbance, CDFW will be consulted to determine the appropriate course of action. All vegetation and structures with active nests will be monitored to determine when the young have fledged and are feeding on their own before work can resume within the buffer zone. Whenever a lapse in construction activities of 2 weeks or greater occurs, pre-construction surveys will be required. **Mitigation Measure BR-1.8: Conduct pre-construction surveys for roosting bats and delineate no-disturbance buffer zones for active maternity roosts.** Within 2 weeks before the removal of potential roosting habitat (i.e., old buildings, bridges, culverts, trees greater than 12	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		inches diameter at breast height, rock crevices, caves) a qualified bat biologist will survey these areas within 200 feet of an the construction work limits. The biologist will conduct a search for suitable entry points, roost cavities or crevices; and, survey for evidence of day roosts, and maternity roosts. If no roosting is observed, no additional mitigation is required. If roosting surveys are inconclusive, indicate potential occupation by a special-status bat species, and/or identify a large day roosting population or maternity roost by any bat species within 200 feet of an active construction work area, a qualified biologist will conduct focused day and night emergence surveys. If active maternity roosts or day roosts are found in areas which will be removed as part of project construction, active demolition will commence before maternity colonies form (before March 1) or after young are flying (after July 31). Disturbance free buffer zones (determined by a qualified biologist in coordination with CDFW) will be observed during the maternity roost season (March 1–July 31) for any active maternity colony identified during the surveys. If a non-breeding bat roost is found in a tree or structure scheduled for removal, the individuals will be safely evicted, under the direction of a qualified biologist (as determined by a Memorandum of Understanding with CDFW). **Mitigation Measure BR-1.9: Take specified actions to minimize impacts on San Francisco dusky-footed woodrat.** Not more than 2 weeks before initial ground disturbance, including grading and vegetation clearing, a qualified biologist will conduct a pre-construction survey to determine if active San-Francisco dusky-footed woodrat nests occur within a 25-foot buffer of areas to be cleared of vegetation. If woodrat nests	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		can be avoided by construction activities, the qualified biologist will demarcate a suitable buffer area for avoidance. If woodrat nests found within 25 feet of activities are determined to be occupied, each nest will be relocated to suitable habitat with consultation with CDFW. If young are found in the nest, a no-disturbance buffer will be established around the nest in consultation with CDFW. The nest will not be disturbed until young have been weaned (up to 6 weeks from birth), at which point the nest will be dismantled and relocated.	
Impact BR-2: The proposed project would have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS.	Potentially Significant	**Mitigation Measure BR-2.1: Minimize construction effects on riparian habitat by use of preservation fencing to the extent feasible.** Riparian areas will be identified on the Final Engineering Plans and demarcated as a sensitive resource to be avoided. Before beginning construction, the edge of the CDFW jurisdictional riparian habitat will be marked in the field by a qualified biologist. Where construction limits are within 100 feet of riparian habitat, preservation fencing (e.g., visible orange construction fencing) will be installed by the contractor before construction, offset by 50 feet from the edge of the riparian habitat, to the extent feasible. Where construction limits are within 50 feet of the riparian edge, fencing will be placed as far as is feasible from the riparian edge, and signage (i.e., visible to construction equipment operators from a minimum of 100 feet away) that indicates the sensitive nature of the habitat and the need for avoidance will be installed on the fence. **Mitigation Measure BR-2.2: Comply with Section 1602 of the California Department of Fish and Game Code.** A Section 1602 Streambed Alteration Agreement from CDFW will be obtained before any potential impact (e.g., ground disturbance) or removal of trees occurs within the banks of	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		jurisdictional channel features, including the San Leandro Creek stream channel and the associated riparian vegetation zone or below the top of the bank of Lake Chabot. EBMUD will comply with all terms and conditions of the Streambed Alteration Agreement, including measures to replace any riparian habitat, on at least a 1:1 ratio or as directed by CDFW.	
Impact BR-3: The proposed project would have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWS (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means.	Potentially Significant	**Mitigation Measure BR-3.1: Minimize potential fill of jurisdictional waters of the United States and loss of sensitive habitat, and compensate for unavoidable impacts.** Based on USACE jurisdictional determination, waters of the United States, including wetlands, will be identified on the Final Engineering Plans and demarcated as a sensitive resource to be avoided. Before beginning construction, the boundary of the jurisdictional wetlands and waters will be marked in the field by a qualified biologist. Where construction limits are within 100 feet of jurisdictional wetlands or waters, preservation fencing (e.g., visible orange construction fencing) will be installed by the contractor before construction, offset by 50 feet from the edge of the waters, to the extent feasible. Where construction limits are within 50 feet of the jurisdictional feature, fencing will be placed as far as is feasible from the border, and signage (visible to construction equipment operators a minimum of 100 feet away) that indicates the sensitive nature of the habitat and the need for avoidance will be installed on the fence. For those waters of the United States or State that cannot be avoided during project construction, authorization for fill of jurisdictional waters of the United States and State would be secured before construction begins. The following permits, as deemed necessary by the resource agencies, would be sought	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		before construction begins: a permit from USACE under Section 404 of the CWA, a Letter of Permission or permit from the USACE under Section 10 of the Rivers and Harbors Act, a water quality certification from RWQCB under Section 401 of the CWA, and a Streambed Alteration Agreement from CDFW under Section 1602 of CDFG Code. As required, EBMUD would implement waste discharge BMPs to minimize disturbance and release of sediment into the water, to the extent possible. All requirements of these permitting processes, mitigation measures, and conditions associated with these permits will be implemented by EBMUD. A permanent impact on jurisdictional waters is unlikely to occur. If a permanent impact on jurisdictional wetlands or waters is unavoidable, compensatory mitigation will be determined in consultation with the resource agencies and a minimum mitigation ratio of 1:1 will be implemented so that no net loss will be achieved. The mitigation ratio ultimately will be determined by USACE, the RWQCB, and CDFW through the permitting process.	
Impact BR-4: The proposed project could conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	Potentially Significant	**Mitigation Measure BR-4.1: Avoid all protected trees.** Avoidance of protected trees (as defined by the Oakland Municipal Code) will be exercised to the greatest extent practicable. Tree avoidance will be consistent with the Tree Preservation Plan (as identified in **Mitigation Measure BR-4.3**). During the design process, EBMUD will make tree preservation or removal decisions based on the potentially impacted trees' suitability for preservation, which will in turn be based on tree health, structural stability, species status (protected, unprotected or invasive), and the species ability to	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		withstand potential construction impacts. **Mitigation Measure BR-4.2: Replace all non-invasive protected trees that are removed as part of the construction process.** When removal is determined to be necessary, protected tree removal will be mitigated at a 1:1 ratio. The definition of a protected tree will be based on the Oakland Municipal Code's tree ordinance. Non-native tree or shrub invasive species, as identified by the California Invasive Plant Council, will not be replaced, unless required by permitting agencies. For tree or shrub removal in Chabot Park or along the West Shore Trail, replacement will be at or near their original location, or in another location/configuration nearby, in consultation with the City of San Leandro (in Chabot Park) or East Bay Regional Park District (along the West Shore Trail), where feasible. The replacement trees will be established with appropriate maintenance to provide long-term, self-sustaining survivorship (75 percent survival rate, 2 years after planting). **Mitigation Measure BR-4.3: Prepare and implement a Tree Preservation Plan.** A Tree Preservation Plan (Plan) will be prepared by a certified arborist for protected trees (as identified in **Mitigation Measure BR-4.2**) within the project area that will be avoided by the proposed project, so that they are adequately protected during construction activities. The Plan will include detailed recommendations for tree preservation and removal based on construction and grading plans, with specific reference to suitability for preservation, proximity to construction activities, and ability to tolerate impacts. The Plan will include general preservation and construction guidelines as well as	

Table S-2 Summary of Potentially Significant Impacts and Mitigation Measures			
Impacts	**Impact Significance Before Mitigation**	**Mitigation Measures**	**Impact Significance After Mitigation**
		recommendations for specific protective measures for trees before, during, and after construction, to reduce impacts on trees from development and maintain their health throughout the construction process. The Plan will be based on the Tree Survey and Assessment for the project site or a similar report, detailing information on tree species, size, location, and condition. Proposed construction plans will be examined to evaluate the potential for preservation of trees with regards to planned grading, equipment access, and other needs related to construction. The contractor will warrant the health of trees to be preserved within or adjacent to construction zones for up to 1 year after construction is completed.	

Table S-2 Summary of Potentially Significant Impacts and Mitigation Measures			
Impacts	**Impact Significance Before Mitigation**	**Mitigation Measures**	**Impact Significance After Mitigation**
Cultural Resources			
Impact CR-1: The proposed project would cause a substantial adverse change in the significance of a historical resource.	Potentially Significant	**Mitigation Measure CR-1.1: Produce and distribute an interpretive/educational document about the Lake Chabot Waterworks District.** As an addition to the existing on-site interpretive panels of the Lake Chabot Waterworks District and the cultural resources inventory and evaluation report (**Appendix E-1** of the Draft EIR and provided to the Northwest Information Center at Sonoma State University), EBMUD will prepare an electronic document on the history of Lake Chabot Waterworks District that documents the site in its entirety and is easily accessible to the public, to help compensate for the impact of the proposed project on Lake Chabot Waterworks District. **Mitigation Measure CR-1.2: Stop work if prehistoric or historic archaeological resources are discovered, assess the significance of any find, and implement recovery plan, as required.** Cultural resources awareness training will be provided to construction and contractor staff before ground-disturbing activity. This training will explain the potential to encounter cultural material during project-related ground-disturbance activities and the requirements for responding to such unanticipated discoveries. If any prehistoric or historic cultural material is discovered during ground-disturbing activities, work within 100 feet of the discovery will be halted, and a qualified archaeologist will be consulted immediately to designate an appropriate stop work area and to assess the significance of the find, according to Section 15064.5 of the State CEQA Guidelines.	Significant and Unavoidable

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		If it is determined that project construction may damage a historical resource or a unique archaeological resource, mitigation will be implemented, in accordance with Section 21083.2 of the PRC and Section 15126.4 of the State CEQA Guidelines, with a preference for preservation in place. If avoidance is infeasible, project impacts may be mitigated through the implementation of an archaeological data recovery plan developed by the evaluating archaeologist. This plan, which would include recommendations for the treatment of discovered cultural material, will be submitted to EBMUD for review. Upon approval, project construction activity within the area of the discovery may resume. The qualified archaeologist will then prepare and submit to EBMUD a report documenting the methods employed and results. On review and approval by EBMUD, a copy of the report will be submitted to the Northwest Information Center in Rohnert Park, California. Work may proceed at other project work sites while mitigation for historical resources or unique archaeological resources is being carried out. Additionally, in accordance with Section 5097.993 of the PRC, EBMUD will inform construction workers that the collection of any Native American artifact is prohibited by law.	
Impact CR-2: The proposed project would cause a substantial adverse change in the significance of an archaeological resource.	Potentially Significant	Implement **Mitigation Measure CR-1.2.**	Less than Significant
Impact CR-3: The proposed project would not directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature.	Less than Significant	**None required.**	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact CR-4: The proposed project would disturb any human remains, including those interred outside of formal cemeteries.	Potentially Significant	**Mitigation Measure CR-4.1: Conduct construction worker training, stop work if human skeletal remains are uncovered, and follow the procedures set forth in Section 15064.5(e)(1) of the State CEQA Guidelines.** Construction and contractor staff will be informed before ground-disturbing activity that, although remote, there is the potential to encounter as yet undiscovered human remains during project-related ground-disturbance activities. According to Section 7050.5(b) of the California Health and Safety Code, in the event of discovery or recognition of any human remains there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. Furthermore, if the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission pursuant to California Health and Safety Code 7050.5-7055.	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		Per Public Resources Code 5097.98, the human remains will not be damaged or disturbed by further activity until the EBMUD has discussed and conferred, as prescribed in this section (California Public Resources Code Section 5097.98), with the Most Likely Descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.	
Transportation and Circulation			
Impact TR-1: The proposed project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.	Potentially Significant	**Mitigation Measure TR-1.1: Prepare and implement a traffic control plan before and during project construction.** EBMUD and the construction contractor(s) will prepare and implement a traffic control plan and will coordinate with Caltrans and local jurisdictions, as appropriate, for affected roadways and intersections. The traffic control plan will include, but will not be limited to, the following elements: • Flaggers will be deployed to the intersection of Benedict Drive and Estudillo Avenue during the AM peak hour to facilitate traffic movements at the intersection. When an extended queue is formed on the northbound approach (Benedict Drive), the flaggers will stop traffic intermittently in the east-west direction (on Estudillo Avenue) to allow the northbound traffic to make turns. • EBMUD and the construction contractor(s) will consult with the City of San Leandro to finalize designated truck routes. • EBMUD will notify the City of San Leandro Police Department of the dates when heavy equipment will be moved into or out of Chabot Park. • Warning signs will be posted along Estudillo Avenue to	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		inform bicyclists and motorists about the closure of Chabot Park entrance at the end of Estudillo Avenue and to provide detour routes to access the park (e.g., Lake Chabot Road and Fairmont Drive). • Advance warning signs (e.g., "Truck Crossing") will be installed along Estudillo Avenue, advising motorists of the construction traffic to minimize hazards associated with the truck traffic on narrow roadways. Flaggers, illuminated signs, a temporary stop sign, or a combination of these methods will be used to slow approaching traffic throughout the construction period. • All equipment and materials will be stored in designated contractor staging areas on-site, in a manner intended to minimize any safety hazards. • Roadway pavement conditions will be documented for all affected roadways (e.g., Estudillo Avenue, MacArthur Boulevard, and Grand Avenue) before and after project construction. Roads found to have been damaged by construction vehicles will be repaired to the level at which they existed before project construction. • To the extent applicable, the traffic control plan will conform to the latest edition of California Manual on Uniform Traffic Control Devices for Temporary Traffic Control (Caltrans 2013).	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact TR-2: The proposed project would conflict with an applicable congestion management program, including but not limited to LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.	Potentially Significant	Implement **Mitigation Measure TR-1.1.**	Less than Significant
Impact TR-3: The proposed project would substantially increase hazards resulting from a design feature or incompatible uses.	Potentially Significant	Implement **Mitigation Measure TR-1.1.**	Less than Significant
Impact TR-4: The proposed project would result in inadequate emergency access.	Potentially Significant	Implement **Mitigation Measure TR-1.1.**	Less than Significant
Impact TR-5: The proposed project would not conflict with adopted policies, plans, programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.	Less than Significant	**None required.**	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Air Quality			
Impact AQ-1: The proposed project would conflict with or obstruct implementation of the regional applicable air quality plan (Clean Air Plan).	Potentially Significant	Implement **Mitigation Measure AQ-2.1.**	Significant and Unavoidable
Impact AQ-2: The proposed project would violate an air quality standard (NO_2 ambient air quality standard) and would contribute substantially to an existing or projected air quality violation.	Potentially Significant	**Mitigation Measure AQ-2.1: Implement BAAQMD's Basic and Additional Construction Control Measures.** EBMUD will follow BAAQMD's recommendations and will implement the Basic Construction Control Measures during construction. The Basic Construction Control Measures include: • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads, stockpiles) will be watered as necessitated by soil and air conditions or applied with (nontoxic) soil stabilizers. • All haul trucks transporting soil, sand, or other loose material off-site will be covered. • All visible mud or dirt track-out onto adjacent public roads will be removed, using wet power vacuum street sweepers at least once per day, if visible soil material is tracked into public streets. The use of dry power sweeping will be prohibited. • All vehicle speeds on unpaved roads will be limited to 15 miles per hour. • Idling times will be minimized, by either shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California	Significant and Unavoidable

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		Airborne Toxics Control Measure, Title 13, Section 2485 of the California Code of Regulations). Clear signage will be provided to construction workers at all access points. • All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. A schedule of tune-ups will be developed, and the tune-ups will be performed for all equipment that is operating within the project area. A log of required tune-ups will be maintained, and a copy of the log will be submitted to EBMUD for review every 2,000 service hours. • Publicly visible signs will be posted at all entrances to the project site and along roadways adjacent to the project site where citizens could be traveling, with the telephone number and person to contact at EBMUD regarding dust complaints. This person will respond and take corrective action within 48 hours. In addition, because the proposed project would exceed the NO_X threshold of significance under both construction options, will include a substantial amount of cut/fill operations, and will be located approximately 500 to 1,200 feet from the nearest sensitive receptor, additional mitigation measures will be implemented to reduce emissions and avoid exposing nearby receptors to substantial construction emissions. BAAQMD has developed Additional Construction Mitigation Measures for those projects that either will include extensive earthmoving activities or that will be located near sensitive receptors. The following measures from BAAQMD's Additional Construction Measures also will be implemented during construction: • EBMUD or the contractor will develop a plan demonstrating that the off-road equipment (more than 50	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		horsepower) to be used in project construction (i.e., owned, leased, and subcontractor vehicles) would achieve a project-wide fleet-average 20 percent NO_X reduction and 45 percent PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions would include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, restricting idling time of diesel-powered construction equipment to 2 minutes or less, equipping diesel engines with Best Available Control Technology for emission reductions of NO_X and PM, using equipment that meets CARB's most recent certification standard for off-road, heavy-duty diesel engines, making payment(s) for off-site mitigation, and/or performing or participating in any other options that become available. • All trucks and equipment, including their tires, will be washed before leaving the project area. • Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.	
Impact AQ-3: The proposed project would expose sensitive receptors to substantial pollutant concentrations.	Potentially Significant	Implement **Mitigation Measure AQ-2.1**.	Less than Significant
Impact AQ-4: The proposed project would not create objectionable odors affecting a substantial number of people.	Less than Significant	**None required.**	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Greenhouse Gas Emissions			
Impact GH-1: The proposed project would not generate annual GHG emissions that exceed 1,100 metric tons.	Less than Significant	**None required.**	
Impact GH-2: The proposed project would not result in net new operation-related GHG emissions.	Less than Significant	**None required.**	
Impact GH-3: The proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.	Less than Significant	**None required.**	
Noise and Vibration			
Impact NO-1: The proposed project would expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, and would result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the proposed project.	Potentially Significant	**Mitigation Measure NO-1.1: Reduce construction noise levels from operation of construction equipment.** During construction, EBMUD and its construction contractor will implement the following measures to reduce noise levels: • EBMUD and its construction contractor(s) will use available noise control techniques (e.g., mufflers, intake silencers, extension ducts, engine enclosures, and acoustically attenuating shields or shrouds) for all equipment and trucks. • Noise-generating activities greater than 90 dBA—impact construction including hydraulic backhoe, concrete recycling activities (i.e., concrete breakup, pulverizing, separation, crushing)—will be limited to between 8:00 a.m.	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		and 4:00 p.m., Monday through Friday, and will be limited in duration to the maximum extent feasible. EBMUD will hire an independent noise monitoring consultant to perform site monitoring during specific phases of construction (e.g., demolition, concrete recycling), when noise is expected to exceed 90 dBA. **Mitigation Measure NO-1.2: Notify residents in the immediate project vicinity in advance of construction activities.** EBMUD or its construction contractor(s) will notify property owners and tenants within 300 feet of the edge of the construction right-of-way and along the haul routes at least 2 weeks in advance of construction activities. Property owners and tenants will be notified by first-class mail and signage will be posted at the Estudillo Avenue main entrance to Chabot Park, leading to the project area. **Mitigation Measure NO-1.3: Limit the hours of operation for haul truck trips through residential areas.** Consistent with the on-site project work, construction contractor(s) will limit haul truck trips through residential areas to or from project work sites, from 7:00 a.m. until 7:00 p.m., Monday through Friday, with exceptions for delivery by “extra legal” trucks from 6:30 a.m. to 7:00 p.m., as necessary. **Mitigation Measure NO-1.4: Designate a Community Affairs contact, responsible for responding to construction-related noise issues.** EBMUD will designate a Community Affairs contact for responding to construction-related noise issues during normal	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		business hours. The District's direct telephone number and e-mail contact will be posted conspicuously at construction areas and on all advanced notifications. The Community Affairs contact will communicate the concerns to the construction manager who will take necessary steps to resolve complaints, including coordinating periodic noise monitoring, when necessary.	
Impact NO-2: The project would not expose persons to or generate excessive groundborne vibration or groundborne noise levels.	Less than Significant	**None required.**	
Impact NO-3: The project would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.	Less than Significant	**None required.**	
Recreation			
Impact RE-1: The proposed project would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	Potentially Significant	Implement **Mitigation Measure TR-1.1**. **Mitigation Measure RE-1.1: Provide advanced notification to East Bay Regional Park District (EBRPD) regarding anticipated lake level during construction.** Once determined, EBMUD will notify EBRPD regarding the anticipated lake level during construction and when the lake drawdown will occur.	Significant and Unavoidable

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact RE-2: The proposed project would not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.	No Impact	**None required.**	
Impact RE-3: The proposed project would substantially degrade recreational experiences.	Potentially Significant	Implement **Mitigation Measures BR-4.1, BR-4.2, BR-4.3, and AE-1.1.**	Less than Significant
Hydrology and Water Quality			
Impact HY-1: The proposed project would violate water quality standards or waste discharge requirements.	Potentially Significant	**Mitigation Measure HY-1.1: Prepare a Storm Water Pollution Prevention Plan for each construction activity.** EBMUD will prepare an SWPPP addressing each construction activity, regardless of the construction alternative used. The SWPPP will identify pollutant sources that may affect the quality of stormwater discharge and will specify implementation of specific BMPs to reduce pollutants in stormwater discharges during construction and post-construction. The SWPPP will include the following: • Source identification • Preparation of a site map • Description of construction materials, practices, and equipment storage and maintenance • List of pollutants likely to contact storm water • Estimate of the construction site area and percent impervious area	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		• Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in storm water runoff, such as detention basins, fiber rolls, silt fences, check dams, geofabric, drainage swales, and sandbag dikes • Proposed construction dewatering plan • List of provisions to eliminate or reduce discharge of materials to storm water • Description of waste management practices • Spill prevention and control measures • Maintenance and training practices • Sampling and analysis strategy and sampling schedule for discharges from construction activities The SWPPP will address the following construction activities: • *Excavation of downstream face of the dam*: CDSM option or Conventional Earthwork option. The Conventional Earthwork option will require additional treatment capacities to handle higher potential sediment loads. • *Use of stockpiles*: Stockpiles areas will require the use of erosion and sediment control practices listed above or other BMPs to prevent polluted runoff. Particular care will be used to prevent contaminated runoff to the creek. **Mitigation Measure HY-1.2: Install a turbidity curtain and containment boom during the outlet works construction.** A turbidity curtain made of impermeable fabric will be installed to contain any disturbance from the outlet works construction. A secondary containment boom will be installed	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		within the perimeter of the turbidity curtain, and it will contain and capture petroleum products that may flow on the water. The turbidity curtain and containment boom, combined, will protect the lake's water quality during the outlet works construction. Fuel and/or hydraulic fluid sources will be closely monitored and controlled in containment basins on the barge deck and will follow safe practices. **Mitigation Measure HY-1.3: Require grading of construction staging areas to prevent migration of contaminants.** EBMUD will incorporate into contract specifications the requirement for grading construction staging areas to contain surface runoff, so that contaminants such as oil, grease, and fuel products will not drain towards receiving waters. If heavy-duty construction equipment is stored overnight at the construction staging areas, drip pans will be placed beneath the machinery engine block and hydraulic systems to prevent any leakage from entering runoff or receiving waters. Vehicles or equipment will not be refueled within 100 feet of Lake Chabot or San Leandro Creek unless a bermed and lined fueling area is constructed. **Mitigation Measure HY-1.4: Comply with regional, state, and federal wetlands and streambed requirements for any creek crossings and drainage channels.** For construction adjacent to or crossing any creeks or drainage channels, EBMUD or the contractor is not required to obtain an encroachment permit from the Alameda County Flood Control and Water Conservation District. However, construction activities will comply with CDFW and USACE requirements pertaining to wetlands and streambeds, including associated	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		water quality protection requirements of the RWQCB. **Mitigation Measure HY-1.5: Maintain a spill kit at all locations where fuel or hydraulic powered equipment is in use over or adjacent to lake waters during the outlet works construction.** A spill kit made of oil absorbent napkins, additional floating sock-like oil absorbent boom sections, and an approved granular oil disbursement product in 5-gallon containers will be immediately available at all locations where fuel and/or hydraulic powered equipment are in use over or adjacent to the lake's waters.	
Impact HY-2: The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge to cause a net deficit in aquifer volume or a lowering of the local groundwater table level.	Less than Significant	**None required.**	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact HY-3: The proposed project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.	Potentially Significant	**Mitigation Measure HY-3.1: Grade the project site topography to match or improve pre-existing draining conditions, after completion of construction.** Following completion of construction, the topography of the project site will be graded to match or improve existing drainage conditions. Use of permanent BMPs, such as vegetated filter strips and/or vegetated swales, may be required.	Less than Significant
Impact HY-4: The proposed project would not create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.	No Impact	**None required.**	
Impact HY-5: The proposed project would substantially degrade water quality.	Potentially Significant	Implement **Mitigation Measures HY-1.1, HY-1.2, and HY-1.3**.	Less than Significant
Impact HY-6: The proposed project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.	No Impact	**None required.**	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact HY-7: The proposed project would not expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow.	No Impact	**None required.**	
Hazards and Hazardous Materials			
Impact HZ-1. The proposed project would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	Potentially Significant	**Mitigation Measure HZ-1.1: Prepare and implement a Hazard Communication Plan, Injury and Illness Prevention Plan, and a Hazardous Materials Control and Spill Prevention and Response Plan.** Before construction, EBMUD or the construction contractor(s) will prepare an HCP, IIPP, and a Hazardous Materials Control and Spill Prevention and Response Plan. Implementation of these plans by the construction contractor(s) will minimize construction worker exposure to hazardous materials. Hazardous waste generated during project construction will be contained, sampled, and disposed in accordance with all applicable federal, state, and local laws and regulations. With regard to hazardous materials, licensing and training personnel, accumulation limits, time limits, reporting, and record keeping are regulated by the federal RCRA and the California Hazardous Waste Control Law. The Hazardous Materials Control and Spill Prevention and Response Plan will include strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways. The plan will include measures to prevent construction-related raw cement, concrete, or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses. Steps for	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		immediate clean-up of construction-related spills and notification procedures will be included. Where applicable, the Hazardous Materials Control and Spill Prevention and Response Plan will reference the Storm Water Pollution Prevention Plan (see **Mitigation Measure HY-1.1**). **Mitigation Measure HZ-1.2: Assess the pole-mounted transformer for the presence of PCBs.** The construction contractor(s) will assess the pole-mounted transformer at the Park Stockpile location for the presence of PCBs, based on the age of the pole-mounted transformer, if project construction activities necessitate the removal or relocation of the pole-mounted transformer. If the pole-mounted transformer is dated prior to 1978, it will be considered to contain hazardous materials and will be disposed in accordance with TSCA (40 CFR Section 761.62) requirements. PCB bulk product waste containing 50 parts per million or more of PCBs must be disposed at a TSCA-approved facility. Disposal of PCB bulk product waste does not require approval from the EPA. **Mitigation Measure HZ-1.3: Evaluate all pre-1980 structures before project construction.** Before beginning project construction activities, EBMUD or its contractor(s) will conduct an evaluation of all structures (built before 1980) to be demolished at the outlet works, to evaluate the presence of lead-based paint and ACM. Remediation will be implemented in accordance with the recommendations of the evaluation and disposed at an appropriate, permitted off-site disposal facility.	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact HZ-2. The proposed project would create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment.	Potentially Significant	**Mitigation Measure HZ-2.1: Perform project construction activities in accordance with the Asbestos Dust Mitigation Plan.** Because soils to be disturbed are confirmed to contain NOA, project construction activities, including excavation with either the CDSM or Conventional Earthwork option, soil stockpiling, road construction, and demolition will be performed under an Asbestos Dust Mitigation Plan, in accordance with the ATCM as administered by BAAQMD, to reduce public and worker exposure to NOA by employing the best available dust mitigation practices.	Less than Significant
Impact HZ-3. The proposed project would not be located on a site that is included on a list of hazardous materials sites, compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.	No Impact	**None required.**	
Impact HZ-4. The proposed project would impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	Potentially Significant	Implement **Mitigation Measure TR-1.1.** **Mitigation Measure HZ-4.1: Prepare a site-specific emergency response plan and maintain emergency access and evacuation routes to/from the project area, in cooperation with local public agencies.** EBMUD will prepare a site-specific emergency response plan for the site, using the EBMUD Emergency Operations Plan as a guide; the plan will identify staff members to perform	Less than Significant

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
		emergency duties and lists the resources needed to accomplish emergency tasks.	
Impact HZ-5. The proposed project would expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.	Potentially Significant	**Mitigation Measure HZ-5.1: Take precautions regarding all flammable material around construction equipment and maintain fire-fighting tools including a shovel and fire extinguisher at project work sites where construction equipment is being used or flammable materials are being temporarily stored.** All flammable material, including snags, will be cleared from project work sites around construction equipment and temporary storage for flammable materials. One serviceable round point shovel with an overall length of not less than 46 inches and one backpack pump water-type fire extinguisher, fully equipped and ready for use, will be maintained and will be readily available at each project component work site during construction equipment operation and at project work sites where temporary storage of flammable materials is located.	Less than Significant
Cumulative Impacts			
Impact AE-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on visual character/quality or scenic resources.	No Cumulative Impact	**None required**.	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact GE-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on geology and soils.	No Cumulative Impact	**None required**.	
Impact BR-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on special-status plant or wildlife species.	No Cumulative Impact	**None required.**	
Impact BR-CU-2: The proposed project, in combination with past, present, and reasonably foreseeable development, would result in a significant cumulative impact on sensitive vegetation communities.	No Cumulative Impact.	**None required.**	
Impact BR-CU-3: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on wetlands and other aquatic habitats.	Less than Significant	**None required.**	
Impact BR-CU-4: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a	No Cumulative Impact	**None required.**	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
significant cumulative impact related to local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.			
Impact CR-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on historical resources.	No Cumulative Impact	**None required.**	
Impact CR CU-2: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on paleontological resources.	No Cumulative Impact	**None required.**	
Impact TR-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on transportation and circulation.	No Cumulative Impact	**None required.**	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
Impact AQ-CU-1: The proposed project would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment.	Potentially Significant	Implement **Mitigation Measure AQ-2.1**.	Significant and Unavoidable
Impact GH-CU-1: The proposed project would not result in a cumulatively considerable net increase of greenhouse gas emissions.	Less than Significant	**None required.**	
Impact NO-CU-1: The proposed project would not result in a significant cumulative impact related to noise and vibration.	No Cumulative Impact	**None required.**	
Impact RE-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on recreation.	No Cumulative Impact	**None required.**	
Impact HY-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on hydrology and water quality.	No Cumulative Impact	**None required.**	
Impact HZ-CU-1: The proposed project, in combination with past,	No Cumulative Impact	**None required.**	

Table S-2
Summary of Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Before Mitigation	Mitigation Measures	Impact Significance After Mitigation
present, and reasonably foreseeable development, would not result in a significant cumulative impact related to hazards and hazardous materials.			

Source: Data compiled by AECOM in 2013

EBMUD completed a constructability and environmental review of project options. EBMUD prepared conceptual designs for the two construction options (CDSM and Conventional Earthwork options) to meet the seismic upgrade objectives of the dam and four improvement options to meet the retrofit objectives of the outlet works tower. As part of this constructability analysis, both on-site and off-site stockpiles and haul routes were reviewed. The alternatives considered include:

- Project Alternative 1: Off-site Stockpiles and Haul Routes
- Project Alternative 2: Outlet Works—Pavilion and Tower
- No Project Alternative

No alternative sites to the proposed project are analyzed in this document. Alternative sites would not meet the fundamental project objectives or be cost effective. Other alternatives not considered in this Draft EIR include using additional haul routes, installing a conveyance system to an offsite stockpile site, installing a cofferdam or draining Lake Chabot prior to performing outlet works construction, decommissioning Chabot Dam, and transferring ownership of the dam,

The Draft EIR analyzes the following three alternatives to the proposed project that may feasibly attain some of the project objectives (each is analyzed in detail in Chapter 4, Analysis of Alternatives):

Project Alternative 1: Alternative 1 would be similar to the proposed project, but off-site stockpiles and their associated off-site haul routes also would be used. The off-site stockpile sites would include the Quarry Stockpile and the Covington Stockpile to accommodate a maximum total volume of storage of 155,000 cy from the dam excavation work site. Using the Quarry Stockpile site would include hauling material to the stockpile via Estudillo Avenue and Lake Chabot Road. Using the Covington Stockpile site would include hauling material to the stockpile via Estudillo Avenue, MacArthur Boulevard, Marlow Drive, and Covington Street. The use of either off-site haul route still would require use of the on-site haul routes, also part of the proposed project. Alternative 1 generally would have greater potential impacts than the proposed project, including greater potential construction-related air quality, transportation and circulation, GHG, and noise impacts. Alternative 1 would meet all of the basic project objectives; however, it would have greater potential impacts than the proposed project and would not reduce the potentially significant and unavoidable impacts identified for cultural resources, air quality, and recreation.

Project Alternative 2: Alternative 2 would be similar to the proposed project but would differ in construction of the outlet works. Alternative 2 would include subalternatives for the following: line the vertical shaft, remove the pavilion and option to retrofit the tower (Alternative 2a); line the vertical shaft, retrofit the pavilion (Alternative 2b); and fill the vertical shaft, remove pavilion and tower and build a new tower (Alternative 2c). The proposed project would remove the tower and pavilion to address seismic hazards at the outlet works. Alternatives 2a and 2b generally would have similar to slightly less potential impacts than the proposed project because they would not require removal of both tower and pavilion elements, resulting in fewer construction activities associated with the outlet works. Alternatives 2a and 2b would meet most of the basic project objectives, and it would reduce the potentially significant and unavoidable impacts identified for air quality but not to a less-than-significant level. Alternative 2c would have greater potential impacts than the proposed project because it would require constructing a new tower in addition to removing the pavilion and outlet tower. Alternative 2c would meet all of the basic project objectives; however, it would not reduce the potentially significant and unavoidable impacts identified for air quality and recreation. All Alternative 2 subalternatives would reduce the potentially significant and unavoidable impact identified for cultural resources to a less-than-significant level with mitigation.

No Project Alternative: Under the No Project Alternative, the proposed project would not be implemented. Neither the proposed upgrade of the dam nor retrofit of the outlet works would occur.

Conclusion: Pursuant to the State CEQA Guidelines, Alternative 2a with the tower retrofit option would be the environmentally superior alternative. However, under Alternative 2a the potential for earthquake damage to the outlet works would remain, it would have higher future maintenance requirements, and results in a structure with no operational function. Under the proposed project, five significant and unavoidable impacts would occur (one of which is cumulative), three of which would remain for Alternative 2.

S.6 Issues Raised During Public Outreach and Notice of Preparation Scoping Review Period

EBMUD has conducted two community meetings and 11 meetings with public agencies and other organizations through June 2013, to discuss the proposed project and solicit public input. **Appendix A** provides a description of public outreach efforts.

A variety of issues and concerns were raised in response to the community outreach process, related to air quality, noise, traffic and parking, biological resources, water quality, park closure, potential recreational impacts, permits, site restoration, and stockpile and dam stability. This important dialog was helpful in developing the Draft EIR.

The initial step in the Draft EIR process was to issue a Notice of Preparation (NOP) for the proposed project. The NOP was published on April 25, 2013, and the 30-day review/comment period expired on May 27, 2013. EBMUD received six comment letters by the end of the NOP comment period. The NOP and comments received in response to the NOP are provided in **Appendix B**.

S.7 Resources Not Evaluated Further in the Draft EIR

Pursuant to Sections 15128 and 15083(a) of the State CEQA Guidelines, the Draft EIR analyzes only those environmental impacts identified as potentially significant in the Initial Study that was prepared for the proposed project. The Initial Study is provided in **Appendix C**. These potentially significant impacts include: Aesthetics; Geology and Soils; Biological Resources; Cultural Resources; Transportation and Circulation; Air Quality; Greenhouse Gas Emissions; Noise and Vibration; Recreation; Hydrology and Water Quality; and Hazards and Hazardous Materials.

Potential environmental impacts found to not be potentially significant and excluded from this Draft EIR include: Public Services; Agricultural and Forestry Resources; Population and Housing; Land Use and Planning; Utilities and Service Systems; and Mineral Resources. However, the latter is briefly described in Section 3.3, Geology and Soils.

S.8 Organization of the Draft EIR

This Draft EIR is presented in the following chapters:

1. Introduction: This chapter discusses the CEQA process and the purpose of the Draft EIR.

2. Project Description: This chapter provides an overview of the Chabot Dam Seismic Upgrade Project, describes the need for and objectives of the proposed project, and describes in detail the proposed project design, construction, and operating characteristics.

3. Environmental Setting, Impacts, and Mitigation Measures: This chapter presents a description of the physical and regulatory setting of the proposed project, describes potential impacts that could result from implementation of the proposed project, and identifies measures to mitigate any potentially significant impacts. This chapter is divided into environmental resource areas, consistent with the Initial Study (**Appendix C**). In order of presentation, the resource sections are as follows:

- Aesthetics
- Geology and Soils
- Biological Resources
- Cultural Resources
- Transportation and Circulation
- Air Quality
- Greenhouse Gas Emissions
- Noise and Vibration
- Recreation
- Hydrology and Water Quality
- Hazards and Hazardous Materials

4. Analysis of Alternatives: This chapter presents an overview of the alternatives development and evaluation process, including two Alternatives and the No Project Alternative.

5. Other CEQA Considerations: This chapter addresses other topics required by the State CEQA Guidelines, including potential cumulative impacts, a summary of potentially significant and unavoidable impacts, irreversible effects associated with the proposed project, and a discussion of the proposed project's growth inducement potential. For the potential cumulative impacts, this chapter identifies and describes other EBMUD projects as well as projects proposed by other entities that potentially could contribute to significant cumulative impacts; it also indicates the potential for implementation of the Chabot Dam Seismic Upgrade Project, in combination with other projects in the project vicinity, to contribute to significant cumulative impacts.

6. References: This chapter lists the references cited in the Draft EIR as well as organizations and persons consulted during preparation of the Draft EIR.

7. Report Preparers: This chapter lists those organizations and individuals who were involved in preparing the Draft EIR.

Technical Appendices: The appendices provided in the Draft EIR are as follows:

Appendix A: Public Involvement

Appendix B: NOP and NOP Comment Letters

Appendix C: Initial Study

Appendix D: Biological Resources

- Appendix D-1: Preliminary Jurisdictional Wetland Delineation
- Appendix D-2: California Red-Legged Frog Habitat Assessment
- Appendix D-3: Focused Botanical Survey Report

Appendix E: Cultural Resources

- Appendix E-1: Cultural Resources Inventory and Evaluation Report
- Appendix E-2: NAHC Consultation Letters

Appendix F: Traffic Calculations

- Appendix F-1: Trip Generation
- Appendix F-2: LOS Calculations

Appendix G: Air Quality and Greenhouse Gas Emissions Calculations

Appendix H: Noise Calculations

Appendix I: Hazardous Materials Assessment

1 Introduction

1.1 Purpose of the EIR

The East Bay Municipal Utility District (EBMUD), as the lead agency, has prepared this Draft Environmental Impact Report (Draft EIR) for the Chabot Dam Seismic Upgrade Project (proposed project) in compliance with California Environmental Quality Act (CEQA) Statutes[1]and the State CEQA Guidelines.[2] The Draft EIR is a public document that identifies and evaluates the potential environmental effects of a project, recommending mitigation measures to lessen or eliminate adverse impacts, and examining feasible alternatives to the proposed project. The impact analyses in this report are based on a variety of sources; references for these sources are listed at the end of each technical section. The information contained in the Draft EIR and public comments on the content of this document will be reviewed and considered by the EBMUD Board of Directors before the ultimate decision to approve, disapprove, or modify the proposed project.

1.2 CEQA EIR Process

1.2.1 Public Scoping and Notice of Preparation

EBMUD has conducted two community meetings and 11 meetings with public agencies and other organizations to date, to discuss the proposed project and to solicit public input. **Appendix A** of the Draft EIR presents a description of public outreach efforts. These meetings have provided direction for the development of alternatives and the scope of effects to be considered.

A variety of issues and concerns were raised in the community outreach process, including issues related to air quality, noise, traffic, parking, biological resources, water quality, recreational impacts, permits, site restoration, and stockpile and dam stability. These issues were considered during preparation of the Draft EIR.

In accordance with Sections 15063 and 15082 of the State CEQA Guidelines, EBMUD prepared an Initial Study and Notice of Preparation (NOP) for the Draft EIR. The NOP provided a general description of the proposed project, a review of the proposed project location, and a preliminary list of potential environmental impacts. The NOP was published on April 25, 2013, and the required 30-day review/comment period expired on May 27, 2013. The NOP and Initial Study are attached as **Appendices B** and **C**, respectively. Comments received in response to the NOP are included in **Appendix B**. A table is included in **Appendix B** with a summary of issues, indicating where they are addressed in the Draft EIR. Two late letters were received beyond the NOP comment period. EBMUD provided responses to these letters, which are included as late responses in **Appendix B**.

1.2.2 Resources Not Further Evaluated in This EIR

Section 15128 of the State CEQA Guidelines addresses Effects Not Found to be Significant:

> An EIR shall contain a statement indicating the reasons that various possible significant effects were found not to be significant and were therefore not discussed in detail in the EIR. Such statement may be contained in an attached copy of an initial study.

[1] Public Resources Code 21000-21177.

[2] California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387.

Furthermore, Section 15083, Early Public Consultation states:

> (a) Scoping has been helpful to agencies in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important.

Pursuant to Sections 15128 and 15083(a) of the State CEQA Guidelines, this Draft EIR analyzed only those effects identified as potentially significant in the Initial Study prepared for the proposed project. The Initial Study is included in this Draft EIR as **Appendix C**. These effects include: Aesthetics; Geology and Soils; Biological Resources; Cultural Resources; Transportation and Circulation; Air Quality; Greenhouses Gas Emissions; Noise and Vibration; Recreation; Hydrology and Water Quality; and Hazards and Hazardous Materials.

Effects found to not be significant and excluded from this Draft EIR include Public Services; Agricultural and Forestry Resources; Population and Housing; Land Use and Planning; Utilities and Service Systems and Mineral Resources. However, the latter is briefly addressed in the Soils and Geology section of Chapter 3, Environmental Setting, Impacts and Mitigation Measures of this Draft EIR.

1.2.3 Draft EIR

The Draft EIR will be made available to local, state, and federal agencies and to interested organizations and individuals who may want to review and comment on the report. The Notice of Availability of the Draft EIR also will be sent directly to every agency, person, or organization that commented on the NOP (a total of 8 were received) or requested to be informed of proposed project activities during the two public outreach meetings or 11 agency/organization meetings.

The publication of the Draft EIR marks the beginning of a mandatory 60-day public review period. During the review period, written comments should be emailed, mailed or hand delivered to:

Bill Maggiore, Senior Civil Engineer
East Bay Municipal Utility District
375 Eleventh Street (Mail Slot 701)
Oakland, CA 94607-4240
Chabot.Dam.EIR@ebmud.com

1.2.4 Final EIR

Written and oral comments received on the Draft EIR will be addressed in a Response to Comments document that, together with the Draft EIR, will constitute the Final EIR. The Response to Comments document also will stipulate any changes to the Draft EIR resulting from public and agency input.

The EBMUD Board of Directors will consider certification of the Final EIR at a regularly scheduled Board meeting in June 2014, and as part of this process, the Board will adopt findings in accordance with CEQA. Following EIR certification, the EBMUD Board of Directors may proceed with project approval actions, including design and construction of the proposed project and selecting the preferred construction method for the dam (CDSM or Conventional Earthwork).

CEQA requires that the lead agency neither approve nor implement a project without determining whether the project's significant environmental effects have been reduced to a less than significant level, essentially "eliminating, avoiding, or substantially lessening" the expected impacts. If the lead agency approves a project that will result in the occurrence of significant environmental impacts that cannot be mitigated to a less than significant level, the agency must state the reasons for its action in writing. This Statement of Overriding Considerations must be included in the record of project approval.

1.2.5 Mitigation Monitoring and Reporting

CEQA requires lead agencies to adopt a Mitigation Monitoring and Reporting Program (MMRP), incorporating those changes to the project that have been adopted or made a condition of project approval to mitigate or avoid significant effects on the environment. The State CEQA Guidelines do not require that the specific reporting or monitoring program be included in the EIR. However, throughout this Draft EIR, proposed mitigation measures have been clearly identified and presented in language intended to facilitate establishment of a monitoring program.

Furthermore, comments received during the public review period on the mitigation measures and their implementation also will be considered for inclusion in the MMRP. EBMUD will comply with all adopted measures in the MMRP. The proposed project design and construction mitigation measures generally will be included in the contract specifications and drawings and monitored by EBMUD staff for completion.

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2 Project Description

2.1 Project Location

The project area is located approximately 2 miles east of the City of San Leandro and 10 miles southeast of the City of Oakland in California. The project area is located within the jurisdictions of the City of Oakland, the City of San Leandro, and a portion of unincorporated Alameda County (Castro Valley). Chabot Dam is located at the end of Estudillo Avenue, and on the west end of Lake Chabot. The location and vicinity maps are shown in **Figure 2-1**.

2.2 Chabot Dam, Lake Chabot, and Appurtenant Facilities

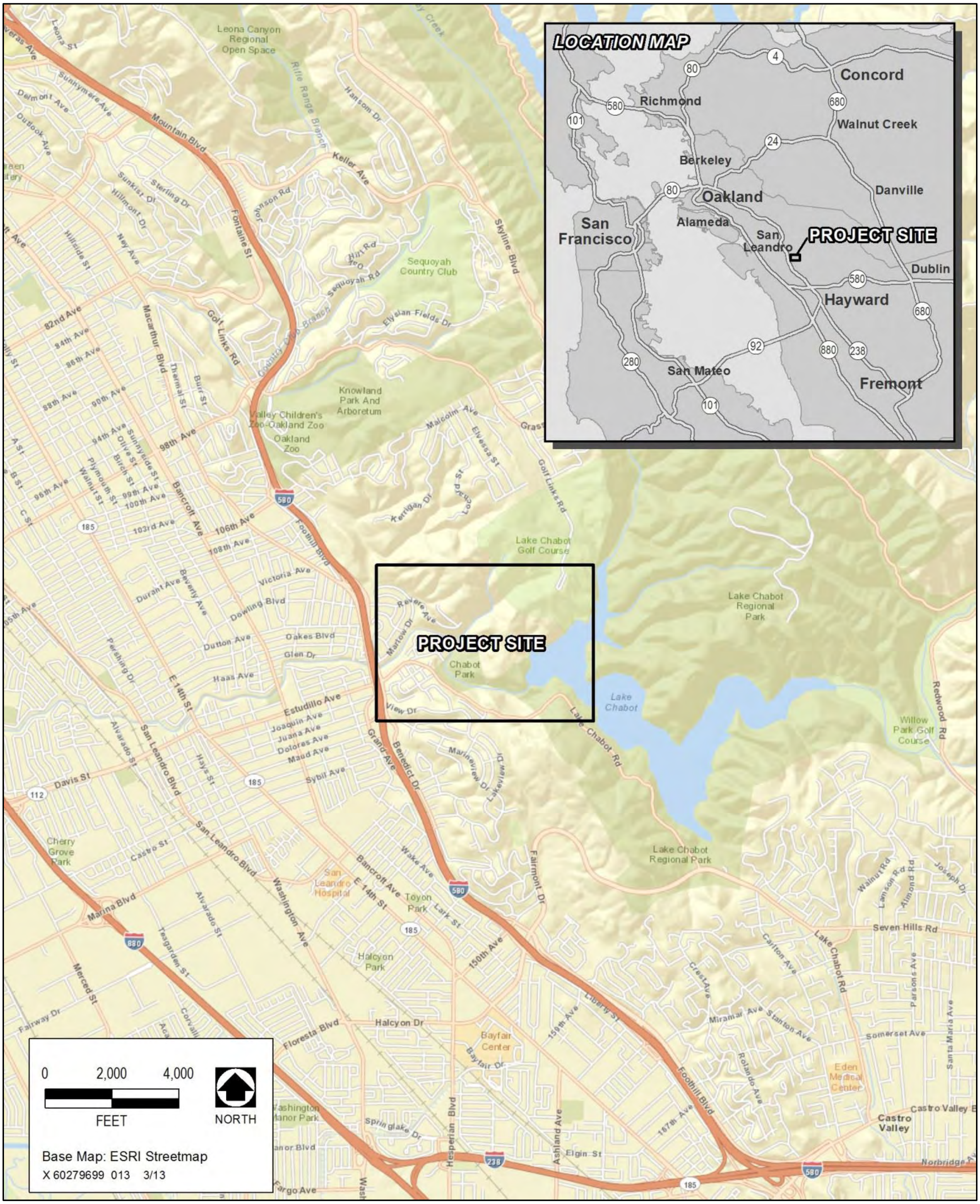
Lake Chabot is one of five storage reservoirs operated by the East Bay Municipal Utility District (EBMUD). Lake Chabot serves four main functions: non-potable water supply, emergency water supply, conservation/storage of local runoff, and recreation. The non-potable water supply use includes irrigation for Lake Chabot Golf Course and Willow Park Golf Course. The emergency supply use includes water for drinking or fire suppression. The storage of local runoff provides flood management benefits to areas downstream from the lake. Recreation activities provided at the lake include fishing, boating, hiking, biking, and picnicking. Trails in the lake area interconnect with other regional trail systems.

2.2.1 Dam Safety Program

EBMUD owns and manages 29 dams as part of its water system. The dams generally were built from the late 1800s to the late 1960s. The larger dams are regulated by Division of Safety of Dams (DSOD). These facilities are inspected annually in coordination with DSOD staff to monitor, and if necessary, correct issues that could potentially impact the integrity of the embankments. EBMUD also periodically conducts an extensive seismic study of its dams and monitors the embankments for movement semi-annually. EBMUD personnel inspect each dam monthly. Seepage is also tracked monthly via underdrain flow monitoring; monthly assessments of groundwater elevations are also made based on monitors located around each dam site. Lake Chabot currently operates at normal levels based on DSOD's permitting requirements and criteria.

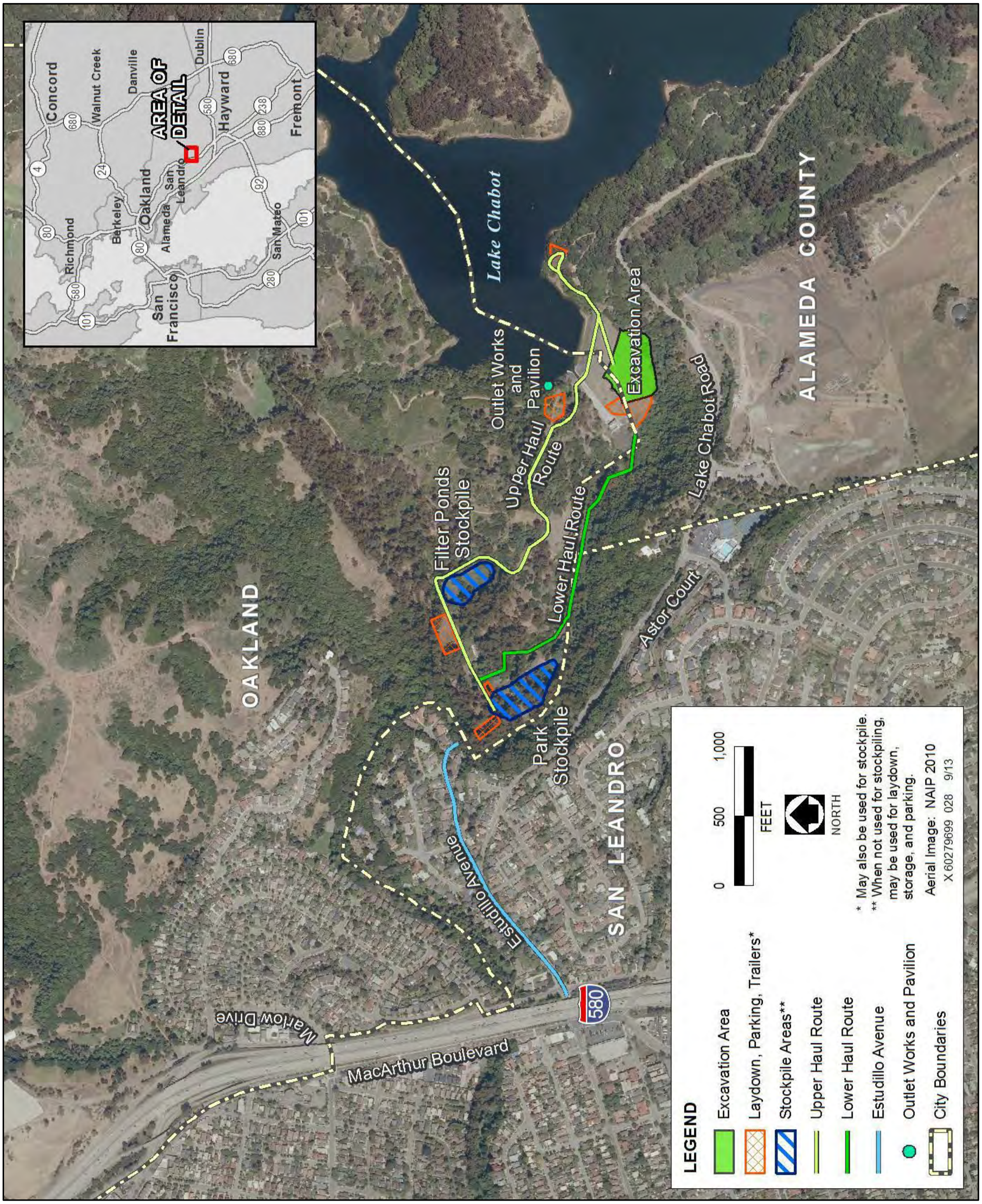
2.2.2 Description of Dam and Lake

Figure 2-2 shows the general project area of Chabot Dam, including the existing dam, access roads, and surrounding features. **Figure 2-3** shows a plan and typical cross section of the existing dam. The dam is approximately 135 feet high and 500 feet long, and has a 30-foot-wide crest (top of the dam). All elevations are in feet above mean sea level (msl). The dam crest is at elevation 250 and the spillway crest elevation is 227. The downstream slope is 3:1 (horizontal:vertical) with a 15-foot-wide bench at elevation 210. The upstream slope is approximately 2:1 and is protected by a layer of riprap in the upper portion. The main body of the dam is composed of "wagon fill," which is a term used to describe fill placed and compacted by horse-drawn wagons.



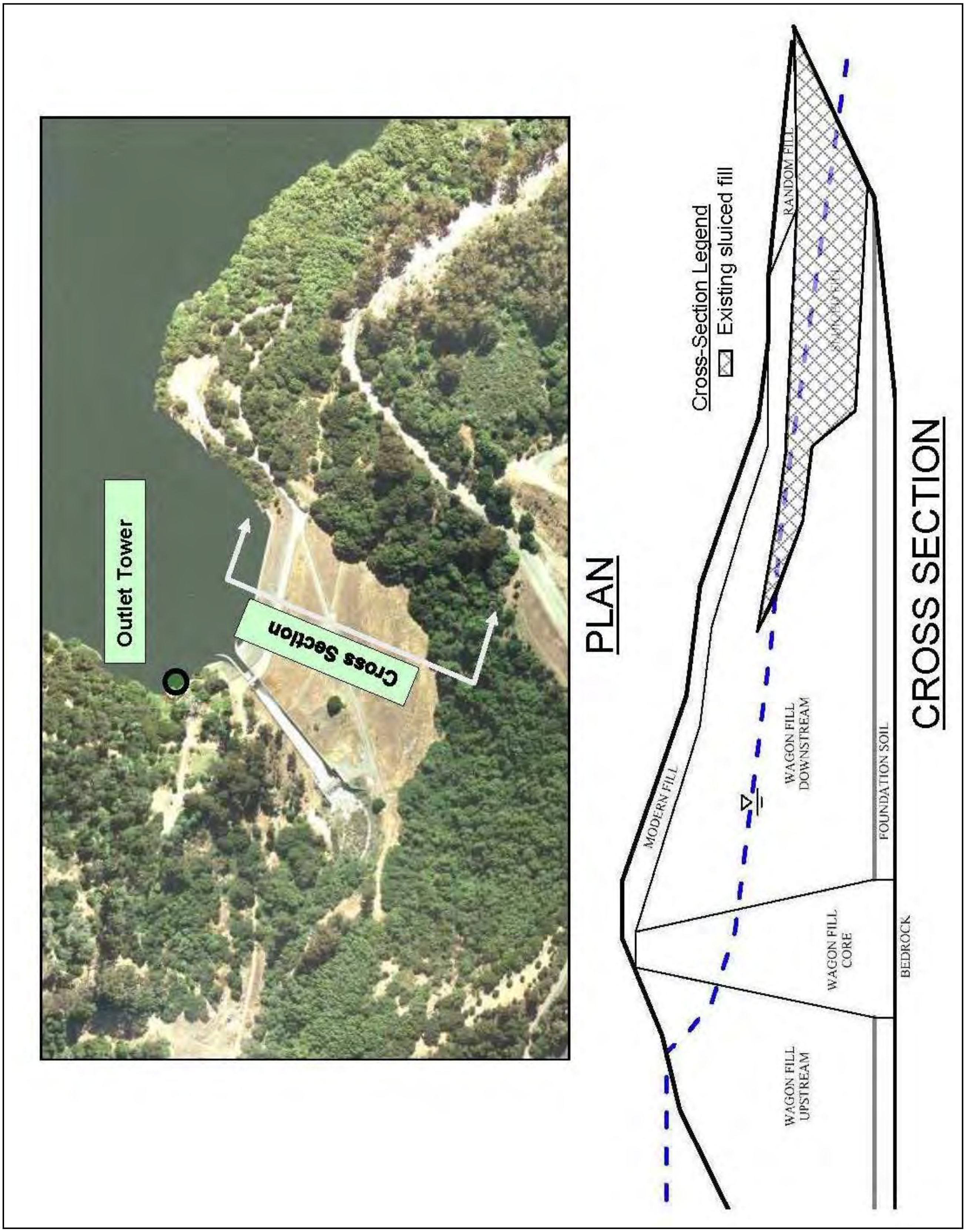
Source: Compiled by AECOM in 2013

Figure 2-1: Location and Vicinity Map



Source: Terra Engineers 2013, EBMUD 2013, compiled by AECOM in 2013

Figure 2-2: Project Area Features



Source: EBMUD 2013

Figure 2-3: Plan and Cross Section

On the crest and downstream slope, the wagon fill is overlain by recent compacted, engineered fill. The downstream slope of the embankment is buttressed by hydraulic-deposited materials, referred to as "sluiced fill." Lake Chabot has a capacity of 10,400 acre-feet, a surface area of 340 acres, and a drainage area of 41 square miles.

The outlet works allow the reservoir surface water level to be operated as low as 197 feet msl. Over the last 23 years, the reservoir surface water level has ranged from approximately 216 to 229 feet msl, and typically ranged in elevation between 219 and 226 feet msl.

Lake water is normally released through the outlet works to San Leandro Creek at approximately 80 gallons per minute. In the event that the reservoir needs to be lowered, such as in anticipation of large rainfall events, the releases can be up to 67,000 gallons per minute (150 cubic feet per second). Such releases typically occur intermittently from the fall through spring; normal releases are maintained at all other times. Separately and unrelated to the proposed project, EBMUD's Natural Resources Department is meeting with creek stakeholders including Friends of San Leandro Creek to discuss lake releases to San Leandro Creek.

2.2.3 Chabot Dam Appurtenant Facilities

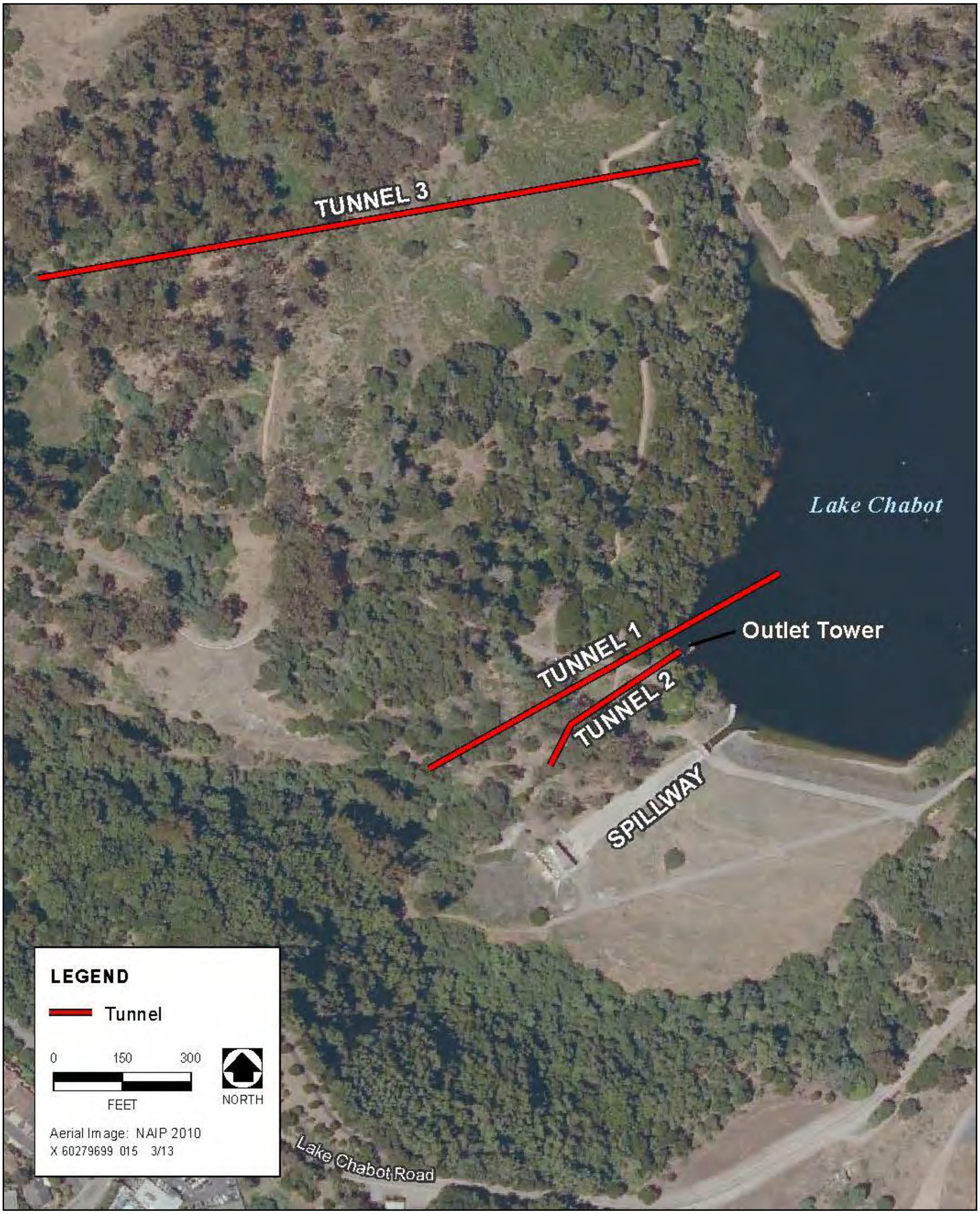
The project appurtenant facilities include three outlet tunnels (Tunnel Nos. 1, 2, and 3), an outlet tower, and a spillway, as shown in **Figure 2-4**. The tower is at the upstream end of Tunnel No. 2 and is located on the west shore of the lake near the spillway. Tunnel No. 2 and the tower are the outlet works system that is used to deliver water from the lake for downstream uses; Tunnel No. 3 was constructed as an additional (auxiliary) spillway. Tunnel No. 1 is no longer used; because of siltation, it was blocked in 1938, when EBMUD inserted a concrete and steel bulkhead at the tunnel inlet to prevent water from entering.

The outlet works are shown in **Figure 2-5**. Inflow from the tower is passed to Tunnel No. 2 through an 8-foot-diameter, brick-lined outlet shaft behind the tower. Viewed from above, the tower is approximately 23 feet by 23 feet. It is 48 feet tall. It is made primarily of plain stone masonry and cast against the rock on its back side. It is capped with a 13-foot-high reinforced concrete pavilion that was added to the tower in 1923. Water passing through the tower enters a 36-inch diameter, non-potable water line in Tunnel No. 2. The 36-inch pipe connects to a 30-inch blowoff pipe and structure.

The spillway, shown in **Figure 2-6**, was constructed with the dam modifications in 1980. The spillway is used to maintain the lake at a safe level below the crest of the dam for infrequent events such as heavy rainfall. It consists of a concrete approach, weir, chute, and stilling basing. The spillway crest and approach are about 70 feet wide. The stilling basin is about 100 feet long.

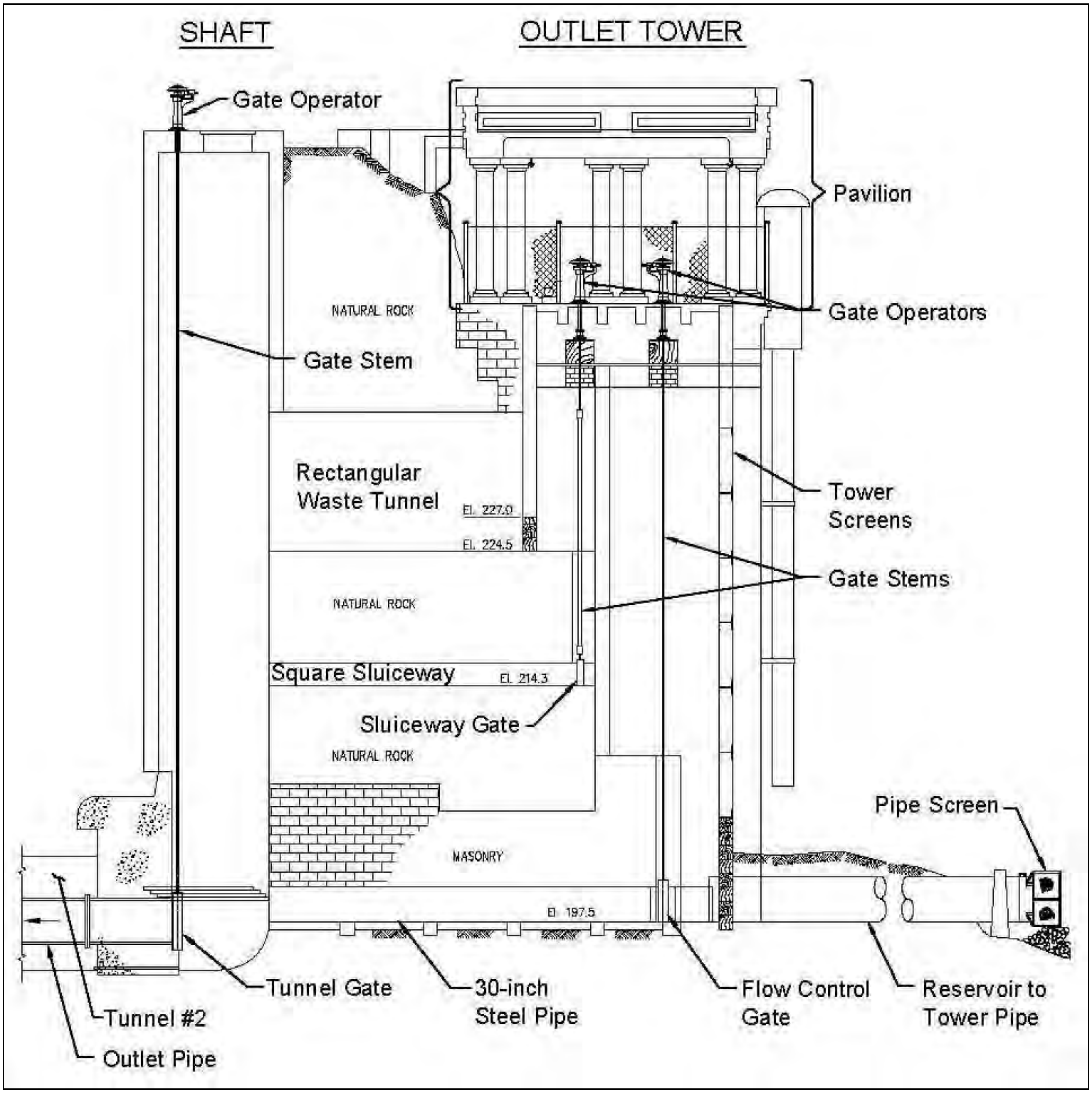
2.2.4 Chabot Dam Construction History

Construction of Chabot Dam began on San Leandro Creek in 1874. The construction technique included bringing soil and rock to the site in horse-drawn wagons, spreading the soil in one-foot layers, sprinkling it with water, and compacting it with horses and wagons. Fill deposited in this manner is termed "wagon fill." Wagon fill was placed through 1875 to elevation 233 to form the main body of the dam. Between 1875 and 1888 the channel below the dam was filled and the downstream slope of the dam was flattened with "sluiced fill" up to elevation 185. The sluiced fill construction technique included shoveling soil into human-made wooden chutes (termed "flumes") that were inclined downward to the dam and adding water to the flumes to transport and deposit the soil at the site. The wagon fill was raised to a crest elevation of 243 between 1891 and 1892.



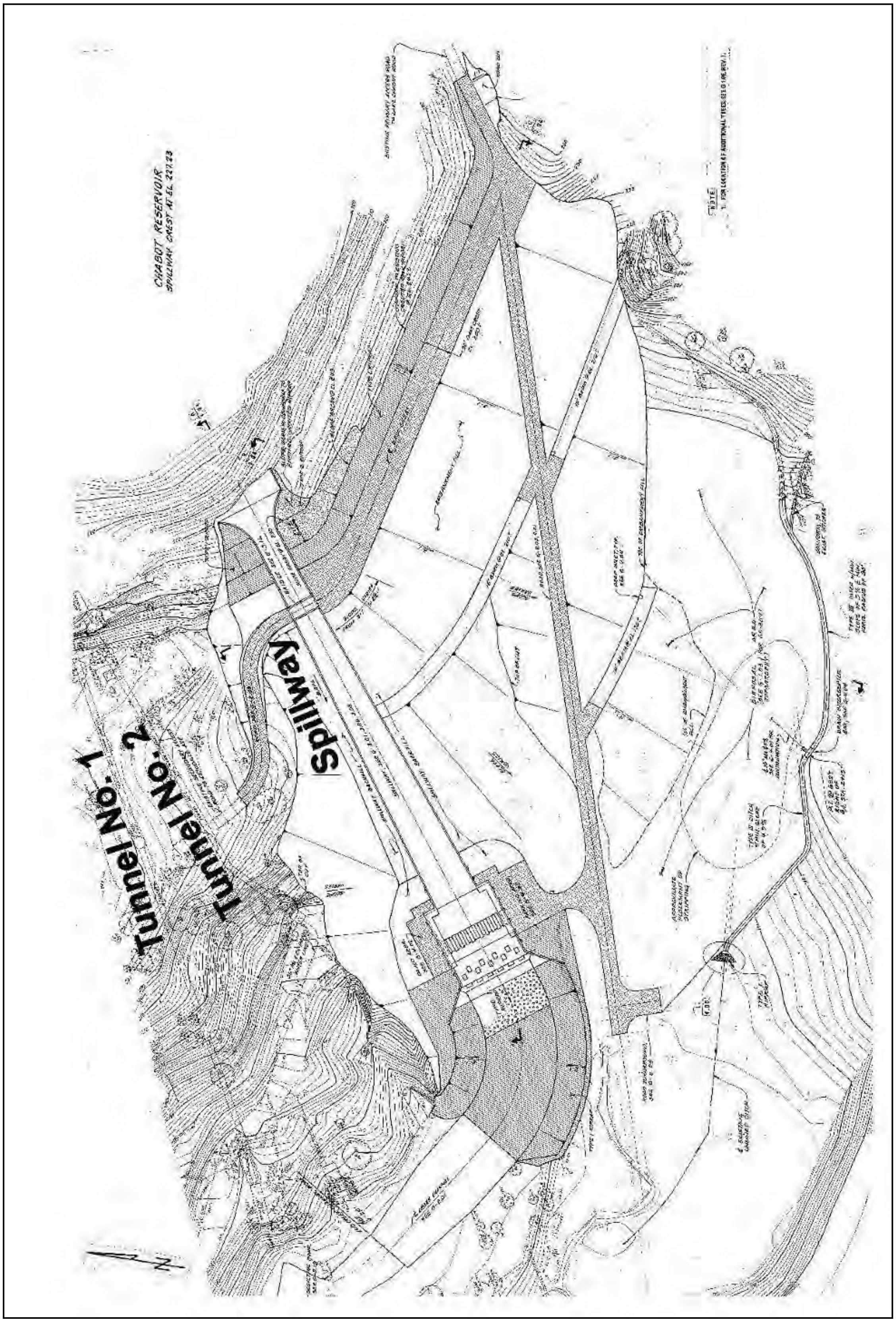
Source: EBMUD 2013, compiled by AECOM in 2013

Figure 2-4: Appurtenant Facilities



Source: EBMUD 2013

Figure 2-5: Existing Outlet Works



Source: EBMUD 2005

Figure 2-6: Spillway and Tunnel Nos. 1 and 2

A narrow fill was placed on the downstream slope, following the recommendations of a 1965 stability evaluation. In 1980 engineered fill (referred to as “modern fill”) was placed on the downstream slope to raise the crest to the current elevation 250. A new spillway was also constructed in 1980, and unsorted material from the spillway excavation and construction demolition (termed “random fill”) was placed near the downstream toe and covered with topsoil.

2.3 Project Need

In 2005, at the request of DSOD, EBMUD prepared a report on the seismic stability of Chabot Dam, and a report on the seismic evaluation on the outlet works tower. The seismic stability of the dam was evaluated using site-specific earthquake ground motions, estimated for a maximum credible earthquake with a moment magnitude of 7.25 on the Hayward Fault, at a distance of approximately 0.3 miles from Chabot Dam. Earthquake-induced effects within the embankment and foundation were estimated for representative cross-sections of the embankment and foundation. The results of the evaluation indicated that the sluiced fill in the downstream portion of the dam is susceptible to liquefaction, and would likely liquefy during the maximum credible earthquake (URS 2005). In the stability analysis, the wagon fill and foundation soils were judged not to be susceptible to liquefaction.

The stability analysis indicated that the top of the dam (crest) would settle less than 4 feet but would remain stable. Because the dam has a freeboard (distance between the crest of the dam and the maximum reservoir surface water level) of about 23 feet, the estimated crest settlements would not lead to overtopping of the embankment, and the dam would remain safe. Local displacements of several feet could occur in the sluiced fill buttress at the toe of the dam in the direction of the downstream channel.

The outlet works tower was evaluated for a maximum design earthquake, which has a 475-year return period. The results indicated that the reinforced concrete pavilion would suffer severe damage and probably would collapse. The results also showed that the masonry tower would experience cracking that could lead to formation of disjointed blocks and a complete separation of the tower from the rock. Although the tower may not collapse, the cracking and separation could diminish its load-resisting capabilities. The valve shafts or shaft supports could be damaged causing accidental blockage of the sluice valves, and thus blocking release of water from the lake, which could become a safety concern.

In light of these findings, DSOD required, and EBMUD proposed, seismic upgrades to the dam and outlet works. DSOD reviewed the proposed project approach at the conceptual level and found it to be acceptable.

2.4 Project Objectives

The primary objectives of the Chabot Dam Seismic Upgrade Project (proposed project) are to:

- improve the sluiced fill buttress at the embankment toe to withstand shaking generated by the maximum credible earthquake on the Hayward Fault without significant strength loss,
- prevent damage to the outlet works from the design level earthquake so that the outlet works remain operational following the earthquake, and
- continue use of Lake Chabot and outlet works during the dam construction.

2.5 Project Options to Be Evaluated in the Environmental Impact Report

The proposed project consists of upgrading the dam and retrofitting the outlet works, both of which could be accomplished using a variety of construction methods. EBMUD has reviewed several construction options for both the dam and outlet works construction activities and has determined the most feasible options for both. The proposed project includes two optional methods to upgrade the dam: a Cement Deep Soil Mixing (CDSM) option, and a Conventional Earthwork option. The proposed project also includes a retrofit of the outlet works that would occur under either CDSM or Conventional Earthwork option for upgrading the dam. Following the EIR certification, the preferred project, including the preferred construction method for the dam (CDSM or Conventional Earthwork) will be selected and recommended to the EBMUD Board of Directors.

2.5.1 Outlet Works

The outlet works retrofit layout is shown conceptually in **Figure 2-7**. The outlet pipes would be relined or replaced to provide continued operation after the design earthquake. The seismic hazard would be reduced by removing the tower and pavilion. This component was retained as the preferred outlet works retrofit approach and is analyzed in the Environmental Impact Report (EIR) because it satisfies the project objectives and provides a permanent solution to the potential damage to outlet facilities/operations that could occur as a result of a design earthquake.

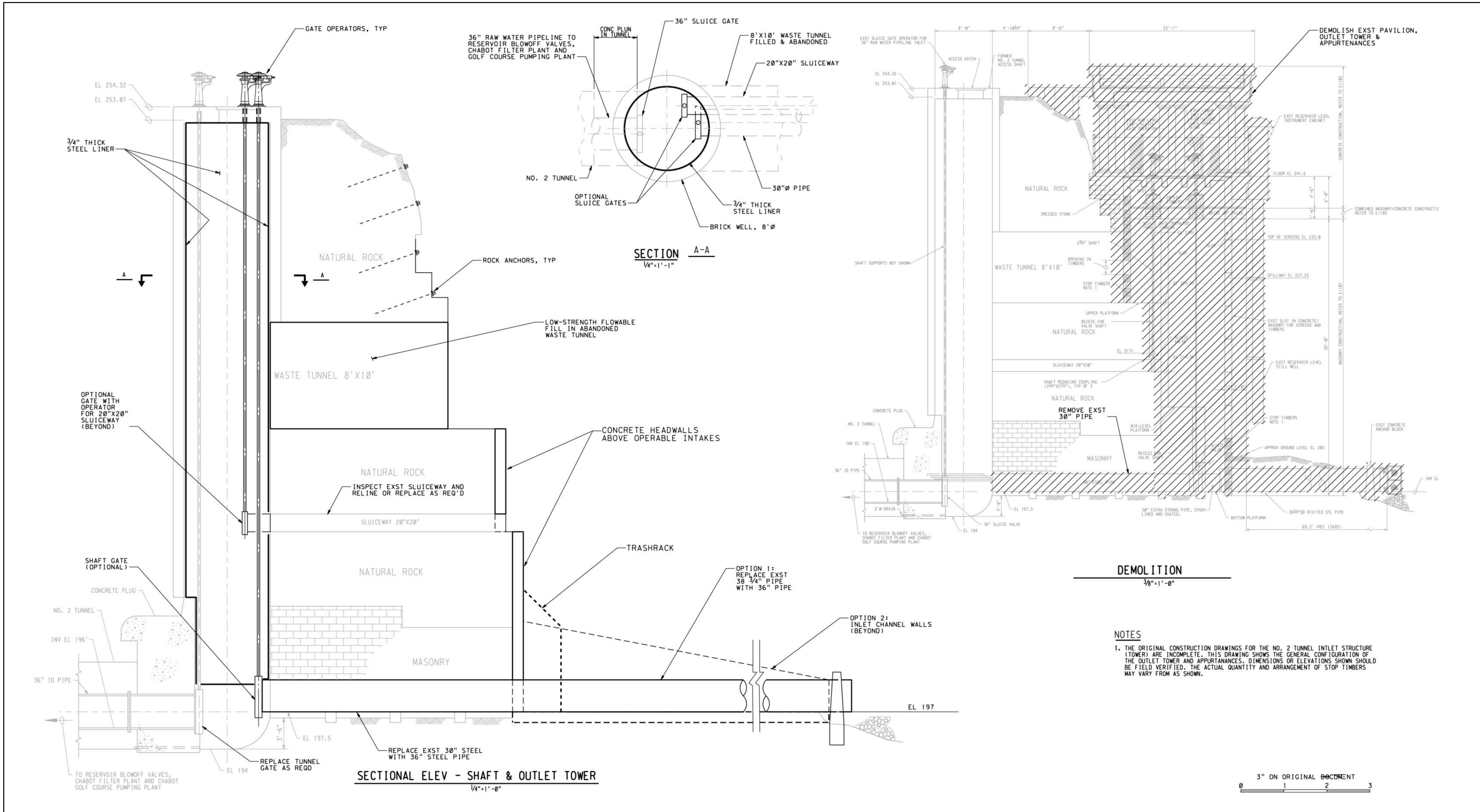
This outlet works retrofit is EBMUD's preferred method for the long term performance of the outlet works when compared with alternatives where the tower is left in place (see Chapter 4, Alternatives). The outlet tower would no longer serve any operational functions when the controls are removed and installed in the relined shaft. If left in place, the tower may collapse during a major seismic event, damaging the outlet pipes and preventing the ability to make controlled releases from the lake. The removal of the tower would improve future maintenance as well as current constructability of the outlet pipes because access to the pipes would not be impeded by the tower. The pavilion and tower are accessible from land, but not intended for occupied uses. The pavilion and tower have become a target of trespassers and is covered with graffiti. Its removal would restore the site to a more natural state.

2.5.2 CDSM Option

The CDSM option for upgrading the dam is shown conceptually in **Figure 2-8** with the site layout shown in **Figure 2-9**. In the CDSM option, cement slurry is injected through drilling augers and mixed with the existing sluice fill in-place to form a system of interconnected non-liquefiable walls that would strengthen the sluiced fill, and thereby improve the seismic performance of the dam. Construction at the outlet works potentially could begin concurrently with work at the dam. As part of this option, a drain would be installed upstream from the CDSM treatment area to provide adequate control of groundwater flow within the dam embankment.

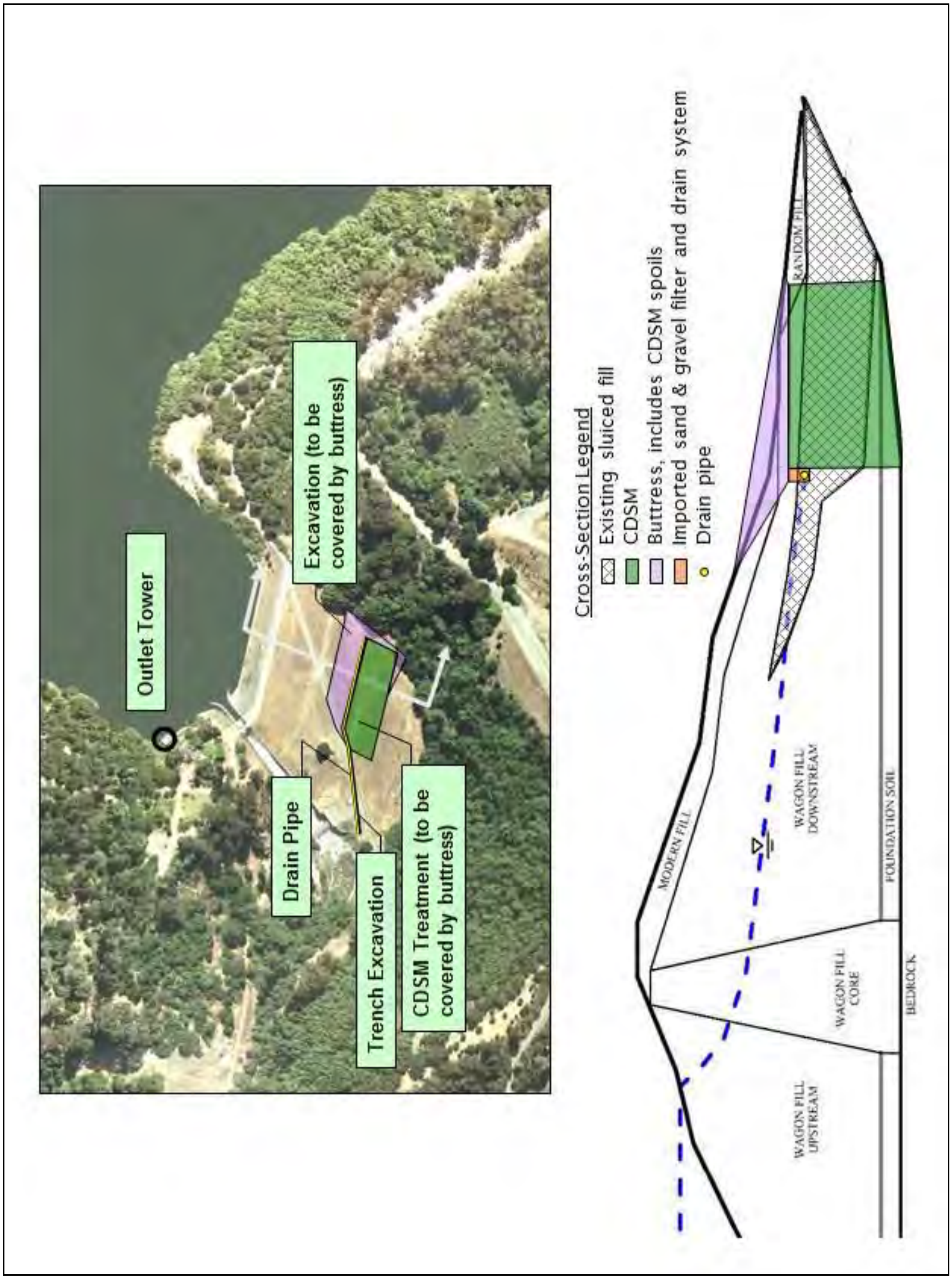
2.5.3 Conventional Earthwork Option

The Conventional Earthwork option is shown conceptually on the cross section in **Figure 2-10,** with the site layout shown in **Figure 2-11**. The dam would be improved by excavating most of the sluiced fill, mixing and moisture conditioning the excavated soil to near optimal water content, and then placing and compacting it in the excavated area. This would improve the strength of the soil, and thereby would improve the seismic performance of the dam. The Conventional Earthwork option requires the installation of a temporary dewatering system to maintain safe slope stability during excavation.



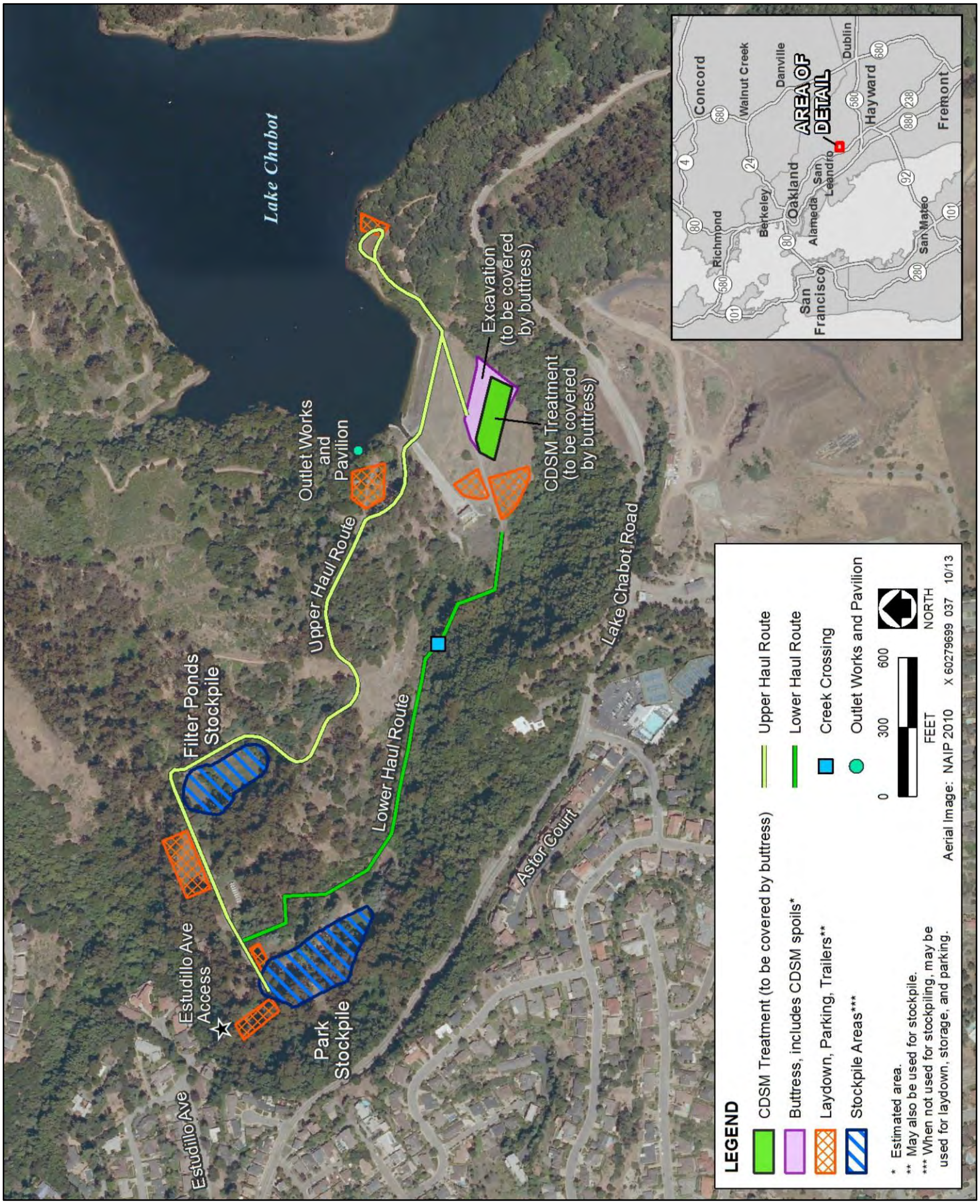
Source: EBMUD 2013

Figure 2-7: Outlet Works Layout



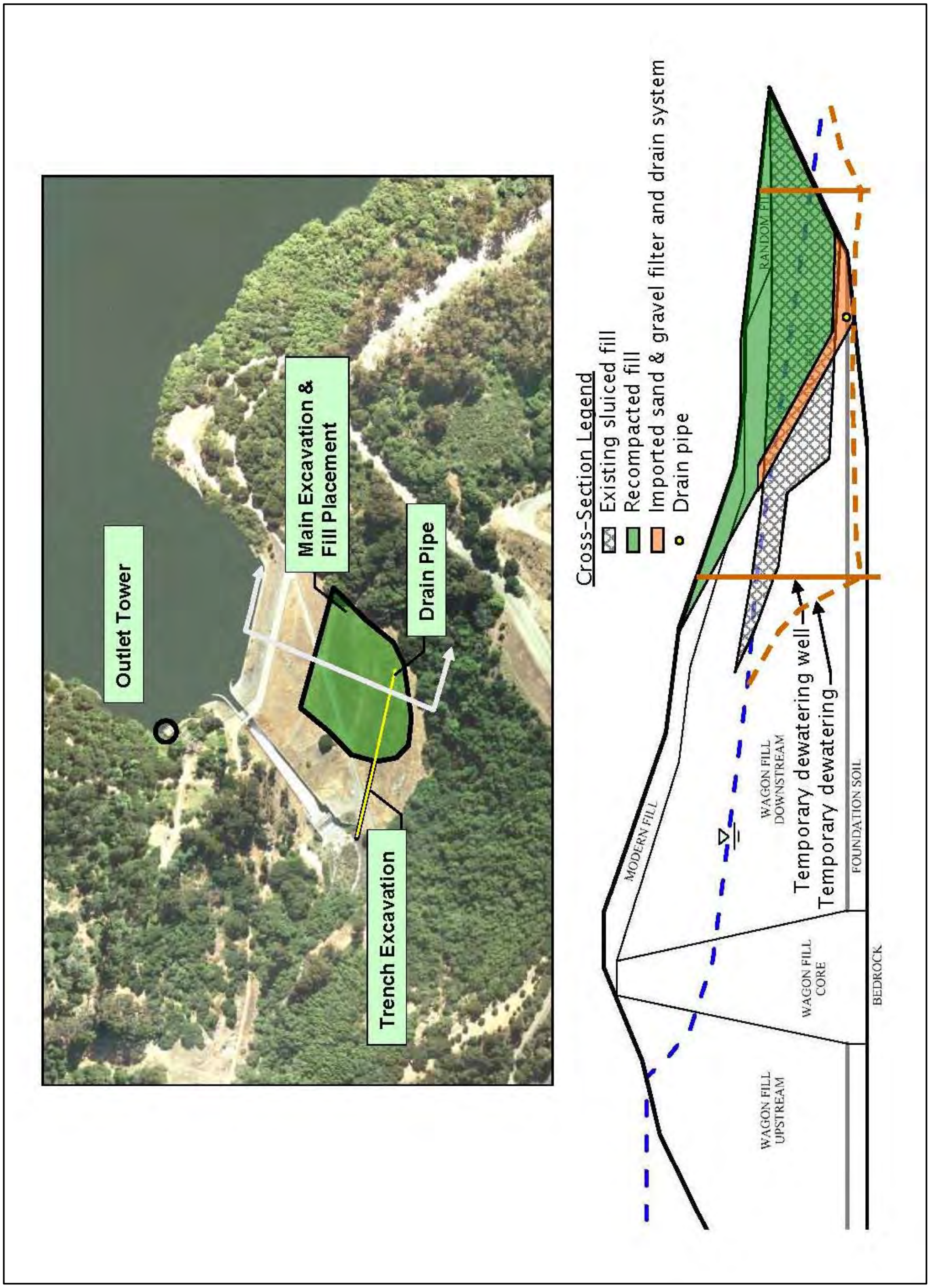
Source: EBMUD 2013

Figure 2-8: CDSM Option



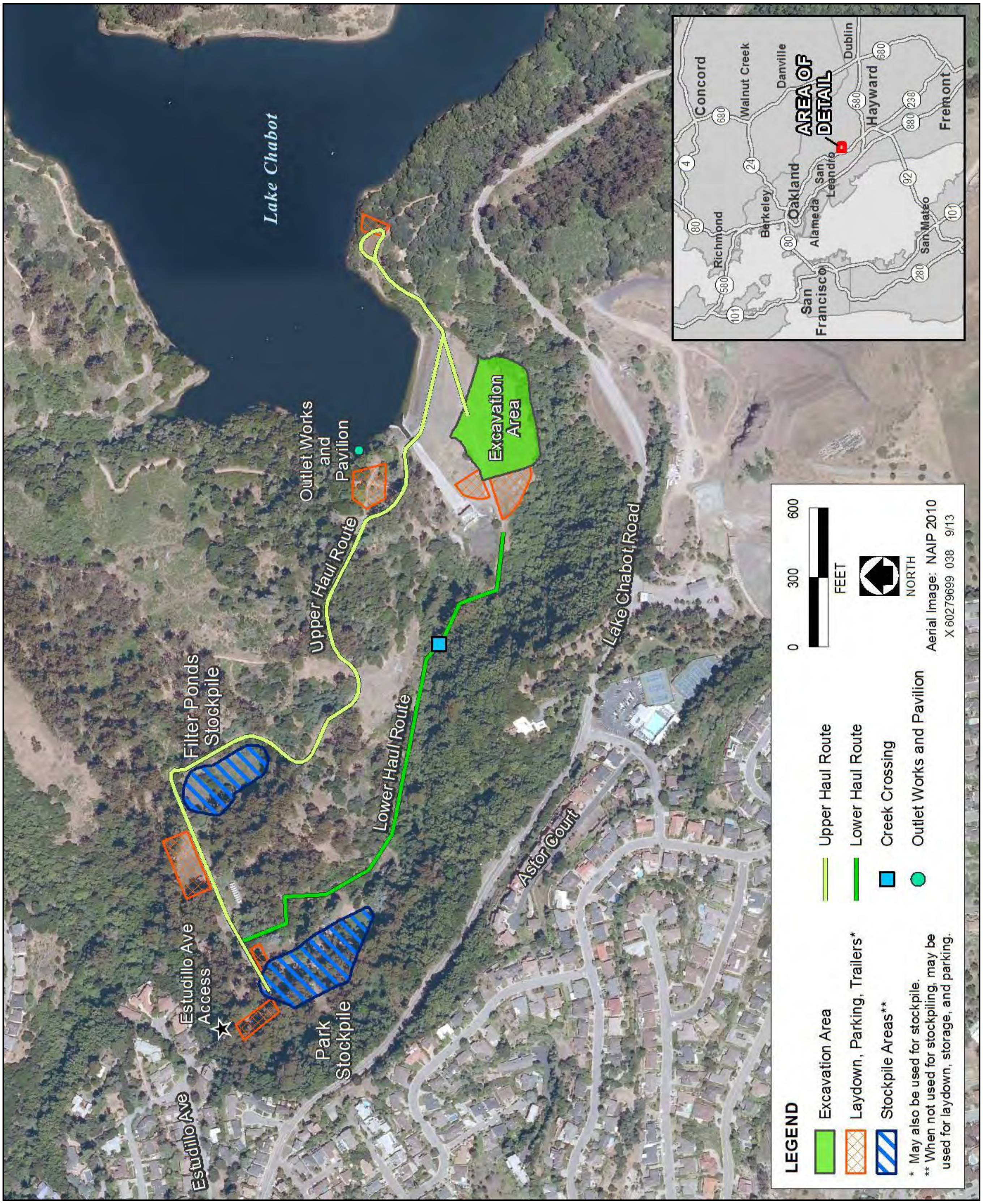
Source: Terra Engineers 2013, EBMUD 2013, compiled by AECOM in 2013

Figure 2-9: CDSM Option Layout



Source: EBMUD 2013

Figure 2-10: Conventional Earthwork Option



Source: Terra Engineers 2013, EBMUD 2013, compiled by AECOM in 2013

Figure 2-11: Conventional Earthwork Option Layout

For the Conventional Earthwork option, DSOD requires that work at the outlet works is complete before work at the dam commences, to ensure that water can be released from the reservoir during dam construction.

2.6 Project Design Characteristics

The proposed project's design characteristics include a CDSM option for upgrading the dam, a Conventional Earthwork option for upgrading the dam, and upgrades at the outlet works, including the tower.

2.6.1 Outlet Works Design Characteristics

The outlet works would be improved by lining the shaft, moving the valves and controls from the tower to the shaft, relining or installing new outlet pipes from the shaft to the lake, and removing the tower and pavilion, as shown conceptually in **Figure 2-7**. The 30-inch pipe from the tower to the shaft and the 38-3/4 inch pipe would be replaced with a single 36-inch pipe. The 20-inch by 20-inch sluiceway would be relined or replaced. New concrete headwalls would be constructed above the sluiceway and bottom pipe. New gates would be installed in the vertical shaft, and electrical power lines would be installed and connected to the valve operators. The abandoned waste tunnel would be filled with low-strength concrete or flowable fill. A 3/4-inch-thick steel liner would be installed in the shaft.

2.6.2 CDSM Design Characteristics

The CDSM option generally would include excavating a portion of the downstream face of the dam to create a level working platform, and then treating a portion of the sluiced fill, wagon fill, and foundation soil in-place by mixing the soil with cement grout for a width of about 75 to 100 feet and to a maximum depth of 55 feet, to create shear panels of treated soil oriented perpendicular to the axis of the dam. A schematic drawing of the proposed excavation plan and the in-place treatment area are shown in **Figure 2-8**.

The CDSM process would generate excess material, namely a mixture of soil and cement grout (termed "spoil"), which would harden and be used to buttress the downstream portion of the dam. The final surface elevation at the toe of the dam would be slightly higher than the existing elevation with the CDSM option, as shown in **Figure 2-8**.

2.6.3 Conventional Earthwork Design Characteristics

The Conventional Earthwork option generally would include excavating a portion of the downstream face of the dam to bedrock, to remove a portion of the liquefiable soils. The excavated soils would be stockpiled on-site, hauled from the stockpile(s) to the excavation, and recompacted. To excavate safely, the groundwater in the proposed excavation area would need to be lowered with wells and similar installations in a process termed dewatering. The schematic proposed excavation, dewatering, and recompacted fill are shown in **Figure 2-10**.

2.6.4 Common Design Characteristics for CDSM and Conventional Earthwork Options

For both the CDSM and Conventional Earthwork option, the proposed project would include the construction of a permanent filter and drain system at the upstream end of the excavation. The filter and drain system would maintain dam stability by keeping lake water from seeping into the recompacted soils. The drain system would include graded filter materials which would slope down to a perforated drain pipe that would connect to a solid pipe with an outfall in the riprap section of the spillway stilling basin downstream of the dam, at or near the location of the existing drain outfall.

Prior to excavation activities, the lake surface water level may need to be lowered to ensure stability of the dam. To lower the surface water level, releases to San Leandro Creek greater than the typical 80 gallons per minute may be required; the release rate and duration of release would depend on the amount of rainfall, lake levels prior to construction, and the required lake level during construction. The lake would remain in service during construction activities, at a surface water level of 211 feet or greater, which may be lower than typical. The time frame for the surface water level to return to its typical operating range after construction would depend on the surface water level during construction and amount of rainfall. The proposed project has no impact on planned releases from Lake Chabot or the surface water operating range after construction is complete.

2.7 Project Construction Characteristics and Schedule

2.7.1 Outlet Works

Outlet Works Schedule

DSOD would require project construction at the outlet works to be completed before beginning earthwork at the dam for the Conventional Earthwork option. For the CDSM option, construction at the outlet works would begin in fall 2015 (if taking place before the CDSM construction activities), or spring 2016 (if concurrent with the CDSM construction activities).

Under the proposed project, outlet works construction activities would be conducted during one 10-hour shift per day, five days per week (Monday through Friday, 7:00 a.m. to 7:00 p.m.). Outlet works construction would take approximately 15 weeks, as shown in **Table 2-1**. The duration of individual tasks, and the duration of the overall schedule, may vary.

Table 2-1
Outlet Works Construction Task Durations

Construction Activity	Estimated Duration
Mobilization	2 weeks
Tower and pavilion removal	2 weeks
Construction of outlet works upgrades, relining or replacement of pipes, and valve installation	9 weeks
Demobilization	2 weeks
Total Time	**15 weeks**
Source: Data compiled by AECOM in 2013	

Other construction activities would occur between 7:00 a.m. and 7:00 p.m. 5 days per week, with some construction activities occurring after regular daytime hours and on weekends to accommodate equipment maintenance or unexpected occurrences (such as repair of temporary blind flanges on the outlet pipes to prevent leaking). Work on weekends or at night would be allowed to maintain or accelerate the schedule, as necessary.

Weekend construction activities would primarily occur on-site. Construction workers could arrive on-site and depart approximately one-half hour before or after construction work hours. Large haul truck trips to and from the project area would be generally limited to the hours between 7:00 a.m. and 7:00 p.m., Monday through Friday, but occasionally would occur on weekends subject to prior EBMUD approval. In addition, "extra legal" trucks (i.e., a vehicle or combination of vehicles or special mobile equipment that exceeds the maximum legal weight and/or size specified in Sections 35000–35796 of the California Vehicle Code) are not allowed on San Francisco vicinity freeways between 7 a.m. and 9 a.m., per Section 502.2 of the Transportation Permits Manual (California Department of Transportation [Caltrans] 1995). Therefore, periodically over the course of construction, very large trucks delivering construction equipment may arrive at the project site as early as 6:30 a.m.

2.7.2 CDSM

CDSM Quantities

The CDSM option would improve approximately 60,000 to 80,000 cubic yards (cy) of sluiced fill and underlying soils by installing approximately 24,000 to 32,000 cy of CDSM. A by-product of the CDSM installation is approximately 20,000 to 26,500 cubic yards of hardened granular CDSM spoil that can be crushed, recycled, and reused as fill material. The volume of soil excavated to build the level working platform is estimated to be approximately 12,000 cy, which would be temporarily stored until the excavation is completed. Because the stockpile volumes are relatively smaller under the CDSM option, it is likely that only one of the two stockpile locations, Filter Pond Stockpile or Park Stockpile, would need to be used.

Once the excavation is completed, the material at the stockpile would be moisture conditioned, hauled back to the dam, placed in layers of about 1 foot thick or less, and compacted. "Moisture conditioning" is a term used to describe adding or removing water from soil so that the soil water content is near the optimum that maximizes compaction. Water is typically added with a water truck. Water is removed by allowing the moisture to evaporate from the soil.

The excavated soil and CDSM spoil would bulk (increase in volume) by an estimated 25 percent above the initial volume during transport and, as a result, the volume of soil transported would be approximately 15,000 cy. The granular CDSM spoil would bulk during transportation by an estimated 15 percent above the volume at the stockpile and, as a result, the volume of CDSM spoil transported would be approximately 23,000 to 30,500 cy. The total volume of soil and CDSM spoil transported to the stockpile would be 38,000 to 45,500 cy. This volume would be reduced to 33,000 to 39,500 cy at the stockpile because of compaction that occurs as the materials are placed at the stockpile.

Approximately 5,000 to 7,000 cubic yards of imported sand and gravel would be required for the filter and drain system. These materials would be transported from off-site sources and, depending on the delivery schedule, some of these materials may be temporarily stockpiled before placement at the dam. The stockpiled filter and drain material would be stored separately from the stockpile of the excavated dam soil and spoil. The quantities are summarized in **Table 2-2**.

Table 2-2
Summary of Quantities for the CDSM Option

Item	Initial Volume	Transported Volume (Initial + 25%)	Stockpile Volume (Initial + 10%)
Excavated Soil	12,000 cy	15,000 cy	13,000 cy
Granular Spoil	20,000 to 26,500 cy	23,000 to 30,500 cy	20,000 to 26,500 cy
Imported Filter Material	5,000 to 7,000 cy	5,000 to 7,000 cy[1]	5,000 to 7,000 cy[1]
Total	**37,000 to 45,500**	**43,000 to 47,500 cy**	**38,000 to 46,500 cy**

Note:
[1] Imported filter material would not bulk significantly.
Source: Data compiled by AECOM in 2013

CDSM Schedule

Under the proposed project, CDSM installation activities would include one or two CDSM rigs working one or two 12-hour shifts per day, 5 to 6 days per week (Monday through Saturday). One shift would occur from 7:00 a.m. to 7:00 p.m. and would be termed the "day shift," one shift would occur from 7:00 p.m. to 7:00 a.m. and would be termed the "night shift." Other construction activities, such as excavation fill placement, and the associated hauling to and from stockpiles, would occur between 7:00 a.m. and 7:00 p.m., 5 days per week. Some periods of construction activity could occur after normal daytime hours and on weekends to accommodate very large truck deliveries of construction equipment, equipment maintenance, or unexpected occurrences (such as repair of erosion control work that is damaged during a storm).

CDSM construction would require about 20 weeks to complete if using one CDSM rig working only day shifts, and about 12 weeks to complete using one CDSM rig working day and night shifts. CDSM construction work would require about 13 weeks to complete if using two CDSM rigs working only day shifts, and about 8 weeks to complete using two CDSM rigs working day and night shifts. Night shift work for CDSM would improve schedule efficiency, which would reduce the construction duration and potentially could result in a lower project cost. An additional 2 weeks would be required to set up the equipment and 1 week to remove the equipment. Two additional weeks would be required after the end of CDSM construction to obtain 14-day compressive strength quality control test results on CDSM core samples. The anticipated duration of individual tasks is shown in **Table 2-3**, although these times may vary.

Construction work for the CDSM option would begin in spring 2016 and would be complete by the end of 2016 provided there is no significant delay.

Weekend construction activities primarily would occur on-site. Construction workers could arrive on-site and depart approximately one-half hour before or after construction work hours. Large haul truck trips to and from the project area generally would be limited to between 7:00 a.m. and 7:00 p.m., Monday through Friday. On weekends, large haul truck trips to and from the site would occur occasionally, subject to prior EBMUD approval.

Table 2-3
CDSM Construction Task Durations

Construction Activity	Estimated Duration
Mobilization	2 weeks
Preparation of haul routes and stockpiles	2 weeks
Excavation of CDSM working platform	1 week
Setup of CDSM rig(s)	2 weeks
CDSM Construction using one rig[3]	12 to 20 weeks[1]
CDSM Construction using two rigs[3]	8 to 13 weeks[2]
Wait for 14-day strength test results (verification testing)	2 weeks
Tear down of CDSM rig(s)	1 week
Placement and compaction of fill	4 weeks
Site finishing and restoration of haul routes and stockpile	2 weeks
Demobilization	2 weeks
Total Time using One CDSM Rig	**30 to 38 weeks[1]**
Total Time using Two CDSM Rigs	**26 to 31 weeks[2]**

Notes:
[1] If night shift work was performed using one CDSM rig, the duration of CDSM construction would be reduced from 20 to 12 weeks, and the total duration for CDSM construction activities would be reduced from 38 to 30 weeks.
[2] If night shift work was performed using two CDSM rigs, the duration of CDSM construction would be reduced from 13 to 8 weeks, and the total duration for CDSM construction activities would be reduced from 31 to 26 weeks.
[3] Schedule includes a CDSM test section. The test section duration is approximately 2 weeks, and would be completed 28 days or more before the start of CDSM construction.
Source: Data compiled by AECOM in 2013

Together with the outlet works, the CDSM option would require a 26-week to 58-week construction period, depending on whether construction activities at the outlet works start concurrently with the CDSM work and if one or two CDSM rigs are used. If construction activities at the outlet works start concurrently with the CDSM work, then the construction period would be 26 to 30 weeks if night shift work is performed with two or one CDSM rigs, respectively, or 31 to 38 weeks if all CDSM work is done only on day shifts and with two or one CSDM rigs, respectively. If project construction at the outlet works is completed before CDSM work begins, then the project duration would be approximately 46 to 58 weeks with two or one CDSM rigs, respectively. The 58 weeks would include 15 weeks of construction activities at the outlet works plus an additional 5 weeks of schedule float between the end of construction at the outlet works and the start of CDSM so that the CDSM work could begin on time. The total duration of CDSM plus outlet works construction is summarized in **Table 2-4**. The duration of individual tasks, and the total duration of project construction may vary.

Table 2-4
Total Duration of CDSM plus Outlet Works Construction

	CDSM Construction on Day and Night Shifts[1]	CDSM Construction on Day Shifts Only[1]
Outlet works construction concurrent with CDSM	26 to 30 weeks	31 to 38 weeks
Outlet works construction before CDSM	46 to 50 weeks	51 to 58 weeks

Note:
[1] The lower range assumes work would be performed using two CDSM rigs.
Source: Data compiled by AECOM in 2013

2.7.3 Conventional Earthwork

Conventional Earthwork Quantities

The Conventional Earthwork option for remediating the downstream embankment of the dam would require excavating between 100,000 and 140,000 cy of soil and hauling this material to an on-site stockpile, where it would be temporarily stored until the excavation is completed. After excavation is completed, the material at the stockpile would be moisture conditioned, hauled back to the dam, placed in layers of about 1 foot thick or less, and compacted. Excavated material would increase by about 25 percent above the initial volume during transport and an estimated 10 percent above the initial volume at the stockpile(s). Moisture conditioning is a term used to describe adding or removing water from soil so that the soil water content is near the optimum that maximizes compaction. Water is typically added with a water truck. Water is removed by allowing the moisture to evaporate from the soil by the sun, wind, or both.

Approximately 5,000 to 7,000 cy of imported sand and gravel would be required for the filter and drain system. These materials would be transported from off-site sources and, depending on the delivery schedule, some of these materials may be temporarily stockpiled before placement at the dam. The stockpiled filter and drain material would be separate from the stockpile of the excavated soil and spoil.

Recompaction of the soil at the dam is expected to cause a 5 to 10 percent reduction in volume, corresponding to 5,000 to 14,000 cy. Consequently, compensating for volume reduction due to re-compaction would require import of 0 to 7,000 cy of suitable fill materials, to maintain the existing dam volume after accounting for the imported sand and gravel. The quantities are summarized in **Table 2-5**.

Table 2-5
Summary of Quantities for the Conventional Earthwork Option

Item	Initial Volume	Transported Volume (Initial + 25%)	Stockpile Volume (Initial + 10%)
Excavated Soil	100,000 to 140,000 cy	125,000 to 175,000 cy	110,000 to 155,000 cy
Imported Filter Material	5,000 to 7,000 cy	5,000 to 7,000 cy(1)	5,000 to 7,000 cy [1]
Imported Random Fill	0 to 7,000 cy	0 to 8,750 cy	0 to 7,700 cy
Total (rounded)	**105,000 to 153,000**	**130,000 to 191,000 cy**	**115,000 to 170,000 cy**

Note:
1 Imported filter material would not bulk substantially.
Source: Data compiled by AECOM in 2013

Conventional Earthwork Schedule

Outlet works construction and dewatering would begin in fall 2015 so that construction for the Conventional Earthwork option would begin in spring 2016. Under the proposed project, Conventional Earthwork option activities would be performed in one 10-hour shift per day, 6 days per week (Monday through Saturday). If a delay occurs in construction, and earthwork cannot be performed during the rainy season, the site would have to remain closed and protected, and work would have to resume the following spring.

Other construction activities would occur between 7:00 a.m. and 7:00 p.m., 6 days per week, with some construction activities occurring after hours and on Sundays to accommodate very large truck deliveries of construction equipment, equipment maintenance, or unexpected occurrences (such as repair of erosion control work that is damaged during a storm).

Conventional Earthwork activities would require about 40 weeks to complete, assuming 140,000 cy of excavation at the dam, and assuming that both the Lower Haul Route and Park Stockpile were to be used. The durations of Conventional Earthwork construction activities are summarized in **Table 2-6**. The duration of individual tasks and the total duration may vary.

Construction workers could arrive on-site and depart approximately one-half hour before or after construction work hours. Large haul truck trips to and from the site would be generally limited to the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday. On weekends, large haul truck trips to and from the site would occur occasionally, subject to prior EBMUD approval.

Together with the outlet works, the Conventional Earthwork option would require a 60-week construction period. The 60 weeks would include 40 weeks for the earthwork at the dam, plus 15 weeks of work for dewatering and outlet works retrofit prior to the start of excavation. An additional 5 weeks of schedule float would be added at the completion of dewatering and the outlet works retrofit, and before the start of the earthwork, to ensure that the dewatering and outlet works retrofit tasks are completed before the earthwork begins.

Table 2-6 Conventional Earthwork Construction Task Durations	
Construction Activity	**Estimated Duration**
Mobilization	2 weeks
Preparation of haul route(s) and stockpile areas	4 weeks
Excavation	16 weeks
Site preparation for filling	2 weeks
Placement and compaction of fill	10 weeks
Site finishing and restoration of haul roads and stockpiles	4 weeks
Demobilization	2 weeks
Total Time	**40 weeks**
Source: Data compiled by AECOM in 2013	

Dewatering would be concurrent with construction activities at the outlet works; both tasks would begin 20 weeks before the start of earthwork. The installation of the dewatering system is anticipated to take approximately 3 weeks, including mobilization. The dewatering system would need to operate during excavation activities , to safely draw the groundwater elevation to below the level of the excavation. Similar to work at the outlet works, 5 weeks of schedule float would be provided between lowering of the groundwater level and start of the earthwork, so that the earthwork could safely begin on time. The dewatering operation would continue until the end of earthwork operations. The total duration of earthwork, outlet works, and dewatering is summarized in **Table 2-7**.

Table 2-7 Total Duration of Conventional Earthwork plus Outlet Works Construction	
	Conventional Earthwork on Day Shift Only
Outlet Works before Conventional Earthwork concurrent with Dewatering	20 weeks
Conventional Earthwork	40 weeks
Total Time	**60 weeks**
Source: Data compiled by AECOM in 2013	

2.7.4 Stockpiles

Two main potential stockpile locations are proposed: the Filter Pond Stockpile and the Park Stockpile, as shown in **Figure 2-2**. Either or both stockpile locations may be used under either construction option; however the CDSM option would require smaller stockpile areas than the Conventional Earthwork option. In addition, the laydown, parking, and trailer areas also may be used for stockpiles.

The Filter Pond Stockpile would be located at the former filter ponds, which are located on EBMUD property in the project area. The maximum capacity of the Filter Pond Stockpile would be approximately 60,000 cy, and the Filter Pond Stockpile would require clearing, grubbing, and grading of approximately 2.5 acres of currently fenced-off land. The Filter Pond Stockpile would be at maximum 50 feet high. Tree removal would be required.

The Park Stockpile would be located at Chabot Park. The property is owned by EBMUD and leased to the City of San Leandro, which operates the park. The maximum capacity of the Park Stockpile would be approximately 110,000 cy. The Park Stockpile would require clearing, grubbing, and grading of approximately 4 acres of land and the temporary relocation of existing electrical transmission lines. The Park Stockpile would be at maximum 60 feet high. Tree removal also would be required. Equipment and facilities removed at Chabot Park as a result of construction would be temporarily stored and reinstalled at its original location at end of construction, in consultation with the City of San Leandro. Any equipment that is demolished or damaged beyond repair would be replaced in kind.

2.7.5 Haul Routes

Two potential haul routes are proposed: the Upper Haul Route and the Lower Haul Route. Either or both haul routes may be used and each would require some improvements, discussed in Section 2.11.5, Haul Route Modifications.

The Upper Haul Route is shown in **Figure 2-12**. It is approximately 4,740 feet long, starts at the gate at the east side of the dam crest and ends at the trailhead of the West Shore trail. The 3,500-foot segment west of the gate is part of the West Shore Trail, which is normally open to the public, would be closed for the duration of the project. The West Shore Trail is part of Lake Chabot Regional Park, which is property owned by EBMUD and leased to the East Bay Regional Park District (EBRPD), which operates the park. The Upper Haul Route also includes an unpaved 1,240-foot segment starting at the gate and running east to a turnaround. The turnaround allows trucks to avoid the hairpin turn between the Upper Haul Route and the steep road running diagonally across the downstream face of the dam. The Upper Haul Route is entirely paved with asphalt, except for the turnout at the lake. Because it is a moderately steep one-lane road with several small-radius turns, haul trucks would be limited to 10 cy capacity on the Upper Haul Route.

The Lower Haul Route is shown in **Figure 2-13**; it is approximately 2,380 feet long, starts at the bottom of the dam and ends at the park road near the proposed Park Stockpile location. The road is mostly flat, with no sharp turns along its alignment. The route is unpaved, bordered by vegetation on either side, and covered by a canopy of trees in most locations. The Lower Haul Route currently is closed to the public and is used only by EBMUD service vehicles or emergency vehicles only. Because it is essentially flat and straight, haul trucks with a capacity up to 20 cy could use the Lower Haul Route.

2.8 Project Construction Traffic

2.8.1 Construction Traffic—General

The proposed project would contribute to off-site construction-related traffic, for equipment and material delivery as well as for construction worker access to the project area from Estudillo Avenue, as shown in **Figure 2-2**. The proposed project also would add on-site construction traffic, for hauling to and from the excavation and stockpile areas, either by the Lower Haul Route or Upper Haul Route, as shown in **Figure 2-2**.

Source: GoogleEarth 2012

Figure 2-12: Upper Haul Route

Source: GoogleEarth 2013

Figure 2-13: Lower Haul Route

The number of on-site, round-trip, haul truck trips would depend on the capacity of the haul trucks. The maximum capacity haul truck for the Upper Haul Route is 10 cy. The maximum capacity haul truck for the Lower Haul Route is 20 cy. Section 3.6, Transportation and Circulation, provides more detailed information regarding anticipated on-site and off-site truck and worker vehicle trips.

2.8.2 Construction Traffic—Outlet Works

The outlet works would require delivery trips during the mobilization, tower and pavilion removal, construction of the outlet works upgrades, and demobilization phases. The number of average construction vehicle round-trips per day are presented in **Table 2-8**, by phase. The delivery trip assumptions for the outlet works would apply for both the CDSM and Conventional Earthwork options. No internal haul truck trips would occur for the outlet works upgrades.

Table 2-8
Average Construction Vehicle Round Trips per Day—Outlet Works

Construction Activity	Duration (Weeks)	Daily External Vehicle Round Trips[1]				Total External Round Trips	Daily Internal Vehicle Round Trips[1]
		Equipment Delivery	Material Delivery	Hauling Truck	Worker Trips		Hauling Truck
Mobilization	2	5	20	0	23	48	0
Tower and pavilion removal	2	2	0	4	27	33	0
Construct Outlet Works	9	10	10	0	27	47	0
Demobilization	2	3	20	0	15	38	0

Note:
[1] One daily round trip equals half the number of daily one-way trips.
Source: Data compiled by CHS and AECOM in 2013

2.8.3 Construction Traffic—CDSM Option

Off-site Construction Traffic

For the CDSM option, an average work day would be expected to include concurrent CDSM work and construction activities at the outlet works. During the CDSM phase of construction, which would be the longest construction element (up to 20 weeks), construction traffic to the project area would include an average of 95 vehicle round-trips per day, consisting of 23 round-trips by trucks and 36 to 72 round-trips by worker vehicles using the Upper Haul Route. Otherwise, construction traffic to the project area would include an average of 49 vehicle round-trips per day, consisting of 13 round-trips by trucks and 36 to 72 round-trips by worker vehicles using the Lower Haul Route. The worker vehicle trip range is based on two CDSM rigs working day shifts and two CDSM rigs working day and night shifts for a conservative estimate. The average daily construction vehicle trips are summarized for each phase of the CDSM construction activity in **Table 2-9**.

Table 2-9
Average Construction Vehicle Round Trips per Day—CDSM Option

Construction Activity	Duration (Weeks)	Daily External Vehicle Round Trips[1]					Daily Internal Vehicle Round Trips[1]
		Equipment Delivery	Material Delivery	Hauling Truck	Worker Trips[2]	Total External Round Trips	Hauling Truck
Mobilization	2	2	0	0	28	30	0
Preparation of haul routes and stockpiles	2	8	1-2	0	36	45-46	0
Excavation of CDSM working platform	1	4	2	3–8	33–38	42–52	91–182
Setup of CDSM rig(s)	2	5	10–20	0	36	51–61	0
CDSM Construction[3]	8–20	3	10–20	0	36 (72)[4]	49 (95)[4]	0
Wait for 14-day strength test results (verification testing)	2	0	0	0	20	20	0
Tear down of CDSM rig(s)	1	3	20–35	0	28	51–66	0
Placement and compaction of fill	4	5	20–35	5–12	32–35	62–87	114–228
Site finishing and restoration of haul routes and stockpile	2	5	25	0	30	60	0
Demobilization	2	0	0	0	28	30	0

Notes:
1 Lower number in the range indicates the scenario in which lower haul route is used, and the higher number indicates the scenario in which upper haul route is used. One daily round trip equals half the number of daily one-way trips.
2 Includes administration staff.
3 Schedule includes a CDSM test section. The test section duration is approximately 2 weeks, and would be completed 28 days or more before the start of CDSM construction.
4 The number in parentheses indicates trips associated with the day and night shift construction scenario.
Source: Data compiled by CHS and AECOM in 2013

On-site Construction Traffic

CDSM hauling would include truck trips restricted to project construction sites. The hauling truck trips would transfer soil and spoils between the dam and stockpiles, and would be internal to the sites. The number of round-trip, on-site, haul truck trips would depend on the capacity of the haul truck, and the phase of work. For the CDSM option, hauling activities would occur during the excavation and replacement periods. During the excavation period, on-site haul traffic would include an average of 182 daily round-trips for 10 cy trucks, or 91 daily round-trips for 20 cy trucks. During the replacement period, on-site haul trips would include an average of 228 daily round-trips for 10 cy trucks or 114 daily round trips for 20 cy trucks.

2.8.4 Construction Traffic—Conventional Earthwork Option

Off-site Construction Traffic

For the Conventional Earthwork option, an average work day is assumed to be the replacement period when compaction of excavated material and filter and drain material would occur. During this period, construction traffic to the site would include an average of 105 vehicle round-trips per day, consisting of 57 round-trips by trucks and 48 round-trips by worker vehicles using the Upper Haul Route. Construction traffic to the site using Upper Haul Route would include an average of 68 vehicle round-trips per day, consisting of 31 round-trips by trucks and 37 round-trips by worker vehicles. These average daily construction vehicle trips for each phase of the Conventional Earthwork construction activity are shown in **Table 2-10**.

Table 2-10
Average Construction Vehicle Round Trips per Day—Conventional Earthwork Option

Construction Activity	Duration (Week)	Daily External Vehicle Round Trips[1]					Daily Internal Vehicle Round Trips[1]
		Equipment Delivery	Material Delivery	Hauling Truck	Worker Trips[2]	Daily Total External Round Trips	Hauling Truck
Mobilization	2	2	0	0	28	30	0
Preparation of haul route(s) and stockpile areas	4	8	1-2	0	36	45–46	0
Excavation	16	4–5	2	11–29	41–63	59–98	292–583
Site preparation for filling	2	2	20	0	20	42	0
Placement and compaction of fill	10	2	22–37	7–18	37–48	68–105	175–350
Site finishing and restoration of haul roads and stockpiles	4	5	25	0	30	60	0
Demobilization	2	0	0	0	28	30	0

Notes:
1 Lower number in the range indicates the scenario in which lower haul route is used, and the higher number indicates the scenario in which upper haul route is used. One daily round trip equals half the number of daily one-way trips.
2 Includes administration staff.
Source: Data compiled by CHS and AECOM in 2013

On-site Construction Traffic

The Conventional Earthwork option would include truck trips restricted to construction sites. The hauling truck trips would transfer soil and spoils between the dam and stockpiles and would be internal to the site. The number of round-trip, on-site haul truck trips would depend on the capacity of the haul trucks, and the phase of work.

For the Conventional Earthwork option, hauling activities would occur during the excavation and replacement periods. During the excavation period, hauling soil and spoil from the stockpiles to the embankment, on-site haul traffic would include an average of 583 daily round-trips for 10-cy trucks, or 292 daily round-trips for 20-cy trucks. During the replacement period when soil would be hauled from the embankment to the stockpiles, on-site haul trips would include 350 daily round-trips for 10-cy trucks, or 175 daily round-trips for 20-cy trucks.

2.9 Proposed Project Combinations

EBMUD will select a combination of the project components upon certification of the Final EIR. The possible combinations of the proposed project are shown in **Table 2-11**.

Table 2-11
Proposed Project Combinations

CDSM			
Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route[1]	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route[1]
Conventional Earthwork			
Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route	Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route[1]	Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route	Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route[1]

Notes:
[1] Selection of the Lower Haul Route would still require use of the Upper Haul Route for the outlet works component.
Source: Compiled by AECOM in 2013

2.10 Environmental Controls

EBMUD typically includes standard environmental control specifications in its construction contracts that are designed to lessen the effects of construction-generated impacts. These environmental control specifications address construction, including scheduled work hours, construction noise, dust and litter control, traffic control, erosion control, work adjacent to other utilities, hazardous conditions, emergency access, fire prevention, and seismic considerations.

2.11 Construction Sequence, Mobilization, and Modifications

2.11.1 CDSM Option Construction Sequence

The proposed construction sequence is listed below and detailed in the following sections:

- arrange for temporary and permanent electrical power at the site;
- mobilize equipment and personnel to site;
- delineate and fence equipment and work areas as required to restrict access;
- modify access and circulation within the project area;
- clear embankment, stockpile, laydown, and trailer areas;
- perform outlet works modifications;
- install monitoring devices;
- excavate downstream portion of dam for working platform and stockpile material;
- perform CDSM at toe of embankment;
- place embankment fill and drain system to final grade, using stockpiled material and imported drain material;
- install additional automated instrumentation;
- restore and replant embankment and stockpile areas to prevent erosion; and
- demobilize and remove fencing and temporary structures.

2.11.2 Conventional Earthwork Option Construction Sequence

The proposed construction sequence is listed below and detailed in the following sections:

- arrange for temporary and permanent electrical power at the site;
- mobilize equipment and personnel to site for outlet works and embankment dewatering work;
- perform outlet works modifications and embankment dewatering;
- demobilize outlet works equipment and personnel;
- mobilize earthwork equipment and personnel to site;
- delineate and fence equipment and work areas as required to restrict access;
- modify access and circulation within the project area;
- clear embankment, stockpile, laydown, and trailer areas;
- install monitoring devices;
- excavate downstream portion of dam;
- place embankment fill and drain system to final grade, using stockpiled material and imported drain material;
- demobilize dewatering equipment and personnel;

- install additional automated instrumentation;
- restore and replant embankment and stockpile areas to prevent erosion; and
- demobilize and remove fencing and temporary structures.

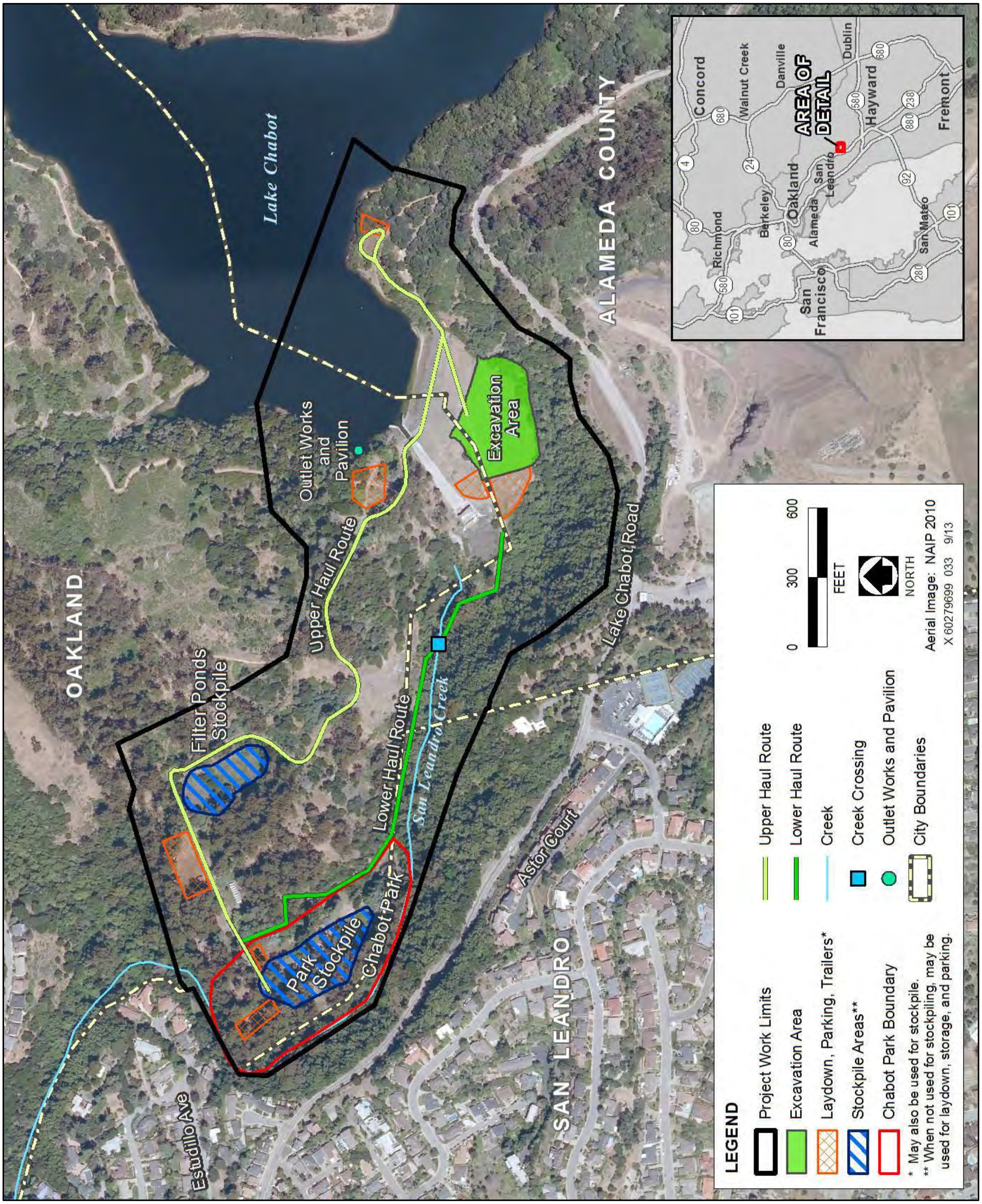
2.11.3 Mobilization Activities

Construction equipment for the outlet works, CDSM option, and Conventional Earthwork option would include, but would not be limited to:

- Excavators (includes scrapers)
- Graders
- Loaders
- Bulldozers
- CDSM rigs (CDSM option only)
- Vibrating rollers
- Sheepfoot rollers
- Hydraulic backhoes
- Dump trucks
- Large trucks
- Generators
- Air compressors
- Cranes
- Barges
- Work skiff
- Winches
- Welding sets
- Concrete pump
- Large-diameter drilling and pipe installation equipment

Construction activities could also require connections to existing power sources within the construction site; temporary light poles; storage of petroleum products in aboveground tanks; pumps, hoses, and temporary pipelines to deliver water supply to the construction area from existing outlets (fire hydrants) or from Lake Chabot; large water tank trucks; dust control operations; and other equipment and activities required to support the construction process. Before undertaking dam improvements, this equipment would be mobilized to required construction sites or to the stockpile areas. Some equipment would be brought to the project area during specific work phases.

Before the start of construction activities, project construction sites and project work limits would be defined to provide site security and public protection, as shown in **Figure 2-14**. Fencing would be installed to restrict the public from work areas. In addition, a construction office would be established on the work site.



Source: Terra Engineers 2013, EBMUD 2013, compiled by AECOM in 2013

Figure 2-14: Project Work Limits

2.11.4 Access Modifications

Project construction would require access to the main work areas downstream of the dam from Estudillo Avenue, as shown in **Figure 2-2**. A main gate would be set up on the existing EBMUD access road at the entrance to Chabot Park to control traffic flow in and out of the site. Public access to Chabot Park and the West Shore Trail within the project work limits would be closed for the duration of work at the dam and outlet works. The site within the project work limits would remain closed during periods of non-work, such as weekends, holidays, and any potential time between the completion of construction at the outlet works and the start of construction at the dam for public safety purposes and to maintain a secure construction site. The main gate would be opened by EBMUD's contractor 30 minutes before the start of construction to avoid potential vehicle queues on the neighborhood streets. Signage advising visitors about the schedule for the trail and Chabot Park closures would be posted in advance of construction. In addition, trail and park closure notifications also would be posted on the EBMUD and City of San Leandro's website.

2.11.5 Haul Route Modifications

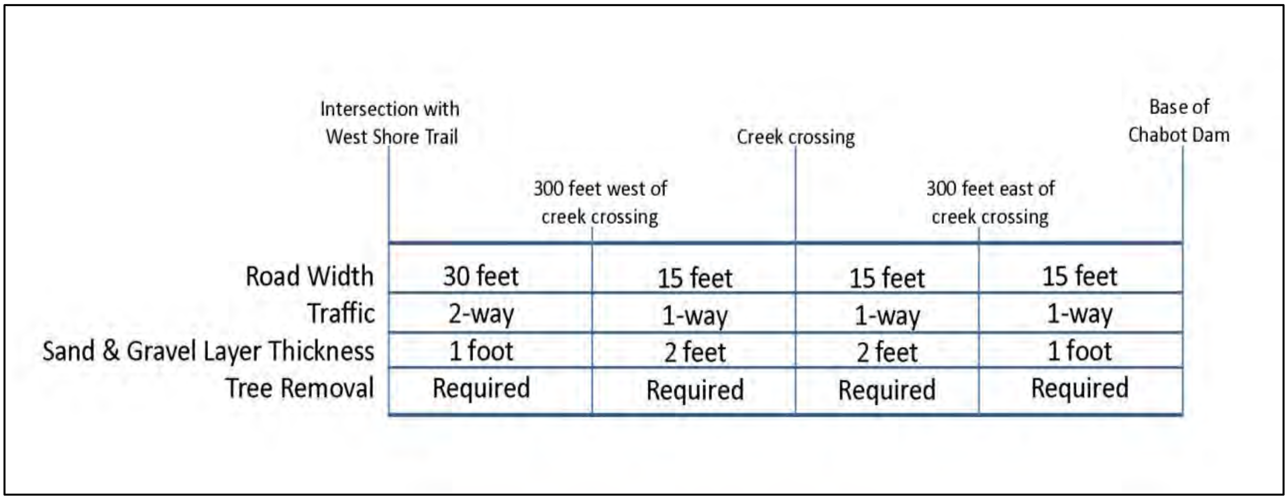
Modifications would be required for the Upper Haul Route and the Lower Haul Route and described below. The width of the Upper Haul Route varies from 10 to 16 feet. Localized widening would be required to maintain a width of 15 feet for construction. In addition, several turnouts would be constructed along the route to extend the right-of-way up to 20 feet in width.

The existing crest roadway spillway bridge has a width of 12 feet and no sidewalks or shoulders. The bridge would be too narrow for heavily loaded project trucks. Consequently, for the Upper Haul Route, a temporary bridge with a minimum width of 15 feet would be located adjacent to the existing spillway bridge with appropriate modifications to the road alignment at the approaches to the bridge.

Hauling on the Upper Haul Route would be limited to 10 cy trucks because it is a moderately steep one-lane road with several small radius turns. Hauling in two directions would require traffic control and convoying of trucks because the road is one lane.

The Lower Haul Road crosses San Leandro Creek approximately 600 feet from its starting point at the downstream toe of the dam and meets the fenced boundary of the park approximately 975 feet from the creek crossing. **Figure 2-15** summarizes conditions along the Lower Haul Route. The subgrade of the road is relatively soft for a nominal distance of 300 feet on either side of the creek crossing. The width of the Lower Haul Route varies from 15 to 25 feet. The majority of the route is bordered by vegetation on each side. During the construction season, typical stream flows are approximately 80 gallons per minute and the creek is less than 10 feet wide at the crossing.

Improvements to the Lower Haul Road are shown in **Figure 2-15**. The subgrade of the unpaved Lower Haul Route would require temporary stabilization to support truck traffic. Temporary stabilization would be achieved by a compacted a mixed sand and gravel layer that would be placed on the road bed before construction and removed at the end of construction to return the road to pre-construction conditions.



Source: EBMUD 2013

Figure 2-15: Summary of Conditions and Improvements along Lower Haul Route

The temporary sand and gravel layer would be 1 foot thick, except in the areas of softer subgrade located 300 feet on either side of the creek crossing; the thickness of the sand and gravel layer would be increased to 2 feet in these areas. The Lower Haul Route would be widened to 30 feet to accommodate 2-way truck traffic starting 300 feet west of the creek crossing and extending west to the Park Stockpile or the Filter Pond Stockpile. The stabilized road would be 15 feet wide for the remainder of the Lower Haul Route, with occasional widening to 20 feet to accommodate turnouts. Tree removal along the road alignment would be required to accommodate a 30-foot road width. Pruning of overhead branches would be required in the road segment located 100 feet to 800 feet west of the creek crossing.

A temporary bridge with a minimum span of approximately 10 feet would be installed over the creek. The creek would be less than 10 feet wide during the normal releases. The bridge would be required to minimize the effects of hauling on aquatic habitat associated with the active creek channel. Hauling in two directions would require traffic control and convoying of trucks to accommodate the one-lane portion of the route. The Lower Haul Route is essentially flat and straight and, therefore either 10-cy or 20-cy trucks or scrapers could be used for hauling.

2.11.6 Site Preparation

In addition to improvements for the stockpiles, site access, and haul routes, the main construction sites at the dam embankment and at the laydown, parking and trailer areas would be prepared for excavation fill removal and CDSM activities. The roughly 4.5-acre embankment area and 2 to 3 acres of laydown, parking and trailer areas would be cleared and grubbed of vegetation, debris, and large rocks using bulldozers, loaders, and other earthmoving equipment. Some material, such as topsoil and approved fill, would be stockpiled for reuse. The topsoil stockpile would be separate from the main stockpiles, would be a maximum of 10 feet high, and would be located at any of the stockpile sites or at any laydown, parking and trailer site. Material unsuitable for reuse as fill would be removed off-site for disposal at an approved landfill.

2.11.7 Monitoring Device Installation

Monitoring devices would be installed at the downstream areas to detect movement and groundwater levels within the dam during project construction activities. Typical devices include piezometers (small-diameter wells used to measure groundwater elevations), inclinometers (instruments to measure small changes in slope), and survey monuments (physical ground marking points of a survey). The number, location, and type of device used would be confirmed and approved by DSOD during the design process.

Piezometers and inclinometers are installed using a standard drill rig. A hole would be advanced to the desired depth, and then either the inclinometer casing or piezometer is installed. The annular space around the casing is then grouted with cement bentonite grout to the ground surface and protective box is placed over the top of the casing. Monitoring devices also could include measures such as alarms, cameras, and seepage monitors.

2.11.8 Dam Embankment Excavations

The soils excavated at the downstream portion of the dam would be used to reconstruct the dam. The soils would require thorough mixing and moisture conditioning before being reused.

For the CDSM option, the proposed excavation would not likely extend below the groundwater level, alleviating the need for significant construction dewatering. If dewatering is necessary, water generated would be discharged into the riprap section of the spillway stilling basin below the dam, in accordance with applicable regulatory requirements. The preliminary excavation plan for the CDSM option is shown in **Figure 2-8**.

For the Conventional Earthwork option, the proposed excavation would extend below the groundwater level and would therefore require significant construction dewatering. Water generated would be discharged into the riprap section of the spillway stilling basin below the dam or into Lake Chabot, in accordance with applicable regulatory requirements. The preliminary excavation plan for the Conventional Earthwork option is shown in **Figure 2-10.**

2.11.9 Staging and Stockpiling Activities

For the CDSM option, solidified CDSM spoil would be broken up at the stockpiles using sheepfoot rollers, and track mounted equipment, such as bulldozers. Spoil and excavated soil would be mixed with equipment such as discs, and would be moisture conditioned with water from water trucks.

For the Conventional Earthwork option, soil at the stockpile would be mixed with equipment such as discs, and would be moisture conditioned with water from water trucks. For both the CDSM and Conventional Earthwork option, the stockpiles would incorporate erosion control features.

Uses and activities within the laydown, parking and trailer areas could include, but are not limited to:

- Stockpiling,
- Delivery of construction equipment, cement, drainage rock, concrete, controlled low strength material, and pipe lining material (equipment would likely be coming and going throughout the construction process. Cement import would end after CDSM activities are complete. Concrete, controlled low strength material, and pipe lining material delivery would occur during work at the outlet works).
- Delivery of fuel and fueling/maintenance of construction equipment (daily)
- Construction administration and meetings at the trailer area (daily)
- Worker restrooms
- Worker and visitor parking and sign-in area

- Temporary storage of other equipment and materials, including concrete forms, scaffolding, etc. (daily)

2.11.10 CDSM Activities

CDSM activities could occur concurrently with the work at the outlet works, or it may follow work at the outlet works. Work at the outlet works are described separately in Section 2.11.12, Outlet Works Activities. Subsurface water is not expected to interfere with CDSM activities; therefore, dewatering is not anticipated under the CDSM option.

Site grading would occur after buttress excavation activities are complete to create a level surface for the CDSM rigs. The excavated material would be stockpiled and used as buttress fill. In addition, temporary light poles would be established in the CDSM area if night work is proposed.

In-place treatment would include CDSM, a process by which soils to be improved are mixed in place with cement grout, using large (2- to 5-foot-diameter) mixing augers. The following describes typical CDSM activities that would apply to the proposed project. The augers would be equipped with paddles along the shafts and grout injection ports at the tips. The mixing augers would be mounted on a crane or rig and driven by a power source that would be sufficient to provide torque in a wide range of drilling conditions and to maintain continuous installation of vertical soil-cement mixed columns. As the mixing shafts were advanced in the soil, Portland cement grout would be pumped through the hollow stem of the shafts and injected into the soil at the shaft tips. Auger flights and mixing blades on the shafts would blend the soil with the grout. When the design depth was reached, the mixing shafts would be withdrawn and the mixing process would continue until the augers were completely removed from the ground. After withdrawal, two to six overlapping soil-cement columns would remain in the ground. Adjacent, overlapping columns would be installed for form blocks or grids of treated columns. CDSM columns would penetrate through the foundation soils.

Cement grout would be batched at the site in a grout plant, and then would be pumped to the mixing rig. Cement would be temporarily stored in silos, which would be about 20 to 30 feet high. The silos would be recharged with regular cement truck deliveries. The grout plant and silos would likely be moved two or three times over the construction duration, to minimize the distance between the batch plant and the mixing rig. Approximately 60,000 to 80,000 cy of soil would be treated at a replacement ratio of 0.4, so that the total volume of installed CDSM would be 24,000 to 32,000 cy. The cement factor, which would be the pounds of cement per cubic foot of installed CDSM, would be about 25 pounds per cubic foot. For this cement factor, the total weight of cement to install 24,000 to 32,000 cy of CDSM would be 8,100 to 10,800 tons. The volume of the resulting crushed, granular CDSM spoil would be approximately 20,000 to 26,500 cy.

Before beginning CDSM construction, a demonstration test section would be performed to verify that the proposed equipment, procedures, and CDSM mix design could mix the foundation soils uniformly and achieve the required strengths. Based on the laboratory test results and visual inspection of cores taken from the in-place CDSM treated soil, a determination would be made as to whether the test section yielded acceptable results.

Following completion of CDSM installation, the stockpiled soil and spoil would be hauled back to the CDSM construction site for fill placement and compaction. The filter and drain system would be installed concurrently with fill placement and compaction. Following placement and compaction of fill, topsoil would be placed on the embankment and the area would be seeded.

2.11.11 Conventional Earthwork Activities

Before starting earthwork at the dam, construction activities at the outlet works would be completed, and the dewatering system would be installed and operating to lower the groundwater surface to below the proposed excavation. Construction activities at the outlet works are described separately.

Dewatering would include installing deep wells into bedrock, and eductors and well points into the dam and foundation. Eductors are narrow-diameter wells; water is pumped into the well and passes through a venturi (a short tapered tube that lowers the water pressure to remove groundwater from the adjacent soil). The dewatering system would ring the excavation area to prevent groundwater from entering in any direction. Estimated pumping rates range from 5 to 50 gallons per minute, starting at a period 3 to 4 months before the excavation would begin and continuing until the fill is completed. Water generated would be discharged in San Leandro Creek or Lake Chabot, in accordance with applicable regulatory requirements to remove sediments

Excavation activities would include first clearing and grubbing vegetation. Excavation would follow 2:1 (horizontal:vertical) slopes, and would be accomplished with excavators and haul trucks, with scrapers, or a combination of both. Excavated material would be hauled to the Park Stockpile and Filter Pond Stockpile using the Lower Haul Route, Upper Haul Route, or a loop of the two routes. After excavation was completed, the stockpiled soil would be hauled back to the excavation for fill placement and compaction. The filter and drain system would be installed concurrently with fill placement and compaction. If required, additional fill would be imported so that the combined volume of compacted soil and drain material would be equal to the volume of excavated material. Following the placement and compaction of fill, topsoil would be placed on the embankment and the area would be seeded.

2.11.12 Outlet Works Activities

Project construction at the outlet works would include installing a steel liner in the masonry shaft using a crane and welders. New valves and operators would be installed at the shaft, replacing those that now exist at the tower. The existing pipes would be relined or replaced. The tower and pavilion would be removed to reduce the seismic hazard. Some demolition and construction activities would take place underwater and would require use of divers.

Work to remove the tower and pavilion could be accomplished in several ways, including the use of a hydraulic ram attached to the arm of an excavator on a barge. Some of the demolition would require use of a crane from the area above the tower and pavilion, to lower equipment and recover demolition debris. The general sequence for the outlet works would be: demolition and removal of mechanical items including all valves and operators; removal of piping; and removal of brick, concrete and rock materials working from the highest elevation down.

To minimize barge movement and optimize stability in operating the excavator over the water, the barge would be securely moored. The hydraulic ram would be used for demolition above water and below the waterline. The excavator would be outfitted later with a bucket to load debris from the demolition. If necessary, workers would assist with tower removal above water using jackhammers, and divers could assist with minor demolition underwater using jackhammers. For the underwater debris removal, divers would be used to spot, direct, and clean up debris from the demolition. A turbidity curtain and containment system would be assembled and installed, using individual 50-foot-wide panel sections made of impermeable fabric materials; a floatation member incorporated along the top and a ballast chain stitched into the bottom would enable it to seal along the entire water column. A moveable entry gate would be incorporated into the turbidity curtain to enable movement and passage of materials barges and support boats into and out of the demolition area. A secondary floating oil and debris containment boom, made of oil absorbent sock-like materials, also could be assembled and installed just within the perimeter of the turbidity curtain. This material would be used help contain and capture petroleum products that may escape and float on the water. Typically, leakage from diesel fuel and/or hydraulic fluid sources used for equipment mounted on floating equipment is closely monitored and controlled using containment catch basins, mounted on the deck of the barge, following safe practices when fueling (i.e., use of double-wall containment fuel cells and spring loaded closure valves on fuel nozzles).

The demolition debris would be taken off site: (1) by using the crane above the tower and pavilion to recover all demolition debris, then loading and hauling it out by trucks, using the Upper Haul Route; or (2) by loading the materials barge with demolition debris and floating it to a temporary ramp or bulkhead at the shoreline adjacent to the Upper Haul Route turnaround, then loading and hauling it out by trucks using the Lower Haul Route. The haul trucks would carry the debris to an appropriate landfill.

During the period of construction, normal reservoir releases would be maintained by the use of temporary piping and a pump to convey water from the lake to the creek. Although not anticipated during construction, if blowoff releases are necessary, the contractor would temporarily suspend work activities during the blowoff.

2.11.13 Instrumentation Installation

Following completion of the previously described activities, additional piezometers and survey monuments would be installed on the surface of the new fill, using the techniques described above under Section 2.11.7, Monitoring Device Installation.

2.11.14 Site Restoration

Following completion of the dam and outlet works upgrade, the work areas at the dam and stockpiles would be regraded, contoured, and seeded or replanted with plant species. Native trees removed as a result of construction at the Park and Filter Pond stockpiles, as well as along the haul routes, would be replaced. The haul routes would be restored, to a similar appearance as preconstruction conditions. Equipment and facilities removed at Chabot Park as a result of construction would be temporarily stored and reinstalled at its original location at end of construction, in consultation with the City of San Leandro. Any equipment that is demolished or damaged beyond repair would be replaced in kind.

2.11.15 Demobilization

Following completion of dam upgrade activities and in coordination with site restoration activities, construction equipment and materials and temporary fencing would be removed from the project area.

2.12 Operating Characteristics

Existing maintenance includes activities such as cleaning the screens at the outlet works tower, and cleaning the pipe for the existing drain system to remove build up of silt and vegetation. Existing monitoring includes reading of the groundwater level in the piezometers and the flow quantities at the weirs, and the survey position of the survey monuments.

Following the completion of construction activities, the operation, maintenance, and monitoring of the dam, lake, and appurtenant facilities would be the same as the existing operation. The filter and drain system would be monitored with one or more weirs to establish normal flow quantities at the typical lake levels. Flows through the filter and drain system to the riprap section of the spillway stilling basin downstream of the dam are estimated to be similar to the flows through the existing drain at this location. Increased flow quantities through the filter and drain system after an earthquake could require emergency lowering of the water in the lake. Piezometers and survey monuments would also be monitored following construction to assess dam stability and to maintain safe operation of the dam. Frequent monitoring would occur until the lake's surface water level returned to normal levels and the groundwater level in the dam stabilized. EBMUD also would maintain the downstream embankment and adjacent areas, including the pipe for the filter and drain system, to remove any built-up silt and vegetation.

2.13 Project Schedule and Cost

EBMUD's Board of Directors is scheduled to consider certification of this Draft EIR and approval of the proposed project at a regularly scheduled Board meeting in June 2014. If the Board certifies the EIR and approves the proposed project, the project design would be completed and the construction bid package prepared. Construction would begin after the bid was awarded.

The planning level total project cost is estimated at approximately $20 million. This estimate includes design, construction, construction management, inspection, and mitigation.

2.14 Discretionary Approvals Required for Project

Table 2-12 presents a preliminary list of the agencies and entities, in addition to EBMUD, that would use this EIR in their consideration of specific permits and other discretionary approvals that may apply to the proposed project. This EIR is intended to provide those agencies with information to support their decision-making process. The table also lists the types of activities that would be subject to these requirements.

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, or transmission of water (California Office of Administrative Law 2013a). However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

Table 2-12
Required Permits and Approvals for Project

Agency	Permits and Approvals Required	Action Associated with Permit or Approval	Project Component(s) or Activities that would Trigger Permit or Approval
Division of Safety of Dams (DSOD)	Review and approval of plans for modifying the dam embankment and outlet works.	Seismic upgrade of the dam and outlet works	• Chabot Dam is under DSOD jurisdiction.
U.S. Army Corps of Engineers (USACE)	Clean Water Act (CWA) Section 404 Nationwide Permit	Impacts to wetlands and waters of the U.S.	• Temporary impacts associated with the Lower Haul Route crossing the San Leandro

Table 2-12
Required Permits and Approvals for Project

Agency	Permits and Approvals Required	Action Associated with Permit or Approval	Project Component(s) or Activities that would Trigger Permit or Approval
			Creek below ordinary high water mark (OHWM), including placement of the bridge footings or stabilizing road fill. • Any temporary or permanent fill within the federally jurisdictional wetland for installation of the subdrain outfall at the dam excavation site. • Work associated with the outlet tower that would involve fill (temporary or permanent) below the OHWM within Lake Chabot, including: replacement of the inlet pipe or installation of the trash rack/inlet option, and installation of a temporary bulkhead or ramp near the Upper Haul Route turn-round to remove outlet works construction debris.
Regional Water Quality Control Board (RWQCB)	National Pollutant Discharge Elimination System (NPDES) Construction General Permit and Stormwater Pollution Prevention Permit	Control of stormwater pollution during construction, apply Best Management Practices, preparation of Stormwater Pollution Prevention Plan (SWPPP)	• Construction activities that include greater than one acre of land disturbance. The project components considered together would disturb more than one acre. A SWPPP is required to obtain NPDES permit coverage for stormwater discharge.

Table 2-12
Required Permits and Approvals for Project

Agency	Permits and Approvals Required	Action Associated with Permit or Approval	Project Component(s) or Activities that would Trigger Permit or Approval
RWQCB (continued)	CWA Section 401 Permit	CWA Section 401 Water Quality Certification is obtained in conjunction with a CWA Section 404 Permit	• CWA Section 404 Permit is triggered due to the Lower Haul Route. A 401 Permit would be obtained in conjunction.
California Air Resources Board (CARB)	Portable Equipment Registration	Registration of portable engines not related to motor vehicles	• Portable engines above 50 hp (e.g., air compressors and generators) are required to have a current registration with CARB.
United States Fish and Wildlife Service (USFWS)/ National Oceanic and Atmospheric Administration Fisheries	Section 7 consultation under the federal Endangered Species Act (ESA)	USFWS to evaluate potential impacts to special-status plant and animal species; required as part of USACE 404 permitting	• Impacts to federally listed species and/or their habitat. Several status species, such as Alameda whipsnake (threatened), steelhead (threatened), and California red-legged frog (threatened) have the potential to occur within or near the project area.
State Historic Preservation Officer (SHPO)	Section 106 Review	Consultation necessary as part of the USACE permit process	• CWA Section 404 Permit is triggered due to the Lower Haul Route.
California Department of Fish and Wildlife (CDFW)	Section 1602 Streambed Alteration Agreement	Potential impacts to creeks and special-status plant and animal species	• In addition to those permit triggers identified under the USACE 404 permitting process, any vegetation trimming/removal within riparian corridor, particularly along the Upper and Lower Haul Routes.
	Incidental Take Permit (ITP) under the California Endangered Species Act (CESA)	CDFW to evaluate potential impacts to state listed species	• Take of state-listed species and determination of impacts and mitigation measures.

Source: Data compiled by AECOM in 2013

3 Environmental Setting, Impacts, and Mitigation Measures

3.1 Introduction

3.1.1 Organization of Chapter 3

Chapter 3 is organized by environmental resource area, as follows:

- 3.2 Aesthetics
- 3.3 Geology and Soils
- 3.4 Biological Resources
- 3.5 Cultural Resources
- 3.6 Transportation and Circulation
- 3.7 Air Quality
- 3.8 Greenhouse Gas Emissions
- 3.9 Noise and Vibration
- 3.10 Recreation
- 3.11 Hydrology and Water Quality
- 3.12 Hazards and Hazardous Materials

Each section of Chapter 3 is organized into the following subsections based on requirements of CEQA.

3.1.2 Approach to Analysis

This subsection describes the general approach to analyzing the subject environmental resource area and cross references related to issues addressed elsewhere in this Draft EIR.

3.1.3 Environmental Setting

This subsection presents a description of the physical environmental conditions of the subject environmental resource area in the project vicinity.

3.1.4 Regulatory Background

This subsection discusses pertinent federal, state, regional, and local laws, regulations, and ordinances, including regional and local plans.

3.1.5 Impact Analysis

This subsection is divided into the following two discussions: (1) Significance Criteria; and (2) Project Impacts and Mitigation Measures.

Significance Criteria

In Chapter 3, the environmental impacts of the proposed project are identified as either significant or less than significant. Section 15382 of the State CEQA Guidelines defines a significant impact as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project."

For each environmental resource area evaluated in this Draft EIR, criteria for significance have been developed, using the State CEQA Guidelines, applicable city and county standards and policies, and/or the "significance thresholds" of federal, state, regional, or local agencies. An impact that is classified as **significant and unavoidable** would meet the criteria for significance developed for each category of physical environmental conditions. An impact that is **potentially significant** but would require mitigation measure(s) to reduce the impact to a less-than-significant level is identified as **less than significant with mitigation incorporated**. An impact that would not be significant (because it would not meet the significance criteria) is identified as **less than significant**. A less-than-significant impact includes conditions where no measurable physical change from the proposed project would occur in the physical environmental conditions, or **no impact**.

Project Impacts and Mitigation Measures

The Project Impacts and Mitigation Measures section discusses the impact analysis and identifies mitigation measures to reduce potentially significant impacts.

Project Impacts

Project impacts were determined by comparing the environmental effects of constructing the proposed project with existing environmental conditions. The analysis is summarized in a numbered impact statement that corresponds to the significance criteria, and it provides an explanation for each impact determination (no impact, less than significant, less than significant with mitigation incorporated, or significant and unavoidable). Following each impact summary statement is the analysis that provides the information and rationale for the impact determination.

Project impacts related to the specific environmental resource area addressed in this subsection are divided into project components where the impacts can vary by component. Otherwise, the impacts are discussed generally, covering all project components. The impacts associated with the proposed project are generally short-term and temporary construction impacts with the exception of the cultural resources impacts and impacts from tree removal (biological resources, recreation, aesthetics).

Operational activities following project construction would be the same as the existing activities. Following construction, the project area would be restored to a similar appearance as pre-construction conditions, as stated in Section 2.11.14, Site Restoration. Operational activities would continue to include occasional inspection and maintenance, and vehicle trips to the dam facilities. Because long-term operation and maintenance would not result in a net increase in maintenance activities, no impacts would be associated with the operations. Therefore, long-term operation and maintenance impacts are not discussed further in the Draft EIR.

Mitigation Measures

Section 15126.4(a)(1) of the State CEQA Guidelines states that an EIR "shall describe feasible measures, which could minimize significant adverse impacts..." Section 15126.4(a)(3) states that "mitigation measures are not required for effects which are not found to be significant." In this Draft EIR, mitigation measures are identified (where feasible) for all of the potentially significant impacts as well as for some of the impacts that are identified as less than significant, and the residual effect after mitigation is noted. In general, the mitigation measures proposed herein reduce any potential impacts to a less than significant level with mitigation incorporated, but for cultural resources, air quality, and recreation resource issues, the impacts would remain significant and unavoidable, even with mitigation incorporated. All mitigation measures are described as part of the proposed project.

The mitigation measures are numbered to correspond to the impact summary statement number. For example, **Mitigation Measure CR-1.1** and **Mitigation Measure CR-1.2** are the first and second mitigation measures identified for **Impact CR-1** (Cultural Resources). Each mitigation measure is described in terms of its implementation, timing, enforcement, and the residual effect after application of the mitigation measure.

Mitigation measures would be incorporated into contract specifications and would be implemented by EBMUD or its contractors, and would be monitored by EBMUD-appointed personnel or EBMUD construction inspectors. The Mitigation Monitoring and Reporting Program that would be prepared for the proposed project would identify the responsible parties through each project phase, from design and construction to operations and maintenance.

3.1.6 Impact and Mitigation Summary

A table at the end of each section summarizes the impact analysis. Across the first row are the project component combinations. The first column contains each of the impact statements for the environmental resource area, previously discussed in detail in the section. The impact conclusions and any applicable mitigation measures then are listed below each of the project component combinations. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

3.1.7 Resources Not Further Evaluated in This EIR

As discussed in Section 1.2.2, Resources Not Further Evaluated in This EIR, this Draft EIR analyzes only those effects identified as potentially significant in the Initial Study that was prepared for the proposed project (provided in **Appendix C**). Effects found not to be significant and excluded from this Draft EIR include: Public Services; Agricultural and Forestry Resources; Population and Housing; Land Use and Planning; Utilities and Service Systems; and Mineral Resources.

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3.2 Aesthetics

This section discusses the existing aesthetics and visual resources in the project area, describes the pertinent federal, state, regional, and local laws and guidelines, presents the potential construction impacts, and identifies potential aesthetics and visual resources mitigation measures, if required.

3.2.1 Approach to Analysis

Aesthetics analysis considers view obstruction, negative aesthetic effects, conflict with adopted environmental plans or goals, and light and glare effects. Visual impacts are evaluated by comparing visual changes from the proposed project with the existing visual character of the project area and vicinity. Visual character is defined to include analysis of viewsheds, physical site characteristics, and lighting.

A project is considered to have a negative effect on aesthetics if it will introduce to the viewshed highly visible, incongruous elements, or introduce elements that are out of character or incongruous with the surrounding environment. Viewshed is defined as the surface areas visible from an observer's viewpoint and apply where a sensitive community is affected. For this project, this would correspond to distant views from adjacent residences or people traveling on Lake Chabot Road, or recreational visitors to the park. The nearest residences are within 500 feet from the Park Stockpile (Estudillo Avenue and Sylvan Circle), 800 feet to 900 feet from the Filter Pond Stockpile Sylvan Circle and Revere Avenue), and 1,500 feet from Chabot Dam (Astor Court, Lakeview Drive, Lake Chabot Road). The residences along Sylvan Circle are located north and northwest of the Park and Filter Ponds stockpiles. Residences along Revere Avenue are uphill from the Upper Haul Route and Park Stockpile. The residences along Astor Court, Lakeview Drive, and Lake Chabot Road are southwest and uphill from the dam.

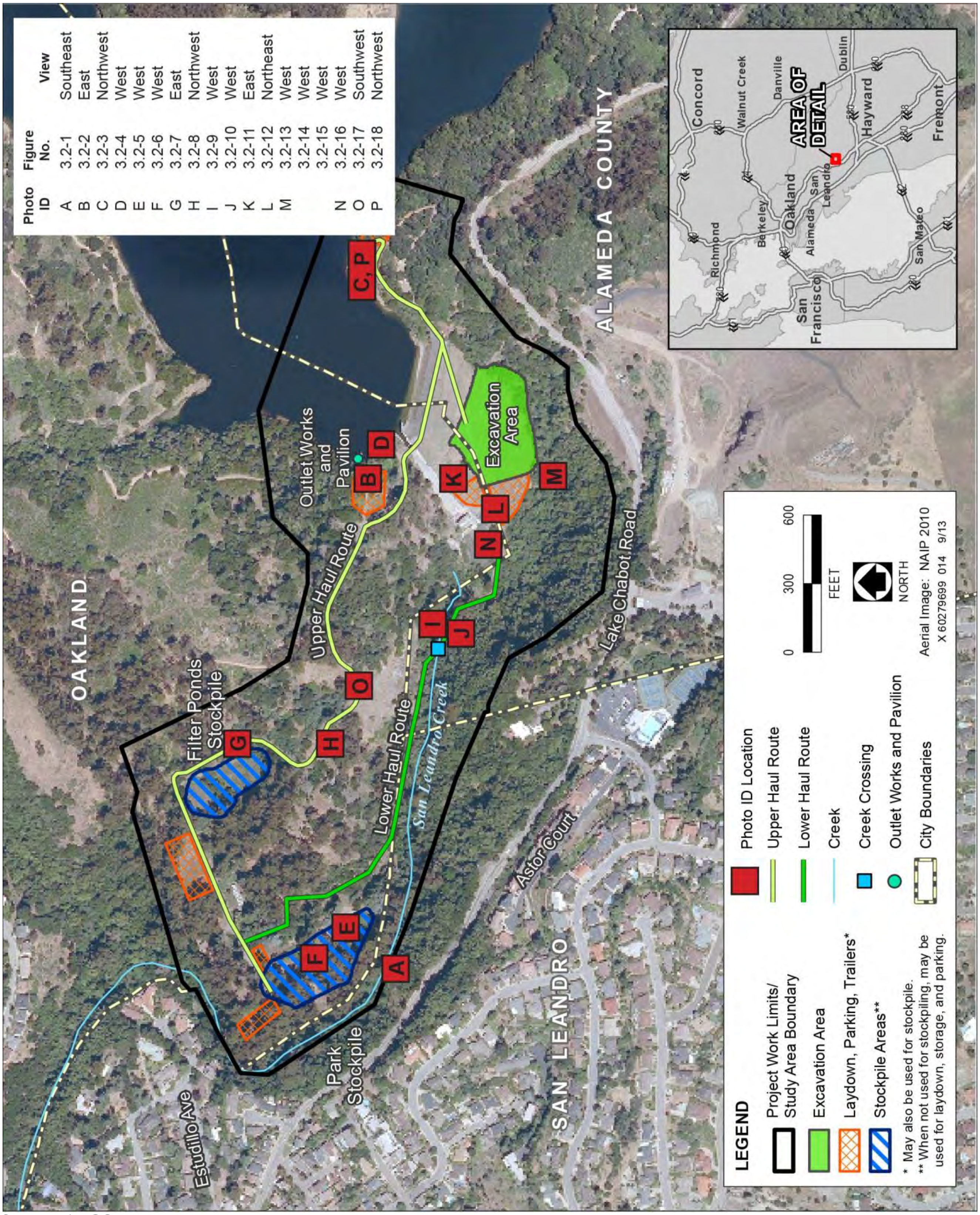
The potential direct and indirect effects to aesthetics during project construction and after construction at several locations are evaluated. The locations evaluated include those affected during construction: Chabot Dam, Lake Chabot, haul routes, outlet works, and stockpile locations. An assessment of viewer sensitivity can be made based on the extent of the public's concern for a particular landscape. Viewer sensitivity varies, depending on the characteristics and preferences of the viewer group. Sensitivity is generally higher for views seen by people from their homes, those who are driving for pleasure, and people engaged in recreational activities, and less for views seen by people commuting to or during work.

3.2.2 Environmental Setting

The environmental setting provides visual descriptions and photographs of views for the regional area and project area and features. The photograph locations are identified with letters and cross-referenced to the figure numbers in the text, with view directions, as shown in **Figure 3.2-1**.

Regional Visual Setting

The visual features of the region include California's northern Coast Ranch mountains and inland valley landscapes. Natural features include rolling grass covered hillsides, steep rugged hills and narrow ravines, broad valleys and prominent ridges, meandering tree-lined creeks and drainages, and oak woodlands. Open ridgelines and wooded hillsides provide a visual backdrop for the area's urban and suburban development, and Lake Chabot, as shown in the panoramic view of the area in **Photo 3.2-1**.



Source: AECOM 2013, Terra Engineers 2013, EBMUD 2013

Figure 3.2-1: General Site Plan with Photograph Identification (ID) Locations

Photo 3.2-1 shows the primary landscape features consisting of Lake Chabot Regional Park, Anthony Chabot Regional Park, and Lake Chabot. Lake Chabot Regional Park is located adjacent to the western end of Anthony Chabot Regional Park and surrounds the 315-acre Lake Chabot. The trails in Lake Chabot Regional Park connect to trails in Anthony Chabot Regional Park, including the Skyline National Trail. The paved 3.5-mile West Shore and East Shore trails provide access to the south and east shores of the lake and originate at the Lake Chabot Marina. These parks feature a mosaic of non-native woodlands, oak and mixed woodlands, native and non-native grasslands, upland scrubs, wetland communities, and riparian scrubs and woodlands. These areas tend to be highly visible and form a picturesque backdrop for individual neighborhoods and the cities, and motorists on surrounding roads.

Source: Chris Saulit, Flickr, 2010, http://www.flickr.com/photos/csaulit/4760552599/

Photo 3.2-1: Regional landscape above and west of the dam, facing southeast

Project Area Setting

The project area is bounded on the west and southwest by residential development, on the southeast by an active quarry (**Photo 3.2-1**), and on the north and east by park and open space. San Leandro Creek flows west through the project area.

Source: AECOM 2012

Photo 3.2-2: Lake Chabot and top of pavilion, looking east

Portions of the project area are within the cities of Oakland and San Leandro, unincorporated Alameda County (Castro Valley), Chabot Park, and the trails of Lake Chabot Regional Park. Chabot Dam is located at the west end of Chabot Lake. These parks and features are further described in Section 3.10, Recreation, and Section 3.4, Biological Resources.

Source: AECOM 2012

Photo 3.2-3: Pavilion and Chabot Dam, looking northwest

The following photographs depict the visual character of various project area locations. As shown in many of the photographs, the hilly topography and mature trees screen views of the project area from many of the residential locations west of the project site. However, views from Lake Chabot Road and ridgelines would include scenic views of Lake Chabot and Chabot Dam. **Photo 3.2-1** is an aerial view of Lake Chabot. **Photo 3.2-2** shows the scenic view of Lake Chabot from the hill above the lake. **Photo 3.2-2** also shows a view of the top of the pavilion and outlet works tower. The pavilion and outlet works tower are located at the west end of Lake Chabot and approximately

200 feet from Lake Chabot Dam's spillway. The outlet works tower is about 23 by 23 feet wide, and four feet tall made of stone and set against the rock. It is capped with a 13 foot-high reinforced concrete pavilion. **Photo 3.2-3** shows Lake Chabot looking west toward the dam and pavilion and outlet works. This photo represents a distant view of the pavilion from the east along the West Shore Trail.

Source: WRE 2013

Photo 3.2-4: Close-up of pavilion, looking north

The pavilion is a 13-foot high, reinforced concrete structure on top of the outlet works tower. The pavilion is surrounded by chain link fencing, covered with graffiti, and not readily accessible or visible to the public from the Bass Cove Trail near the dam. However, the pavilion is a recognizable feature by locals, visible from the lake and West Shore Trail, and considered to have a heritage value since it was added to the outlet works in 1923. **Photo 3.2-4** shows a close-up view of the pavilion, as seen from the maintenance access path north of the spillway and dam. The maintenance access path is not open to the public. Information on the history of the pavilion is presented in Section 3.5, Cultural Resources.

Source: Burleson Consulting 2012

Photo 3.2-5: Entrance to Chabot Park

Photo 3.2-5 shows a view from within the back of the park towards the entrance to Chabot Park, a 10-acre park, gated, and surrounded by trees that provide screening from adjacent neighborhoods. Access to the park is through a residential neighborhood from Estudillo Avenue and Sylvan Circle. San Leandro Creek is adjacent to the southern edge of the park. A paved path provides access through the park to the large grassy open field, which is the location for the Park Stockpile (**Photo 3.2-6**).

Source: AECOM 2012

Photo 3.2-6: Proposed Park Stockpile location, looking west and showing stand of trees in background

The proposed Park Stockpile site would occupy the park area, extending from the park entrance, continuing through the park east end, and terminating at the existing gated access road (which would be the Lower Haul Route). The proposed stockpile would be maximum 60 feet in height.

The Filter Pond Stockpile would be located at the site of the former filter ponds, located on EBMUD's property, as shown in **Photo 3.2-7**. The site would be accessed near the entrance to Chabot Park from both the Upper and Lower Haul routes. The Filter Pond Stockpile site is fenced and not accessible to the public. The site is a 2.5-acre area that is devoid of landscaping, except for trees and shrubs around the perimeter.

The proposed stockpile would be maximum 50 feet in height.

Source: CHS 2012

Photo 3.2-7: Proposed Filter Pond Stockpile, looking east along Upper Haul Route

Photos 3.2-8 and **3.2-9** show segments of the two haul routes. The Upper Haul Route (**Photo 3.2-8**) is approximately 4,700 feet long by about 10 to 16 feet wide and paved, except for a 1,240-foot segment that is a turnaround near the lake. It includes the West Shore Trail in Lake Chabot Regional Park. The Upper Haul Route is bordered by shrubs and trees with occasional glimpses across the canyon to distant hillsides.

The Lower Haul Route (**Photo 3.2-9 and Photo 3.2-10**) is an approximately 2,380-foot-long by about 15 to 25-foot-wide flat unpaved roadway, starting from the Lake Chabot Dam toe and spillway, and continuing to the park road at the west end of Chabot Park. The Lower Haul Route is covered by a canopy of trees, crosses over San Leandro Creek, and is not readily visible or currently open to the public.

Source: CHS 2012

Photo 3.2-8: Upper Haul Route, looking northwest

Photo 3.2-11 shows the Chabot Dam toe, an open space that is covered with grass and shrubs, and surrounded by trees on the hillsides. This area is not open to the public but is visible from a distance through a fence from the West Shore Trail on top of Chabot Dam and from residences on the hillside along Lake Chabot Road.

Photo 3.2-12 shows the concrete fenced spillway on the north edge of the toe. The spillway includes a concrete approach, weir, chute, and stilling basin. The spillway is about 70 feet wide, and the basin is about 100 feet long. This area is not open to the public but is visible from a distance from the West Shore Trail on top of Chabot Dam and through the trees from residences on the hillside along Lake Chabot Road.

Source: CHS 2012

Photo 3.2-9: Lower Haul Route at San Leandro Creek crossing at high flows, looking west

3.2.3 Project Viewshed and Public View Corridors

The project viewshed, or the general area from which the project area is visible, includes more distant viewing locations in the vicinity. Intervening topography and mature vegetation and trees screen views of the project area from many locations in the project vicinity. Residences in the neighborhood adjacent to Chabot Park would not have views of the Park Stockpile or the Filter Pond Stockpile because this area of the project site is heavily wooded, and thus is screened from adjacent residences. The project site at the dam crest may be visible from hillside residences and ridgeline areas, including recreational trails such as the West Shore Trail. In addition, the dam and lake can be seen by motorists at limited locations along Chabot Dam Road.

Source: CHS 2012

Photo 3.2-10: Lower Haul Route at San Leandro Creek crossing at low flows (normal), same location looking west

Homeowners are expected to be highly sensitive to views near their homes. The approximately 30 homes at the higher elevations along the ridgeline about 1,500 feet west and south of Lake Chabot would have distant views of Chabot Dam and Lake Chabot. **Photo 3.2-13** shows an aerial view of Chabot Dam toe, spillway, and Lake Chabot in the background. The toe is covered with grass and surrounded by trees. The road across the dam is also visible from a distance from the residences along the ridgeline.

3.2.4 Regulatory Background

Federal

Source: Burleson Consulting 2012

Photo 3.2-11: Chabot Dam Toe, looking east

No federal regulations related to aesthetics and visual resources are applicable to the proposed project.

State

Although the ordinances and regulations listed in this section may not apply to the proposed project for the reasons cited under "California Government Code" below, they provide useful context for any post-construction landscaping that may be required to address construction impacts of the project.

Scenic Highways

The State Scenic Highways program, a provision of the Streets and Highways Code, was established by the Legislature in 1963, to preserve and enhance the natural beauty of California (California Office of Administrative Law 2013c). The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. The status of a State Scenic Highway changes from "eligible" to "officially designated" when the local jurisdiction adopts a scenic corridor protection program, applies to Caltrans for scenic highway approval, and receives the designation from Caltrans.

Source: Burleson Consulting 2012

Photo 3.2-12: Chabot Dam spillway, looking northeast

Regional

Alameda County General Plan

Source: EBMUD File Photo

Photo 3.2-13: Aerial view of Chabot Dam Toe and Lake Chabot, looking northeast

Alameda County does not have a countywide land use or circulation element but has adopted area plans that meet the California Government Code's requirements for these elements for Castro Valley and other unincorporated areas. The Alameda County General Plan consists of several documents (Alameda County Community Development Agency 2013a). Three area plans contain land use and circulation elements for their respective geographic areas, as well as area specific goals, policies and actions for circulation, open space, conservation, safety, and noise. A portion of the proposed project would be within the Castro Valley Area Plan planning area, which includes the Castro Valley urban area and surrounding canyonlands; the project area is designated as Protected Open Space and Regional Parks (Alameda County Community Development Agency 2012).

Scenic Route Element

The Scenic Route Element is a countywide element of the General Plan, adopted in 1966 and amended in 1994 (Alameda County 1966). The project area is encompassed within this plan. The plan serves as a guide for development of city and county legislation and the program to protect and enhance scenic values along routes designated in the plan. The required action in the plan is adoption by the county and cities within the county of scenic route elements to each specific area's general plan, and also streambed, canal, lake, and reservoir protection legislation to establish a system for review and approval of alterations to inland water bodies or watercourses.

The types of scenic routes include scenic freeways and expressways, scenic thoroughfares, and scenic rural-recreation routes. The scenic routes also include the right-of-way, scenic corridor, and areas extending beyond scenic corridors. The plan's objectives and principals are to protect against land uses, features, and development that destroy scenic views in these scenic routes.

Lake Chabot Road is identified in the General Plan as having scenic views of Lake Chabot and Chabot Dam.

One objective in the plan that is relevant to the proposed project is:

- To conserve, enhance, and protect scenic views observable from scenic routes.

In addition, the following principals are included in the plan:

- Landscaping should be designed and maintained in scenic route corridors to provide added visual interest, to frame scenic view, and to screen unsightly views;
- No mature trees should be removed without permission of the local jurisdiction as a means of preserving the scenic quality of the county.

- Alteration of streambeds or bodies of water and adjacent vegetation should be permitted only with approval of the local jurisdiction, as a means of preserving the natural scenic quality of stream courses, bodies of water, vegetation and wildlife in the county. Development along edges of streams, canals, reservoirs, and other bodies of water should be designed and treated so as to result in naturalistic, architectural or sculptural forms.

The Alameda County Planning Department is developing an amendment to the Alameda County General Ordinance Code to address development in areas that have been identified for their scenic importance, based on the Scenic Route Element Plan and other specific area general plans, including the Castro Valley General Plan. The Alameda County Planning Commission recommended approval of a Scenic Corridor Combining District, and approval by the Alameda County Board of Supervisors is expected in 2013 (Alameda County Community Development Agency 2013b).

Open Space Element

The Open Space Element of the General Plan includes proposals for open space surrounding communities, agricultural open space, and Bay, shoreline, and woodland preserves. (Alameda County Community Development Agency 2013a). The element also proposes a system of recreation trails and scenic routes to connect major park and recreation facilities. The Open Space Element also is concerned with preservation of the ecological system (i.e., "the balance between habitat and its residents so that all can flourish"). The Open Space Element states: "Provision of open space surrounding communities provides relief from the visual congestion, noise, and traffic of high density urban development. Clean air and the visual amenities of open and wooded vistas often contrast to the urban experience."

Principles in the Open Space Element that are relevant to the proposed project (construction) include the following:

- Open Space Circulation and Access Roads: Provide open space circulation in accord with adopted plans and new access roads should be kept to a minimum. All circulation routes should follow adopted county scenic route polices and principles.
- Protect Open Space Areas from Erosion; Restore Eroded Areas.
- Scenic Route Element Recommendations should be Implemented.

Local

California Government Code

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, or transmission of water (California Office of Administrative Law 2013a). However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

City of San Leandro General Plan

The City of San Leandro General Plan covers a portion of the project area, including a portion of unincorporated Alameda County that encompasses the western access to the area through a residential neighborhood via Estudillo Avenue and a portion of Lake Chabot Road. San Leandro Creek flows from Lake Chabot and is considered one of San Leandro's natural resources that contribute to its ecological health and scenic beauty, and flows within the City of San Leandro's city limits (City of San Leandro 2013a).

One of the plan's goals is to maximize the potential benefits of the East Bay Regional Park District system for San Leandro residents. Policies in the plan include upgrading the trail along San Leandro Creek from Chabot Park (at the end of Estudillo Avenue) to Lake Chabot Dam. Another goal of the plan is to protect San Leandro Creek as a citywide open space and natural resource, and many policies are related to that goal, which include creek stewardship, development, habitat restoration, and creek maintenance.

Another plan element that is relevant to aesthetics concerns historic preservation and community design; however, this element is not relevant to the proposed project. Community design elements also include designation of scenic highways and encourage preservation and care of street trees. The 1989 General Plan designated Estudillo Avenue and Lake Chabot Road as scenic highways. The relevant policies and actions related to aesthetics are as follows (City of San Leandro 2013a):

- **Policy 44.03**: **Tree Removal and Replacement**: Discourage the removal of healthy trees and require replacements for any trees that are removed from street rights-of-way. Where healthy trees must be removed, consider their relocation to other suitable sites instead of their disposal. Encourage the preservation and proper care of mature trees throughout the City, particularly those which may have historic importance or contribute substantially to neighborhood character.
- **Action 44.03-A: Tree Preservation**: Investigate methods to: (a) encourage the protection of historic, landmark, and heritage trees; (b) provide incentives for property owners to maintain significant trees and reduce the burden of maintenance; (c) provide greater protection for public trees located within the street rights-of-way; and (d) require preservation of large, mature or significant trees on new development sites.

City of San Leandro Municipal Code

Under Title 3, Health and Safety, Chapter 3-22, Bay-Friendly Landscaping Requirements for City Projects, (k) the City requires City projects and public-private partnership projects to incorporate Bay-friendly Landscape Guidelines as necessary and appropriate to achieving the benefits of sustainable landscaping in the city. Bay-Friendly Landscape Guidelines means the most recent version of guidelines developed by StopWaste.Org for use in the professional design, construction, and maintenance of landscapes (City of San Leandro 2013b).

City of Oakland General Plan

The Open Space, Conservation, and Recreation Element of this plan addresses the management of open land, natural resources, and parks in the City of Oakland. The regional parkland in the hills above Oakland is considered to be an invaluable aesthetic, ecological, and recreational resource for the city. Open space principles include management of existing open space and no net loss of public open space in the city. Relevant goals and policies related to the parks and aesthetics include (City of Oakland 2013a):

- **Goal OS-1**: A Citywide open space system accessible to every Oakland resident which provides land for recreation, natural resource management, the protection of public health and safety, and visual enjoyment.

- **Policy OS-1.1: Wildland Parks**. Conserve existing City and Regional Parks characterized by steep slopes, large groundwater recharge areas, native plant and animal communities, extreme fire hazards, or similar conditions. Manage such areas to protect public health and safety and conserve natural resources.

3.2.5 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on aesthetics if it would:

1. have a substantial adverse effect on a scenic vista;
2. substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
3. substantially degrade the existing visual character or quality of the site and its surroundings; or
4. create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Viewer Groups

The project viewshed would include two types of viewer groups. These groups would overlap at times, but for the purposes of this discussion, they are described separately:

- Motorists on local roads including Lake Chabot Road and Estudillo Avenue. These motorists would include local residents and commuters. The duration of project views of Lake Chabot and Chabot Dam from these roads would be short and would be obscured by trees. Lake Chabot Road is designated as a local scenic roadway by the City of San Leandro. Therefore, the sensitivity of this group is considered low to moderate.
- Residents located near the project area, including inhabitants of San Leandro, and recreational park visitors. Views of the Park and Filter Pond stockpiles and Upper and Lower Haul routes from residents at about 500 feet to 900 feet from the nearest site (Sylvan Circle and Estudillo Avenue, and Revere Avenue) would be obscured by the terrain and trees. Views of Lake Chabot and Chabot Dam would be only from residences along the ridgeline on Astor Court, Lakeview Drive, or Lake Chabot Road, at a distance of 1,500 feet. Because Chabot Park and trails within the project work limits would be closed for the construction duration, the project area would be visible to park visitors from a distance, similar to the view for the homeowners. Therefore, the sensitivity of this group is considered low.

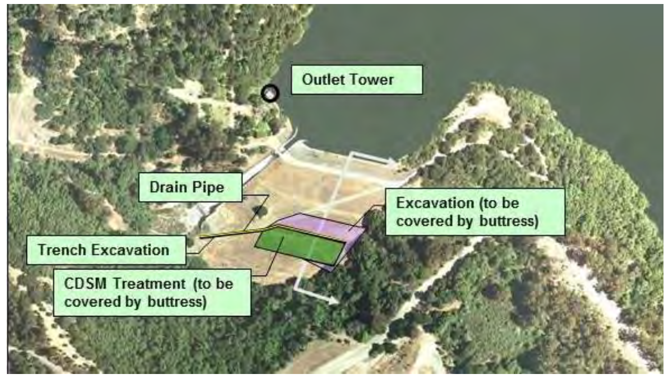
Project Impacts and Mitigation Measures

Impact AE-1: The proposed project would have a substantial adverse effect on a scenic vista (Criterion 1). (Less than Significant with Mitigation Incorporated)

Existing views from the ridgelines above Lake Chabot would be considered scenic to several viewer groups, including residences, recreational visitors using the park trails (such as West Shore Trail), and motorists on Lake Chabot Road. A scenic vista is a viewpoint that provides expansive views of a highly valued landscape to the general public. Determining a scenic vista is subjective and often is determined in general plans or other planning documents. Lake Chabot Road is identified in the Alameda County General Plan as having scenic views of Lake Chabot and Chabot Dam.

CDSM and Conventional Earthwork Options

Photos 3.2-14 and **3.2-15** show the topography, existing landscape, and excavation footprint of the Chabot Dam project location for the CDSM and Conventional Earthwork options.



Source: EBMUD 2013

Photo 3.2-14: Cement Deep Soil Mixing Earthwork Option

Source: EBMUD 2013

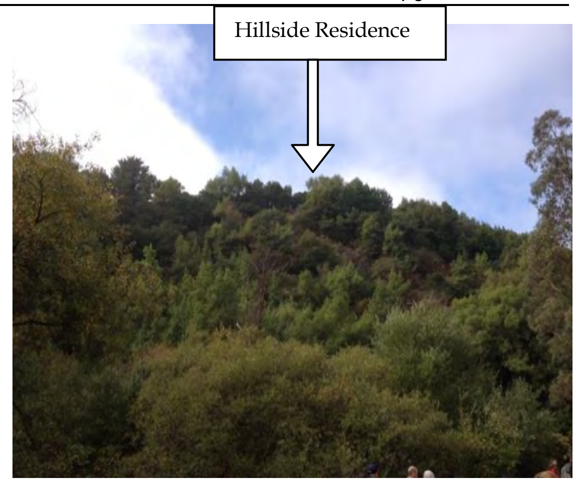
Photo 3.2-15: Conventional Earthwork Option

The area below the dam toe would be excavated and as such protected tree removal would be required at the excavation site some for both construction options; 15 trees for the CDSM option and 75 trees for the Conventional Earthwork option. During the excavation and construction activities, equipment, construction trailers, trucks, ongoing work and tree removal would be visible from a distance to residents along Lake Chabot Road, Astor Court, and Lakeview Drive, on the ridgeline above the dam. Construction equipment and work activities within Chabot Lake and at the outlet works also would be visible from the ridgeline as well as from recreational trails such as the West Shore Trail, and briefly for motorists traveling on Lake Chabot Road.

Although construction activity would occur at the dam toe and within the lake, the lake would remain in service and would be operated at a surface water level of 211 feet or greater under both CDSM and Conventional Earthwork options. Over the last 23 years, the reservoir surface water level has ranged from approximately 216 to 229 feet mean sea level (msl), and typically has ranged in elevation between 219 and 226 feet msl. Operating the reservoir at 211 feet or above would be, at most, 5 feet below the normal range. The difference in water level during construction may be perceptible to recreational visitors to the lake, including trail users and boaters. However, the change in the lake level would be temporary and would return to operating within the average range following construction. Therefore, the impact would be *less than significant* on scenic vistas.

During construction, open space surrounding the project area would not be obstructed and would still be visible to recreational visitors on the open portion of West Shore Trail (across the lake), boaters on the lake, and motorists traveling on Lake Chabot Road. Therefore, the impact would be *less than significant* on the scenic vista from temporary construction activities that could be seen from these locations, as well as tree removal at the excavation site.

The residences located at higher elevations from the dam site (about 150 feet higher) along the ridgeline on Lake Chabot Road, Astor Court, or Lakeview Drive, approximately 1,500 feet west and south of Lake Chabot (as shown in **Photo 3.2-16)**, would have distant views of Chabot Dam, the toe and spillway, and Lake Chabot**.** The intervening topography, mature vegetation, and trees naturally screen many of these distant views. The scenic view of the lake would remain after construction was completed, and the views of the temporary construction activities and equipment would be confined to the lower elevation areas near the dam. Therefore, *no impact* would occur on this scenic vista for the nearest residences because they would be obstructed from viewing the lower portions of the dam.



Source: Burleson Consulting 2012

Photo 3.2-16: View of the Hillside Residence from Chabot Dam, looking west 150 feet above the dam and at a distance of 1,500 feet

Haul Routes

Source: Burleson Consulting 2012

Photo 3.2-17: Residences 1,000 feet across the ridge from the Upper Haul Route, looking southwest

A temporary increase in construction truck traffic would occur on the Upper Haul Route that may be noticed by residences on Astor Court from a distance. **Photo 3.2-17** shows the view in the opposite direction, from the Upper Haul Route toward a few houses on Astor Court. Approximately 30 protected trees along the Upper Haul Route would be removed to widen the road where needed, as discussed in Section 3.4, Biological Resources (see **Figure 3.4-4** for tree removal areas). The Upper Haul Route area is not easily visible from the nearby residences along Astor Court, approximately 1,000 feet away, because the intervening topography, mature vegetation, and trees along the park perimeter naturally screen these distant views.

The scenic views for recreationists within the park would be altered because of the removal of trees along the Upper Haul Route (which is part of the West Shore Trail) after construction. However, in comparison with the quantity and density of trees and vegetation along the routes, the removal of approximately 30 protected trees would not substantially alter the scenic vistas for residences along Astor Court or recreationists along the West Shore Trail. Therefore, a *less-than-significant* impact would occur on long-term scenic vistas.

Approximately 50 protected trees would be removed to widen the Lower Haul Route (see **Figure 3.4-4**). However, this route is closed to the public, obscured by a canopy of trees, and not readily visible from a distance or any public viewing location. Thus, the scenic views by the two viewer groups would not be affected by construction activities or tree removal on the Lower Haul Route. Therefore, *no impact* would occur on a scenic vista from the Lower Haul Route.

Stockpiles/Staging

Both the Filter Pond Stockpile and Park Stockpile settings would be altered from existing conditions by tree removal and the temporary placement of large piles of soil at these sites during construction. The Park Stockpile would be at maximum 60 feet high and would cover about 4 acres. The Filter Pond Stockpile would be at maximum 50 feet high and would cover about 2.5 acres. The staging areas (**Figure 3.2-1**) would be located within areas of Chabot Park and along the haul routes that are undisturbed, non-vegetated, and surrounded by trees. The Filter Pond Stockpile and Park Stockpile locations and staging areas would not be easily visible within the scenic vistas of nearby homeowners because these locations are within the park and are obscured by trees that are located along the park perimeter, closer to the nearby homes. Therefore, despite their height, the stockpiles would not be easily seen. During project construction, Chabot Park would be temporarily closed to the public, and thus scenic views for park visitors would not be affected by the Filter Pond Stockpile or the Park Stockpile. Therefore, the impact would be *less than significant* on scenic views of the stockpiles and staging areas during construction.

Equipment and facilities removed at Chabot Park as a result of construction would be temporarily stored and reinstalled at its original location at the end of construction, in consultation with the City of San Leandro. Any equipment that is demolished or damaged beyond repair would be replaced in kind. In addition, the stockpile and staging areas would be re-graded, contoured, and seeded with plant species.

The Filter Pond Stockpile is located adjacent to the Upper Haul Route, which is part of the West Shore Trail. This stockpile area is not open to the public; however, it would be visible to recreationists in the park after construction. The scenic views for recreationists within the park would be permanently altered because of removal of approximately five trees at the Filter Pond Stockpile and approximately 80 protected trees at the Park Stockpile (see **Figure 3.4-4** for tree removal areas), and because of other landform modifications to the park from construction use of the area. Therefore, the long-term impact of the stockpiles and staging areas would be *potentially significant*. Implementation of **Mitigation Measures BR-4.1, BR- 4.2, and BR-4.3** would require the avoidance of protected trees to the extent practicable, replacement of protected trees that are removed, and the preparation and implementation of a tree preservation plan, respectively. Implementation of **Mitigation Measure AE-1.1** would restore the construction areas to existing topography. Implementation of **Mitigation Measures BR-4.1, BR- 4.2, BR-4.3, and AE-1.1** would reduce the potentially significant impact on scenic vistas as a result of tree removal and landform modifications to a *less-than-significant* level.

Mitigation Measure AE-1.1: Restoration of construction areas to existing topography.

Areas that are disturbed by construction will be re-graded and hydroseeded to result in landforms that are consistent with existing site topography. Restoration work in Chabot Park will be done in consultation with the City of San Leandro.

Implementation: EBMUD or construction contractor(s)

Timing: After construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure AE-1.1** would reduce impacts on scenic vistas and would restore Chabot Park and trails. In conjunction with **Mitigation Measures BR-4.1, 4.2, and 4.3**, the impact on scenic vistas would be *less than significant with mitigation incorporated*.

Outlet Works

The outlet works would be retrofitted, which would include removal of the tower and pavilion and moving the controls to a relined shaft. The current shaft is an 8-foot-diameter, brick-lined outlet shaft, located behind the tower. Outlet works construction would also require the removal of approximately 25 protected trees near the Upper Haul Route, away from the water's edge. Removal of the tower and pavilion would not impact the scenic view from distant residences above the outlet works because these are not large prominent features in scenic views observed from across Lake Chabot. Removal of 25 protected trees also would not impact the scenic views from distant residences due to the high density of trees in the area. Removal of the tower and pavilion may be perceptible to recreationists who are viewing the outlet works area from the West Shore Trail, or by boaters from the lake. However, as shown in **Photo 3.2-18**, the scenic views as seen by boaters or trail users would not be substantially altered, and therefore the impact on scenic views of the outlet works would be *less than significant*. Removal of protected trees would occur away from the water's edge and therefore would not impact scenic views for recreationists.

Impact AE-2: The proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway (Criterion 2). (No Impact)

The City of San Leandro has designated Estudillo Avenue and Lake Chabot Road as scenic routes. However, these roads are not designated as state scenic highways. Therefore, *no impact* would occur.

Impact AE-3: The proposed project would substantially degrade the existing visual character or quality of the site and its surroundings (Criterion 3). (Less than Significant with Mitigation Incorporated)

The proposed project would alter the appearance of several locations, including the pavilion and outlet tower, Chabot Park, and the Upper and Lower Haul Routes during construction.

All Project Components—Construction

Short-term changes would occur to the visual character of the project site and surroundings during the proposed project's construction activities. These changes would include ground disturbance, removal of trees, and introduction of heavy equipment, cranes, and construction trailers to the project site during construction. The lake would remain in service at a surface level of 211 feet or greater during construction. Over the last 23 years, the reservoir surface water level has ranged from 216 to 229 feet msl, and typically has ranged in elevation between 219 and 226 feet msl. Up to a difference of 5 feet below the normal range may be perceptible to recreationists at the lake because of a larger exposed drawdown zone. However, lake levels fluctuate seasonally and the "bathtub ring," which shows the high water mark when water is at lower levels, is part of the normal aesthetic of the lake. The construction period is projected to occur at the most, over 2 years, after which Lake Chabot would return to its average operating range. Overall, the temporary small change in water elevation would not change the character of the lake, and therefore, the impact would be *less than significant*.

Existing

Proposed

Source: AECOM Artist's Impression, compiled in 2013

Photo 3.2-18: Simulation of outlet works with pavilion removed

Outlet Tower Works

Removal of the pavilion and outlet tower would result in changes to the visual character of the West Shore Trail, as shown in **Photo 3.2-18.** Currently, the project foreground is dominated by the lake. The spillway entrance is visible in the center of the photo, and the outlet works are to the right. These built features do not extend above the hillside and treeline. Visual character (as shown in **Photo 3.2-18**) is dominated by the lake and vegetation. Except for removal of the outlet tower and pavilion, the other dam features would remain similar to the existing ones after construction (as shown under "Proposed" in **Photo 3.2-18**). The pavilion and outlet tower are not listed as scenic resources in the City of Oakland, Alameda County, or Castro Valley Area General Plans. Although the pavilion and outlet tower are recognizable to visitors at Lake Chabot (as shown in **Photo 3.2-18**), removal of these facilities would not substantially degrade the existing visual quality or character of the dam area because they are only easily visible from a distance (see **Photo 3.2-18**). The pavilion has also become a target of trespassers and is covered with graffiti. Its removal would restore the site to a natural setting, which would be more consistent with the visual character of the area/wildland park setting. Therefore, removal of the pavilion and outlet tower would have a *less-than-significant* impact on aesthetics.

Boaters on Lake Chabot could have a closer view of the pavilion and outlet tower than the view from the West Shore Trail presented in **Photo 3.2-18** because the on-water restricted area buoy line is closer than where the photo was taken (the buoy line is visible in the photo). However, the visual character of the view for boaters would still be dominated by the lake and vegetation. Thus, removal of the pavilion and tower would be more consistent with the visual character of the wildland park setting. Therefore, removal of the pavilion and outlet tower would have a *less-than-significant* impact on aesthetics for boaters on the lake.

Removal of 25 protected trees in the outlet works area (away from the water's edge) would not substantially degrade the existing visual quality or character of the dam area due to the high density of trees in the area.

Stockpiles/Staging

The designated staging areas within Chabot Park and Lake Chabot Regional Park would contain construction equipment and trailers, and thus alter the visual character of these areas. The visual character of Chabot Park would be altered by the presence of large soil stockpiles (up to 60 feet high), removal of picnic tables and other park equipment, and clearing, grubbing, and grading of approximately 4 acres of vegetation to allow for approximately 110,000 cubic yards of stockpiling. The Park Stockpile and Filter Pond Stockpile areas would be cleared and grubbed, and many trees would be removed. A stand of trees in Chabot Park, shown in **Photo 3.2-6,** would be removed. As described under Impact AE-1, recreation equipment would be reinstalled at Chabot Park; however, the visual character of the park and other construction areas would be altered from the removal of many trees and alteration of landforms during construction use. Thus, the visual character of the stockpiles and staging areas could be substantially degraded, resulting in a *potentially significant* impact on the visual character. Implementation of **Mitigation Measures BR-4.1, BR- 4.2, BR-4.3, and AE-1.1** would restore the visual character of the stockpile and staging areas through tree replacement/preservation and site restoration, thus reducing the impact to a *less than significant* level.

Haul Routes

Use of the Upper Haul Route during construction would require tree and vegetation removal and installing a temporary bridge over the spillway, adjacent to the existing spillway bridge. For the Lower

Haul Route, a temporary bridge would be installed at the San Leandro Creek crossing, and trees and shrubs would be removed to widen the road. This Lower Haul Route's San Leandro Creek crossing area is not viewable or open to the public. Following construction, the temporary bridges would be removed and the routes would be restored. The character of the haul routes as paths through a forested area would remain. Therefore, the impact on visual character would be *less than significant*.

Impact AE-4: The proposed project would introduce new source of substantial light or glare which would adversely affect day or nighttime views in the area (Criterion 4). (Less than Significant with Mitigation Incorporated)

All Project Components—Construction

Light that falls beyond the intended area of illumination is referred to as light trespass. Types of light trespass include spillover light and glare. Spillover light, which is light that illuminates surfaces beyond the area intended, typically is caused by artificial lighting sources, such as from building security lighting, signage, parking lot lighting, roadway lighting, and stadium lighting on playing fields. Spillover light can adversely affect light sensitive uses, such as residential neighborhoods at nighttime. However, nighttime lighting is necessary to provide and maintain safe, secure, and attractive environments.

The second type of light trespass is glare, which can result from sunlight or artificial light sources reflecting off building exteriors, such as glass windows or other highly reflective surface materials. Glare results when a light source in the field of vision is brighter than the eye can comfortably accept. Squinting or turning away from a light source is an indication of glare. The presence of a bright light in an otherwise dark setting may be distracting or annoying, referred to as discomfort glare, or it may diminish the ability to see other objects in the darkened environment, referred to as disability glare. Glare is particularly associated with high light intensity, as measured in candelas, emitted at angles near horizontal (75 to 90 degrees from straight down).

Project construction under the Conventional Earthwork option would take place during the daytime. Night lighting typically would consist of temporary lights in a construction trailer or security lights aimed at the construction area. These lights may be visible to the distant residences on the ridgeline, but they also would be obscured by trees between the work sites and residences, and this construction-related light would not fall beyond the project work area. Lights at the stockpile locations also would be partially or completely obscured by surrounding trees and would not be readily visible to nearby residents. Therefore, construction lighting under the Conventional Earthwork option would have a *less-than-significant* impact on aesthetics.

Under the CDSM option, construction could take place both during the daytime and nighttime. Therefore, spotlights, floodlights, and other sources of illumination potentially would be used to illuminate project work sites, construction trailers, signs, parking and loading areas on Chabot Dam, the dam toe, stockpiles, parking areas, staging areas, and locations along the haul routes. These lights would be equipped with lenses or other devices that would concentrate and direct their illumination on specific project features, and shining them toward off-site locations would be avoided. Although construction lighting for the CDSM option would be temporary, it could adversely affect nighttime views in the area. Therefore, the impact would be *potentially significant* for the CDSM option. Implementation of **Mitigation Measure AE-4.1** would reduce the impact to a *less-than-significant* level.

Mitigation Measure AE-4.1: Direct nighttime lighting away from residential areas.

To the extent possible, lighting used during nighttime construction will be directed downward and oriented toward project features so that no light source is directly visible from the neighboring residential area.

Implementation: EBMUD or construction contractor(s)

Timing: During construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure AE-4.1** would be taken to avoid affecting residential areas by construction lighting, so that nighttime views in the area would not be adversely affected during CDSM nighttime construction. The impact would be *less than significant with mitigation incorporated*.

3.2.6 Impact and Mitigation Summary

Table 3.2-1 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

Table 3.2-1
Aesthetics Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact AE-1: The proposed project would have a substantial adverse effect on a scenic vista (Criterion 1).	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1
Impact AE-2: The proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway (Criterion 2).	NI	NI	NI	NI	NI	NI	NI	NI
Impact AE-3: The proposed project would substantially degrade the existing visual character or quality of the site and its surroundings (Criterion 3).	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles.	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles.	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles.	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, AE-1.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles.
Impact AE-4: The proposed project could introduce new source of substantial light or glare which would adversely affect day or nighttime views in the area (Criterion 4).	LTSM Mitigation Measure AE-4.1 Greater impact than the Conventional Earthwork option if CDSM includes nighttime construction.	LTSM Mitigation Measure AE-4.1 Greater impact than the Conventional Earthwork option if CDSM includes nighttime construction.	LTSM Mitigation Measure AE-4.1 Greater impact than the Conventional Earthwork option if CDSM includes nighttime construction.	LTSM Mitigation Measure AE-4.1 Greater impact than the Conventional Earthwork option if CDSM includes nighttime construction.	LTS	LTS	LTS	LTS

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

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3.3 Geology and Soils

3.3.1 Approach to Analysis

This section discusses the existing geologic environment and seismic hazards in the region and in the project area. It describes the relevant state laws and guidelines and local policies related to geology, soils, and seismicity. This section also presents potential project construction impacts related to local geology, existing soil conditions, or seismicity, and identifies mitigation measures, if required.

The analysis is based, in part, on review of various geologic maps, site-specific investigations, reports, and other literature. The following reports were used to prepare this analysis:

- Dynamic Stability Analysis of Chabot Dam, Final Report (URS 2005);
- Summary of August 2011 Field Investigation Program Memorandum, Chabot Dam Remediation Concept Project (URS 2011);
- East Bay Municipal Utility District Letter to Division of Safety of Dams RE: Chabot Dam, No. 31-5 (EBMUD 2011); and
- Division of Safety of Dams Response Letter RE: Chabot Dam, No. 31-5 (DWR 2012).

The 2005 URS report included detailed studies of site geology by Dr. John Wakabayashi and the seismotectonic setting by William Lettis & Associates as appendices. These studies are the primary source of information on the geologic and seismotectonic settings presented in this section.

3.3.2 Environmental Setting

Topography

The project area is located on the east side of San Francisco Bay in the East Bay hills. The topography of the area consists of rolling hills and canyons with topographic relief of up to approximately 600 feet. The dam crest elevation is 250 feet, and the spillway crest elevation is 227.25 feet[1] according to EBMUD as-built drawings (URS 2005). The current downstream slope is 3:1 (horizontal:vertical) with a 15-foot-wide bench at elevation 210 feet. The upstream slope is approximately 2:1 and is protected by a layer of riprap. The project area also includes the San Leandro Creek drainage, which is oriented generally east-west.

The Upper Haul Route is approximately 4,740 feet long, starting at the gate at the east side of the dam crest and ending at the trailhead of the East Shore trail. The 3,500-foot-long segment west of the gate is part of the trail, which hikers and bikers frequent throughout the day. The maximum grade along the Upper Haul Route is 21 percent.

The Lower Haul Route is approximately 2,380 feet long, starting at the bottom of the dam and ending at the park road near the sand filter tanks. The road is mostly flat. The route crosses San Leandro Creek

1 All elevations are in feet based on the NGVD 88 vertical datum.

approximately 600 feet from its starting point at the downstream toe of the dam and meets the fenced boundary of the park approximately 975 feet from the creek crossing.

The Park Stockpile is situated on approximately 4 acres of land that ranges in elevation from 115 to 137 feet. The Filter Pond Stockpile is located on approximately 2.5 acres that ranges in elevation from 174 to 235 feet.

Regional Geologic Setting

The project area lies in the geologically complex Coast Ranges geomorphic province. The geomorphic province is bounded by the Pacific Ocean to the west, the Great Valley province to the east, the Oregon border to the north, and the Santa Ynez Mountains near Santa Barbara to the south. It consists of structurally complex, subparallel, northwest-trending faults, folds, and mountain ranges. Much of the Coast Ranges province is composed of marine sedimentary deposits and volcanic rocks that form northwest-trending mountain ridges and valleys, running roughly parallel to the San Andreas Fault Zone.

Chabot Dam is located in the seismically active region between the Pacific tectonic plate on the west and the Sierra Nevada-Central Valley ("Sierran") microplate on the east. The geometry and motion of these two plates has resulted in strike-slip and thrust faulting in the eastern San Francisco Bay Area. **Figure 3.3-1** shows the location of faults in the project region.

The dam and lake are situated in a narrow canyon near the western edge of the East Bay hills, which border San Francisco Bay on the east. The East Bay hills region is in the central Coast Ranges province and is bounded by the Hayward fault on the west and the Northern Calaveras fault on the east.

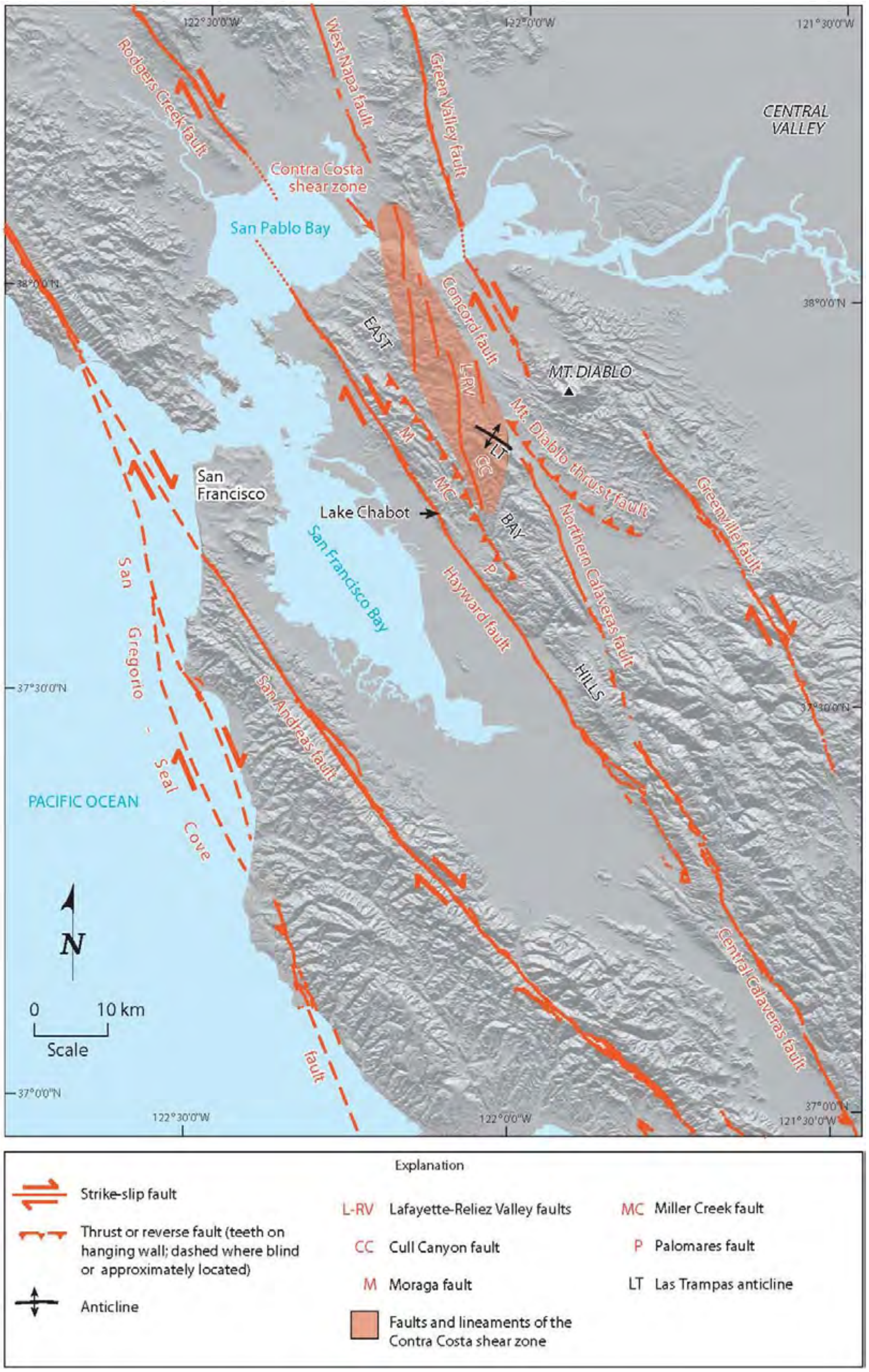
Project Area Geologic Setting

Geologic Units

Chabot Dam is situated in a narrow canyon incised by San Leandro Creek. Bedrock at the dam site is composed of Upper Jurassic Knoxville Formation sedimentary rocks of the Great Valley Group and volcanic and intrusive rocks of the Middle-to-Upper Jurassic Coast Range ophiolite (a section of oceanic crust and underlying upper mantle that has been uplifted and exposed above sea level). Geologic units are shown in **Figure 3.3-2** and are briefly described as follows (URS 2005):

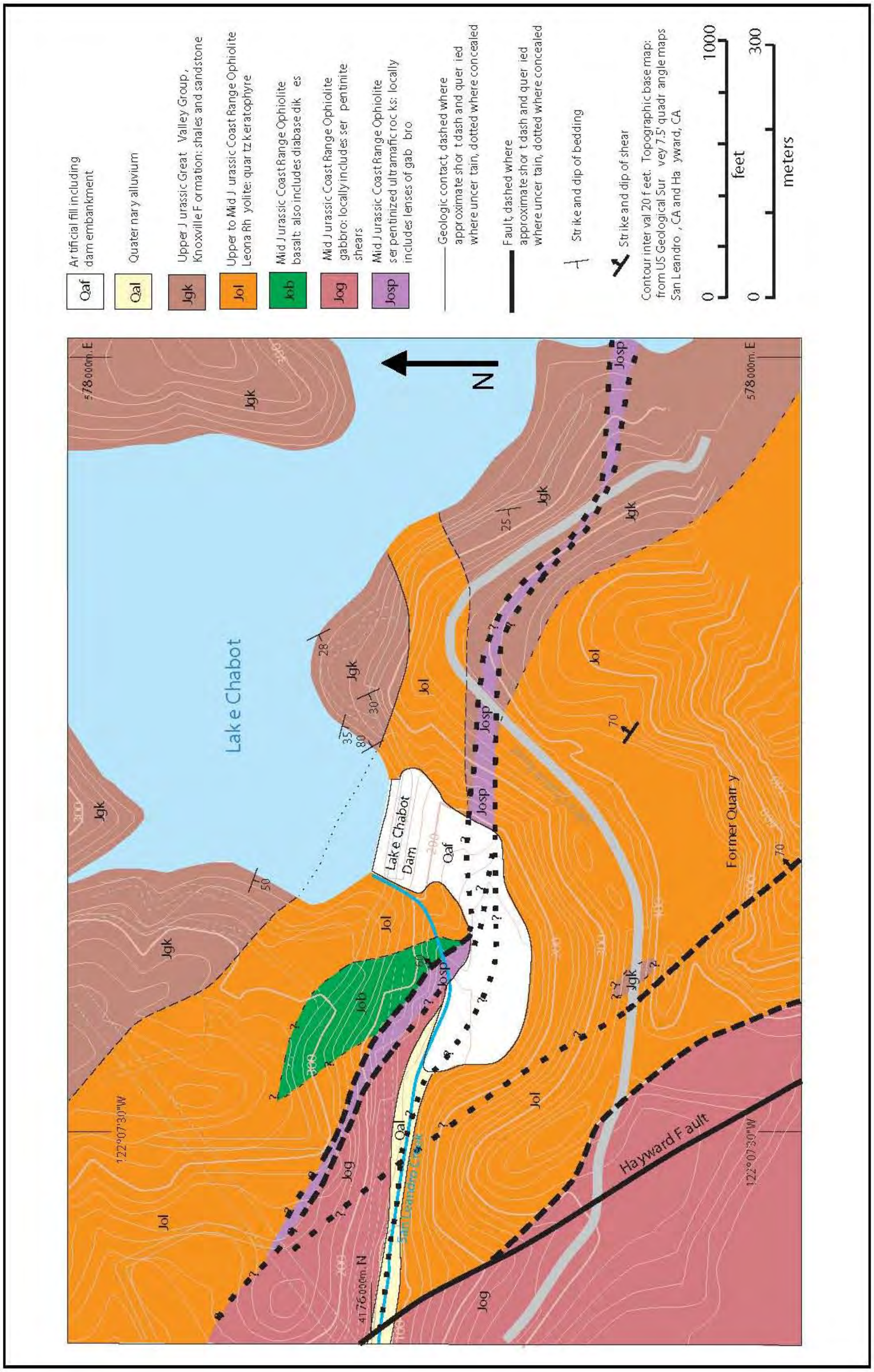
- *Upper Jurassic Great Valley Group, Knoxville Formation (Jgk).* This unit outcrops north and east of the dam and may underlie the upstream toe of the dam. Most of the exposures consist of weak and friable shale or siltstones with some interbeds of sandstones or siltstones that are harder and stronger.

- *Upper to Middle Jurassic Coast Range Ophiolite: Leona Rhyolite (Jol).* This unit outcrops in two main bodies in the site area referred to as the northern exposure and southern exposure (**Figure 3.3-2**). The northern exposure comprises both abutments of the dam and underlies the dam axis. The southern exposure is located entirely south and east of the canyon downstream of the dam. The unit is hard, strong, and massive. Local faults or shear zones up to several centimeters wide can be observed in several outcrops.



Source: URS 2005

Figure 3.3-1: Regional Fault Locations



Source: URS 2005

Figure 3.3-2: Project Area Geological Map

- *Middle Jurassic Coast Range Ophiolite: Basalt (Job).* This unit is exposed west of the dam. The basalt is hard and strong, with generally close fracture spacing. The north and east margins of the unit are in contact with Leona rhyolite. The southwestern contact of the basalt unit is a serpentinite shear zone (Josp).

- *Middle Jurassic Coast Range Ophiolite: Gabbro (Jog).* This unit outcrops west of the downstream side of the dam. The gabbro is generally hard and strong, with fracture spacing ranging from widely spaced to localized zones with very close fracture spacing (less than 3 centimeters). The gabbro on the north wall of San Leandro Creek canyon is bounded on the north by the serpentinite shear zone and on the south by a fault that approximately coincides with the stream valley axis.

- *Middle Jurassic Coast Range Ophiolite: Ultramafic (Josp)*. This unit is exposed east and west of the dam and likely passes under the dam (**Figure 3.3-2**). It is linear, oriented roughly east-west, and fault-bounded. It contains serpentinized ultramafic rock and, locally, lenses of gabbro. Serpentinite may contain naturally occurring asbestos (NOA), especially in proximity to fault zones.

Faults

Regional Faulting

The San Francisco Bay Area is characterized by high seismicity and includes many active and potentially active faults. The U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities (WGCEP) determined that there is a 63-percent probability of one or more earthquakes of magnitude 6.7 (moment magnitude (Mw) scale) or greater occurring in the San Francisco Bay Area in the 30-year period between 2007 and 2037 (WGCEP 2008).

The San Andreas fault system forms the boundary between the Pacific Plate and the North American Plate and includes the San Andreas, Hayward-Rodgers Creek, San Gregorio-Hosgri, Calaveras, Mount Diablo thrust, Marsh Creek-Greenville, and Concord-Green Valley faults, some of which have experienced significant seismic activity in historic time (the last 200 years).

Regional faults that could affect Chabot Dam, as identified in the report Dynamic Stability Analysis of Chabot Dam (URS 2005), are listed in **Table 3.3-1**, along with maximum magnitude, distance from the dam, and activity status. The locations of regional faults are shown in **Figure 3.3-2**.

The Hayward-Rodgers Creek and San Andreas faults have the highest probabilities of generating a magnitude 6.7 Mw or greater earthquake before 2037, at 31 percent and 21 percent, respectively (WGCEP 2008). The Hayward fault is the active fault closest to the project area at approximately 0.3 mile to the west.

Localized Faulting

Some faults have been identified that pass through or beneath Chabot Dam. Evidence of these faults is seen by examination of geologic bedrock contacts. None of these faults, however, are active (i.e., none have shown movement since the late Quaternary, which is defined as the last 2.6 million years through the present).

Table 3.3-1
Earthquake Sources Affecting Chabot Dam

Fault	Maximum Magnitude (Mw)	Site-to-Source Distance (miles)	Activity[1]
Hayward-Rodgers Creek	7.25	0.3	Active
Miller Creek	6.25	2.5	Active
Contra Costa Shear Zone[2]	6.50	3.7	Conditionally Active
Northern Calaveras	7.00	8.1	Active
Mount Diablo Thrust	6.75	9.3	Active
Contra Costa Shear Zone[3]	6.50	10.6	Conditionally Active
Concord-Green Valley	6.75	14.9	Active
San Andreas	8.00	18.6	Active
Greenville	7.00	20.5	Active
San Gregorio-Seal Cove	7.50	25.5	Active

Notes:
1 Defined in accordance with California Department of Water Resources Division of Safety of Dams guidelines. An active fault is a fault that has ruptured in the past 35,000 years. A conditionally active fault is a fault that has been active during the Quaternary (period of time spanning 1.6 million years ago to present), but its displacement history during the last 35,000 years is not known well enough to determine activity or inactivity.
2 Cull Canyon-Lafayette-Reliz Valley faults.
3 Lineament zones, northern East Bay hills.
Source: URS 2005

In approximate upstream to downstream order, and as shown in **Figure 3.3-2**, the mapped geologic contacts are as follows:

- **Contact between northern exposure of Leona rhyolite and Knoxville Formation to the north:** This contact may pass beneath the upstream toe of the dam. It is not clear if this contact is tectonic or depositional; however, because the contact is folded, it is unlikely to have been active in the late Quaternary if it is a fault.

- **Serpentinite shear zone exposed in spillway cut:** A shear zone is a section of rock that has been compressed and deformed by tectonic forces. The serpentinite shear zone passes beneath the downstream toe of the dam. This zone is folded, so it is unlikely to have been active in the late Quaternary.

- **Contact between gabbro and Leona rhyolite that locally follows stream valley axis downstream of dam:** This contact is a fault and may pass beneath the downstream toe of the dam. Late Quaternary fault movement is not suspected.

The Hayward fault shows an eastern splay fault zone passing through the western wall of an inactive quarry south of Chabot Dam on the south side of Lake Chabot Road based on Lienkaempers's map

(1992). The extension of the splay projects northwestward to cross San Leandro Creek about 1,150 feet (350 meters) downstream (west) of the dam. Detailed geologic review of previous investigations and review of aerial photographs confirms that this splay fault does not pass beneath Chabot Dam.

Soils

In-Place Soils

Soil units at the project area consist of alluvium (unconsolidated sediments that have been eroded, transported by water, and redeposited in a nonmarine setting) and colluvium (unconsolidated sediments that have been deposited at the base of hill slopes). Colluvium of undetermined thickness is present along the base of most of the slopes in the area where bedrock outcrops are not seen. Alluvium is present in the stream bottom downstream of the dam. This part of the stream bottom is the narrowest part of the canyon. No bedrock exposures were observed in the streambed; therefore, it is likely that the streambed in the project area is underlain by alluvium and colluvium (URS 2005).

The U.S. Natural Resources Conservation Service has mapped soils in the project area. The soils in the project area consist of clays, clay loams, and gravelly loams, with fill material located in the developed area of San Leandro just west of the dam. The characteristics of the major soil types in the project area are presented in **Table 3.3-2**, and a map of soils in the area is presented as **Figure 3.3-3**.

Dam Materials

Figure 3.3-4 shows a cross section of the dam that follows the approximate original alignment of San Leandro Creek beneath the dam where the maximum dam height occurs. The dam consists mainly of the following soil materials (URS 2005):

- wagon fill placed between 1874 and 1875 and between 1890 and 1892: primarily clayey sands and sandy clays with gravel and pockets of gravels, sands, and silty sands;
- sluiced fill placed between 1875 and 1888: primarily silty and clayey sands with gravel with pockets of cleaner sands and gravels and clay lenses; and
- modern fill and random fill placed in 1980: primarily medium dense to dense gravelly clayey sand.

Borings indicate that the thickness of foundation soils beneath Chabot Dam (colluvium and alluvium) varies from 0 feet to 37 feet and varies in composition from gravelly sandy clay to gravelly sand and clayey gravel. The thickness of foundation soils is typically 0 feet beneath the core trench of the dam and 10–15 feet beneath the upstream and downstream slopes (URS 2005).

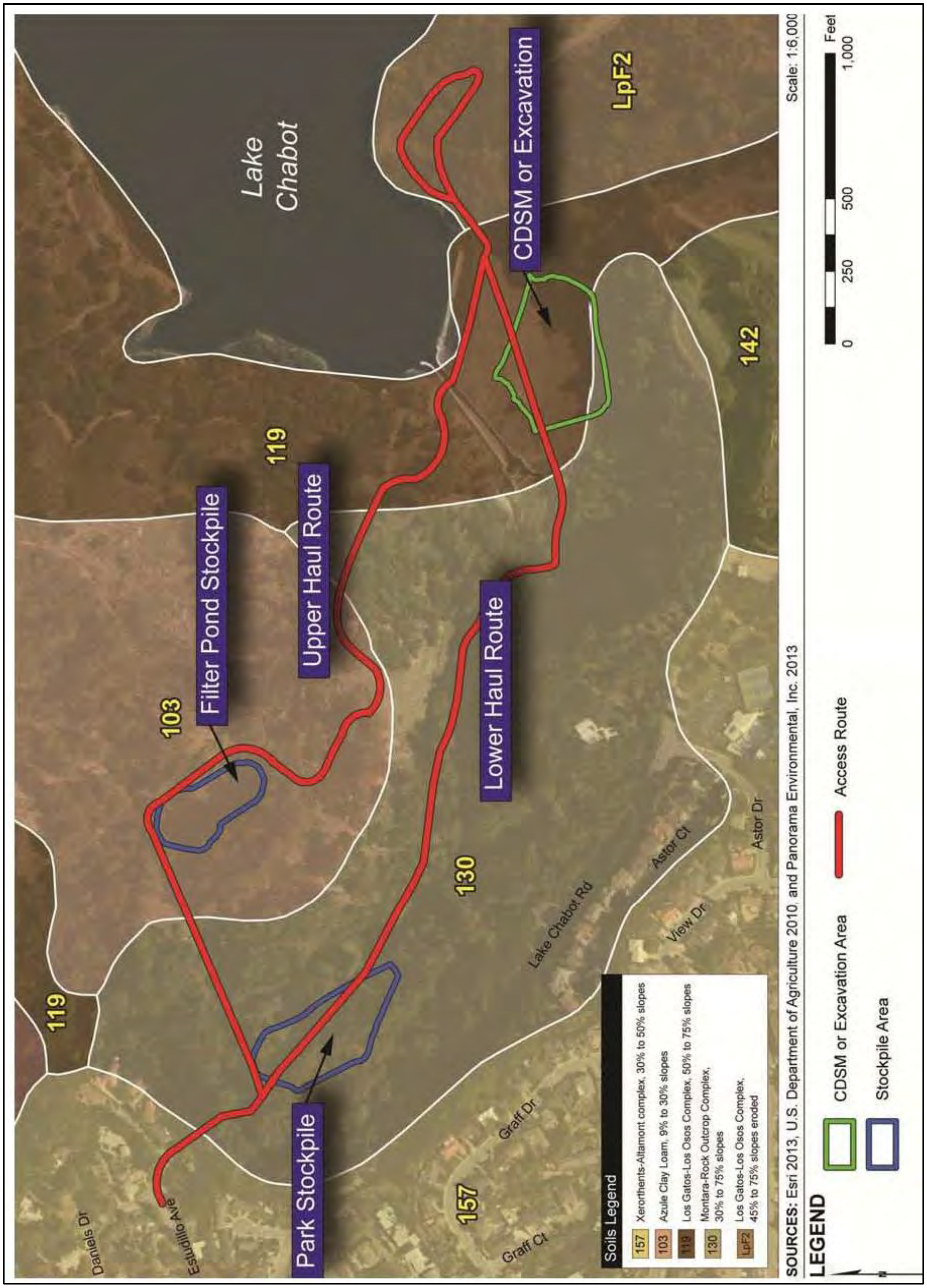
Geologic Hazards

Expansive and Collapsible Soils

Expansive soils contain significant amounts of clays that expand when wetted and can cause damage to foundations if moisture collects beneath structures. Damage also occurs from expansive soils when the soils dry out and contract, causing subsidence and earth fissuring.

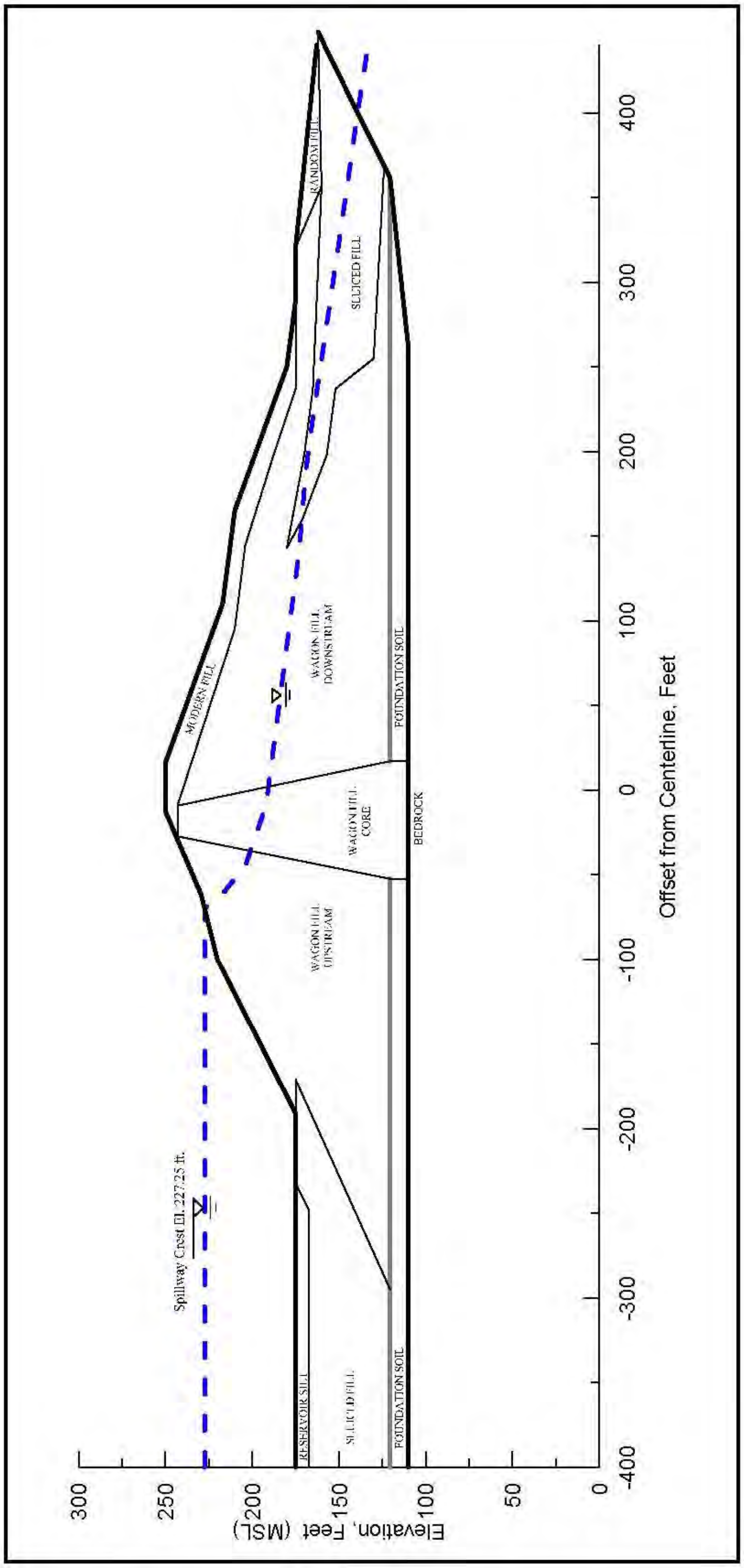
Table 3.3-2
Characteristics of Major Soil Units in the Project Area

Soil Series	Description	Slope (%)	Shrink-Swell Potential	Runoff Rate	Erosion Potential
Xerorthents-Altamont Complex	**Xerorthents:** fills and reworked soils associated with developed areas; well drained **Altamont:** clay-rich soil with clay or silt-clay loam texture; deep; well drained; formed in residuum of soft, interbedded sedimentary rock; found on gently sloping to very steep uplands, hills, and mountains	30–50	Altamont is smectitic: moderate	Moderate to very rapid	Moderate to high
Azule Clay Loam	**Clay Loam:** moderately deep; moderately well drained; formed in residuum of consolidated alluvial sediment, soft shale, or fine-grained sandstone; found on uplands	9–30	Smectitic: moderate	Rapid	Low
Los Gatos-Los Osos Complex	**Los Gatos:** clay loam and gravelly clay loam; moderately deep; well drained; formed in residuum of interbedded sedimentary rock; found on north-facing slopes and toe slopes on uplands **Los Osos:** loam; moderately deep; well drained; formed in residuum of interbedded sedimentary rock; found on uplands	50–75	Los Osos is smectitic: moderate	Rapid to very rapid	High
Montara-Rock Outcrop Complex	**Montara:** clay loam; shallow; well drained; formed in residuum of ultrabasic rock (e.g., serpentinite); found on uplands and rounded ridge tops	30–75	Low	Rapid	High
Los Gatos-Los Osos Complex, slopes eroded	**Los Gatos:** clay loam and gravelly clay loam; moderately deep; well drained; formed in residuum of interbedded sedimentary rock; found on north-facing slopes and toe slopes on uplands **Los Osos:** loam; moderately deep; well drained; formed in residuum of interbedded sedimentary rock; found on uplands	45–75	Los Osos is smectitic: moderate	Rapid to very rapid	High
Source: NRCS 2013					



Sources: ESRI 2013, NRCS 2013, and Panorama Environmental, Inc. 2013

Figure 3.3-3: Project Area Soils Map



Source: EBMUD 2011

Figure 3.3-4: Idealized Dam Cross Section

The soil units described in **Table 3.3-2** include soils that are smectitic (NRCS 2013). Smectite is an expansive clay. Most of the Lower Haul Route and the Park Stockpile are located on Montara-Rock Outcrop Complex soils, which have low expansive potential. Most of the Upper Haul Route and the Filter Pond Stockpile (that has been filled with material from the Miller Road trench spoils site) are located on Los Gatos-Los Osos Complex soils and Azule Clay Loam soils, which are smectitic and therefore have, at minimum, a moderate expansive potential. The dam materials contain a significant fraction of coarse-grained material (i.e., sands and gravels) and therefore have a low expansive potential.

Soil collapse occurs when increased moisture causes chemical or physical bonds between soil particles to weaken, which allow the structure of the soil to collapse and the ground surface to subside. Collapsible soils generally are low-density, fine-grained combinations of clay and sand left by mudflows that have dried, leaving tiny air pockets. When the soil is dry, the clay is strong enough to bond the sand particles together. When the clay becomes wet, moisture alters the cementation structure and the soil strength is compromised, causing collapse or subsidence. No mudflow deposits have been identified in the project area. The likelihood of encountering collapsible soils is low.

Erosion

Erosion is the process by which rocks, soil, and other land materials are abraded or worn away from the earth's surface over time by physical forces, such as rainfall, flowing water, wind, or anthropogenic agents. Urban development, including construction activities, can expedite the erosion process by increasing runoff, decreasing infiltration rates, and exposing soils to the effects of wind and water. Erosion potential is generally higher in areas with steep slopes and on sandy or high clay content soils, but it also increases when vegetation is removed and soils are compacted. The erosion rate depends on many factors, including soil type, geologic parent material, slope, soil placement, vegetation, and human activity.

Most of the mapped soils in the project area have a moderate to high erosion potential. In addition, slopes generally are high in the area, which could result in an increased susceptibility to local erosion.

Subsidence

The project area is not an area of fluid withdrawal or subsurface mining and is not underlain by carbonate rocks or organic-rich soils; therefore, susceptibility to subsidence is low.

Landslides

A landslide is the slipping down or flowing of a mass of land (rock, soil, and debris) from a mountain or hill. Landslide potential is high in steeply sloped areas underlain by alluvial soils, highly weathered material, thinly bedded shale, or bedrock where the bedding lanes are oriented in an out-of-slope direction (bedding plane angles that are greater than horizontal but less than the slope face). Landslides can be caused by both natural events (e.g., earthquakes, rainfall, and erosion) and human activities. Those induced by humans are most commonly related to grading activities that can potentially cause new slides or reactivate old slides when compacted fill is placed on potentially unstable slopes. Excavation operations can also contribute to landslides when lateral support near the base of unstable hillside areas is removed. Conditions to be considered in regard to slope instability include slope inclination, characteristics of the soil materials, presence of groundwater, and degree of soil saturation.

Landslides may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges.

Earthquake-induced landslide hazard areas are identified throughout much of the hillsides surrounding Lake Chabot (CGS 2012; Alameda County 2012). USGS has mapped most of the project area as an area of "few landslides," which indicates an area with few, if any, large mapped landslides but with locally scattered, small landslides and questionably identified larger landslides. A localized area delineated by USGS as "mostly landslides" is identified on the south side of the lake, outside of the project area (USGS 1997).

Seismicity and Ground Shaking

Figure 3.3-1 shows regional fault locations in the vicinity of Chabot Dam. The Hayward-Rodgers Creek fault is located about 0.3 mile west of the dam site. This fault was the source of an estimated M6.8 earthquake on October 21, 1868. The Northern Calaveras fault, located about 8.1 miles east of the dam, has a historical record of small earthquakes; however, paleoseismic trenching studies indicate that the fault has produced multiple surface ruptures during late Quaternary time. Other active faults within 31.1 miles (50 kilometers) of the dam that are considered potential sources of future large earthquakes include the San Andreas, San Gregorio-Seal Cove, Greenville, Mount Diablo thrust, and Concord-Green Valley faults (**Table 3.3-1**).

The Mws for each identified seismic source were estimated based on the potential rupture length and seismogenic depth using an empirical relationship that relates earthquake Mw and rupture area (**Table 3.3-1**). The Hayward fault, which is capable of generating a magnitude 7.25 Mw earthquake at a site-source distance of 0.3 mile (0.5 kilometers), is the most significant seismic source for evaluation of Chabot Dam. The San Andreas fault, located about 18.6 miles (30 kilometers) west of the dam, is capable of generating long-duration shaking (Mw 8.0). All other intermediate faults have estimated Mws lower than the Hayward-Rodgers Creek fault. Therefore, the Hayward and San Andreas faults are considered the controlling earthquake sources for evaluation of Chabot Dam.

The intensity of seismic shaking, or strong ground motion, during an earthquake is dependent on the distance between the seismic source and the site, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the site. The intensity of earthquake-induced ground motions can be described using peak ground accelerations, represented as a fraction of the acceleration of gravity (g). The mean calculated horizontal peak ground accelerations for the Hayward-Rodgers Creek fault and San Andreas fault are 1.05g and 0.33g, respectively.

Liquefaction and Lateral Spreading

Liquefaction is a phenomenon in which saturated granular sediments temporarily lose a portion of their shear strength and become fluid-like during periods of earthquake-induced strong ground shaking. Saturated, unconsolidated silts, sands, silty sands, and gravels are most susceptible to liquefaction. Liquefaction-related phenomena include vertical settlement from densification, lateral spreading, ground oscillations, flow failures, loss of bearing strength, subsidence, and buoyancy effects.

Holocene-aged alluvial sediments are especially prone to liquefaction. The alluvial deposits along San Leandro Creek downstream of the dam have been identified as a potential liquefaction zone (CGS 2012; Alameda County 2012).

The seismic stability of the dam was evaluated using site-specific earthquake ground motions estimated for a maximum credible earthquake with a moment magnitude of 7.25 Mw on the Hayward fault, at a distance of approximately 0.3 mile (0.5 kilometers) from Chabot Dam. Earthquake-induced effects within the embankment and foundation were estimated for representative cross-sections of the embankment and foundation. The results of the evaluation indicated that the sluiced fill in the downstream portion of the dam is susceptible to liquefaction and would likely liquefy during the maximum credible earthquake (URS 2005). In the stability analysis, the wagon fill and foundation soils were judged not to be susceptible to liquefaction.

Lateral spreading is a phenomenon where large blocks of intact, nonliquefied soil move downslope on a liquefied substrate of large areal extent. Liquefaction hazards have been identified along San Leandro Creek, downstream of the dam but because of the limited extent of the alluvium in the narrow valley, lateral spreading is not a potential hazard.

Mineral Resources

Lands in the San Francisco Bay Area have been classified into four Mineral Resource Zones (MRZs) in accordance with the Surface Mining and Reclamation Act of 1975. The classification of MRZs is based on guidelines adopted by the California Division of Mines and Geology (now known as the California Geological Survey) and focuses on construction aggregate. The zones are defined as follows:

- MRZ-1 zones are areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood for their presence exists.
- MRZ-2 zones are areas where adequate information indicates significant mineral resources are present or where it is judged that a high likelihood for their presence exists.
- MRZ-3 zones are considered to have potential mineral deposits, but their significance cannot be evaluated based on available data.
- MRZ-4 zones are areas where available information is inadequate for assignment to any other MRZ category.

The easternmost portion of the project area is mapped in CGS Special Report 146 (Stinson et al. 1987) as MRZ-3. The majority of the project area has not been assigned an MRZ. The San Leandro Quarry, located on the south side of Lake Chabot Road and designated MRZ-2, south of the dam (**Figure 3.3-2**), was a significant source of construction aggregates until it closed in 1986.

3.3.3 Regulatory Background

Geologic resources and hazards are governed primarily by state and local jurisdictions. Seismic hazards are addressed by state and local requirements for identifying and avoiding faults when considering new development. Seismic hazards for dams are regulated by the California Department of Water Resources (DWR) Division of Safety of Dams (DSOD).

Federal

No federal regulations related to geology and soils are applicable to the proposed project.

State

Alquist-Priolo Earthquake Fault Zoning Act

Surface rupture is generally the most easily avoided seismic hazard. The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface fault rupture to structures built for human occupancy. In accordance with this act, the state geologist established regulatory zones, called "earthquake fault zones," around the surface traces of active faults and published maps showing these zones. In these zones, buildings for human occupancy cannot be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200–500 feet on either side of the mapped fault trace because many active faults are complex and consist of more than one branch and there is the potential for ground surface rupture along any of the branches. Surface fault rupture and fault activity at dam sites are addressed by DSOD requirements for geologic mapping, subsurface investigation, and evaluation of fault activity.

Seismic Hazard Mapping Act

The Seismic Hazard Mapping Act was passed in 1990, following the Loma Prieta earthquake, to reduce threats to public health and safety and to minimize property damage caused by earthquakes. The act directs the California Department of Conservation to identify and map areas prone to the earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. It requires site-specific geotechnical investigations to identify potential seismic hazards and formulate mitigation measures before permitting most developments designed for human occupancy in the Zones of Required Investigation.

Division of Occupational Safety and Health

The California Division of Occupational Safety and Health (Cal/OSHA) oversees underground construction and classifies the gas hazard of every tunnel project in accordance with Title 8 of the California Code of Regulations (CCR). EBMUD may be required to request the gas hazard classification from the Mining and Tunnel Unit (MTU) of Cal/OSHA before the start of construction and modification of the outlet works. The MTU enforces the Tunnel Safety Orders, which include the gas classification, pre-construction safety conference, personnel certifications, blasting licenses, and underground operation of diesel engines.

California Building Standards Code

The 2010 California Building Standards Code (CBC) is based on the 2009 International Building Code but includes more extensive structural seismic provisions. The CBC is contained in Title 24 of the CCR and is a compilation of three types of building standards from three different origins:

- building standards that have been adopted by state agencies without change from building standards contained in national model codes;
- building standards that have been adopted and adapted from the national model code standards to meet California conditions; and
- building standards, authorized by the California legislature, that constitute extensive additions not covered by the model codes that have been adopted to address particular California concerns.

The CBC covers grading and other geotechnical issues, building specifications, and nonbuilding structures, which the project would include. The Building Seismic Safety Council acknowledges that dams and other lifeline facilities are not typical nonbuilding structures and are covered by other well-established industry design criteria; therefore, dams are not typically under the jurisdiction of local building officials and require technical considerations beyond the scope of the CBC (BSSC 2004). In addition, California Water Code Section 6026 provides that no city or county has the authority to regulate, supervise, or provide for the regulation or supervision of any dam or reservoir in California that is under DSOD jurisdiction; the state has exclusive jurisdiction over construction and operation of jurisdictional dams like Chabot Dam.

Division of Safety of Dams

DWR, with regulatory power from the California Water Code, delegates dam safety to DSOD to protect people against loss of life and property from dam failure. DSOD engineers and engineering geologists review and approve plans and specifications for the design of dams and oversee their construction to ensure compliance with the approved plans and specifications. Geologic and seismic reviews include site geology, seismic setting, geologic/geotechnical site investigations, construction material evaluation, and seismic dam stability. In addition, DSOD engineers inspect existing dams on a yearly schedule to ensure that they are performing and being maintained in a safe manner.

DSOD Seismic Guidelines

DSOD has published guidelines for determining earthquake design loading for jurisdictional facilities as presented in DSOD's 2002 "Guidelines for use of the Consequence-Hazard Matrix and Selection of Ground Motion Parameters." The report defines a Consequence-Hazard Matrix that prescribes the statistical (deterministic) level Peak Ground Acceleration (PGA) and spectral acceleration based upon Total Class Weight of the facility and slip rate of the controlling fault. The Total Class Weight--a damage potential parameter DSOD uses to evaluate spillway capacity and frequency of facility inspections--is used to represent the range of failure consequences while the slip rate is used as a measure of the likelihood of the controlling earthquake event. The Hazard Matrix requires the use of 84th percentile ground motion parameters for dams with high consequences of failure and/or high slip rate controlling faults and the use of 50th percentile ground motion parameters for dams with lower consequences of failure and/or low slip rates. The guideline also provides procedures to account for near fault directivity effects and establishes minimum earthquake parameters for facilities in areas of low seismicity (DWR 2012).

Regional Water Quality Control Board

The San Francisco Bay Regional Water Quality Control Board (RWQCB), along with the State Water Resources Control Board, oversees regulation of discharge of waste into waters of the United States and waters of the state through National Pollutant Discharge Elimination System (NPDES) permits (Clean Water Act Section 402) and waste discharge requirements. RWQCB also requires that a stormwater pollution prevention plan be prepared as part of the NPDES requirement before construction begins. Issues related to discharge of eroded soil, naturally occurring asbestos, and metals are addressed in these permits.

Local

EBMUD Dam Safety Program

EBMUD has a comprehensive Dam Safety Program. Engineers monitor dams using instruments, monthly visual inspections and periodic dam safety reviews to prevent loss of life, personal injury and property damage from the failure of dams. The safety of each dam is reevaluated with advances in geotechnical, structural and earthquake engineering and also if there is evidence of seepage or ongoing ground movement. As previously stated, Chabot Dam is under the jurisdiction of the California DSOD, who performs independent annual dam inspections (EBMUD 2013).

3.3.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on geology and soils if it would:

1. expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
    a. rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
    b. strong seismic ground shaking;
    c. seismic-related ground failure, including liquefaction;
    d. landslides;
2. result in substantial soil erosion or the loss of topsoil;
3. be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse;
4. be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property;
5. have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
6. result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or
7. result in the loss of availability of a locally important mineral resource recovery site delineated on a local General Plan, Specific Plan, or other land use plan.

None of the project components would require the use of septic tanks or other alternative wastewater disposal systems. No known mineral resources are within the project area and vicinity. Therefore, criteria 5, 6, and 7 would not be applicable to the proposed project and are not discussed further in this document.

Project impacts related to geology and soils addressed in this discussion are divided into project components where the impacts can vary by component. Otherwise, the impacts are discussed generally, covering all project components.

Project Impacts and Mitigation Measures

Impact GE-1: The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; or landslides (Criterion 1). (Less than Significant)

All Project Components—Construction

The project area is located within a seismically active region. A 63-percent probability exists for one or more earthquakes of magnitude 6.7 Mw or greater to occur in the San Francisco Bay Area in the 30-year period between 2007 and 2037 (WGCEP 2008). However, the likelihood of a seismic event occurring during the approximately 14 months of project construction is extremely low. In the unlikely event of an earthquake, construction workers could be exposed to short-term hazards from strong seismic ground shaking or ground failure. Project construction would not substantially increase these risks of exposure over typical risks of exposure throughout the region. Earthquake safety training pursuant to Occupational Safety and Health Administration regulations would minimize potential impacts on workers as much as possible.

A seismic event could result in damage to the haul routes, project work sites, and stockpile areas. For example, the downstream area of San Leandro Creek, just west of the dam, has been identified as being at risk of liquefaction, which could result in damage to the Lower Haul Route in the rare event of an earthquake. Damaged routes or work sites would be repaired as needed to complete construction. Prior to excavation activities, the lake level may need to be lowered to ensure stability of the dam (discussed under Impact GE-3), which also would reduce risks to life, property, and the environment associated with dam failure, if a seismic event were to occur during construction of the embankment toe.

Seismic risks to life and property would be reduced after construction and during operation of the proposed project. The dam's seismic stability was evaluated using site-specific earthquake ground motions, estimated for a maximum credible earthquake with a moment magnitude of 7.25 Mw on the Hayward fault, at a distance of approximately 0.3 mile from Chabot Dam. Earthquake-induced effects within the embankment and foundation were estimated for representative cross sections of the embankment and foundation. The results of the evaluation indicated that the sluiced fill in the downstream portion of the dam is susceptible to liquefaction and would likely liquefy during the maximum credible earthquake (URS 2005). In the stability analysis, the wagon fill and foundation soils were judged not to be susceptible to liquefaction. The purpose of the proposed project is to improve the sluice buttress at the embankment toe of the dam so that it can withstand shaking generated by the maximum credible earthquake on the Hayward fault and to improve the outlet works to prevent damage from an earthquake. The proposed project has been designed in accordance with current seismic criteria, which have been specifically established to prevent a failure of the dam and its appurtenant structures during major earthquakes. A major earthquake could still result in damage to the outlet or dam embankment. Such damage could require short-term, temporary service interruptions to inspect and repair the damage, and long-term repairs also could be required. The loss of some operational functions related to an earthquake would have substantially reduced probability of occurrence and reduced severity of impact with the proposed project than would occur without it. Therefore, the impact would be *less than significant*.

Impact GE-2: The proposed project would result in substantial soil erosion or the loss of topsoil (Criterion 2). (Less than Significant with Mitigation Incorporated)

All Project Components—Construction

Project construction would require ground disturbing activities that could result in the short-term, temporary loss of topsoil. Topsoil is the uppermost layer of soil capable of growing and supporting vegetation. It contains nutrient- and organic-rich matter necessary for root growth that is absent from the inorganic layers below. Loss of topsoil can result in removal of native species that may effectively compete with invasive species and cause a change in soil characteristics that may bolster invasive growth. Topsoil would be removed during site preparation for construction, which would include vegetation removal and grading. The proposed project would require site preparation for embankment construction; establishment of laydown, parking, and trailer areas; establishment of stockpile areas; and widening and placement of subgrade along the Lower Haul Route. Up to 14 acres of land would be disturbed for site preparation. Topsoil from grading would be stockpiled and stored for reuse.

The stockpiles would need to be protected from wind and water erosion to prevent soil loss. A Storm Water Pollution Prevention Plan (SWPPP) would be prepared and implemented to control and manage soil erosion, sedimentation, and runoff, as required by **Mitigation Measure HY-1.1**. Project construction activities that disturb soils could result in soil erosion and generating dust that contains NOA. Best management practices (BMPs) included in the SWPPP would be applied to handling of stockpiled topsoil, to minimize erosion and loss of the soil. The disturbed soil would be handled as described in **Mitigation Measure HZ-2.1**.

The beneficial characteristics of the topsoil also would need to be protected for later reuse during site restoration. Stockpiling topsoil could result in the disruption and loss of beneficial soil microorganisms, and if stockpiled over an extended period of time (approximately 9 months), may result in total or partial loss of soil microorganisms. Therefore, the impact would be *potentially significant*. However, implementation of **Mitigation Measures GE-2.1, HY-1.1, and HZ-2.1** would reduce the potentially significant topsoil and stockpile impacts to a *less-than-significant* level.

Mitigation Measure GE-2.1: Include provisions for topsoil and soil stockpiling in the SWPPP.

The SWPPP will include the following provisions, applicable to topsoil and soil stockpiling:

- Topsoil will be excavated (to approximately 6 inches depth) and stockpiled for later restoration.
- To the extent practicable, aboveground vegetation, including plant debris, will be mixed or otherwise incorporated into the topsoil before excavation.
- The topsoil will be placed into designated topsoil-only stockpiles at locations designated in project construction plans.

- All stockpiles of soils (i.e., topsoil, imported fill materials, and non-topsoil excavated soils) will be treated with temporary soil stabilization and erosion control measures. If soil binders are used, they will be nontoxic to plant and animal life and will not be applied during or immediately before rainfall. Topsoil will be covered to prevent infestation with weeds.

- When using stockpiled topsoil for restoration, the top 1 foot of the stockpile material will be mixed with the remainder of the topsoil stockpile so that living organisms are distributed throughout the topsoil material at the time of final placement. The use of microorganism inoculates will be used to reestablish microorganisms in topsoil material if it has been stockpiled for more than 9 months.

Implementation: EBMUD and construction contractor(s)

Timing: Before and during construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure GE-2.1** would reduce the potentially significant impact related to topsoil and soil stockpiling so that most of the topsoil would be preserved and the quality of the topsoil would not be degraded. The impact would be *less than significant with mitigation incorporated*.

Construction activities at each of the project work sites could otherwise cause substantial short-term soil erosion, which could result in sedimentation of the surrounding environment and waterways. Many of the project components are underlain by soils that are classified as having moderate to severe erosion hazards, and stockpiling of fill and excavated soils would be required. Erosion of soils could occur from:

- exposure of bare soils after vegetation removal and grading;

- exposure of stockpiled fill material in the stockpile areas—the CDSM option would require considerably less stockpiling of soils (up to 40,000 cubic yards) than would the Conventional Earthwork option (up to 155,000 cubic yards); and

- destabilization of San Leandro Creek bank or bed soils resulting from discharge of water from the filter drain system, and discharge generated by dewatering of the embankment excavation for the Conventional Earthwork option (and CDSM option if dewatering is required).

EBMUD and/or its construction contractor would perform all grading and other earth-disturbing activities, in compliance with the SWPPP, to control and manage soil erosion, sedimentation, and runoff as required by **Mitigation Measure HY-1.1**. The SWPPP would specify the required use of certified weed-free straw wattles, water bars, covers, silt fences, sensitive area access restrictions (e.g., flagging), or other sediment containment methods to be placed around and/or downslope from work areas before earth-disturbing activities and before the onset of winter rains or any anticipated storm events. The SWPPP requirements would apply to the stockpile areas and along haul routes where the routes would be widened. However, because of the quantity of stockpiled soils, loss of soil and subsequent sedimentation of surrounding areas still could occur and would be substantial. Therefore, the impact would be *potentially significant*. However, implementation of **Mitigation Measures GE-2.2** and **HY-3.1** would reduce the potentially significant impact related to soil loss to a *less-than-significant* level.

Mitigation Measure GE-2.2: Include provisions for site restoration and rainy season and long-term erosion control in the SWPPP.

The SWPPP will include the following provisions, applicable to site restoration and rainy season and long-term erosion control:

- grading and contouring of soils following completion of construction;
- seeding with native plant mixes;
- installation of additional erosion and runoff control measures if construction activities continue into the rainy season;
- installation of permanent erosion control measures, as appropriate, following completion of construction;
- no use of monofilament plastic for erosion control; and
- repair and restoration of roadways.

Implementation: EBMUD and construction contractor(s)

Timing: Before, during, and after construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure GE-2.2** would reduce the potentially significant impact related to soil loss to a less-than-significant level through implementation of site restoration and rainy season and long-term erosion control efforts. The impact would be *less than significant with mitigation incorporated*.

Discharge of water generated by the filter drain system and by excavation dewatering to the riprap section of the spillway stilling basin below the dam for the Conventional Earthwork option (and potentially for the CDSM option if required) could result in streambank and streambed erosion and sedimentation of the creek. A discharge permit would be required from the San Francisco Bay RWQCB. The permit would require that BMPs be implemented so that erosion and sedimentation of the creek would not occur. A smaller quantity of water would be generated for the CDSM option, and would be discharged to the riprap section of the creek, which would result in a lower potential for streambank and streambed erosion and sedimentation impacts compared to the Conventional Earthwork option. (This impact is discussed in Section 3.11, Hydrology and Water Quality.)

Impact GE-3: The proposed project would be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse (Criterion 3). (Less than Significant with Mitigation Incorporated)

Construction of the embankment toe has been designed so that the dam would remain stable.

CDSM and Conventional Earthwork Options

For the CDSM option, a portion of the downstream face of the dam would be excavated to create a level working platform and then the sluiced fill, wagon fill, and foundation soil would be treated in-place by mixing the soil with cement grout. The Conventional Earthwork option would include excavating a portion of the downstream face of the dam to bedrock, to remove a portion of the liquefiable soils. The excavated soils would be stockpiled on-site, hauled from the stockpile(s) to the excavation site, and recompacted. To excavate safely, groundwater levels within the proposed excavation for the Conventional Earthwork option (and potentially for the CDSM option if required) would be lowered using wells and similar installations via dewatering. The lake would remain in service during construction activities, at a surface water level of 211 feet or greater under both construction options. For both the CDSM and Conventional Earthwork options, the proposed project would include construction of a filter and drain system at the upstream end of the excavation. The filter and drain system would maintain dam stability by keeping water from the lake from seeping into the recompacted soils. The drain system would include graded filter materials, which would slope down to a perforated drain pipe that would connect to a solid pipe with an outfall in the bank of San Leandro Creek. Both construction options would be designed and engineered to provide for stability of the dam during construction. The impact would be *less than significant*.

Outlet Tower Works

Construction of the outlet works would include removing the existing tower and pavilion. The control valves would be moved to an existing vertical shaft in the rock located behind the tower. New outlet pipes may need to be installed. However, because of the location of these features and because most are existing structures, risks of land instability from construction would be minimal. The majority of activities associated with the outlet works would not involve earthwork or soil disturbance. The impact would be *less than significant*.

The outlet pipes may either be relined or replaced from the shaft to the lake. The decision would be made during final design. If the pipes are replaced, the alignment of the pipes would remain the same as the existing pipes and a minimal amount of soil disturbance would occur during pipe removal and installation activities. Retrofitting of the tower walls may involve minor soil disturbance adjacent to the walls to install stabilization materials. The impact would be *less than significant*.

Stockpiles

Up to 155,000 cubic yards of soil may be stockpiled at the two designated stockpile locations. Temporary stockpiles of excavated soils and import materials (i.e., sand and gravel for filter and drain system), as well as cement silos used to temporarily store cement for the grout plant, would place heavy loads on the ground at the stockpile locations. Potential would exist for instability of the stockpiles or excessive settlement of the ground beneath the stockpiles resulting from these loads. Both stockpile locations are on clay loam soils. The Filter Pond Stockpile would be located in an area of low slopes on soils with a low potential for erosion. The Park Stockpile would be located in an area with moderate to steep slopes. The soils at the Park Stockpile location include a rock outcrop component, which, in combination with the existing slopes, would result in a greater potential for erosion. Grading and removal of vegetation at the stockpile locations could result in slope instability during site preparation activities and also during use for stockpiling, if the sites are not properly prepared to address potential soil stability issues. Potential hazards at the Park Stockpile would be greater than those at the Filter Pond Stockpile because of its greater slopes and soil erodibility. Therefore, the impact would be *potentially significant*. However, implementation of **Mitigation Measure GE-3.1** would reduce the potentially significant soil stockpile impact to a *less-than-significant* level.

Mitigation Measure GE-3.1: Conduct a geotechnical evaluation of the stockpile locations to determine their suitability for stockpiling.

The geotechnical evaluation during design will focus on the identification and evaluation of landslide hazards and soil stability hazards, including slope stability hazards associated with stockpiling of soils. The evaluation will identify the maximum size and distribution of stockpiling permissible at the stockpile locations to prevent landslides or other slope instabilities and excessive land settlement. The results of the evaluation will be used during design to specify appropriate preventative efforts in the design drawings.

Implementation:	EBMUD and construction contractor(s)
Timing:	Before and during construction
Enforcement:	EBMUD
Residual Effect:	Implementation of **Mitigation Measure GE-3.1** would reduce the potentially significant impact related to unstable soils to a less-than-significant level because the geotechnical evaluation would specify the maximum size and distribution of stockpiles to ensure stability, and the stockpile and storage areas design would withstand the static loading during project construction. The impact would be *less than significant with mitigation incorporated*.

Haul Routes

The Upper Haul Route is mostly paved, with the exception of the turnaround next to Chabot Lake at the eastern extent of the route. The constructability report (Terra Engineers 2013) states that this route can accommodate haul trucks with a capacity of 10 cubic yards. It would be used regularly during construction to transport heavy loads and heavy equipment through steep, hilly areas with grades up to 21 percent. Although it is paved, some of the pavement is in poor condition (Terra Engineers 2013) and the increased load on the road may result in damage to the pavement or subgrade. This damage could, in turn, result in reduced slope stability and, potentially localized slope failures immediately adjacent to the roadway. Consequently, temporary stabilization methods would be implemented as part of the proposed project that are tailored to specific sections of the Upper Haul Route and conditions encountered during construction. The Lower Haul Route is unpaved and the subgrade materials may not be suitable for supporting loads from heavily-loaded earth-moving vehicles. The Lower Haul Route runs along a portion of San Leandro Creek, which is located within a steep-walled valley. However, as described in Section 2.11.5, Haul Route Modifications, as part of the proposed project, temporary stabilization methods, tailored to specific sections of the Lower Haul Route would be implemented to stabilize the road bed and would be removed after completion of construction. These stabilization measures would address the potential for significant streambank instability (and associated erosion) as a result of construction equipment vibration. The impact would be *less than significant*.

Impact GE-4: The proposed project would not be located on expansive soil that would create substantial risks to life or property (Criterion 4). (Less than Significant)

All Project Components—Construction

Expansive soils shrink and swell as a result of moisture change. These changes can cause damage to structures and buried utilities, and also can result in increased maintenance requirements. The soils data for the proposed project indicate that some of the soil units in the project vicinity are likely to have some risk for expansion (NRCS 2013).

The dam materials contain a substantial fraction of coarse-grained material (i.e., sands and gravels) and, therefore, have a low expansive potential. The earthwork at the dam site would include excavation, reconditioning, and replacement of existing fill material and/or CDSM, which would serve to strengthen dam materials in place and would not include or be affected by expansive soils. The outlet works would require a retrofit of the existing facilities, although new outlet pipes may be installed. The soils in the areas of the outlet pipes are smectitic and have a moderate expansive potential. If the outlet pipes are replaced, the alignment of the pipes would remain the same as the existing pipes and a minimal amount of soil disturbance would occur during old pipe removal and installation activities. Retrofitting of the outlet tower walls may involve minor soil disturbance adjacent to the walls to install stabilization materials. The majority of soils disturbed in these areas would consist of previously disturbed soils (either recompacted native soils or fill materials), which would have a much lower risk of expansion than would the surrounding native soils. Therefore, the impact would be short-term and temporary, and would be *less than significant*.

3.3.5 Impact and Mitigation Summary

Table 3.3-3 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

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Table 3.3-3
Geology and Soils Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact GE-1: The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; or landslides (Criterion 1).	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Impact GE-2: The proposed project would result in substantial soil erosion or the loss of topsoil (Criterion 2).	LTSM Mitigation Measures GE-2.1, 2.2, HY-1.1, 3.1, and HZ-2.1	LTSM Mitigation Measures GE-2.1, 2.2, HY-1.1, 3.1, and HZ-2.1	LTSM Mitigation Measures GE-2.1, 2.2, HY-1.1, 3.1, and HZ-2.1	LTSM Mitigation Measures GE-2.1, 2.2, HY-1.1, 3.1, and HZ-2.1	LTSM Mitigation Measures GE-2.1, 2.2, HY-1.1, 3.1, and HZ-2.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles and larger quantity of water discharged.	LTSM Mitigation Measures GE-2.1, 2.2, HY-1.1, 3.1, and HZ-2.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles and larger quantity of water discharged.	LTSM Mitigation Measures GE-2.1, 2.2, HY-1.1, 3.1, and HZ-2.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles and larger quantity of water discharged.	LTSM Mitigation Measures GE-2.1, 2.2, HY-1.1, 3.1, and HZ-2.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles and larger quantity of water discharged.
Impact GE-3: The proposed project would be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse (Criterion 3).	LTSM Mitigation Measure GE-3.1	LTSM Mitigation Measure GE-3.1	LTSM Mitigation Measure GE-3.1	LTSM Mitigation Measure GE-3.1	LTSM Mitigation Measure GE-3.1	LTSM Mitigation Measure GE-3.1	LTSM Mitigation Measure GE-3.1	LTSM Mitigation Measure GE-3.1
Impact GE-4: The proposed project would not be located on expansive soil that would create substantial risks to life or property (Criterion 4).	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

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3.4 Biological Resources

3.4.1 Approach to Analysis

This section discusses the existing biological conditions in the project vicinity, describes the pertinent federal, state, and local laws and guidelines, presents the potential construction impacts, and identifies potential biological resources mitigation measures, if required. The specific biological resources addressed in this section are:

- plants and animals identified as candidate, sensitive, or special-status species by the U.S. Fish and Wildlife Service (USFWS) or California Department of Fish and Wildlife (CDFW) (formerly the California Department of Fish and Game) or in local plans, policies, or regulations;
- sensitive natural communities, including riparian habitat and wetlands and waters protected by federal and state regulations; and
- trees and other biological resources protected by state and local ordinances and regulations.

The analysis, as further described below, is based on a background literature and database review; consultation with natural resources specialists; and field surveys and Geographic Information System mapping of potentially jurisdictional wetlands and waters of the United States, vegetation communities including riparian habitat, and sensitive and non-sensitive botanical and wildlife resources.

Literature Search and Project Consultation

The following documents and sources were reviewed for information relating to the biological resources in the project area and documented occurrences of special-status species in the vicinity of the project area:

- Chabot Dam Seismic Remediation Project: Initial Biological Resources Assessment (EBMUD 2011a);
- Upper San Leandro Reservoir Watershed Salmonid Habitat Assessment (EBMUD 2011b);
- USFWS quadrangle species lists for the Oakland East, Las Trampas Ridge, San Leandro, and Hayward quadrangles (USFWS 2011);
- California Natural Diversity Database (CNDDB) (CDFW 2013a);
- State and Federally Listed Endangered and Threatened Animals of California (CDFW 2013b);
- CNDDB Special Animals List (CDFW 2011);
- State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFW 2013c);
- Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2013d);
- Inventory of Rare and Endangered Plants of California (CNPS 2013);
- Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties (Lake 2010);
- Natural Communities List Arranged Alphabetically by Life Form (CDFW 2010); and
- other unpublished data and reports provided by EBMUD including a fish habitat assessment for San Leandro Creek, fish and wildlife survey and occurrence data.

The following spatial data resources were used to create the figures in this section of the report:

- National Agriculture Imagery Program aerial imagery (2012) and
- California Natural Diversity Database (CNDDB 2013) species occurrence locations.

EBMUD conducted informal consultation efforts with the resource agencies in May 2012. Phone calls were made to discuss the potential impacts of the proposed project and follow-up e-mail correspondence was sent to the National Oceanic and Atmospheric Administration Fisheries, U.S. Army Corps of Engineers (USACE), USFWS, the Regional Water Quality Control Board (RWQCB), and CDFW to provide information about the proposed project and obtain initial input regarding potential project impacts.

Field Assessment

Vegetation communities discussed in this section were described in the Chabot Dam Seismic Remediation Project: Initial Biological Resources Assessment (EBMUD 2011a) and verified in the field in February 2013. The project area was traversed on foot, to map and describe plant communities, wildlife habitat, and any sensitive habitats, and to determine whether existing conditions provided suitable habitat for any special-status plant or wildlife species.

The purpose of the initial field assessment was to identify the presence or absence of suitable habitat for each special-status species known to occur in the project vicinity. The reconnaissance-level site visit that was conducted does not constitute a protocol-level survey and was not intended to determine the actual presence or absence of a species. The presence of any special-status species observed during the field surveys was recorded and is discussed in this section.

In addition to the reconnaissance-level survey, a preliminary jurisdictional wetland delineation was completed in January and March 2013 (**Appendix D-1**), a habitat assessment for California red-legged frog was completed in March 2013 (**Appendix D-2**), and focused surveys for special-status plants were conducted in March and May 2013 (**Appendix D-3**). These focused survey efforts covered all project component impact sites. A list of plant species observed during the field surveys is contained within the botanical survey report.

The potential for each special-status species to occur in the project area was evaluated according to the following criteria:

1. **No Potential:** Habitat is unsuitable for the species' requirements (e.g., foraging, breeding, cover, substrate, elevation, hydrology, plant community, historic record, disturbance regime).

2. **Unlikely:** Few of the habitat components meeting the species' requirements are present, and/or most of the habitat is unsuitable or of very poor quality. The species is not likely to be found.

3. **Moderate Potential:** Some of the habitat components meeting the species' requirements are present, and/or only some of the habitat is unsuitable. The species has a moderate probability of being found.

4. **High Potential:** All of the habitat components meeting the species' requirements are present, and/or most of the habitat is highly suitable. The species has a high probability of being found.

5. **Present:** The species was observed during the field surveys or has been recorded (e.g., CNDDB, other reports).

3.4.2 Environmental Setting

Regional Setting

Lake Chabot is located in the San Leandro Hills, a range of the Pacific Coast Ranges situated on the eastern side of the valley which includes the San Francisco Bay (**Figure 2-1**). The San Leandro Creek watershed drains approximately 3,920 acres in the Coast Ranges. Elevations in the subbasin range from approximately 1,100 feet to approximately 60 feet where the San Leandro Creek flows from the lake's spillway, approximately 4.5 miles east of the San Francisco Bay (EBMUD 1999).

San Leandro Creek is a 22-mile-long, year-round natural stream that flows along the east side of the Berkeley and San Leandro Hills into Upper San Leandro Reservoir and on to Lake Chabot. It then flows through the City of San Leandro and into San Leandro Bay after crossing Hegenberger Road just north of the Oakland International Airport. The creek terminates in Arrowhead Marsh, one of the few tidal marshes remaining in the East Bay.

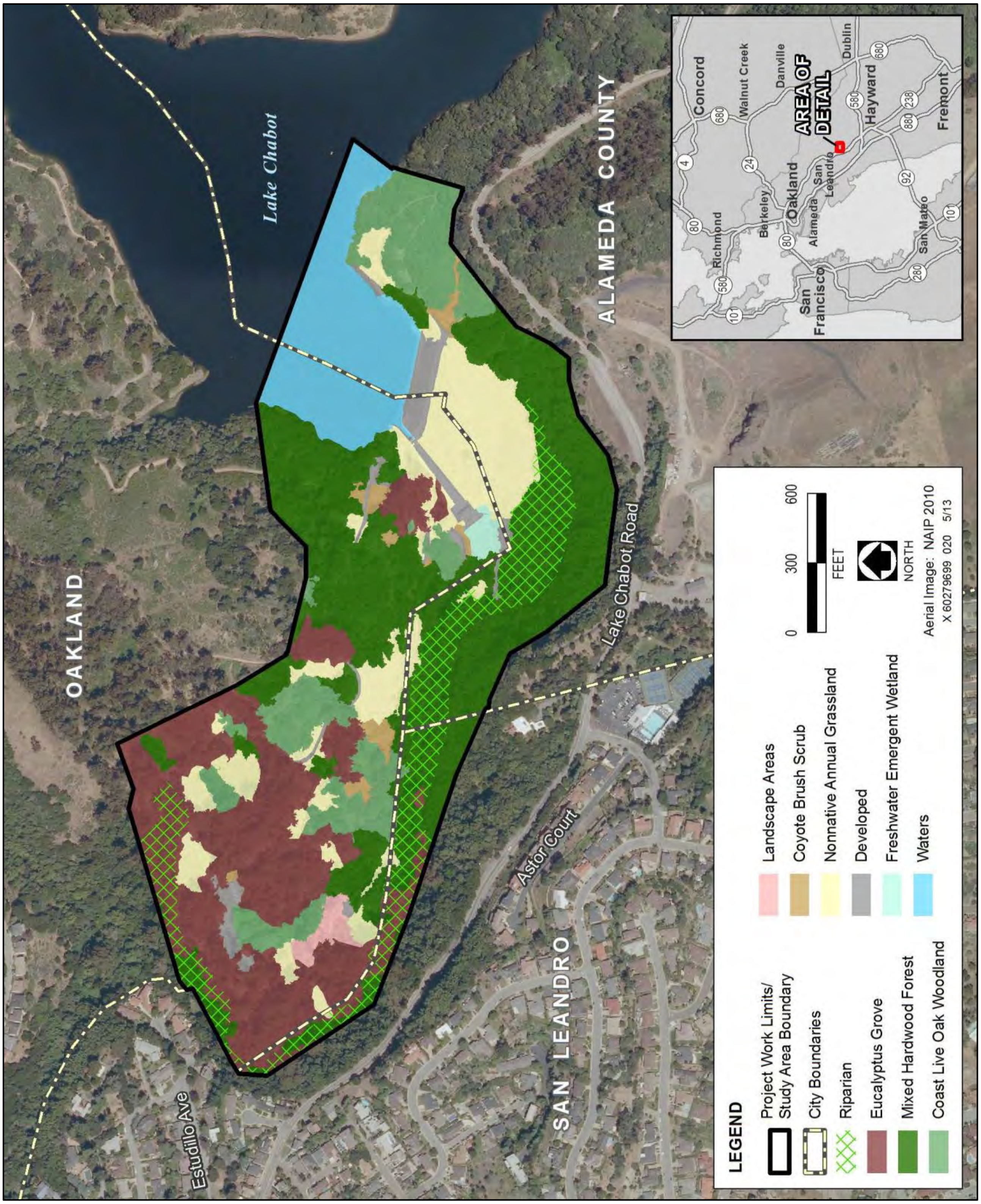
The climate of the region is characterized as Mediterranean, typified by mild, wet winters and warm, dry summers. The average regional temperature is 57 degrees Fahrenheit, with daily temperatures ranging from 40 to 70 degrees Fahrenheit. Average annual precipitation is approximately 25 inches, with approximately 88 percent occurring as rain from October through April (Western Regional Climate Center 2013).

Project Area Setting

The approximately 98-acre project area is located within the Lake Chabot Regional Park, owned by EBMUD and managed by the East Bay Regional Park District (EBRPD), and the 10-acre Chabot Park, owned by and leased from EBMUD and managed by the City of San Leandro (**Figure 3.4-1**). The area is characterized by a mosaic of non-native woodlands, native oak and mixed woodlands, native and non-native grasslands, upland scrub, wetland communities, and riparian scrub and woodlands (**Figure 3.4-1**). An approximately 0.5-mile stretch of San Leandro Creek flows west through the area. Within the project area, the creek originates downstream from the dam spillway and continues along the southern boundary, eventually flowing out of the area and through the City of San Leandro to the San Francisco Bay.

Existing land uses in the project area include recreation, water storage, and open space. The area is bounded on the west and southwest by residential development, on the southeast by an active quarry, and on the north and east by Lake Chabot Regional Park, Anthony Chabot Regional Park and EBMUD watershed lands. Intervening topography and mature trees screen views of the project area from many locations in the project vicinity.

Vegetation in the project area has been subject to substantial human-caused disturbance for more than 135 years. More than 30 percent of the plant species that are found in the park are non-natives (EBRPD 2003). Numerous exotic plant species occur in the area's vegetation communities, such as silver wattle (*Acacia dealbata*) from Australia, tree of heaven (*Ailanthus altissima*) from China, cork oak *(Quercus suber*) from Europe and North Africa, and Canary Island date palm (*Phoenix canariensis*). In the 1910s, Frank C. Havens of People's Water Company (the predecessor to EBMUD) imported millions of eucalyptus (*Eucalyptus* spp.) seedlings that were planted in the area, as evidenced by the extensive eucalyptus trees on-site (EBMUD 2011a).



Source: EBMUD 2011a, Compiled by AECOM in 2013

Figure 3.4-1: Natural Communities and Aquatic Features in the Project Area

Nonsensitive Biological Communities

Biological communities present in the project area were classified based on existing plant community descriptions described in *A Manual of California Vegetation* (Sawyer et al. 2009) and/or *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). However, in some cases the terminology deviates slightly because it was necessary to identify variants of community types or to describe nonvegetated areas that are not described in the literature. Nonsensitive biological communities are those communities that are not afforded special protection under CEQA and other state, federal, and local laws, regulations, and ordinances. These biological communities may, however, provide important habitat for plant and wildlife species. These communities are described below and are shown in **Figure 3.4-1**.

Non-Native Annual Grassland

Non-native annual grassland communities typically are composed of a dense cover of introduced (non-native) annual grasses and ruderal (weedy) forbs (broad-leaved plants) adapted to colonizing and persisting in disturbed upland habitats. Dominant non-native grasses in this community that occur in the project area include wild oats (*Avena fatua*), Italian ryegrass (*Festuca perennis*), ripgut brome (*Bromus diandrus*), and hare barley (*Hordeum murinum* ssp. *leporinum*). Common non-native forbs include burclover (*Medicago polymorpha*), rose clover (*Trifolium hirtum*), and filarees (*Erodium* spp.). Invasive non-native annual forbs such as yellow star-thistle (*Centaurea solstitialis*), fennel (*Foeniculum vulgare*), and Italian thistle (*Carduus pycnocephalus*) are present in areas of past soil disturbance. A few native grasses, such as blue wildrye (*Elymus glaucus*) and creeping wildrye (*Elymus triticoides*), occur sparingly as relicts of the coastal prairie in this community. Common native forbs are also present, including California poppy (*Eschscholzia californica*), yarrow (*Achillea millefolium*), and blue-eyed grass (*Sisyrinchium bellum*). Approximately 12 acres of non-native annual grassland occurs in the project area.

Coyote Brush Scrub

Coyote brush (*Baccharis pilularis*) is the sole or dominant shrub in the continuous or intermittent canopy of the Coyote Brush Scrub community which is found in small isolated patches within the project area. Other species found within this community on-site include poison-oak (*Toxicodendron diversilobum*), California sagebrush (*Artemisia californica*), coast live oak (*Quercus agrifolia*), bush monkeyflower (*Mimulus aurantiacus*), California blackberry (*Rubus ursinus*), toyon (*Heteromeles arbutifolia*), California coffeeberry (*Rhamnus californica*), silver bush lupine (*Lupinus albifrons*), and soaproot (*Chlorogalum pomeridianum*). French broom (*Genista monspessulana*), a non-native invasive also occurs within this community on-site. Approximately 1 acre of coyote brush scrub occurs in the project area.

Coast Live Oak Woodland

Coast live oak is the sole, dominant or important tree in the canopy. Bigleaf maple (*Acer macrophyllum*), valley oak (*Quercus lobata*), box elder (*Acer negundo*), California bay (*Umbellularia californica*), California buckeye (*Aesculus californica*), elderberry (*Sambucus* spp.), toyon, California coffeeberry (*Rhamnus californica*), and madrone (*Arbutus menziesii*) may also be present. Approximately 11 acres of coast live oak woodland occurs in the project area.

Mixed Hardwood Forest

The mixed hardwood forest community consists of a mix of trees that reach 30 to 50 feet in height. Coast live oak and California bay are co-dominant species, but other native trees, such as California buckeye, bigleaf maple, California black oak (*Quercus kelloggii*), and madrone, may also be present. Narrowleaf willow (*Salix exigua*), box elder, arroyo willow (*Salix lasiolepis*), California sycamore (*Platanus racemosa*), and blue elderberry (*Sambucus nigra* ssp. *caerulea*) are more common on the mesic, northeast-facing slopes. Monterey pine (*Pinus radiata*) and eucalyptus have invaded some disturbed areas. About 26 acres of mixed hardwood forest occurs in the project area.

Eucalyptus Grove

Eucalyptus trees were introduced from Australia in the early 1900s and widely planted throughout the East Bay Hills. In the project area, blue-gum eucalyptus (*Eucalyptus globulus*) is the dominant species, but red gum eucalyptus (*Eucalyptus camaldulensis*) stands are also common. The rapid growth to a height of 80 to 140 feet and high rate of reproduction of eucalyptus trees have resulted in their complete dominance in large portions of the East Bay Hills. These invasive trees outcompete native species by shading and by producing a dense leaf and bark plant debris on the ground. This plant debris, which contains allelopathic oils, prevents most other plants from becoming established, but other species, including coast live oak, California bay, madrone, and California blackberry, are present. Shrubs are infrequent, and the ground layer is usually sparse. About 19 acres of eucalyptus grove occurs in the project area.

Developed/Landscaped Areas

Developed or landscaped areas are those that have been developed or otherwise disturbed and maintained by human activities; covered with structures and pavement; or support predominately non-native trees, shrubs, grasses, and forbs. Such areas are highly susceptible to invasion by non-native species. Some of the most invasive, non-native weeds that occur in disturbed areas in the project area are French broom, golden spurge (*Euphorbia oblongata*), poison hemlock (*Conium maculatum*), yellow star-thistle, Italian thistle, and fennel. A limited number of native plant species (e.g., coast redwood [*Sequoia sempervirens*] and Fremont cottonwood [*Populus fremontii*]) also occur in this community. About 4 acres of developed/landscaped areas occurs in the project area.

Sensitive Biological Communities

Sensitive biological communities are defined as those communities that are given special protection under CEQA and other applicable federal, state, and local laws, regulations, and ordinances. Three sensitive natural communities were identified within 1 mile of the project area, through a review of the CNDDB and reconnaissance surveys: valley needlegrass grassland, riparian, and freshwater emergent wetland. Of these three communities, only two occur in the project area: riparian and freshwater emergent wetland. Valley needlegrass grassland is not addressed further in this section because it does not occur on the project area.

Riparian Forest

Approximately 13 acres of riparian forest dominated by narrowleaf willow, box elder, arroyo willow, Fremont cottonwood, and California sycamore occurs in association with San Leandro Creek. These areas may be considered jurisdictional and subject to regulation by CDFW and/or RWQCB.

Freshwater Emergent Wetland

About 0.5 acre of freshwater emergent wetland occurs directly below the Chabot Dam concrete spillway (**Figure 3.4-1**). In the project area, this community is characterized by emergent marsh vegetation dominated almost entirely by broad-leaved cattail (*Typha latifolia*). Other species present include common tule (*Schoenoplectus acutus* var. *occidentalis*), rushes (*Juncus* spp.), tall flatsedge (*Cyperus eragrostis*), southern bulrush (*Schoenoplectus californicus*), Olney's three-square bulrush (*Schoenoplectus americanus*), spikerush (*Eleocharis macrostachya*), water plantain (*Alisma triviale*), and water smartweed (*Persicaria amphibia*). These areas may be considered jurisdictional and subject to regulation by USACE, CDFW, and/or RWQCB.

Wetlands and Waters

Wetlands and water features include those that are considered sensitive to resource agencies or those that are afforded specific consideration through the federal Endangered Species Act (ESA), CEQA, Section 1602 of the California Fish and Game Code, or Sections 404 and 401 of the Clean Water Act (CWA). These habitats are of special concern because of their historic loss and degradation and because they may be of high value to special-status wildlife, fish, and plant species and may have a higher potential to support sensitive species. They also provide other important ecological functions, such as enhancing flood and erosion control and maintaining water quality.

The project area was surveyed to determine whether any wetlands and waters potentially subject to jurisdiction by USACE, RWQCB, or CDFW were present. The preliminary wetlands assessment was based primarily on the presence of wetland indicator plants and any observed indicators of wetland hydrology or wetland soils. The preliminary waters assessment was based primarily on the presence of unvegetated, ponded areas or flowing water or evidence indicating their presence, such as a high-water mark or a defined drainage course.

Potentially jurisdictional wetlands and waters in the project area include Lake Chabot, San Leandro Creek, the riparian wetlands adjacent to San Leandro Creek, and the freshwater emergent wetland (**Figure 3.4-1**). Potentially jurisdictional wetlands and waters are further described in **Appendix D-1**.

Fisheries Resources

In 1975, CDFW noted that the lower section of San Leandro Creek supported a remnant steelhead run that at the time was considered the only known viable steelhead population on the east shore of San Francisco Bay (Curtis and Scoppettone 1975). Physical barriers blocking passage of anadromous fish are not known to be present in the lower section of San Leandro Creek. In September 2010, EBMUD fisheries and wildlife staff completed a barrier assessment in San Leandro Creek from San Francisco Bay to Chabot Dam (EBMUD 2011b). No total barriers were identified but two potential passage obstacles were noted, the concrete box channel down near the bay and a weir above I-580. These structures were judged to be passable at typical spawning season flows. Steelhead and/or rainbow trout have been observed in the lower section of San Leandro Creek during numerous surveys from 1995 through 2011 (EBMUD unpublished fisheries survey data for San Leandro Creek). However, it is uncertain whether steelhead (*Oncorhynchus mykiss*), rainbow trout (*Oncorhynchus mykiss*), or both were observed because of difficulties in differentiating each form of *O. mykiss* species

Altered flow regimes, channel modification, and pollution from urban runoff have reduced fish habitat quality in the lower section of San Leandro Creek, especially below Chabot Park. Urbanization and modified flow regimes have also limited natural physical processes in the creek (sediment transport and deposition) and resulted in artificial seasonal flows relative to natural conditions. Past channel modifications for flood protection have resulted in trapezoidal channels lacking instream structure that provide only limited habitat functions. These modifications have resulted in marginal conditions for most native fish species, in particular below Chabot Park. Within the park boundaries, some habitat components for native fish species persist (EBMUD 2011b).

Lake Chabot is stocked with hatchery-raised rainbow trout (*Oncorhynchus mykiss*) and channel catfish (*Ictalurus punctatus*) by EBRPD and CDFW for recreational fishing. The lake also supports a popular non-native, warm water recreational fishery where largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and black crappie (*Pomoxis nigromaculatus*) are the primary target species. A reproducing native trout population is not known to exist in Lake Chabot; however, some native trout escape from the Upper San Leandro Reservoir during spill events and likely end up in Lake Chabot.

Fish species occurring in lower San Leandro Creek below Chabot Dam include threespine stickleback (*Gasterosteus aculeatus*), Sacramento sucker (*Catostomus occidentalis*), prickly sculpin and rainbow trout. All of these are native fish species. Stocked rainbow trout have spilled over Chabot Dam, but the reproductive status of these hatchery fish in the lower section of San Leandro Creek is unknown. There is a small population of rainbow trout and/or steelhead in San Leandro Creek just downstream from Chabot Dam; the origin of these fish has not been determined. Non-native fish present below the dam include largemouth bass and the common carp (*Cyprinus carpio*). Largemouth bass are predators of both rainbow trout and steelhead (EBMUD 2000).

Wildlife Species and Diversity

The value of a site to wildlife is influenced by a combination of the physical and biological features of the immediate environment. Species diversity is a function of abiotic and biotic conditions and may be greatly affected by human use of the land. Habitat quality is ultimately determined by the type, size, and diversity of vegetation communities present and their degree of disturbance. Wildlife habitats are typically distinguished by vegetation type, with varying combinations of plant species providing different resources for use by wildlife. The following discussion describes the habitats found on-site and the wildlife species they support.

Non-Native Annual Grassland

Grassland habitats, both native and non-native, attract many reptile species, such as alligator lizard (*Gerrhonotus* spp.), western fence lizard (*Sceloporus occidentalis*), and gopher snake (*Pituophis catenifer catenifer*). This habitat also attracts seed-eating and insect-eating species of birds and mammals. Mourning dove (*Zenaida macroura*) and western meadowlark (*Sturnella neglecta*) commonly nest and forage in grasslands. Many other bird species use the habitat for foraging (e.g., western kingbird [*Tyrannus verticalis*]). Grasslands are important foraging grounds for insectivorous bats, such as myotis (*Myotis* spp.) and pallid bat (*Antrozous pallidus*). A large number of other mammal species, such as the California vole (*Microtus californicus*), deer mouse (*Peromyscus maniculatus*), Botta's pocket gopher (*Thomomys bottae*), Beechey (California) ground squirrel (*Spermophilus beecheyi*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), and black-tailed hare (*Lepus californicus*), also forage and nest or den in grasslands. Small rodents attract raptors (i.e., birds of prey) such as owls, which hunt at night, and day-hunting raptors, such as red-tailed hawk (*Buteo jamaicensis*), golden eagle

(*Aquila chrysaetos*), and red-shouldered hawk (*Buteo lineatus*). Black-tailed deer (*Odocoileus hemionus californicus*) can also use grasslands for browsing and resting.

Coyote Brush Scrub

Coyote brush scrub habitat provides habitat for reptiles such as common kingsnake (*Lampropeltis getula*) and western fence lizard, which are common in the warm, dry scrub communities. Often interspersed with other habitats, coyote brush scrub provides foraging and nesting habitat for bird species that are attracted to edges of communities, including California quail (*Callipepla californica*), California thrasher (*Toxostoma redivivum*), and spotted towhee (*Pipilo maculatus*). These species forage among the plant debris for invertebrates. Avian species that use the canopy of scrub for catching insects include flycatchers (*Empidonax* sp.) and wrentit (*Chamaea fasciata*). Raptors that hunt other birds, such as falcons and accipiters, sometimes use scrub habitats for nesting and foraging grounds if water is nearby. Coyote brush scrub also provides food and cover for numerous rodent species, such as deer mouse and pocket mouse (*Chaetodipus* sp.), as well as rabbits, such as Audubon's cottontail (*Sylvilagus audubonii*) and brush rabbit (*Sylvilagus bachmani*). The presence of these species in turn attracts predators such as bobcat (*Felis rufus*).

Coast Live Oak Woodland

Coast live oak woodland provides water, foraging, nesting, cover, and migrating and dispersal corridors for a variety of wildlife species. Amphibians, such as Pacific slender salamander (*Batrachoseps pacificus*), rough-skinned newt (*Taricha granulosa*), and ensatina (*Ensatina eschscholtzii*), can be found underneath the cover of fallen plant debris and bark. Avian insect eaters, such as chestnut-backed chickadee (*Poecile rufescens*), bushtit (*Psaltriparus minimus*), oak titmouse (*Baeolophus inornatus*), and dark-eyed junco (*Junco hyemalis*) feed on the foliage. Steller's jay (*Cyanocitta stelleri*) and acorn woodpecker (*Melanerpes formicivorus*) feed on insects and acorns. Cooper's hawk (*Accipiter cooperii*) and sharp-shinned hawk (*Accipiter striatus*) often hunt small birds in this habitat. Mammals commonly found in coast live oak woodland include western gray squirrel (*Sciurus griseus*), long-tailed weasel (*Mustela frenata*), and black-tailed deer (*Odocoileus hemionus californicus*). Mature oaks and snags are important features in this habitat because they provide good roosting areas for a variety of special-status species of bats found in this region.

Developed/Landscaped Areas

Wildlife species generally associated with disturbed lands include raccoon (*Procyon lotor*), opossum (*Didelphis virginianus*), European starling (*Sturnus vulgaris*), and mourning dove. Insects present in disturbed habitats provide food for species such as western meadowlark, blackbird, loggerhead shrike (*Lanius ludovicianus*), and western fence lizard. This community can support a variety of predators, including snakes, various raptors, and red fox.

Eucalyptus Grove

The plant debris from eucalyptus trees contains allelopathic oils, which prevent the understory from becoming established and preclude the use of many wildlife species. Similar to developed areas, common wildlife species are found in this disturbed habitat. Additionally, many raptors and owl species, including bald eagle, red-tailed hawk, red-shouldered hawk, Cooper's hawk, barn owl (*Tyto alba*), and great horned owl (*Bubo virginianus*), use the tall trees as nesting habitat. The monarch butterfly (*Danaus plexippus*) is also known to use eucalyptus stands for roosting habitat, especially along the California coast.

Riparian Forest

Riparian woodlands are particularly valuable in their function as an interface between aquatic and terrestrial communities. Riparian zones provide nutrients, shade, and bank stabilization for aquatic systems, as well as nesting and foraging habitat, migration corridors, and refuges for wildlife. Riparian habitat typically supports large-diameter trees, such as willows, cottonwoods, box elders, and California sycamore that provide excellent nesting habitat for raptors, including red-shouldered hawk and American kestrel. A variety of passerine species, such as black phoebe (*Sayornis nigricans*), white-crowned sparrow (*Zonotrichia leucophrys*), song sparrow (*Melospiza melodia*), yellow-rumped warbler (*Dendroica coronata*), Wilson's warbler (*Wilsonia pusilla*), and spotted towhee (*Pipilo maculatus*), can be expected to occur and nest in this habitat. Common mammals found in this habitat include raccoon, gray fox (*Urocyon cinereoargenteus*), striped skunk, and dusky-footed woodrat (*Neotoma fuscipes*).

Freshwater Emergent Wetland

Freshwater emergent wetland habitat is productive for wildlife in that it offers water, food, and cover for a variety of species. Reptiles and amphibians that commonly occur in this habitat include western aquatic garter snake (*Thamnophis couchii*), Pacific treefrog (*Psuedacris regilla*), and American bullfrog (*Rana catesbeiana*). Red-winged blackbird (*Agelaius phoeniceus*), common yellowthroat (*Geothlypis trichas*), and killdeer often use these areas for foraging and nesting. Snowy egret (*Egretta thula*), green heron (*Butorides virescens*), black-crowned night-heron (*Nycticorax nycticorax*), and mallard (*Anas platyrhynchos*) also forage in this habitat, feeding on small fish, amphibians, and reptiles. Mammals commonly present in this habitat include California meadow vole (*Microtus californicus*), raccoon, striped skunk, and gray fox. This habitat provides important foraging and drinking areas for aerial- and ground-feeding insectivorous bats, such as *Myotis* species.

Wildlife Movement Corridors and Habitat Fragmentation

Wildlife movement includes migration (usually one direction per season), interpopulation movement (e.g., long-term genetic exchange), and daily movement in an animal's territory. Small travel pathways used to facilitate movement for daily home range activities, such as foraging or escaping from predators, can also provide connection between outlying populations, permitting gene flow between populations.

Where patches of pristine habitat are fragmented, habitat linkages (i.e., movement and migration corridors) facilitate movement between populations in discrete outlying areas and larger "core" habitat areas. Habitat fragmentation, by definition, is an event that creates a greater number of habitat patches that are smaller than the original contiguous tract(s) of habitat. Fragmentation of primary habitat can be a result of topographic changes, changes in vegetation, or human disturbance that hinders local or regional movements of wildlife. The resulting reduced interaction between individuals changes the long-term dynamics of populations distributed among fragments, potentially reducing genetic diversity and the population's ability to genetically adapt to or respond to environmental pressures. This increases the probability of extinction for these populations compared to those associated with nonfragmented landscapes (Kupfer et al. 1997, Zuidema et al. 1996). Effects of fragmentation on the movement or dispersal of organisms are critical to species composition and diversity in a given habitat (Opdam 1990; Tiebout and Anderson 1997).

Wildlife directional movement in the project area is predominantly to open space lands to the north and east, including Anthony Chabot Regional Park, Lake Chabot Regional Park, and EBMUD watershed lands. Portions of the project area represent the western edge of this open space. Residential and commercial development to the west and south of the project area hinders movement of wildlife in those directions. To the east, the lake acts as a partial barrier to movement by some species to and from the project area, particularly amphibian species (e.g., California red-legged frog) that may be subject to predation by non-native fish. Human activities in the park also likely affect movement of wildlife species near the lake.

Special-Status Plant Species

The plant species considered to have special status for purposes of this report meet at least one of the following criteria:

- covered under the ESA or California Endangered Species Act (CESA) (CDFW 2013c);
- listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.);
- identified as California Rare Plant Rank (CRPR) 1A (presumed extinct in California), CRPR 1B (rare, threatened, and endangered in California and elsewhere), or CRPR 2 (rare, threatened, or endangered in California, but more common elsewhere) if they also meet the definitions of Section 1901, Chapter 10 (California Native Plant Protection Act) or CESA Sections 2050–2098;
- identified as CRPR 3 (plants about which more information is needed [review list]) or CRPR 4 (plants of limited distribution [watch list]); or
- identified in California Native Plant Society (CNPS) list of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties (Lake 2010).

Based on a literature review and a familiarity with the flora in the project region, 82 special-status plant species have been recorded historically in the project vicinity or were otherwise considered to have potential to occur in the region. Many of the special-status plant species occurring in the region are not expected to occur because suitable habitat is lacking on the site. Habitat requirements for all plant species considered in this evaluation are detailed further in **Appendix D-3**. **Table 3.4-1** lists the CNDDB special-status plant species within 3 miles of the project area and their potential to occur in the project area. **Figure 3.4-2** depicts special-status plant species that have been observed within 0.5, 1, and 3 miles of the project area and reported to the CNDDB. Occurrences are assigned to an accuracy class by CDFW, based on the reliability and level of detail received with each CNDDB data submission. Accuracy classes are shown in **Figure 3.4-2**.

Special-Status Fish and Wildlife Species

Table 3.4-2 lists CNDDB occurrences of sensitive fish and wildlife species within 3 miles of the project area and sensitive species that may be affected by project implementation. Fish and wildlife species federally or state listed as threatened or endangered and for which CNDDB occurrences have been noted within 3 miles of the project area are discussed individually below. **Figure 3.4-3** depicts special-status wildlife species that have been observed within 0.5, 1, and 3 miles of the project area and reported to the CNDDB. Occurrences are assigned to an accuracy class by CDFW, based on the reliability and level of detail received with each CNDDB data submission. Accuracy classes are shown in **Figure 3.4-3**.

Table 3.4-1
Special-Status Plant Species with Potential to Occur in the Project Area

Scientific Name	Common Name	Status[1]	Potential for Occurrence
Balsamorhiza macrolepis var. *macrolepis*	Big-scale balsamroot	CRPR 1B.2, EBCNPS A1	Moderate potential
Centromadia parryi ssp. congdonii	Congdon's tarplant	CRPR 1B.1, EBCNPS A2	Unlikely
Fritillaria liliacea	Fragrant fritillary	CRPR 1B.2, EBCNPS A1	Moderate potential
Helianthella castanea	Diablo helianthella	CRPR 1B.2, EBCNPS A2	Moderate potential
Monolopia gracilens	Woodland woollythreads	CRPR 1B.2, EBCNPS A1	Unlikely
Polygonum marinense	Marin knotweed	CRPR 3.1	No potential
Streptanthus albidus ssp. *peramoenus*	Most beautiful jewel-flower	CRPR 1B.2, EBCNPS A2	Unlikely

Notes:
CRPR = California Rare Plant Rank; EBCNPS = East Bay Chapter, California Native Plant Society
[1] Status definitions:
CRPR 1B.1 = Eligible for state listing, CEQA review; Rare, threatened, or endangered in California and elsewhere; seriously endangered in California
CRPR 1B.2 = Eligible for state listing, CEQA review; Rare, threatened, or endangered in California and elsewhere; fairly endangered in California
CNPS 3.1 = Review list, more information needed, recommended for CEQA review; seriously endangered in California
EBCNPS A1 = Eligible for state listing, known from one or two regions in Alameda and Contra Costa Counties, CEQA review
EBCNPS A2 = Eligible for state listing, known from three to five regions in Alameda and Contra Costa Counties, CEQA review
Source: Data compiled by AECOM in 2013

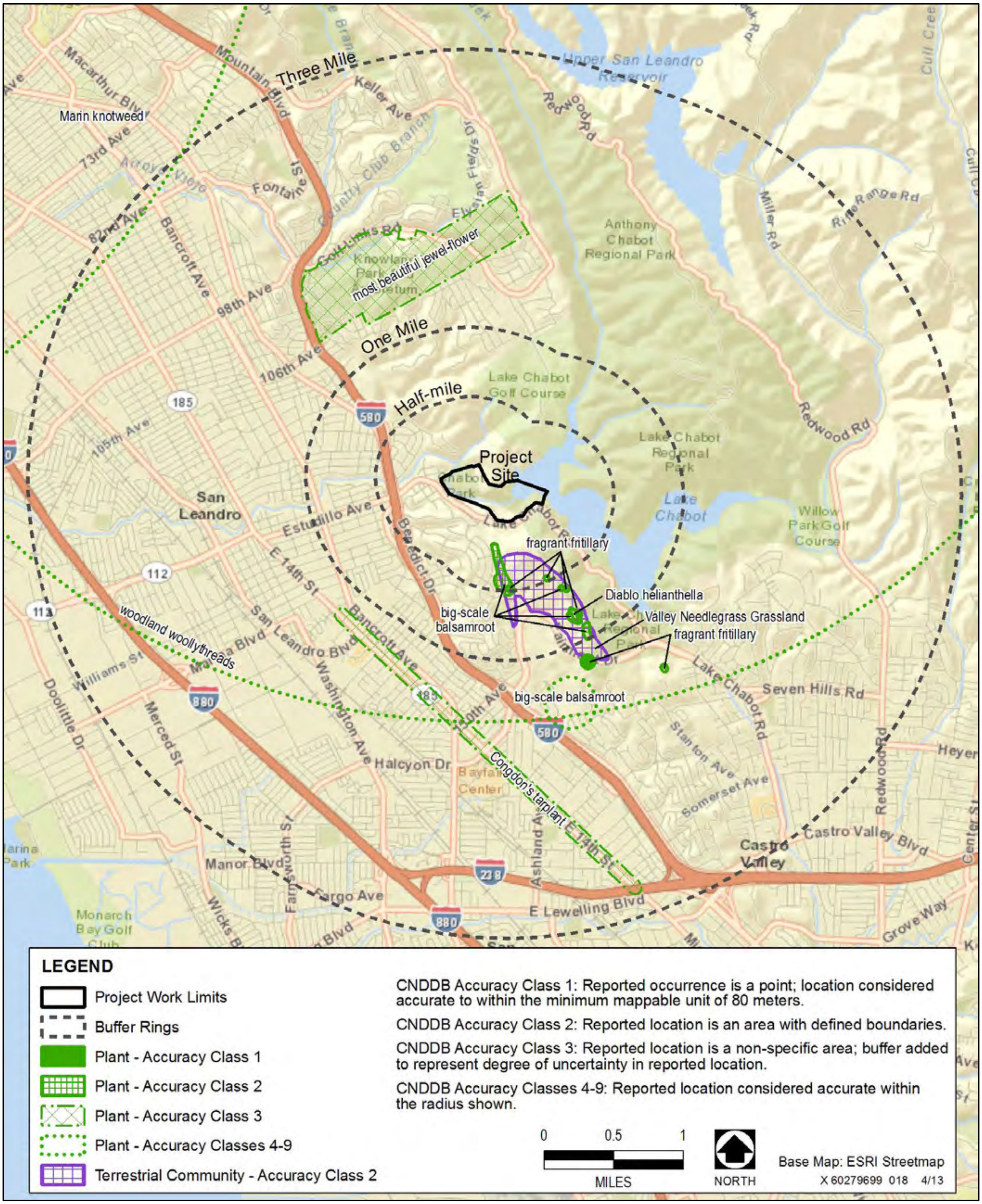
Table 3.4-2
Special-Status Fish and Wildlife Species with Potential to Occur in the Project Area

Common Name	Scientific Name	Status[1]	Potential for Occurrence
Invertebrates			
Euphydryas editha bayensis	Bay checkerspot butterfly	Federal: threatened	Unlikely
Amphibians			
Rana draytonii	California red-legged frog	Federal: threatened California: species of special concern	Moderate potential

Table 3.4-2
Special-Status Fish and Wildlife Species with Potential to Occur in the Project Area

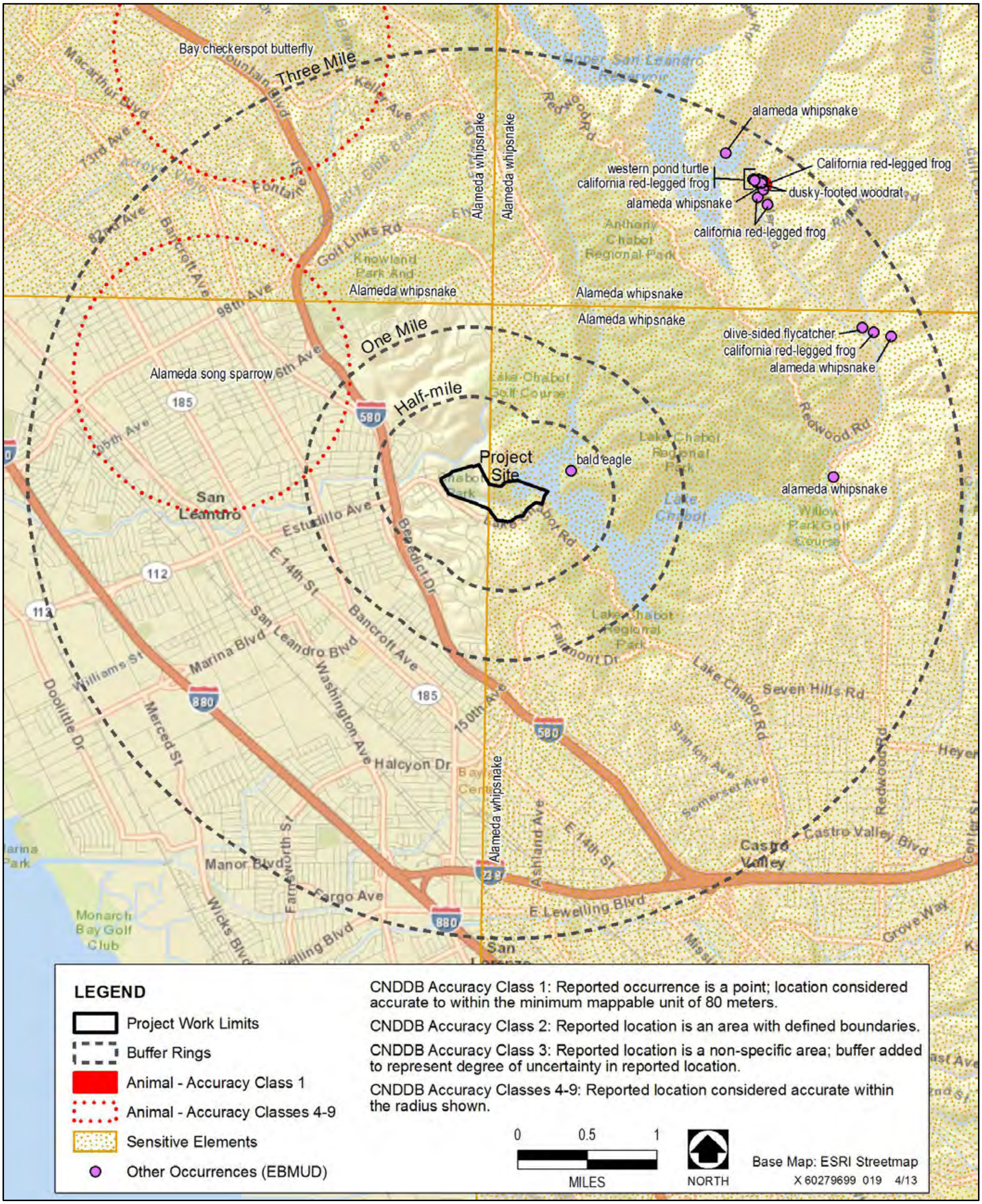
Reptiles			
Emys marmorata	Western pond turtle	California: species of special concern	Moderate potential
Masticophis lateralis euryxanthus	Alameda whipsnake	Federal: threatened California: threatened	Moderate potential
Birds			
Contopus cooperi	Olive-sided flycatcher	California: species of special concern	Moderate potential
Haliaeetus leucocephalus	Bald eagle	California: threatened	Moderate potential
Melospiza melodia pusillula	Alameda song sparrow	California: species of special concern	No potential
Mammals			
Antrozous pallidus	Pallid bat	California: species of special concern	Unlikely
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	California: species of special concern	Moderate potential
Nyctinomops macrotis	Big free-tailed bat	California: species of special concern	Moderate potential
Fish			
Oncorhynchus mykiss	Central California Coast steelhead DPS	Federal: threatened	Moderate potential

Notes:
DPS = Distinct Population Segment
[1] Status definitions:
Endangered = Listed as being in danger of extinction
Threatened = Listed as likely to become endangered in the foreseeable future
Species of special concern = Declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction (CDFW)
Source: Compiled by AECOM in 2013



Source: CDFW 2013a, Compiled by AECOM in 2013

Figure 3.4-2: CNDDB Plant Occurrences in the Project Vicinity



Source: CDFW 2013, EBMUD 2013, Compiled by AECOM in 2013

Figure 3.4-3: CNDDB Wildlife Occurrences in the Project Vicinity

Bay Checkerspot Butterfly

The bay checkerspot butterfly (*Euphydryas editha bayensis*) occurs in native grasslands occurring on shallow serpentine-derived or similar droughty or infertile soils (USFWS 1998). Its life cycle is closely tied to that of its host plant, dwarf plantain (*Plantago erecta*), which germinates in early October through late December and senesces in early April to mid-May. The bay checkerspot sometimes makes use of two species of secondary host plants, purple owl's clover (*Castilleja densiflora*), and exserted paintbrush (*Castilleja exserta*), if the dwarf plantain senesces before butterfly development is complete. Adults feed on nectar from a number of plant species found in association with serpentine grasslands (i.e., grasslands that exist on soils derived from serpentine rock that are nutrient-poor and contain high ratios of calcium to magnesium compared to typical soils limiting the plant community composition [Stromberg et al. 2007]) , including California goldfields (*Lasthenia californica*), tidy tips (*Layia platyglossa*), and desert parsleys (*Lomatium* spp.). Topography of the grassland is also an important habitat element. Both the warmer, drier south-facing slopes and the cooler, wetter north-facing slopes are needed. Development occurs faster on the warmer slopes, but host plants also senesce more quickly on the warmer slopes than on cool, north-facing slopes. The bay checkerspot exists as a number of small metapopulations, and the exact distribution of the butterfly varies through time. Therefore, any site with appropriate habitat in the vicinity of the historic range of the bay checkerspot should be considered potential habitat. One CNDDB record of this species is within 3 miles of the project area. A small area of serpentine grassland occurs in the project area; however, because of the small size of the area, the steep slopes, and lack of microclimates, the potential for this species to occur on the project area is unlikely, and no individual has been observed in the project area (Fleishman et al. 2000).

California Red-Legged Frog

The California red-legged frog (*Rana draytonii*) is found along the coast and Coast Ranges from Mendocino County in northern California south to northern Baja California, and inland east through the northern Sacramento Valley into the foothills of the Sierra Nevada. Optimal habitat includes ponds, stream courses, and permanent pools (Storer 1925) and intermittent streams (Hayes and Jennings 1988; 71 Federal Register [FR] 19243, April 13, 2006). Typical habitat characteristics include water depth of at least 2.5 feet; largely intact emergent or shoreline vegetation, such as cattails (*Typha* spp.), tules (*Schoenoplectus* spp.), or willows (*Salix* spp.); and absence of competitors/predators, such as bullfrogs (*Rana catesbeiana*) and largemouth bass (*Micropterus salmoides*) (Hayes and Jennings 1988). Adults are highly aquatic and are most active at night (Storer 1925). California red-legged frogs also make use of terrestrial habitat, especially after precipitation events for nonmigratory forays into adjacent upland habitats and for migratory overland movements to breeding sites. California red-legged frogs were documented to migrate between breeding and nonbreeding aquatic sites at distances up to almost 2 miles (Bulger et al. 2003). One CNDDB record documents this species within 3 miles of the project area. The closest occurrences of this species are located just below the spillway of the Upper San Leandro Reservoir, approximately 2.5 miles to the northeast. Further downstream, below the stream crossing at Redwood Road, habitat for California red-legged frog declines as the creek flows through the Willow Park Golf Course, where permanent golf course ponds provide habitat for bullfrogs. Predator populations in the lake also are high. No observations of California red-legged frog have been noted in Lake Chabot or below the spillway during observations performed by EBMUD. The closest critical habitat for this species is located more than 5.5 miles to the east. Critical habitat is a term defined in the ESA. It identifies geographic areas that contain features essential for the conservation of a threatened or endangered species. Habitat for this species occurs in the project area, and a moderate potential exists for occurrence; however, the presence of predators greatly reduces habitat suitability. As described above, no observations of this species have been recorded within the project area.

Alameda Whipsnake

The Alameda whipsnake (*Masticophis lateralis*) is restricted to the hills of Alameda, Contra Costa, and northern Santa Clara Counties in the San Francisco Bay region (Stebbins 2003). The five remaining populations, which have little to no genetic flow between them, are located in Sobrante Ridge, Oakland Hills, Hayward Hills, the Mt. Diablo vicinity, the Black Hills, and Wauhab Ridge. This regional restriction corresponds to the distribution of coastal scrub and chaparral in the area (Stebbins 2003). It may reflect the species' preference for friable, well-drained soils. Primary habitats for Alameda whipsnake typically are east-, southeast-, south- and southwest-facing slopes containing coastal scrub and chaparral, including rock outcrops that are within approximately 0.5 mile (Swaim 1994). However, current unpublished data suggest that Alameda whipsnake may use a wider range of habitat types. Canopy cover within these habitats typically is open (less than 75 percent cover of total area) with little to no herbaceous understory (Swaim 1994). Telemetry data indicate that, although home ranges of Alameda whipsnakes are centered on shrub communities, whipsnakes frequently venture into adjacent habitats, including grassland, oak savanna, and occasionally oak-bay woodland. Swaim (1994) recorded male Alameda whipsnake home ranges of 4.7 to 21.7 acres. A total of 44 CNDDB records of this species occur within USFWS quadrangle species lists (USFWS 2011). The two closest CNDDB occurrences are located 4.5 and 5 miles to the north of the project area. The EBMUD species database shows five Alameda whipsnake occurrences approximately 3 miles to the east of the project area (**Figure 3.4-3**). The closest critical habitat unit for this species is located more than 1.5 miles to the northwest. Habitat for this species is found in the project area; however, the patches of suitable habitat are small, with much of the project area covered in closed canopy woodland. A moderate potential exists for occurrence. As described above, no observations of this species have been recorded within the project area.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a raptor typically associated with aquatic ecosystems that frequents large lakes, rivers, estuaries, reservoirs, and coastal habitats. Bald eagles usually nest in large trees along shorelines and use the same breeding territory each year although they may use alternative nests in the territory. The bald eagle in California was initially federally listed as endangered in 1978 but was reclassified as threatened in 1995 (60 FR 36000, July 12, 1995). USFWS proposed to delist the bald eagle in 1999, and on July 9, 2007, announced the delisting of the bald eagle, which went into effect on August 8, 2007 (72 FR 37345; July 9, 2007). Although the bald eagle was removed from the federal endangered species list, it continues to receive federal protection under the federal Bald and Golden Eagle Protection Act.

In 2012, a pair of nesting bald eagles were found by EBRPD in a eucalyptus tree near the edge of the lake in its northeastern-most arm, called Bass Cove. This occurrence is approximately 0.25 mile from the project area boundary. Although bald eagles have been seen at the lake in previous years, this is the first nesting occurrence. Repeat use of nesting sites is common. A moderate potential exists for this species to occur in the project area.

Central California Coast Steelhead DPS

The range of the Central California Coast steelhead Distinct Population Segment (DPS) includes coastal basins from the Russian River, in Sonoma and Mendocino Counties, to Aptos Creek, in Santa Cruz County, and the drainages of San Francisco Bay and San Pablo Bay eastward to the Napa River, excluding the Sacramento–San Joaquin River Basin (71 FR 834, January 5, 2006). Steelhead has an anadromous life cycle. Spawning and rearing occur in perennial streams. After spawning, they migrate to the ocean, where they spend the intermediate stages of their life-history. Resident rainbow trout spend their entire life in freshwater and never migrate to the ocean. Steelhead found along the central California coast enters freshwater to spawn when winter rains have been sufficient to raise stream flows. The peak season for upstream migration of steelhead adults lasts from late October through the end of May, but typically the bulk of migration occurs between mid-December and mid-April. Anadromous steelhead are unique among Pacific salmon in that ocean-migrating individuals may return to the ocean after spawning and return to freshwater to spawn one or more times. Spawning habitat is usually characterized by perennial streams with cool, clear, fast-flowing water with high dissolved oxygen content and abundant gravels and riffles. Rearing habitat is characterized by riparian, emergent, and wetland habitat with low-velocity water areas along stream margins.

Because differentiating between steelhead and rainbow trout is difficult, it is unclear what life-form of *O. mykiss* has been observed in San Leandro Creek. The potential for steelhead to be present in the lower section of San Leandro Creek, below Chabot Dam, is considered moderate because (1) CDFW has stated that this section of the creek may host a remnant population (Curtis and Scoppettone 1975), (2) no total barriers to anadromy exist in this creek section (EBMUD 2011b), and (3) unidentified forms of *O. mykiss* have recently been observed in this section of the creek. The National Marine Fisheries Service (NMFS) designated critical habitat for the Central California Coast steelhead DPS in 2005. San Leandro Creek is not considered critical habitat (i.e., essential for the conservation of the species).

3.4.3 Regulatory Background

Federal

Federal Endangered Species Act

Under the ESA, the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (16 U.S. Code [USC] 1533[c]). USFWS has jurisdiction over plants, wildlife, and resident fish, and NMFS has jurisdiction over anadromous fish and marine fish and mammals. In addition to listing threatened and endangered species, USFWS and NMFS publish a list of candidate species for which they have biological information sufficient to support a proposal to list them as endangered or threatened. Species on the candidate list are not protected under the ESA, but they receive special attention during environmental review.

Section 7(a)(2) of the ESA requires federal agencies to consult with other federal agencies with regulatory authority so that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of or destroy or adversely modify designated critical habitat of listed species. Critical habitat is an area occupied by a listed species within which are found the physical or geographical features essential to the conservation of the species. Critical habitat can also be unoccupied habitat that is essential to the conservation of the species.

Section 9 of the ESA prohibits the “take” of federally listed species. “Take” is defined under the ESA, in part, as harassing, harming, wounding, killing, or trapping federally listed species or attempting to perform any of these actions (16 USC 1532[19]). Under federal regulations, “take” is further defined to include habitat modification or degradation where it results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 Code of Federal Regulations 17.3—Definitions). USFWS can issue an incidental take statement that identifies the specific impacts of such taking, reasonable and prudent measures that are necessary or appropriate to minimize such impact, and terms and conditions that must be complied with by the lead federal agency and/or applicant (16 USC 1536[b][4][C]).

For projects where a federal nexus is not involved and take of a listed species may occur, the project proponent may seek to obtain an incidental take permit under Section 10(a) of the ESA. Section 10(a) allows USFWS to permit the incidental take of listed species if such take is accompanied by a habitat conservation plan that identifies components to minimize and mitigate impacts associated with the take.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703–712), as amended, in part, prohibits taking, capturing, or killing migratory birds, or attempting to take, capture, or kill migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. The Act does not provide protection for habitat of migratory birds, but it does prohibit the destruction or possession of individual birds, eggs, or nest in active use without a permit from USFWS.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668–668c) prohibits anyone, without a permit issued by the Secretary of the Interior for very limited scientific or educational purposes, from taking bald eagles, including their parts, nests, or eggs. It imposes criminal and civil penalties on anyone (including associations, partnerships, and corporations) in the United States or within its jurisdiction who, without a permit, takes, possesses, sells, purchases, barters, offers to sell or purchase or barter, transports, exports, or imports at any time or in any manner a bald or golden eagle, alive or dead; or any part, nest or egg of these eagles. The Act defines “take” to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.

USFWS Mitigation Policy on Riparian Communities in California

Riparian communities have a variety of functions, including providing high-quality habitat for resident and migrant wildlife, streambank stabilization, and filtration of runoff water. Throughout the United States, riparian habitats have declined substantially in extent and quality compared with their historical distribution and condition. These declines have increased concerns about dependent plant and wildlife species, leading federal agencies to adopt policies to arrest further loss. USFWS mitigation policy identifies California’s riparian habitats as belonging to resource Category 2, for which “no net loss” of existing habitat value is recommended (46 FR 7644, January 23, 1981).

Clean Water Act Sections 404 and 401

USACE regulates the discharge of dredged or fill material into waters of the United States under Section 404 of the CWA. Waters of the United States include navigable waters of the United States; interstate waters; all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce; tributaries to any of these waters; and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Wetlands are defined as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions (33 USC 328.3[b]). Wetlands falling under USACE jurisdiction must demonstrate the presence of three specific wetland parameters: hydric soils, hydrophytic vegetation, and sufficient wetland hydrology.

Generally, wetlands include swamps, marshes, bogs, and similar areas. Lakes, rivers, and streams are defined as "other waters." Jurisdictional limits of these features are typically noted by the ordinary high-water mark. The ordinary high-water mark is the line on the shore or bank established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in soils, lack of woody or terrestrial vegetation, the presence of plant debris, or other characteristics of the surrounding areas (33 USC 328.3[e]). Previously, isolated ponds or seasonal depressions had been regulated as waters of the United States. However, in *Solid Waste Agency of Northwestern Cook County* [SWANCC] *v. United States Army Corps of Engineers, et al.* (January 8, 2001), the U.S. Supreme Court ruled that certain "isolated" wetlands (e.g., non-navigable, isolated, and intrastate wetlands) do not fall under the jurisdiction of the CWA and are no longer under the jurisdiction of the USACE. Some circuit courts (e.g., *U.S. v. Deaton* [2003], *U.S. v. Rapanos* [2003], *Northern California River Watch v. City of Healdsburg* [2006]), however, have ruled that the SWANCC decision does not prevent CWA jurisdiction if a "significant nexus" (such as a hydrologic, biological, or chemical connection) exists, whether it be a human-made (e.g., roadside ditch) or natural tributary to navigable waters, direct seepage from the wetland to the navigable water, a surface or an underground hydraulic connection, an ecological connection (e.g., the same bird, mammal, and fish populations are supported by both the wetland and the navigable water), or changes to chemical concentrations in the navigable water attributable to water from the wetland.

Section 404 prohibits the discharge of dredged or fill material into waters of the United States, including wetlands, without a permit from USACE. "Fill material" refers to material placed in waters of the United States where the material has the effect of replacing any portion of a water of the United States with dry land or changing the bottom elevation of any portion of a water of the United States. Examples of fill material include rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mining or other excavation activities, and material used to create any structure or infrastructure in waters of the United States. The regulations and policies of USACE, the U.S. Environmental Protection Agency (EPA), and USFWS mandate that the filling of wetlands be avoided unless it can be demonstrated that no practicable alternatives to filling the wetlands exist.
Section 404 authorization from USACE can be issued in one of four ways: a nationwide permit that covers specific categories of activities, a regional permit, a letter of permission, or an individual permit. Section 401 of the CWA requires an applicant for any federal permit that, when issued, may result in a discharge into waters of the United States to obtain a certification from the state that the discharge would comply with provisions of the CWA. Although isolated wetlands may not be under federal regulation, they are regulated by the State of California. The nine RWQCBs administer this program. Any condition of water quality certification would be incorporated into the USACE permit. The state has a policy of no net loss of wetlands and typically requires mitigation for impacts on wetlands before it will issue a water quality certification.

State

California Endangered Species Act

Under CESA, CDFW maintains a list of threatened and endangered species. In addition, CDFW maintains lists of candidate species and species of special concern. Candidate species are those species under review for addition to either the list of threatened or the list of endangered species. Section 2080 of the California Fish and Game Code prohibits take of state-listed species; however, CDFW may, under Section 2081(b) of the Fish and Game Code, issue a permit for the take of state-listed species incidental to otherwise lawful activities, except in the case of fully protected species. Section 86 of the Fish and Game Code defines "take" as hunt, pursue, catch, capture, or kill or attempt to hunt, pursue, catch, capture, or kill. Impacts associated with the authorized take must be fully mitigated. The measures required to meet this obligation must be roughly proportional in extent to the impact of the authorized take of the species. Section 2080.1 allows for a consistency determination with USFWS when a federal incidental take statement has been issued pursuant to a federal ESA Section 7 or 10(a) consultation.

California Fish and Game Code Section 1602

Section 1602 of the California Fish and Game Code prohibits the substantial diversion or obstruction of the natural flow of, or substantial change or use of any material from, the bed, channel, or bank of any river, stream, or lake unless CDFW is provided written notification regarding the activity and CDFW either issues a no-effect determination or a lake or streambed alteration agreement, or fails to issue a no-effect determination or a lake or streambed alteration agreement within the statutory period.

California Fish and Game Code Section 3503

Section 3503.5 of the California Fish and Game Code states that it is "unlawful to take, possess, or destroy any birds-of-prey in the orders Falconiformes or Strigiformes..." These orders include hawks, owls, eagles, and falcons. The loss of an active nest is considered a violation of this code by CDFW. This statute does not provide for the issuance of any type of incidental take permit. Section 3503 prohibits unlawful take, possession, or needless destruction of the nest or eggs of any bird.

California Fish and Game Code Section 3511

Several statutes in the California Fish and Game Code prohibit the take or possession of fully protected species and do not provide for authorization of incidental take of these species. Nonfederal agencies and private parties must avoid take of any fully protected species. Section 3511 specifically prohibits the take of fully protected bird species identified in this section of the code.

Native Plant Protection Act

The Native Plant Protection Act (codified in California Fish and Game Code Sections 1900–1913) is intended to preserve, protect, and enhance endangered or rare native plants in the state. The Act directs CDFW to establish criteria for determining what native plants are rare or endangered. Under Section 1901, a species is considered endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more cause. Also under Section 1901, a species is considered rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens. Under the Act, the California Fish and Game Commission may adopt regulations governing the taking, possessing, propagation, or sale of any endangered or rare native plant.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Act, all surface water and groundwater within the boundaries of the state are considered "waters of the state" and fall under the jurisdiction of the State Water Resources Control Board (State Water Board) and RWQCBs. Waters of the state also include isolated wetlands and waters deemed by USACE to be nonjurisdictional with respect to the SWANCC decision (see CWA Sections 404 and 401 above). RWQCBs must prepare and periodically update water quality control plans. Each plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards.

In most cases, the RWQCBs seeks to protect these beneficial uses by requiring the integration of water quality control measures into projects that would result in discharge into waters of the state. Projects that affect waters of the state must meet waste discharge requirements (WDR), which may be issued in addition to a water quality certification under Section 401 of the CWA. For waters of the state that are not subject to USACE jurisdiction, State Water Board and the RWQCB may authorize impacts by issuing a WDR or, in some cases, a waiver of a WDR.

State CEQA Guidelines Section 15206

With respect to biological resources, Section 15206 of the State CEQA Guidelines specifies that a project will be deemed to be of statewide, regional, or area-wide significance if it would substantially affect sensitive wildlife habitats, including but not limited to riparian lands, wetlands, bays, estuaries, marshes, and habitats for rare and endangered species.

State CEQA Guidelines Section 15380

Section 15380 of the State CEQA Guidelines provides that a species not listed under the ESA or CESA may be considered rare or endangered under specific criteria. These criteria have been modeled after the definition in the ESA and CESA. Section 15380 was included in the State CEQA Guidelines primarily to address situations in which a public agency is reviewing a project that may have a significant effect on a candidate species that has not yet been listed by either USFWS or CDFW. Thus, Section 15380 provides an agency with the ability to protect a species from a project's potential impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

An example would be the vascular plants that are listed as rare or endangered by CNPS but that may have no designated status or protection under the ESA or CESA. The CRPR system has five rankings, as described in the "Special Status Plant Species" section above.

In general, plants identified as CRPR 1A, 1B, or 2 species meet the criteria of Section 15380. Additionally, these plants meet the definition of rare under the Native Plant Protection Act and CESA.

Oak Woodlands Conservation Act

California Senate Bill 1334, the Oak Woodlands Conservation Act, became law on January 1, 2005, and was added to the CEQA statutes as Section 21083.4. This statute requires a county to determine whether implementing a project might result in a significant impact on oak woodlands and, if the county determines that such an impact might occur, requires the county to implement one or more of the following mitigation measures:

- conserve oak woodlands through the use of conservation easements;
- plant an appropriate number of trees, maintain the plantings, and replace failed plantings;
- contribute funds to the Oak Woodlands Conservation Fund for the purpose of purchasing oak woodlands conservation easements; and/or
- implement other mitigation measures developed by the county.

This law protects oak woodlands that are not protected under the State Forest Practice Act.

Local

California Government Code

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, or transmission of water (California Office of Administrative Law 2013a). However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

Alameda County General Plan

Alameda County does not have a countywide land use or circulation element but has adopted area plans that meet the California Government Code's requirements for these elements for Castro Valley and other unincorporated areas. The Alameda County General Plan is comprised of several documents covering particular planning areas and includes the General Plan for Castro Valley (ACCDA 2012). This document includes the Land Use and Circulation Elements for the urbanized area of Castro Valley and establishes policies for other topics specific to Castro Valley. The project area is located in the Castro Valley General Plan planning area and is designated as Protected Open Space and Regional Parks (ACCDA 2012).

County of Alameda Tree Ordinance

The Alameda County tree ordinance (Ordinance No. 0-2004-23) is contained in the Alameda County Municipal Code Title 12, Public Roadways and Parks, Chapter 12.11, Regulation of Trees in County Right of Way. The ordinance preserves and protects trees within county rights-of-way (land that by deed, conveyance, agreement, dedication, usage or process of law is reserved for use by the county or any other public entity or by the licensees or agents of the county or any other public entity). The ordinance prohibits any person or utility from removing or causing to be removed any tree from the right-of-way unless so authorized by an encroachment permit issued by the county. Protected trees include any woody perennial plant characterized by having a single trunk or multitrunk structure at least 10 feet high and having a major trunk that is at least 2 inches in diameter at breast height (dbh).

City of Oakland General Plan

A portion of the project area is located in the City of Oakland and is zoned as Dunsmuir Ridge Open Space, a Resource Conservation Area. The City of Oakland General Plan (1996) includes an Open Space, Conservation, and Recreation Element (City of Oakland 1996) that provides guidance related to making Oakland more attractive and "a better place to live by conserving and rediscovering its natural resources" and "growing in harmony with the environment." Chapter 2, Open Space, identifies goals, policies, and actions related to resource conservation areas and wildland parks, urban parks, trail improvement, and creek conservation. Chapter 3, Conservation, identifies a single goal: to preserve and prudently use natural resources to sustain life, support urban activities, protect public health and safety, and provide a source of beauty and enjoyment. A number of policies on different aspects of the city's natural resources, including earth, water, and plant and animal resources, are presented in the chapter.

City of Oakland Protected Trees Ordinance and Street Trees and Shrubs Ordinance

The City of Oakland Protected Trees Ordinance (City of Oakland Municipal Code Title 12, Chapter 12.36) protects all coast live oak (*Quercus agrifolia*) trees that are 4 inches dbh or greater and any tree that is 9 inches dbh or greater with the exception of eucalyptus or single specimens of Monterey pine (*Pinus radiata*). Replacement plantings are required for the removal of any native trees, with a 1:1 replacement for trees of a 24-inch box size and 3:1 replacement for trees that are 15 gallons in size.

The Protected Street Trees and Shrubs Ordinance (Chapter 12.32) requires a written permit from the city director of parks and recreation to plant, remove, or maintain any tree or shrub on any public street, avenue, highway, alley, walk, or lane. "Maintain" includes clipping, spraying, fertilizing, irrigating, propping, treating for disease or injury, and any other similar acts that promote the life, growth, health, or beauty of trees and shrubs. The ordinance also requires a permit to destroy, deface, or mutilate any tree or shrub or to attach or place any rope, wire, sign, poster, handbill, or other item on a tree or on any guard or protection of a tree, or to cause or permit any wire charged with electricity to come into contact with any such tree.

City of San Leandro General Plan

The City of San Leandro General Plan (City of San Leandro 2011; includes a chapter on open space, parks, and conservation. This chapter addresses the management of San Leandro's park and open space areas and the conservation of natural resources, such as soil, water, and natural habitat. It identifies goals that relate to protecting local watersheds and plant and animal communities. Goal 25 of the plan focuses on promoting habitat restoration, water quality improvement, and maintenance and monitoring programs to protect and restore San Leandro Creek. Goal 26 of the plan focuses on promoting the long-term conservation of San Leandro's natural ecosystems, including conducting habitat conservation and restoration, requiring that development decisions be in accordance with biological assessments, and mitigating for the impacts of development. For each of these goals, the implementation strategies include intergovernmental and private property owner coordination to improve and conserve the natural resources.

City of San Leandro Street Trees Ordinance

The City of San Leandro has a tree ordinance in the San Leandro Municipal Code, Title 5, Chapter 5-2, Street Trees, relating only to street trees. A street tree is any tree planted and maintained within the public right-of-way. A permit is required for the removal, replacement, or planting of any street tree, and approval must be obtained from the public works director or a designee to prune, inspect, maintain, root prune, or otherwise alter street trees.

3.4.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts in this analysis are consistent with the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on biological resources if it would:

1. have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW or USFWS;

2. have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS;

3. have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means;

4. interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

5. conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

6. conflict with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan.

EBMUD has a Low Effect East Bay Habitat Conservation Plan (LEHCP) that covers an approximately 120-acre area of the San Leandro watershed, between the base of Chabot Dam and the edge of Chabot Park. However, the LEHCP covers general maintenance activities in the watershed, not specific project work such as the proposed project. The avoidance and minimization measures included in the proposed project are similar to those required by the LEHCP. Thus, the proposed project does not conflict with the LEHCP. No other adopted habitat conservation plans, natural community conservation plans, or other approved local, regional, or state habitat conservation plans exist for the project area. Thus, criterion 6 is not discussed further in this document.

Approach to Impact Analysis

This section presents the methodology used to assess the potential impacts, temporary and permanent, direct and indirect, of the proposed project on biological resources, including special-status species listed as having potential to occur within the project area as described in **Table 3.4-2**, sensitive vegetation communities, and wetlands and aquatic resources. The impact analysis was based on consideration of: (1) construction activities and the area anticipated to be disturbed, (2) existing habitat conditions in the areas proposed for construction activities and nearby areas, and (3) known or presumed occurrences of protected species near construction areas. Permanent effects include loss of habitat in areas that would be destroyed or substantially altered. The removal of large mature trees is considered to be a permanent impact. This is referred to as a permanent impact because of the long time period necessary for replacement trees to reach maturity and provide wildlife habitat and other ecological functions, such as groundwater infiltration and erosion control. Temporary effects are activities that would occur only during the construction period. They include: grading disturbance at the dam face, construction and use of stockpiles, and haul roads and staging areas. These areas would be restored to original condition after construction is completed. Direct impacts would include the removal or degradation of special-status species habitat or the loss of any special-status species individuals. Potential indirect impacts would include noise and vibration from construction, and startle or motion response from special-status species because of construction activity.

The method for evaluating impacts included a process for qualifying or quantifying the direct and indirect impacts as they relate to the CEQA thresholds. **Table 3.4-3** presents acreages of direct impacts on each plant community and cover type located in the project area. Acreages in **Table 3.4-3** are calculated to the 0.01 acre. For purposes of the impact analysis, parking and laydown areas identified in Chapter 2, Project Description, were grouped with the closest construction components. Laydown and parking acreages were added to the Upper Haul Route, and the mutually exclusive CDSM and Convention Earthwork options. Qualitative discussions are provided for indirect impacts (such as noise, motion and startle) and any potential water quality impacts (such as erosion and sedimentation). For these indirect impacts, the severity was evaluated without having specific numeric or quantitative data.

Table 3.4-3
Acreages of Habitats Potentially Affected by Project Construction

Land Cover/Habitat	CDSM Option	Conventional Earthwork Option	Filter Pond Stockpile	Park Stockpile	Upper Haul Route	Lower Haul Route	Outlet Works
Eucalyptus Grove	_	_	0.18	1.47	1.04	0.21	0.30
Mixed Hardwood Forest	0.8	0.43	0.08	0.05	0.24	0.44	0.73
Coast Live Oak Woodland	_	_	0.36	_	0.22	0.26	_
Landscape Area	_	_	_	0.49	_	_	_
Coyote Brush Scrub	_	_	_	_	< 0.01	_	0.26
Non-Native Annual Grassland	1.83	3.49	0.86	0.41	0.81	0.01	0.10
Developed	_	_	_	0.01	0.33	0.10	0.18
San Leandro Creek	_	_	_	_	_	0.03	_
Riparian Forest	0.001	0.07	_	_	0.19	0.57	
Open Water of Lake Chabot	_	_	_	_	_	_	0.01
Total Area Potentially Affected	**2.63**	**3.99**	**1.48**	**2.42**	**2.84**	**1.63**	**1.58**
Source: Data compiled by AECOM in 2013							

The proposed project would include upgrading the dam and retrofitting the outlet works, both of which could be accomplished using a variety of construction methods. EBMUD identified two feasible options to upgrade the dam: a CDSM option and a Conventional Earthwork option. The final construction method (CDSM or Conventional Earthwork) would be determined before project implementation by EBMUD with approval from the California Division of Safety of Dams. The proposed project would not include any modifications to Lake Chabot's post-construction operations or management. Therefore, lake operation and changes to flows in San Leandro Creek associated with reoperation are not discussed. The loss of habitat that would result from construction is quantified and potential impacts that would result from implementation of the following construction components are analyzed in this section:

- CDSM Option
- Conventional Earthwork Option
- Filter Pond Stockpile
- Park Stockpile
- Upper Haul Route
- Lower Haul Route
- Outlet Works

Most of the project area has been subject to significant disturbance and does not provide high quality habitat for the special-status species listed in **Table 3.4-2**. The maximum area of disturbance of the proposed project is approximately 13.94 acres, located primarily on EBMUD watershed lands and within the City of San Leandro's Chabot Park, but also a small portion within Lake Chabot Regional Park. Both parks experience high levels of recreational use and are close to the urban development of the City of San Leandro. The project area is surrounded by Lake Chabot Regional Park, Anthony Chabot Regional Park, and EBMUD watershed lands composed of thousands of acres of open space; therefore, the potential project impact would be of relatively small extent within the larger context of the surrounding open space of the two regional parks and the Upper San Leandro Creek watershed.

Project implementation would not have significant impacts that could not be avoided with mitigation measures on any special-status plant or wildlife species, sensitive vegetation community, or wetland or aquatic habitat. Because of the low quality of special-status plant and wildlife habitat within the project area, and the relatively small area of impact in relation to the thousands of acres of open space to the north and east adjacent to the project area, project activities would not have a substantial adverse effect on biological resources.

Table 3.4-4 provides an overview of the significance conclusions for all biological resources that potentially could be affected by the proposed project before implementation of mitigation measures. Special-status species with no impact or a less-than-significant impact as a result of the proposed project construction activities are discussed by species below. Discussions for resources with a potentially significant or significant impact are organized by project component under Project Impacts and Mitigation Measures.

Focused plant surveys were conducted during the blooming periods for the six special-status plants with potential to occur within the project area. No special-status plants were observed within the project area during focused surveys; therefore, project implementation would have *no impact* on special-status plants.

Table 3.4-4
Summary of the Significance Conclusions for Biological Resources before Mitigation

Biological Resource	CDSM Option	Conventional Earthwork Option	Filter Pond Stockpile	Park Stockpile	Upper Haul Route	Lower Haul Route	Outlet Works
Special-status plant Species	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Bay checkerspot butterfly	No impact	No impact	No impact	No impact	No impact	No impact	No impact
California red-legged frog	Potentially significant impact	Potentially significant impact	No impact	Less than significant impact	No impact	Potentially significant impact	Less than significant impact
Western pond turtle	Less than significant impact	Less than significant impact	No impact	Less than significant impact	No impact	Less than significant impact	Potentially significant impact
Alameda whipsnake	Less than significant impact	Less than significant impact	No Impact	No Impact	Less than significant impact	No Impact	Less than significant impact
Olive-sided flycatcher	No impact	No impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Less than significant impact	No impact
Bald eagle	No impact	No impact	No impact	No impact	No impact	No impact	Potentially significant impact
Nesting birds protected under the Migratory Bird Treaty Act	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact
Pallid bat	Less than significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact
Big free-tailed bat	Less than significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact
San Francisco dusky-footed woodrat	Less than significant impact	Potentially significant impact	Potentially significant impact	Less than significant impact	Potentially significant impact	Potentially significant impact	Potentially significant impact

Table 3.4-4
Summary of the Significance Conclusions for Biological Resources before Mitigation

Biological Resource	CDSM Option	Conventional Earthwork Option	Filter Pond Stockpile	Park Stockpile	Upper Haul Route	Lower Haul Route	Outlet Works
Central California Coast steelhead DPS	Potentially significant impact	Potentially significant impact	No impact	Potentially significant impact	No impact	Potentially significant impact	No impact
Jurisdictional Wetlands and Waters	Potentially significant impact	Potentially significant impact	No impact	No impact	No impact	Potentially significant impact	Potentially significant impact
Riparian vegetation	No impact	Significant Impact	No impact	No impact	Significant Impact	Significant Impact	No impact
Protected Trees	Less than significant impact	Significant Impact	Less than significant impact	Significant Impact	Significant Impact	Significant Impact	Significant Impact

Source: Compiled by AECOM in 2013

Bay checkerspot butterfly was determined to be unlikely to occur in the project area. The small area of serpentine habitat in the project area is low quality, unlikely to support the species. No bay checkerspot butterflies have been observed within the project footprint. In addition, this habitat would not be affected by construction components therefore; project implementation would have *no impact* on Bay checkerspot butterfly.

No suitable habitat for California red-legged frog is located within the footprints of the Upper Haul Route or Filter Pond Stockpile. Although the Park Stockpile is adjacent to San Leandro Creek, the California red-legged frog Habitat Assessment (**Appendix D-2**) determined it was unlikely for California red-legged frog to be present. Potential habitat is degraded because of the high level of recreational visitor use which diminishes the likelihood of California red-legged frog use of the area. The portion of Lake Chabot in the footprint of the outlet works does not have suitable habitat to support California red-legged frog. Frogs require the presence of largely intact emergent or shoreline vegetation, such as cattails, tules, or willows. Furthermore, Lake Chabot is occupied by predators of California red-legged frog such as bullfrogs and largemouth bass (**Appendix D-2** and EBMUD unpublished fisheries survey data for San Leandro Creek), and typically these species do not occupy the same habitats. Upland habitat available for California red-legged frog surrounding Lake Chabot at the outlet works is heavily forested with a dense herbaceous understory, and is unsuitable for California red-legged frog. Potential impacts on California red-legged frog could occur as a result of implementation of the CDSM option or Conventional Earthwork option, or the Lower Haul Route. No California red-legged frogs have been observed within the project footprint. Based on the lack of potential habitat, the Upper Haul Route and Filter Pond Stockpile would have *no impact* on California red-legged frog. Based on low habitat suitability, the outlet works and Park Stockpile would have a *less-than-significant* impact on California red-legged frog. There is potential habitat for California red-legged frog within San Leandro Creek near the creek crossing on the Lower Haul Route, and the freshwater emergent wetland at the base of the dam spillway. Potential impacts on California red-legged frog are discussed in subsequent sections.

No suitable habitat for Western pond turtle is located within the footprints of the Upper Haul Route and Filter Pond Stockpile. Habitat within the freshwater emergent wetland at the base of the dam spillway is filled with dense emergent vegetation and does not provide the necessary basking habitat or open water habitat required to support Western pond turtle. Lower San Leandro Creek supports low quality habitat for Western pond turtle. The creek flows through closed canopy with few basking sites. The Park Stockpile and the Lower Haul Route are subject to a high level of human disturbance. Thus occurrences within, or adjacent to, the creek are unlikely at either of these locations or within the footprints of the Conventional Earthwork or CDSM options. Aquatic habitat within Lake Chabot is the only area in the project footprint with potential to support Western pond turtle. No Western pond turtles have been observed within the project footprint. Based on the lack of potential habitat, the Upper Haul Route and Filter Pond Stockpile would have *no impact* on Western pond turtle. Based on low habitat suitability, the Park Stockpile, Lower Haul Route, Conventional Earthwork option, and CDSM option would have a *less-than-significant* impact on Western pond turtle. Thus, the outlet works is the only project component with potential to affect Western pond turtle. Potential impacts on Western pond turtle in Lake Chabot are discussed in the outlet works impact section below.

The potential for Alameda whipsnake to occupy the project area is unlikely. There is no scrub habitat within, or adjacent to, the Park Stockpile, Filter Pond Stockpile, and Lower Haul Route. Within the project area, the patches of coyote scrub habitat are small, highly disturbed, and disconnected from larger patches of scrub habitat outside of the project area by closed canopy woodland; therefore, the potential for Alameda whipsnake to move through the project area is also unlikely. The project area experiences high levels of human disturbance by park visitors. No reported occurrences of this species are within the project footprint. The nearest occurrences to the project area are 4.5 and 5 miles to the north, and 3 miles to the east. Project construction would disturb approximately 0.26 acre of coyote bush scrub as part at the outlet works. Based on the lack of potential habitat, the Park Stockpile, Filter Pond Stockpile, Lower Haul Route, Upper Haul Route, and Filter Pond Stockpile would have *no impact* on Alameda whipsnake. Because of the minor level of impact in low quality habitat that is unlikely to support the species, the impact would be *less than significant* for the remaining project components.

No suitable habitat for olive-sided flycatcher is located within the footprint of the outlet works, Conventional Earthwork option, or CDSM option. Olive-sided flycatchers are most often found on the edges of, and within openings or clearings in dense coniferous woodland; and open canopy coniferous forests (Shuford and Gardali 2008). This species is also known to use eucalyptus trees for breeding. Olive-sided flycatcher may be affected by construction along the Lower Haul Route, but a low potential exists for the species to occur with the exception of areas adjacent to the Park Stockpile, and the impact would be less than significant. No olive-sided flycatchers have been observed within the project footprint. Based on the lack of potential habitat, the outlet works, Conventional Earthwork option, and CDSM option would have *no impact* on olive-sided flycatcher. Based on low habitat suitability, the Lower Haul Route would have a *less-than-significant* impact on olive-sided flycatcher. Construction activities would remove vegetation with the potential to support the species within the Park Stockpile, Filter Pond Stockpile and along the Upper Haul Route. The impact on olive-sided flycatcher is discussed further below.

Bald eagles are unlikely to occur within six of the seven project components because of the high level of human disturbance within or adjacent to these areas and/or the lack of suitable habitat. The only construction activity with the potential to affect bald eagle would occur at the outlet works. Nesting typically occurs in large, old growth trees or snags near open water with at least one perch in open view to the water body where the eagles forage (USFWS 2006). No bald eagles have been observed within the project footprint. Based on the high level of human disturbance and/or the lack of suitable habitat, all project components with the exception of the outlet works would have *no impact* on bald eagles. The potential impact on the species is discussed in the Outlet Works impacts analysis section.

Suitable habitat for big free-tailed bat and pallid bat is present within the project area and potential impacts for the Conventional Earthwork option, Filter Pond Stockpile, haul routes, and outlet works are described below. The project component that would have a *less-than-significant* impact on the species would be the CDSM option. The CDSM option would not remove a substantial amount of habitat for these species.

Suitable habitat for San Francisco dusky-footed woodrat is present within the project area and potential impacts for the Conventional Earthwork option, Filter Pond Stockpile, haul routes, and outlet works are described below. Project components that would have a less than significant effect on the species are the CDSM option and the Park Stockpile. The CDSM option would not remove a substantial amount of habitat for the San Francisco dusky-footed woodrat. In addition, based on the availability of surrounding habitat, this impact is not expected to substantially affect the species. The Park Stockpile experiences high levels of human disturbance by park visitors. In addition, the open understory dominated by eucalyptus and landscape trees provide poor quality habitat for this species. Based on the small size of the project footprint and the high levels of human disturbance, the CDSM option and the Park Stockpile would have a *less-than-significant* impact on San Francisco dusky-footed woodrat.

No aquatic habitat that supports steelhead occurs in the vicinity of the Upper Haul Route, Filter Pond Stockpile, or outlet works. Based on the lack of potential habitat, these project components would have *no impact* on steelhead. Steelhead could be potentially affected by the CDSM or Conventional Earthwork option, and Lower Haul Route and Park Stockpile construction use as discussed below.

Project Impacts and Mitigation Measures

Project impacts related to biological resources addressed in this discussion are divided into construction components where the impacts can vary by component. Otherwise, the impacts are discussed generally, covering all components.

Impact BR-1: The proposed project would have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW or USFWS; or would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or could impede the use of native wildlife nursery sites (Criteria 1 and 4). (Less than Significant with Mitigation Incorporated)

Although the project area has been subject to a high level of disturbance because of recreation and park operations and maintenance, plant communities and land cover types located in the project area have the potential to support a number of special-status wildlife species that could be affected by project construction.

Project implementation would not significantly interfere, temporarily or permanently, with the movement of any native or resident fish or wildlife species. The project area is located on the southern edge of Lake Chabot Regional Park, not within the center of critical wildlife movement corridors; therefore, it would not eliminate opportunities for movement or dispersal. Construction would result in temporary displacement of some native and resident wildlife. However, those individuals would move into surrounding areas within Lake Chabot Regional Park and EBMUD watershed lands to find shelter and foraging opportunities, and repopulate the area upon completion of construction activities.

CDSM Option

The CDSM option would include the disturbance of an approximate 2.63 acre portion of the downstream face of the dam to create a level working platform to perform dam stability upgrades. For both the CSDM and Conventional Earthwork options, the construction components would include the construction of a subterranean filter and drain system that would maintain dam stability by minimizing seepage from Lake Chabot into the recompacted soils. The drain system would include graded filter material that would slope down to a perforated drain pipe, and then would connect to solid pipe with an outfall placed in the existing riprap at the edge of the dam spillway stilling area and freshwater emergent wetland. The CDSM option may require dewatering. If necessary it would require significantly less dewatering than the Conventional Earthwork option. The schedule for CDSM construction activities potentially could include night work.

Direct impacts resulting from construction of the CDSM option would include the temporary removal of 1.83 acres of non-native annual grassland and removal of 0.80 acre of mixed hardwood forest. Installation of the drain outfall would occur within existing riprap bordering the freshwater emergent wetland. The CDSM option could potentially impact two of the 11 species listed in **Table 3.4-2**, and nesting birds. The special-status species with potential to be affected by the CDSM option are California red-legged frog and steelhead.

California Red-Legged Frog: One CNDDB record documents California red-legged frog within 3 miles of the project area. The closest known population of California red-legged frog is located just below the spillway of the Upper San Leandro Reservoir. Predator populations in Lake Chabot, including large mouth bass, are high, which reduces potential for population dispersal into lower San Leandro Creek.

The CDSM option would temporarily disturb 1.83 acres of poor quality non-native annual grassland upland habitat. Upland California red-legged frog habitat present on the downstream face of the dam has been subject to significant human-caused disturbance. A habitat assessment conducted for California red-legged frog in May of 2013 concluded California red-legged frog use of the area of the dam face is unlikely because of the lack of suitable rodent burrows required for upland refugia. Because affected environment in the footprint of the CDSM option is highly altered, it is not considered suitable upland habitat to support California red-legged frog, therefore and construction would not be expected to impact California red-legged frog upland habitat.

The CDSM option would include the installation of a subterranean drain to maintain dam stability by keeping water from Lake Chabot from seeping into the recompacted soils. The outfall of this drain would be placed in existing riprap at the edge of the spillway stilling area on the edge of the freshwater emergent wetland. The habitat assessment concluded the likelihood for California red-legged frog to occur within San Leandro Creek, and the freshwater emergent wetland at the base of the spillway as unlikely to moderate. The habitat quality in these areas is low, and it is impaired by the presence of predatory bullfrogs and non-native fish in San Leandro Creek. This area provides poor quality aquatic refugia habitat for California red-legged frog, therefore California red-legged frog has low potential to occupy this area.

If frogs were present in this construction work site, mortality or injury of individuals of this protected species would be an expected outcome given the substantial amount of earthmoving, operation of mechanical equipment, frequent haul truck movements and human activities. Temporary impacts would include the loss or degradation of California red-legged frog aquatic habitat by placement of the drain outfall. Potential indirect effects would include vibrations from clearing, grubbing, and other ground-disturbing activities, and reduced water quality because of runoff from the construction site. Although California red-legged frog would be unlikely to occupy the poor upland and aquatic habitat under the CDSM option, any loss of individual frogs would be *potentially significant*. However, implementation of **Mitigation Measures BR-1.1, BR-1.2, BR-1.3, BR-1.4, BR-1.5, HY-1.1, and HZ-1.1** would reduce the potentially significant impact on California red-legged frog habitat to *a less-than-significant* level. **Mitigation Measures HY-1.1 and HZ-1.1** requiring the preparation and implementation of a Storm Water Pollution Prevention Plan, and Hazardous Materials Control and Spill Prevention and Response Plan respectively, would reduce impacts on aquatic species because it would reduce potential stormwater, sediment, and contaminant discharges into San Leandro Creek and other nearby aquatic habitats.

Nesting Birds (native birds protected under the MBTA): Raptors and other migratory birds that extensively use coast live oak woodland and non-native annual grassland for foraging and nesting potentially could be affected by construction activities.

If construction occurs during the breeding season (February 1 to September 1), construction activities (e.g., grubbing, grading and excavation) could cause direct impacts on migratory and special-status nesting birds by removing or disturbing nests. Indirect impacts, such as operation of mechanical equipment, frequent haul truck movement, and human activities could also affect nesting birds. Repeated exposure to construction-related disturbance could reduce reproductive success and potentially cause nest abandonment. Any reduction in reproductive success, or nest failure would be a *potentially significant* impact. However, implementation of **Mitigation Measures BR-1.4, BR-1.6, and BR-1.7** would reduce the potentially significant impact on nesting birds a *less-than-significant* level.

Central California Coast Steelhead DPS: San Leandro Creek is located southwest of the excavation area and has moderate potential to support steelhead. Impact analysis for steelhead in Lower San Leandro Creek evaluated potential direct and indirect impacts on the species resulting from proposed construction activities. The proposed project would not alter water release quantities or schedule from Lake Chabot to San Leandro Creek, the dam spillway components, or operations and/or management of Lake Chabot.

Potential impacts on San Leandro Creek would include the release of water from a subterranean drain to be installed to maintain dam stability. The subdrain outfall would be installed within an existing vault box located in the riprap section of the spillway stilling basin downstream of the dam, adjacent to a freshwater emergent wetland. Flows exiting the filter and drain system are estimated to similar to the flows exiting the existing drain at this location. This amount of water is expected to be completely absorbed by the freshwater emergent wetland. In the event excess flow exceeds wetland absorption capacity, increased water flow into San Leandro Creek would have a positive ecological impact. Additional flows in the creek potentially could reduce water temperature in the creek and may help reduce algae blooms and increase the ability of the water to carry dissolved oxygen. Furthermore, increased flows may help dilute potential toxins and pollutants in San Leandro Creek. Therefore, *no impact f*rom subterranean drain flows on steelhead would occur.

Fish population levels and survival have been linked to levels of turbidity and siltation in a watershed. Prolonged exposure to high levels of suspended sediment could create a loss of visual capability in fish, leading to a reduction in feeding and growth rates, increase in stress levels and reducing the tolerance of fish to disease and toxins. Furthermore, high levels of suspended sediments could cause the movement and redistribution of steelhead, thus exposure to predators.

Construction activities that could impair aquatic habitat through temporary increases in sedimentation and turbidity or the release of contaminants into waterways and result in loss of fish would include: grading, clearing and grubbing of the face of the downstream toe of the dam and subsequent reconstruction; construction of the interconnected non-liquefiable walls for dam stability; site restoration; and demobilization and cleanup. Furthermore, contaminants such as cement grout slurry, fuels, oils and other petroleum products used in construction activities may be toxic to fish or may alter oxygen diffusion rates and could cause acute and/or chronic toxicity to aquatic organisms, thereby reducing growth and/or survival. Substances contributing to sedimentation, turbidity, or contamination could enter waterways directly during construction activities or through surface runoff. Because fish have the potential to be present year round, runoff would be a *potentially significant* impact. The loss of any individuals of this threatened species would be considered substantial. Implementation of **Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1** would reduce the potentially significant impact on aquatic habitat to a *less-than-significant* level.

Mitigation Measure BR-1.1: Conduct pre-construction surveys for California red-legged frog and western pond turtle.

Within 48 hours before any construction activities that involve ground disturbance or vegetation removal a USFWS approved biologist will conduct pre-construction surveys, for California red-legged frog and Western pond turtle. The survey area will include all habitats suitable for these species within the construction work limits and a 300-foot buffer surrounding the work limits. Whenever a lapse in project-related construction activity of 2 weeks or greater has occurred, these areas will be re-inspected. If California red-legged frog(s) (including eggs, larvae, or adult forms) is/are found during pre-construction surveys, the biologist will contact USFWS and/or CDFW to determine whether their relocation is appropriate and if additional measures are necessary. If Western pond turtle is found during pre-construction surveys, a qualified biologist, in coordination with CDFW, will move the turtle(s) that may be affected by construction activities to the nearest suitable habitat outside the project construction area. If Western pond turtle nests are found during pre-construction activities, CDFW will be consulted to determine a course of action. Construction activities will not proceed until consultation and/or relocation activities are complete.

Implementation: EBMUD, construction contractor(s), and a qualified biologist

Timing: Before construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.1** would reduce the impact on special status wildlife species because it would reduce potential mortality to California red-legged frog, and Western pond turtle during initial ground disturbance, vegetation clearing, or grubbing. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-1.2: Conduct biological monitoring during initial ground disturbance.

A qualified wildlife biologist will be present at all times during initial ground disturbance or vegetation removal activities. The biologist will remain on-site until initial ground disturbance is completed (after clearing and grubbing. The biologist will have the authority to stop work if a listed species is encountered or a violation of any regulatory permit issued for the project occurs. After coordination with the appropriate regulatory agencies, a biologist who is qualified to handle the listed species on-site will relocate any individuals that may be affected by construction activities. If work is stopped, the biologist or on-site monitor will notify the regulatory agencies in accordance with permit requirements.

Implementation: EBMUD, construction contractor(s), and a qualified biologist

Timing: At the start of construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.2** would reduce the impact on special status wildlife species because it would reduce potential mortality to California red-legged frog and Western pond turtle during initial ground disturbance, vegetation clearing, or grubbing. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-1.3: Erect temporary exclusion fencing.

Temporary exclusion fencing will be erected around active work areas (including the work limits at dam face, the stockpile location(s), and the staging areas) before clearing and grubbing activities and before pre-construction surveys for California red-legged frog and Western pond turtle. The purpose of this fencing will be to prevent wildlife from entering the work area during project activities. Wildlife exclusion fencing may be constructed of various materials but will be buried deep enough (6–8 inches) and will be tall enough (at least 24 inches aboveground) to prevent the passage of target species. During all construction activities, the condition of the fencing will be assessed at least weekly by construction personnel and monthly by a qualified biologist to determine if repairs are required. As necessary, repairs will be conducted within 2 working days of being noted by construction workers. All exclusion fencing will be removed at the end of construction activities.

Implementation: EBMUD and construction contractor(s)

Timing: After clearing and grubbing and before the onset of any other construction activity

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.3** would reduce the impacts on California red-legged frog, and Western pond turtle because it would reduce potential mortality caused by construction activities. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-1.4: Implement and track a worker awareness education program.

Before beginning construction, all construction personnel including site supervisors and project managers will attend a worker education awareness program conducted by a qualified biologist or by watching a video of the first training. This program will be used to describe all sensitive habitats and sensitive species that may occur within the project work limits. Descriptions of the potentially occurring sensitive species, their habitats, legal status, and required protection will be included. All applicable mitigation measures will be reviewed. The responsibilities of project personnel and applicable mitigation measures including observing speed limits, adhering to project work limits, maintaining exclusion fencing, and notification requirements will be included. Documentation of training attendance by construction personnel will be tracked by EBMUD.

Implementation: EBMUD and all project personnel

Timing: Before and during construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.4** would reduce the impacts on sensitive species through competent worker awareness education. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-1.5: Restrict construction-related vehicle traffic.

During ground-disturbing activities, construction-related vehicle traffic will be restricted to within the designated construction work limits, to established roads, and other designated areas needed to complete the work. Construction equipment will be stored in staging areas designated on the construction plans. All personnel will observe a 15 mile-per-hour speed limit for construction areas to minimize the potential of construction equipment striking wildlife species. If a sensitive species is encountered during construction, all construction activities will cease in the immediate area until appropriate corrective measures have been completed or it has been determined by the biologist that the species will not be harmed. For federally protected species, USFWS will be contacted within 24 hours, and for state protected species, CDFW will be contacted within 24 hours. All access roads and construction areas will be marked on construction drawings.

Implementation: EBMUD and all project personnel

Timing: During all construction-related activities

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.5** would reduce would reduce potential wildlife species mortality resulting from vehicle collisions. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-1.6: Remove potential nesting habitat in the project area outside the nesting bird season.

Removal of potential nesting habitat (e.g., trees and shrubs) as necessary for construction activities will be conducted before the nesting bird season (February 1–August 31), to the extent feasible and practicable, to minimize the potential for loss of active nests.

Implementation: EBMUD and construction contractor(s)

Timing: Outside of the nesting bird season (disturbance will occur between September 1 and January 31)

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.6** would reduce impacts on special-status and native birds protected under the MBTA because it would reduce the potential for construction-related disturbance to nesting birds. The impact would *be less than significant with mitigation incorporated*.

Mitigation Measure BR-1.7: Conduct pre-construction surveys for nesting birds and delineate no-disturbance buffer zones for active nests.

If construction activities including vegetation clearing and grading are scheduled during the nesting bird season (February 1–August 31), a focused survey for active nests will be conducted by a qualified biologist no more than 10 days before beginning construction activities. During this survey, the biologist will inspect all trees and other potential nesting habitats in and within 100 feet of the edge of construction limits for nesting passerines and within 500 feet of the edge of construction limits for nesting raptors. If an active nest is found and it is determined that it potentially could be disturbed by construction, a biologist, in consultation with CDFW, will determine the extent of a no-disturbance buffer zone to be established around the nest to protect the nest, eggs and young. The size of the buffer may vary, depending on the nest location, nest stage, construction activity, and monitoring results. If implementation of the buffer becomes infeasible or construction activities result in an unanticipated nest disturbance, CDFW will be consulted to determine the appropriate course of action. All vegetation and structures with active nests will be monitored to determine when the young have fledged and are feeding on their own before work can resume within the buffer zone. Whenever a lapse in construction activities of 2 weeks or greater occurs, pre-construction surveys will be required.

Implementation: EBMUD, construction contractor(s), and a qualified biologist

Timing: Within 10 days before beginning construction-related activities during the nesting bird season (February 1–August 31).

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.7** would reduce impacts on special-status and native nesting birds protected under the MBTA because it would reduce the potential for impacts on nesting birds. The impact would be *less than significant with mitigation incorporated*.

Conventional Earthwork Option

Implementation of the Conventional Earthwork option would include the excavation of an approximate 3.99-acre portion of the downstream face of the dam to bedrock, to remove a portion of the liquefiable soils, and subsequent reconstruction. The Conventional Earthwork option would disturb 1.36 additional acres compared to the CDSM option. For both the CSDM and Conventional Earthwork option, the construction would include the installation of a filter and drain system that would maintain dam stability by keeping water from Lake Chabot from seeping into the recompacted soils, as described above. The Conventional Earthwork option would require temporary groundwater dewatering.

Direct impacts on this area would include the removal 3.51 acres of non-native annual grassland and 0.48 acre of mixed hardwood forest. Installation of the drain outfall would occur within the existing riprap on the edge of the freshwater emergent wetland at the base of the dam spillway. The Conventional Earthwork option potentially could impact five of the 11 species listed in **Table 3.4-2**, and nesting birds. The special-status species with potential to be affected are: California red-legged frog, big free-tailed bat, pallid bat, San Francisco dusky-footed woodrat, and steelhead.

Although the Conventional Earthwork option would have a larger footprint than the CDSM option, impacts on **California red-legged frog**, **Central California Coast steelhead DPS**, and **nesting birds** would be similar to implementation of the CDSM option. These species potentially could be affected both directly and indirectly, as described above under the CDSM option analysis section, and the impact would be *potentially significant*. **Mitigation Measures BR-1.1, BR-1.2, BR-1.3, BR-1.4, BR-1.5, BR-1.6, BR-1.7, HY-1.1 and HZ-1.1** would be implemented to reduce the potentially significant impact on these species to a *less-than-significant* level.

Big Free-Tailed Bat and Pallid Bat: The big free-tailed bat and pallid bats have the potential to be affected by the Conventional Earthwork option. Potential roosting habitat includes large trees (greater than 12-inches diameter-at-breast-height) that may be present within the Mixed Hardwood Forest. The removal of 0.48 acre of trees during construction activities could cause direct impacts on big free-tailed bat by removing or disturbing roosting habitat. Although the area would be returned to pre-project conditions after construction, a temporal loss of roosting habitat would occur for approximately 10 to 15 years while replacement trees matured. However, the project area is surrounded by Lake Chabot Regional Park, Anthony Chabot Regional Park, Lake Chabot, and EBMUD watershed lands, together creating thousands of acres of open space available to bats for roosting and foraging. Because the area of impact would be relatively small and construction only would occur over the course of one nesting season, implementation of the Conventional Earthwork Option would not substantially affect available habitat.

If construction occurred during maternal rooting season (March 1–July 31), indirect impacts could result in maternal roosting bats leaving their roosting territories to avoid noise, ultrasonic vibrations, and other disturbances from construction activities. Because repeated exposure to disturbance could reduce reproductive success and could increase mortality through the exposure of roosts to predators and the elements, this could be *a potentially significant* impact.

Night work and increased lighting after sunset potentially could disrupt foraging activities of big free-tailed and pallid bats. Nocturnal insects are drawn by lighting, which in turn attracts foraging bats. Bats could be attracted to lighted construction areas for opportunistic feeding, but this is unlikely to be detrimental to bats. Because of the remote location of the construction areas and the low likelihood of regular night work, the impact would be *less-than-significant*.

The Conventional Earthwork option would remove approximately 0.48 acre of mixed hardwood forest. Although this would not be a substantial amount of habitat loss, if bats were present in the construction area during tree removal, or a maternal roost is present nearby the construction area, mortality or injury of individuals of these protected species could occur and would be a *potentially significant* impact. **Mitigation Measure BR-1.4 and BR-1.8** would be implemented to reduce the potentially significant impacts on special-status bat species to a *less-than-significant* level.

San-Francisco Dusky Footed Woodrat: Mixed hardwood forest near the southern end of the dam excavation area provides suitable habitat for San Francisco dusky-footed woodrat; therefore, San Francisco dusky-footed woodrat would have moderate potential to occur within the area. Approximately 0.48 acre of mixed hardwood forest would be removed during construction. After completion of construction, the area would be returned to pre-project conditions, a temporal loss of nesting habitat would occur for approximately 10 to 15 years while vegetation matured. However, extensive available habitat is directly adjacent to the impact areas. Thus, this temporal loss would not have a significant affect. If San Francisco dusky-footed woodrat is present within the construction footprint during construction activity, mortality, injury, or harassment of individuals would be an expected outcome because of the proposed earthmoving activities, operation of mechanical equipment, frequent haul truck movements, and human activities. Direct impacts on San Francisco dusky-footed woodrat potentially could occur from construction activities crushing nests, as well as vehicle strikes. Indirect impacts on San Francisco dusky-footed woodrat could occur from noise, dust, and motion disturbance. The impact on San-Francisco dusky-footed woodrat would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.5, and BR-1.9** would be implemented to reduce the potentially significant impact on San-Francisco dusky-footed woodrat to a *less-than-significant* level.

Mitigation Measure BR-1.8: Conduct pre-construction surveys for roosting bats and delineate no-disturbance buffer zones for active maternity roosts.

Within 2 weeks before the removal of potential roosting habitat (i.e., old buildings, bridges, culverts, trees greater than 12 inches diameter at breast height, rock crevices, caves) a qualified bat biologist will survey these areas within 200 feet of an the construction work limits. The biologist will conduct a search for suitable entry points, roost cavities or crevices; and, survey for evidence of day roosts, and maternity roosts. If no roosting is observed, no additional mitigation is required.

If roosting surveys are inconclusive, indicate potential occupation by a special-status bat species, and/or identify a large day roosting population or maternity roost by any bat species within 200 feet of an active construction work area, a qualified biologist will conduct focused day and night emergence surveys. If active maternity roosts or day roosts are found in areas which will be removed as part of project construction, active demolition will commence before maternity colonies form (before March 1) or after young are flying (after July 31). Disturbance free buffer zones (determined by a qualified biologist in coordination with CDFW) will be observed during the maternity roost season (March 1–July 31) for any active maternity colony identified during the surveys. If a non-breeding bat roost is found in a tree or structure scheduled for removal, the individuals will be safely evicted, under the direction of a qualified biologist (as determined by a Memorandum of Understanding with CDFW).

Implementation: EBMUD, construction contractor(s), a and qualified biologist

Timing: Within 2 weeks before removal of potential roosting habitat

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.8** would reduce would reduce the potential for disturbance to special-status bat species. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-1.9: Take specified actions to minimize impacts on San Francisco dusky-footed woodrat.

Not more than 2 weeks before initial ground disturbance, including grading and vegetation clearing, a qualified biologist will conduct a pre-construction survey to determine if active San-Francisco dusky-footed woodrat nests occur within a 25-foot buffer of areas to be cleared of vegetation. If woodrat nests can be avoided by construction activities, the qualified biologist will demarcate a suitable buffer area for avoidance. If woodrat nests found within 25 feet of activities are determined to be occupied, each nest will be relocated to suitable habitat with consultation with CDFW. If young are found in the nest, a no-disturbance buffer will be established around the nest in consultation with CDFW. The nest will not be disturbed until young have been weaned (up to 6 weeks from birth), at which point the nest will be dismantled and relocated.

Implementation: EBMUD, construction contractor(s), and a qualified biologist

Timing: Within 2 weeks before initial ground-disturbing activities, including grading and vegetation clearing

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-1.9** would reduce the potential for disturbance to San Francisco dusky-footed woodrat. The impact would *be less than significant with mitigation incorporated*.

Filter Pond Stockpile

Construction activities at the Filter Pond Stockpile would include clearing, grubbing, and grading of approximately 1.48 acres of a currently fenced-off portion of EBMUD watershed lands. The Filter Pond Stockpile vicinity contains the following plant communities and land cover types: 0.36 acre of coast live oak woodland, 0.08 acre of mixed hardwood forest, 0.18 acre of eucalyptus grove, and 0.86 acre of non-native annual grassland and developed areas. The Filter Pond Stockpile potentially could impact four of the 11 species listed in **Table 3.4-2**, and nesting birds. Construction activities at the Filter Pond Stockpile would have the potential to adversely affect olive-sided flycatcher, pallid bat, big free-tailed bat, and San Francisco dusky-footed woodrat.

Olive-sided Flycatcher: The olive-sided flycatcher is a California species of special concern that could occur at the Filter Pond Stockpile. It requires forested areas near edges and clearings and also favors areas near lakes or rivers. Although it frequents coniferous forests, it has also been known to occupy eucalyptus stands. Direct impacts on this species would include the loss of habitat resulting from vegetation removal and habitat loss. If construction occurs during the breeding season (February 1 to August 31), construction activities (e.g., grubbing, grading and excavation) could cause direct impacts on olive-sided flycatcher by removing or disturbing nests. After completion of construction, the area would be returned to pre-project conditions, a temporal loss of nesting habitat would occur for approximately 10 to 15 years while vegetation matured. However, extensive available habitat is directly adjacent to the impact areas. Thus, this temporal loss would not have a significant affect. Indirect impacts would include potential harassment and nest failure because of close proximity to construction equipment, and human presence. The impact on olive-sided flycatcher would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.6, and BR-1.7** would be implemented to reduce the potentially significant impact on olive-sided flycatcher to a *less-than-significant* level.

Nesting Birds (native birds protected under the MBTA): Vegetation communities and land cover types located in the Filter Pond Stockpile area have the potential to support a number of bird species that could be affected by project construction. Direct and indirect impacts on nesting birds would be similar to those listed for the CDSM option.

Mitigation Measures BR-1.4, BR-1.6, and BR-1.7 would be implemented to reduce the potentially significant impact on olive-sided flycatcher and birds protected by the MBTA to a *less-than-significant* level.

Mammals: The Filter Pond Stockpile area contains coast live oak woodland, mixed hardwood forest and eucalyptus forest with the potential to support pallid, big free-tailed bat and San Francisco dusky-footed woodrat. Because construction activities at the Filter Pond Stockpile potentially could affect these species both directly and indirectly (similar to how this is described above for the CDSM option), the impact would be potentially significant. **Mitigation Measures BR-1.4, BR-1.5, BR-1.8, and BR-1.9** would be implemented to reduce the potentially significant impact on these species to a *less-than-significant* level.

Park Stockpile

Construction activities at the Park Stockpile would include clearing, grubbing, and grading of approximately 2.42 acres. The Park Stockpile area contains the following plant communities and land cover types: 0.49 acre of landscape plantings, 0.41 acre of non-native annual grassland, 1.47 acres of eucalyptus grove, 0.95 acre of mixed hardwood forest, and 0.01 acre of developed area (**Table 3.4-3)**. San Leandro Creek runs along the western boundary of the park adjacent to the proposed stockpile. Construction activities at the Park Stockpile potentially could impact four of the 11 species listed in **Table 3.4-2**, and nesting birds. The special-status species with potential to be adversely affected are: olive-sided flycatcher, pallid bat, big free-tailed bat, and steelhead.

The Park Stockpile location is a designated recreational area with picnic facilities, and experiences high visitor use and disturbance. Therefore, the ecological value of the Park Stockpile location for special-status wildlife has been greatly diminished, compared to areas that do not experience the same level of human disturbance.

Olive-sided Flycatcher and Nesting Birds (native birds protected under the MBTA): The Park Stockpile area contains a wide range of habitats known to support a diversity of birds. Because construction activities at the Filter Pond Stockpile would affect special-status and migratory birds both directly and indirectly (similar to those described for the CDSM option and Filter Pond Stockpile), the impact would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.6, and BR-1.7** would be implemented to reduce the potentially significant impact on special-status and migratory birds to a *less-than-significant* level.

Mammals: The Park Stockpile site contains coast live oak woodland, mixed hardwood forest and eucalyptus forest known to support pallid bat, big free-tailed bat. Because construction activities at the Park Stockpile potentially could affect these species both directly and indirectly (similar to those described in the Conventional Earthwork section above), the impact would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.5, BR-1.8, and BR-1.9** would be implemented to reduce the impact on these species to a *less-than-significant* level.

Central California Coast Steelhead DPS: Steelhead would have a moderate potential to occupy San Leandro Creek adjacent to the Park Stockpile. Indirect effects of construction could include a reduction of water quality resulting from erosion, spills, fuel, or other hazardous materials during construction. Although construction activities at the Park Stockpile would not directly impact steelhead, any indirect impacts that may cause the loss of any individuals would be a *potentially significant* impact. **Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1** would be implemented to reduce the potentially significant impact on Central California Coast steelhead DPS to a *less-than-significant* level.

Upper Haul Route

Construction activities at the Upper Haul Route would include widening the existing West Shore Trail, creating three pullouts, and creating a turnaround. The haul route is 4,740 feet long, and it starts at the gate at the east site of the dam crest and ends at the trailhead of West Shore Trail. The Upper Haul Route covers approximately 2.84 acres and intercepts the following plant communities and land cover types: less than 0.01 acre of coyote brush scrub, 0.22 acre of coast live oak woodland, 1.23 acres of eucalyptus grove, 0.81 acre of non-native annual grassland, and 0.33 acre of developed area (**Table 3.4-3)**. Construction activities at the Upper Haul Route potentially could impact four of the 11 species listed in **Table 3.4-2**, and nesting birds. The special-status species with potential to be affected are: olive-sided flycatcher, pallid bat, big free-tailed bat, and San Francisco dusky-footed woodrat.

Olive-sided flycatcher and Nesting Birds (native birds protected under the MBTA): The Upper Haul Route contains a wide range of habitats known to support a diversity of birds. Because construction at the Upper Haul Route could affect special-status and migratory birds both directly and indirectly (as described for the CDSM option and Filter Pond Stockpile), the impact would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.6, and BR-1.7** would be implemented to reduce the potentially significant impact on special-status and migratory birds to a *less-than-significant* level.

Mammals: The Upper Haul Route contains a wide range of habitats known to support pallid bat, big free-tailed bat, and San Francisco dusky-footed woodrat. Because construction activities at the Upper Haul Route potentially could affect these species both directly and indirectly (as described for the Conventional Earthwork option), the impact would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.5, BR-1.7, and BR-1.8** would be implemented to reduce the potentially significant impact on these species to a *less-than-significant* level.

Lower Haul Route

Construction activities at the Lower Haul Route would include temporary widening and stabilization of approximately 900 feet of an existing EBMUD maintenance road that runs along San Leandro Creek between the downstream toe of the dam to the western fenced border of the park. The Lower Haul Route would cross San Leandro Creek approximately 300 feet from the downstream toe of the dam. Construction activities on the road would include installation of a temporary bridge with a span of approximately 20 feet over the creek. The Lower Haul Route would be stabilized by lining the road with a compacted base made up a broadly graded mixture of sand and gravel. The layer of sand and gravel used for stabilization would be placed before use and removed at the end of construction, at which time the area would be returned to pre-project conditions. During construction, the Lower Haul Route would have a width ranging from 15 feet in the vicinity of the creek crossing to 30 feet in most areas, to accommodate two lanes west of the creek crossing and one lane east of the crossing. A turnout on the east side of the stream crossing would be required. This turnout would be located in areas that would require no tree removal.

The Lower Haul Route covers approximately 1.65 acres and intercepts the following plant communities and land cover types: 0.95 acre of mixed hardwood forest, 0.28 acre of coast live oak woodland, 0.21 acres of eucalyptus grove, 0.04 acres of non-native annual grassland, 0.11 acre of developed area, and 0.03 acre of San Leandro Creek (**Table 3.4-3**). The Lower Haul Route potentially could impact five of the 11 species listed in **Table 3.4-2**, and nesting birds. The special-status species that would be potentially affected are: California red-legged frog, pallid bat, big free-tailed bat, San Francisco dusky-footed woodrat, and steelhead.

California Red-Legged Frog: A habitat assessment for California red-legged frog concluded that an unlikely to moderate potential would exist for California red-legged frog to occur in San Leandro Creek within the footprint of the Lower Haul Route-proposed temporary stream crossing.

Indirect effects potentially could include vibrations from clearing, grubbing, and other ground-disturbing activities, and a potential decrease in water quality caused by runoff from the construction site. Direct effects potentially could include vehicle collisions with construction traffic along the haul route. The directly affected section of San Leandro Creek would be approximately 20 linear feet. However, the creek would not contain suitable substrate for breeding, and it also would be impaired by the presence of predatory non-native fish and bullfrogs (**Appendix D-2,** EBMUD unpublished fisheries survey data for San Leandro Creek). The temporary disturbance of this non-breeding stream habitat would not be substantial. However, if California red-legged frog individuals were present in the area of the temporary crossing at the time of installation or removal, injury or mortality of individuals could occur. The impact from any loss of California red-legged frog individuals would be *potentially significant*. **Mitigation Measures BR-1.1, BR-1.2, BR-1.3, BR-1.4, BR-1.5, HY-1.1, and HZ-1.1** would be implemented to reduce the potentially significant impact on California red-legged frog to a *less-than-significant* level.

Nesting Birds (native birds protected under the MBTA): The Lower Haul Route contains a wide range of habitats with potential to support a diversity of birds. Because construction on the Lower Haul Route could affect special-status and migratory birds both directly and indirectly (similar to that described for the CDSM option), the impact would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.6, and BR-1.7** would be implemented to reduce the potentially significant impact on special-status and migratory birds to a *less-than-significant* level.

Mammals: The Lower Haul Route contains a wide range of habitats with potential to support pallid bat, big free-tailed bat, and San Francisco dusky-footed woodrat. Because construction on the Lower Haul Route potentially could affect these species both directly and indirectly (as described above for the CDSM option), the impact would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.8, and BR-1.9** would be implemented to reduce the potentially significant impact on these species to a *less-than-significant* level.

Central California Coast Steelhead DPS: Steelhead has a moderate potential to occupy San Leandro Creek adjacent to the Lower Haul Route and within the area of the temporary stream crossing. A free-spanning bridge would be used for the temporary stream crossing. This would avoid direct impacts on in-water habitat during the construction season. Thus, no direct impacts on aquatic habitat would occur, and the stream crossing would be installed and removed within a single construction season. The free-spanning bridge would allow fish passage, so steelhead could move between the upstream and downstream portion of lower San Leandro Creek.

Indirect effects of construction could include a reduction of water quality resulting from erosion, spills, fuel, or other hazardous materials during construction. Although construction activities on Lower Haul Route would not directly impact steelhead, any indirect impact that may cause the loss of any steelhead individual would be potentially significant. If steelhead were present in the area of the temporary crossing at the time of installation or removal, injury or mortality of individuals could occur as a result of erosion or spills. Any loss of steelhead individuals would be a *potentially significant* impact. **Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1,** would be implemented to reduce the potentially significant impact on Central California Coast steelhead DPS to a *less-than-significant* level.

Outlet Works

Construction activities for the outlet works would include lining the shafts, moving the valves and controls from the tower to the shaft, relining or installing new inlet pipes from Lake Chabot to the shaft, and removing the tower and pavilion. Some portions of the work above the lake level done in the dry; other portions of the work would need to be done underwater with divers. Water releases from Lake Chabot would not change as a result of project construction for the outlet works.

The footprint of construction for the outlet works would be approximately 1.58 acres, including the following plant communities and land cover types: 0.30 acre of eucalyptus grove, 0.73 acre of mixed hardwood forest, 0.26 acre of coyote brush scrub, 0.10 acre of non-native annual grassland, 0.18 acre of developed area, and 0.01 acre of Lake Chabot. Construction of the outlet works potentially could impact five of the 11 species listed in **Table 3.4-2**, and nesting birds. The special-status species with potential to be affected are: Western pond turtle, bald eagle, big free-tailed bat, pallid bat, and San Francisco dusky-footed woodrat.

Western Pond Turtle: Lake Chabot in the footprint of the outlet works has low potential to support Western pond turtle. Western pond turtle prefer slow-moving rivers and streams, lakes, reservoirs, permanent and ephemeral wetlands, and stock ponds. Optimal habitat includes undercut banks, submerged vegetation (Holland 1994), and emergent basking sites such as mud banks, rocks, logs, and root wads (Holland 1994, Bash 1999). The species have been known to avoid areas of open water that lack refugia (Holland 1994). Preferred nesting habitat are areas with sparse vegetation of short grasses or forbs, in clay or silt soils, and along south or west facing low slopes (Holland 1994). In the footprint of the outlet works are earthen banks with some aquatic vegetation suitable for Western pond turtle. The slopes of Lake Chabot in this area are very steep and are not typically preferred for nesting, however the banks could provide potential basking habitat. Impacts on habitat would be temporary and would be restored to pre-project conditions and thus would not constitute a substantial affect. Western pond turtle could occupy the area during construction, and any loss of Western pond turtle would be a *potentially significant* impact. **Mitigation Measures BR-1.1, BR-1.2, BR-1.3, BR-1.4, and BR-1.5** would be implemented to reduce the potentially significant impact on Western pond turtle to a *less-than-significant* level.

Bald Eagle: Bald eagles were documented nesting at Lake Chabot in 2012, in the northernmost arm of the lake at Bass Cove. No nest trees or structures are expected to be removed by the proposed project, but under some circumstances, construction activities may result in nest failure. Although bald eagles frequently reuse nests sites, they can move nest locations from year to year. Therefore, the potential effects of construction on the nesting pair would depend on the location of the active nest during the construction period.

Construction noise traveling from the project work site at the outlet works to an active nest could elicit several responses from nesting birds, including eagles, such as abandonment of the territory, displacement from preferred nesting locations, missed feedings, or nest failure (USFWS 2007).

The large workforce in the area also would pose a potential concern for harassment of nesting eagles. Eagles are a subject of curiosity and interest to people, and nesting eagles could attract construction workers on breaks and off-hours to a nest. Such visits, even those carried out with sensitivity, could disturb the eagles and would be a *potentially significant* impact. **Mitigation Measures BR-1.4, BR-1.6, and BR-1.7** would be implemented to reduce the potentially significant impact on bald eagles to a *less-than-significant* level.

Nesting Birds (native birds protected under the MBTA): The outlet works footprint contains a wide range of habitats with potential to support a diversity of birds. Because construction of the outlet works could affect special-status and migratory birds both directly and indirectly similar to those described in the CDSM option analysis section, the impact would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.6, and BR-1.7** would be implemented to reduce the impact on special-status and migratory birds to a *less-than-significant* level.

Mammals: The outlet works project work site contains a wide range of habitats known to support San Francisco dusky-footed woodrat, and pallid and big free-tailed bat. Because construction of the outlet works potentially may affect San Francisco dusky-footed woodrat and special-status bat species both directly and indirectly, similar to the description above for the Conventional Earthwork option, the impact would be *potentially significant*. **Mitigation Measures BR-1.4, BR-1.5, BR-1.8, and BR-1.9** would be implemented to reduce the potentially significant impact on these mammals to a *less-than-significant* level.

Impact BR-2: The proposed project would have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS (Criterion 2). (Less than Significant with Mitigation Incorporated)

Riparian woodland habitat occurs as a corridor along the banks of San Leandro Creek. This community is not considered a natural community of special concern; however, it is subject to CDFW jurisdiction under Section 1602 of the California Fish and Game Code. Construction components with potential to affect riparian habitat would include the CDSM option, Conventional Earthwork option, Upper Haul Route, and Lower Haul Route. **Table 3.4-5** shows the acreages of riparian habitat within each construction component.

Table 3.4-5
Acreages of Riparian Habitat Potentially Affected by Project Construction

Land Cover/Habitat	CDSM Option	Conventional Earthwork Option	Upper Haul Route	Lower Haul Route	Potential Range of Total Impact Area
Total Area of Potentially Affected Riparian Habitat	0.001	0.07	0.19	0.57	0.19-0.83
Source: Data compiled by AECOM in 2013					

As shown in **Table 3.4-5**, between 0.19 and 0.83 acres (depending on the dam construction option and haul route used) of riparian habitat would be affected in the project area. Although the project area would be returned to pre-project conditions after completion of construction, a temporal loss of habitat function would occur for approximately 10 to 15 years while replacement vegetation matured. Because of the long time period that is required for trees to reach maturity, removal of large trees could be a permanent, substantial impact because of the long time period necessary for replacement trees to reach maturity and provide wildlife habitat and other ecological functions, such as groundwater infiltration and erosion control (please refer to Impact BR-4 for discussion regarding trees). Any loss of riparian habitat or function would be a *potentially significant* impact. **Mitigation Measures BR-2.1 and BR-2.2** would be implemented to reduce the potentially significant impact on riparian habitat to a *less-than-significant* level.

Mitigation Measure BR-2.1: Minimize construction effects on riparian habitat by use of preservation fencing to the extent feasible.

Riparian areas will be identified on the Final Engineering Plans and demarcated as a sensitive resource to be avoided. Before beginning construction, the edge of the CDFW jurisdictional riparian habitat will be marked in the field by a qualified biologist. Where construction limits are within 100 feet of riparian habitat, preservation fencing (e.g., visible orange construction fencing) will be installed by the contractor before construction, offset by 50 feet from the edge of the riparian habitat, to the extent feasible. Where construction limits are within 50 feet of the riparian edge, fencing will be placed as far as is feasible from the riparian edge, and signage (i.e., visible to construction equipment operators from a minimum of 100 feet away) that indicates the sensitive nature of the habitat and the need for avoidance will be installed on the fence.

Implementation: EBMUD and construction contractor(s)

Timing: Before, during, and after construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-2.1** would minimize inadvertent impacts on riparian areas. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-2.2: Comply with Section 1602 of the California Department of Fish and Game Code.

A Section 1602 Streambed Alteration Agreement from CDFW will be obtained before any potential impact (e.g., ground disturbance) or removal of trees occurs within the banks of jurisdictional channel features, including the San Leandro Creek stream channel and the associated riparian vegetation zone or below the top of the bank of Lake Chabot. EBMUD will comply with all terms and conditions of the Streambed Alteration Agreement, including measures to replace any riparian habitat, on at least a 1:1 ratio or as directed by CDFW.

Implementation: EBMUD and construction contractor(s)

Timing: Before beginning construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-2.2** would reduce the loss of trees in riparian habitat by requiring EBMUD to compensate for any affected biological resources. Therefore, the impact would be *less than significant with mitigation incorporated*.

Impact BR-3: The proposed project would have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWS (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means (Criterion 3). (Less than Significant with Mitigation Incorporated)

A USACE wetland delineation and preliminary jurisdictional determination for the project area was conducted in January and March 2013 (**Appendix D-1**). **Table 3.4-3** shows waters of the United States that are present within the footprints of each construction component.

Both the CDSM and Conventional Earthwork option's dam upgrade methods would require the installation of a drain outfall in the existing riprap on the edge of the freshwater emergent wetland, located at the base of the spillway of the dam. The Lower Haul Route construction activities would temporarily affect 0.03 acre of San Leandro Creek, a perennial stream. Construction at the outlet works would temporarily affect 0.01 acre of Lake Chabot.

Inadvertent filling or grading of wetlands and waters during construction would be a potentially significant impact. Any loss of wetlands would be a *potentially significant* impact.

CDSM and Conventional Earthwork Options

For both the CDSM and Conventional Earthwork options, the proposed project would construct a filter and drain system that would maintain dam stability by reducing groundwater seepage into adjacent recompacted soils, as described above. The drain system would include a perforated drain pipe located within graded filter materials. The pipe would slope down to, and then would outfall in the riprap section at the edge of the freshwater emergent wetland at the base of the dam spillway. The final footprint of the outfall is expected to be restricted to the non-jurisdictional riprap area above the emergent marsh. However, during installation of the outfall, the adjacent freshwater emergent marsh at the dam spillway may be temporarily affected. After completion of construction, any temporary impacts on the jurisdictional wetland would be returned to pre-project conditions. Any loss of wetlands or waters would be a *potentially significant* impact. **Mitigation Measure BR-3.1** would be implemented to reduce the potentially significant impact on jurisdictional wetland to a *less-than-significant* level.

Mitigation Measure BR-3.1: Minimize potential fill of jurisdictional waters of the United States and loss of sensitive habitat, and compensate for unavoidable impacts.

Based on USACE jurisdictional determination, waters of the United States, including wetlands, will be identified on the Final Engineering Plans and demarcated as a sensitive resource to be avoided. Before beginning construction, the boundary of the jurisdictional wetlands and waters will be marked in the field by a qualified biologist. Where construction limits are within 100 feet of jurisdictional wetlands or waters, preservation fencing (e.g., visible orange construction fencing) will be installed by the contractor before construction, offset by 50 feet from the edge of the waters, to the extent feasible. Where construction limits are within 50 feet of the jurisdictional feature, fencing will be placed as far as is feasible from the border, and signage (visible to construction equipment operators a minimum of 100 feet away) that indicates the sensitive nature of the habitat and the need for avoidance will be installed on the fence.

For those waters of the United States or State that cannot be avoided during project construction, authorization for fill of jurisdictional waters of the United States and State would be secured before construction begins. The following permits, as deemed necessary by the resource agencies, would be sought before construction begins: a permit from USACE under Section 404 of the CWA, a Letter of Permission or permit from the USACE under Section 10 of the Rivers and Harbors Act, a water quality certification from RWQCB under Section 401 of the CWA, and a Streambed Alteration Agreement from CDFW under Section 1602 of CDFG Code. As required, EBMUD would implement waste discharge BMPs to minimize disturbance and release of sediment into the water, to the extent possible. All requirements of these permitting processes, mitigation measures, and conditions associated with these permits will be implemented by EBMUD.

A permanent impact on jurisdictional waters is unlikely to occur. If a permanent impact on jurisdictional wetlands or waters is unavoidable, compensatory mitigation will be determined in consultation with the resource agencies and a minimum mitigation ratio of 1:1 will be implemented so that no net loss will be achieved. The mitigation ratio ultimately will be determined by USACE, the RWQCB, and CDFW through the permitting process.

Implementation: EBMUD and construction contractor(s)

Timing: During construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-3.1** would minimize the inadvertent impact on jurisdictional sensitive aquatic resources and would compensate for any affected resources. The impact would be *less than significant with mitigation incorporated*.

Lower Haul Route

Construction on the Lower Haul Route would include installation of a temporary stream crossing over San Leandro Creek. The crossing would include a temporary bridge with a span of approximately 20 feet over the creek. The bridge footings and road stabilization on either side of the bridge may require temporary fill within jurisdictional wetlands, if this fill is placed below the ordinary high water. After completion of construction, the stream crossing would be removed and the site would be returned to pre-project conditions. However, any loss of wetlands or water of the U.S. would be a *potentially significant* impact. **Mitigation Measure BR-3.1** would be implemented to reduce the potentially significant impact on wetlands or water of the U.S. to a *less-than-significant* level.

Outlet Works

Construction at the outlet works would occur both above the lake level, using dry techniques, and underwater. The footprint of the inlet structure of the proposed outlet works is expected to be the same or minimally larger than the existing structure. Any change in the footprint size would not be substantial and would not be likely to trigger compensatory mitigation. Construction debris generated during demolition of the outlet works tower would be removed from the project site with a crane from above the outlet works, or using a barge. If debris is removed by barge, a temporary ramp or bulkhead would be constructed near the Upper Haul Route turn-around, resulting in a temporary impact on jurisdictional waters. Any loss of wetlands would be *a potentially significant* impact. Therefore, **Mitigation Measure BR-3.1** would be implemented to reduce the potentially significant impact on wetlands to a *less-than-significant* level.

Stockpiles and Upper Haul Route

No federally protected wetlands are within the footprint of the Filter Pond Stockpile, Park Stockpile, or Upper Haul Route. Therefore, *no impact* would occur as a result of construction activities for these project components. For this part of the project area, the wetland areas within USACE jurisdiction also are expected to be within the jurisdiction of RWQCB and CDFW.

Impact BR-4: The proposed project could conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Criterion 5). (Less than Significant with Mitigation Incorporated)

As stated in Section 3.4.3, Regulatory Background, this project is not subject to building and land use zoning ordinances (such as tree ordinances); however, EBMUD's practice is to work with host jurisdictions and neighboring communities during project planning and consider local environmental protection policies for guidance. The following discussion of local policies and ordinances is provided for informational purposes and to assist with CEQA review.

According to the Alameda County General Plan's General Plan for Castro Valley, Chabot Regional Park is designated as Protected Open Space and Regional Parks. The City of Oakland General Plan includes an Open Space, Conservation, and Recreation Element that contains goals, policies, and actions related to resource conservation. The City of San Leandro General Plan also includes a chapter on open space, parks, and conservation, with goals regarding management of open spaces and conservation of natural resources. Although a temporal loss of mature habitat would occur, project construction work sites would be restored to a similar appearance as their pre-construction conditions. The project area would remain as a regional park, and thus, no conflict would occur with local plans and policies.

The construction components are situated within three different jurisdictions: the City of Oakland, the City of San Leandro, and unincorporated Alameda County (Castro Valley). The City of San Leandro tree protection ordinance protects street trees only, and no impact would occur under this ordinance. The County of Alameda protects trees within the County right-of-way, and no impacts would occur under this ordinance. The City of Oakland ordinance protects all Coast live oak trees of 4 inches dbh (54 inches above grade) or greater, and any tree 9 inches dbh or greater with the exception of eucalyptus or single specimens of Monterey pine (*Pinus radiata*).

Although not required to comply with these ordinances, EBMUD would utilize the Oakland Municipal Code's definition of protected trees when determining the number of trees that would be removed. Replacement planting would be based on all native or protected species, excluding any species on the California Invasive Plant Council's (Cal-IPC) Invasive Plant Inventory list. The project is located in a wildland setting and removal of any invasive species is considered a beneficial impact of the project. Invasive species disrupt ecosystems by altering physical processes, displacing native plants, and degrading wildlife habitat (Cal-IPC 2006).

All construction components would include grading or other activities that may affect protected trees. During the field reconnaissance visits and review of aerial photographs, an estimated 280 trees of potentially protected size were determined to be present within areas potentially directly impacted by construction activities. This estimate excludes approximately 50 eucalyptus trees, located primarily within Chabot Park, that are not considered to be protected trees as defined by the Oakland Municipal Code. Depending on the final configuration of the construction components (construction method, haul route, and stockpile), the proposed project may result in the removal of approximately 75 (CDSM Option using the Upper Haul Route to the Filter Pond Stockpile) to 265 protected trees (Conventional Earthwork Option using both haul routes to both stockpile locations), and the permanent impact on protected trees because of the long time period necessary for replacement trees would be significant. However, considering that areas surrounding the project site are primarily woodlands, this would not be a substantial comparative reduction in the number of trees to be removed. **Table 3.4-6** describes how many trees would potentially need to be removed for the construction of each project component, and **Figure 3.4-4** shows how many trees and the approximate location of the removals that would be necessary. Additionally, protected trees in close proximity to the grading envelope could be damaged by construction activities. Therefore, implementation of **Mitigation Measures BR-4.1, BR-4.2, and 4.3** would be implemented to reduce the potentially significant impact on protected trees to a *less-than-significant* level.

Table 3.4-6
Estimated Tree Impacts by Jurisdiction and Construction Component1

Jurisdiction	Construction Component						
	CDSM Option	Conventional Earthwork Option	Upper Haul Route	Lower Haul Route	Filter Pond Stockpile	Park Stockpile	Outlet Works
City of Oakland			30	10	5	80	25
Alameda County	15	75		30			
City of San Leandro				10			
Total Trees Removed	**15**	**75**	**30**	**50**	**5**	**80**	**25**

Note:
[1] Excluding approximately 50 eucalyptus trees not considered to be protected as defined by Oakland Municipal Code.
Source: Data compiled by AECOM in 2013

Mitigation Measure BR-4.1: Avoid all protected trees.

Avoidance of protected trees (as defined by the Oakland Municipal Code) will be exercised to the greatest extent practicable. Tree avoidance will be consistent with the Tree Preservation Plan (as identified in **Mitigation Measure BR-4.3**). During the design process, EBMUD will make tree preservation or removal decisions based on the potentially impacted trees' suitability for preservation, which will in turn be based on tree health, structural stability, species status (protected, unprotected or invasive), and the species ability to withstand potential construction impacts.

Implementation: EBMUD and construction contractor(s)

Timing: Before and during construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-4.1** would minimize removal of protected trees and would provide for careful design decisions related to tree preservation. Therefore, the impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-4.2: Replace all non-invasive protected trees that are removed as part of the construction process.

When removal is determined to be necessary, protected tree removal will be mitigated at a 1:1 ratio. The definition of a protected tree will be based on the Oakland Municipal Code's tree ordinance. Non-native tree or shrub invasive species, as identified by the California Invasive Plant Council, will not be replaced, unless required by permitting agencies. For tree or shrub removal in Chabot Park or along the West Shore Trail, replacement will be at or near their original location, or in another location/configuration nearby, in consultation with the City of San Leandro (in Chabot Park) or East Bay Regional Park District (along the West Shore Trail), where feasible. The replacement trees will be established with appropriate maintenance to provide long-term, self-sustaining survivorship (75 percent survival rate, 2 years after planting).

Implementation: EBMUD and construction contractor(s)

Timing: After completion of construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-4.2** would require replacement and appropriate maintenance of any native or protected trees removed by the proposed project. Therefore, the impact would be *less than significant with mitigation incorporated*.

Mitigation Measure BR-4.3: Prepare and implement a Tree Preservation Plan.

A Tree Preservation Plan (Plan) will be prepared by a certified arborist for protected trees (as identified in **Mitigation Measure BR-4.2**) within the project area that will be avoided by the proposed project, so that they are adequately protected during construction activities. The Plan will include detailed recommendations for tree preservation and removal based on construction and grading plans, with specific reference to suitability for preservation, proximity to construction activities, and ability to tolerate impacts. The Plan will include general preservation and construction guidelines as well as recommendations for specific protective measures for trees before, during, and after construction, to reduce impacts on trees from development and maintain their health throughout the construction process. The Plan will be based on the Tree Survey and Assessment for the project site or a similar report, detailing information on tree species, size, location, and condition. Proposed construction plans will be examined to evaluate the potential for preservation of trees with regards to planned grading, equipment access, and other needs related to construction.

The contractor will warrant the health of trees to be preserved within or adjacent to construction zones for up to 1 year after construction is completed.

Implementation: EBMUD, construction contractor(s), and a certified arborist

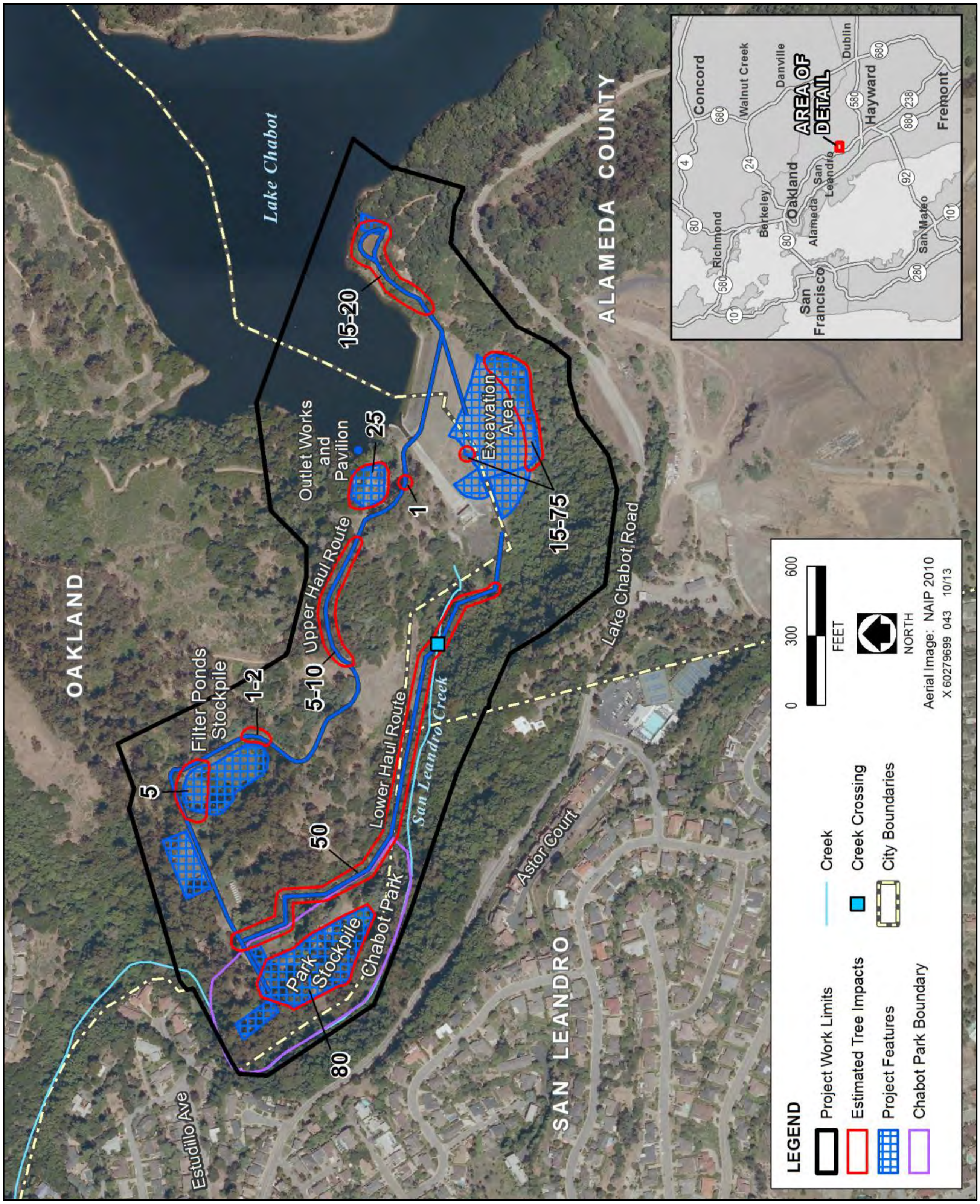
Timing: Before, during, and after construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure BR-4.3** would provide preservation and construction guidelines for native and protected trees removed as a result of project construction. Therefore, the impact would be *less than significant with mitigation incorporated*.

3.4.5 Impact and Mitigation Summary

Table 3.4-7 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.



Source: CDFW 2013, EBMUD 2013, Compiled by AECOM in 2013

Figure 3.4-4: Estimated Removal of Protected Trees

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Table 3.4-7
Biological Resources Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact BR-1: The proposed project would have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW or USFWS; or would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or could impede the use of native wildlife nursery sites (Criteria 1 and 4).[1]	Total Acreage Disturbed: 8.53	Total Acreage Disturbed: 10.16	Total Acreage Disturbed: 9.47	Total Acreage Disturbed: 11.10	Total Acreage Disturbed: 12.31 Greater impact than CDSM option due to larger acreage disturbed.	Total Acreage Disturbed: 13.94 Greater impact than CDSM option due to larger acreage disturbed.	Total Acreage Disturbed: 10.83 Greater impact than CDSM option due to larger acreage disturbed.	Total Acreage Disturbed: 12.46 Greater impact than CDSM option due to larger acreage disturbed.
Special status plants	NI	NI	NI	NI	NI	NI	NI	NI
Bay checkerspot butterfly	NI	NI	NI	NI	NI	NI	NI	NI
California red-legged frog	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, HY-1.1, and HZ-1.1
Western pond turtle	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, and 1.5
Alameda whipsnake	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Olive-sided flycatcher	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7
Bald eagle	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7
Nesting birds protected under the MBTA	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7	LTSM Mitigation Measures BR-1.4, 1.6, and 1.7

Table 3.4-7
Biological Resources Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
San Francisco dusky-footed woodrat	LTSM Mitigation Measures BR-1.4, 1.5, and 1.9	LTSM Mitigation Measures BR-1.4, 1.5, and 1.9	LTSM Mitigation Measures BR-1.4, 1.5, and 1.9	LTSM Mitigation Measures BR-1.4, 1.5, and 1.9	LTSM Mitigation Measures BR-1.4, 1.5, and 1.9	LTSM Mitigation Measures BR-1.4, 1.5, and 1.9	LTSM Mitigation Measures BR-1.4, 1.5, and 1.9	LTSM Mitigation Measures BR-1.4, 1.5, and 1.9
Pallid bat	LTSM Mitigation Measures BR-1.4, and 1.8	LTSM Mitigation Measures BR-1.3 and 1.7	LTSM Mitigation Measures BR-1.3 and 1.7	LTSM Mitigation Measure BR-1.3 and 1.7	LTSM Mitigation Measure BR-1.3 and 1.7	LTSM Mitigation Measure BR-1.3 and 1.7	LTSM Mitigation Measure BR-1.3 and 1.7	LTSM Mitigation Measure BR-1.3 and 1.7
Big free-tailed bat	LTSM Mitigation Measures BR-1.3 and 1.7	LTSM Mitigation Measures BR-1.3 and 1.7	LTSM Mitigation Measures BR-1.3 and 1.7	LTSM Mitigation Measure BR-1.3 and 1.7	LTSM Mitigation Measures BR-1.3 and 1.7	LTSM Mitigation Measures BR-1.3 and 1.7	LTSM Mitigation Measures BR-1.3 and 1.7	LTSM Mitigation Measures BR-1.3 and 1.7
Central California Coast Steelhead DPS	LTSM Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1	LTSM Mitigation Measures BR-1.4, HY-1.1, and HZ-1.1
Impact BR-2: The proposed project would have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS (Criterion 2).[1]	Total Riparian Acreage Disturbed: 0.19	Total Riparian Acreage Disturbed: 0.76	Total Riparian Acreage Disturbed: 0.19	Total Riparian Acreage Disturbed: 0.76	Total Riparian Acreage Disturbed: 0.26	Total Riparian Acreage Disturbed:0.83	Total Riparian Acreage Disturbed: 0.26	Total Riparian Acreage Disturbed: 0.83
Riparian	LTSM Mitigation Measures BR-2.1 and 2.2	LTSM Mitigation Measures BR-2.1 and 2.2	LTSM Mitigation Measures BR-2.1 and 2.2	LTSM Mitigation Measures BR-2.1 and 2.2	LTSM Mitigation Measures BR-2.1 and 2.2	LTSM Mitigation Measures BR-2.1 and 2.2	LTSM Mitigation Measures BR-2.1 and 2.2	LTSM Mitigation Measures BR-2.1 and 2.2
Impact BR-3: The proposed project would have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWS (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means (Criterion 3).[1]	Estimated Acreage Disturbed: 0.01 LTSM Mitigation Measures BR-3.1	Estimated Acreage Disturbed: 0.04 LTSM Mitigation Measures BR-3.1	Estimated Acreage Disturbed: 0.01 LTSM Mitigation Measures BR-3.1	Estimated Acreage Disturbed: 0.04 LTSM Mitigation Measures BR-3.1	Estimated Acreage Disturbed: 0.01 LTSM Mitigation Measures BR-3.1	Estimated Acreage Disturbed: 0.04 LTSM Mitigation Measures BR-3.1	Estimated Acreage Disturbed: 0.01 LTSM Mitigation Measures BR-3.1	Estimated Acreage Disturbed: 0.04 LTSM Mitigation Measures BR-3.1
Impact BR-4: The proposed project could conflict with any local policies or ordinances protecting biological	Total Number of Trees Removed: 75 LTSM	Total Number of Trees Removed: 125 LTSM	Total Number of Trees Removed: 150 LTSM	Total Number of Trees Removed: 200 LTSM	Total Number of Trees Removed: 215 LTSM	Total Number Trees of Removed: 265 LTSM	Total Number of Trees Removed: 210 LTSM	Total Number of Trees Removed: 260 LTSM

Table 3.4-7
Biological Resources Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
resources, such as a tree preservation policy or ordinance (Criterion 5).	Mitigation Measures BR-4.1, 4.2, and 4.3	Mitigation Measures BR-1.3, 4.1, 4.2, and 4.3	Mitigation Measures BR-4.1, 4.2, and 4.3	Mitigation Measures BR-4.1, 4.2, and 4.3	Mitigation Measures BR-4.1, 4.2, and 4.3 Greater impact than CDSM option due to larger number of tree removal needed.	Mitigation Measures BR-4.1, 4.2, and 4.3 Greater impact than CDSM option due to larger number of tree removal needed.	Mitigation Measures BR-4.1, 4.2, and 4.3 Greater impact than CDSM option due to number of larger tree removal needed.	Mitigation Measures BR-4.1, 4.2, and 4.3 Greater impact than CDSM option due to number of larger tree removal needed.

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable
[1] Impact acreages are estimated based on the current project footprint and the level of details currently available.

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3.5 Cultural Resources

3.5.1 Approach to Analysis

This section discusses the existing cultural resources conditions in the project area, describes the pertinent state and local laws and guidelines, presents the potential construction impacts, and identifies potential cultural resource mitigation measures, if required.

The following discussion describes the methodology used for the analysis, including a relevant records search, Native American consultation, and a field survey of the project area.

Records Search

An AECOM archaeologist conducted an archaeological and historical resources records search for the project area at the Northwest Information Center (NWIC) of the California Historical Resources Information System on December 13, 2012 (File No. 12-0298). The purposes of the records search were to: determine whether known cultural resources have been recorded within or adjacent to the project area; assess the likelihood for unrecorded cultural resources to be present, based on historical references and the distribution of nearby sites; and develop a context for the identification and preliminary evaluation of cultural resources. Information summarized in this section is discussed in detail in the Chabot Dam Seismic Upgrade Cultural Resources Inventory and Evaluation Report (AECOM 2013). Sources of information consulted include:

- NWIC base maps: U.S. Geological Survey San Leandro 7.5-minute topographic maps, to identify recorded archaeological sites and studies as well as historic period resources of the built environment (buildings, structures, and objects) within a 0.5-mile radius of the project area
- California Inventory of Historic Resources (OHP 1976)
- California State Historical Landmarks (OHP 1996)
- California Points of Historic Interest (OHP 1992)
- Historic Properties Directory Listing by City (OHP 2013)

To develop a context for the identification and evaluation of unrecorded built environment or archaeological resources, research was conducted using the following sources and repositories:

- Oakland History Room, at the Oakland Public Library
- EBMUD historical drawing and photograph archives
- Online Archive of California
- Calisphere Digital Archive
- Library of Congress, Chronicling America Historic Newspaper collection
- California Digital Newspaper Collection (sponsored by the University of California, Riverside)

Additionally, previous environmental documentation about Chabot Dam and its associated features, including a 1978 Environmental Impact Report (EBMUD 1978), was reviewed.

Three archaeological sites with assigned primary numbers (P-01-149, P-01-229, and P-01-235) and a single archaeological locus (Shovel Hill, no primary number assigned) were identified during the records search. P-01-149 contained the remains of a Chinese worker camp, P—01-229 contained the foundations of the Chabot Dam Surveyor's and Supervisor's houses, and P-01-239 contains the remnants of a kiln, possibly associated with P-01-149. The Shovel Hill locus contained numerous nineteenth-century tools and traces of physical disturbance in the landscape. For a more detailed discussion of these resources, see the Chabot Dam Seismic Upgrade Cultural Resources Inventory and Evaluation Report (AECOM 2013). Because the location of archaeological sites is kept confidential to help protect them from vandalism, the version of the survey report provided in **Appendix E-1** of this document has had all indication of archaeological site locations removed.

The record search and additional research at the City of Oakland identified one previously recorded built environment resource in the project area—Lake Chabot Waterworks District. This district was recorded by the City of Oakland for planning purposes and was designated as an Area of Primary Importance (API). In 1998, the City of Oakland amended its Preservation Element to create a Local Register of Historical Resources (Local Register). The Local Register recognizes the importance of buildings and districts, whether or not they have been designated by the Landmarks Preservation Advisory Board. The Local Register includes all sites designated as APIs, thus defining the district as a CEQA historical resource under Section 5024.1(g) of the California Public Resources Code (PRC) and Section 15064.5 of the State CEQA Guidelines.

Native American Consultation

On April 5, 2013, correspondence with the Native American Heritage Commission (NAHC) was initiated to obtain information regarding prehistoric, historic, or ethnographic Native American values that may be present near or within the project area. A request was made for the NAHC to check the Sacred Lands Files for any culturally sensitive areas existing in the project vicinity, as well as to provide a list of tribal contacts who might have additional insights about resources in the project area. In a response dated June 11, 2013, the NAHC indicated that a search of the sacred land file failed to indicate the presence of Native American cultural resources in the project area. A list of Native American individuals/organizations with possible knowledge of specific resources in the area was included in the correspondence. Consultation letters were sent to these individuals and organizations on July 30, 2013, and follow up phone calls were made as necessary. Documentation of the consultation correspondence is provided in **Appendix E-2**.

Pedestrian Survey

A survey of the project area was conducted on February 15 and March 21, 2013. Locations that were surveyed included the Lower Haul Route, the Excavation Area, the base of the spillway, and the stockpile and laydown areas. During the latter field visit, an overall field reconnaissance and visual inspection were conducted in locations outside the project area. This survey was performed to gain a greater understanding of those historical resources which may contribute to the overall character of the historic district and included areas previously documented.

No cultural material was collected during this survey. The features were photographed and identified on a map using GPS waypoints. Descriptions and an evaluation of these resources are discussed in the Chabot Dam Seismic Upgrade Cultural Resources Inventory and Evaluation Report (AECOM 2013) and accompanying Department of Parks and Recreation (DPR) 523 forms.

Survey of the historic structures associated with Lake Chabot Waterworks District included pedestrian access to the structures, photographic documentation, and visual inspection and written notation of materials, design features, condition, and characteristics of each feature's setting.

For the archaeological survey, transects[1] were placed systematically according to the parcel being inspected. For the Lower Haul Route, transects were positioned on either side of the roadway approximately 10 feet (3.08 meters) from the edge of the pavement where possible and ended at the Excavation Area, located at the route's southeastern terminus. However, proximity to standing water and vegetation often necessitated that these transects veer much closer to the roadway. Visibility generally was moderate to poor because of the presence of vegetative overgrowth. Four east-west trending transects were placed at the Excavation Area and adjacent laydown area (surveyed concurrently), connected to the Lower Haul Route. Much of the interior of this location is covered by vegetation, resulting in poor to moderate visibility. However, visibility tended to be slightly better toward the parcel margins during the survey.

The archaeological survey of the stockpile and laydown locations involved walking two to three transects spaced approximately 20 feet (6 meters) apart, depending on the size and conditions of the parcel. Three northwest/southeast trending transects were utilized at the Filter Pond Stockpile location, while the presence of park furniture and parking lots allowed for walking only two such transects at the Park Stockpile area and adjacent laydown area (surveyed concurrently).

Three east/west transects were placed at the laydown area overlooking the outlet works and its concrete pavilion. The area immediately to the north of this laydown area also was visually inspected because it contains the remnants of a documented historic resource (P-01-229).

Two east/west transects also were placed at the laydown area at the eastern boundary of the project area footprint. No cultural material was identified in this location. However, a human-made depression containing a substantial amount of concrete and building rubble was identified immediately next to this laydown area.

Paleontological Resources Inventory Methods and Assessment

Geologic maps and reports covering the geology of the project area and vicinity were reviewed to determine the exposed rock units and delineate their respective areal distributions. In addition, published geological and paleontological literature was reviewed to document the number and locations of previously recorded fossil sites from rock units exposed in and near the project area and vicinity, as well as the types of fossil remains each rock unit has produced. The literature review was supplemented by an archival search, conducted at the University of California Museum of Paleontology (UCMP) in Berkeley, California, on July 26, 2013.

The potential paleontological importance of a project area can be assessed by identifying the paleontological importance of exposed rock units within that area. Because the areal distribution of a rock unit can be delineated easily on a topographic map, this method is conducive to delineating parts of a project area that are of higher and lower sensitivity for paleontological resources.

A paleontologically important rock unit is one that has a high potential paleontological productivity rating and is known to have produced unique, scientifically important fossils. The potential

1 Often used during archaeological survey, transects are linear sample units that are separated by specified uniform widths. By walking along these lines, the archaeologist conducts a systematic study of the landscape and reduces the potential for sample bias.

paleontological productivity rating of a rock unit exposed in a project area refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near a project area. Exposures of a specific rock unit in a project area are most likely to yield fossil remains representing particular species, in quantities or densities similar to those previously recorded from the unit in and near the project area.

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, the Society of Vertebrate Paleontology (SVP) established three categories of sensitivity for paleontological resources: high, low, and undetermined (SVP 1995:22–27). Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas that have not had any previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity until surveys and mapping are performed to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly subsurface testing, a qualified paleontologist can determine whether an area should be categorized as having high or low sensitivity. In keeping with the significance criteria of the SVP, all vertebrate fossils are generally categorized as being of potentially significant scientific value (SVP 1995:22–27).

3.5.2 Environmental Setting

This section provides an overview of the history of Lake Chabot Waterworks District and resources of historical significance that may be affected by the proposed project.

Prehistoric Context

Prehistoric adaptations over the ensuing centuries have been identified in the archaeological record by numerous researchers who have been working in the Bay Area since the early 1900s, as summarized by Fredrickson (1974) and Moratto (1984). These periods include the Paleo-Indian Period (of which few sites exist in the Bay Area), the Lower (8000–5000 Before Present [B.P.]), Middle (5000–2500 B.P.), and Upper (2500–1300 B.P.) Archaic Periods, and the Emergent Period (1300–200 B.P.). The Middle Archaic, Upper Archaic, and Emergent Periods can be broken down further, according to additional cultural manifestations that are well represented in archaeological assemblages in the Bay Area (Windmiller Pattern [5000–1500 B.P.], Berkeley Pattern [2200–1300 B.P.], and Augustine Pattern [1300–200 B.P.]). No prehistoric sites were identified in the project area or within 0.5 mile of the project area boundaries.

Ethnographic Context

When European explorers arrived in the San Francisco Bay area in 1769, they encountered approximately 40 tribelets, each speaking one of four dialects. In the East Bay, an Ohlonean dialect was spoken, with groups settled along the shorelines and into the Livermore Valley (Banks 1982). The primary social organization was centered around the patrilineal family unit, with a focus on patrilocality (a socially instituted practice by which a married couple lives with or near the family of the husband), and sovereign tribelets often were defined by territorial holdings (Banks 1982, Bennyhoff 1977; ESA 2006). Remnants of these prehistoric sites have been reported throughout the Bay Area.

A few tribelets who spoke a Bay Miwok dialect also occupied the interior valleys of what is now adjacent Contra Costa County (Banks 1982). The Bay Miwok were the first of the Eastern Miwok to undergo missionization, with the first recorded Bay Miwok converts coming from the Saclan tribelet to Mission San Francisco in 1794 (Levy 1978:8.398–413). The first baptisms of Bay Miwok occurred between 1805 and 1812. Many indigenous tribelets later disappeared because of the combined effects of missionization and epidemics, which killed thousands in the first half of the nineteenth century.

Historic Context

In 1772, the Spanish, led by Juan Bautista de Anza, began exploring the inner coastal region of California. Later, Spanish settlers established a permanent presence through the construction of missions and presidios. When Mexico became independent from Spain in 1822, the Spanish missions were secularized and their lands were redistributed to private individuals by way of land grants. Large parcels were developed into cattle ranches, maintained by Mexican grantees. After the Mexican-American War, the area became part of the United States in 1848, and in 1853, the boundaries of Alameda County were established. Early European immigrants who settled in the area after the gold rush were Dutch, Anglo, and Portuguese. The City of Oakland was incorporated in 1852. In 1880, when the Central Pacific Railroad made Oakland the western terminus for the transcontinental railroad, Oakland's population boomed from just over 1,500 residents to become the second-largest population center in the state (CSUN 2013).

Anthony Chabot

Anthony Chabot made his fortune by mining gold in Nevada City and operating sawmills in Sierra County. He became a master at conveying water to dry mining areas, digging ditches and flumes to unearth large amounts of earth and float logs. Chabot often is credited for inventing hydraulic mining, although he developed only the basic principles of the process (Starr 2005). Fellow miner Edward Mattison used Chabot's basic principles and made the hydraulic mining process work.

Chabot moved to San Francisco in 1856, where, along with two other men, he founded the city's second water company (but the first to pipe drinking water to residents). In 1866, Chabot founded the Contra Costa Water Company with his brother Remi and associate Henry Pierce, with the goal of providing a reliable drinking water source to residents of Oakland (Burgess 1992). Chabot's first major water control and conveyance project in the East Bay was Temescal Dam, completed in 1869 (Noble, McClendon, and Montgomery 1999), followed by the San Leandro Dam (the original name of the present-day Chabot Dam) in 1876.

Water Use History

Lake Chabot (also called Chabot Reservoir) was initially impounded in 1876, following construction of the main portion of Chabot Dam (then called San Leandro Dam) in 1874–1875 along San Leandro Creek. Chabot Reservoir continued to provide drinking water to the City of Oakland until the 1960s, when the reservoir was assigned to standby service, to be used only for emergencies and during extreme drought conditions (EBMUD 1978), and as a non-potable water source for irrigation use. The water at the Chabot Reservoir, now Lake Chabot, was changed to standby status for a number of reasons, but mainly because construction of the Pardee Dam Reservoir in the Sierra Nevada foothills, completed in the late 1920s, provided a reliable source of suitable quality drinking water to Oakland. In June 1966, Lake Chabot opened to the public under the auspices of the East Bay Regional Park District. Since then, the lake has been used for recreational fishing and boating.

Chinese Laborers

The majority of the work during the initial construction of the Chabot Dam was performed by Chinese laborers. Their contributions to Chabot Dam and its water conveyance system were substantial (Banks

1982; Beggs 1997; Coleman 1996; Miller 1981). Chinese laborers performed vegetation clearing and grubbing on about 330 acres before beginning construction on the Chabot Reservoir, and dug approximately 3,100 feet of tunnels in the initial dam construction phase, between 1874 and 1875 (Miller 1981). After the Chabot Reservoir was filled with water and nearly 4 miles of roads in the vicinity were flooded, Chinese laborers were responsible for constructing about 15 miles of new roadways and bridges in the area (Miller 1981).

Lake Chabot Waterworks District

As mentioned previously, one known CEQA historical resource is located in the project area, Lake Chabot Waterworks District. The City of Oakland has recognized the district as an Area of Primary Importance, which according to its local planning policies means that the district qualifies as a CEQA historical resource. In addition, the cultural resources technical study prepared for the proposed project concludes that Chabot Dam and its associated built-environment and archaeological features appear to meet the criteria for a multiple-component historic district, to be listed in the California Register of Historical Resources (CRHR) at the local level of significance. In both cases, the Lake Chabot Waterworks District is recognized for its importance as part of the infrastructure that was critical to the City of Oakland's development. The district is highly significant for its association with Anthony Chabot, one of the San Francisco Bay Area's most influential early residents, and for its association with Chinese laborers in nineteenth century California, specifically the hundreds of Chinese workers who constructed Chabot Dam and its associated features. Furthermore, from a physical standpoint, Chabot Dam and its associated built-environment features are an outstanding extant example of a late-nineteenth century earthen dam water system in the San Francisco Bay Area.

Many of the historic built-environment features related to the history of the Chabot water system and its construction are extant, and—in the case of some built-environment features—still are in operation. Some of these features, including the dam itself, the lake, and Tunnel No. 2 Intake Tower, are located in the project area. These contributors to Lake Chabot Waterworks District are described in the following table.

As mentioned previously, archaeological resources include three sites with primary numbers issued (P-01-149, P-01-229, and P-01-235), and a fourth resource, Shovel Hill, identified and subjected to preliminary study that has not yet been assigned a primary number. Small-scale features related to water conveyance, including pipes, channels, and gutters located throughout the project area, are not considered potential contributing elements to Lake Chabot Waterworks District, in part because of their tendency to be replaced and modified over time, resulting in a lack of direct association with a historic facility.

Table 3.5-1 summarizes the components that are contributing elements of the Lake Chabot Waterworks Historic District. Detailed descriptions of each component are included in **Appendix E-1**, Cultural Resources Inventory and Evaluation Report.

Table 3.5-1
Contributing Project Elements of the Lake Chabot Waterworks Historic District

Project Element	Significance	CRHR Eligibility Criteria[1]
P-01-149	The site has strong association with the history of Chinese labor and construction of Chabot Dam and its associated features.	The site is able to convey historical significance under Criteria 1 and 4.
P-01-229	The site has potential to provide additional information regarding the locations and footprints of the residences and structures described in historical documentation.	The site is able to convey historical significance under Criteria 1 and 4.
P-01-229	The site has potential to provide additional information regarding the locations and footprints of the residences and structures described in historical documentation.	The site is able to convey historical significance under Criteria 1 and 4.
P-01-235	The site has potential to provide more information about Chinese labor and the construction of Chabot Dam and associated facilities.	The site is able to convey historical significance under Criteria 1 and 4.
Shovel Hill	A high potential exists for additional cultural material to be present at this location, possibly adding to the available data set regarding the early period of construction of Chabot Dam and its associated features.	The site possesses the potential for historical significance under Criteria 1, 3 and 4.
Historic-Period Dump	The site has potential to add to the existing body of knowledge regarding everyday living conditions of the first people who lived in the Chabot Dam area.	The site possesses the potential for historical significance under Criterion 1 and 4.
Other Archaeologically Sensitive Areas	Locations and conditions of potential resources could contribute to the available body of knowledge regarding historical work methods and those individuals involved in such work.	These locations may convey historical significance under Criteria 1, 3, and 4.
Chabot Dam	Associated with 19th century infrastructure that facilitated the development of Oakland and with the Chinese laborers who constructed the facilities. Represents the contributions made by Anthony Chabot, one of the San Francisco Bay Area's most influential early residents. Represents an outstanding extant example of a late-nineteenth century earthen dam water system in the San Francisco Bay Area. Also significant for its ability to yield additional information regarding methods and tools employed during dam construction.	Chabot Dam is able to convey historical significance under Criteria 1, 2, 3, and 4.

Table 3.5-1
Contributing Project Elements of the Lake Chabot Waterworks Historic District

Project Element	Significance	CRHR Eligibility Criteria[1]
Chabot Reservoir (now Lake Chabot)	Associated with nineteenth century infrastructure that facilitated the development of Oakland and with the Chinese laborers who constructed the facilities. Represents the contributions made by Anthony Chabot, one of the San Francisco Bay Area's most influential early residents. Represents an outstanding extant example of a late-nineteenth century earthen dam water system in the San Francisco Bay Area.	Lake Chabot is able to convey its historical significance under Criteria 1, 2, and 3.
Tunnel No. 2	Associated with nineteenth century infrastructure that facilitated the development of Oakland and with the Chinese laborers who constructed the facilities. Represents the contributions made by Anthony Chabot, one of the San Francisco Bay Area's most influential early residents. Represents an outstanding extant example of a late-nineteenth century earthen dam water system in the San Francisco Bay Area. Also significant for its ability to yield additional information regarding methods and tools employed during dam construction.	Tunnel No. 2 is able to convey its historical significance under Criteria 1, 2, 3, and 4.
Tunnel No. 2 Intake Tower	Associated with nineteenth century infrastructure that facilitated the development of Oakland and with the Chinese laborers who constructed the facilities. Represents the contributions made by Anthony Chabot, one of the San Francisco Bay Area's most influential early residents. Represents an outstanding extant example of a late-nineteenth century earthen dam water system in the San Francisco Bay Area. Also significant for its ability to yield additional information regarding methods and tools employed during dam construction.	Tunnel No. 2 Intake Tower is able to convey historical significance under Criteria 1, 2, and 3.
Spillway No. 3 and Tunnel No. 3	Associated with nineteenth century infrastructure that facilitated the development of Oakland and with the Chinese laborers who constructed the facilities. Represents the contributions made by Anthony Chabot, one of the San Francisco Bay Area's most influential early residents. Represents an outstanding extant example of a late-nineteenth century earthen dam water system in the San Francisco Bay Area. Also significant for its ability to yield additional information regarding methods and tools employed during dam construction.	Spillway No. 3 and Tunnel No. 3 are able to convey significance under Criteria 1, 2, 3, and 4.

Table 3.5-1
Contributing Project Elements of the Lake Chabot Waterworks Historic District

Project Element	Significance	CRHR Eligibility Criteria[1]
Filtration System	Associated with nineteenth century infrastructure that facilitated the development of Oakland and with the Chinese laborers who constructed the facilities. Represents the contributions made by Anthony Chabot, one of the San Francisco Bay Area's most influential early residents. Represents an outstanding extant example of a late-nineteenth century earthen dam water system in the San Francisco Bay Area.	The Hyatt Filters are able to convey their significance under Criteria 1, 2, and 3.
Roads	Associated with nineteenth century infrastructure that facilitated the development of Oakland and with the Chinese laborers who constructed the facilities. Represents the contributions made by Anthony Chabot, one of the San Francisco Bay Area's most influential early residents. Represents the original circulation system for an outstanding extant example of a late-nineteenth century earthen dam water system in the San Francisco Bay Area.	The roads appear to be able to convey their significance under Criteria 1, 2, and 3.

Note:
[1] CRHR eligibility criteria are discussed further in Section 3.5.3, Regulatory Setting.
Source: Data compiled by AECOM in 2013

Paleontological Resources

Geologic Setting

As discussed in detail in Section 3.3, Geology and Soils, the project area is located on the east side of San Francisco Bay in the East Bay hills, within the Coast Ranges geomorphic province. Much of the Coast Ranges province is composed of marine sedimentary deposits and volcanic rocks that form northwest-trending mountain ridges and valleys, running roughly parallel to the San Andreas Fault Zone. These include:

- Upper Jurassic Great Valley Group: Knoxville Formation
- Upper to Middle Jurassic Coast Range Ophiolite: Leona Rhyolite
- Middle Jurassic Coast Range Ophiolite: Basalt
- Middle Jurassic Coast Range Ophiolite: Gabbro

Upper Jurassic Great Valley Group: Knoxville Formation: Based on a review of published geological literature and a records search of the UCMP (2013) database, the Knoxville Formation does not contain vertebrate fossils. Although the records search indicates that one vertebrate locality has been documented in California (V-75073, in Tehama County), the UCMP database cross-references this record to invertebrate locality B-5077. Although the presence of marine invertebrates in the Knoxville

Formation has been well documented (e.g., fossil bivalves such as Buchia spp.), marine invertebrates generally are common; the fossil record is well developed and well documented, and such fossils generally would not be considered a unique paleontological resource.

Coast Range Ophiolite: The Coast Range ophiolite represents oceanic crust on which much of the sedimentary rock of the Great Valley sequence was deposited. The rhyolite, gabbro, and basalt sequences of the Coast Range ophiolite are present in the project area.

Rhyolite: Rhyolite is an igneous, silica-rich volcanic rock. It can be considered as the extrusive equivalent to plutonic granite rock. Because of the way this rock is formed (i.e., volcanic), it would not contain paleontological resources.

Gabbro and Basalt: Gabbro is a group of dark, coarse-grained, intrusive mafic igneous rocks that are equivalent to basalt. Both gabbro and basalt are plutonic, meaning they form when molten magma is trapped beneath the Earth's surface and cools into a crystalline mass. Because of the way these rocks are formed, neither gabbro nor basalt would contain paleontological resources.

3.5.3 Regulatory Setting

Federal

No federal regulations related to historical resources are applicable to the proposed project because any such regulations—such as the National Historic Preservation Act—are triggered by the use of federal funding or the need for federal permits or approvals, and the proposed project will not use any federal funds or require federal permits or approvals.

Professional Paleontological Standards

SVP, a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation (SVP 1995:22–27; 1996:31–32). Most practicing professional paleontologists in the nation adhere to the SVP assessment, mitigation, and monitoring requirements, as specifically spelled out in its standard guidelines.

State

California Environmental Quality Act

CEQA requires lead agencies to determine if a proposed project would have a significant effect on historical resources, including archaeological resources. The State CEQA Guidelines define a "historical resource" as: (1) a resource included in or eligible for inclusion in the CRHR; (2) a resource included in a local register of historical resources, as defined in Section 5020.1(k) of the PRC or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the PRC; or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of Section 21084.1 of the PRC would apply along with Section 15064.5 of the State CEQA Guidelines. If an archaeological site does not meet the State CEQA Guidelines criteria for a historical resource, then the site may meet the threshold of Section 21083 of the PRC regarding "unique archaeological resources." A unique archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria (PRC Section 21083.2[g]):

1) contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

2) has a special and particular quality such as being the oldest of its type or the best available example of its type.

3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

Section 15064.5(c)(4) of the State CEQA Guidelines notes that if a resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource will not be considered a significant effect on the environment.

California Register of Historical Resources

The CRHR is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility to the CRHR are consistent with National Register of Historic Places (NRHP) criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties that are formally determined to be eligible for or listed in the NRHP.

To be eligible for the CRHR, a historical resource must be significant at the local, state, and/or federal level under one or more of the following criteria (PRC Section 5024.1[c]):

1) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2) is associated with the lives of persons important in our past;

3) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or,

4) has yielded, or may be likely to yield, information important in prehistory or history.

For a resource to be eligible for the CRHR, it also must retain enough integrity to be recognizable as a historical resource and to convey its significance. The seven aspects or qualities of integrity are defined as location, design, setting, materials, workmanship, feeling, and association.

Forty-five years is the standard age threshold used by the California Office of Historic Preservation for determining potential historical significance. Therefore, any buildings or structures located in the project area that were built before 1968 could be eligible for listing in the CRHR if they meet any one of the four criteria listed above and retain sufficient integrity to convey their historical significance.

Local

California Government Code

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district serving a broad regional area , is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities used for the production, generation, storage, or transmission of water. However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

Alameda County Historic Preservation Ordinance

On January 10, 2012, the Board of Supervisors adopted a Historic Preservation Ordinance for unincorporated Alameda County (which the project site falls within Castro Valley). Under the provisions set forth in the ordinance, the Parks, Recreation, and Historical Commission (PRHC) oversees all issues related to historical resources and advises the Board of Supervisors on issues related to: how the Alameda County Register of Historic Resources is defined and maintained; how properties can be added or removed from the Register; which alterations to historic properties, if any, are subject to review; and which incentives programs may apply to historic properties. The PRHC advises the Boards of Zoning Adjustments, Planning Commission, and Board of Supervisors on recreation and parks issues in Alameda County.

City of Oakland General Plan Historic Preservation Element

The City of Oakland adopted a Historic Preservation Element as part of its General Plan in 1994. The Historic Preservation Element prescribes policies and actions related to two goals: "to use historic preservation to foster economic vitality and quality of life and to prevent unnecessary destruction of properties of special historical, cultural, and aesthetic value" (City of Oakland 1994). The Element applies to what the City of Oakland has defined as Designated Historic Properties (landmarks, districts, and Heritage Properties) and Potential Designated Historic Properties.

In 1998, the City of Oakland updated the Historic Preservation Element to include a category called Local Register of Historical Resources (Local Register). The Local Register is a list of buildings and districts that are recognized as important by the City of Oakland, although they are not necessarily designated by the Landmarks Preservation Advisory Board. The properties listed in the Local Register have been assigned survey ratings of: A ("highest importance"); B ("major importance"); or Areas of Primary Importance (areas that appear eligible for the National Register of Historic Places, as districts). Buildings listed in the Local Register can be considered historical resources for the purposes of CEQA.

City of San Leandro Historic Preservation Ordinance

The San Leandro General Plan (updated 2011) states that the mission of San Leandro's Historic Preservation program is: "to preserve and maintain sites and structures that serve as significant, visible reminders of San Leandro's social and architectural history; to integrate historic preservation more fully into San Leandro's comprehensive planning process; to increase public awareness of local history; to contribute to the economic development and vitality of the City; and to preserve the character and livability of San Leandro's neighborhoods and strengthen civic pride through neighborhood conservation" (City of San Leandro 2011).

The San Leandro City Council adopted a historic preservation ordinance in 2003, setting forth a policy for the city's historical resources. The Ordinance requires that permits for demolition, removal, or substantial alterations to documented historic structures or trees be referred to the City Library's Historical Commission for a recommendation. It provides for demolition delay in the event that buildings of potential historic importance are threatened. The Ordinance applies only to the structures and trees listed in the City's historic registry.

3.5.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts in this analysis are consistent with the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on cultural resources if it would:

1) cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;

2) cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;

3) directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature; or

4) disturb any human remains, including those interred outside of formal cemeteries.

Paleontological Resources

Based on the environmental checklist in Appendix G of the State CEQA Guidelines as listed above, a project would have a significant impact on paleontological resources if it would directly or indirectly destroy a unique paleontological resource or site. A "unique paleontological resource or site" is one that is considered significant under the professional paleontological standards described as follows.

An individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved, and it meets one of the following criteria:

- a type specimen (i.e., the individual from which a species or subspecies has been described);
- a member of a rare species;
- a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn;
- a skeletal element different from, or a specimen more complete than, those now available for its species; or
- a complete specimen (i.e., all or substantially all of the entire skeleton is present).

The value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions (such as for a research project). Marine invertebrates generally are common; the fossil record is well developed and well documented, and they typically would not be considered a unique paleontological resource. Identifiable vertebrate marine and terrestrial fossils usually are considered scientifically important because they are relatively rare.

Project Impacts and Mitigation Measures

Project impacts related to cultural resources addressed in this discussion are divided into project components where the impacts can vary by component. Otherwise, the impacts are discussed generally, covering all project components.

Impact CR-1: The proposed project would cause a substantial adverse change in the significance of a historical resource (Criterion 1). (Significant and Unavoidable)

Outlet Tower

Removal of the outlet tower would require the use of heavy machinery on the plateau area above the tower. Archaeological sites that have been identified as contributors to the Lake Chabot Waterworks Historic District are located on this plateau, and could be disturbed by project construction activities associated with the use of heavy machinery in this location. Thus, this aspect of the proposed project has the potential to substantially affect a historical resource. The outlet tower is a prominent visual and functional component of Lake Chabot Waterworks District. Removal of the outlet tower would alter a major physical characteristic of the historical resource (the Lake Chabot Waterworks District) and would impair the ability of the district to convey its significance under CRHR criteria 1, 2, and 3. Thus, this aspect of the proposed project would result in a substantial adverse change to the historical resource. Therefore, the impact would be *potentially significant*. The demolition of the tower (not the pavilion) and the loss of the ability for the public to view the relationship between functional parts of the water works, rather than the loss of the aesthetic features of the pavilion, is what leads to a significant unavoidable impact under CEQA.

Mitigation Measure CR-1.1: Produce and distribute an interpretive/educational document about the Lake Chabot Waterworks District.

As an addition to the existing on-site interpretive panels of the Lake Chabot Waterworks District and the cultural resources inventory and evaluation report (**Appendix E-1** of the Draft EIR and provided to the Northwest Information Center at Sonoma State University), EBMUD will prepare an electronic document on the history of Lake Chabot Waterworks District that documents the site in its entirety and is easily accessible to the public, to help compensate for the impact of the proposed project on Lake Chabot Waterworks District.

Implementation:	EBMUD
Timing:	By completion of the proposed project
Enforcement:	EBMUD
Residual Effect	Implementation of **Mitigation Measure CR-1.1** would document the Lake Chabot Waterworks District in its entirety. Implementation of Mitigation Measure CR-1.1 would not reduce the impact of the proposed project on the ability of the district to convey its significance because the project would still result in the permanent loss of one of the primary

contributing elements of the historic district (the outlet tower). The impact would be *significant and unavoidable*. The mitigation would provide the public with historical narrative and visual illustrations of the role that the tower had played in the history of the Lake Chabot Waterworks, and by extension, the tower's contribution to local heritage.

Outlet Pipes

The outlet pipes are not considered a major component of the historic waterworks system at Lake Chabot Waterworks District. Thus, relining or replacement of the outlet pipes would not result in an adverse change to the historical resource. *No impact* would occur.

Chabot Dam

Chabot Dam is one of the most prominent visual and functional components of Lake Chabot Waterworks District. If the CDSM option for strengthening the dam is selected, the composition of the soil would be altered, but the overall form of the dam would not change. Thus, the CDSM option would not result in an adverse change to the historical resource. If the Conventional Earthwork option for strengthening the dam is selected, the soil would be excavated, reconditioned, and replaced, but the overall form of the dam would not change. Thus, the Conventional Earthwork option would not result in an adverse change to the historical resource. Therefore, for either option, *no impact* would occur.

Haul Routes

The Upper Haul Route is located on a historic circulation route, which is considered a contributing component of Lake Chabot Waterworks District. The proposed project would not alter the material or configuration of the historic circulation route. Thus, the Upper Haul Route option would not result in an adverse change to the historical resource. The Lower Haul Route also is located on the same historic circulation route. Thus, the Lower Haul Route option would not result in an adverse change to the historical resource. Therefore, for either route, *no impact* would occur.

Stockpiles

Either stockpile site is in an area where no significant built-environment components are known to exist. Thus, no adverse change to the historical resource would occur as a result of construction activities. Therefore, *no impact* would occur.

Impact CR-2: The proposed project would cause a substantial adverse change in the significance of an archaeological resource (Criterion 2). (Less than Significant with Mitigation Incorporated)

CDSM and Conventional Earthwork Options

The CDSM and Conventional Earthwork options would likely have no impacts to known archaeological resources because of the level of previous disturbance in the area. However, the excavation would occur in an area of archaeological sensitivity, and previously unknown, buried cultural resources may be present. Installation of new or replacement underground utilities (if required) may encounter previously undocumented archaeological resources that could constitute a substantial adverse change. Multiple areas of archaeological sensitivity exist within the vicinity of Chabot Dam and Tunnel 2. In the event that such resources are identified during construction (including direct excavation, compaction, or other disturbance), and these resources are found to be significant, then this project would cause an adverse change in the significance of an archaeological resource. Therefore, the impact is *potentially significant*. However, with implementation of **Mitigation Measure CR-1.2**, the impact would be reduced to *less than significant with mitigation incorporated*.

Haul Routes

The Upper Haul Route is mostly paved, and the unpaved section is not in an area of archaeological sensitivity. No impacts on previously undocumented subsurface resources from the use of the Upper Haul Route are anticipated. Therefore, *no impact* would occur.

The Lower Haul Route makes use of an unpaved road surface which goes through and past areas of known cultural resources and areas of archaeological sensitivity. The Lower Haul Route would be widened to 30 feet, to accommodate two-way truck traffic starting 300 feet west of the creek crossing and extending west to the Park Stockpile or the Filter Pond Stockpile. The stabilized road would be 15 feet wide for the remainder of the Lower Haul Route, with occasional widening to 20 feet to allow for turnouts. Tree removal along the road alignment would be required to accommodate a 30-foot road width. If previously unknown archaeological resources were impacted during construction-related activities (including direct excavation, compaction, or other disturbance) and these resources were found to be significant, this project would cause a substantial adverse change in the significance of an archaeological resource. Therefore, the impact is *potentially significant*. However, with implementation of **Mitigation Measure CR-1.2,** the impact would be reduced to *less than significant with mitigation incorporated*.

Mitigation Measure CR-1.2: Stop work if prehistoric or historic archaeological resources are discovered, assess the significance of any find, and implement recovery plan, as required.

Cultural resources awareness training will be provided to construction and contractor staff before ground-disturbing activity. This training will explain the potential to encounter cultural material during project-related ground-disturbance activities and the requirements for responding to such unanticipated discoveries.

If any prehistoric or historic cultural material is discovered during ground-disturbing activities, work within 100 feet of the discovery will be halted, and a qualified archaeologist will be consulted immediately to designate an appropriate stop work area and to assess the significance of the find, according to Section 15064.5 of the State CEQA Guidelines.

If it is determined that project construction may damage a historical resource or a unique archaeological resource, mitigation will be implemented, in accordance with Section 21083.2 of the PRC and Section 15126.4 of the State CEQA Guidelines, with a preference for preservation in place. If avoidance is infeasible, project impacts may be mitigated through the implementation of an archaeological data recovery plan developed by the evaluating archaeologist. This plan, which would include recommendations for the treatment of discovered cultural material, will be submitted to EBMUD for review. Upon approval, project construction activity within the area of the discovery may resume. The qualified archaeologist will then prepare and submit to EBMUD a report documenting the methods employed and results. On review and approval by EBMUD, a copy of the report will be submitted to the Northwest Information Center in Rohnert Park, California. Work may proceed at other project work sites while mitigation for historical resources or unique archaeological resources is being carried out.

Additionally, in accordance with Section 5097.993 of the PRC, EBMUD will inform construction workers that the collection of any Native American artifact is prohibited by law.

Implementation: EBMUD, construction contractor(s), and a qualified archaeologist

Timing: Before ground-disturbing activity

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure CR-1.2** would reduce potentially significant impacts related to known and unknown archaeological resources to a less-than-significant level because a qualified archaeologist would be consulted in the event of a discovery during ground-disturbing activities and appropriate measures would be implemented. The impact would be *less than significant with mitigation incorporated*.

Stockpiles

The proposed stockpiles are not in areas of known archaeological sensitivity, and impacts on archaeological components of the resource resulting from activities related to soil stockpiling are not anticipated. Therefore, *no impact* would occur.

Impact CR-3: The proposed project would not directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature (Criterion 3). (Less than Significant)

As discussed in Section 3.5.2, Environmental Setting, and as shown in **Figure 3.3-2** in Section 3.3, Geology and Soils, the project site is composed of the Knoxville Formation and the Coast Range ophiolite (rhyolite, gabbro, and basalt sequences). Based on a review of published literature and a UCMP (2013) database search, the Knoxville Formation contains specimens of marine invertebrates. However, marine invertebrates generally are common and have been well documented. The Knoxville Formation does not contain vertebrate fossils. Therefore, the Knoxville Formation is considered to be of low paleontological sensitivity.

The rhyolite, gabbro, and basalt sequences of the Coast Range ophiolite are volcanic rocks. Because of the way that volcanic rocks are formed, they would not be expected to contain paleontological resources, and a search of the UCMP (2013) database indicates that no localities have been recorded. Therefore, the Coast Range ophiolite is considered to be of low paleontological sensitivity.

Because the rock formations in the project area are of low paleontological sensitivity, the impact would be *less than significant*. No mitigation measures are required.

Impact CR-4: The proposed project would disturb any human remains, including those interred outside of formal cemeteries (Criterion 4). (Less than Significant with Mitigation Incorporated)

The proposed project potentially could disturb or destroy human remains, including those interred outside formal cemeteries or in Native American burial grounds. However, because no indication exists that any particular location in the project area has been used for human burial purposes in the distant or recent past, it is unlikely that human remains would be encountered during project construction. However, in the unlikely event that human remains, including those interred outside of formal cemeteries, are discovered during subsurface activities, they could be damaged inadvertently.

Therefore, the impact would be *potentially significant*. However, with implementation of **Mitigation Measure CR-4.1,** the impact would be reduced to *less than significant with mitigation incorporated*.

Mitigation Measure CR-4.1: Conduct construction worker training, stop work if human skeletal remains are uncovered, and follow the procedures set forth in Section 15064.5(e)(1) of the State CEQA Guidelines.

Construction and contractor staff will be informed before ground-disturbing activity that, although remote, there is the potential to encounter as yet undiscovered human remains during project-related ground-disturbance activities. According to Section 7050.5(b) of the California Health and Safety Code, in the event of discovery or recognition of any human remains there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

Furthermore, if the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission pursuant to California Health and Safety Code 7050.5-7055.

Per Public Resources Code 5097.98, the human remains will not be damaged or disturbed by further activity until the EBMUD has discussed and conferred, as prescribed in this section (California Public Resources Code Section 5097.98), with the Most Likely Descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.

Implementation: EBMUD

Timing: During construction activities, as appropriate

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure CR-4.1** would reduce potentially significant impacts related to the disturbance or destruction of undiscovered human remains to a less-than-significant level because the Alameda County coroner would be contacted to evaluate the remains and appropriate measures would be taken. The impact would be *less than significant with mitigation incorporated*.

3.5.5 Cultural Resources Impact and Mitigation Summary

Table 3.5-2 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

Table 3.5-2
Cultural Resources Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact CR-1. The proposed project would cause a substantial adverse change in the significance of a historical resource (Criterion 1).	SU Mitigation Measures CR-1.1 and CR-1.2	SU Mitigation Measures CR-1.1 and CR-1.2	SU Mitigation Measures CR-1.1 and CR-1.2	SU Mitigation Measures CR-1.1 and CR-1.2	SU Mitigation Measures CR-1.1 and CR-1.2	SU Mitigation Measures CR-1.1 and CR-1.2	SU Mitigation Measures CR-1.1 and CR-1.2	SU Mitigation Measures CR-1.1 and CR-1.2
Impact CR-2. The proposed project would cause a substantial adverse change in the significance of an archaeological resource (Criterion 2).	LTSM Mitigation Measure CR-1.2	LTSM Mitigation Measure CR-1.2	LTSM Mitigation Measure CR-1.2	LTSM Mitigation Measure CR-1.2	LTSM Mitigation Measure CR-1.2	LTSM Mitigation Measure CR-1.2	LTSM Mitigation Measure CR-1.2	LTSM Mitigation Measure CR-1.2
Impact CR-3: The proposed project would not directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature (Criterion 3).	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Impact CR-4. The proposed project would disturb any human remains, including those interred outside of formal cemeteries (Criterion 4).	LTSM Mitigation Measure CR-4.1	LTSM Mitigation Measure CR-4.1	LTSM Mitigation Measure CR-4.1	LTSM Mitigation Measure CR-4.1	LTSM Mitigation Measure CR-4.1	LTSM Mitigation Measure CR-4.1	LTSM Mitigation Measure CR-4.1	LTSM Mitigation Measure CR-4.1

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

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3.6 Transportation and Circulation

3.6.1 Approach to Analysis

This section discusses the existing roadway network and traffic circulation conditions in the vicinity of the project area, describes the pertinent state and local laws and guidelines, presents the potential construction impacts, and identifies potential traffic mitigation measures, if required.

3.6.2 Environmental Setting

The transportation and circulation study area extends beyond the project area and includes the roadways and intersections that could be affected by project construction. **Figure 3.6-1** shows the access roadways to the project area. **Figure 3.6-2** shows the study intersections. Primary access routes for construction trucks would differ from access routes for worker vehicles because of truck restrictions on Interstate 580 (I-580) north of the project area; thus, two separate figures are presented (see Truck Access below for details). Each of the affected facilities is described next.

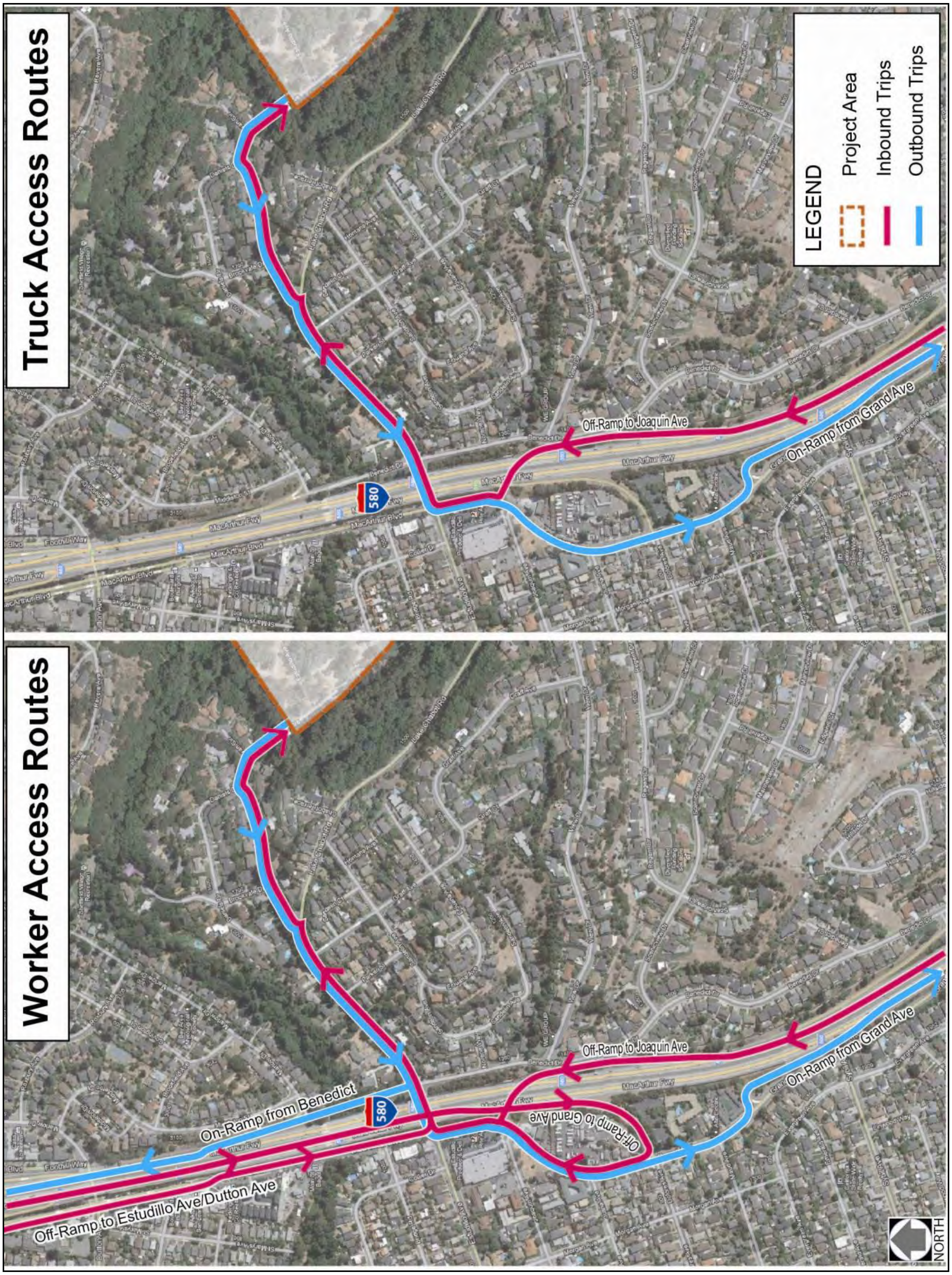
Regional Access

The project area is located just east of I-580, near the borders of the City of Oakland, the City of San Leandro, and unincorporated Alameda County (Castro Valley). The main freeway access is I-580, and I-580 connects to I-238 and by I-238 to I-880. These interstate freeway facilities are described next. Average daily traffic (ADT) volumes[1] were obtained from Caltrans' database of Traffic Volumes on California State Highways (Caltrans 2011).

Interstate 580 (I-580) is a regional freeway located west of the project area, extending from U.S. 101 in Marin County to Interstate 5 south of Tracy. In the vicinity of the project area, I-580 runs in a north-south direction and has four lanes in each direction. Project area access from I-580 includes off-ramps at Grand Avenue and Dutton Avenue, and access from the project area to I-580 includes on-ramps at Benedict Drive and Grand Avenue. The speed limit on I-580 is generally 65 miles per hour (mph). The average daily traffic volume on I-580 is approximately 151,000 vehicles west of the project area. The AM and PM peak-hour traffic volumes at this location are approximately 12,300 and 13,100 vehicles, respectively (Caltrans 2012).

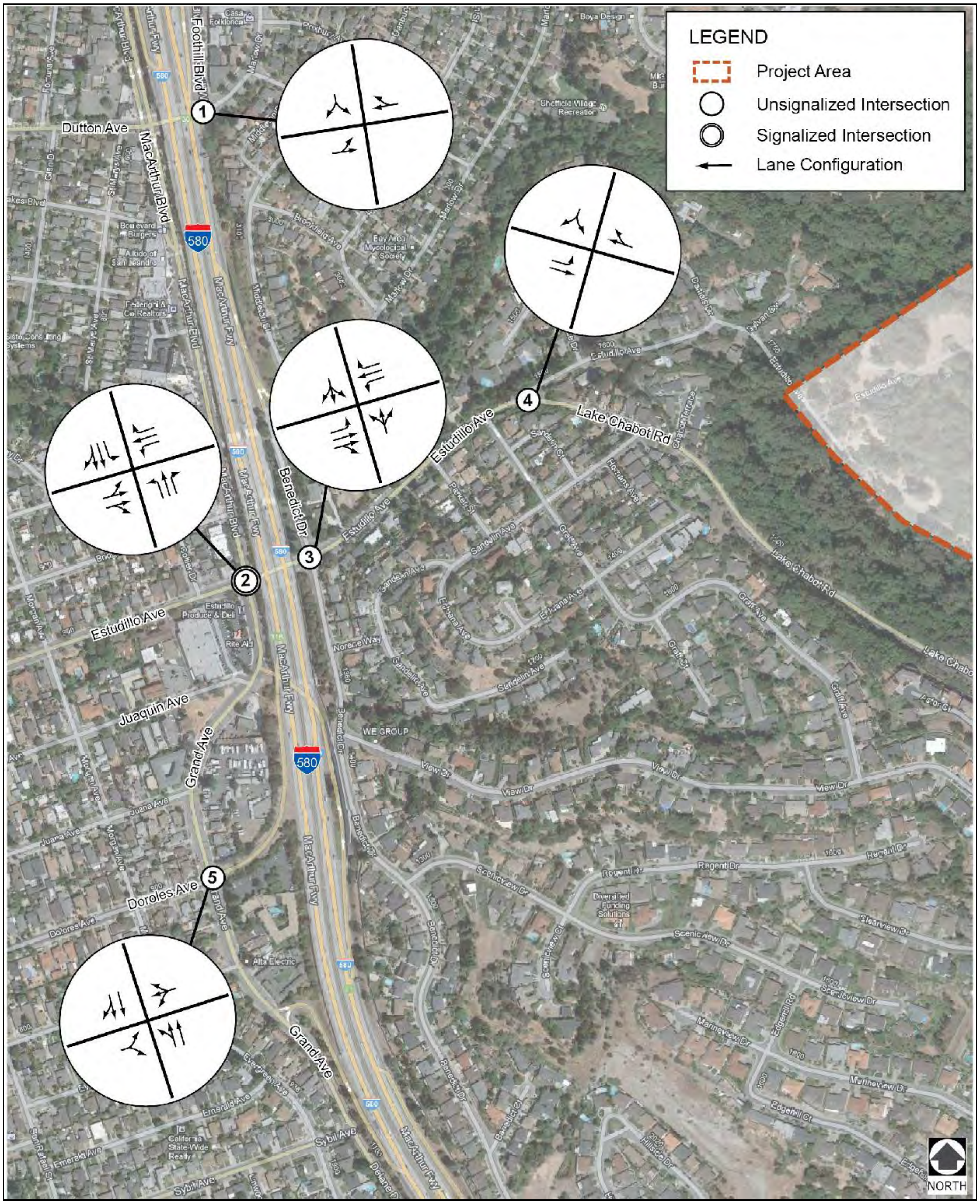
Interstate 238 (I-238) is an east-west freeway that connects I-880 near the southern border of San Leandro and I-580 near Castro Valley. It is approximately 2 miles long and has four lanes in each direction, with Bay Area Rapid Transit (BART) tracks in the middle. The speed limit on I-238 generally is 65 mph. The average daily traffic volume on I-238 is approximately 140,000 vehicles at the interchange with I-580. The AM and PM peak-hour traffic volumes at this location are approximately 8,700 and 9,500 vehicles, respectively (CHS Consulting Group 2013).

[1] ADT volumes represent total volumes for both directions



Source: CHS Consulting Group 2013

Figure 3.6-1: Access Routes to Project Area



Source: CHS Consulting Group 2013

Figure 3.6-2: Study Intersections

Interstate 880 (I-880) is a north-south freeway extending between I-80 in Emeryville and I-280 in San Jose. It generally is an eight-lane freeway with four lanes in each direction. The speed limit on I-880 is 65 mph. The average daily traffic volume on I-880 is approximately 159,000 vehicles at the interchange with I-238. The AM and PM peak-hour traffic volumes at this location are approximately 9,700 and 10,000 vehicles, respectively (Caltrans 2012).

Local and Project Area Access

The following roadways provide local access to the project area:

Estudillo Avenue is an east-west roadway that extends from East 14th Street to the entrance of Chabot Park. Estudillo Avenue is approximately 32 to 48 feet wide and has one travel lane in each direction and on-street parking on the south side of the street. Estudillo Avenue is designated as a Residential Collector Road in the City of San Leandro General Plan (City of San Leandro 2002). In the vicinity of the project area, the speed limit on Estudillo Avenue is 25 mph. The average daily traffic volume on Estudillo Avenue is approximately 4,700 vehicles between Lake Chabot Road and MacArthur Boulevard (City of San Leandro 2012).

MacArthur Boulevard is a north-south roadway that extends between 73rd Avenue in Oakland and Estudillo Avenue. South of Estudillo Avenue, it becomes Grand Avenue. In the vicinity of the project area, MacArthur Boulevard is approximately 45 feet wide and has one travel lane and on-street parking lane in each direction and a landscaped median south of Dutton Avenue. MacArthur Boulevard is designated as an Arterial Street and a Local Truck Route in the City of San Leandro General Plan (City of San Leandro 2012). In the vicinity of the project area, the speed limit on MacArthur Boulevard is 35 mph. The average daily traffic volume on MacArthur Boulevard is approximately 9,700 vehicles between Estudillo Avenue and Marlow Drive (City of San Leandro 2012).

Grand Avenue is a north-south roadway that extends south of MacArthur Boulevard from Estudillo Avenue to Sybil Avenue. Grand Avenue is approximately 58 feet wide and has two travel lanes and on-street parking in each direction. Grand Avenue is designated as a Collector Street. The speed limit on Grand Avenue is 30 mph.

Benedict Drive is a 600-foot-long north-south roadway that connects Estudillo Avenue and the I-580 northbound on-ramp. It is 31 feet wide and has one travel lane in each direction. The speed limit on Benedict Drive is 15 mph.

Truck Access

On I-580, trucks over 4.5 tons are prohibited from traveling on an approximately 10-mile-long segment north of the project area, through Oakland between Grand Avenue and the San Leandro border (Caltrans 2000). As a result, large construction vehicles (e.g., hauling trucks, equipment delivery, etc.) would access the project area only from I-580 North via an off-ramp at Joaquin Avenue and onto Estudillo Avenue. Likewise, outbound trucks from the project area would use Estudillo Avenue, and the Grand Avenue on-ramp to I-580 southbound. Trucks coming from north of the project area would use I-880 and I-238 as an alternative route. All other small construction vehicles (e.g., pickup trucks, pilot trucks, and automobiles) would be able to access the project area from both I-580 North and South. Truck access routes to the project area are shown in **Figure 3.6-1**.

Existing Traffic Conditions

Roadway/Ramp Levels of Service

The existing level of service (LOS)[2] analysis for the roadway and ramps was based on traffic volume data obtained from the California Department of Transportation's (Caltrans) Freeway Performance Measurement System (PeMS) (Caltrans 2012). Freeway LOS criteria is derived from the 2000 Highway Capacity Manual (TRB 2001) and is presented in **Table 3.6-1**. The LOS criterion for freeway mainline segments or ramps is determined using vehicle density and is expressed in terms of passenger cars per mile per lane.

Table 3.6-1
Level of Service Criteria for Freeway and Ramps

	Freeway	Two-Lane Highway in Class II	Ramp
	Density[1] (pc/mi/ln)	Percent Time-Spent-Following	Density (pc/mi/ln)
A	≤ 11	≤ 40	≤ 10
B	> 11 – 18	> 40 – 55	> 10 – 20
C	> 18 – 26	> 55 – 70	> 20 – 28
D	> 26 – 35	> 70 – 85	> 28 – 35
E	> 35 – 45	> 85	> 35
F	> 45	–	–

Note:
1 Free-flow speed = 60 to 65 mph
pc/mi/ln = passenger cars per mile per lane
Source: TRB 2001

Table 3.6-2 presents the results of LOS calculations for freeway segments and ramps in the vicinity of the project area. The Alameda County Transportation Commission considers LOS A to E to be acceptable conditions for I-580 east of Highway 24.

In the vicinity of the project area, all study segments on I-580 currently operate at LOS C or D. Traffic volumes along I-580 are marginally heavier in the northbound direction during the AM peak hour and in the southbound direction during the PM peak hour. All ramps along I-580 in the vicinity of the project area also operate at LOS C or D.

2 Level of Service (LOS) is a qualitative description of a facility's performance based on the average delay per vehicle, vehicle density, or volume-to-capacity ratios. LOS ranges from A, which indicates free-flow or excellent conditions with short delays, to F, which indicates congested or overloaded conditions with extremely long delays.

Table 3.6-2
Freeway Mainline/Ramp Level of Service—Existing

		AM Peak Hour		PM Peak Hour	
		LOS	Density[1]	LOS	Density[1]
Roadways					
From	**To**				
I-580 Northbound					
Grand Avenue On-Ramp	Joaquin Avenue Off-Ramp	D	29.5	D	26.9
Joaquin Avenue Off-Ramp	Benedict Drive On-Ramp	D	26.8	C	24.1
Benedict Drive On-Ramp	Foothill Boulevard Off-Ramp	D	29.9	D	27.0
I-580 Southbound					
Foothill Blvd. On-Ramp	Grand Avenue Off-Ramp	D	26.9	D	30.0
Grand Avenue Off-Ramp	Grand Avenue On-Ramp	C	24.5	D	27.0
Grand Avenue On-Ramp	150th Avenue Off-Ramp	C	25.1	D	28.9
Ramps					
I-580 Northbound					
Off-Ramp to Grand Avenue		D	29.9	D	28.3
On-Ramp from Benedict Avenue		C	25.4	C	23.7
I-580 Southbound					
Off-Ramp to Grand Avenue		D	30.9	D	33.6
On-Ramp from Grand Avenue		C	20.2	C	21.8

Note:
[1] Density for freeway segments represents the average passenger car per mile per lane.
Sources: Caltrans 2007, 2008, 2012; CHS Consulting Group 2013

Intersection Level of Service

Existing traffic conditions were evaluated at major intersections in the vicinity of the project area that would be directly affected by the traffic generated by the proposed project. Five study intersections were analyzed (see **Figure 3.6-2**):

1. Foothill Boulevard/Dutton Avenue/Marlow Drive
2. MacArthur Boulevard/Estudillo Avenue
3. Benedict Drive/Estudillo Avenue

4. Lake Chabot Road/Estudillo Avenue
5. I-580 Off-Ramp/Grand Avenue/Dolores Avenue

All study intersections are unsignalized except for the intersection of MacArthur Boulevard/Estudillo Avenue.

The LOS for each intersection was analyzed for the 60-minute period during the weekday AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) peak periods. Traffic turning movement counts for the study intersections were conducted on November 6, 2012 and February 28, 2013, during both the AM and PM peak periods. **Figure 3.6-3** shows the existing turning movement volumes at the study intersections. The intersections were evaluated using the *2000 Highway Capacity Manual* operations methodology, which determines the capacity for each lane group approaching the intersection. LOS then is based on the average stopped delay per vehicle (seconds per vehicle) for the various movements within the intersection. The City of San Leandro considers LOS D to be the minimum acceptable service level for intersections.

Table 3.6-3 presents the existing LOS and delay data for the study intersections. All intersections were found to operate at LOS C or better, except for the intersection of Benedict Drive and Estudillo Avenue, which operates at LOS F in the AM peak-hour. The intersection of Benedict Drive and Estudillo Avenue is stop controlled on the northbound approach (Benedict Drive), but the remaining three approaches are free flowing. As a result, the northbound approach experiences up to 10 minutes of delay or LOS F when heavy east-west bound traffic occurs on Estudillo Avenue (837 vehicles in the AM peak hour and 1,070 vehicles in the PM peak-hour).

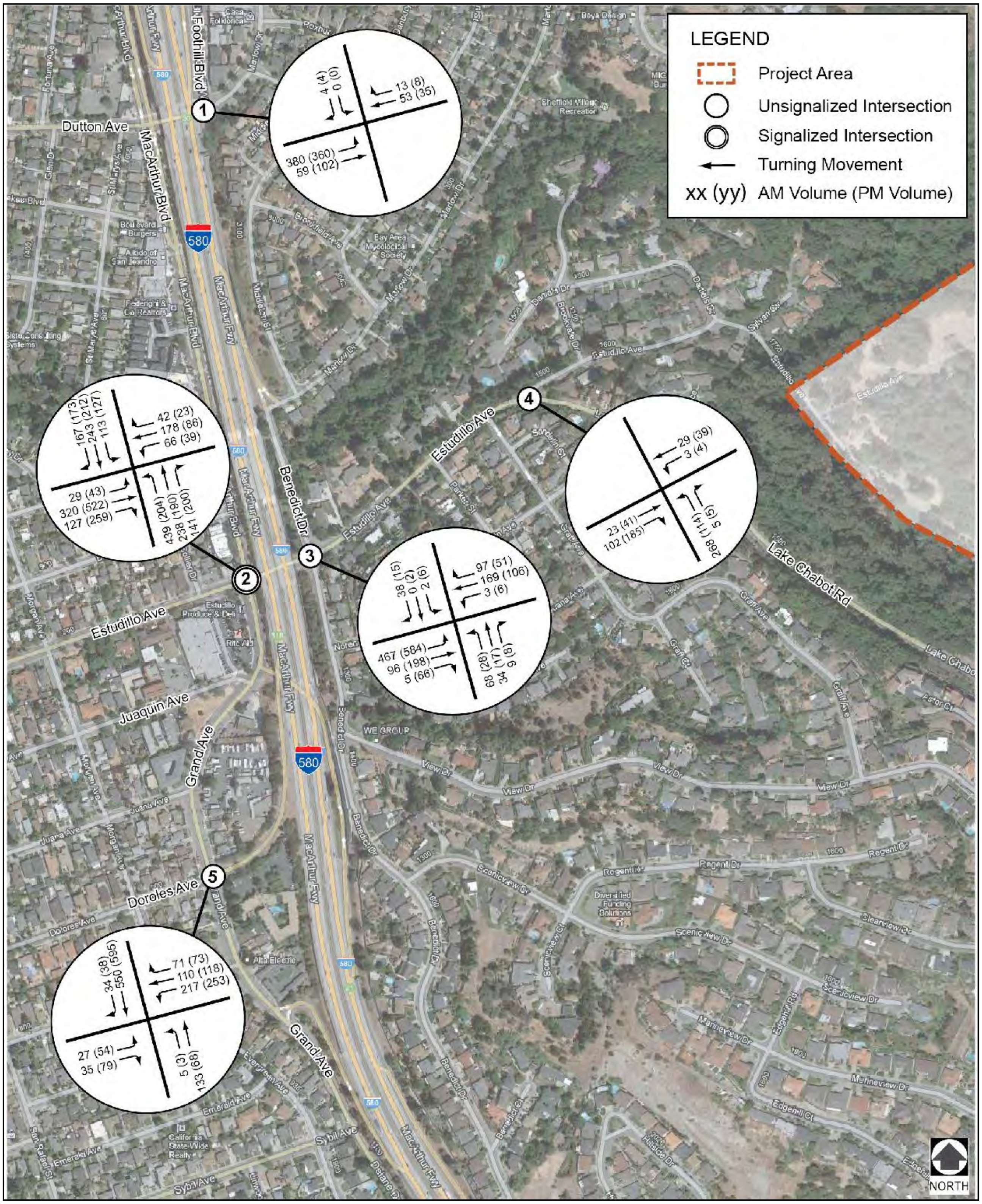
Public Transit

Alameda–Contra Costa Transit District (AC Transit) provides bus service within Alameda County and western Contra Costa County, as well as between Alameda County and parts of San Francisco. In the vicinity of the project area, three AC Transit bus routes—75, NX4, and NXC—operate along MacArthur Boulevard, with a stop at the intersection of MacArthur Boulevard and Estudillo Avenue. Route 75 provides service to the San Leandro BART Station via Dutton Avenue and operates every 60 minutes throughout the day. Routes NX4 and NXC are Transbay bus routes that provide service to the Transbay Terminal in San Francisco every 30 minutes during the AM and PM peak periods.

Bikeways

Bikeways are typically classified as Class I, Class II, or Class III facilities. Class I bikeways are bike paths with exclusive rights-of-way for use by bicyclists, with minimal cross flow by motorized vehicles. Class II bikeways are bike lanes striped within the paved areas of roadways and established for the exclusive use of bicyclists. Class III bikeways are signed bike routes that allow bicycles to share streets with vehicles.

The primary existing bikeway in the vicinity of the project area is the Class III bike path along Estudillo Avenue, between Lake Chabot Road and the entrance to Chabot Park. In addition, the City of San Leandro General Plan has proposed a Class I bike path along Estudillo Avenue, between MacArthur Boulevard and Lake Chabot Road, but it has not been constructed.



Source: CHS Consulting Group 2013

Figure 3.6-3: Existing Traffic Volume at Study Intersections

Table 3.6-3
Intersection Level of Service—Existing

Study Intersections	AM Peak		PM Peak	
	LOS	Delay[1] (seconds/vehicle)	LOS	Delay[1] (seconds/vehicle)
Signalized				
MacArthur Boulevard/Estudillo Avenue (Study Intersection 2)	B	18.9	B	16.6
Unsignalized				
Foothill Boulevard/Dutton Avenue/Marlow Drive[2] (Study Intersection 1)	A/A	6.2/ 8.6 (SB)	A/A	5.8/ 8.5 (SB)
Benedict Drive/Estudillo Avenue[2] (Study Intersection 3)	F/F	<80.0/ <80.0 (NB)	C/F	18.5/ <80.0 (NB)
Lake Chabot Road/Estudillo Avenue[2] (Study Intersection 4)	A/A	1.2/ 10.0 (SB)	A/A	1.8/ 9.4 (SB)
I-580 Off-Ramp/Grand Avenue/Dolores Avenue[3] (Study Intersection 5)	C	17.8	C	17.9

Notes:
1 Delay values are not actually measured in the field, but are estimated based on the calculations of existing traffic volumes. Delay values represent the seconds of average delay per vehicle.
2 Two-way stop-controlled intersection; delay is presented as the average delay/worst approach delay.
3 Four-way stop-controlled intersection; delay is presented as the average delay/worst approach delay.
NB = Northbound; SB = Southbound
Source: CHS Consulting Group 2013

Pedestrian Walkway

The level of pedestrian facilities (e.g., sidewalks, crosswalk) and pedestrian volumes varies in the vicinity of the project area. MacArthur Boulevard, Grand Avenue, and Benedict Drive all have sidewalks on both sides of the street. On Estudillo Avenue, sidewalks exist only on the south side of the street west of Parker Street. The nearest pedestrian crosswalks from the project area are located at the signalized intersection of Estudillo Avenue and MacArthur Boulevard.

Project Trip Generation

To evaluate potential impacts of the proposed project on the regional and local roadway system, project trip generation was estimated based on the number of construction related vehicle trips needed in each phase of the project. Construction related vehicle trips include trips made by construction workers traveling to and from the project area, material and equipment deliveries, and hauling truck trips associated with excavation and transfer of spoils. The number of project trips would vary on a daily basis, depending on the construction phase, planned activity, and material delivery needs. This section first presents the assumptions used to determine project trips and then the estimated number of vehicle trips used for traffic analyses.

Vehicle trips for construction workers, material and equipment delivery, and hauling truck trips were estimated separately for each construction phase using the following assumptions:

Construction Worker Trips – The number of daily worker vehicle trips were calculated for each construction phase (detailed calculation sheets are provided in **Appendix F-1**). Approximately two workers presumably would be needed for each piece of equipment used on-site in addition to administrative staff. Construction shifts would generally occur between 7:00 a.m. and 7:00 p.m., for a 12-hour shift. As stated previously in Chapter 2, Project Description, CDSM installation activities would include one or two CDSM rigs working one or two 12-hour shifts per day, 5 to 6 days per week (Monday through Saturday). One shift would occur from 7:00 a.m. to 7:00 p.m. and would be termed the "day shift," one shift would occur from 7:00 p.m. to 7:00 a.m. and would be termed the "night shift." Other construction activities such as excavation fill placement, and the associated hauling to and from stockpiles, would occur between 7:00 a.m. and 7:00 p.m., 5 days per week. Some periods of construction activity could occur after normal daytime hours and on weekends to accommodate very large truck deliveries of construction equipment, equipment maintenance, or unexpected occurrences (such as repair of erosion control work that is damaged during a storm).

To provide a conservative assessment of potential traffic impacts, all construction workers were assumed to arrive and depart the project area during the weekday AM (7:00 a.m. to 9:00 a.m.) and PM (5:00 p.m. to 7:00 p.m.) peak periods, respectively. Therefore, half of the daily construction worker vehicle trips were assumed to be inbound trips during the AM peak hour, and the remaining half were assumed to be outbound trips during the PM peak hour. As a conservative assumption, all workers are assumed to drive alone to the project area and would use the park entrance on Estudillo Avenue to access the project area. As an analytical assumption, about half of the workers are assumed to originate from north of the project area (via I-580 southbound) and the remaining half of the workers are assumed to originate from south of the project area (via I-580 northbound).

Material Delivery Trips – Material delivery trips include the transport of materials to the project area including, but not limited to, fuel, stone, filler material, cement, etc. The number of estimated daily material delivery trips and schedule was calculated for each construction phase (see **Appendix F-1**). The peak hour material delivery trips were estimated by distributing the daily trips evenly throughout a 10-hour work day from 7:00 a.m. to 5:00 p.m. All material delivery trucks are expected to come from south of the project area (via I-580 northbound) due to truck restrictions on I-580 north of project area, and these trucks would use the Chabot Park entrance on Estudillo Avenue.

Equipment Delivery Trips – Equipment delivery and removal activities are expected to occur during the mobilization and demobilization periods, respectively. A detailed list of construction equipment and their delivery schedule are presented in **Appendix F-1**. The peak-hour equipment delivery trips were estimated by distributing the daily trips evenly throughout a 10-hour work day from 7:00 a.m. to 5:00 p.m.[3] All equipment delivery trucks are expected to come from south of the project area (via I-580 northbound) due to truck restrictions on I-580 north of project area, and these vehicles would use the park entrance on Estudillo Avenue.

[3] The proposed work hours are typically from 7:00 a.m. to 7:00 p.m.; however, the contractors may elect to work a 10-hour shift from 7:00 a.m. to 5:00 p.m. Daily trips were distributed over a 10-hour work day to obtain the conservative estimate of peak-hour trips.

Hauling Truck Trips – Hauling trucks would come to the project area from an off-site location at the beginning of the excavation and the placement and compaction phases, transfer spoils between the dam and stockpile locations within the project area, and then leave the project area at the end of the excavation and the placement and compaction phases. Therefore, the total number of hauling trucks required for each phase would make inbound and outbound trip at the beginning and the end of the excavation and the placement and replacement phases, respectively.[4] As such, the number of hauling trucks was estimated by distributing the total amount of transported soils and spoils to the size of a truck (i.e., 10- or 20-cubic-yard trucks depending on the haul route used) and then over the duration of hauling activities. A detailed calculation of hauling truck trips and its assumptions are presented in **Appendix F-1**. The number of peak hour hauling truck trips was estimated by distributing the daily trips evenly throughout a 10-hour work day from 7:00 a.m. to 5:00 p.m. All hauling trucks are expected to come from south of the project area (via I-580 northbound) due to truck restriction on I-580 north of project area, and these trucks would use the park entrance on Estudillo Avenue.

As described in Chapter 2, Project Description, each construction component (i.e., outlet works, dewatering, CDSM construction, or Conventional Earthwork) would be staggered or would partially overlap with one another depending on the type of construction method chosen and the sequence of each construction component. For example, the outlet work may be carried out concurrently with CDSM construction over a 26-week period, or the outlet works and Conventional Earthwork may be sequenced one after another and last over a 60-week period. **Table 3.6-4** presents the comparison of peak daily project trip[5] generated by each scenario. A detailed calculation of daily vehicle trip generation for each scenario is presented in **Appendix F-1**. The number of peak daily vehicle trips – which assume that equipment and material deliveries, hauling truck trips as well as worker vehicle trips would all occur on the same day – would range between 174 and 283 vehicle trips depending on the scenario.

However, in reality, equipment delivery and hauling truck trips would mostly occur over one or two days when they are mobilized and demobilized at the beginning and the end of each construction phases, respectively. Therefore, for the purpose of traffic analysis, the number of daily equipment delivery trips and hauling truck trips are discounted from the total peak daily trip generation. The number of daily vehicle trips without equipment delivery and hauling truck trips would be approximately 140 to 258 vehicle trips depending on the scenario.

Project construction activities are expected to occur at varying levels of intensity over the duration of the construction period. **Figure 3.6-4** presents the magnitude of project trips and their respective durations for the scenario with the most intense traffic impacts resulting from material delivery and worker vehicle trips (i.e., outlet work is done concurrently with CDSM construction over day and night shifts). It shows that the highest volume period would last for up to 6 weeks with approximately 258 trips per day. To provide a conservative assessment of potential traffic impacts, the vehicle trips generated during this period were used for the analysis.

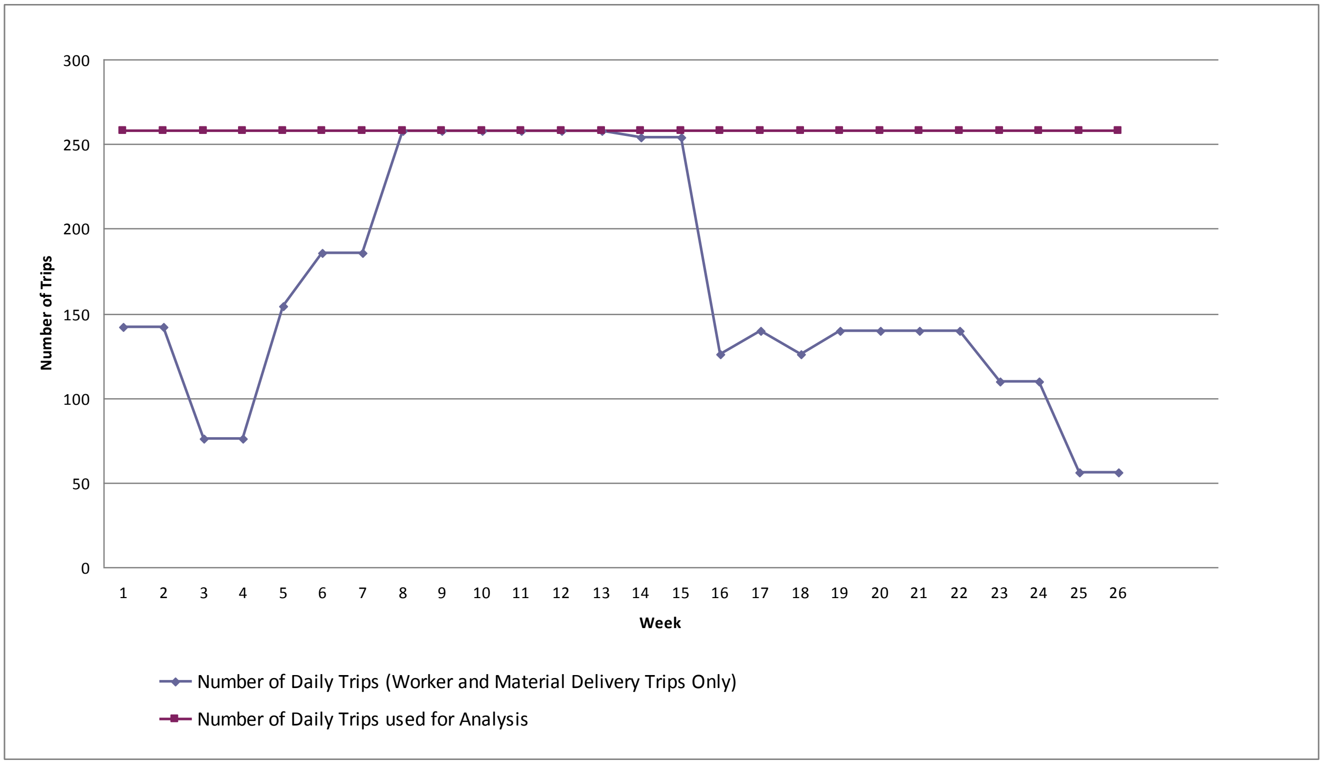
4 Hauling truck trips associated with transfer of soil and spoils between the dam and stockpiles are not accounted for in the traffic analysis because these trips would occur within the project area and not affect the traffic circulation on public roadways.

5 Peak daily project trips are one-way trips.

Table 3.6-4
Peak Daily Trip Generation by Scenario

Scenario	Total Duration (weeks)	Peak Daily Vehicle Trips[1]					
		Workers	Material	Equipment	Hauling Truck Trips	Total Peak Daily Vehicle Trips	Total for Worker and Material Delivery Trips Only
Outlet Work done concurrently with CDSM Construction over Day and Night Shifts[2]	26	198	60	25	0	283	258
Outlet Work done concurrently with CDSM Construction over Day Shift Only[2]	31	126	60	30	0	216	186
Outlet Work done before CDSM Construction over Day and Night Shifts[2]	46	144	40	5	0	189	184
Outlet Work done before CDSM Construction over Day Shift Only[2]	51	70	70	10	24	174	140
Outlet Work done before Conventional Earthwork Option	60	100	76	8	36	220	176

Source: Data compiled by CHS Consulting Group and AECOM in 2013
Notes:
1 Peak daily project trips are one-way trips.
2 This assumes the operation of two CDSM rigs and presents the most conservative scenario for peak daily vehicle trips.



Source: CHS Consulting 2013

Figure 3.6-4: Daily Project Trips for CDSM Construction Concurrent with Outlet Works

Table 3.6-5 presents the daily and the peak hour vehicle trips by direction. All day shift workers are assumed to arrive during the AM peak hour and depart during the PM peak hour and all night shift workers are assumed to depart during the AM peak hour and arrive during the PM peak hour. For material delivery, half of the peak-hour trips are accounted for as inbound trips and the other half as outbound trips. The project would generate a total of 105 vehicle trips during the peak hour, of which 66 trips would occur in the peak direction. All vehicles would access the project area using Estudillo Avenue. For regional access, workers would use both I-580 North and South, whereas the material delivery trucks would use I-580 North only due to truck restrictions on I-580 north of the project area.

Table 3.6-5
Peak-Hour Trips by Direction (Highest Volume Period)[1]

	Daily Vehicle Trips	Peak-Hour Trips	AM Peak-Hour		PM Peak-Hour	
			Inbound	Outbound	Inbound	Outbound
Material Delivery	60	6	3	3	3	3
Workers	198	99	63	36	36	63
Total	**258**	**105**	**66**	**39**	**39**	**66**

Note:
[1] Assumes CDSM construction with outlet tower concurrent working only one 12 hour shift. The most intense scenario would include the night shift workers.
Source: CHS Consulting Group 2013

3.6.3 Regulatory Background

Federal

No federal regulations related to transportation resources are applicable to the proposed project.

State

The California Department of Transportation (Caltrans) is responsible for the planning, design, construction, and management of interstate and state highways. A truck restriction exists along an approximately 10-mile segment of I-580 north of the project area, between Grand Avenue and the San Leandro border (Caltrans 2000). Trucks weighing over 4.5 tons are prohibited from traveling on this section of I-580.

Regional

The Metropolitan Transportation Commission (MTC) is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area. MTC's role also includes the Bay Area Toll Authority (BATA) and the Service Authority for Freeways and Expressways (SAFE). MTC functions as both the regional transportation planning agency—a state designation—and, for federal purposes, as the region's metropolitan planning organization (MPO). As such, it is responsible for regularly updating the Regional Transportation Plan, a comprehensive blueprint for the development of mass transit and highway, airport, seaport, railroad, bicycle, and pedestrian facilities. MTC also screens requests from local agencies for state and federal grants for transportation projects, to determine their compatibility with the plan.

The Alameda County Transportation Commission (Alameda CTC) plans, funds, and delivers transportation programs and projects that expand access and improve mobility for Alameda County. Alameda CTC combines the functions of two formerly separate agencies: the Alameda County Congestion Management Agency (ACCMA), and the Alameda County Transportation Improvement Authority (ACTIA). Alameda CTC delivers the Expenditure Plan for Measure B, the half-cent Alameda County sales tax dedicated to funding transportation projects. The Expenditure Plan contains a number of capital projects (e.g., freeway widening, interchange improvements, high-occupancy vehicle [HOV] lanes, BART extensions, and transit station development) as well as programs for local street and road improvements (e.g., fixing potholes), special transportation services for seniors and disabled individuals, bicycle and pedestrian safety, and transit operations. As the congestion management agency, the Alameda CTC is also responsible for managing the Congestion Management Plan.

For the freeways and congestion management program roadways (i.e., I-580, I-238, and I-880 in the vicinity of project area), the threshold is determined by the Alameda CTC. The LOS standards for the freeway segments are presented in **Table 3.6-6**.

Table 3.6-6 Level of Service Standards for Roadway Segments		
Route	**Roadway Segment**	**LOS Standard[1]**
I-580 NB/SB	I-80 to I-238	E
I-238 EB	I-880 to I-580	F
I-238 WB	I-580 to I-880	E
I-880 NB/SB	I-980 to Dixon Landing Road	E

Note:
[1] LOS calculations are based on volume-to-capacity ratios.
Source: ACCMA 2009

Local

Although the California Vehicle Code allows trucks to use any street in the local system, the City of San Leandro designates certain thoroughfares to minimize neighborhood impacts in the city limits (City of San Leandro 2012).

Policies regarding traffic service levels in the City of San Leandro specify that roadways must maintain LOS D as the minimum acceptable service level at its intersections. LOS lower than D is only acceptable where the following circumstances exist (City of San Leandro 2012):

- Roadway improvements are not possible because the necessary right-of-way does not exist and cannot be acquired without significant impacts on adjacent buildings and properties.
- The intersection or road segment is in a pedestrian district, such as Downtown, where the priority is on pedestrian, bicycle, and public transit access rather than vehicle traffic.

3.6.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on transportation and circulation if it would:

1. conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

2. conflict with an applicable congestion management program, including but not limited to LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

3. substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

4. result in inadequate emergency access; or
5. conflict with adopted policies, plans, programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Project Impacts and Mitigation Measures

The impact analysis addresses short-term transportation impacts related to project construction and long-term impacts associated with operation of the facility after construction. Transportation impacts related to project construction were assessed in terms of increased traffic volumes on area roadways and the resulting effect on roadway congestion and safety during the construction period.

As described in Chapter 2, Project Description, EBMUD estimates that project construction would last for at least 1 year, from fall 2015 to the end of 2016 Traffic impacts were analyzed for 2015 conditions. Year 2015 background traffic volumes were estimated based on projected growth rates, derived from the Alameda Countywide Travel Demand Model for 2005 and 2020 (ACCMA 2009). Potential project impacts were assessed in part by determining how the baseline level of service would change because of project construction activities, and by a qualitative analysis of the roadway conditions (e.g., safety hazards and parking availability).

Impact TR-1: The proposed project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit (Criterion 1). (Less than Significant with Mitigation Incorporated)

Adding construction vehicle traffic to the existing roadways could result in short-term increases in traffic congestion and vehicle delays, including public transit, and bicycle flows. These impacts are discussed under Traffic Impacts below.

The use of big trucks to transport equipment and material to and from the project worksite could affect pavement conditions on the designated haul routes by increasing the rate of road wear. The degree to which this impact would occur depends on the design (pavement type and thickness) and the existing condition of the road. Major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. The project's impacts are expected to be negligible on those roads. Residential streets are generally not built with a pavement thickness that would withstand substantial truck traffic volumes. However, because the project would generate truck trips on arterials and collectors, the project is unlikely to degrade pavement conditions.

Traffic Impacts—Freeway Segments and Ramps

Traffic impacts were analyzed for the construction option that would generate the most truck trips (CDSM with the outlet works done currently) and for the peak construction period, which would generate the greatest amount of additional peak hour vehicles to area roads. **Table 3.6-7** presents the projected LOS in freeway mainline segments and on-and off-ramps in the project vicinity, by the existing and existing plus project-generated vehicle trips. The table shows that, with project-generated vehicle trips, all of the freeway segments and ramps in the project vicinity would continue to operate satisfactorily at LOS D or better during the AM and PM peak hours. No change would occur in the LOS from the existing conditions because of the project. Therefore, the impact would be *less than significant*.

Table 3.6-7
Freeway Mainline/Ramp Levels of Service—Existing Plus Project

		Existing				Existing Plus Project			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		LOS	Density[1]	LOS	Density[1]	LOS	Density[1]	LOS	Density[1]
Roadways									
From	**To**								
I-580 Northbound									
Grand Avenue On-Ramp	Joaquin Avenue Off-Ramp	D	29.5	D	26.9	D	29.7	D	27.0
Joaquin Avenue Off-Ramp	Benedict Drive On-Ramp	D	26.8	C	24.1	D	26.8	C	24.1
Benedict Drive On-Ramp	Foothill Boulevard Off-Ramp	D	29.9	D	27.0	D	30.0	D	27.0
I-580 Southbound									
Foothill Blvd. On-Ramp	Grand Avenue Off-Ramp	D	26.9	D	30.0	D	26.9	D	30.1
Grand Avenue Off-Ramp	Grand Avenue On-Ramp	C	24.5	D	27.0	C	24.5	D	27.0
Grand Avenue On-Ramp	150th Avenue Off-Ramp	C	25.1	D	28.9	C	25.2	D	29.1
Ramps									
I-580 Northbound									
Off-Ramp to Grand Avenue		D	29.9	D	28.3	D	30.2	D	28.4
On-Ramp from Benedict Avenue		C	25.4	C	23.7	C	25.5	C	23.7
I-580 Southbound									
Off-Ramp to Grand Avenue		D	30.9	D	33.6	D	31.1	D	33.7
On-Ramp from Grand Avenue		C	20.2	C	21.8	C	20.2	C	21.8

Note:
[1] Density for freeway segments represents the average passenger car per mile per lane.
Sources: Caltrans 2007, 2008, 2012; CHS Consulting Group 2013

Traffic Impacts—Study Intersections

Traffic conditions also were evaluated at study intersections that would be directly affected by the construction traffic generated by the proposed project. **Table 3.6-8** presents the projected LOS and delay data for the study intersections. With the increase in traffic ("with project"), all study intersections would continue to operate satisfactorily at LOS C or better, except for the intersection of Benedict Drive and Estudillo Avenue. The intersection of Benedict Drive and Estudillo Avenue currently operates at LOS F during the AM peak-hour because of extended delays on the northbound approach (stop-controlled) when heavy east-west traffic exists on Estudillo Avenue (uncontrolled). With the addition of project trips (105 vehicles), the intersection would continue to operate at LOS F and would worsen the delays in the northbound approach during the AM peak hour. Therefore, the impact would be *potentially significant*. However, implementation of **Mitigation Measure TR-1.1** would reduce the potentially significant impact at the Benedict Drive and Estudillo Avenue intersection by working with the City of San Leandro, posting signs to provide detour routes, and deploying flaggers to facilitate the intersection turning movements during the peak hours to a *less than significant* level.

Table 3.6-8
Intersection Level of Service—Existing Plus Project

	Existing				Existing Plus Project			
Study Intersections	**AM Peak**		**PM Peak**		**AM Peak**		**PM Peak**	
	LOS	**Delay[1]**	**LOS**	**Delay[1]**	**LOS[2]**	**Delay[1]**	**LOS[2]**	**Delay[1]**
Signalized								
MacArthur Boulevard/Estudillo Avenue (Study Intersection 2)	B	18.9	B	16.6	B	19.2	B	16.7
Unsignalized								
Foothill Boulevard/Dutton Avenue/Marlow Drive[2] (Study Intersection 1)	A/A	6.2/8.6 (SB)	A/A	5.8/ 8.5 (SB)	A/A	6.2/8.6 (SB)	A/A	5.8/ 8.5 (SB)
Benedict Drive/Estudillo Avenue[3] (Study Intersection 3)	F/F	<80.0/ <80.0 (NB)	C/F	18.5/ <80.0 (NB)	F/F	<80.0/ <80.0 (NB)	C/F	21.7/ <80.0 (NB)
Lake Chabot Road/Estudillo Avenue[2] (Study Intersection 4)	A/A	1.2/ 10.0 (SB)	A/A	1.8/ 9.4 (SB)	A/B	2.7/ 10.2 (SB)	A/A	3.4/ 9.7 (SB)
I-580 Off-Ramp/Grand Avenue/Dolores Avenue[4] (Study Intersection 5)	C	17.8	C	17.9	C	18.7	C	19.2

Notes:
1 Delay values are not actually measured in the field, but are estimated based on the calculations of existing traffic volumes.
2 LOS calculations are provided in Appendix F-2.
3 Two-way stop-controlled intersection; delay is presented as the average delay/worst approach delay.
4 Four-way stop-controlled intersection; delay is presented as the average delay/worst approach delay.
NB = Northbound; SB = Southbound
Source: CHS Consulting Group 2013

With the addition of construction-related vehicle trips (105 vehicle trips), traffic volume on Estudillo Avenue (east of Benedict Drive) would increase by approximately 28 percent, and the traffic volume on MacArthur Boulevard (north of Estudillo Avenue) would increase by four percent.[6] Although the increases in volumes may be noticeable to local residents, the additional construction-related vehicles would not cause traffic volumes along these streets to exceed or approach the carrying capacity of the roadways (i.e., 800 vehicles per hour along Estudillo Avenue or 1,600 vehicles per hour along MacArthur Boulevard), or cause queuing issues along Estudillo Avenue. As described in Section 2.11.4, Access Modifications, the park gate would be open 30 minutes before the start of construction to further eliminate any worker vehicle backup on the neighborhood street. Thus, the proposed project would not substantially affect traffic operations along either Estudillo Avenue or MacArthur Boulevard. Therefore, the impact would be *less than significant*.

Mitigation Measure TR-1.1: Prepare and implement a traffic control plan before and during project construction.

EBMUD and the construction contractor(s) will prepare and implement a traffic control plan and will coordinate with Caltrans and local jurisdictions, as appropriate, for affected roadways and intersections. The traffic control plan will include, but will not be limited to, the following elements:

- Flaggers will be deployed to the intersection of Benedict Drive and Estudillo Avenue during the AM peak hour to facilitate traffic movements at the intersection. When an extended queue is formed on the northbound approach (Benedict Drive), the flaggers will stop traffic intermittently in the east-west direction (on Estudillo Avenue) to allow the northbound traffic to make turns.
- EBMUD and the construction contractor(s) will consult with the City of San Leandro to finalize designated truck routes.
- EBMUD will notify the City of San Leandro Police Department of the dates when heavy equipment will be moved into or out of Chabot Park.
- Warning signs will be posted along Estudillo Avenue to inform bicyclists and motorists about the closure of Chabot Park entrance at the end of Estudillo Avenue and to provide detour routes to access the park (e.g., Lake Chabot Road and Fairmont Drive).
- Advance warning signs (e.g., “Truck Crossing") will be installed along Estudillo Avenue, advising motorists of the construction traffic to minimize hazards associated with the truck traffic on narrow roadways. Flaggers, illuminated signs, a temporary stop sign, or a combination of these methods will be used to slow approaching traffic throughout the construction period.
- All equipment and materials will be stored in designated contractor staging areas on-site, in a manner intended to minimize any safety hazards.

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6 Estudillo Avenue currently carries approximately 375 vehicles between Benedict Drive and Parker Street during the AM and PM peak hours, and the project would add 105 vehicles during the AM and PM peak hours. MacArthur Boulevard currently carries approximately 830 vehicles between Estudillo Avenue and Bridge Road during the AM and PM peak hours, and the project would add 37 vehicles during the AM and PM peak hours

- Roadway pavement conditions will be documented for all affected roadways (e.g., Estudillo Avenue, MacArthur Boulevard, and Grand Avenue) before and after project construction. Roads found to have been damaged by construction vehicles will be repaired to the level at which they existed before project construction.

- To the extent applicable, the traffic control plan will conform to the latest edition of California Manual on Uniform Traffic Control Devices for Temporary Traffic Control (Caltrans 2013).

Implementation: EBMUD or construction contractor(s)

Timing: Before and during construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure TR-1.1** would reduce the potentially significant construction traffic related impact to the Benedict Drive and Estudillo Avenue intersection by preparing and implementing a traffic control plan to facilitate intersection turning movements during the peak hours and requiring flaggers to facilitate the intersection turning movements during the peak hours. The impact would be *less than significant with mitigation incorporated*.

Public Transit Operation

As described in Section 3.6.2, Environmental Setting, one local and two Transbay buses operate along MacArthur Boulevard, and the nearest transit stop to the project area is at the intersection of MacArthur Boulevard and Estudillo Avenue. The proposed project would generate a maximum of 66 vehicle trips during the peak construction month, in the peak hour and in the peak direction. Approximately 34 of these 66 vehicles would use Grand Avenue south of Estudillo Avenue, which may potentially interfere with transit operation along Grand Avenue. This conflict is likely to be minor because the additional traffic volume generated by the project would not change the levels of services at the intersection of Macarthur Boulevard and Estudillo and along Grand Avenue. Because of a lack of direct transit connection to the project area, no additional demand for transit service would be expected by construction workers. Therefore, the impact would be *less than significant*.

Bicycle Traffic Flow

As described in Section 3.6.2, Environmental Setting, Estudillo Avenue is designated as a Class III bike path between Lake Chabot Road and the entrance to Chabot Park. Because the park entrance at the end of Estudillo Avenue would be closed to the public during project construction, most bicyclists would be likely to use the existing bike lanes along Fairmont Drive to access the southern portion of Lake Chabot Regional Park, and little bicycle traffic would occur on Estudillo Avenue. Implementation of **Mitigation Measure TR-1.1**, requiring that warning signs be posted along Estudillo Avenue to inform bicyclists about the closure of park entrance on Estudillo Avenue and to provide detour routes to access the park, would further reduce any potential impact. Therefore, the impact would be *less than significant*.

Pavement Use

Large trucks would be used to bring in equipment and materials as well as to haul excavated spoils from the project area. Although MacArthur Boulevard is designated as a truck route in the City of San Leandro and is designed to withstand substantial truck volumes, residential roads such as Estudillo Avenue are not. Estudillo Avenue is paved with asphalt; the street has a few potholes between Parker Street and Graff Avenue, and mild cracks between Lake Chabot Road and Brookvale Drive. Estudillo Avenue would be likely to experience increased wear and tear as a result of the project construction traffic. Therefore, the impact would be *potentially significant*.

Implementation of **Mitigation Measure TR-1.1** would require documentation of road pavement conditions for all routes that would be used by construction vehicles, both before and after project construction. Roads found to have been damaged by construction vehicles would be repaired to the level at which they existed before project construction. Therefore, the impact would *be less than significant with mitigation incorporated*.

Parking Use

All construction equipment, trailers, and worker parking would be contained within the project area. Construction worker parking would be located in the three laydown areas by the Park Stockpile and Filter Ponds Stockpiles, as shown in **Figure 2-14.** These laydown areas would total approximately 48,350 square feet and would accommodate up to 160 vehicle parking spaces.[7] During the peak construction period, up to 63 workers would be on-site; therefore, a sufficient number of parking spaces would be available within the project area and offsite parking is not necessary. All parking and staging would be contained within the project area and no spillover would occur onto public roadways. To allow workers to park on site, the main gate will be opened 30 minutes before the start of construction to avoid potential worker vehicle queues on neighborhood streets. Therefore, the impact would be *less than significant*.

Impact TR-2: The proposed project would conflict with an applicable congestion management program, including but not limited to LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways (Criterion 2). (Less than Significant with Mitigation Incorporated)

As described under Impact TR-1, with the addition of project traffic, the I-580 freeway mainline segments and on- and off-ramps in the project vicinity would operate at LOS D or better. This would be above the threshold determined by the Alameda County Transportation Commission, which is LOS E. Therefore, the project would not conflict with the standards set by the congestion management agency.

The addition of project traffic would, however, cause the intersection of Benedict Drive and Estudillo Avenue to operate at LOS F in the AM peak hour. According to the City of San Leandro LOS standards, the impact would be *potentially significant*. Implementation of **Mitigation Measure TR-1.1** would reduce the impact by working with the City of San Leandro, posting signs to provide detour routes, and deploying flaggers to facilitate the intersection turning movements during the peak hours. Therefore, the impact would be *less than significant with mitigation incorporated*.

7 Approximately 300 square feet is assumed for each vehicle parking space.

Impact TR-3: The proposed project would substantially increase hazards resulting from a design feature or incompatible uses (Criterion 3). (Less than Significant with Mitigation Incorporated)

Construction vehicles could be considered a safety hazard for local vehicles, bicyclists, and pedestrians on adjacent public roadways because local users may not be accustomed to the presence of large construction vehicles and an increase in conflicts could occur (i.e., traffic accidents). Moreover, larger construction vehicles also would temporarily and intermittently reduce the capacity of local roadway because of their slower movements and larger turning radii. The construction trucks would need to make wide turns at the Estudillo Avenue park entrance, which could conflict with traffic during peak traffic periods.

During the busiest construction phase, approximately 63 worker vehicle trips and six truck trips are expected to use Estudillo Avenue during the AM and PM peak hours. During the midday period, about six trucks trips would occur per hour. Truck trips on Estudillo Avenue could increase pedestrian and bicyclists safety concerns because of narrow the roadway width and lack of sidewalks north of Parker Street. Furthermore, larger vehicles may not easily see smaller vehicles, bicyclists, and pedestrian, which could increase the potential for accidents.

Construction-related traffic would increase the risk of accidents with vehicular, pedestrian, and/or bicycle traffic on Estudillo Avenue. Thus, the impact would be *potentially significant*. Implementing **Mitigation Measure TR-1.1** would prepare and implement a traffic control plan, and it would require installing signage or deploying flaggers to guide vehicles on truck routes so that appropriate access and detours would be maintained for vehicles, bicycles, and pedestrians. Therefore, the impact would be *less than significant with mitigation incorporated*.

Impact TR-4: The proposed project would result in inadequate emergency access (Criterion 4). (Less than Significant with Mitigation Incorporated)

Construction and worker vehicles queuing at the project entrance could block emergency vehicle access to the project area. Thus, the impact would be *potentially significant*. Implementation of **Mitigation Measure TR-1.1** would require flaggers to reduce queuing of construction trucks. The proposed project would not result in inadequate emergency access because no complete roadway closures would occur, and thus no disruptions to emergency vehicle access would be generated. Emergency vehicle access to and from the project area also would be maintained and coordinated between EBMUD and other local agencies before and during construction. After construction, emergency access to the project area and vicinity would be unchanged from existing conditions. Therefore, the impact would be *less than significant with mitigation incorporated*.

Impact TR-5: The proposed project would not conflict with adopted policies, plans, programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities (Criterion 5). (Less than Significant)

Project construction would cause a temporary closure of the West Shore Trail in Chabot Park, which runs along the Upper Haul Route, and this closure would potentially displace bicycle and pedestrian paths. (Section 3.10, Recreation provides a detailed discussion of potential impacts to recreational facilities and user groups.) However, any impact would be temporary and short-term, and would not conflict with any long-term policies or plans regarding public transit, bicycle or pedestrian facilities. After completion of construction, the trails would be restored to their pre-construction conditions. Therefore, the impact would be *less than significant*.

3.6.5 Impact and Mitigation Summary

Table 3.6-9 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

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Table 3.6-9
Transportation and Circulation Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact TR-1: The proposed project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit (Criterion 1).	LTSM Mitigation Measure TR-1.1 Greater peak daily vehicle trips than Conventional Earthwork option because of day and night shifts. However, the greatest peak daily vehicle trips would be for a shorter duration and the overall timeframe is substantially shorter than the Conventional Earthwork option.	LTSM Mitigation Measure TR-1.1 Greater peak daily vehicle trips than Conventional Earthwork option because of day and night shifts. However, the greatest peak daily vehicle trips would be for a shorter duration and the overall timeframe is substantially shorter than the Conventional Earthwork option.	LTSM Mitigation Measure TR-1.1 Greater peak daily vehicle trips than Conventional Earthwork option because of day and night shifts. However, the greatest peak daily vehicle trips would be for a shorter duration and the overall timeframe is substantially shorter than the Conventional Earthwork option.	LTSM Mitigation Measure TR-1.1 Greater peak daily vehicle trips than Conventional Earthwork option because of day and night shifts. However, the greatest peak daily vehicle trips would be for a shorter duration and the overall timeframe is substantially shorter than the Conventional Earthwork option.	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1
Impact TR-2: The proposed project would conflict with an applicable congestion management program, including but not limited to LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways (Criterion 2).	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1
Impact TR-3: The proposed project would substantially increase hazards resulting from a design feature or incompatible uses (Criterion 3).	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1
Impact TR-4: The proposed project would result in inadequate emergency access (Criterion 4).	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1	LTSM Mitigation Measure TR-1.1
Impact TR-5: The proposed project would not conflict with adopted policies, plans, programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities (Criterion 5).	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Table 3.6-9
Transportation and Circulation Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

3.7 Air Quality

3.7.1 Approach to Analysis

This section discusses the existing air quality conditions in the project area, describes the pertinent federal, state, regional, and local laws and guidelines, presents the potential construction impacts, and identifies potential air quality mitigation measures, if required.

3.7.2 Environmental Setting

Regional Setting

Meteorology and Climate of the East Bay Area

The East Bay Area stretches 20 miles from the Richmond area through Oakland to San Leandro. Its western boundary is defined by the San Francisco Bay and its eastern boundary by Oakland–Berkeley Hills. Oakland–Berkeley Hills are a significant barrier to air flow, having an approximate ridge line height of 1,500 feet. The most densely populated area in the region is the corridor between the Bay and the 500-foot elevation, where most residents live, drive, and work. It is a narrow strip of land, averaging about 4 miles in width, with a 2-mile minimum in the Berkeley and southern Richmond areas and an 8-mile maximum at points in the San Leandro and Oakland areas. This area is home to an international airport, major chemical, petroleum, shipping and other industrial operations, a large university, a major military facility (in the process of being decommissioned), and a population of over 750,000.

In this area, marine air intrusion through the Golden Gate, across San Francisco, and through the San Bruno Gap is a dominant weather factor throughout the year. Oakland–Berkeley Hills causes a bifurcation of westerly flow in the vicinity of Oakland, with southerly winds observed over the San Francisco Bay north of the Golden Gate and northwest winds south of the Golden Gate. The divergent wind field results in diminished speed on the east side of the Bay, with a higher frequency of nearly calm conditions than areas west of this split-flow zone.

Temperatures have a narrow range because of the proximity of the moist marine air. Maximum temperatures in summer average in the upper 60s to low 70s (degrees Fahrenheit), with minimums in the mid-50s. Winter highs are in the mid to high 50s, and winter lows are in the low to mid-40s. Precipitation totals generally increase from south to north and from the lowlands to the Oakland–Berkeley Hills ridge line.

The prevailing wind direction is westerly, with a 57 percent frequency for wind within the northwest-southwest sector. The average speed for this sector is 9 miles per hour (mph) and ranges from 7 to 10 mph. Winds less than 5 mph occur 30 percent of the time.

Precipitation totals near 18 inches annually, on average. Sunshine is slightly more plentiful than at the more coastward locations, but invasions of stratus in summer keep the amount somewhat lower than at the more inland locations.

The air pollution potential in the areas closest to the marine air is low, because of frequent good ventilation and less influx of high pollutant concentrations from upwind sources. Light wind occurrence, however, mainly during the night and early morning, can cause occasional elevations in pollutant levels. The air pollution potential south and north of this region is higher and may be termed marginal. Its location, downwind and surrounded by air pollution sources, coupled with a relatively high frequency of light winds, mainly in the nighttime and early morning hours, can augment higher pollutant levels (BAAQMD 2011).

Criteria Air Pollutants and Ambient Air Quality

Nitrogen Oxides: The major human-made sources of nitrogen dioxide (NO_2) are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (EPA 2012a).The resulting compounds containing nitrogen are primarily NO and NO_2. Mixtures of these two compounds are known as oxides of nitrogen (NO_x), and they are part of photochemical reactions that produce ozone.

At concentrations experienced in the Bay Area, NO_2 typically can be seen as a brown haze. The severity of the adverse health effects (described in further detail below) depends primarily on the concentration inhaled rather than on the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After approximately 4-12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions (EPA 2012a).

Organic Compounds: Organic gases, or hydrocarbons, are released when fuels or organic waste materials are burned. These materials are the result of incomplete combustion and range in complexity from methane, a simple organic gas, to much more complex molecules containing carbon, hydrogen, and oxygen in varying proportions. Organic compounds also emitted by consumer products, such as aerosol sprays, and by paints, inks, solvents, and gasoline when they evaporate. Some organic compounds are not emitted directly but are products of other compounds that react in and are oxidized by the atmosphere.

Most organic compounds (excluding methane and ethane) are significant air pollutants because they react with NO_x in the presence of sunlight to produce photochemical smog, or ozone. The Bay Area Air Quality Management District (BAAQMD) has adopted more than 50 rules to directly control organic compounds from numerous operations, such as petroleum production, refining and marketing; various coating operations; and semiconductor manufacturing. In addition, some organic compounds, such as benzene 1,3-butadiene, formaldehyde, and acrolein are toxic. Health risks posed by these compounds include cancer risks; chronic, non-cancer risks, such as diseases of the lungs, liver, and kidneys; and acute risks, such as eye and respiratory irritations.

BAAQMD has initiated the Community Air Risk Evaluation program (BAAQMD 2006), to identify locations with high levels of toxic emissions and sensitive populations, and is using this information to reduce toxic emissions in areas with high exposures to toxic air contaminants (TAC) and sensitive populations.

Photochemical (Ground Level) Ozone: Commonly referred to as "smog," this condition results from a chemical reaction that takes place in the atmosphere among ozone precursors (reactive organic gases [ROG] and NO_x) under the photochemical influence of sunlight. Various factors affect this process, including the quantity of gases present, the volume of air available for dilution, the temperature, and the intensity of the ultraviolet light. Conditions for ozone formation occur in the summer and early fall on warm, windless, sunny days. The major effects of photochemical smog are aggravation of respiratory diseases, eye irritation, visibility reduction, and vegetation damage.

Motor vehicles are the greatest source of ozone precursors in the Bay Area, accounting for more than 50 percent of ROG and NO_x in the region. California's motor vehicle control program and BAAQMD's regulatory controls have greatly reduced exceedances of the national ozone standard.

Particulate Matter (PM): Dust, mist, ash, smoke, vehicle exhaust, and fumes are some of the liquid or solid particles found in the atmosphere. In many parts of the world, natural particles like dust and pollens are the principal source of air pollution; in industrialized regions, particulate emissions caused by human activities predominate. Some types of particulate matter (PM) are more toxic than others.

Respirable PM with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of PM emitted directly into the air, such as fugitive dust, soot, and mobile and stationary source exhaust, construction operations, fires and natural windblown dust, and PM formed in the atmosphere by condensation and/or transformation of sulfur dioxide (SO_2) and ROG (EPA 2012a). $PM_{2.5}$ is a subgroup of PM_{10}, consisting of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (EPA 2012a).

Industrial processes, such as those used in refining crude oil and in manufacturing chemicals, also contribute to particulate formation. Liquid aerosols and solid particles form photochemically in the atmosphere when sunlight reacts with waste gases. When metals are melted, the heated material emits fumes that may condense to form metallic oxides in the atmosphere. Industrial dust is formed by grinding or pulverizing materials, as in cement production. Earth-moving operations, especially farming and construction, also cause large amounts of dust to enter into the air.

Studies of exposed workers have shown that particles from diesel combustion engines are highly carcinogenic, prompting regulators to focus on implementing tighter controls for diesel-powered trucks, ships, trains, and construction equipment. Communities near freeways and ports have been identified as having high concentrations of diesel PM, and the emitters are the focus of regulatory efforts and grant programs to reduce diesel PM.

Carbon Monoxide (CO): This is an odorless, invisible gas which affects the health of people exposed to high concentrations. CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include symptoms such as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2012a). Almost 70 percent of the Bay Area's CO is generated by motor vehicles. A substantial amount also comes from burning wood in fireplaces and woodstoves. State and federal controls on new cars and voluntary efforts to reduce wood burning have been implemented to prevent CO from reaching adverse levels. The Bay Area has not exceeded the national or state standard for carbon monoxide for several years and has been formally recognized as a CO attainment area (BAAQMD 1994).

Sulfur Dioxide/Oxides: Heating and burning "fossil fuels," such as coal and oil, release the sulfur present in these materials. In areas where large quantities of fossil fuels are used, sulfur oxides can be a major air pollution problem. The largest fraction of sulfur oxides is SO_2. This substance often further oxidizes to form sulfur trioxide (SO_3), which in the presence of moisture can form sulfuric acid mist (H_2SO_4). These contaminants can damage vegetation and affect the health of both humans and animals.

BAAQMD has been controlling emissions from these sources since 1961, however, and no state or federal excesses have been recorded at BAAQMD monitoring stations since 1976.

Lead: Lead is a metal found naturally in the environment as well as in manufactured products. Historically, the major sources of lead emissions have been mobile and industrial sources. As a result of the phase-out of leaded gasoline (discussed below), metal processing is the primary source of lead emissions. The highest levels of lead in air generally are found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Thirty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the U.S. Environmental Protection Agency (EPA) established national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2012a). As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, contribute 13 percent of lead emissions. The National Health and Nutrition Examination Survey reported a 78 percent decrease in the levels of lead in human blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (EPA 2012a).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is one of California's most dramatic success stories related to air quality management. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent California Air Resources Board (CARB) regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, CARB has identified lead as a TAC.

Project Area Setting

Current Ambient Air Quality

Each year, BAAQMD publishes a table summarizing the air pollution data collected from its air quality monitoring stations (BAAQMD 2013). These stations sample the ambient air at various locations in the Bay Area. At each station, readings are taken of the levels of air pollutants for which health-based exposure limits have been set by the EPA and the State of California; however, not all pollutant data are available at each station for all years.

Sampling results for three stations nearby the project site (Oakland, Oakland West and San Francisco) are presented in **Table 3.7-1** for 2009 through 2011, the most recent years available. During these years, one exceedance of the California 1-hour ozone standard occurred, at the Oakland station. Several exceedances of $PM_{2.5}$ standards were reported at all stations. No exceedances of state or federal ambient air quality standards for NO_2, SO_2, CO, or PM_{10} were recorded at any of the three stations.

Table 3.7-1
Ambient Air Quality Data Summary—Selected Bay Area Monitoring Stations

	Ozone						Carbon Monoxide			Nitrogen Dioxide			Sulfur Dioxide			PM_{10}				$PM_{2.5}$				
	Max 1-Hr	Cal 1-Hr	Max 8-Hr	Nat 8-Hr	Cal Days	3-Yr Avg	Max 1-Hr	Max 8-Hr	Nat/ Cal Days	Max 1-Hr	Ann Avg	Nat/ Cal Days	Max 1-Hr	Max 24-Hr	Nat/ Cal Days	Ann Avg	Max 24-Hr	Nat Days	Cal Days	Max 24-Hr	Nat Days	3-yr Avg	Ann Avg	3-yr Avg
Monitoring Stations	(ppb)	Days		(ppb)			(ppm)			(ppb)			(ppb)											
2009																								
Oakland	92	0	62	0	0	*	4.6	2.0	0	62	14.2	0	-	-	-	-	-	-	-	36.3	1	*	9.3	*
Oakland- West	-	-	-	-	-	-	2.8	2.0	0	57	15.7	0	5	1.6	0									
San Francisco	72	0	56	0	0	48	4.3	2.9	0	59	15.1	0	-	-	-	18.7	36	0	0	35.6	1	27	9.7	9.4
2010																								
Oakland	97	1	58	0	0	53	3.0	1.6	0	64.1	13	0	11.0	3.7	-	-	-	-	-	25.2	0	23	7.8	8.9
Oakland-West	-	-	-	-	-	-	2.7	1.7	0	68.6	16	0	-	-	-	-	-	-	-	-	-	-	-	-
San Francisco	79	0	51	0	0	47	1.8	1.4	0	92.9	13	0	-	-	-	19.9	40	0	0	45.3	3	26	10.5	10.0
2011																								
Oakland	91	0	51	0	0	49	4.1	1.5	0	56	13	0	-	-	-	-	-	-	-	49.3	3	25	10.1	9.0
Oakland-West	57	0	48	0	0	*	3.5	2.7	0	62	16	0	19.3	3.8	0	-	-	-	-	-	-	-	-	-
San Francisco	70	0	54	0	0	47	1.8	1.2	0	93	14	0				19.5	46	0	0	47.5	2	27	9.5	9.9

Notes:
Dash indicates pollutant was not monitored at the site during that year.
Station information:
2009: The Oakland site opened on November 1, 2007; therefore, 3-year average statistics for ozone and $PM_{2.5}$ are not available. The Oakland-West site opened on February 26, 2009.
2011: Ozone monitoring at Oakland-West began in December 2010; therefore, 3-year average ozone statistics are not available.
Source: EPA 2012b

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Sensitive Receptors

Locations where the very young, elderly, and those suffering from certain illnesses or disabilities reside are considered to be "sensitive receptors" to air quality impacts. Sensitive receptors include schools, daycare centers, parks, recreational areas, medical facilities, rest homes, convalescent care facilities, and residences. Land use conflicts can arise when sensitive receptors are located near major sources of air pollutant emissions. Residential areas are considered more sensitive to air quality conditions than commercial and industrial areas, because people generally spend longer periods of time at their residences, resulting in greater exposure to ambient air quality conditions. Recreational uses are also considered sensitive, due to the greater exposure to ambient air quality conditions and because the presence of pollution detracts from the recreational experience.

The project area is located within the boundaries of Lake Chabot Regional Park and Chabot Park. During construction of the proposed project, Chabot Park will be closed and therefore no sensitive receptors will be within the park area. The nearest sensitive receptors to the dam are residences to the west, on Astor Court in San Leandro, which parallels Lake Chabot Road, approximately 1,500 feet away from Chabot Dam, which would provide some buffer (i.e., potential for dilution and dispersion of emissions) from air quality impacts. Furthermore, the dam site and other areas where construction activities would occur (e.g., haul truck routes) are buffered from residents to the west by mature vegetation. The closest residences on Estudillo Avenue would be approximately 500 and 800 feet from the Park Stockpile and Filter Ponds Stockpile, respectively. **Table 3.7-2** presents the types of sensitive receptors along with the distance and direction they are located from the proposed construction site.

Table 3.7-2
Chabot Dam Sensitive Receptor Distances and Locations

Receptor Type	Distance and Direction from Project Site
Residential—Estudillo Avenue	500 feet northwest
Residential—Astor Court	1,500 feet southwest

Source: Compiled by AECOM in 2013

3.7.3 Regulatory Background

Federal

Federal Clean Air Act

The EPA is responsible at the federal level for implementing national air quality programs. The federal Clean Air Act (CAA) (CAA; 1970, as amended in 1977 and 1990) requires the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and welfare and has required development of air quality management planning programs. The EPA has identified six "criteria" air pollutants as being of concern nationwide: ozone, PM (further subdivided according to size; PM_{10} and PM 2.5), NO_x, CO, SO_2, and lead.

Standards for these pollutants represent the levels of air quality necessary, with an adequate margin of safety, to protect the public health and welfare. The EPA has approved changes to the ozone and PM_{10} federal standards in 2005. In place of the 1-hour ozone standard, the EPA has approved an 8-hour standard of 0.08 parts per million (ppm) and has revoked the 1-hour federal standard of 0.12 ppm. In addition to the existing PM_{10} standard, the EPA has approved a standard for $PM_{2.5}$. Implementation of new standards and monitoring of ambient conditions relative to these new standards is an ongoing process.

The CAA requires states to classify air basins (or portions thereof) as either "attainment" or "nonattainment" with respect to criteria air pollutants, based on whether the NAAQS have been achieved, and to prepare air quality plans containing emission reduction strategies for those areas designated as "nonattainment." The current federal attainment status and state attainment status are discussed in the following subsection.

State

California Clean Air Act

CARB is the state agency responsible for overseeing state and local air pollution control programs and implementing the California Clean Air Act of 1988 (CCAA). The enactment of the CCAA produced changes in the structure and administration of air quality management programs in California. The CCAA substantially added to the authority and responsibilities of the state's air pollution control districts. The CCAA establishes an air quality management process that generally parallels the federal process. The CCAA focuses on attainment of the state ambient air quality standards that, for certain pollutant/averaging periods are more stringent than the comparable federal standards.

CARB also gathers air quality data for California, ensures the quality of this data, and designs and implements air models. CARB and local air pollution control districts are developing plans for meeting new national air quality standards for ozone and $PM_{2.5}$. California's adopted 2007 State Strategy was submitted to EPA as a revision to the State Implementation Plan (SIP) in November 2007 (CARB 2012). In July 2011, CARB approved revisions to the SIP that updated CARB's rulemaking calendar, made adjustments to transportation conformity budgets, and revised reasonable-further-progress tables and associated reductions for contingency purposes (CARB 2012). These actions affect the state's actions and ability to attain the new 8-hour and $PM_{2.5}$ standards.

Air Quality Attainment Plans

The CCAA requires that air districts prepare an air quality attainment plan if the district violates state air quality standards for CO, SO_2, NO_x, or ozone. The San Francisco Bay Area Air Basin (SFBAAB) is classified as a nonattainment area for the state ozone, PM_{10}, and $PM_{2.5}$ standards (CARB 2013). No locally prepared attainment plans are required for areas that violate the state PM_{10} or $PM_{2.5}$ standards. The CCAA requires that the state air quality standards be met as expeditiously as practicable, but does not set precise attainment deadlines. Instead, the act establishes increasingly stringent requirements for areas that require more time to achieve the standards.

The air quality attainment plan requirements established by the CCAA are based on the severity of air pollution problems caused by locally generated emissions. Upwind air pollution control districts are required to establish and implement emission control programs, commensurate with the extent of pollutant transport to downwind districts.

Regulation to Reduce Emissions from In-Use Off-Road Diesel Vehicles

In 1998, CARB identified diesel engine PM as a TAC and human carcinogen. Before the listing of diesel exhaust as a TAC, California already adopted various regulations to reduce diesel emissions. These regulations included new standards for diesel fuel, emission standards for new diesel trucks, buses, autos, and utility equipment, and inspection and maintenance requirements for heavy duty vehicles.

CARB approved a regulation on July 26, 2007 (amended 2011), to reduce emissions from existing off-road diesel vehicles used in California in construction, mining, and other industries. This Regulation to Reduce Emissions from In-Use Off-Road Diesel Vehicles (CARB 2013b) is intended to achieve significant emission reductions in diesel PM and NO_x and protect public health. The regulation applies to individuals, businesses, and government agencies that own or operate diesel-powered off-road vehicles in California (except for agricultural or personal use or for use at ports or intermodal rail yards) that have engines with maximum power of 25 horsepower or greater.

The regulation also applies to vehicles commonly used in construction, mining, rental, airport ground support, and other industries. The regulation requires fleets to apply exhaust retrofits that capture pollutants before they are emitted to the air, and to accelerate turnover of fleets to newer, cleaner engines.

Regulation to Reduce Emissions from On-Road Heavy-Duty Diesel Vehicles (In-Use)

The regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Heavier trucks had to begin to phase in retrofitting with PM filters from January 1, 2012, and older trucks must be replaced from January 1, 2015. By January 1, 2023, nearly all trucks and buses will be required to have 2010 model year engines or equivalent. The regulation applies to nearly all privately and federally owned diesel-fueled trucks and buses as well as privately and publicly owned school buses with a gross vehicle weight rating greater than 14,000 pounds. Part 3 "Truck and Bus" of the rulemaking was filed with the Secretary of State on December 14, 2011; Title 13, California Code of Regulations (CCR), Section 2025.

Fleet Rule for Public Agencies and Utilities

The CARB Rule for On-Road Heavy-Duty Diesel-Fueled Public and Utility Fleets (approved December 8, 2005; Title 13, CCR, Sections 2020, 2022, and 2022.1) is designed to reduce both criteria pollutant emissions and exposure to toxic air contaminants. The rule mandates that public agency and utility vehicle owners reduce diesel PM emissions from their affected vehicles through the application of Best Available Control Technology on these vehicles by specified implementation dates. Implementation is phased-in by engine model year groups.

State and Federal Air Quality Standards

Ambient air quality standards are set to protect public health. Ambient air quality standards are set by the EPA and state air quality agencies (by Cal/EPA in California). California air quality standards generally are more stringent than federal standards. Continuous air monitoring by these agencies and BAAQMD ensure that air quality standards are being met and improved. A summary of state and federal ambient air quality standards and the attainment status in the SFBAAB for criteria pollutants is shown in **Table 3.7-3**.

Table 3.7-3
National and California Ambient Air Quality Standards and SFBAAB Attainment Status

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
Ozone	8 Hour	0.070 ppm (137μg/m^3)	N[9]	0.075 ppm	N[4]
	1 Hour	0.09 ppm (180 μg/m^3)	N	No Standard	See Footnote 5
Carbon Monoxide	8 Hour	9.0 ppm (10 mg/m^3)	A	9 ppm (10 mg/m^3)	A[6]
	1 Hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	A
Nitrogen Dioxide	1 Hour	0.18 ppm (339 μg/m^3)	A	0.100 ppm (see Footnote 11)	U
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	A	0.053 ppm (100 μg/m^3)	A
Sulfur Dioxide (See Footnote #12)	24 Hour	0.04 ppm (105 μg/m^3)	A	0.14 ppm (365 μg/m^3)	A
	1 Hour	0.25 ppm (655 μg/m^3)	A	0.075 ppm (196 μg/m^3)	A
	Annual Arithmetic Mean	No Standard	---	0.030 ppm (80 μg/m^3)	A
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 μg/m^3	N[7]	No Standard	---
	24 Hour	50 μg/m^3	N	150 μg/m^3	U
Particulate Matter - Fine ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m^3	N[7]	12μg/m^3 See Footnote 15	A
	24 Hour	No Standard	---	35 μg/m^3 See Footnote 10	N
Sulfates	24 Hour	25 μg/m^3	A	No Standard	---
Lead (See Footnote # 13)	30 day Average	1.5 μg/m^3	A	No Standard	---
	Calendar Quarter	No Standard	---	1.5 μg/m^3	A
	Rolling 3 Month Average[14]	No Standard	---	0.15 μg/m^3	(See Footnote 14)
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m^3)	U	No Standard	---
Vinyl Chloride (chloromethane)	24 Hour	0.010 ppm (26 μg/m^3)	No information available	No Standard	---
Visibility Reducing particles	8 Hour (10:00 to 18:00 PST)	See Footnote 8	U	No Standard	---

Table 3.7-3
National and California Ambient Air Quality Standards and SFBAAB Attainment Status

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status

Notes:

A=Attainment N=Nonattainment U=Unclassified

mg/m^3 = milligrams per cubic meter; ppm = parts per million; $\mu g/m^3$=micrograms per cubic meter

[1] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.

[2] National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.075 ppm (75 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m3.
Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

[3] National air quality standards are set by US EPA at levels determined to be protective of public health with an adequate margin of safety.

[4] Final designations effective July 20, 2012.

[5] The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005.

[6] In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

[7] In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

[8] Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

[9] The 8-hour CA ozone standard was approved by the Air Resources Board on April 28, 2005 and became effective on May 17, 2006.

[10] U.S EPA lowered the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ in 2006. EPA designated the Bay Area as nonattainment of the $PM_{2.5}$ standard on October 8, 2009. The effective date of the designation is December 14, 2009 and the Air District has 3 years to develop a plan, called a State Implementation Plan (SIP) that demonstrates the Bay Area will achieve the revised standard by December 14, 2014. The SIP for the new $PM_{2.5}$ standard must be submitted to the US EPA by December 14, 2012.

[11] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100ppm (effective January 22, 2010).

[12] On June 2, 2010, the U.S. EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS however must continue to be used until one year following U.S. EPA initial designations of the new 1-hour SO2 NAAQS. EPA expects to designate areas by June 2012.

[13] CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure below which there are no adverse health effects determined.

[14] National lead standard, rolling 3-month average: final rule signed October 15, 2008. Final designations effective December 31, 2011.

[15] On December 14, 2012, U.S. EPA lowered the federal primary PM2.5 annual standard from 15.0 micrograms per cubic meter to 12.0 micrograms per cubic meter.

Source: BAAQMD 2013

Regional

BAAQMD is the public agency entrusted with regulating stationary sources of air pollution in the nine counties that surround San Francisco Bay, including Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties. BAAQMD regulates air pollution from stationary sources through rules, regulations, and permits.

BAAQMD regulates air quality through its planning and review activities. BAAQMD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits; they can also impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. BAAQMD regulates new or expanding stationary sources of toxic air contaminants. BAAQMD also indirectly regulates construction projects that use mobile sources via the statewide Portable Equipment Registration Program (PERP), discussed below.

Because the proposed project does not meet the definition of a permanent stationary source (i.e., an air emissions source that does not move around), no Authority to Construct (permit) would be required from BAAQMD.

Bay Area 2010 Clean Air Plan

The Bay Area 2010 Clean Air Plan (2010 CAP) serves to update the Bay Area ozone plan, in compliance with the requirements of Chapter 10 of the California Health and Safety Code (BAAQMD 2010). The region is classified as a "Serious" nonattainment area for ozone, which triggers various plan submittal requirements and transportation performance standards. Part of those requirements, along with those of the CCAA, are that the district update its air quality attainment plan every 3 years (triennially), to reflect progress in meeting the air quality standards and incorporate new information regarding the feasibility of control measures and new emission inventory data.

The 2010 CAP provides an integrated, multi-pollutant strategy to improve air quality, protect public health, and protect the climate by:

- updating the Bay Area 2005 Ozone Strategy, in accordance with the requirements of the California Clean Air Act, to implement "all feasible measures" to reduce ozone;
- providing a control strategy to reduce ozone, PM, toxic air contaminants, and greenhouse gases in a single, integrated plan;
- reviewing progress in improving air quality in recent years; and
- establishing emission control measures.

Ozone Planning - Bay Area 2005 Ozone Strategy

In 2005, BAAQMD adopted the Bay Area 2005 Ozone Strategy (BAAQMD 2005), in cooperation with the Metropolitan Transportation Commission and the Association of Bay Area Governments. The Ozone Strategy is a roadmap for how the San Francisco Bay Area will achieve compliance with the state's one-hour air quality standard for ozone as expeditiously as practicable, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The 2005 Ozone Strategy provides background information on topics including the Bay Area's emission inventory, historical ozone trends, and the implementation status of past control measures.

Regulations to Reduce Emissions

Non-road Engine Standards - Federal Tier 1 standards for off-road diesel engines were adopted as part of the California requirements for 1995. Federal Tier 2 and Tier 3 standards were adopted in 2000 and selectively apply to the full range of diesel off-road engine power categories. Both Tier 2 and Tier 3 standards include durability requirements to ensure compliance with the standards throughout the useful life of the engine (40 Code of Federal Regulations [CFR] 89.112, 13 CCR 2423).

Portable Equipment Registration Program - The statewide PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units. Once registered in PERP, engines and equipment units may operate throughout the State of California without the need to obtain individual permits from local air districts. Any portable diesel engine not registered in the PERP before January 1, 2006, is illegal, and may not be operated in California unless it meets the Air Toxics Control Measures (ATCM) Tier requirements or has an operating permit issued by an air district.

BAAQMD Regulation 2, Sections 2-1-105 and 2-1-114 list types of portable equipment commonly used in construction as exempt from stationary source rule requirements provided that the equipment complies with all applicable requirements of the statewide PERP pursuant to 13 CCR, Division 3, Chapter 3, Article 5.

Air Toxics Control Measures - On July 26, 2007, CARB adopted a regulation to reduce diesel particulate matter and NO_x emissions from in use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The ATCM regulation supplements existing tiered emission standards for non-road diesel engines in California (CARB 2010).

Senate Bill 656 - SB 656 is a planning requirement that requires CARB to identify, develop, and adopt a list of control measures to reduce the emissions of $PM_{2.5}$ andPM_{10} from new and existing stationary, mobile, and area sources. BAAQMD has developed particulate matter control measures and submitted plans to CARB that include lists of measures to reduce particulate matter. Under the plans, BAAQMD is required to continue to assess $PM_{2.5}$ and PM_{10} emissions and their impacts. For construction emissions of fugitive PM_{10}, BAAQMD has adopted a number of feasible control measures that can be reasonably implemented to significantly reduce fugitive PM_{10} emissions from construction. In general, BAAQMD's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions.

Nuisance (Odors) - BAAQMD's CEQA Air Quality Guidelines (BAAQMD 2012), require an assessment of a project's potential to cause a public nuisance by subjecting surrounding land uses (receptors) to objectionable odors. An objectionable odor problem is defined by BAAQMD Regulation 7, Rule 102 as when the Air Pollution Control Officer "receives odor complaints from ten or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel, or residence."

Toxic Air Contaminants - A project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of toxic air contaminants, as designated by CARB under 17 CCR Section 93001, listed in BAAQMD's Toxic Air Contaminants Inventory (BAAQMD 2004), would be deemed to have a significant impact. Projects that have the potential to expose the public to toxic air contaminants in excess of the significance thresholds shown in Section

3.7.4, Impact Analysis would be considered to have a significant air quality impact. The proposed project's health risk impacts are evaluated in Impact AQ-3 to quantify risk, which is based on a 70-year exposure.

BAAQMD's Dust Abatement Approach requires sponsors of individual development projects who require site development and/or environmental review to implement the BAAQMD's approach to dust abatement through conditions of approval (BAAQMD 1999). This calls for "basic" control measures that must be implemented at all construction sites, "enhanced" control measures that must be implemented in addition to the basic control measures at construction sites greater than 4 acres in area, and "optional" control measures that must be implemented on a case-by-case basis at construction sites that are large in area, located near sensitive receptors or which, for any other reason, may warrant additional emissions reductions.

Local

Alameda County General Plan/General Plan for Castro Valley

Alameda County does not have a countywide land use or circulation element but has adopted area plans that meet the California Government Code's requirements for these elements for Castro Valley and other unincorporated areas. The Alameda County General Plan is comprised of several documents covering particular planning areas and includes the General Plan for Castro Valley (ACCDA 2012). The Castro Valley Area General Plan is the only local general plan (of the jurisdictions serving the project area) that addresses air quality specifically. It identifies the following goal, five policies, and four actions toward meeting general air quality standards and reducing air emissions, and it reiterates BAAQMD CEQA policies but does not refer to specific local rules or codes outside of BAAQMD's.

Air Quality Goals

- **GOAL 12.1-1**: Improve air quality and meet all Federal and State ambient air quality standards by reducing the generation of air pollutants from stationary and mobile sources and by appropriate siting and design of sensitive land uses.

Air Quality Policies

- **Policy 12.1-1**: Promotion of Alternate Travel Modes to Reduce Air Pollution. Promote pedestrian, bicycle, and transit modes of travel to reduce air pollutant emissions from automobiles.
- **Policy 12.1-2**: Land Use Planning to Reduce Air Pollution. Promote land use mixes and development densities that encourage pedestrian, bicycle and transit modes of travel to reduce air pollutant emissions from automobiles.
- **Policy 12.1-3**: Protection of Sensitive Receptors Adjacent to I-580. Protect sensitive receptors, including residential uses, schools, daycare centers, parks with recreation facilities, and medical facilities, which are located within 1000 feet of the Interstate 580 corridors from air pollutants. Also consider the impacts of odors and toxic emissions on sensitive receptors.
- **Policy 12.1-4**: Location of Sensitive Receptors in Relation to I-580. Locate sensitive receptors at least 300 feet away, and ideally 500 feet away, from the edge of Interstate 580.
- **Policy 12.1-5**: Air Quality Requirements for Construction and Demolition Activities. Reduce combustion emissions and release of suspended and inhalable PM during construction and demolition phases.

Air Quality Actions

- **Action 12.1-1**: Requirements for Air Quality Analyses for Environmental Review. In environmental review documents analyzing air quality, comply with the Regional Air Quality Plan's assumptions used for population and vehicle miles traveled and be consistent with the Bay Area Air Quality Management District's 2010 Clean Air Plan.
- **Action 12.1-2**: Regional Air Quality Strategies. Cooperate with the Bay Area Air Quality Management District in the review of land use proposals. Provide input and assistance to the Bay Area Air Quality Management District's development and implementation of regional air quality strategies.
- **Action 12.1-3**: Site Design Criteria/Development Standards for Projects Adjacent to I-580. Establish site design criteria and standards for development sites adjacent to the Interstate 580 corridor through Castro Valley to help reduce potential adverse air quality impacts. Also consider if there are any odor sources near the sites and whether mitigations should be required.
- **Action 12.1-4**: BAAQMD's Dust Abatement Approach.

3.7.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts in this analysis are consistent with the environmental checklist in Appendix G of the State CEQA Guidelines and guidance from BAAQMD. The proposed project would have a significant impact on air quality if it would:

1. conflict with or obstruct implementation of the applicable air quality plan;
2. violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. result in a cumulatively considerable net increase of any criteria pollutant for which the project area is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
4. expose sensitive receptors to substantial pollutant concentrations; or
5. create objectionable odors affecting a substantial number of people.

BAAQMD's adopted thresholds of significance, established in the June 2010 CEQA Guidelines (the Guidelines were further updated in May 2011), were challenged in a lawsuit. However, on August 13, 2013, the Court of Appeals ruled in favor of the BAAQMD 2010 Guidelines finding that the 2010 Guidelines are not a "project" subject to CEQA review, and that the guidelines should be reinstated. Therefore, this analysis used the 2010 CEQA Guidelines and thresholds of significance to evaluate the proposed project's air quality impacts. The 2010 CEQA Guidelines include more stringent and complete thresholds of significance to evaluate a project's air quality emissions than the previous 1999 CEQA Guidelines.

Thus, pursuant to BAAQMD's CEQA 2010 Guidelines, implementation of the proposed project would be considered significant if it would exceed any of the following criteria:

1. Criteria Air Pollutants

    a. Regional Significance Criteria

        - Generate average daily construction emissions of ROG, NO_X, and (exhaust) $PM_{2.5}$ that would exceed 54 pounds per day (lbs/day) or PM_{10} exhaust emissions that would exceed 82 lbs/day, or
        - Construction would not implement all of BAAQMD's Best Management Practices for fugitive dust control and the Basic Construction Mitigation Measures, or
        - Generate average daily operational emissions of ROG, NO_X, and (exhaust) $PM_{2.5}$ that would exceed 54 lbs/day or PM_{10} exhaust emissions that would exceed 82 lbs/day, or
        - Generate annual operational emissions of ROG, NO_X, and (exhaust) $PM_{2.5}$ that would exceed 10 tons per year (tpy) or PM_{10} exhaust emissions that would exceed 15 tpy.

    b. Local CO Hotspots

        - The project is consistent with an applicable congestion management program established by the County Congestion Management Agency for designated roads or highways, the regional transportation plan, and local congestion management agency plans, or
        - The project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour, or
        - The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

    c. Odors

        - Projects that would develop or place sensitive receptors or substantial odor sources (e.g., wastewater treatment plants, landfills or transfer stations, composting facilities, confined animal facilities, food manufacturing, and chemical plants) within the prescribed screening distance of each other should consider odor impacts. The 2010 Guidelines recommend a qualitative analysis of the odor parameters such as types of odor sources, frequency of odor events, distance and landscape between receptors and odor source(s), local wind speed and direction, and odor complaint history in order to determine significance.

2. Community Risk and Hazards

    a. Siting a New Receptor: Project-Level Community Risk

        Project-level emissions of TACs or $PM_{2.5}$ from individual sources within 1,000 feet of the project that exceed any of the thresholds listed below are considered a potentially significant community health risk:

        - Non-compliance with a qualified Community Risk Reduction Plan, or

- Generate an excess cancer risk level of more than 10 in one million, or a non-cancer chronic or acute hazard index greater than 1.0, or
- Generate an incremental increase of greater than 0.3 µg/m3 annual average PM2.5 from a single source would be a significant cumulatively considerable contribution.

b. Siting a New Receptor: Cumulative Community Risk

Cumulative sources of TACs and $PM_{2.5}$ from all past, present, and reasonably foreseeable sources within a 1,000-foot evaluation zone plus the contribution of the proposed project are considered a potentially significant cumulative community health risk if:

- Project would be noncompliant with a qualified Community Risk Reduction Plan; or
- The cumulative community risk plus the proposed project would generate an excess cancer risk of more than 100 in one million or chronic non-cancer hazard index greater than 10.0; or
- The cumulative community risk plus the proposed project would generate PM2.5 concentrations in excess of 0.8 µg/m3.

c. The cumulative community risk plus the proposed project would generate PM2.5 concentrations in excess of 0.8 µg/m3.

d. Construction Risk

Generate excess cancer risk levels of more than 10 in one million.

Analysis Methodology

Construction emissions associated with the complete proposed project were modeled using the most currently-available air emissions models. For off-road construction equipment, the California Emissions Estimator Model (CalEEMod) Version 2011.1.1 was used to estimate criteria air pollutant emissions (SCAQMD 2013). CalEEMod can estimate construction-related and operational emissions based on project-specific parameters (e.g., construction schedule, construction equipment, land uses to be developed). For on-road vehicles such as material delivery trucks, equipment delivery trucks, and construction worker vehicles, the CARB on-road emissions inventory model EMFAC2011 was used to estimate criteria air pollutants (CARB 2013c). CalEEMod also is able to estimate on-road emissions; however, CalEEMod Version 2011.1.1 uses a previous version of EMFAC (EMFAC2007), and therefore this analysis modeled on-road emissions "off-model" to incorporate the most current on-road emissions factors.

The modeling was based on all construction-related information for each construction option and its associated components (e.g., dam work, stockpile activities, material hauling), including the schedule (i.e., working days), types and number of off-road equipment used per day, number of haul truck trips per day, and number of construction worker trips vehicle per day. The modeled construction emissions associated with all construction components for each construction option are presented in **Table 3.7-4**.

Criterion 3 is discussed in Chapter 5, Other CEQA Considerations for the cumulative analysis.

Table 3.7-4
Chabot Dam Conventional Earthwork and Cement Deep Soil Mixing Option Construction Emissions

Emissions Source	Total Emissions (tons)			
	ROG	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
Conventional Earthwork Option				
Outlet Works subtotal	***0.13***	***1.17***	***0.06***	***0.05***
Off-Road Construction Equipment	0.11	0.71	0.04	0.04
On-Road Vehicles	0.02	0.46	0.02	0.01
Conventional Earthwork subtotal	***0.72***	***7.33***	***0.34***	***0.31***
Off-Road Construction Equipment	0.60	4.53	0.24	0.24
On-Road Vehicles	0.12	2.80	0.10	0.07
Total Conventional Earthwork Emissions (tons)	***0.88***	***9.15***	***0.42***	***0.38***
Average Daily Emissions (lbs/day) [1]	7.83	81.33	3.72	3.34
Mitigated Daily Emissions (lbs/day) [2]	—	65.06	—	—
BAAQMD Thresholds of Significance (lbs/day)	54	54	82	54
Exceeds BAAQMD Thresholds?	No	**Yes**	No	No
Cement Deep Soil Mixing (CDSM) Option				
Outlet Works subtotal	***0.13***	***1.17***	***0.06***	***0.06***
Off-Road Construction Equipment	0.11	0.71	0.04	0.04
On-Road Vehicles	0.02	0.46	0.02	0.01
CDSM subtotal	***0.39***	***4.16***	***0.18***	***0.16***
Off-Road Construction Equipment	0.33	2.84	0.13	0.13
On-Road Vehicles	0.06	1.32	0.05	0.03
Total CDSM Emissions (tons)	***0.55***	***5.98***	***0.26***	***0.23***
Average Daily Emissions (lbs/day) [3]	9.50	103.94	4.45	3.99
Mitigated Daily Emissions (lbs/day) [2]	—	83.15	—	—
BAAQMD Thresholds of Significance (lbs/day)	54	54	82	54
Exceeds BAAQMD Thresholds?	No	**Yes**	No	No

Table 3.7-4
Chabot Dam Conventional Earthwork and Cement Deep Soil Mixing Option Construction Emissions

Emissions Source	Total Emissions (tons)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$

Notes:
ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter with aerodynamic diameter less than 10 microns; $PM_{2.5}$ = particulate matter with aerodynamic diameter less than 2.5 microns; lbs/day = pounds per day; BAAQMD = Bay Area Air Quality Management District
[1] Average daily emissions for the Conventional Earthwork Option were calculated assuming 225 construction work days.
[2] Mitigated emissions assume implementation of BAAQMD Additional Construction Mitigation Measures to reduce significant NO_X emissions by 20%.
[3] Average daily emissions for the CDSM Option were calculated assuming 115 construction work days.
Source: Data modeled by AECOM in 2013

Project Impacts and Mitigation Measures

Impact AQ-1: The proposed project would conflict with or obstruct implementation of the regional applicable air quality plan (Clean Air Plan) (Criterion 1). (Significant and Unavoidable)

BAAQMD regulates regional air quality by enforcing rules and regulations, issuing air quality permits, and developing air quality plans. Air quality plans are developed with input from Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC); they are designed to attain and maintain ambient air quality standards. The existing emissions profile and projected growth of a region (based on local general plans) are evaluated along with proposed mitigation measures to determine if the region would attain ambient air quality standards. At the time of this writing, the most current regional air quality plan is the Bay Area 2010 CAP, which was developed as a multi-pollutant plan for ozone, particulate matter, TACs, and greenhouse gas emissions. Projects that would be consistent with the applicable elements of the Castro Valley General Plan would be accounted in the Bay Area 2010 Clean Air Plan's emission projections, and therefore would not conflict or obstruct implementation of the regional air quality plan.

The short-term and temporary emissions would cease after completion of construction. Post-construction, long-term dam facility operational activities and related emissions would not result in a net increase beyond existing conditions. The proposed project would not involve any land uses that would generate or attract additional vehicle trips beyond the existing conditions. Therefore, the long-term operation of the proposed project would not be expected to conflict or exceed the emission estimates in the Castro Valley General Plan, and thus would not conflict or exceed the emission estimates from the applicable air quality plan (i.e., Bay Area 2010 Clean Air Plan).

However, as discussed under Impact AQ-2, the project construction-related NO_X emissions would exceed BAAQMD's threshold of significance. The thresholds of significance were developed as allowable emission limits where projects would not interfere with the attainment status of the region. It should be noted that these thresholds of significance are used to evaluate regional emissions and attaining ambient air quality standards rather than localized emissions and direct health risk impacts, which are discussed further in Impact AQ-3 and AQ-4. Although project construction-related NO_X emissions would be short-term and temporary, because of the nonattainment status of the region with respect to ozone (i.e., NO_X is an ozone precursor), project construction emissions potentially would conflict or obstruct implementation of the applicable air quality plan. The impact would be *significant and unavoidable*. (See Impact AQ-2 for further discussion of mitigation for construction-related emissions.)

Impact AQ-2: The proposed project would violate an air quality standard (NO_2 ambient air quality standard) and would contribute substantially to an existing or projected air quality violation (Criterion 2). (Significant and Unavoidable)

Construction emissions are considered to be short-term and temporary, but having the potential to represent a significant impact with respect to air quality. Fugitive particulate matter dust emissions are among the pollutants of greatest concern with respect to typical construction activities. These emissions from construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and unwanted accumulation of fugitive dust on exposed surfaces. Typically, cut and fill operations along with general site grading operations are the primary sources of fugitive particulate matter dust emissions from construction activities. Vehicle movement on unpaved roads also can generate fugitive particulate matter dust emissions, by kicking up ground particulate matter dust into the atmosphere. Construction fugitive particulate matter dust emissions can vary greatly, depending on the level of activity, the specific operations taking place, the number and types of equipment operated, vehicle speeds, local soil conditions, weather conditions, and the amount of earth disturbance (e.g., site grading, excavation, cut-and-fill). The proposed project would involve excavation and transport of soil materials from the main project work site (i.e., the dam construction site) to stockpile sites. The stockpile sites are approximately 4,700 feet from the dam site using the Upper Haul Route, and 2,400 feet using the Lower Haul Route. A small amount of soil would be imported to the stockpile site, to be used for fill at project work sites (i.e., the dam construction site). During construction activities, fugitive dust emissions would be generated during soil excavation, soil material handling, and vehicle travel along paved and unpaved roadways.

Emissions of ozone precursors, ROG and NO_X, primarily are generated from mobile sources (i.e., material delivery trucks, construction worker vehicles) and off-road construction equipment. Generation of these emissions vary as a function of vehicle trips per day, associated with construction materials delivery, the importing and exporting of soil, vendor trips, and worker commute trips, and by the types and number of heavy-duty, off-road equipment used and the intensity and frequency of their operation. A majority of haul truck emissions would result from movement of soil materials between stockpile sites and the dam construction site. Off-road construction equipment would operate intermittently throughout the day and would generate exhaust emissions as required for various construction activities. Furthermore, daily trips by construction worker vehicles, coming to and leave project work sites, would generate passenger vehicle exhaust emissions.

As previously discussed, project-specific construction parameters along with the most currently available emission factors were used to model project construction emissions. BAAQMD's 2010 CEQA Guidelines establish construction-related thresholds in units of average daily pounds of ROG, NO_X, PM_{10}, and $PM_{2.5}$. Therefore, total construction emissions for each construction option (i.e., Conventional Earthwork and CDSM) were first calculated in units of tons per year and then converted to pounds before being divided by the total number of days, to calculate average daily emissions. Pursuant to BAAQMD's 2010 CEQA Guidelines, the average daily construction emissions resulting from both construction options are presented in **Table 3.7-4**. (See **Appendix G** for additional details and assumptions related to project construction modeling.

As shown in **Table 3.7-4**, the proposed project's average daily construction NO_X emissions under the Conventional Earthwork and CDSM Option would both exceed BAAQMD's thresholds of significance.

Therefore, the impact would be *potentially significant*. Implementation of **Mitigation Measure AQ-2.1** would reduce the potentially significant impact but not to a less-than-significant level. As a result, the proposed project would have a *significant and unavoidable* construction-related NO_x emissions impact.

Mitigation Measure AQ-2.1: Implement BAAQMD's Basic and Additional Construction Control Measures.

EBMUD will follow BAAQMD's recommendations and will implement the Basic Construction Control Measures during construction. The Basic Construction Control Measures include:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads, stockpiles) will be watered as necessitated by soil and air conditions or applied with (nontoxic) soil stabilizers.
- All haul trucks transporting soil, sand, or other loose material off-site will be covered.
- All visible mud or dirt track-out onto adjacent public roads will be removed, using wet power vacuum street sweepers at least once per day, if visible soil material is tracked into public streets. The use of dry power sweeping will be prohibited.
- All vehicle speeds on unpaved roads will be limited to 15 miles per hour.
- Idling times will be minimized, by either shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure, Title 13, Section 2485 of the California Code of Regulations). Clear signage will be provided to construction workers at all access points.
- All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. A schedule of tune-ups will be developed, and the tune-ups will be performed for all equipment that is operating within the project area. A log of required tune-ups will be maintained, and a copy of the log will be submitted to EBMUD for review every 2,000 service hours.
- Publicly visible signs will be posted at all entrances to the project site and along roadways adjacent to the project site where citizens could be traveling, with the telephone number and person to contact at EBMUD regarding dust complaints. This person will respond and take corrective action within 48 hours.

In addition, because the proposed project would exceed the NO_X threshold of significance under both construction options, will include a substantial amount of cut/fill operations, and will be located approximately 500 to 1,200 feet from the nearest sensitive receptor (see Sensitive Receptors under Section 3.7.2, Environmental Setting, and **Table 3.7-2**), additional mitigation measures will be implemented to reduce emissions and avoid exposing nearby receptors to substantial construction emissions. BAAQMD has developed Additional Construction Mitigation Measures for those projects that either will include extensive earthmoving activities or that will be located near sensitive receptors. The following measures from BAAQMD's Additional Construction Measures also will be implemented during construction:

- EBMUD or the contractor will develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in project construction (i.e., owned, leased, and subcontractor vehicles) would achieve a project-wide fleet-average 20 percent NO_X

reduction and 45 percent PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions would include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, restricting idling time of diesel-powered construction equipment to 2 minutes or less, equipping diesel engines with Best Available Control Technology for emission reductions of NO_X and PM, using equipment that meets CARB's most recent certification standard for off-road, heavy-duty diesel engines, making payment(s) for off-site mitigation, and/or performing or participating in any other options that become available.

- All trucks and equipment, including their tires, will be washed before leaving the project area.
- Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.

Implementation: EBMUD and construction contractor(s)

Timing: During construction activities

Enforcement: EBMUD, BAAQMD

Residual Effect: Implementation of **Mitigation Measure AQ-2.1** would fulfill the minimal requirements of BAAQMD for each project. Furthermore, the mitigation measures also would fulfill the additional measures required by BAAQMD for projects with substantial cut/fill operations or projects located in proximity of sensitive receptors. Implementation of Mitigation Measure AQ-2.1 would effectively minimize and control all fugitive dust emissions from project construction. However, as shown in **Table 3.7-4**, even with full implementation of the Mitigation Measure AQ-2.1, the construction-related NO_X emissions for the Conventional Earthwork and CDSM options would continue to exceed BAAQMD's threshold of significance for NO_X, which are designed to evaluate the regional impact of a project's emissions and not localized health risks. Therefore, even with implementation of Mitigation Measure AQ-2.1, the impact would be *significant and unavoidable.*

Impact AQ-3: The proposed project would expose sensitive receptors to substantial pollutant concentrations (Criterion 4). (Less than Significant With Mitigation Incorporated)

All Project Components—CO Hotspots

The primary mobile-source pollutant of localized concern is CO. Local mobile-source CO emissions and concentrations near roadway intersections are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under specific meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels with respect to local sensitive land uses, such as residential units, hospitals, schools, and childcare facilities.

BAAQMD has developed a screening threshold to determine whether a project potentially could cause an intersection to generate a CO hotspot. The screening threshold has been developed with conservative assumptions to avoid underestimating potential CO concentrations. Therefore, a project that would not exceed the screening thresholds would be highly unlikely to generate a CO hotspot. BAAQMD has determined that intersections serving less than 44,000 vehicles per hour would not have the potential to generate CO hotspots, and the impact would be less than significant. For intersections located in areas where vertical and/or horizontal mixing is substantially limited, the screen threshold is 24,000 vehicles per hour.

A traffic study was performed to evaluate the daily and maximum daily vehicle trips that would occur during project construction as a result of material delivery trucks, equipment delivery trucks, and construction worker vehicles. As determined in this study, the maximum daily vehicle trips that would occur during project construction would be 283 trips per day for the CDSM option, which would include a mix of construction worker, material delivery, and equipment delivery trips. These vehicle trips would occur at various times throughout the day and night because construction worker trips typically would occur in the morning when workers arrive at project work sites and again at night as they depart. Because the maximum daily vehicle trips would occur under the CDSM option, which includes day and night construction activities, it is anticipated that these material delivery, equipment delivery, and construction worker vehicle trips would be spread over a larger period of time and could likely occur during off-peak hours. In addition, these 283 daily vehicle trips would be dispersed throughout the regional roadway network, and all 283 trips would be highly unlikely to reach a single intersection at the same hour. Please refer to Section 3.6, Transportation and Circulation, and **Appendix F** for the traffic analysis and traffic calculations, respectively.

However, even in the case that all construction-related trips that occurred under a maximum daily scenario reached a single intersection at the same hour, the relative contribution from the proposed project would be less than 1 percent of the screening threshold. Thus, the proposed project's construction-related vehicle trips would not be expected to contribute a substantial amount of traffic to any intersection that could reach BAAQMD's screening threshold of 24,000 and 44,000 vehicles per hour. Furthermore, when evaluating vehicle traffic in the project area, the annual average daily vehicle trips would be approximately 7,401 per day. Even if the maximum daily construction trips were conservatively added to the total daily vehicle trips occurring in the region and assumed to occur simultaneously at an intersection, this volume would be substantially less than BAAQMD's screening threshold. Considering that these conservative methods to compare potential traffic during construction to the screening thresholds are still substantially less than the thresholds, implementation of the proposed project is not expected to have the potential to generate CO hotspots that would expose sensitive receptors to unhealthy concentrations of CO. Therefore, the impact would be *less than significant*.

All Project Components—Off-Site Community Risk and Hazard from Project Construction

Project construction would result in the generation of diesel particulate matter emissions from the use of off-road diesel equipment, required for construction activities. Diesel PM has been classified as a TAC by CARB, and thus even acute exposure could have health impacts. Construction emissions would occur intermittently during the 14- or 6-month work period for the Conventional Earthwork option or CDSM option, respectively. Diesel particulate matter emissions would vary, depending on the types of construction activities occurring each day. During excavation activities that would require large mechanical forces such as large diesel equipment, diesel particulate matter emissions are expected to be greater than those of building construction and architectural coatings that would require more manual labor. After completion of construction, all such activities and associated diesel particulate matter emissions would cease.

The dose to which receptors are exposed is the primary factor used to determine health risk and is a function of concentration and duration of exposure. According to the Office of Environmental Health Hazard Assessment, health risk assessments that determine the health risks associated with exposure of residential receptors to TAC emissions should be based on a 70-year exposure period, and health risk assessments that address the health risk associated with exposure of children to TAC emissions should be based on a 9-year exposure period (OEHHA 2003). TAC exposure to children is of special concern because children typically metabolize more air per unit of body weight in comparison to adults, and they can be more sensitive to toxics during development. However, heath risk assessments should be limited to the period/duration of activities associated with the emissions activity (Salinas, pers. comm., 2004).

As discussed previously, construction activities would occur for a maximum of 14 months under the Conventional Earthwork option and a minimum of 6 months under the CDSM option. Thus, the total exposure time would be less than the minimum number of years recommended for a health risk assessment (i.e., 9 years) and approximately 1 percent of the total exposure time (i.e., 70 years) for a typical health risk assessment. As discussed, construction-related emissions would cease following project buildout. Therefore, although residential receptors are located approximately 500 feet from the edge of the project area and approximately 1,500 feet from the main project work site (i.e., the dam site), exposure would be intermittent and relatively short with respect to health risk assessments, and temporary. Nevertheless, for the purposes of a conservative analysis, the diesel PM health risk impacts were evaluated using EPA's SCREEN3.

To conservatively estimate health risk impacts from project construction, all $PM_{2.5}$ exhaust emissions were assumed to be diesel PM emissions. In reality, some of the emissions would be associated with typical gasoline-fueled vehicles (i.e., construction worker vehicles), which would not be TACs. In addition, all $PM_{2.5}$ exhaust emissions associated with off-road construction equipment, material haul trucks, equipment delivery trucks, and construction worker vehicles were assumed to occur in the project area. In reality, emissions associated with on-road vehicles such as material delivery trucks, equipment delivery trucks, and construction worker vehicles would be generated along the regional roadway network and only a fraction of those emissions would occur in the project area. Furthermore, the construction option with the highest level of emissions (CDSM option), and thus the most conservative, was used to model health risk impacts along with the construction option with the longest exposure period (the Conventional Earthwork option of 14 months). Lastly, as recommended by EPA, the proposed project's health risks were modeled under "full meteorological" conditions in SCREEN3 to account for all possible meteorological stability classes and wind speeds (EPA 1995). The results of the health risk screening are presented in **Table 3.7-5**.

Table 3.7-5
Chabot Dam Health Risk Screening [1]

Category	Cancer Risk (excess cancer cases in one million)	Health Hazard Index
Proposed Project	1.51	0.066
BAAQMD Threshold	10	5
Exceeds Thresholds?	No	No

Notes:
BAAQMD = Bay Area Air Quality Management District
[1] Health risk impacts shown conservatively to represent the potential health risk impacts at the maximally exposed receptor, assuming sensitive receptors would be located at that location.
Additional details and assumptions available in **Appendix G**.
Source: Data compiled by AECOM in 2013

As shown in **Table 3.7-5**, the construction-related health impacts would not generate health risk impacts that would exceed BAAQMD's thresholds of significance. However, without implementation of BAAQMD's Basic Construction Control Measures, construction impacts could generate a significant impact. Therefore, with implementation of **Mitigation Measure AQ-2.1**, which would also reduce diesel particulate matter emissions from heavy-duty construction equipment and is not accounted in the modeling shown in **Table 3.7-5**, construction-related health risk impacts would be reduced to a less-than-significant level. Thus, because the use of off-road construction equipment would be temporary and intermittent, because of the relatively low exposure period in combination with the dispersive properties of diesel particulate matter (Zhu et al. 2002.36:4323–4335), because the modeled health risk impacts are less than the thresholds of significance, and because the project would implement **Mitigation Measure AQ-2.1** that includes all of BAAQMD required Basic Construction Control Measures, short-term construction activities would not result in the exposure of sensitive receptors to localized emission levels that would result in a health hazard or exceed applicable health risk standards. Therefore, the impact would be *less than significant with mitigation incorporated*.

All Project Components—On-Site Community Risk and Hazards

The proposed project would not construct any land uses that would affect any sensitive receptor. As discussed previously, the proposed project would upgrade an existing dam to meet seismic standards, which would not involve sensitive receptors or regular employees at the dam facilities. Thus, the proposed project would not lead to any receptors being exposed to substantial TAC or $PM_{2.5}$ emissions from existing or proposed sources. Therefore, the impact would be *less than significant*.

Impact AQ-4: The proposed project would not create objectionable odors affecting a substantial number of people (Criterion 5). (Less than Significant)

All Project Components—Construction

Project construction is not anticipated to expose nearby, off-site receptors to objectionable odors. Construction activities would generate diesel particulate matter exhaust from heavy-duty trucks and off-road construction equipment, which may be considered offensive to some individuals. Although construction activities could be fairly intensive during cut/fill and other earth-disturbing activities, other phases would not require such intensive use of construction equipment. Rather, other construction phases could involve various piece of construction equipment operating intermittently throughout the day. Thus, construction activities would not expose nearby receptors to a continuous source of diesel particulate matter emissions. In addition, construction activities for either the Conventional Earthwork or CDSM option would occur for a maximum of 14 months and would cease following completion of the buildout. Any potential odor impact would not occur over the long term, after completion of construction. Considering all these factors and the temporary nature of construction activities, project construction is not expected to expose a substantial number of receptors to objectionable odor emissions. Therefore, the impact would be *less than significant*.

3.7.5 Impact and Mitigation Summary

Table 3.7-6 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

Table 3.7-6
Air Quality Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact AQ-1: The proposed project would conflict with or obstruct implementation of the regional applicable air quality plan (Clean Air Plan) (Criterion 1).	SU Greater average daily emissions than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total mass emissions of NO_X would be approximately 65 percent of the Conventional Earthwork option.	SU Greater average daily emissions than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total mass emissions of NO_X would be approximately 65 percent of the Conventional Earthwork option.	SU Greater average daily emissions than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total mass emissions of NO_X would be approximately 65 percent of the Conventional Earthwork option.	SU Greater average daily emissions than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total mass emissions of NO_X would be approximately 65 percent of the Conventional Earthwork option.	SU	SU	SU	SU
Impact AQ-2: The proposed project would violate an air quality standard (NO_2 ambient air quality standard) and would contribute substantially to an existing or projected air quality violation (Criterion 2).	SU Mitigation Measure AQ-2.1 Greater average daily emissions than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total mass emissions of NO_X would be approximately 65 percent of the Conventional Earthwork option.	SU Mitigation Measure AQ-2.1 Greater average daily emissions than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total mass emissions of NO_X would be approximately 65 percent of the Conventional Earthwork option.	SU Mitigation Measure AQ-2.1 Greater average daily emissions than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total mass emissions of NO_X would be approximately 65 percent of the Conventional Earthwork option.	SU Mitigation Measure AQ-2.1 Greater average daily emissions than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total mass emissions of NO_X would be approximately 65 percent of the Conventional Earthwork option.	SU Mitigation Measure AQ-2.1	SU Mitigation Measure AQ-2.1	SU Mitigation Measure AQ-2.1	SU Mitigation Measure AQ-2.1
Impact AQ-3: The proposed project would expose sensitive receptors to substantial pollutant concentrations (Criterion 4).	LTSM Mitigation Measure AQ-2.1 Greater average daily vehicle trips and diesel PM emissions than Conventional Earthwork option because of day and	LTSM Mitigation Measure AQ-2.1 Greater average daily vehicle trips and diesel PM emissions than Conventional Earthwork option because of day and	LTSM Mitigation Measure AQ-2.1 Greater average daily vehicle trips and diesel PM emissions than Conventional Earthwork option because of day and	LTSM Mitigation Measure AQ-2.1 Greater average daily vehicle trips and diesel PM emissions than Conventional Earthwork option because of day and	LTSM Mitigation Measure AQ-2.1	LTSM Mitigation Measure AQ-2.1	LTSM Mitigation Measure AQ-2.1	LTSM Mitigation Measure AQ-2.1

Table 3.7-6
Air Quality Impact and Mitigation Summary

	night shifts; however, the duration of construction activities would be substantially shorter and total diesel PM emissions from construction equipment would be approximately 61 percent of the Conventional Earthwork option.	night shifts; however, the duration of construction activities would be substantially shorter and total diesel PM emissions from construction equipment would be approximately 61 percent of the Conventional Earthwork option.	night shifts; however, the duration of construction activities would be substantially shorter and total diesel PM emissions from construction equipment would be 61 percent of the Conventional Earthwork option.	night shifts; however, the duration of construction activities would be substantially shorter and total diesel PM emissions from construction equipment would be 61 percent of the Conventional Earthwork option.				
Impact AQ-4: The proposed project would not create objectionable odors affecting a substantial number of people (Criterion 5).	LTS Greater daily odor emissions (i.e., diesel PM) than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total diesel PM emissions from construction equipment would be approximately 61 percent of the Conventional Earthwork option.	LTS Greater daily odor emissions (i.e., diesel PM) than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total diesel PM emissions from construction equipment would be approximately 61 percent of the Conventional Earthwork option.	LTS Greater daily odor emissions (i.e., diesel PM) than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total diesel PM emissions from construction equipment would be approximately 61 percent of the Conventional Earthwork option.	LTS Greater daily odor emissions (i.e., diesel PM) than Conventional Earthwork option because of day and night shifts; however, the duration of construction activities would be substantially shorter and total diesel PM emissions from construction equipment would be approximately 61 percent of the Conventional Earthwork option.	LTS	LTS	LTS	LTS

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

3.8 Greenhouse Gas Emissions

3.8.1 Approach to Analysis

Greenhouse gas (GHG) emissions have the potential to adversely affect the environment, because such emissions contribute, on a cumulative basis, to global climate change. This section discusses existing GHG emissions and climate change conditions in the vicinity of the project area, describes the pertinent federal, state, and regional laws and guidelines, presents the potential construction impacts, and identifies potential GHG emission mitigation measures, if required.

3.8.2 Environmental Setting

Existing Climate

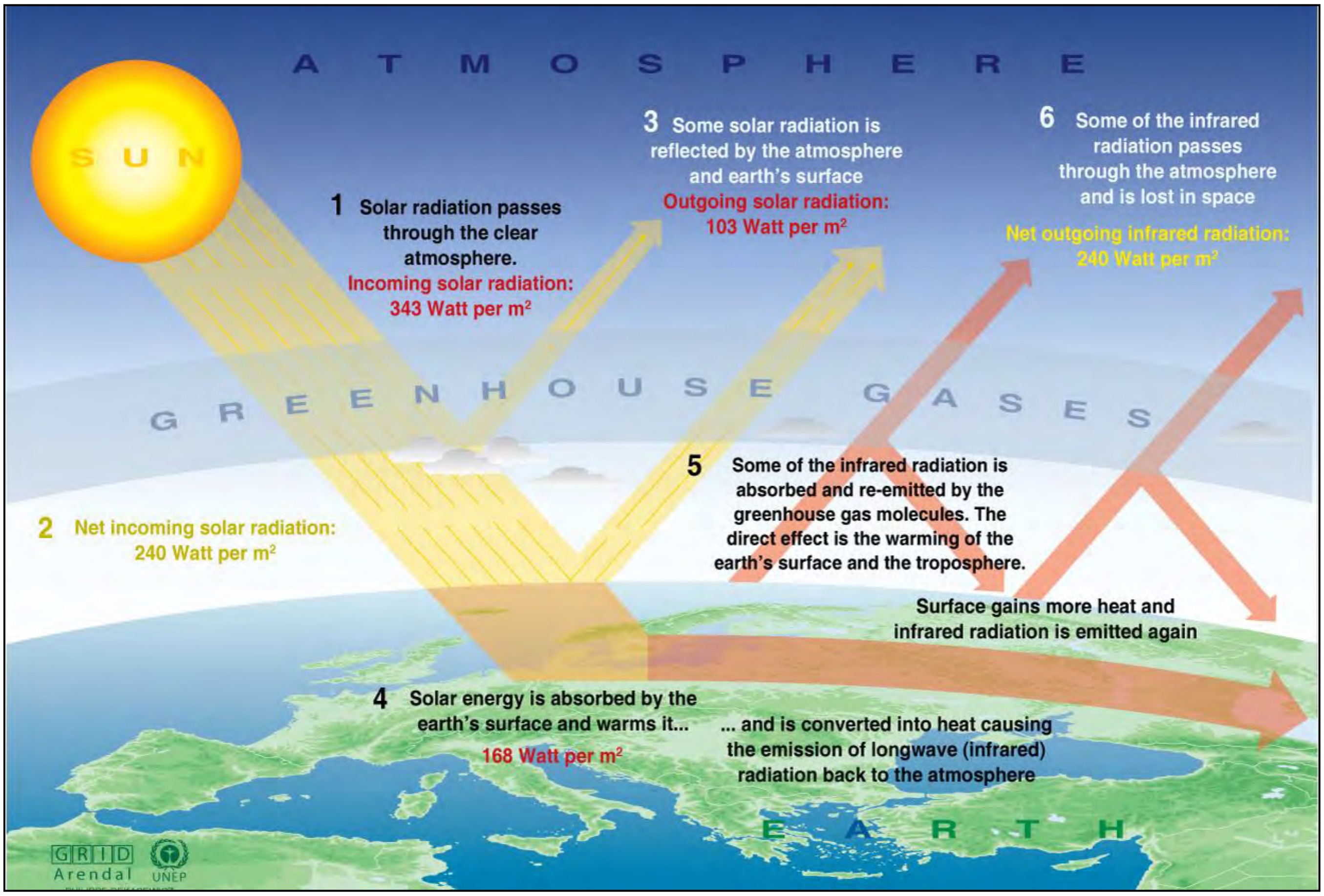
The term climate refers to the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place (Ahrens 2003). The proposed project is located in a climatic zone characterized as dry-summer subtropical or Mediterranean (abbreviated Cs) on the Köppen climate classification system. The Köppen system's classifications are based primarily on annual and monthly averages of temperature and precipitation. Please refer to Section 3.7, Air Quality for a description of the meteorology and climate of the San Francisco Bay Area Air Basin.

Attributing Climate Change—Physical Scientific Basis

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. When high-frequency solar radiation (e.g., visible light) enters the earth's atmosphere from space (i.e., from the sun), a portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. However, the re-radiated energy by the earth is not the same high-frequency solar radiation that was received but is lower frequency infrared radiation (i.e., thermal energy). The frequencies at which bodies emit radiation are proportional to temperature. Therefore, the earth, having a much lower temperature than the sun, emits lower frequency (longer wavelength) radiation (i.e., infrared radiation). When infrared radiation comes into contact with GHGs in the atmosphere, a portion of that thermal energy can be absorbed by the GHG molecule and/or re-radiated back toward the earth's surface. Both outcomes result in a "trapping" of heat within the earth's atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on earth's surface (see **Figure 3.8-1**). Without the greenhouse effect, the earth would not be able to support life as we know it.

Prominent GHGs contributing to the earth's greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and high global warming potential (high-GWP) GHGs. Although high-GWP GHGs typically are emitted at lower rates than CO_2, CH_4, and N_2O, they still can make a substantial contribution to climate change because they are more effective at absorbing outgoing infrared radiation than CO_2.

The concept of CO_2-equivalency (CO_2e) is used to account for the different potentials of GHGs to absorb infrared radiation. This potential, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime or persistence of the gas molecule in the atmosphere, its ability to absorb/trap infrared radiation, and the spectrum of light energy (i.e., range of wavelengths and frequencies) absorbed by the gas molecule. Every GHG's GWP is measured relative to CO_2, which has



Source: UNEP/GRID-Arendal 2012

Figure 3.8-1: The Greenhouse Effect

a GWP of 1. High-GWP GHGs include ozone depleting substances (ODS), chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC), halons, and their replacement hydrofluorocarbons (HFC). Other high-GWP GHGs include perfluorocarbons (PFC) and sulfur hexafluoride (SF_6). Anthropogenic (i.e., caused by humans) emissions of these GHGs leading to atmospheric levels of GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's atmosphere, land, and oceans, with corresponding effects on global circulation patterns and climate (IPCC 2007a:665). Carbon dioxide emissions associated with fossil fuel combustion for energy-related activities are the primary contributors to human-induced climate change (EPA 2011).

Climate change is a global problem because GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one year to several thousand years). GHGs persist in the atmosphere for a long enough time to be dispersed around the globe, continually contributing to the greenhouse gas effect. Although the exact lifetime of any particular GHG molecule depends on multiple variables and cannot be pinpointed, more CO_2 is currently emitted into the atmosphere than is sequestered. Carbon dioxide sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through photosynthesis and dissolution, respectively. These are two of the most common processes of natural CO_2 sequestration. Of the total annual human-caused CO_2 emissions, approximately 54 percent is sequestered through ocean uptake, northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46 percent of human-caused CO_2 emissions remain stored in the atmosphere (Seinfeld and Pandis 1998:1091).

Similarly, effects of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and TACs. GHG emissions generated in the U.S. can contribute to climate change that affects other countries or continents. Climate change has the potential to result in sea level rise (resulting in flooding of low-lying areas), affect rainfall and snowfall (leading to changes in water supply), affect temperatures and habitats (affecting biological resources and public health), and result in many other adverse environmental consequences. Because of the long atmospheric lifetimes of GHGs in the atmosphere, global climate change is expected to continue to occur over the next 100 plus years.

Global Surface Temperatures

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Program to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. Warming of the climate system now is considered to be unequivocal (IPCC, 2007b), with global surface temperature increasing approximately 1.33 degrees Fahrenheit (°F) over the last 100 years. The IPCC predicts increases in global average temperature globally of between 2° and 11°F over the next 100 years (IPCC, 2007c).

Attributing Climate Change—Greenhouse Gas Emissions

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural emissions sectors (CARB 2011a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (CARB 2011a).

Emissions of CO_2 are byproducts of fossil fuel combustion. Methane, a highly potent GHG, results from off-gassing (i.e., the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with anaerobic conditions (i.e., lack of oxygen) found in natural resources (e.g., wetlands), agricultural practices, and landfills. N_2O is attributable mainly to agricultural practices and soil management.

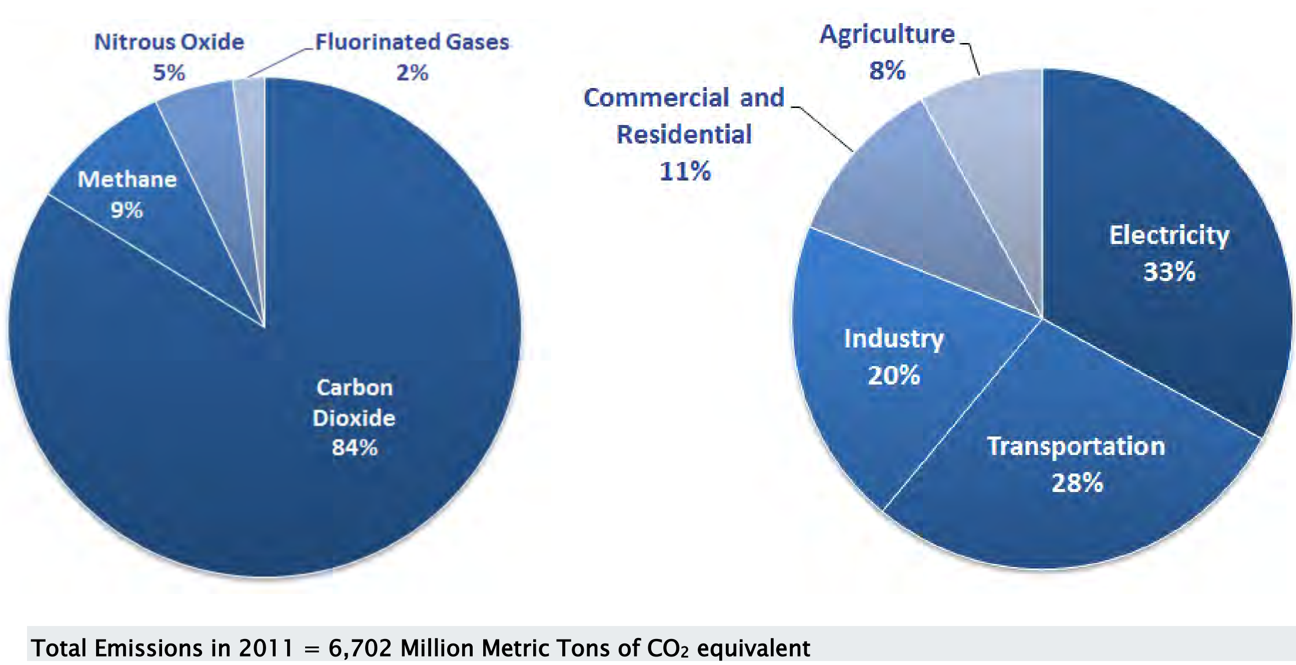
Land use decisions and development projects are not themselves GHG emissions sectors; however, land use decisions can affect the generation rate of GHG emissions from several sectors (e.g., transportation, energy consumption, water, and waste). In addition, activities associated with the long-term operation of development projects can result in direct or indirect GHG emissions. Direct emissions are GHG emissions that are generated at the site of consumption. For example, the use of natural gas for space or water heating generates direct GHG emissions because the natural gas is combusted at the site where the heat is used. Conversely, the use of electricity generates indirect GHG emissions because, although the consumer may utilize the electricity at their home, the generation of that electricity and (if fossil fuel is used for generation) consequent GHG emissions likely are being generated off-site.

Although the international, national, state, and regional communities are beginning to address GHGs, worldwide GHG emissions are expected to continue to rise over the next several years. The following section describes the major GHG emission sectors and their recent associated emissions at the national, state, and local level.

Existing Greenhouse Gas Emissions

U.S. Greenhouse Gas Emissions Inventory

Total U.S. GHG emissions in 2011 were 6,702 million metric tons (MMT) CO_2e (DOE 2013). **Figure 3.8-2** presents 2011 U.S. GHG emissions percentages by type of gas. GHG emissions in 2011 (84 percent) mainly were the result of CO_2 emissions. Other GHGs' contributions to total emissions were relatively small: 9 percent for CH_4, 5 percent MMT CO_2e for N_2O, and 2 percent for high-GWP GHGs (DOE 2013).



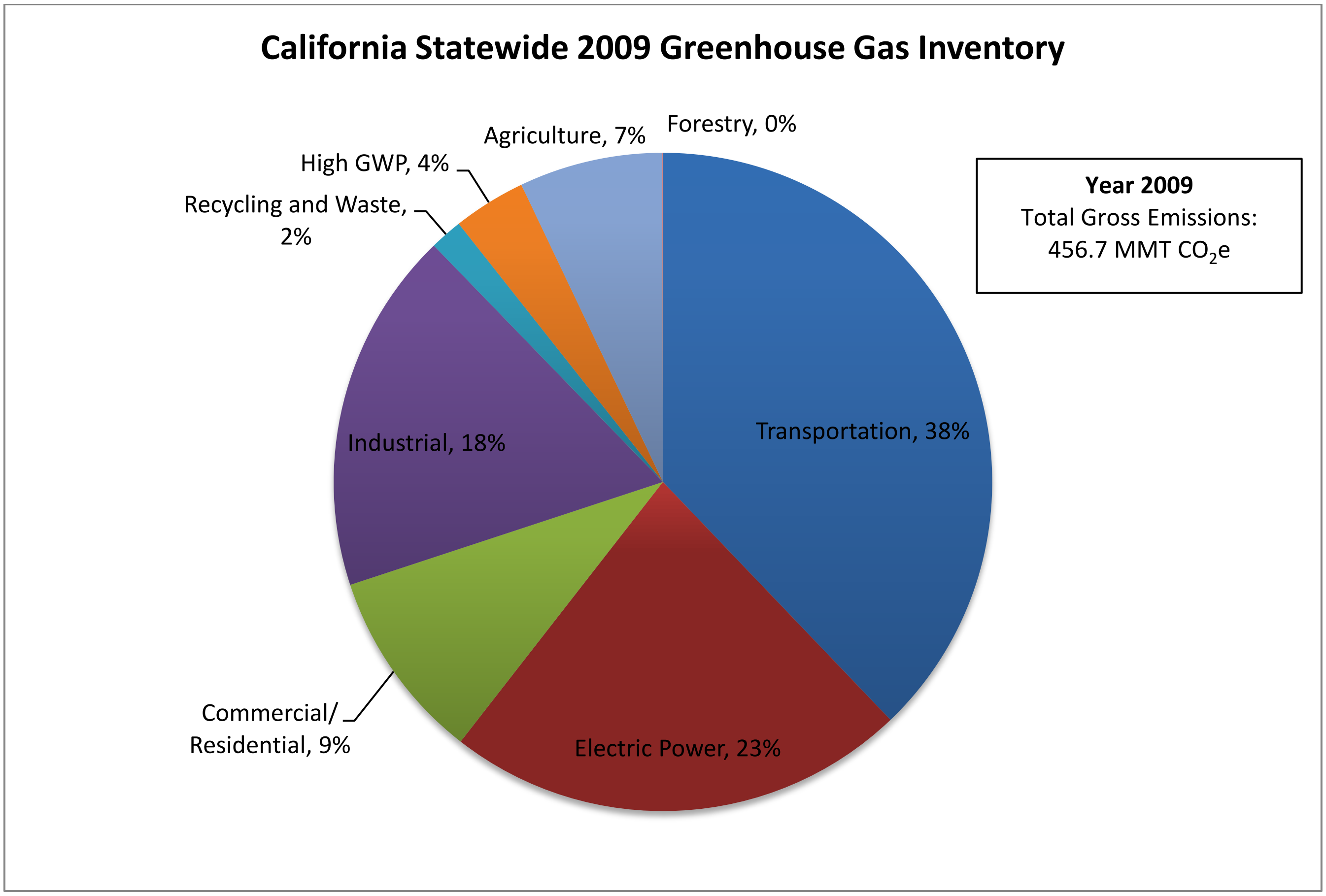
Source: DOE 2013

Figure 3.8-2: 2011 U.S. GHG Emissions by Gas

U.S. CO_2 emissions in 2011 resulted primarily from three factors: electricity generation and transmission, transportation, and industrial operations (DOE 2013). Residential and commercial operations accounted for 11 percent and agricultural operations for 8 percent of 2011 emissions.

California Greenhouse Gas Emissions Inventory

As the second largest emitter of GHG emissions in the U.S. and twelfth to sixteenth largest in the world, California contributes a substantial quantity of GHGs to the atmosphere (CEC 2006:i). Emissions of CO_2 are byproducts of fossil-fuel combustion and are attributable in large part to human activities associated with transportation, industry, electricity generation, natural gas consumption, and agriculture (CARB 2011a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (CARB 2011a) (see **Figure 3.8-3**).



Source: CARB 2011a

Figure 3.8-3: 2009 California GHG Emissions by Sector

Project Area

The 96-acre project area consists of an approximately 500-foot-long and 135-foot-high dam, the supporting infrastructure, and the waterways behind and in front of the dam. Existing project area GHG emissions are associated with operation of the dam and supporting infrastructure, and include emissions related to water release (i.e., mechanized release gates), other minimal energy uses, and maintenance vehicle trips. In addition, the lake acts as a GHG sink by absorbing CO_2 from the atmosphere. Ongoing activities at the dam emit CO_2e, with the majority of GHG emissions resulting from maintenance associated with the dam uses.

3.8.3 Regulatory Background

Federal

Clean Air Act

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for implementing the U.S. Clean Air Act (CAA). The U.S. Supreme Court ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. However, no federal regulations or policies exist regarding GHG emissions applicable to the proposed project. See the California Assembly Bill (AB) 1493 discussion below for further information on the California Clean Air Act (CCAA) Waiver.

Energy and Independence Security Act of 2007 and Corporate Average Fuel Economy Standards

The Energy and Independence Security Act of 2007 (EISA) amended the Energy Policy and Conservation Act (EPCA), to further reduce fuel consumption and expand production of renewable fuels. The EISA's most important amendment includes a statutory mandate for the National Highway Traffic Safety Administration (NHTSA) to set passenger car corporate average fuel economy (CAFE) standards for each model year (MY) at the maximum feasible level. This statutory mandate also eliminates the old default CAFE standard of 27.5 miles per gallon (mpg). The EISA requires that CAFE standards for MY 2011–2020 be set sufficiently high to achieve the goal of an industry-wide passenger car and light-duty truck average CAFE standard of 35 mpg. The rule making for this goal, per President Obama's request, has been divided into two separate parts. The first part, which was published in the Federal Register in March 2009, includes CAFE standards for MY 2011, to meet the statutory deadline (i.e., March 30, 2009). The second part of the rulemaking applies to MY 2012 and subsequent years. These would be the maximum CAFE standards feasible under the limits of the EPCA and EISA. The NHTSA and EPA currently are working together to develop a national program, targeting MY 2012–2016 passenger cars and light trucks.

EPA-Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act

In response to the mounting issue of climate change, EPA has taken the following actions to regulate, monitor, and potentially reduce GHG emissions. On December 7, 2009, EPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CCA (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the EPA Administrator should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., CO_2, CH_4, N_2O, HFCs, perfluorocarbons, and SF_6) in the atmosphere threaten the health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs, and thus to the threat of climate change.

The EPA Administrator found that atmospheric concentrations of GHGs endanger public health and welfare within the meaning of Section 202(a) of the CAA. The EPA Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare.

State

Because every nation emits GHGs, and thus makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can help to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions. Several statewide initiatives relevant to land use planning are discussed below; however, this does not represent a complete list of climate change-related legislation in California.

Assembly Bill 1493 "Pavley"—Light-Duty Vehicle GHG Emissions Standards

Signed into law 2002, AB 1493 required for the California Air Resources Board (CARB) to develop and adopt regulations by January 1, 2005, that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state."

To meet the requirements of AB 1493, CARB approved amendments to the California Code of Regulations (CCR) in 2004, adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1) require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), beginning with the 2009 MY. For passenger cars and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 pounds or less, the GHG emission limits for the 2016 MY are approximately 37 percent lower than the limits for the first year of the regulations, the 2009 MY. For light-duty trucks with LVW of 3,751 pounds to gross vehicle weight (GVW) of 8,500 pounds, as well as medium-duty passenger vehicles, GHG emissions would be reduced approximately 24 percent between 2009 and 2016.

In December 2004, a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against CARB to prevent enforcement of 13 CCR Sections 1900 and 1961 as amended by AB 1493 and 13 CCR 1961.1 (*Central Valley Chrysler-Jeep et al. v. Catherine E. Witherspoon, in Her Official Capacity as Executive Director of the California Air Resources Board, et al.*). The automobile makers' suit, in the U.S. District Court for the Eastern District of California, contended California's implementation of regulations that, in effect, regulate vehicle fuel economy, violates various federal laws, regulations, and policies.

On December 12, 2007, the court found that if California received appropriate authorization from EPA (the last remaining factor in enforcing the standard), then these regulations would be consistent with and have the force of federal law; thus, rejecting the automobile makers' claim. This authorization to implement more stringent standards in California was requested in the form of a CAA Section 209(b) waiver in 2005. After that time, EPA failed to act on granting California authorization to implement the standards. Then Governor Schwarzenegger and then Attorney General Edmund G. Brown filed suit against EPA for the delay. In December 2007, EPA Administrator Stephen Johnson denied California's request for the waiver to implement AB 1493. Johnson cited the need for a national approach to reducing GHG emissions, the lack of a "need to meet compelling and extraordinary conditions," and the supposition that emissions reductions that would be achieved through the Energy Independence and Security Act of 2007 as the reasoning for the denial (Office of the White House 2009).

The State of California filed suit against EPA for its decision to deny the CAA waiver. Under the Obama administration, EPA was directed to reexamine its position for denial of California's CAA waiver and for its past opposition to GHG emissions regulation. On June 30, 2009, California received the CAA waiver, which granted CARB the authority to regulate GHG emissions as a pollutant and, thus, implement the requirements of AB 1493.

Executive Order S-3-05

Executive Order S-3-05, which was signed into law in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea level. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions were to be reduced to the 2000 level by 2010, are to be reduced to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (Cal/EPA) to coordinate a multiagency effort to reduce GHG emissions to the target levels. The Secretary also must submit biannual reports to the Governor and State Legislature, describing progress made toward reaching the emission targets; impacts of global warming on California's resources; and mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of Cal/EPA created the California Climate Action Team (CCAT), made up of members from various state agencies and commission. CCAT released its first report in March 2006. The report proposed to achieve the GHG emissions targets by building on voluntary actions of California businesses, local governments, and communities, as well as through state incentive and regulatory programs.

Assembly Bill 32, California Global Warming Solutions Act of 2006

In September 2006, AB 32, the California Global Warming Solutions Act of 2006, was enacted. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction is to be accomplished through an enforceable statewide cap on GHG emissions that began to be phased in, starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emission reductions in an economically efficient manner and under conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Senate Bill 1368

Senate Bill (SB) 1368 is the companion bill of AB 32 and was signed into law in September 2006. SB 1368 requires the California Public Utilities Commission (CPUC) to establish a GHG performance standard for baseload generation from investor-owned utilities by February 1, 2007. The CEC must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.

Executive Order S-1-07

Executive Order S-1-07, enacted in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at over 40 percent of statewide emissions. It establishes a goal that the carbon intensity of transportation fuels sold in California is to be reduced by a minimum of 10 percent by 2020. This order also directed CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early action measure after meeting the mandates in AB 32. CARB adopted the LCFS on April 23, 2009.

Low Carbon Fuel Standard

The purpose of the LCFS (Title 17, Sections 95480–95490 of the California Code of Regulations) is to reduce GHG emissions by reducing the full fuel-cycle, carbon intensity of the transportation fuel pool used in the state. The LCFS applies to any transportation fuel that is sold, supplied, or offered for sale in California, and to any person responsible for a transportation fuel in a calendar year. The LCFS aims for a 10 percent life-cycle GHG emissions reduction from increased renewable fuel use in California by 2020.

Senate Bill 97

SB 97, enacted in August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the California Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Natural Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA by July 1, 2009. The California Natural Resources Agency adopted those guidelines on December 30, 2009, and the guidelines became effective March 18, 2010.

Senate Bill 375

SB 375, enacted in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPO) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets are to be updated every 8 years, but they can be updated every 4 years if advancements in emission technologies affect the reduction strategies to achieve the targets. CARB also is charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. Transportation projects became ineligible for funding programmed after January 1, 2012, for MPOs who failed to meet the GHG emission reduction targets.

This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City and county land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA are intended to incentivize qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

The Climate Change Scoping Plan

On December 11, 2008, CARB adopted its Climate Change Scoping Plan (Scoping Plan), which functions as a roadmap for CARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations (CARB 2009). The Scoping Plan contains the main strategies that California will implement to reduce CO_2e emissions by 169 MMT, or approximately 30 percent, from the state's projected 2020 emissions level of 596 MMT of CO_2e under a business-as-usual scenario. (This is a reduction of 42 MMT CO_2e, or almost 10 percent, from 2002–2004 average emissions, but requires the reductions in the face of population and economic growth through 2020). The Scoping Plan also breaks down the amount of GHG emissions reductions CARB recommends for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e),
- the LCFS (15.0 MMT CO_2e),
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e), and
- a renewable portfolio standard for electricity production (21.3 MMT CO_2e).

In addition, with respect to the proposed project, the Scoping Plan cites the need for future efficiency strategies and low carbon fuels for off-road vehicles; however, no defined GHG reductions or strategies have been developed for these actions (CARB 2009).

Addressing Climate Change at the Project Level: California Attorney General's Office
In January 2010, the California Attorney General's Office released a document to assist local agencies with addressing climate change and sustainability at the project level under CEQA. The document provides examples of various measures that may reduce the impacts related to climate change at the individual project level. As appropriate, the measures can be included as design features of a project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees).

Regional

BAAQMD CEQA Air Quality Guidelines

In June 2010, the Bay Area Air Quality Management District (BAAQMD) adopted its 2010 CEQA Air Quality Guidelines (2010 Guidelines) that established quantitative GHG thresholds of significance. The 2010 Guidelines include separate thresholds of significance for project- and plan-level analyses. At the project level, BAAQMD recommends that projects use a qualitative threshold of significance, based on the project's consistency with a "qualified greenhouse gas reduction plan." In addition, project-level analyses also can be evaluated using two quantitative thresholds, based on the project's annual GHG emissions (i.e., MT CO_2e/year) or the project's GHG efficiency (i.e., MT CO_2e/year/service population). The service population of a project is defined by the number of employees and residents. At the plan level, BAAQMD recommends that projects are evaluated using a quantitative GHG efficiency threshold (similar to that for project-level analyses) and a qualitative threshold based on the plan's consistency with a "qualified greenhouse gas reduction plan."

Local EBMUD Climate Change Monitoring and Response Plan

EBMUD has developed a Climate Change Monitoring and Response Plan to advise the District's future water supply, water quality, and infrastructure planning, to support "no regrets" infrastructure investment decisions, and to guide mitigation of District GHG emissions that contribute to climate change. The District has set a goal to achieve a 10 percent net reduction in GHG emissions from District facilities over the 2000 Baseline by 2015 (calendar years). The District participated in the California Climate Action Registry (CCAR) for three years and calculated, verified, and publicly-reported its District-wide CO_2 emissions inventories for calendar years 2005, 2006, and 2007. The District ended its participation in CCAR, since the benefits did not justify the verification and reporting costs. However, the District continues to quantify and track District-wide GHG emissions using CCAR protocols. EBMUD has already attained this goal. In 2012, the District caused 31,106 MT of CO_2 to be emitted, which is much less than the goal for 2015 (40,931 MT).

3.8.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines and guidance from BAAQMD. The proposed project would have a significant impact on GHG emissions if it would:

1. generate greenhouse gas emissions, either directly, indirectly, that may have a significant impact on the environment; or

2. conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

As stated in Appendix G, the significance criteria established by the applicable air quality management district (i.e., Bay Area Air Quality Management District) may be relied on to make the above determinations. BAAQMD adopted GHG thresholds in their 2010 Guidelines, identified below, but because of a subsequent Alameda County Superior Court decision, these thresholds were effectively put on-hold. However, on August 13, 2013, the Court of Appeals ruled in favor of the BAAQMD 2010 Guidelines, finding that the 2010 Guidelines are not a "project" subject to CEQA review and that the guidelines should be reinstated. Accordingly, this analysis uses GHG thresholds and guidance from the 2010 Guidelines to evaluate the proposed project's GHG emissions. As part of the BAAQMD's 2010 CEQA Guidelines, BAAQMD developed a quantitative, "bright line" threshold of significance to evaluate GHG emissions. In addition, BAAQMD also recommends that projects, similar to the Appendix G Checklist criterion, be evaluated based on their consistency with applicable GHG reduction plans. Thus, the proposed project also would have a significant impact on GHG emissions if it would not be consistent with any of the following BAAQMD thresholds of significance:

- Criterion 1 (referenced in the Project Impacts and Mitigation Measures discussed below): Generate annual operational GHG emissions that exceed 1,100 metric tons (MT) of carbon dioxide equivalent (MT CO_2e); or

- Criterion 2 (referenced in the Project Impacts and Mitigation Measures discussed below): Be inconsistent with a qualified climate action plan or program.

Criterion 1 was developed to apply to the annual long-term operational GHG emissions, and not necessarily to the total short-term construction emissions, such as those associated with construction of the proposed project. Although BAAQMD does not explicitly recommend amortizing construction emissions over the lifetime of a project, other air quality regulatory agencies including the Sacramento Metropolitan Air District and the California Air Pollution Control Officers Association have recommended this method for evaluating construction-related GHG emissions. Therefore, because the proposed project is primarily a construction project, its construction-related emissions have been amortized over the assumed project lifetime (i.e., 100 years), to calculate annual emissions and compare them with the threshold in Criterion 1.

Analysis Methodology

The proposed project would generate short-term and temporary construction-related GHG emissions. Following completion of construction activities, it is not anticipated that the proposed project would result in a net increase in operational activities. Therefore, because operational emissions would remain unchanged and no increase is anticipated, this analysis did not model operational-related emission. For construction emissions, all of the emissions models used (CalEEMod Version 2011.1.1, EMFAC2011, and OFFROAD2007) to model air quality emissions also contain emission factors for GHG emissions. For GHG emissions, EMFAC2011 includes emission factors for business-as-usual GHG emissions as well as emission factors that incorporate AB 1493 and LCFS. This impact analysis presents both business-as-usual emissions and emissions with statewide reduction measures incorporated. However, the emissions with statewide measure incorporated were used to compare with the threshold of significance. Therefore, the proposed project's GHG emissions were modeled using the same methods and models as described in Section 3.7, Air Quality. Please see the Analysis Methodology section in Section 3.7, Air Quality and **Appendix G** for a more detailed description of modeling assumptions and methods.

Project Impacts and Mitigation Measures

Project impacts related to GHG addressed in this impact discussion are divided into project components where the impacts can vary by component. Otherwise, the impacts are discussed generally, covering all project components.

Impact GH-1: The proposed project would not generate annual GHG emissions that exceed 1,100 metric tons (Criterion 1). (Less than Significant)

All Project Components—Construction

Construction activities at the dam (both Conventional Earthwork and CDSM methods) would generate GHG exhaust emissions associated with heavy-duty construction equipment, material delivery and haul trucks, and construction worker vehicles. Heavy-duty construction equipment would be used on-site at the dam site for construction of project components, site preparation, and soil excavation among others. Material delivery trucks would come to the project site intermittently to deliver construction materials and equipment. Haul trucks would bring soil materials between the dam site and proposed stockpile sites. Lastly, daily construction worker trips would be generated from workers coming to and leaving from the project site. The GHG emissions associated with these sources would vary depending on which construction option is selected. For example, the CDSM option may require lowering the groundwater at the dam's downstream face to excavate a level working platform, but the dewatering requirement would be significantly less than for the Conventional Earthwork option. Thus, the modeling for each construction option included GHG emissions associated with heavy-duty construction equipment, material delivery and haul trucks, and construction worker vehicles for the stockpiles and outlet works, using the on-site haul routes. The Conventional Earthwork option would require a longer overall construction schedule including more on-road haul truck movement than the CDSM option. In addition, more construction equipment would be required for the Conventional Earthwork option than that required for the CDSM option. Therefore, the Conventional Earthwork option is expected to result in higher overall GHG emissions.

Table 3.8-1 and **Table 3.8-2** show a summary of quantified GHG emissions related to construction activities for Conventional Earthwork and CDSM options, respectively, at the dam. As described above in Analysis Methodology, the on-road emissions shown in **Table 3.8-1 and 3.8-2** account for the GHG reductions associated with implementation of existing state vehicle standards (Pavley I) and LCFS.

BAAQMD's 2010 Guidelines include a GHG threshold of significance for operational emissions but no GHG threshold of significance for construction emissions. Lacking a specific EBMUD GHG emissions reduction goal and a specific BAAQMD construction-related GHG emissions threshold, the proposed project's annual amortized construction GHG emissions have been compared to the BAAQMD "bright line" GHG emissions threshold of 1,100 MT CO_2e.

Table 3.8-1
Proposed Project's Conventional Earthwork Option Construction-Related GHG Emissions

Conventional Earthwork Construction Phase/ Emission Source	Business-as-Usual Metric Tons CO_2e	With Statewide Reductions Metric Tons CO_2e
Outlet Works subtotal	192	188
Off-Road	84	84
On-Road	108	104
Conventional Earthwork subtotal (includes dewatering)	1,117	1,098
Off-Road	488	488
On-Road	629	610
Internal and External Truck Trips subtotal	121	119
Total Emissions	**1,429**	**1,405**
Amortized Emissions [1]	**14.29**	**14.05**

Notes:
CO_2e = carbon dioxide equivalent
[1] Total construction-related emissions were amortized over 100-years, which is the anticipated lifetime of the proposed project.
Source: Data compiled by AECOM in 2013

Table 3.8-2 **Proposed Project's CDSM Option Construction-Related GHG Emissions**		
CDSM Construction Phase/ Emission Source	**Metric Tons CO_2e**	**With Statewide Reductions Metric Tons CO_2e**
Outlet Works subtotal	192	188
Off-Road	84	84
On-Road	108	104
CDSM subtotal	637	627
Off-Road	337	337
On-Road	300	291
Internal and External Truck Trips subtotal	121	119
Total Emissions	**950**	**934**
Amortized Emissions [1]	**9.50**	**9.34**

Notes: CO_2e = carbon dioxide equivalent
[1] Total construction-related emissions were amortized over 100-years, which is the anticipated lifetime of the proposed project.
Source: Data compiled by AECOM in 2013

Conventional Earthwork Option

The Conventional Earthwork option would result in approximately 14 MT CO_2e per year over the lifetime of the project, which would not exceed the annual 1,100 metric tons CO_2e threshold. Typical land use development projects for which the threshold has been developed have a lifetime of approximately 30 years. Even if the proposed project's total construction emissions were conservatively amortized over a 30-year period, amortized emissions (i.e., 47 MT CO_2e per year) would remain substantially below the threshold of significance. Therefore, the impact would be *less than significant*. Furthermore, implementation of exhaust-related control measures included as part of **Mitigation Measure AQ-2.1** would further reduce the GHG emissions impact.

CDSM Option

The CDSM option would result in approximately 10 MT CO_2e per year over the lifetime of the project, which would not exceed the annual 1,100 metric tons CO_2e threshold. Similar to the Conventional Earthwork option, even if the proposed project's total construction emissions were amortized conservatively over a 30-year period, amortized emissions (i.e., 32 MT CO_2e per year) would remain substantially below the threshold of significance. Therefore, the CDSM option would have a *less-than-significant* GHG emissions impact. Furthermore, implementation of exhaust-related control measures included as part of **Mitigation Measure AQ-2.1** would further reduce the GHG emissions impact.

Impact GH-2: The proposed project would not result in net new operation-related GHG emissions (Criterion 1). (Less than Significant)

After completion of construction, the operation and maintenance of the dam, lake, and appurtenant facilities would be the same as for the existing conditions. Specifically, the proposed project would not develop any land uses that would generate or attract additional vehicle trips beyond existing levels, and the current operations and maintenance activities, which include infrequent vehicle trips to inspect the dam, are anticipated to continue without change.

EBMUD's Chabot Dam and Lake Chabot also were designed to optimize use of gravity flow conditions to convey waters downstream. Among other requirements, EBMUD operates the lake in an integrated manner to limit the production of GHG emissions by minimizing energy usage to convey the water for emergency supply (fire suppression or drinking water), recreation, conservation/storage of local runoff, or non-potable water supply.

Thus, no net increase in operational GHG emissions related to operation of Chabot Dam would occur, after the proposed project is constructed. Therefore, the impact would be *less than significant*.

Impact GH-3: The proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions (Criterion 2). (Less than Significant)

The project area is located within the jurisdictions of the City of Oakland, the City of San Leandro, and a portion of unincorporated Alameda County (Castro Valley). Although the cities of Oakland and San Leandro have adopted a Climate Action Plan, they do not directly relate to this utility-type proposed project. However, because EBMUD promotes water conservation, its conservation actions through the proposed project could help local cities meet their Climate Action Plan goals. In addition, EBMUD has developed and implemented a climate change monitoring and response plan to inform future water supply, water quality, and infrastructure planning.

Proposed project-related construction GHG emissions have been conservatively compared with the 2010 BAAQMD Guidelines for operational GHG emissions. BAAQMD's 2010 thresholds and methodologies take into account implementation of statewide regulations and plans, such as the AB 32 Climate Change Scoping Plan and adopted State regulations. Furthermore, the proposed project's GHG emissions would be reported to the California Climate Action Registry, along with all EBMUD GHG emissions, as currently is done. Therefore, the impact would be *less than significant*.

3.8.5 Impact and Mitigation Summary

Table 3.8-3 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

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Table 3.8-3
Greenhouse Gas Emissions Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route	Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route	Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route	Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route	Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route
Impact GH-1: The proposed project would not generate annual GHG emissions that exceed 1,100 metric tons (Criterion 1).	LTS	LTS	LTS	LTS	LTS Greater emissions than the CDSM option due to the additional amount of construction equipment use and haul truck trips.	LTS Greater emissions than the CDSM option due to the additional amount of construction equipment use and haul truck trips.	LTS Greater emissions than the CDSM option due to the additional amount of construction equipment use and haul truck trips.	LTS Greater emissions than the CDSM option due to the additional amount of construction equipment use and haul truck trips.
Impact GH-2: The proposed project would not result in net new operation-related GHG emissions (Criterion 1).	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Impact GH-3: The proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions (Criterion 2).	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

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3.9 Noise and Vibration

3.9.1 Approach to Analysis

This section discusses the existing noise environment in the vicinity of the project area, describes the pertinent state and local laws and guidelines, presents the potential construction impacts, and identifies potential noise mitigation measures, if required.

Noise Descriptors

Sound is characterized by various parameters that describe sound frequencies, the speed of propagation, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound.
The decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Because the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called "A-weighting," expressed as "dBA." The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA (Beranek 1988). A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated. **Table 3.9-1** shows some representative noise sources and their corresponding noise levels in dBA.

The equivalent sound pressure level (L_{eq}) is defined as the average noise level of a source or environment, on an energy basis, for a stated period of time (e.g., hourly or daily). In practice, the level of a sound source is measured using a sound level meter that includes an electrical filter corresponding to the A-weighted curve.

In determining the daily level of environmental noise, the difference in response of people to daytime and nighttime noises must be considered. Nighttime exterior background noise levels are generally lower than daytime levels. Most household noise levels also decreases at night and exterior noise becomes more noticeable. Furthermore, most people sleep at night and are more sensitive to noise intrusion. The day-night sound level rating (L_{dn}) divides the day into daytime and nighttime with a 10 dBA weighting factor applied to nighttime levels.

To account for human sensitivity to nighttime noise levels, the Community Noise Equivalent Level (CNEL) index was developed. CNEL is a noise index that accounts for the greater awareness and sensitivity toward noise during the evening and nighttime hours. CNEL values are calculated by averaging hourly L_{eq} sound levels for a 24-hour period, and apply a weighting or penalty factor to evening and nighttime L_{eq} values.

Table 3.9-1
Typical Sound Levels

Noise Generators (Distance from Noise Source)	A-Weighted Sound Level in Decibels (dBA)	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100 feet)	130		
Jet Takeoff (200 feet)	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100 feet)	100		Very Loud
Freight Cars (50 feet)	90	Boiler Room Printing Press Plant	
Pneumatic Drill (50 feet) Freeway (100 feet) Vacuum Cleaner (10 feet)	80 70	In Kitchen With Garbage Disposal Running	Moderately Loud
	60	Data Processing Center	
Light Traffic (100 feet) Large Transformer (200 feet)	50	Department Store	
	40	Private Business Office	Quiet
Soft Whisper (5 feet)	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Alameda County Community Development Agency 2010

Increases in noise level can be described in the following ways (Beranek 1988):

- except in carefully controlled laboratory experiments, humans cannot perceive a change of 1 dBA;
- outside the laboratory, a 3 dBA change is considered a "just-detectable" difference;
- a change in noise level of at least 5 dBA is readily noticeable; and
- a 10 dBA increase is subjectively heard as approximately a doubling in loudness, while an increase of 20 dBA is four times as loud, and so on.

Sound from a small localized source (a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. To calculate the noise level at a given distance from a noise source, the noise levels are mathematically propagated using the Inverse Square Law of Noise Propagation. In sum, this formulation states that noise decreases by approximately 6 dBA with every doubling of the distance from the source (Beranek 1988). Under real-life conditions, however, interactions of the sound waves with the ground often results in slightly greater attenuation. Other factors that affect the attenuation of sound with distance include existing structures, topography, foliage, and ground cover. Atmospheric conditions that can have an effect on the transmission of noise include wind, temperature, humidity and precipitation. Wind can increase sound levels if it is blowing from the noise source to the receiver; conversely, it can reduce noise levels if blowing in the opposite direction. Noise propagation can also be significantly affected when the temperature gradient is such that an inversion is formed. Other atmospheric conditions, such as humidity and precipitation are rarely severe enough to result in significant changes in noise level propagation.

Vibration

Vibration is a unique form of low-frequency noise because its energy is carried through structures and the earth, whereas noise is carried through the air. Thus, vibration is generally felt rather than heard. Typically, groundborne vibration generated by human-generated activities attenuates rapidly as distance from the source of the vibration increases. Actual human and structural response to different vibration levels is influenced by a combination of factors, including soil type, distance between the source and receptor, duration, and the number of perceived events. If great enough, the energy transmitted through the ground as vibration can result in structural damage.

To assess the potential for structural damage associated with vibration, the vibratory ground motion in the vicinity of the affected structure is measured in terms of point peak velocity/peak particle velocity (PPV) in the vertical and horizontal directions (vector sum). A freight train passing at 100 feet can cause PPVs of 0.1 inch per second. Minor cosmetic damage to buildings can begin in the range of 0.5 inch per second (Caltrans 2004).

3.9.2 Environmental Setting

Noise Sources in the Project Vicinity

The project would be located in an open space area, owned by EBMUD and operated by the East Bay Regional Park District (EBRPD). Access to Chabot Dam is provided from public roadways as well as from Chabot Park and Lake Chabot Regional Park, operated by the City of San Leandro and EBRPD, respectively. Residential areas surround the dam site to the west, northwest, and southwest. Lake Chabot and park land are situated to the east. **Figure 2-14** in Chapter 2, Project Description shows the jurisdictional boundaries in relation to the project area. The primary source of noise in the project vicinity is vehicle traffic, generated by residents and recreational users.

The nearest residences to the project are on Estudillo Avenue and Lake Chabot Road in the City of San Leandro. Existing noise levels observed in this area were obtained from a noise level analysis provided in the City of San Leandro General Plan Update, provided in **Appendix H** (City of San Leandro 2002). Based on the noise level contours, 60 dB L_{dn} was found to be representative of the existing ambient background noise level in the project vicinity.

Existing Sensitive Noise Receptors

Nearby residences are considered sensitive noise receptors. Residential neighborhoods with hundreds of homes are located to the west, northwest, and southwest of the project area. The nearest residences are located approximately 500 feet from the proposed Park Stockpile and haul routes, and 800 feet from the Filter Pond Stockpile near the east end of Estudillo Avenue in San Leandro. The nearest residences are 1,500 feet southwest and 150 feet upslope from the Chabot Dam excavation area along Astor Court in San Leandro, adjacent to Lake Chabot Road.

Park users are not considered sensitive receptors for this analysis because they would not be in the project area due to the closure of Chabot Park and portions of trails within Lake Chabot Regional Park during construction.

3.9.3 Regulatory Background

Federal

No federal regulation related to noise and vibration is applicable to the proposed project.

State

The State of California does not promulgate statewide standards for environmental noise but requires each city and county to include a noise element in its general plan (California Government Code Section 65302[f]). In addition, Title 4 of the California Code of Regulations has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure.

The California Department of Transportation (Caltrans) regulates construction vibration for Caltrans projects, in accordance with standards established by the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans 2004). Guidance from this manual may be used as a source to guide vibration impacts for other projects. Continuous sources include the use of vibratory compaction equipment and other construction equipment that create vibration other than in single events. Thresholds for continuous sources are 0.5 per second PPV for structural damage.

Local

California Government Code

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, or transmission of water (California Office of Administrative Law 2013a). However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

Alameda County General Plan

Alameda County does not have a countywide land use or circulation element but has adopted area plans that meet the California Government Code's requirements for these elements for Castro Valley and other unincorporated areas. The Alameda County General Plan is comprised of several documents covering particular planning areas and includes the General Plan for Castro Valley (ACCDA 2012). The General Plan for Castro Valley references the Countywide Noise Element that establishes interior and exterior noise average noise levels (L_{dn}) of 45 dBA and 55 dBA, respectively, for residential land uses based on federal noise level standards. The Noise Element also references noise compatibility standards that were developed by the Association of Bay Area Governments. These standards identify a CNEL of 65 dBA or less as a basis for finding little noise impact on residential land uses, 65 to 70 dBA as a moderate impact, and any level above 70 dBA as a significant impact (Alameda County 1994).

Alameda County Code of Ordinances

Chapter 6.60, Section 6.60.040 A of the Alameda County Code of Ordinances establishes exterior noise level standards for residences, schools, hospitals, churches, or public libraries, as shown in **Table 3.9-2**.

Section 6.60.070 E, however, provides an exemption for construction: "The provisions of this chapter shall not apply to noise sources associated with construction, provided said activities do not take place before seven a.m. or after seven p.m. on any day except Saturday or Sunday, or before eight a.m. or after five p.m. on Saturday or Sunday."

Table 3.9-2
Alameda County Exterior Noise Level Standards

Cumulative Number of Minutes in Any One Hour Time Period	Daytime 7:00 a.m. to 10:00 p.m. (A-weighted decibels)	Nighttime 10:00 p.m. to 7:00 a.m. (A-weighted decibels)
30	50	45
15	55	50
5	60	55
1	65	60
0	70	
Source: Alameda County Code of Ordinances 2013		

City of Oakland General Plan

The City of Oakland General Plan contains noise and land use compatibility guidelines that noise levels of 50 to 60 CNEL normally are acceptable and 60 to 70 CNEL are conditionally acceptable for residential land uses (City of Oakland 2005). Conditionally acceptable is interpreted to mean that development should be undertaken only after an analysis of noise-reduction requirements is conducted and, if necessary, noise mitigating features are included in the design.

City of Oakland Noise Ordinance

The City of Oakland Code of Ordinances, Section 17.120.050, Noise, G., regulates temporary construction or demolition. Maximum allowable residential receiving noise levels are listed in **Table 3.9-3**.

The City of Oakland Code of Ordinances, Section 17.120.060, Vibration (City of Oakland 1998), states, "all activities shall be so operated as not to create a vibration which is perceptible without instruments by the average person at or beyond any lot line of the lot containing such activities." Ground vibration caused by motor vehicles, trains, and temporary construction or demolition work is exempted from this standard.

Table 3.9-3
City of Oakland Summary Table of Maximum Allowable Sound Levels

Weekdays[1]	Saturdays & Sundays[1]
7:00 a.m. to 7:00 p.m. with 80 dBA limit for <10 days and 65 dBA limit for >10 days	9:00 a.m. to 8:00 p.m. with 65 dBA limit for <10 days and 55 dBA limit for>10 days

Note:
[1] Noise Limits—Section 17.120.050 of the Oakland Planning Code stipulates that the noise level between 7:00 a.m. and 10:00 p.m. at the property line of any legal residential activity, school, child care, health care, or nursing home, public open space, and similarly sensitive land use must not exceed 60 dBA more than 20 minutes in any hour, 65 dBA more than 10 minutes in any hour, 70 dBA more than 5 minutes in any hour, 75 dBA more than 1 minute in any hour, and 80 dBA for any period of time. These limits are reduced by 15 dBA between 10:00 p.m. and 7:00 a.m. These standards result in a converted Leq noise limit equivalent of 68 dBA between 7:00 a.m. and 10:00 p.m. and 53 dBA between 10:00 p.m. and 7:00 a.m.
Source: City of Oakland Code of Ordinances 1998

City of San Leandro General Plan

Noise standards within San Leandro are set forth in the Noise Element of the City of San Leandro General Plan Update (City of San Leandro 2002). The Noise Element contains goals and policies so that noise associated with the day-to-day activities of San Leandro residents and businesses do not impede the peace and quiet of the community.

Policy 35.03 of the Noise Element establishes residential exterior noise standards, to maintain an exterior noise level of no more than 60 dB L_{dn} in residential areas. Recognizing that some San Leandro neighborhoods already exceed this noise level, the policy encourages a variety of noise abatement measures that benefit these areas.

City of San Leandro Noise Ordinance

According to Section 4-1-1115(b) of the City of San Leandro's Noise Ordinance (City of San Leandro 2013), the City allows construction work or related activity that is adjacent to or across a street or right-of-way from a residential use between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, or between 8:00 a.m. and 7:00 p.m. on Saturday and Sunday. No such construction is permitted on federal holidays.

The noise ordinance contains an exemption in Section 4-1-1120(e) for public health, welfare, and safety activities that overrides Section 4-1-1115(b). The exemption states, "the provisions shall not apply to construction maintenance and repair operations conducted by public agencies, franchisees of the City and/or utility companies or their contractors which are deemed necessary to serve the best interests of the public and to protect the public health, welfare and safety."

3.9.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines.

The proposed project would have a significant noise impact if it would:

1) expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2) expose persons to or generate excessive groundborne vibration or groundborne noise levels;

3) result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

4) result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

5) for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels; or

6) for a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

The project area is not located within the boundaries of an airport land use plan or within 2 miles of a public or private airstrip. Thus no impact related to airport noise would occur, and criteria 5 and 6 are not discussed further in this document.

Project Impacts and Mitigation Measures

Noise impacts were evaluated based on the maximum noise levels experienced by the nearest sensitive receptors. Maximum noise levels were estimated for activities at the dam face, soil stockpiles, and haul routes.

Impact NO-1: The proposed project would expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, and would result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the proposed project (Criteria 1 and 4). (Less than Significant with Mitigation Incorporated)

The nearest residences to the project area are in the City of San Leandro; however, San Leandro's noise ordinance does not specify acceptable construction noise levels for comparison, only allowable time frames. The City of Oakland's noise ordinance specifies acceptable levels for construction-related noise, and therefore was used for this analysis. Project-related noise increases were compared to the noise level for construction time frames contained in the City of Oakland noise ordinance. The City's standards require a noise limit equivalent of 68 dBA between 7:00 a.m. and 10:00 p.m., and 53 dBA between 10:00 p.m. and 7:00 a.m. Ambient noise levels in the project vicinity were considered when determining appropriate performance standards for mitigation measures.

All Project Components—Construction Noise

Construction activity would contribute to increased noise levels in the project vicinity, resulting from the use of stationary and mobile equipment and vehicles. The project area is located near a single-family residential area that would be subjected to elevated daytime and potentially nighttime noise levels during construction. Section 2.9.3 lists the equipment that would likely be used to complete construction for the outlet works, and the CDSM or Conventional Earthwork options. Noise levels associated with each piece of equipment are shown in **Table 3.9-4**.

Construction activity also would require haul truck and construction vehicle and equipment traffic (collectively known as truck traffic). Truck noise levels would depend on the vehicle speed, load, terrain, and other factors. The effects of construction-related truck traffic would depend on the level of background noise already occurring at a particular receptor site. In quiet environments or during quieter times of the day (such as early morning, when "extra legal" trucks periodically could arrive at the project site as early as 6:30 a.m.; see Chapter 2, Section 2.7.1), truck noise generally would be a single-event disturbance; although the hourly average associated with short, single events would not be very high, individual noise peaks of up to 84 dBA at 50 feet could occur during a single truck's passage.

Table 3.9-4
Construction Equipment 50-Foot Noise Emission Limits

Equipment Category	Maximum Noise Level (A-weighted decibels)[1,2]	Short/Continuous
Air Compressor[3]	70	Short
Bulldozer	85	Continuous
Concrete Pump	76	Continuous
CDSM Rig	75	Continuous
Crane	85	Continuous
Dump Truck	84	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	78	Continuous
Grader	85	Continuous
Grout Batching	85	Continuous
Hydraulic Backhoe	90	Short
Jackhammer	85	Short
Sheepfoot or Vibrating Roller	80	Continuous
Truck (dump, delivery)	84	Continuous

Notes:
1 Measured at 50 feet from the construction equipment, with a "slow" (1 second) time constant.
2 Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.
3 Portable air compressor rated at 75 cubic feet per minute or greater and that operates at greater than 50 pounds per square inch.
Source: EBMUD 2010 and Burleson Consulting 2013

Truck noise in the early morning would be a single-event disturbance and would be short in duration. As stated in Section 2.10, Environmental Controls, the construction specifications would require site access to be open 30 minutes before the start of the work shift. Therefore, the large trucks would not be idling or queuing on Estudillo Avenue. In noisy environments or during less noise sensitive hours, truck noise is perceived as a part of the total noise environment rather than as an individual disturbance.

Construction would occur in several phases. Each phase would have a unique combination of construction equipment operating. Based on the noise levels for typical construction equipment, the loudest piece of equipment used at any project work site would be the hydraulic backhoe, at 90 dBA at 50 feet. The maximum noise levels for other construction equipment (i.e., drill rig, bulldozer, crane, excavator, grader, and jackhammer) would be 85 dBA at 50 feet.

Tables 3.9-5 and 3.9-6 present noise levels from construction equipment and attenuation at the nearest sensitive receptors. The nearest residence is within 1,500 feet of the dam excavation area and within 500 feet of the Park Stockpile and haul routes.

A hydraulic backhoe would be used during pavilion and tower demolition for the outlet works construction phase, scheduled to last approximately 15 weeks. The CDSM option could occur simultaneously with the outlet tower works. The CDSM option concurrent with the outlet works construction would represent the **worst case daytime scenario** because the hydraulic backhoe would be operating concurrently with other heavy equipment for the outlet works (see **Table 3.9-5**). The maximum noise level generated under this worst case daytime scenario would be 92 dBA at 50 feet. This noise level would attenuate to 60 dBA at the nearest residence because of distance and other attenuation factors. Earth-moving equipment and dump trucks would generate noise levels up to 87 dBA at the Park Stockpile and haul routes that are within 500 feet of residences. This noise level would attenuate to 66 dBA at the nearest residence because of distance and other attenuation factors.

Under the CDSM option, the potential would exist to conduct nighttime construction for up to a 12-week period (see **Table 3.9-6**). Under this scenario, only the CDSM component would occur at night; stockpile and tower demolition activities would not be conducted at night. The CDSM option would occur near the dam face, and the combined worst case nighttime noise level would be 89 dBA. This noise level would attenuate to 57 dBA at the nearest residence because of distance and other attenuation factors.

As shown in **Table 3.9-5**, the worst case combined attenuated daytime noise level would be 66 dBA, which would be less than the significance criteria of 68 dBA. As shown in **Table 3.9-6**, the worst case attenuated combined nighttime noise level would be 57 dBA, which would exceed the significance criteria of 53 dBA. The nighttime construction noise impacts would be *potentially significant.* Implementation of **Mitigation Measure NO-1.1**, would require noise control techniques and would reduce construction noise levels to a *less-than-significant level with mitigation incorporated*.

Noise would be generated from truck traffic on the haul routes and stockpile areas. Haul trucks (a maximum of 583 internal round trips per day) would transport material between the dam excavation area to the Filter Pond and Park Stockpiles using the haul routes. More haul trucks would be required to transport excavated material for the Conventional Earthwork option (up to 170,000 cubic yards) than the CDSM option (up to 46,500 cubic yards).

Table 3.9-5
Estimated Construction Daytime Noise Levels at the Nearest Sensitive Receptors and Consistency with Significance Criteria

Receptor Location	Maximum Noise Source	Reference Hourly Leq in dBA at 50 feet[1]	Distance between Project Component and Nearest Receptor[2]	Distance Attenuation[3]	Adjusted L_{eq} for distance	Leq with Additional Attenuation	City of Oakland Daytime Noise Standard Criterion	Unmitigated L_{eq} Exceeds Criterion?	Reduction because of Engine Controls[4]	Mitigated L_{eq} with Engine Controls	City of Oakland Daytime Noise Standard Criterion	Mitigated L_{eq} Exceeds Criterion?
Nearest sensitive receptors on Astor Court in San Leandro, about 1,500 feet from Chabot Dam and about 500 feet from the Park Stockpile and haul routes	Earth-moving Equipment	85	500	-20	65	64	68	No	-10	54	68	No
	Trucks	84	500	-20	64	63	68	No	-10	53	68	No
	Stockpile Combined	**87**	500	-20	67	**66**	**68**	No	-10	**56**	**68**	**No**
	Materials Handling (Grout Batching)	85	1,500	-29	56	53	68	No	-10	43	68	No
	Stationary Equipment (CDSM, pump, and generator)	82[5]	1,500	-29	53	50	68	No	0	50	68	No
	Hydraulic Backhoe	90	1,500	-29	61	58	68	No	-6	52	68	No
Worst Case Daytime Combined Noise Level		**92**	1,500	-29	63	**60**	**68**	**No**	NA	**54**	**68**	No

Notes:
NA = not applicable or no applicable standard
1 Reference noise levels represent the highest noise level for the earth-moving equipment and impact equipment (without controls) listed in Table 3.9-4, at 50 feet.
2 The distances represent the minimum distance (in feet) between the project component and the nearest receptor.
3 The noise level at the nearest residence would be expected to be further reduced by at least 1 dBA (500 feet) and 3 dBA (1,500 feet) because of the elevation difference and the attenuation provided by trees and vegetation.
4 Estimated levels could be attained by selecting quieter procedures or machines and implementing noise-control features that would not require major redesign or extreme cost (e.g., improved mufflers, equipment redesign, use of silencers, shields, shrouds, ducts, and engine enclosures).
5 The reference noise level for a grout batching plant is similar to a concrete mixer, while the reference noise level for stationary equipment represents a combined level reflecting simultaneous operation of two CDSM rigs (75 dBA), pump (76 dBA), and generator (78 dBA).
Source: Compiled by Burleson Consulting in 2013

Table 3.9-6
Estimated Construction Nighttime Noise Levels at the Nearest Sensitive Receptors and Consistency with Significance Criteria

Receptor Location	Maximum Noise Source	Reference Hourly Leq in dBA at 50 feet[1]	Distance between Project Component and Nearest Receptor[2]	Distance Attenuation	Adjusted L_{eq} for distance	Leq with Additional Attenuation[3]	City of Oakland Nighttime Noise Standard Criterion	Unmitigated L_{eq} Exceeds Criterion?	Reduction because of Engine Controls[4]	Mitigated L_{eq} with Engine Controls	City of Oakland Nighttime Noise Standard Criterion	Mitigated L_{eq} Exceeds Criterion?
Nearest sensitive receptors on Astor Court in San Leandro, about 1,500 feet from Chabot Dam[5]	Earth-moving Equipment	85	1,500	-29	56	53	53	No	-10	43	53	No
	Materials Handling (Grout Batching)	85	1,500	-29	56	53	53	No	-10	43	53	No
	Stationary Equipment (CDSM, pump, and generator)	82[6]	1,500	-29	53	50	53	No	0	50	53	No
Worst Case Nighttime Combined Noise Level[7]		**89**	1,500	-29	60	**57**	**53**	**Yes**	**NA**	**51**	**53**	**No**

Notes:
NA = not applicable or no applicable standard
1 Reference noise levels represent the highest noise level for the earth-moving equipment and impact equipment (without controls) listed in Table 3.9-4, at 50 feet.
2 The distances represent the minimum distance (in feet) between the project component and the nearest receptor. Nighttime work will not occur at the park or filter pond stockpile and haul routes will not be used. Therefore, distances are only measured from Chabot Dam to the nearest residence.
3 The noise level at the nearest residence would be expected to be further reduced by at least 3 dBA (1,500 feet) because of the elevation difference and the attenuation provided by trees and vegetation.
4 Estimated levels could be attained by selecting quieter procedures or machines and implementing noise-control features that would not require major redesign or extreme cost (e.g., improved mufflers, equipment redesign, use of silencers, shields, shrouds, ducts, and engine enclosures).
5 The distance is greater at night because there would be no construction activities or truck traffic at the Park Stockpile area.
6 The reference noise level for a grout batching plant is similar to a concrete mixer, while the reference noise level for stationary equipment represents a combined level reflecting simultaneous operation of two CDSM rigs (75 dBA), pump (76 dBA), and generator (78 dBA).
7 These noise levels represent the estimated worst case combined noise level that could occur at night if, a truck, a CDSM rig, a pump, a generator and a grout batching plant were operated simultaneously and continuously during the measurement period.
Source: Compiled by Burleson Consulting in 2013

More than three times as much material would be transported and stockpiled for the Conventional Earthwork option compared to the CDSM option. The Conventional Earthwork option would require about 40 weeks to complete, and the CDSM option would require about 26 weeks to complete under the worst case scenario (two CDSM rigs over day and night shifts). The nearest residences are located within 500 feet of the Park Stockpile and haul routes, and the combined 87 dBA dump truck and earth-moving equipment noise would be attenuated to 66 dBA at the nearest residence because of distance and other attenuation factors. The nearest residence is within 800 feet of the Filter Pond Stockpile, and the noise would attenuate to 62 dBA. These noise levels would be less than the significance criteria. Truck reverse beeping sounds, which are required for safety reasons, may create additional noise impacts to sensitive receptors.

The noise levels generated by truck traffic that would deliver materials to the project site would be 84 dBA to residences along the route (not shown on **Tables 3.9-5 and 3.9-6**). However, truck volumes would vary from day to day and by construction phase. The addition of up to 105 external vehicle round trips per day on project vicinity roadways would be noticeable, compared to the average daily traffic (ADT) of 200 vehicles per day on Estudillo Avenue and 1,130 ADT on Lake Chabot Road (between Astor Drive and Fairmont Drive), but not as noticeable compared to the 9,700 ADT on MacArthur Boulevard, which is a high traffic volume road. This increase in truck traffic would result in short-term increases in noise levels on the local roadway network. The neighborhood surrounding the project area is considered a relatively quiet environment, within the noise contours of 60 dB L_{dn} (City of San Leandro 2002). Therefore, construction-related truck volumes may be noticeable on the residential streets in the project vicinity, where even one truck per hour may be noticeable.

Overall, construction activity associated with the proposed project would contribute to increased daytime (i.e., from 7:00 a.m. to 7:00 p.m. weekdays) and potentially nighttime (from 7:00 p.m. to 7:00 a.m.) noise levels in the project vicinity. Construction activity would generate noise levels that would exceed the significance criteria and would have a substantial noise effect on nearby sensitive receptors, especially during nighttime construction activities. The impact would be *potentially significant,* although it would be temporary and intermittent in nature and would cease on completion of project construction. However, implementation of **Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4** would reduce the potentially significant construction noise impacts to nearby sensitive receptors to a *less-than-significant* level.

Mitigation Measure NO-1.1: Reduce construction noise levels from operation of construction equipment.

During construction, EBMUD and its construction contractor will implement the following measures to reduce noise levels:

- EBMUD and its construction contractor(s) will use available noise control techniques (e.g., mufflers, intake silencers, extension ducts, engine enclosures, and acoustically attenuating shields or shrouds) for all equipment and trucks.
- Noise-generating activities greater than 90 dBA—impact construction including hydraulic backhoe, concrete recycling activities (i.e., concrete breakup, pulverizing, separation, crushing)—will be limited to between 8:00 a.m. and 4:00 p.m., Monday through Friday, and will be limited in duration to the maximum extent feasible. EBMUD will hire an independent noise monitoring consultant to perform site monitoring during specific phases of construction (e.g., demolition, concrete recycling), when noise is expected to exceed 90 dBA.

Implementation: EBMUD or construction contractor(s)

Timing: During all construction activities

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure NO-1.1** would reduce construction-related noise levels generated during operation of construction equipment to a level less than the significance criteria. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure NO-1.2: Notify residents in the immediate project vicinity in advance of construction activities.

EBMUD or its construction contractor(s) will notify property owners and tenants within 300 feet of the edge of the construction right-of-way and along the haul routes at least 2 weeks in advance of construction activities. Property owners and tenants will be notified by first-class mail and signage will be posted at the Estudillo Avenue main entrance to Chabot Park, leading to the project area.

Implementation: EBMUD or construction contractor(s)

Timing: Before construction activities

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure NO-1.2** would heighten public awareness of ongoing, temporary construction noise from project-related vehicles, equipment, and work activities. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure NO-1.3: Limit the hours of operation for haul truck trips through residential areas.

Consistent with the on-site project work, construction contractor(s) will limit haul truck trips through residential areas to or from project work sites, from 7:00 a.m. until 7:00 p.m., Monday through Friday, with exceptions for delivery by "extra legal" trucks from 6:30 a.m. to 7:00 p.m., as necessary.

Implementation: EBMUD or construction contractor(s)

Timing: During construction activities

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure NO-1.3** would reduce construction-related noise levels generated by haul truck trips through residential neighborhoods. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure NO-1.4: Designate a Community Affairs contact, responsible for responding to construction-related noise issues.

EBMUD will designate a Community Affairs contact for responding to construction-related noise issues during normal business hours. The District's direct telephone number and e-mail contact will be posted conspicuously at construction areas and on all advanced notifications. The Community Affairs contact will communicate the concerns to the construction manager who will take necessary steps to resolve complaints, including coordinating periodic noise monitoring, when necessary.

Implementation: EBMUD

Timing: Before construction activities

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure NO-1.4** would address public concerns regarding temporary construction noise from project-related vehicles, equipment, and work activities. The impact would be *less than significant with mitigation incorporated*.

Impact NO-2: The project would not expose persons to or generate excessive groundborne vibration or groundborne noise levels (Criterion 2). (Less than Significant)

All Project Components—Construction Vibration

Ground borne vibration levels are considered potentially damaging if they exceeded a PPV of 0.5 inch per second that risks minor cosmetic damage to structures. Project construction activities would generate vibration at the dam excavation area and haul routes because of the use of heavy equipment, including vibratory rollers and haul trucks. Equipment with the highest potential vibration level during construction would be the vibratory roller, to be used during fill compaction for a maximum 10-week period. This equipment has a reference PPV value of 0.210 inch per second at a distance of 25 feet. Equipment with the highest vibration levels during other phases of construction would include a bulldozer and a hydraulic backhoe, both of which have a reference PPV value of 0.089 inch per second at a distance of 25 feet. Groundborne vibration attenuates rapidly as the distance from the source of the vibration increases, and therefore the PPV would be lower at the nearest sensitive receptors.

Use of the vibratory roller and any other construction equipment would not exceed structural damage standards at any project work site or at any nearby residences because the PPV is less than 0.5 inch per second. Therefore, vibration impacts would be *less than significant*.

Impact NO-3: The project would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (Criterion 3). (Less than Significant)

All Project Components—Construction Noise

Construction activity would be temporary, and therefore it would not result in permanent increases in existing noise levels in the project vicinity (refer to the analysis of temporary impacts from construction activity under Impact NO-1). Therefore, the impact would be *less than significant*.

3.9.5 Noise and Vibration Impact and Mitigation Summary

Table 3.9-7 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

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Table 3.9-7
Noise and Vibration Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact NO-1: The proposed project would expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, and would result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the proposed project (Criteria 1 and 4).	LTSM Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4 Greater impact than Conventional Earthwork option for up to 8 weeks if CDSM occurs at same time as outlet works demolition and night work occurs.	LTSM Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4 Greater impact than Conventional Earthwork option for up to 8 weeks if CDSM occurs at same time as outlet works demolition and night work occurs.	LTSM Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4 Greater impact than Conventional Earthwork option for up to 8 weeks if CDSM occurs at same time as outlet works demolition and night work occurs.	LTSM Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4 Greater impact than Conventional Earthwork option for up to 8 weeks if CDSM occurs at same time as outlet works demolition and night work occurs.	LTSM Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4 Greater impact than CDSM option during the day because 3 times as much fill would be transported requiring 3 times as many haul trips.	LTSM Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4 Greater impact than CDSM option during the day because 3 times as much fill would be transported requiring 3 times as many haul trips.	LTSM Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4 Greater impact than CDSM option during the day because 3 times as much fill would be transported requiring 3 times as many haul trips.	LTSM Mitigation Measures NO-1.1, 1.2, 1.3, and 1.4 Greater impact than CDSM option during the day because 3 times as much fill would be transported requiring 3 times as many haul trips.
Impact NO-2: The project would not expose persons to or generate excessive groundborne vibration or groundborne noise levels (Criterion 2).	LTS	LTS	LTS	LTS	LTS	**LTS**	LTS	LTS
Impact NO-3: The project would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (Criterion 3).	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

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3.10 Recreation

3.10.1 Approach to Analysis

This section discusses the existing recreational resources in the regional area as well as in the immediate project vicinity, describes the pertinent regional and local policies related to recreation, presents the potential construction impacts, and identifies potential recreation mitigation measures, if required.

3.10.2 Environmental Setting

Regional Setting

Anthony Chabot Regional Park

Located north of Interstate 580 in the City of Oakland is the 5,069-acre Anthony Chabot Regional Park, managed by the East Bay Regional Park District (EBRPD) (**Figure 3.10-1**). Facilities in the park include 70 miles of trail, a marksmanship range, a public campground, an equestrian center, five staging areas, and an 18-hole golf course. Hiking, biking, and horseback riding opportunities are available on the many miles of trail throughout the park, and opportunities are available to connect to Lake Chabot Regional Park, the Bay Area Ridge Trail, and Skyline National Trail, which runs the length of the park. Chabot Family Campground is open year-round and provides trailer, tent, and walk-in sites. Group camping also is available on Marciel Road and near the Bort Meadow Staging Area (EBRPD undated 1, EBRPD 2012a).

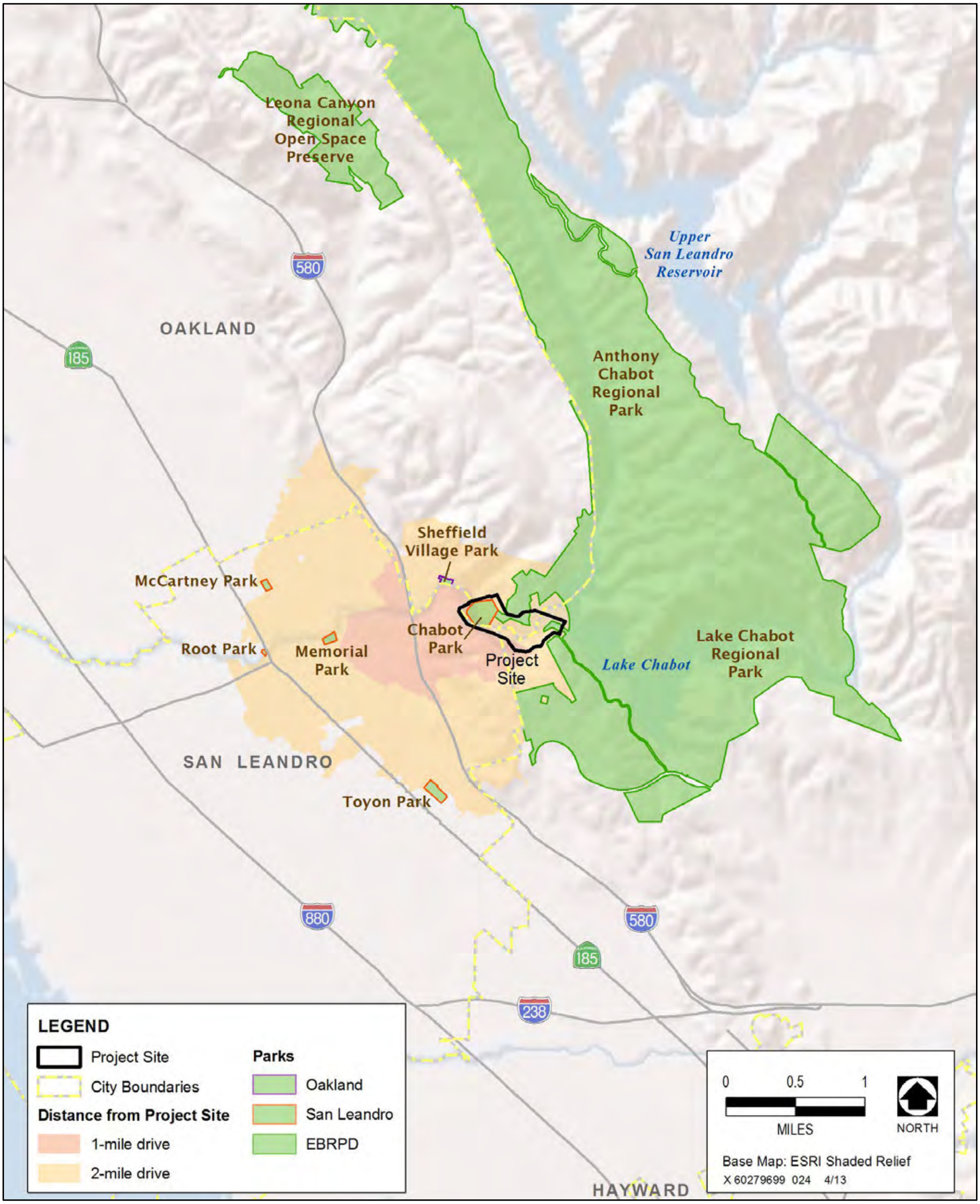
Leona Canyon Regional Open Space Preserve

West of Anthony Chabot Regional Park and immediately east of Merritt College in Oakland is the 290-acre Leona Canyon Regional Open Space Preserve, managed by EBRPD (**Figure 3.10-1**). The preserve provides opportunities for hiking, running, biking, dog walking, and other similar trail-based activities on the preserve's three trails, through the hills and wooded canyon that runs through the center of the preserve. Neighborhood walk-in access is available from three locations, with public parking available on the east side of the preserve and at Merritt College (EBRPD undated 2, EBRPD 2012d).

City of Oakland Parks

The City of Oakland manages 100 parks and over 2,500 acres of open space. The City has 25 recreation, community and interpretive centers, 59 outdoor tennis courts, 3 public golf courses, 53 athletic fields, and 5 swimming pools (City of Oakland 2013a).

The closest City of Oakland park facility that is similar to Chabot Park is Sheffield Village Park (**Figure 3.10-1**). The park provides a softball field, basketball court, children's play area, and soccer/football field. Day camps are also provided at Sheffield Village Recreation Center (City of Oakland 2013b). Sheffield Park is about a 1 mile drive from the project area. Dunsmuir Estate Park and Knowland Park are City of Oakland parks located within a 2-mile drive of the project area. Though these parks are close by, they do not provide the same facilities as Chabot Park (described below).



Source: GreenInfo Network 2012, compiled by AECOM in 2013

Figure 3.10-1: Project Vicinity Recreation Sites

City of San Leandro Parks

The City of San Leandro's Recreation and Human Services Department manages 23 parks and recreation facilities, including community, mini, and neighborhood parks, swimming pools, and sports facilities (City of San Leandro 2013b). Many parks provide a play apparatus, picnic tables, barbeques, and restrooms. Several parks provide softball fields and a few provide baseball fields, tennis courts, volleyball courts, basketball courts, horseshoes, swimming pools, or soccer fields (City of San Leandro 2013c).

Within a 2-mile drive from the project area are four public parks, managed by the City of San Leandro, and they are similar to Chabot Park (described below), which is located within the project area (**Figure 3.10-1**). Most of the four parks have a play apparatus, picnicking facilities, and restrooms, and a few feature softball fields (**Table 3.10-1**). Other parks within the City of San Leandro are between 3 and 6 miles from the project area.

Table 3.10-1
Project Vicinity Parks

Park	Facilities	Driving Distance from Project Area
Chabot Park	Play apparatus, 33 picnic tables, 9 barbeques, restrooms, 2 volleyball courts, 1 softball field, 9-hole disc golf course, stage/amphitheater, 2 horseshoe pits	0
Memorial Park	Play apparatus, 8 picnic tables, 3 barbeques, restrooms	2 miles
Toyon Park	Play apparatus, 11 picnic tables, 2 barbeques, restrooms, 6 horseshoe pits	2 miles
McCartney Park	Play apparatus, 1 picnic table, 1 barbeque, 1 softball field	2 miles
Root Park	4 picnic tables	2 miles
Sources: City of San Leandro 2013c, Professional Disc Golf Association 2012		

Project Area Setting

Chabot Park

Chabot Park is a 10-acre community park[1] located at the end of Estudillo Avenue at San Leandro Creek, managed by the City of San Leandro on land owned by and leased from EBMUD (**Figure 3.10-2**). The park provides recreation opportunities in a scenic setting of large trees. Facilities within the park include a jungle gym, swing set, 33 picnic tables (includes group picnic area for 190 people), 9 barbeques, restrooms, 2 horseshoe pits, 2 volleyball courts, a stage/amphitheater, a softball field/open turf area, and a 9-hole disc golf course (Professional Disc Golf Association 2012, City of San Leandro undated, City of San Leandro 2013a).

1 Community parks range in size from 5 to 30 acres and serve multiple neighborhoods and contain a wide variety of active and passive recreational facilities (City of San Leandro 2002).

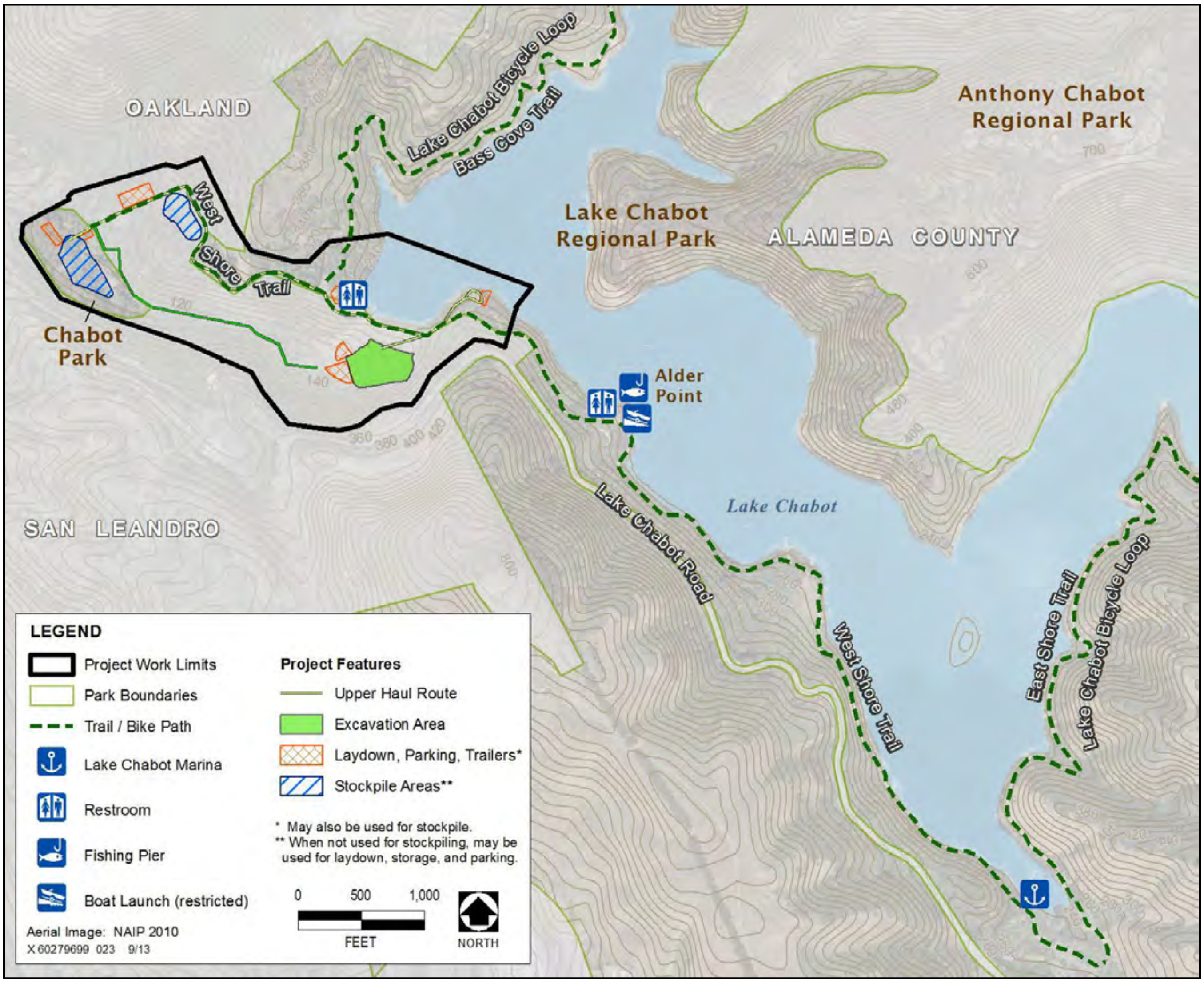
A 0.5-mile walk east on the West Shore Trail connects Chabot Park to Chabot Dam within the larger EBRPD-managed Lake Chabot Regional Park. The West Shore Trail is a hiking and biking only trail. The City of San Leandro also operates a day camp for children from mid-June to early August out of the park (City of San Leandro 2013d:11), with about 100 children participating per two week-day camp session (EBMUD 2012a). On Friday evenings in the summer, Chabot Park hosts live music (EBMUD 2012b).

The park receives over 60,000 visitors a year. Use of the park is typically higher during the warmer months and on weekends; about 40 percent of visitation occurs between June and August. The majority (80-90 percent) of park visitors are estimated to be San Leandro residents, with an estimated 25-35 percent of visitors walking or riding a bicycle to the park. An estimated 35-55 percent of Chabot Park visitors use the West Shore Trail through the park and continue on to trails within Lake Chabot Regional Park. Disc golf use has increased recently at the park, with an estimated 25-40 percent of Chabot Park visitors now using the disc golf course (Knudtson 2013).

Lake Chabot Regional Park

Located adjacent to the eastern end of Anthony Chabot Regional Park is Lake Chabot Regional Park, managed by EBRPD. The centerpiece of the park is the 315-acre Lake Chabot, which was closed to recreational use for over 90 years but was opened to controlled use for recreational activities such as fishing and non-water-contact boating (swimming is not allowed) in 1966. The lake is a popular area fishing destination and is stocked with trout and catfish. Several fishing piers are located in the park, and a spring fishing derby is held every year. A year-round marina is located at the lake and provides a café, bait and tackle shop, and canoe and boat rentals. Seasonal lake tours also are available. Canoes, kayaks, and scull craft, 20 feet and under, can be carried in and launched for a fee at the public boat ramp located at the marina. This is the only public boat ramp at the lake. A restricted area (no boating) exists around the dam.

Land-based recreation opportunities at the park include picnicking adjacent to the marina as well as hiking, biking, and horseback riding on over 20 miles of trail. The trails in Lake Chabot Regional Park connect to trails in Anthony Chabot Regional Park, including Skyline National Trail. The paved 3.5-mile West Shore and East Shore Trails provide access to the south and east shores of the lake and originate at Lake Chabot Marina. West Shore Trail crosses the crest of Chabot Dam and connects to Lake Chabot Bicycle Loop Trail/Bass Cove Trail, which branches off at the restroom facility at the dam and continues along the lakeshore via Bass Cove into Anthony Chabot Regional Park (**Figure 3.10-2**). Lake Chabot Bicycle Loop Trail is over 12 miles long and passes along the south shore of the lake, through Anthony Chabot Regional Park, and down the east shore of the lake (EBRPD 2012b, c). Bass Cove Trail is very popular for fishing, hiking, and biking. Trails in the dam area are more frequently utilized on weekends, but consistent usage occurs during weekdays. More than 3,000 visitors a month are estimated to use West Shore and Bass Cove Trails. The summer months and weekends are the peak use times for both trails, although both are used year-round. Special events occur on both trails; 50k runs use both trails, while 5k runs typically use West Shore Trail up to the dam. The majority of users on Bass Cove Trail access the trail from West Shore Trail, and 20 percent of trail users are estimated to originate from Chabot Park. Also, 30 percent of West Shore Trail users are estimated to originate from Chabot Park. As for Lake Chabot Bicycle Loop Trail, an estimated 40 percent of users do the entire loop, while about 30 percent of users do only the West Shore Trail portion (Andrews 2013).



Source: AECOM 2013, EBRPD 2013, USGS 2010

Figure 3.10-2: Detailed Map of Parks and Trails in the Project Area

3.10.3 Regulatory Background

Federal

No federal regulations related to recreational resources are applicable to the proposed project.

State

No state regulations related to recreational resources are applicable to the proposed project.

Regional

EBRPD Master Plan

The Master Plan for the EBRPD is being revised. In the Draft Master Plan (2012e), Anthony Chabot and Lake Chabot are classified as Regional Parks (each being 500 acres or more, containing scenic or natural resources in at least 70 percent of its area, and having the capacity to accommodate a variety of recreational activities, which may not occur in more than 30 percent of its area). The Draft Master Plan outlines a potential new regional trail, from Dunsmuir Heights to Anthony Chabot/Lake Chabot Regional Parks. Chapter 3 of the Draft Master Plan describes several policies related to public access, interpretation, and recreation. Policies relevant to the proposed project include:

- providing access to parklands and trails to suit the level of expected use;
- coordinating park access opportunities with local trails and bike paths;
- providing areas and facilities in accordance with the plans, policies, and park classifications adopted by the Board of Directors;
- providing a diverse system of trails to accommodate a variety of recreational users, including hikers, joggers, dog owners, bicyclists, and equestrians; and
- continuing to plan, develop and provide a regional system of aquatic facilities at parks that can support these activities, striving to improve public access to lakes.

Local

Alameda County General Plan

Alameda County does not have a countywide land use or circulation element but has adopted area plans that meet the California Government Code's requirements for elements for Castro Valley and other unincorporated areas. The Alameda County General Plan (1994) includes an element focusing on beaches, parks, and recreation areas, the Recreation Plan. The Recreation Plan establishes general areas in the county that have the greatest potential for county, regional, or statewide recreation use, as well as semi-public areas of combined residential-recreational use. The Recreation Plan serves as the official guide for development of various levels of parks and recreation systems in the county.

City of San Leandro General Plan

The City of San Leandro General Plan (2002) includes a chapter on Open Space, Parks and Conservation. This chapter provides direction on management of city parks and recreation facilities in the city, including goals that relate to rehabilitating existing parks and coordinating with EBRPD to provide enhanced recreation opportunities for San Leandro residents. Goal 21 of the General Plan focuses on park rehabilitation and includes polices to renovate parks before building new parks and provide regular, systematic maintenance of park facilities. Goal 23 of the plan focuses on maximizing potential benefits of the EBRPD system for city residents and includes policies related to promoting a greater public awareness of EBRPD lands and facilities in San Leandro, and developing and improving the regional trail system in and around San Leandro. Under this trail policy, the City proposes to work with EBRPD to upgrade the trail along San Leandro Creek from Chabot Park to the Lake Chabot Dam (West Shore Trail) and support development of a trail from Chabot Park to Dunsmuir House and Dunsmuir Ridge in Oakland, with connections to Anthony Chabot Regional Park.

City of Oakland General Plan

The City of Oakland General Plan (1998) includes an Open Space, Conservation, and Recreation (OSCAR) Element (1996), which provides guidance related to recreation and city parks. This element includes goals, policies, and actions related to providing a diverse park system that has safe, clean, accessible, efficiently-run parks and programs that promote personal growth, celebrate Oakland's cultural diversity, and serve all Oakland communities equally.

3.10.3 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on recreational resources if it would:

1. increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or

2. include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

In addition, the proposed project was determined to result in a significant impact on recreational resources if it would:

3. substantially degrade recreational experiences.

Project Impacts and Mitigation Measures

Project impacts on recreational resources addressed in this discussion are divided into project components where the impacts can vary by component. Otherwise, the impacts are discussed generally, covering all project components.

Impact RE-1: The proposed project would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (Criterion 1). (Significant and Unavoidable)

Haul Routes and Stockpile Locations

Regardless of the haul route selected under either construction option, Chabot Park and portions of trails within Lake Chabot Regional Park would be temporarily closed for the duration of construction activities because the movement of equipment and materials through the park and dam areas to the haul routes may pose a threat to public safety. Closure of Chabot Park and the trails would occur at the onset of construction, when equipment and materials are brought onto the site. Therefore, recreational use that normally would take place in Chabot Park or on the trails would be temporarily displaced to other area parks and trails, creating the potential for substantial physical deterioration of these other facilities to occur or be accelerated by their extra use.

Closure of Chabot Park would temporarily displace visitors to the park (e.g., picnickers, disc golf users, hikers) for the duration of construction, which would be approximately 26 weeks under the best case scenario (the CDSM option concurrent with outlet works, using day and night shifts) or approximately 60 weeks under the worst case scenario (the CDSM option not concurrent with outlet works, using day shifts only). This would displace 30,000 to 70,000 or more people from Chabot Park, depending on when construction occurred during the year. Park closure also would displace 600 day camp users, if construction were to occur during the summer when the day camp is open (Knudtson 2013).

Closure of Chabot Park would substantially reduce recreational opportunities in the immediate neighborhood because no other substitute recreation sites are available within 1 mile of the park. Displaced users would have to travel 1 mile to Sheffield Village Park, which has a softball field and children's play area, or 2 miles to the four other City of San Leandro parks that have some of the same facilities as Chabot Park (e.g., picnic facilities, softball fields, horseshoe pits, and playground equipment). Displaced users would have to travel 5 miles to reach the nearest park with a volleyball court (Marina Park) or a stage/amphitheater (Washington Manor Park), and about 12 miles to the nearest disc golf course (Moraga Commons Park) or 15 miles to reach a larger course (Aquatic Park in Berkeley, 18 holes) (Knudtson 2013, Professional Disc Golf Association 2013).

Displaced Chabot Park users would likely visit substitute locations throughout the area, thus increasing use at these substitute locations for 6 to 14 months, including the summer months when use is typically highest at recreational sites in this area. Therefore, closure of Chabot Park and trails may increase the use of other neighborhood parks to the extent that physical deterioration of the other park facilities could occur or could be accelerated. However, use may be dispersed over several substitute locations, lessening the potential physical deterioration at any one facility to a less than substantial level. Therefore, because the displacement of Chabot Park visitors to other facilities may result in degradation of local recreational facilities, the impact on recreational resources would be potentially significant. Because of potential risks to public safety associated with an active construction site(s), keeping some areas of Chabot Park open, opening Chabot Park on weekends, or opening Chabot Park to accommodate the day camp would not be feasible.

Use of the Upper Haul Route would necessitate temporary closure of a portion of the West Shore Trail and closure of a portion of Bass Cove Trail within the project work limits, both of which would also close a portion of Lake Chabot Bicycle Loop Trail. In addition, the restroom on Bass Cove Trail near the outlet works would also be closed. Both West Shore Trail and Bass Cove Trail are very popular year-round and receive an estimated 3,000 visitors a month. Closure of portions of these trails for 6 to 14 months would affect 18,000 to 42,000 people, potentially even more during the summer months. In addition, the special events that occur on these trails would be affected and would need to be re-routed to other trails. **Table 3.10-2** shows the anticipated effects from closure of the three trails related to project construction.

Table 3.10-2
Impacts from Closure of Trails for Project Construction

Trail	Miles Affected	Summary of Impact
West Shore Trail	0.83	The approximately 30 percent of trail users that originate from Chabot Park (approximately 1,000 people per month) would be displaced and likely would have to access the West Shore Trail from the Lake Chabot Marina, unless they choose to use other trails in Lake Chabot and Anthony Chabot Regional Parks.
Bass Cove Trail	0.09	The approximately 20 percent of Bass Cove Trail users that originate from Chabot Park (approximately 600 people per month) would be displaced and would likely have to access the Bass Cove Trail from the Clyde Woolridge Staging Area, unless they chose to use other trails in Lake Chabot and Anthony Chabot Regional Parks. Closure of the West Shore Trail leading up to the Bass Cove Trail would displace almost all of the 3,000 Bass Cove Trail users per month to other trails because 90 percent of Bass Cove Trail users originate from the West Shore Trail.
Lake Chabot Bicycle Loop Trail	0.42	The approximately 40 percent of users that do the entire loop would be affected by the proposed project (no possibility of a loop opportunity) and displaced to other trails. The approximately 30 percent of users that only do the West Shore Trail portion of the Lake Chabot Bicycle Loop Trail would be affected, but may not be displaced from the trail entirely as only the end portion of the trail would be unavailable for use.
Sources: Knudtson 2013, Andrews 2013, Data compiled by AECOM in 2013		

Because of the closures, trail users originating from Chabot Park would temporarily have to travel several miles to access other trails. West Shore Trail users that begin from the Lake Chabot Marina or other trails east of the dam would be least affected by the closure, whereas Bass Cove Trail users would be most affected. Anglers on both the closed portions of the West Shore and Bass Cove Trails would be displaced to other fishing areas around the lake, including the Alder Point fishing pier. In general, closure of portions of the West Shore and Bass Cove Trails would reduce overall opportunities for trail connectivity within Lake Chabot Regional Park and may displace trail users to Anthony Chabot Regional Park or to the east side of the lake for trail loop opportunities.

Thus, because of the large number of displaced users and special events resulting from the proposed project, temporary closure of portions of the West Shore Trail and Bass Cove Trail may increase the use of the trails in Anthony Chabot and Lake Chabot Regional Parks to the extent that substantial physical deterioration of those trails could occur or be accelerated. However, because use may be dispersed over several area trails, and special events may be relocated to alternate sites in the area; these effects potentially could lessen the physical deterioration of any one trail or event area to a less-than-significant level. Nevertheless, the impact on recreational use would be *potentially significant*.

Because of the location of the project work sites and potential safety risks, mitigation to open the trails on the weekends or during special events would not be possible, nor would it be possible to divert the trail around the project work sites. Therefore, this impact would be *significant and unavoidable*.

As stated in Section 2.11.4, Access Modifications, signage advising visitors of the Chabot Park closure as well as alternative locations for recreational facilities and trail access would be provided at the entrance to the park. In addition, signs would be posted on the West Shore and Bass Cove trails, as well as on connecting trails in Lake Chabot Regional Park advising visitors of the trail closures. Trail and park closure notifications also would be posted on the EBMUD and City of San Leandro's website.

Use of the West Shore Trail as the Upper Haul Route would likely lead to destruction of the existing pavement on the trail from heavy truck traffic. This would be a *significant impact* to recreation due to the substantial physical deterioration of this recreation facility. Implementation of **Mitigation Measure TR-1.1,** which includes documenting roadway pavement conditions for all affected roadways before and after project construction and repairing roads found to have been damaged by construction vehicles to the level at which they existed before project construction, would reduce this impact to a *less-than-significant level with mitigation incorporated*.

Temporary closure of the park and trails would not hinder the long-term potential to upgrade West Shore Trail or create a trail from Chabot Park to Dunsmuir House and Dunsmuir Ridge in Oakland, with connections to Anthony Chabot Regional Park, or upgrades to the trail along San Leandro Creek from Chabot Park to Lake Chabot Dam as described in the City of San Leandro General Plan. Alterations to West Shore Trail to use it as a haul route (grading, widening, etc.) could assist in improving the West Shore Trail. The long-term potential for a new regional trail extending from Dunsmuir Heights to Anthony Chabot/Lake Chabot Regional Parks, as discussed in the EBRPD Master Plan, also would not be affected by the temporary trail closures in Lake Chabot Regional Park.

After completion of construction, Chabot Park and its trails would be reopened. Additional information and impacts—from replacement of recreational facilities at Chabot Park and on the recreational setting following construction—are discussed under Impact RE-2 and RE-3.

Conventional Earthwork and CDSM Options

Construction at the dam may require lowering the lake's water level; the lake would remain in service, with a surface water level of 211 or greater. Between January 1990 and May 2012, the lake level ranged between approximately 217 and 229 feet msl and typically ranged between 219 and 226 feet msl. The lake was drawn down to about 216 feet in October 2012, for EBRPD to complete access improvements. When the lake was drawn down to 216 feet, several recreational facilities were affected. Four of the six fishing piers had to be closed, and all six piers sustained physical damage from being out of the water or were tilted at an angle because of low (or no) water. Some of the fishing piers sustained severe physical damage. In addition, the public boat launch was moved to a deeper channel at the marina, to allow public boat launching to continue. Operation of the marina continued during the lake drawdown (Andrews 2013b).

Because the lake could be drawn down below 217 feet msl to perform work at the dam, the public boat ramp presumably would need to be moved again at the marina. Marina operations and public boat launching would continue to be functional. However, if the lake is drawn down below 217 feet msl, the fishing piers at Lake Chabot presumably may become unusable (i.e., anglers could no longer cast into the lake with them out of the water), depending on the lake draw down level. Based on the conditions that existed in 2012, anglers displaced from piers could be displaced to another site, choose not to fish during their visit to the lake, or choose to fish from the shoreline. Recreational facilities would not be impacted if anglers chose not to fish or fished from the shoreline. Displaced anglers that choose to visit another site could increase physical deterioration of facilities at another site, if such facilities were used.

Depending on the lake level and duration of drawdown, the fishing piers at the lake may sustain physical damage from being out of the water or tilted at an angle because of low (or no) water. Existing facilities could sustain substantial physical degradation; therefore, the impact on recreation would be *potentially significant*. Although built to be movable, the fishing piers are old and may not transport well (Andrews 2013b). Therefore, the impact on recreational facilities would be *significant and unavoidable*. Implementation of **Mitigation Measure RE-1.1** would provide EBRPD advance notification of potential drawdown to assist them in determining if any closures are needed and/or modifications to facilities are needed to minimize damage. Even with this mitigation measure, the impact would still be *significant and unavoidable* as it unknown if the fishing piers could be moved without damage and would likely sustain damage if they remain in place.

Mitigation Measure RE-1.1: Provide advanced notification to EBRPD regarding anticipated lake level during construction.

Once determined, EBMUD will notify EBRPD regarding the anticipated lake level during construction and when the lake drawdown will occur.

Implementation: EBMUD

Timing: At least one month before lake is lowered below its typical minimum operating level of 219 feet

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure RE-1.1** would facilitate closures of facilities as needed and could help minimize damage to recreation facilities. However, due to the potential inability to prevent damage to fishing piers because moving the piers may not be feasible given their age, the impact would be *significant and unavoidable*.

Impact RE-2: The proposed project would not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment (Criterion 2). (No Impact)

Stockpiles

Use of Chabot Park as a stockpile location would require removal of recreational facilities at the park. Equipment and facilities removed at Chabot Park as a result of construction would be temporarily stored and reinstalled at its original location at end of construction, in consultation with the City of San Leandro. Any equipment that is demolished or damaged beyond repair would be replaced in kind. The reinstallation of recreation facilities would not provide any new recreation opportunities or experiences that did not exist before construction because only existing facilities would be reinstalled—additional or modified facilities would not be provided. Because Chabot Park would already be closed, reinstallation of recreational facilities would not impact recreational use during construction. Therefore, *no impact* would occur. In the long term, the impact of the reinstallation could be beneficial if, when reinstalled, the facilities were rearranged within the park to better accommodate existing uses.

Impact RE-3: The proposed project would substantially degrade recreational experiences (Criterion 3). (Less than Significant with Mitigation Incorporated)

The proposed project would result in temporary and long-term impacts to the recreational setting because of vegetation removal for haul route widening and use of Chabot Park as a stockpile location, and visual and noise disturbance from other construction activities. Thus, the proposed project could result in degraded recreational experiences because the recreational setting is a key component of a user's recreational experience.

Temporary impacts to visitor's recreational experiences would occur on the open portions of the Bass Cove and West Shore trails as well as on the lake (outside the restricted dam area) because of changes in the recreation setting where construction activities would be audible or visible or where vegetation removal would be notable in the landscape. These impacts are not expected to substantially alter the recreational setting and thus would result in less-than-significant impacts on the recreational experiences of users on the two trails and boaters on the lake. Use of the east side turn-around area may result in disturbances to anglers in the vicinity because of noise from boat launching and debris removal activities; however, any disturbance would likely be brief. Thus, the impacts would be *less than significant*. On-water construction activities, including set up and removal of the turbidity screen, are not expected to affect the recreational setting for other boaters or land-based users.

Long-term impacts on the visible recreational setting primarily would occur at the West Shore Trail, resulting from the removal of the pavilion and tower, and at Chabot Park, resulting from removal of trees to widen the haul routes or use of the park as a stockpile location. Removal of the pavilion and tower are not expected to substantially alter the visible recreational setting at the West Shore Trail because the pavilion and tower would have been visible from only a small portion of the trail. Thus, the proposed project would not substantially degrade the recreational experiences of trail users. However, the impact would be *potentially significant* for users of Chabot Park because many large trees would be removed from around the recreation facilities, altering the visible setting and changing the experiences visitors would have at the park. However, implementation of **Mitigation Measures BR-4.1, BR- 4.2, BR-4.3, and AE-1.1** would reduce the potentially significant impact to a *less-than-significant level with mitigation incorporated*.

The dam construction also would require drawing down the lake below its normal operating range, which may expose boating hazards in already shallow areas. This occurred in 2012, when the lake was drawn down, and led to the closure of Honker Bay, a shallow area that people fish in at the eastern tip of the lake. To protect public safety, if the lake is drawn down, EBRPD would close off any hazardous areas to public boating use using buoys. This could negatively impact the recreation experience for those boaters and boat anglers that prefer using these shallow areas for recreation. However, closure of these areas would be temporary and would not substantially affect the recreation experiences of Lake Chabot visitors. Thus, the impact to recreation would be *less than significant*.

In addition, lake draw down would make Lake Chabot less appealing for fishing use because of the potential closure of fishing piers (discussed under Impact RE-1), and it would create a wider drawdown zone (exposed area below the high water line) for shoreline anglers, which requires additional travel over muddy/rocky ground to reach the shoreline and fishing in a more exposed (sun and mud) location. However, lake drawdown would be temporary (during construction and until local rainfall raises the water level) and would not substantially affect the recreation experiences of Lake Chabot visitors. Thus, the impact on recreation would be *less than significant*.

3.10.4 Recreation Impact and Mitigation Summary

Table 3.10-3 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

Table 3.10-3
Recreation Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact RE-1: The proposed project would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (Criterion 1).	SU Mitigation Measures TR-1.1 and RE-1.1	SU Mitigation Measures TR-1.1 and RE-1.1	SU Mitigation Measures TR-1.1 and RE-1.1	SU Mitigation Measures TR-1.1 and RE-1.1	SU Mitigation Measures TR-1.1 and RE-1.1 Greater impacts than the CDSM option due to longer construction schedule and therefore longer park/trail closures.	SU Mitigation Measures TR-1.1 and RE-1.1 Greater impacts than the CDSM option due to longer construction schedule and therefore longer park/trail closures.	SU Mitigation Measures TR-1.1 and RE-1.1 Greater impacts than the CDSM option due to longer construction schedule and therefore longer park/trail closures.	SU Mitigation Measures TR-1.1 and RE-1.1 Greater impacts than the CDSM option due to longer construction schedule and therefore longer park/trail closures.
Impact RE-2: The proposed project would not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment (Criterion 2).	NI	NI	NI	NI	NI	NI	NI	NI
Impact RE-3: The proposed project would substantially degrade recreational experiences (Criterion 3).	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1	LTSM Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

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3.11 Hydrology and Water Quality

3.11.1 Approach to Analysis

This section discusses the existing hydrology and water quality conditions in the project area, describes the pertinent federal, state, regional, and local laws and guidelines, presents the potential construction impacts, and identifies potential hydrology and water quality mitigation measures, if required.

Information to support the impact analysis was compiled based on published reports and documents as follows:

- Alameda County and City of San Leandro general plans (Alameda County 2012, City of San Leandro 2011);
- Bulletin 118, California's Groundwater— Update 2003 (California Department of Water Resources 2003);
- San Francisco Bay Regional Water Quality Control Board's (RWQCB) Basin Plan for the San Francisco Bay Basin (SFBRWQB 2011); and
- State Water Resources Control Board (State Water Board) 2010 Integrated Report, Clean Water Act Section 303(d) List of Water Quality Limited Segments Requiring Total Maximum Daily Loads (TMDL).

3.11.2 Environmental Setting

Hydrology

The project area drains to San Leandro Creek, and soils in the area downstream from the dam are a mix of soil types including serpentine clay soils and shale bedrock to the east near the dam, and Holocene alluvial fan deposits further west, and artificial fill over bay mud close to the San Francisco Bay (USACE 2008:Appendix C.4). The prevalence of clay soils in the immediate project area may indicate low infiltration rates.

Although not operated as a flood control structure, Chabot Dam provides flood control downstream by attenuating storm hydrographs. As such, Chabot Dam controls flood flows in San Leandro Creek, including portions of San Leandro and Oakland.

Regional Surface Water

Lake Chabot

Lake Chabot (also called Chabot Reservoir) initially was impounded in 1876, following construction of the main portion of Chabot Dam (then called San Leandro Dam) in 1874–1875 along San Leandro Creek. Lake Chabot currently holds approximately 10,350 acre-feet (3.4 billion gallons) of water and covers a surface area of up to 341 acres. The Lake Chabot's shoreline is approximately 8.5 miles in length.

The lake attenuates peak stormwater discharge for all flood recurrence intervals. The dam provides a spillway that reduces the potential for out-of bank flooding in the lower San Leandro Creek watershed. Lake Chabot water is used for emergency supply, recreation, and golf course irrigation; excess water occasionally is released during the winter rainy season. The lake's surface elevation varies seasonally with rainfall and evaporation. Over the last 10 years, the reservoir surface water level has ranged from approximately elevation 216 to 229 feet, and typically ranges between elevation 219 and 226 feet.

The Basin Plan (SFBRWQCB 2011) lists beneficial uses of Lake Chabot, including municipal/domestic water supply, commercial/sport fishing, cold and warm freshwater habitat, fish spawning, wildlife habitat, and noncontact water recreation. Water contact recreation is listed as a limited existing use because contact recreation is prohibited or limited to protect public health (related to the lake's use for municipal water supply).

Toxin levels in the tissue of fish found in Lake Chabot have exceeded screening values set by the California Office of Environmental Health Hazard Assessment (OEHHA). As a result, Lake Chabot is listed as a "303(d) Water Quality Limited Segment" and TMDLs for the toxins showing exceedances are required. These toxins include mercury, chlordane, DDT, Dieldrin, and PCBs (SFBRWQCB 2010).

San Leandro Creek

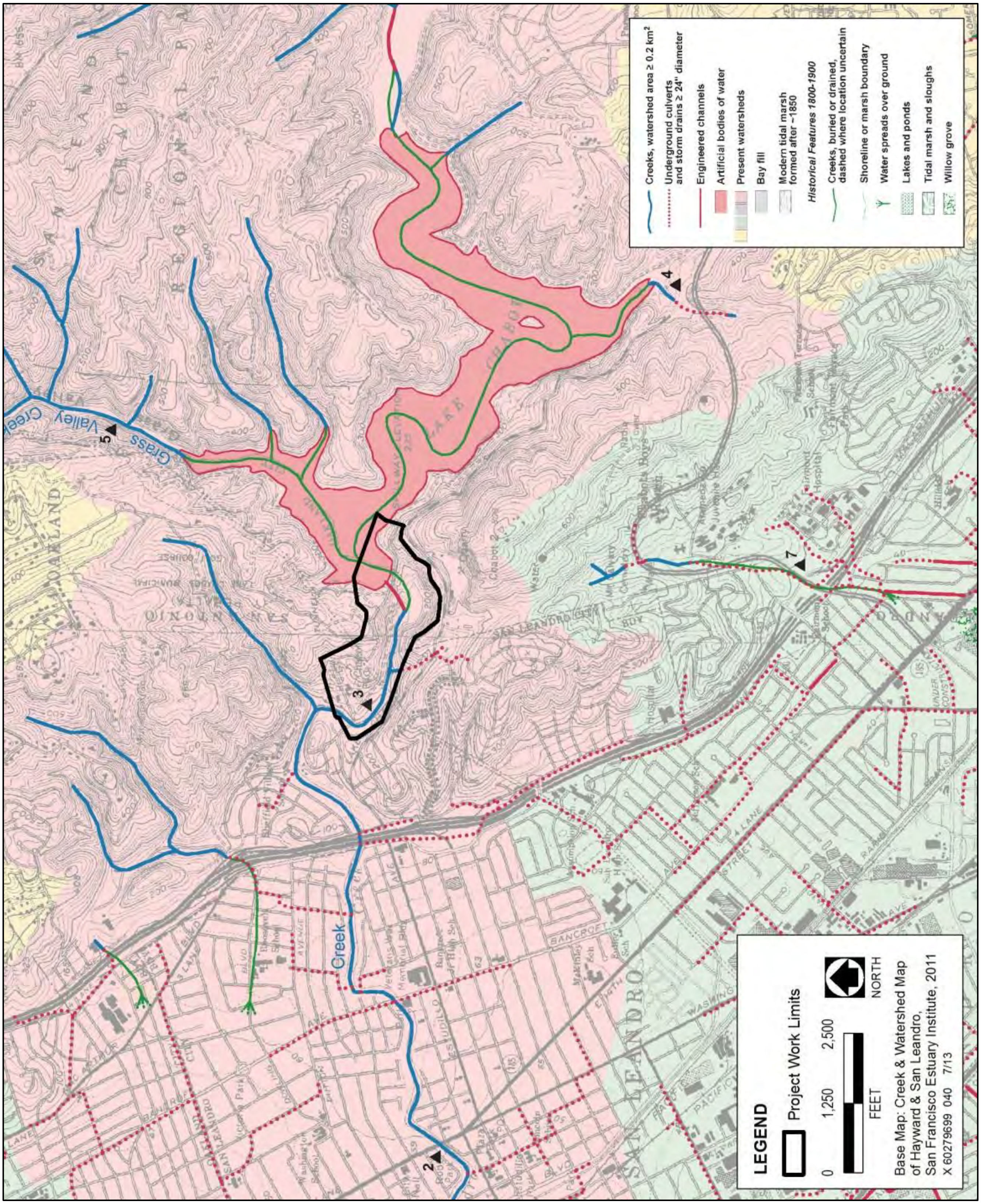
San Leandro Creek drains a watershed of 44 square miles, including areas drained by Moraga, Indian, Redwood, Buckhorn, Kaiser, Miller, and Grass Valley creeks. The creek passes through both Contra Costa and Alameda counties. Two dams are on the creek: Chabot Dam and Upper San Leandro Dam. Chabot Dam impounds Lake Chabot, and Upper San Leandro Dam impounds Upper San Leandro Reservoir. San Leandro Creek flows from its headwaters near Round Top Peak for 5 miles to Upper San Leandro Reservoir. From the outlet at Upper San Leandro Reservoir, the creek continues another 3.5 miles before feeding into Lake Chabot at the lake's easternmost point (SFBRWQCB 2001, Leidy et al. 2005).

Downstream from Lake Chabot, San Leandro Creek runs approximately 6 miles, passing through a heavily urbanized area in the City of San Leandro via a series of concrete channels before reaching Arrowhead Marsh and emptying into San Leandro Bay (**Figure 3.11-1**). Human-made weirs, levees, bridges and other hydraulic structures downstream from the dam were designed by taking into account the presence of the dam.

The Basin Plan (SFBRWQCB 2011) lists existing beneficial uses in Lower San Leandro Creek, including freshwater replenishment, cold freshwater habitat, fish migration, preservation of rare and endangered species, fish spawning, warm freshwater habitat, wildlife habitat, water contact recreation, and noncontact water recreation. No potential beneficial uses were listed for this portion of the creek. Upper San Leandro Creek, above Lake Chabot, includes the same uses except that fish migration and fish spawning are listed as "potential" beneficial uses rather than existing uses, and the preservation of rare and endangered species is not listed as a beneficial use.

Regional Groundwater

Lake Chabot is located on the northern edge of Castro Valley Groundwater Basin, with the project area lying to the east of East Bay Plain Groundwater Basin. Castro Valley Groundwater Basin is listed in the Basin Plan as having four potential beneficial uses: agricultural water supply, municipal/domestic supply, industrial service supply, and industrial process supply. None of these beneficial uses are listed as existing.



Source: Sowers 2011

Figure 3.11-1: San Leandro Creek Watershed and Lake Chabot

Groundwater levels in the vicinity of the proposed excavation area for the Cement Deep Soil Mixing (CDSM) or Conventional Earthwork option are approximately 15 to 40 feet below the ground surface.

Although the project area is not located within East Bay Plain Groundwater Basin, discharges from Lake Chabot could interact with it via San Leandro Creek.

Castro Valley Groundwater Basin

Castro Valley Groundwater Basin is about 3 square miles in surface area (DWR 2004) with the primary water bearing formation being alluvium of the Pleistocene age (ACFCWCD 1988). In general, groundwater yields to wells are limited within the basin, and natural recharge to the basin includes direct percolation of precipitation and seepage from streams or creeks that drain the upland areas of the basin (DWR 2004). Groundwater well depths range from 56 to 305 feet for domestic wells, and 82 to 260 feet for municipal and irrigation wells.

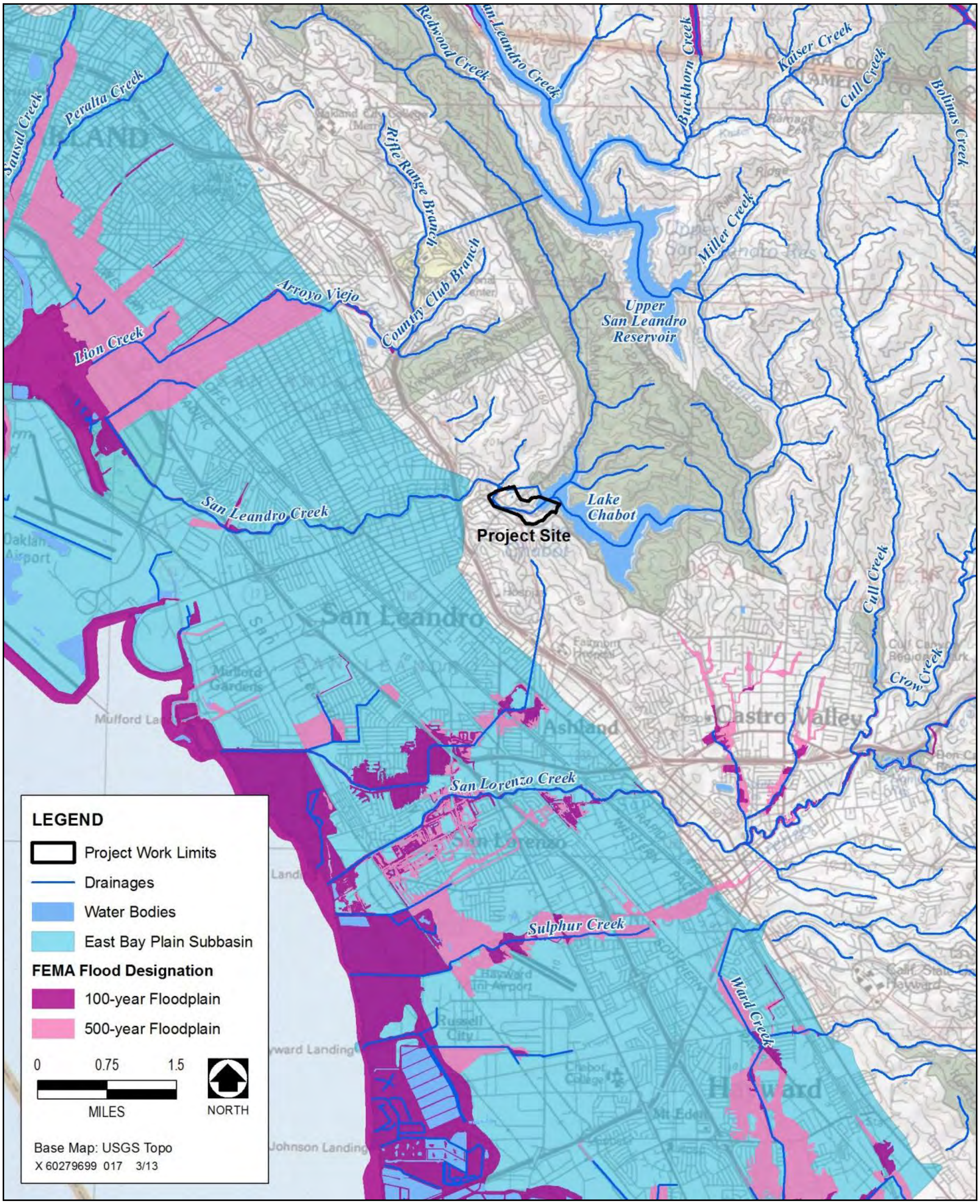
Flooding and Drainage

Flooding is the inundation of normally dry land resulting from a rise of surface water levels or rapid accumulation of stormwater runoff. Flooding also can occur from tsunamis, seiches, or dam failures. Tsunamis are waves caused by an underwater earthquake, landslide, or volcanic eruption, while seiches are waves produced from these events within an enclosed or semi-enclosed body of water, such as a lake, reservoir, or harbor. The Federal Emergency Management Agency (FEMA), through its Flood Insurance Rate Mapping program, designates areas where urban flooding can occur during 100-year and 500-year flood events. The 100- and 500-year floodplain boundaries shown in **Figure 3.11-2** indicate limited flooding potential for the lower reach of the San Leandro River west of Interstate 680. In the event of a 100-year flood, a small area to the northeast of Interstate 880 (I-880) along the San Leandro Creek channel is at risk for flooding. This flood area would include an area southwest of I-880 in the event of a 500-year flood. The proposed project would not change the capacity Chabot Reservoir and therefore would not require revisions to the existing FEMA maps.

Water Quality

Surface Water Quality

Water quality in San Leandro Creek varies greatly from point to point, depending on proximity to industrial, residential, and agricultural areas. Downstream from Lake Chabot, several contaminants have been measured at high levels, with nitrate, orthophosphate, and dissolved chromium at levels exceeding the water quality objectives (WQO) set by the State Water Board. Nitrate levels were measured at greater than 6 milligrams per liter (mg/L); orthophosphate at ~0.36 mg/L; and dissolved chromium at levels exceeding the WQO. Elevated nutrient levels may be associated with agricultural runoff upstream from Lake Chabot and residential fertilizer use along all reaches of the creek, while chromium levels are elevated geologically in the Bay Area and are associated with serpentine deposits (SFBRWQCB 2007). San Leandro Creek water downstream from Lake Chabot has also exceeded state and federal standards for 20 other constituents regulated by the Clean Water Act.



Sources: AECOM 2013, FEMA 2013

Figure 3.11-2: Local Hydrology and Floodplain Boundaries

Groundwater Quality

Groundwater in East Bay Plain Groundwater Basin tends to be a calcium bicarbonate type in the upper 200 feet below ground surface (bgs) and a sodium bicarbonate type between 200 and 1,000 feet bgs. Of 29 wells sampled by Muir (1996), 15 wells had total dissolved solids (TDS) exceeding 500 mg/L. In shallow aquifer calcium bicarbonate type zones, TDS ranged from 360 to 1,020 mg/L, while in the 200 to 1,000-foot bgs aquifers, TDS ranged from 310 to 1,420 mg/L. Groundwater pollution, for the most part, results from releases of fuels or solvents within the upper 50 feet of the subsurface (SFBRWQCB 1999).

Castro Valley Groundwater Basin consists of a mix of calcium and sodium bicarbonate, with TDS concentrations between 300 and 1,000 mg/L. The permeability and near surface proximity of the alluvial deposits in this subbasin make aquifers susceptible to contamination (ACFCWCD 1988).

3.11.3 Regulatory Background

Federal

Clean Water Act

Sections 303, 401, 402, and 404 of the Clean Water Act (CWA) are the primary federal legislation governing water quality. The act's objective is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA establishes the basic structure for regulating discharge of pollutants and gives the U.S. Environmental Protection Agency (EPA) authority to implement pollution control programs. EPA has authorized the California Environmental Protection Agency (Cal/EPA) to administer the CWA in the state.

Section 404 of the CWA was established in 1972, to regulate discharge of dredged or fill material into waters of the United States, including navigable waters, interstate waters, wetlands that could affect interstate or foreign commerce, and wetlands adjacent to other waters of the United States. Section 404 is jointly administered by the U.S. Army Corps of Engineers (USACE), EPA, and Cal/EPA (USFWS 2013).

Section 402 of the CWA, or the National Pollutant Discharge Elimination System (NPDES), requires a permit for the discharge of any pollutant from a point source into waters of the United States. Point sources may include some stormwater discharges (EPA 2012a).

Section 401 of the CWA requires that each applicant for a permit or license for any activity that may result in discharge to a water body must obtain certification, verifying that the proposed activity will comply with state water quality standards. Most certifications are issued in connection with USACE CWA Section 404 permits (Cal/EPA 2013).

Section 303(d) of the CWA requires the State of California to create a list of "water quality impaired segments" of waterways. A water quality-impaired segment is one that does not meet water quality standards necessary to support beneficial uses. Section 303(d) also requires the State of California to maintain a list of impaired water bodies so that a Total Maximum Daily Load (TMDL) can be established. A TMDL is a plan to restore the beneficial uses of a stream or to correct any impairment. It establishes the allowable pollutant loadings or other quantifiable parameters (e.g., pH, temperature) for a water body and, thereby, provides the basis for establishing water quality-based controls (EPA 2012b). Lake Chabot has five pollutants on the 303(d) list, all of which were found in fish tissue at levels exceeding OEHHA screening values: mercury, chlordane, DDT, dieldrin, and PCBs. TMDLs are expected to be completed for all of these pollutants in 2019 with the exception of mercury, which is expected in 2013. Lower San Leandro Creek was added to the 303(d) list for diazinon in 1998 and is being addressed by a 2007 EPA approved TMDL (SWRCB 2010). In addition, Lower San Leandro is on the 303(d) list for Trash, with a TMDL expected in 2021.

Section 404 of the CWA is administered by the USACE, as noted above. To obtain a Section 404 permit, an applicant must demonstrate that the discharge of dredged or fill material would not degrade the quality of waters of the United States, and prove that no practicable alternatives exist that would be less damaging to the aquatic environment. Permit applications that require the preparation of an Environmental Impact Assessment take an average of 3 years to process (EPA 2012a).

National Flood Disaster Protection Act

The Flood Emergency Management Agency's National Flood Insurance Program (NFIP) was established by the National Flood Insurance Act in 1968, and was broadened in 1973 by the Floor Disaster Protection Act. NFIP is a federal program, designed to mitigate future flood losses through building/zoning ordinances and make available affordable, federally backed flood insurance protection for property owners.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act establishes the State Water Board as the primary authority over California water rights and water quality policy, and sets up nine RWQCBs to oversee and monitor local water quality. The RWQCB prepares Basin Plans, or water quality control plans, that define (1) beneficial uses of each protected water body, (2) WQOs for surface and groundwater, and (3) necessary actions to maintain the WQOs and control point and non-point pollution sources. Any pollutant discharger must file a report of waste discharge with the appropriate RWQCB so that waste discharge requirements can be established (CERES 2002).

The State Water Board requires an NPDES Construction General Permit to be issued for any construction or demolition activity that would result in the disturbance of land equal to or greater than 1 acre. If the construction site is located in a municipal separate storm sewer system permit area, which Chabot Dam is not, it may qualify for an exemption. The Construction General Permit particularly applies to projects involving clearing, grading, and/or excavation, and requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would include a site map showing the construction site boundaries, existing and proposed facilities, lots, roadways, and grading/drainage patterns. A list of stormwater best management practices (BMPs) and locations of BMPs to be implemented at the project site must be included in the SWPPP (State Water Board 2013).

California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) requires notification of any proposed activity that may substantially modify a river, stream, or lake and thereby impact fish, wildlife, and native plant resources. Notification is required if an activity will measurably divert or alter the natural flow of any river, stream, or lake; change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit debris or waste where it may pass into a river, stream, or lake. Any activity determined by CDFW to adversely affect fish and wildlife resources would require the preparation of a

Lake or Streambed Alteration Agreement that would protect fish and wildlife resources and comply with CEQA.

Regional

Water Quality Control Plan for San Francisco Bay Basin

The Basin Plan is the San Francisco Bay RWQCB's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the state, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The San Francisco RWQCB finds stormwater discharges from urban areas in the Bay region to be significant sources of certain pollutants that cause or contribute to water quality impairment. Furthermore, as delineated in the CWA Section 303(d) list, the San Francisco Bay RWQCB has found reasonable potential exists that municipal stormwater discharges cause or contribute to a violation above water quality standards for mercury, PCBs, furans, dieldrin, chlordane, DDT, and selenium in San Francisco Bay segments (SFBRWQCB 2011).

Municipal Regional Stormwater NPDES Permit

In October 2009, the RWQCB adopted Order No. R2-2009-0074, the Municipal Regional Stormwater NPDES Permit, No. CAS612008 (SFBRWQCB 2009). This regional permit includes Alameda County and initially describes receiving water limitations that are in common to each of the stormwater management programs. The pertinent sections relevant to the proposed project are Provision C.3, New Development and Redevelopment, and C.6, Construction Site Control. The permit includes Attachment B, which describes the limitations that are program-specific (RWQCB 2009).

The goal of Provision C.3 is to facilitate the inclusion of source controls, site design, and stormwater treatment measures into regulated projects at the planning phase, to help ensure project proponents allow for the space requirements to implement these measures. The control measure type most strongly promoted is to require and/or encourage the use of Low Impact Development (LID) techniques. Provision C.3.b.ii (3) requires all projects that create and/or replace 10,000 square feet or more of impervious surface to implement LID, including source control, site design, and stormwater treatment measures. For projects that alter more than 50 percent of the existing impervious surfaces, their entire impervious surfaces must be included in the treatment system design.

Provision C.6 of the municipal stormwater permit requires municipalities that are subject to the permit to adopt a construction site inspection and control program for all construction sites. Municipalities must review construction-site erosion control plans for consistency with local requirements, including the appropriateness and adequacy of proposed BMPs. They also must verify that site operators/developers have complied with the Construction General Stormwater Permit before issuing a grading permit for a project. The municipalities also are required to conduct inspections to determine compliance with local grading and stormwater requirements.

Local

East Bay Municipal Utility District Urban Water Management Plan

The East Bay Municipal Utility District (EBMUD) includes seismic retrofit work in its 2010 Urban Water Management Plan, and states that Lake Chabot's water will continue to be used for emergency uses, as well as non-potable water for irrigation. During extreme weather events such as landslides, the

Pardee Reservoir turbidity levels may exceed water quality limits, as has happened in the past. During these times, local reservoirs would be used to supply local water treatment plants to supply municipal potable water to EBMUD customers. In a longer term emergency, Lake Chabot possibly could be used for an emergency potable supply. Lake Chabot currently provides non-potable irrigation water for Lake Chabot Golf Course and Willow Park Golf Course, and EBMUD is planning to expand the use of Lake Chabot water for other non-potable uses at a nearby country club, the Oakland Zoo, and other nearby customers. Lake Chabot could provide up to 1.4 MGD during peak irrigation times, or about 0.4 MGD on average (EBMUD 2010).

Alameda County Flood Encroachment Permit

The Alameda County Flood Control and Water Conservation District requires the submittal of a Flood Encroachment Permit before completing work on land within the district's right-of-way. The permit requires for a project to submit the scope of work, which is to include a site inspection.

Alameda County General Plan

Alameda County has adopted several area plans that meet the California Government Code's requirements, including the General Plan for Castro Valley (ACCDA 2012). The General Plan for Castro Valley sets out the following actions pertaining to water service, relevant to the proposed project (ACCDA 2012):

- **Water Conservation Measures**: to be developed based on BMPs from the California Urban Water Conservation Council
- **Water Conservation**: decrease water use by implementing efficient plumbing, adopting water efficient landscaping practices, requiring efficient irrigation, and facilitating recycled water use for irrigation
- **Landscaping**: encourage Bay-friendly landscaping

The following actions pertaining to stormwater management are addressed:

- Collect, store, and dispose of stormwater in safe, sanitary, and environmentally acceptable ways
- Use a watershed management approach when addressing, planning, and managing stormwater issues
- Reduce release of contaminants into the water system by requiring new development to minimize storm drain runoff on project sites

3.11.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on hydrology and water quality if it would:

1. violate any water quality standards or waste discharge requirements;
2. substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
3. substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
4. substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or a substantial increase in the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
5. create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
6. otherwise substantially degrade water quality;
7. place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
8. place within a 100-year flood hazard area structures which would impede or redirect flood flows;
9. expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
10. expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow.

Project Impacts and Mitigation Measures

Potential direct and indirect impacts on hydrology and water quality caused by construction, operation, and maintenance of the proposed project were assessed based on expected construction practices, materials to be used, and locations and duration of project-related activities. Furthermore, the impacts were assessed in light of existing regulatory requirements that would serve to mitigate them.

This analysis focuses on construction impacts. Hydrology and water quality impacts associated with long-term operation of the proposed project are expected to be minimal. Lake Chabot downstream releases would not change as a result of the proposed project, except for a slight increase in downstream seepage with the installation of a new filter and drain system. Temporary and short-term impacts on hydrology and water quality could occur from ground-disturbing activities and other construction-related activities below the existing dam, at the outlet works, at temporary stockpile sites for excavated material and construction equipment, and along haul routes used to access stockpile and construction work sites over the course of the anticipated 26 to 60 weeks of construction, depending on which excavation method is selected.

The proposed project does not include any housing; therefore, Criterion 7 is not discussed further in this Draft EIR. In addition, because the project area is not in a flood hazard zone, impacts related to placement of structures that would impede or redirect flood flows within a 100-year flood hazard area would not occur. As a result, *no impact* would occur and Criterion 8 is not discussed further in this Draft EIR.

Impact HY-1: The proposed project would violate water quality standards or waste discharge requirements (Criterion 1). (Less than Significant with Mitigation Incorporated)

Temporary hydrology and water quality impacts at the dam site, stockpile sites, and along haul routes could result from construction activities. The proposed project would have a significant environmental impact if it would violate water quality standards and waste discharge requirements set out in the Construction General Permit (Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ) from the San Francisco Bay RWQCB. These impacts would be minimized with the implementation of BMPs as part of the SWPPP and compliance with the requirements of the Construction General Permit.

CDSM and Conventional Earthwork Options

In both the Conventional Earthwork and CDSM options, work at the dam could result in temporary impacts to water quality from excavation, grading, and transport of materials. Both construction methods would require the excavation and subsequent transportation of large quantities of soil from the dam site to the stockpile site along haul routes, which could result in spillage and/or mechanical abrasion of roadways and the potential for sediment discharges into San Leandro Creek. The Conventional Earthwork option includes between 100,000 and 140,000 cubic yards of soil excavation, whereas the CDSM option includes approximately 12,000 cubic yards of soil excavation. Although the CDSM option also requires the installation of CDSM rigs and transport of 23,000 to 33,500 cubic yards of CDSM spoil, the overall number of trips and volume of stockpiled materials in the Conventional Earthwork option would have a greater potential for water quality impacts. The excavation work for the Conventional Earthwork option would be deeper than the CDSM option and would include lowering the groundwater table by dewatering, to maintain safe slope stability during excavation. For the CDSM option, construction may require lowering the groundwater at the dam's downstream face to excavate a level working platform, but the dewatering requirement would be significantly less than in the Conventional Earthwork option. Dewatering would create an additional potential source for sediment-filled water to be released into San Leandro Creek, which may require mitigation. Therefore, the impact would be *potentially significant*. However, implementation of **Mitigation Measures HY-1.1, 1.3, and 1.4** would reduce this potentially significant impact on water quality to a *less-than-significant* level.

Haul Routes

Use of the Lower Haul Route would require crossing San Leandro Creek below the Ordinary High Water Mark, which would require a temporary bridge. Use of the Upper Haul Route would require widening at several points. This could lead to a small increase in erosion if plants are cleared from the widened area, and a potential minor increase in impermeable surface area if pavement is extended. Therefore, the impact would be *potentially significant*. However, implementation of **Mitigation Measures HY-1.1, 1.2, 1.3, and 1.4** would reduce this potentially significant impact on water quality to a *less-than-significant* level.

Stockpiles

The Filter Pond Stockpile would be located further away from San Leandro Creek, and thus would have less potential for sediment discharges to the waterway. Conversely, the use of Chabot Park as a stockpile location would result in the placement of stockpiled materials adjacent to San Leandro Creek. This could result in a *potentially significant* impact on San Leandro Creek associated with sediments from stockpile activity. However, implementation of **Mitigation Measures HY-1.1, 1.2, 1.3, and 1.4** would reduce this potentially significant impact on water quality to a *less-than-significant* level.

Outlet Works

The outlet works retrofit would result in temporary water quality impacts including increased turbidity from demolition of the pavilion and tower and the potential for fuel/chemical contamination from underwater cutting and welding activities. Operation of the excavator over the water on the barge could result in accidental oil spillage over or adjacent to Chabot Dam. The impact would be *potentially significant*. However, implementation of **Mitigation Measures HY-1.1, 1.2, and 1.5** would reduce this potentially significant impact on water quality to a *less-than-significant* level.

Mitigation Measure HY-1.1: Prepare a Storm Water Pollution Prevention Plan for each construction activity.

EBMUD will prepare an SWPPP addressing each construction activity, regardless of the construction alternative used. The SWPPP will identify pollutant sources that may affect the quality of stormwater discharge and will specify implementation of specific BMPs to reduce pollutants in stormwater discharges during construction and post-construction. The SWPPP will include the following:

- Source identification
- Preparation of a site map
- Description of construction materials, practices, and equipment storage and maintenance
- List of pollutants likely to contact storm water
- Estimate of the construction site area and percent impervious area
- Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in storm water runoff, such as detention basins, fiber rolls, silt fences, check dams, geofabric, drainage swales, and sandbag dikes
- Proposed construction dewatering plan
- List of provisions to eliminate or reduce discharge of materials to storm water
- Description of waste management practices
- Spill prevention and control measures
- Maintenance and training practices
- Sampling and analysis strategy and sampling schedule for discharges from construction activities

The SWPPP will address the following construction activities:

- *Excavation of downstream face of the dam*: CDSM option or Conventional Earthwork option. The Conventional Earthwork option will require additional treatment capacities to handle higher potential sediment loads.
- *Use of stockpiles*: Stockpiles areas will require the use of erosion and sediment control practices listed above or other BMPs to prevent polluted runoff. Particular care will be used to prevent contaminated runoff to the creek.

Implementation: EBMUD or construction contractor(s)

Timing: Before construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure HY-1.1** would reduce the potentially significant impact related to erosion and runoff by requiring implementation of BMPs. The impact would be *less than significant with mitigation incorporated*.

Mitigation Measure HY-1.2: Install a turbidity curtain and containment boom during the outlet works construction.

A turbidity curtain made of impermeable fabric will be installed to contain any disturbance from the outlet works construction. A secondary containment boom will be installed within the perimeter of the turbidity curtain, and it will contain and capture petroleum products that may flow on the water. The turbidity curtain and containment boom, combined, will protect the lake's water quality during the outlet works construction. Fuel and/or hydraulic fluid sources will be closely monitored and controlled in containment basins on the barge deck and will follow safe practices.

Implementation: EBMUD and construction contractor(s)

Timing: Before and during construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure HY-1.2** would reduce the potentially significant impact related to contamination of runoff or receiving waters. This impact would *be less than significant with mitigation incorporated*.

Mitigation Measure HY-1.3: Require grading of construction staging areas to prevent migration of contaminants.

EBMUD will incorporate into contract specifications the requirement for grading construction staging areas to contain surface runoff, so that contaminants such as oil, grease, and fuel products will not drain towards receiving waters. If heavy-duty construction equipment is stored overnight at the construction staging areas, drip pans will be placed beneath the machinery engine block and hydraulic systems to prevent any leakage from entering runoff or receiving waters. Vehicles or equipment will not be refueled within 100 feet of Lake Chabot or San Leandro Creek unless a bermed and lined fueling area is constructed.

Implementation: EBMUD and construction contractor(s)

Timing: Before construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure HY-1.3** would reduce the potentially significant impact related to contamination of runoff or receiving waters. This impact would *be less than significant with mitigation incorporated*.

Mitigation Measure HY-1.4: Comply with regional, state, and federal wetlands and streambed requirements for any creek crossings and drainage channels.

For construction adjacent to or crossing any creeks or drainage channels, EBMUD or the contractor is not required to obtain an encroachment permit from the Alameda County Flood Control and Water Conservation District. However, construction activities will comply with CDFW and USACE requirements pertaining to wetlands and streambeds, including associated water quality protection requirements of the RWQCB.

Implementation: EBMUD or construction contractor(s)

Timing: Before and during construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure HY-1.4** would reduce the potentially significant impact related to wetlands and streambeds. This impact would be *less than significant with mitigation incorporated*.

Mitigation Measure HY-1.5: Maintain a spill kit at all locations where fuel or hydraulic powered equipment is in use over or adjacent to lake waters during the outlet works construction.

A spill kit made of oil absorbent napkins, additional floating sock-like oil absorbent boom sections, and an approved granular oil disbursement product in 5-gallon containers will be immediately available at all locations where fuel and/or hydraulic powered equipment are in use over or adjacent to the lake's waters.

Implementation: EBMUD or construction contractor(s)

Timing: Before and during outlet works construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure HY-1.5** would reduce the potentially significant impact related to protection of the lake's water quality during outlet works construction. This impact would be *less than significant with mitigation incorporated*.

Impact HY-2: The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge to cause a net deficit in aquifer volume or a lowering of the local groundwater table level (Criterion 2). (Less than Significant)

CDSM and Conventional Earthwork Options

The proposed project would have a significant environmental impact if it would result in a net deficit in aquifer volume or a lowering of the local groundwater table level.

For the Conventional Earthwork option, dewatering would lower the groundwater table to the depth of bedrock within the excavation. The limits of excavation would be located within the dam. No groundwater lowering is planned outside the excavation.

For the Conventional Earthwork option, the groundwater table depth would be approximately 15 to 55 feet bgs within the limits of the excavation, depending on the exact location and seasonal variations. The bedrock depth would vary within the limits of the excavation. At the upstream edge of the excavation, where the ground surface elevation would be approximately 210 feet (NGVD 29), the bedrock depth would be approximately 70 to 80 feet bgs. At the downstream edge of the excavation, where the ground surface elevation would be 165 feet, the bedrock depth would be approximately 60 feet bgs. Based on these approximate measurements, the groundwater table could be lowered by as much as 45 to 50 feet to meet the bedrock surface. No water supply wells are known to be on or near the project area that would be affected by this groundwater table dewatering. Water supply wells far downstream from the dam in Oakland and San Leandro are used primarily for irrigation purposes and would not be likely to experience any negative impacts as a result of construction.

For the CDSM option, construction may require lowering the groundwater at the dam's downstream face to excavate a level working platform, but the dewatering requirement would be significantly less than in the Conventional Earthwork option. Any lowering of the groundwater table in this isolated area would not substantially deplete groundwater supplies or interfere with groundwater recharge.

Project construction and operation for both Conventional Earthwork and CDSM options would not result in an increase in impervious surface area that would interfere substantially with groundwater recharge.

For both the Conventional Earthwork and CDSM options, a new permanent filter and drain system would be installed on the downstream end of the dam, and they would maintain and control the groundwater level within the structure of the dam. The drain would be connected to a perforated drain pipe, in turn connected to a solid pipe with an outfall discharging to San Leandro Creek. This would replace the existing drain in the dam, built of similar materials, that discharges to San Leandro Creek. The new drain and outfall would be likely to produce a minor increase in creek flow, benefitting habitat but having an unsubstantial effect on the groundwater.

In either construction alternative, the effects of construction downstream from the dam on groundwater resources would not be substantial because the proposed project would comply with permitting requirements and would use BMPs in dewatering. The impact would be *less than significant*.

Haul Routes, Stockpiles, and Outlet Works

The haul routes, stockpiles, and outlet works would not require excavation or result in an increase in impervious surface area. Therefore, *no impact* would occur.

Impact HY-3: The proposed project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site (Criteria 3 and 4). (Less than Significant with Mitigation Incorporated)

CDSM and Conventional Earthwork Options, Haul Routes, and Stockpiles

No stream or river would be altered in a manner that would result in substantial erosion or siltation on- or off-site; however, the use of the Lower Haul Route would require a bridge over San Leandro Creek that could result in a small amount of siltation or erosion during construction. After construction, any temporary bridge that is required over San Leandro Creek as part of the project would be removed.

The proposed project would not result in a net increase in impervious surface and would not permanently alter the course of a stream or river, and therefore would not increase the volume of runoff from the project area flowing into the storm sewer system.

The proposed project would result in a significant environmental impact if it would require modifications to drainage patterns that could to lead to substantial erosion of soils, siltation, or flooding. Such drainage pattern changes could be caused by grade changes, the exposure of soils for periods during which erosion could occur, or alterations to creek beds. (See Impact HY-1 regarding potential stormwater and erosion impacts, and mitigation measures.) Therefore, the changes in the site topography resulting from construction activities could result in erosion or siltation on- or off-site, and the impact would be *potentially significant*. However, implementation of **Mitigation Measure HY-3.1** would reduce this potentially significant erosion impact to a *less than significant* level.

Mitigation Measure HY-3.1: Grade the project site topography to match or improve pre-existing draining conditions, after completion of construction.

Following completion of construction, the topography of the project site will be graded to match or improve existing drainage conditions. Use of permanent BMPs, such as vegetated filter strips and/or vegetated swales, may be required.

Implementation: EBMUD or construction contractor(s)

Timing: After construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure HY-3.1** would reduce the potentially significant impact related to changes in project site topography during construction. The impact would be *less than significant with mitigation incorporated*.

Outlet Works

Outlet works construction activities would not include ground disturbance; therefore, they would not modify drainage patterns that could lead to erosion or siltation. *No impact* would occur.

Impact HY-4: The proposed project would not create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff (Criterion 5). (No Impact)

The proposed project would not result in an increase in impervious surface, as stated in Impact HY-4. Stormwater BMPs implemented as part of the SWPPP would be sized to capture runoff occurring on-site during construction activities, and runoff water would not be expected to exceed the capacity of these drainage systems. (See Impact HY-1 for details and mitigation measures related to stormwater runoff.) *No impact* would occur.

Impact HY-5: The proposed project would substantially degrade water quality (Criterion 6). (Less than Significant with Mitigation Incorporated)

Although temporary water quality impacts are anticipated during the project construction (as described in Impact HY-1) and *potentially significant*, the long-term operation impact to surrounding water quality would be minimal because the stockpile locations, haul routes, and excavation site would be returned to pre-existing conditions.

Mitigation measures to prevent water quality degradation during construction are described under Impact HY-1. Implementation of **Mitigation Measures HY-1.1, HY-1.2, and HY-1.3** would reduce the potentially significant impact to a *less-than-significant level with mitigation incorporated*.

Impact HY-6: The proposed project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam (Criterion 9). (No Impact)

The proposed project would enhance the reliability of Chabot Dam and the outlet tower of the dam in case of an earthquake. With DSOD regulatory oversight, monitoring, and design review, the potential for failure of the reconstructed dam would be minimized. The risk of flooding would not be increased as a result of the proposed project. Therefore, *no impact* would occur.

Impact HY-7: The proposed project would not expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow (Criterion 10). (No Impact)

The proposed project area, including the outlet works, excavation site, haul routes and stockpiles, is not located within a tsunami inundation area and is described as having few landslides, according to Association of Bay Area Government maps using data from the USGS (ABAG 2013a, 2013b). The proposed project would be constructed to the safety standards required by the Federal Emergency Management Agency in its Federal Guidelines for Dam Safety (FEMA 2005) and DSOD standards, and would not result in a substantial risk of loss, injury, or death involving inundation by seiche. Therefore, *no impact* would occur.

3.11.5 Impact and Mitigation Summary

Table 3.11-1 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

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Table 3.11-1
Hydrology and Water Quality Impact and Mitigation Summary

	CDSM				**Conventional Earthwork**			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact HY-1: The proposed project would violate water quality standards or waste discharge requirements (Criterion 1).	LTSM Mitigation Measures HY-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures HY-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures HY-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures HY-1.1, 1.2, 1.3, 1.4, and 1.5	LTSM Mitigation Measures HY-1.1, 1.2, 1.3, 1.4, and 1.5 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTSM Mitigation Measures HY-1.1, 1.2, 1.3, 1.4, and 1.5 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTSM Mitigation Measures HY-1.1, 1.2, 1.3, 1.4, and 1.5 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTSM Mitigation Measures HY-1.1, 1.2, 1.3, 1.4, and 1.5 Greater impact than CDSM option because a larger amount of ground disturbance would occur.
Impact HY-2: The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge to cause a net deficit in aquifer volume or a lowering of the local groundwater table level (Criterion 2).	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Impact HY-3: The proposed project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site (Criteria 3 and 4).	LTSM Mitigation Measure HY-3.1	LTSM Mitigation Measure HY-3.1	LTSM Mitigation Measure HY-3.1	LTSM Mitigation Measure HY-3.1	LTSM Mitigation Measure HY-3.1 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTSM Mitigation Measure HY-3.1 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTSM Mitigation Measure HY-3.1 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTSM Mitigation Measure HY-3.1 Greater impact than CDSM option because a larger amount of ground disturbance would occur.
Impact HY-4: The proposed project would not create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff (Criterion 5).	NI	NI	NI	NI	NI	NI	NI	NI

Table 3.11-1
Hydrology and Water Quality Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route	Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route	Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route	Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route	Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route
Impact HY-5: The proposed project would substantially degrade water quality (Criterion 6).	LTSM Mitigation Measures HY-1.1, 1.2, and 1.3	LTSM Mitigation Measures HY-1.1, 1.2, and 1.3	LTSM Mitigation Measures HY-1.1, 1.2, and 1.3	LTSM Mitigation Measures HY-1.1, 1.2, and 1.3	LTS Mitigation Measures HY-1.1, 1.2, and 1.3 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTS M Mitigation Measures HY-1.1, 1.2, and 1.3 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTS M Mitigation Measures HY-1.1, 1.2, and 1.3 Greater impact than CDSM option because a larger amount of ground disturbance would occur.	LTSM Mitigation Measures HY-1.1, 1.2, and 1.3 Greater impact than CDSM option because a larger amount of ground disturbance would occur.
Impact HY-6: The proposed project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam (Criterion 9).	NI	NI	NI	NI	NI	NI	NI	NI
Impact HY-7: The proposed project would not expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow (Criterion 10).	NI	NI	NI	NI	NI	NI	NI	NI

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

3.12 Hazards and Hazardous Materials

3.12.1 Approach to Analysis

This section discusses the existing conditions related to hazards and hazardous materials in the project area, describes the pertinent federal, state, regional, and local laws and guidelines, describes potential risks to human health and the environment associated with the proposed construction, and identifies corresponding mitigation measures to address potential impacts.

In 2013, California-based geotechnical and environmental science consultants, Ninyo & Moore prepared a Hazardous Materials Assessment (HMA) (provided in **Appendix I**), in general accordance with ASTM International E1527-05 and the U.S. Environmental Protection Agency's (EPA) All Appropriate Inquiries. The HMA included the following scope of services: site reconnaissance; review of aerial photographs, topographic maps, city directories, Sanborn fire insurance maps (if available), well records; review of relevant reports related to the project area provided by EBMUD; review readily available local regulatory agency files; and review regulatory agency databases. The findings of the HMA are presented in this section.

3.12.2 Environmental Setting

Regional Setting

Based on a review of the USGS 7.5-Minute Topographic Quadrangle Maps Series of Hayward, 1993, and San Leandro, 1993, the elevation of the project area varies from approximately 150 to 350 feet above mean sea level. The project area topography is hilly and gently slopes towards Lake Chabot to the north and San Leandro Creek to the southwest.

The project area is located in the Coast Ranges geomorphic province. The Coast Ranges are northwest trending and are underlain by marine and non-marine sedimentary rocks. These sedimentary units are underlain by either the Mesozoic Franciscan Formation (metamorphosed sea-floor deposits) or the granitic Salinian Block. The Oakland area is situated on a broad, alluvial plain that slopes gently west from the hills to the San Francisco Bay. The alluvial plain is composed of alluvial sediments that are derived from erosion of the hills to the east.

Examination of the Thomas W. Dibblee Jr., 2005 Geologic Map of the Hayward Quadrangle, Contra Costa and Alameda Counties revealed outcrops of Franciscan Formation rock within the project area boundary. Franciscan Formation rock is associated with naturally occurring asbestos (NOA). Based on the presence of Franciscan Formation rock in the project area, potential exists for soil to have been affected by NOA.

Groundwater depth in the project area was obtained from a URS Summary of August 2011 Field Investigation Program Memo (URS 2011). According to the memo, the groundwater depth ranges from 128 to 175 feet above mean sea level. Groundwater flow direction was not reported, but it generally can be assumed to follow the topography to the north, towards Lake Chabot, or to the southwest, towards San Leandro Creek.

Project Area Setting

The project area includes Chabot Dam and the outlet works, the Upper Haul Route, the Lower Haul Route, the Filter Pond Stockpile location, and the Park Stockpile location. The project area is located at the end of Estudillo Avenue and within the borders of Oakland, San Leandro, and unincorporated Alameda County (Castro Valley). Chabot Dam and the outlet works are situated on the west side of Lake Chabot. Lake Chabot has a capacity of 10,400 acre-feet, a surface area of 340 acres, and a drainage area of 41 square miles. Chabot Dam and the outlet works, the Upper Haul Route, the Lower Haul Route, and the Filter Pond Stockpile would be located on EBMUD property. The Park Stockpile would be located at Chabot Park; Chabot Park is owned by EBMUD and leased to the City of San Leandro, which operates the park.

Potential Hazardous Materials in the Project Area and Vicinity

Naturally Occurring Asbestos

NOA is found in several minerals in many parts of California. The most common type of NOA is chrysotile. When rock containing NOA is broken or crushed, asbestos fibers may be released and become airborne. Exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma, and asbestosis. Sources of NOA include construction activities in ultramafic rock deposits, such as the Franciscan Formation. NOA is associated with Franciscan Formation rock that has been determined to be present in the project area. Because of the presence of Franciscan Formation rock, soil sampling was performed at the site in July 2013 (EMSL Analytical, Inc. 2013). Based on the soil sampling, soil at the site has been impacted by NOA.

Other Hazardous Materials

Other hazardous materials to be used during project construction (e.g., diesel fuel, oil, lubricants, hydraulic fluid, paints, solvents, cements, and adhesives) would be used in varying amounts. Preparation and implementation of a Hazard Communication Plan (HCP) and Injury and Illness Prevention Plan (IIPP) by the construction contractor would minimize construction workers' exposure to hazardous materials. Any hazardous waste generated would be contained, sampled, and disposed in accordance with all applicable federal, state, regional, and local laws and regulations. With regard to hazardous materials, licensing and training personnel, accumulation limits, time limits, reporting, and record keeping would be regulated by the federal Resource Conservation and Recovery Act (RCRA) and the California Hazardous Waste Control Law.

Imported Fill

EBMUD's Chabot Filter Plant, located at the end of East Estudillo Avenue, is listed in the HAZNET database. This facility is situated within the proposed Filter Pond Stockpile location in the project area. Based on information provided by EBMUD, the facility is listed in the database for importation of approximately 22,000 cubic yards of clean fill to the Chabot Filter Ponds in 2003 (Kanazawa 2013). The fill was imported to cover broken concrete debris in the filter ponds and remove a safety concern to potential trespassers. The database listing does not represent a potential environmental concern.

Polychlorinated Biphenyls

A pole-mounted transformer was observed on the northern portion of the Park Stockpile location (see **Figure 3.12-1**). Historically, polychlorinated biphenyls (PCBs) (a group of hazardous substances and suspected human carcinogens) were widely used as an additive in cooling oils for electrical components. Typical sources of PCBs can include electrical transformers. The use of PCBs in electrical transformers manufactured before 1978 was not regulated by EPA. Electrical transformers manufactured since 1978, which do not contain PCBs, should be stamped to indicate that the product is PCB-free. Because of the age of the facilities in the project area, the pole-mounted transformer possibly contains PCBs.

Lead-Based Paint

Structures constructed before 1978, when the U.S. Consumer Product Safety Commission stopped allowing the sale of lead-based paint (LBP), may be painted with LBP. Based on the age of the outlet tower, potential exists for the presence of LBP. If removed improperly from structures, LBP can become a potential health hazard.

Asbestos Containing Materials

Asbestos is a strong, incombustible, and corrosion-resistant material that was used in many construction materials prior to 1978. If inhaled, asbestos fibers can result in serious health problems. Asbestos containing materials (ACM) are defined as building materials containing more than 0.1 to 1.0 percent asbestos. ACMs may include concrete, cement mortar, and caulk. Based on the age of the Chabot Dam outlet tower and outlet pipes, potential exists for the presence of ACMs. Before demolition of the outlet works, the National Emission Standards for Hazardous Air Pollutants would requires that an asbestos survey be conducted to determine the presence of ACMs. Any demolition, renovation, or other construction activities that may disturb suspected ACMs would need to comply with state law, which requires that a certified contractor perform removal of the ACMs.

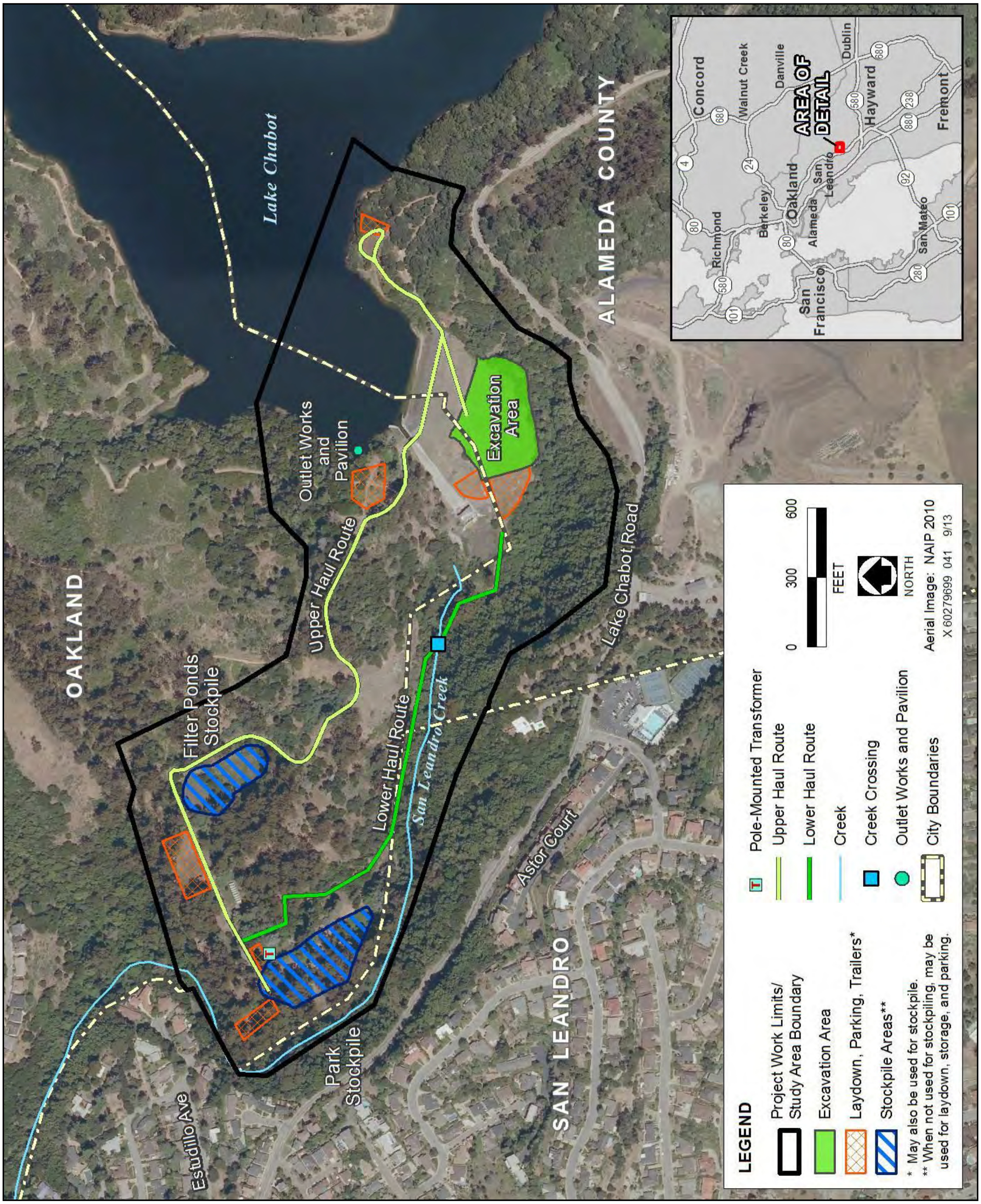
3.12.3 Regulatory Background

Hazardous materials and hazardous wastes are subject to numerous federal, state, regional, and local laws and regulations, intended to protect health, safety, and the environment. The major governmental agencies enforcing these regulations include EPA, the California Department of Toxic Substances Control (DTSC), and the Bay Area Air Quality Management District (BAAQMD). Local regulatory agencies enforce many federal and state regulations through the Certified Unified Program Agency's (CUPA) program.

Federal

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) regulates the distribution, use, and disposal of PCBs. The TSCA identifies requirements for identifying and controlling PCB hazards that pose risks to human health and the environment under Title 40, Part 761 of the Code of Federal Regulations (CFR).



Source: Terra Engineers 2013, EBMUD 2013, Ninyo & Moore 2013, compiled by AECOM in 2013

Figure 3.12-1: Site Plan Showing Potentially Hazardous Materials in the Project Area

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) regulates the licensing and training of personnel, accumulation limits, time limits, reporting, and record keeping. Included in RCRA is the CFR Title 40, Section 261.24 toxicity characteristic that regulates hazardous waste classification.

State

Asbestos Notification, Contractor Licensing, Notification, and Disposal Requirements

If project construction involves more than 100 square feet of ACMs, then Title 8 Sections 1529 and 341.6 through 341.14 of the California Code of Regulations (CCR) require that the California Division of Occupational Safety and Health be notified and that any contractors be licensed through the Contractors Licensing Board of the State of California as an Asbestos Qualified Contractor. In addition, a one-time report on use of carcinogens must be submitted to the California Division of Occupational Safety and Health (Cal/OSHA) under 8 CCR, Chapter 4, Section 5203. The owner of the property where abatement is to occur must have a hazardous waste generator number assigned by and registered with the California Department of Toxic Substances Control. The contractor and hauler of the material are required to file a hazardous waste manifest that details the transportation of material from the project area and its disposal.

Lead Evaluation, Abatement, Worker Accreditation, and Worker Protection Requirements

CCR, Title 17, Sections 1532.1 and 35001 set requirements for lead hazard evaluation and abatement activities, accreditation of lead abatement workers, and worker protection requirements for employees conducting lead-related construction activities, to be administered by the California Department of Public Health (CDPH).

Asbestos Airborne Toxic Control Measure

CCR, Title 17, Section 93105, Asbestos Airborne Toxic Control Measure (ATCM) is administrated in the project area by BAAQMD. The purpose of the ATCM is to reduce public exposure to NOA in dust generated by construction activities. The ATCM requires construction activities in areas where NOA is likely to be found to employ the best available dust mitigation measures, to reduce and control dust emissions.

Standards for Universal Waste Management

CCR, Title 22, Division 4.5, Chapter 11, Article 3, the total threshold leaching procedure and soluble threshold leaching procedure regulates hazardous waste classification.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

CCR Title 27, Division 1, Subdivision 4, Chapter 1 provides for the regulation and administration of the CUPAs. In the project area, the CUPAs are the San Leandro Fire Department and the Oakland Fire Department.

California Accidental Release Program

The California Accidental Release Program (CalARP) includes regulatory requirements for facilities that handle regulated substances. In accordance with CalARP regulations, preparation of a risk management plan (RMP) is required for the storage of regulated substances above threshold quantities. The RMP must include a hazard assessment to evaluate the potential effects of an accidental release. The RMP is filed with and administered by a CUPA.

California Health and Safety Code

Section 19827.5 of the California Health and Safety Code regulates the control of ACMs during construction and requires that local agencies not issue demolition or alteration permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations regarding hazardous air pollutants. BAAQMD is the responsible agency and is to be notified 10 days in advance of demolition or abatement work involving ACMs.

State Water Code

State Water Code Sections 13267 and 13304 provide authority for the State Water Quality Control Board to require investigation and cleanup of sites with unauthorized pollutant releases. This authority is delegated to Alameda County Environmental Health (ACEH) in the site area.

California Public Resources Code

Section 4427 of the California Public Resources Code (PRC) includes fire safety regulations, restricting the use of equipment that may produce a spark, flame, or fire; requiring the use of spark arrestors on construction equipment with an internal combustion engine; specifying requirements for the safe use of gasoline powered tools in fire hazard areas; and specifying fire suppression equipment that must be provided on-site for various types of work in fire-prone areas. The PRC requirements apply to project construction because the project area is designated by the California Department of Forestry and Fire Protection (2008) as a "Very High Fire Hazard Severity Zone."

Regional

Bay Area Air Quality Management District

BAAQMD is the public agency regulating the ATCM for construction, grading, quarrying, and surface mining operations (17CCR93015). The purpose of the regulation is to reduce public and worker exposure to NOA from construction and mining activities that emit dust which may contain NOA. The ATCM requires regulated operations engaged in road construction and maintenance activities, construction, and grading operations, and quarrying and surface mining operations in areas where NOA is likely to be found, to employ the best available dust mitigation measures to reduce and control dust emissions.

Local

EBMUD Emergency Operations Plan

EBMUD has prepared an Emergency Operations Plan (EBMUD 2012), outlining procedures to be followed in the event of natural disasters, severe storms, major system failures, or terrorist attacks.

EBMUD prepares a hazard-specific emergency response plan for individual responses, using the EBMUD Emergency Operations Plan as a guide; each plan identifies staff members to perform emergency duties and lists the resources needed to accomplish emergency tasks.

California Government Code

Under Section 53091 of the California Government Code, EBMUD, as a local agency and utility district, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage, or transmission of water (California Office of Administrative Law 2013a). However, EBMUD's practice is to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

San Leandro Fire Department

San Leandro Fire Department is the CUPA regulating underground storage tanks (UST) and hazardous materials business plans (HMBP) in the City of San Leandro portion of the project area.

Oakland Fire Department

Oakland Fire Department is the CUPA regulating USTs and HMBPs in the City of Oakland portion of the project area.

Cities of San Leandro and Oakland General Plans

The Cities of San Leandro and Oakland General Plans include policies to prevent and respond to hazardous materials incidents, primarily by complying with state and federal laws. Hazardous material handling requires the preparation of a HMBP. Transportation of hazardous materials and notification of releases are regulated. Policies in the General Plan are intended to reduce the production of hazardous materials and safely manage already existing hazardous materials.

3.12.4 Impact Analysis

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact related to hazards and hazardous materials if it would:

1. create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

2. create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment;

3. emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

4. be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;

5. be located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area;

6. be within the vicinity of a private airstrip, and result in a safety hazard for people residing or working in the project area;

7. impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

8. expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

No schools are within 0.25 mile of the project area. Thus, no impact related to emissions of hazardous materials in the vicinity of a school would occur, and Criterion 3 is not discussed further in this Draft EIR.

The project area is not located within the boundaries of an airport land use plan or within 2 miles of a public or private airstrip. Thus, no impact related to airport safety would occur, and Criteria 5 and 6 are not discussed further in this Draft EIR.

Project impacts related to hazards and hazardous materials addressed in this impact discussion are divided into project components where the impacts can vary by component. Otherwise, the impacts are discussed generally, covering all project components.

Project Impacts and Mitigation Measures

Impact HZ-1. The proposed project would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (Criterion 1). (Less than Significant with Mitigation Incorporated)

All Project Components—Other Hazardous Materials

Project construction activities associated with all project components may include the storage, use, and transport of hazardous materials (e.g., diesel fuel, oil, lubricants, hydraulic fluid, paints, solvents, cements, and adhesives). The construction activities at all project work sites may encounter or generate hazardous or solid wastes and debris, and may result in exposure of workers, the public, and/or the environment to hazardous materials. Any project-related hazardous materials would be handled, stored, transported, and disposed by EBMUD and its construction contractor(s) in accordance with local, state, and federal regulations during project construction and operation. The impact would be *potentially significant*. However, implementation of **Mitigation Measure HZ-1.1** would reduce the potentially significant impact related to hazardous materials to a *less-than-significant* level.

Mitigation Measure HZ-1.1: Prepare and implement an HCP, IIPP, and a Hazardous Materials Control and Spill Prevention and Response Plan.

Before construction, EBMUD or the construction contractor(s) will prepare an HCP, IIPP, and a Hazardous Materials Control and Spill Prevention and Response Plan. Implementation of these plans by the construction contractor(s) will minimize construction worker exposure to hazardous materials. Hazardous waste generated during project construction will be contained, sampled, and disposed in accordance with all applicable federal, state, and local laws and regulations. With regard to hazardous materials, licensing and training personnel, accumulation limits, time limits, reporting, and record keeping are regulated by the federal RCRA and the California Hazardous Waste Control Law. The Hazardous Materials Control and Spill Prevention and Response Plan will include strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways. The plan will include measures to prevent construction-related raw cement, concrete, or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses. Steps for immediate clean-up of construction-related spills and notification procedures will be included. Where applicable, the Hazardous Materials Control and Spill Prevention and Response Plan will reference the Storm Water Pollution Prevention Plan (see **Mitigation Measure HY-1.1**).

Implementation:	EBMUD or construction contractor(s)
Timing:	Before and during construction
Enforcement:	EBMUD
Residual Effect:	Implementation of **Mitigation Measure HZ-1.1** would comply with local, state, and federal regulations (implemented through EBMUD contract specifications) regarding the transport, use, or disposal of hazardous materials. The impact would be reduced to *less than significant with mitigation incorporated*.

Park Stockpile—Polychlorinated Biphenyls

Project construction activities at the Park Stockpile location may include relocating or removal of a pole-mounted transformer that could potentially expose workers, the public, and/or the environment to polychlorinated biphenyls (PCBs). PCBs, which are highly toxic, were commonly used before 1978 in transformers, capacitors, and fluorescent light ballasts. Construction activities could cause construction workers and the general public to be exposed to harmful substances where PCBs exist. Therefore, the impact would be *potentially significant.* However, implementation of **Mitigation Measure HZ-1.2** would reduce the potentially significant impact related to PCBs to a *less-than-significant* level.

Mitigation Measure HZ-1.2: Assess the pole-mounted transformer for the presence of PCBs.

The construction contractor(s) will assess the pole-mounted transformer at the Park Stockpile location for the presence of PCBs, based on the age of the pole-mounted transformer, if project construction activities necessitate the removal or relocation of the pole-mounted transformer. If the pole-mounted transformer is dated prior to 1978, it will be considered to contain hazardous materials and will be disposed in accordance with TSCA (40 CFR Section 761.62) requirements.

PCB bulk product waste containing 50 parts per million or more of PCBs must be disposed at a TSCA-approved facility. Disposal of PCB bulk product waste does not require approval from the EPA.

Implementation: Construction contractor(s)

Timing: Before construction

Enforcement: EBMUD and EPA

Residual Effect: Implementation of **Mitigation Measure HZ-1.2** would comply with local, state, and federal regulations (implemented through EBMUD contract specifications) regarding the transport, use, or disposal of hazardous materials. The impact would be *less than significant with mitigation incorporated*.

Outlet Works—Lead Based Paint and Asbestos Containing Materials

Project construction activities at the outlet works location may include demolition of structures possibly painted with lead-based paint and/or constructed with ACM, which would result in exposure of workers, the public, and/or the environment to hazardous materials. The impact would be *potentially significant.* However, implementation of **Mitigation Measure HZ-1.3** would reduce the potentially significant impact related to lead-based paint and/or ACM to a *less-than-significant* level.

Mitigation Measure HZ-1.3: Evaluate all pre-1980 structures before project construction.

Before beginning project construction activities, EBMUD or its contractor(s) will conduct an evaluation of all structures (built before 1980) to be demolished at the outlet works, to evaluate the presence of lead-based paint and ACM. Remediation will be implemented in accordance with the recommendations of the evaluation and disposed at an appropriate, permitted off-site disposal facility.

Implementation: EBMUD or construction contractor(s)

Timing: Before construction

Enforcement: EBMUD, BAAQMD, Cal/OSHA and CDPH

Residual Effect: Implementation of **Mitigation Measure HZ-1.3** would comply with local, state, and federal regulations (implemented through EBMUD contract specifications) regarding potential exposure to lead-based paint and ACM at the outlet works. The impact would be *less than significant with mitigation incorporated*.

Impact HZ-2. The proposed project would create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment (Criterion 2). (Less than Significant with Mitigation Incorporated)

All Project Components—Naturally Occurring Asbestos

NOA is associated with Franciscan Formation rock that has been determined to be present in the project area. Because of the presence of Franciscan Formation rock, soil sampling was performed at the site in July 2013 (EMSL Analytical, Inc. 2013). Based on the soil sampling, soil at the site has been impacted by NOA. Project construction activities that disturb soils, including excavation for either the CDSM or Conventional Earthwork options, soil stockpiling, road construction, and demolition may generate dust that contains NOA, which may result in the exposure of workers, the public, and/or the environment to hazardous materials. The Conventional Earthwork option would disturb a larger area than the CDSM option, resulting in a greater volume of NOA to be disturbed. The impact would be *potentially significant*. However, implementation of **Mitigation Measure HZ-2.1** would reduce the potentially significant impact related to NOA to a *less-than-significant* level.

Mitigation Measure HZ-2.1: Perform project construction activities in accordance with the Asbestos Dust Mitigation Plan.

Because soils to be disturbed are confirmed to contain NOA, project construction activities, including excavation with either the CDSM or Conventional Earthwork option, soil stockpiling, road construction, and demolition will be performed under an Asbestos Dust Mitigation Plan, in accordance with the ATCM as administered by BAAQMD, to reduce public and worker exposure to NOA by employing the best available dust mitigation practices.

Implementation: EBMUD or construction contractor(s)

Timing: Before construction

Enforcement: EBMUD and BAAQMD

Residual Effect: Implementation of **Mitigation Measure HZ-2.1** would comply with local, state, and federal regulations (implemented through EBMUD contract specifications) regarding exposure to NOA. The impact would be *less than significant with mitigation incorporated*.

Impact HZ-3. The proposed project would not be located on a site that is included on a list of hazardous materials sites, compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment (Criterion 4). (No Impact)

The Upper Haul Route, Lower Haul Route, Park Stockpile, Excavation Site, and the outlet works were not listed on databases of hazardous materials sites. *No impact* would occur.

Filter Pond Stockpile—Imported Fill

EBMUD's Chabot Filter Plant (located at the Filter Pond Stockpile project component) is listed in the HAZNET database. Based on information provided by EBMUD, the facility is listed in the database for importation of approximately 22,000 cubic yards of clean fill to the Chabot Filter Ponds in 2003

(Kanazawa 2013). The fill was imported to cover broken concrete debris in the filter ponds and remove a safety concern to potential trespassers. The database listing does not represent a potential environmental concern. *No impact* would occur at the Filter Pond Stockpile worksite as a result of the imported fill.

Impact HZ-4. The proposed project would impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (Criterion 7). (Less than Significant with Mitigation Incorporated)

Construction activities of the proposed project would change existing circulation through the site for emergency vehicles and construction workers. **Mitigation Measure TR-1.1** would require the preparation and implementation of a traffic control plan. This would reduce impacts at affected roadways and intersections in the project vicinity. The proposed project could affect emergency vehicle access and evacuation routes within the site, along the Upper and Lower Haul Routes and to the stockpile and excavation area. Off-site, no changes to the existing street network are proposed. The impact would be *potentially significant*. However, implementation of **Mitigation Measure HZ-4.1** would reduce the potentially significant impact related to emergency access to a *less-than-significant* level.

Mitigation Measure HZ-4.1: Prepare a site-specific emergency response plan and maintain emergency access and evacuation routes to/from the project area, in cooperation with local public agencies.

EBMUD will prepare a site-specific emergency response plan for the site, using the EBMUD Emergency Operations Plan as a guide; the plan will identify staff members to perform emergency duties and lists the resources needed to accomplish emergency tasks.

Implementation: EBMUD or construction contractor(s)

Timing: Before and during construction

Enforcement: EBMUD

Residual Effect: Implementation of **Mitigation Measure HZ-4.1** would comply with local regulations (implemented through EBMUD contract specifications) regarding maintenance of emergency access and evacuation routes to/from the project area and cooperation with local public agencies. The impact would be *less than significant with mitigation incorporated*.

Impact HZ-5. The proposed project would expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (Criterion 8). (Less than Significant with Mitigation Incorporated)

All Project Components—Wildland Fire Risk

The California Department of Forestry and Fire Protection classifies the project area as a "Very High Fire Hazard Severity Zone" (CDF 2008). The use of construction equipment and temporary storage of flammable materials could pose a wildland fire risk in the project area. The time of greatest fire risk would be during the clearing phase of all project components, when construction workers and equipment would be near vegetative fuels that could be highly flammable. The impact would be *potentially significant*. However, implementation of **Mitigation Measure HZ-5.1** would reduce the potentially significant impact related to wildland fire risk to a *less-than-significant* level.

Mitigation Measure HZ-5.1: Take precautions regarding all flammable material around construction equipment and maintain fire-fighting tools including a shovel and fire extinguisher at project work sites where construction equipment is being used or flammable materials are being temporarily stored.

All flammable material, including snags, will be cleared from project work sites around construction equipment and temporary storage for flammable materials. One serviceable round point shovel with an overall length of not less than 46 inches and one backpack pump water-type fire extinguisher, fully equipped and ready for use, will be maintained and will be readily available at each project component work site during construction equipment operation and at project work sites where temporary storage of flammable materials is located.

Implementation:	EBMUD or construction contractor(s)
Timing:	Before and during construction
Enforcement:	EBMUD
Residual Effect:	Implementation of **Mitigation Measure HZ-5.1** would comply with local regulations (implemented through EBMUD contract specifications) regarding necessary precautions for flammable material around construction equipment and maintenance of fire-fighting tools, where construction equipment is being used and flammable materials are being temporarily stored. The impact would be *less than significant with mitigation incorporated*.

3.12.5 Impact and Mitigation Summary

Table 3.12-1 summarizes the impact conclusions for each impact statement for the project component combinations. Mitigation measures are listed, as applicable. If any of the project components would result in greater impacts than another (i.e., if the Conventional Earthwork option would result in greater impacts than the CDSM option), that is identified in the table.

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Table 3.12-1
Hazards and Hazardous Materials Impact and Mitigation Summary

	CDSM				Conventional Earthwork			
	Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper Haul Route**	**Outlet Works, CDSM, Filter Pond Stockpile and/or Park Stockpile, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Filter Pond & Park Stockpiles, Upper & Lower Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper Haul Route**	**Outlet Works, Conventional Earthwork, Park Stockpile, Upper & Lower Haul Route**
Impact HZ-1: The proposed project would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (Criterion 1).	LTSM Mitigation Measures HZ-1.1, 1.2, and 1.3	LTSM Mitigation Measures HZ-1.1, 1.2, and 1.3	LTSM Mitigation Measures HZ-1.1, 1.2, and 1.3	LTSM Mitigation Measures HZ-1.1, 1.2, and 1.3	LTSM Mitigation Measures HZ-1.1, 1.2, and 1.3	LTSM Mitigation Measures HZ-1.1, 1.2, and 1.3	LTSM Mitigation Measures HZ-1.1, 1.2, and 1.3	LTSM Mitigation Measures HZ-1.1, 1.2, and 1.3
Impact HZ-2: The proposed project would create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment (Criterion 2).	LTSM Mitigation Measure HZ-2.1	LTSM Mitigation Measure HZ-2.1	LTSM Mitigation Measure HZ-2.1	LTSM Mitigation Measure HZ-2.1	LTSM Mitigation Measure HZ-2.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles.	LTSM Mitigation Measure HZ-2.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles.	LTSM Mitigation Measure HZ-2.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles.	LTSM Mitigation Measure HZ-2.1 Greater impacts than the CDSM option due to larger disturbance area for excavation and stockpiles.
Impact HZ-3: The proposed project would not be located on a site that is included on a list of hazardous materials sites, compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment (Criterion 4).	NI	NI	NI	NI	NI	NI	NI	NI
Impact HZ-4: The proposed project would impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (Criterion 7).	LTSM Mitigation Measures TR-1.1 and HZ-4.1	LTSM Mitigation Measures TR-1.1 and HZ-4.1	LTSM Mitigation Measures TR-1.1 and HZ-4.1	LTSM Mitigation Measures TR-1.1 and HZ-4.1	LTSM Mitigation Measures TR-1.1 and HZ-4.1	LTSM Mitigation Measures TR-1.1 and HZ-4.1	LTSM Mitigation Measures TR-1.1 and HZ-4.1	LTSM Mitigation Measures TR-1.1 and HZ-4.1
Impact HZ-5: The proposed project would expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (Criterion 8).	LTSM Mitigation Measure HZ-5.1	LTSM Mitigation Measure HZ-5.1	LTSM Mitigation Measure HZ-5.1	LTSM Mitigation Measure HZ-5.1	LTSM Mitigation Measure HZ-5.1	LTSM Mitigation Measure HZ-5.1	LTSM Mitigation Measure HZ-5.1	LTSM Mitigation Measure HZ-5.1

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation Incorporated
SU = Significant and Unavoidable

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4 Analysis of Alternatives

4.1 Introduction and Approach

This chapter summarizes the alternatives analysis and screening process, describes and analyzes the No Project Alternative, compares the environmental impacts of the Chabot Dam Seismic Upgrade Alternatives (Alternatives 1a, 1b, 2a, 2b, and 2c), and identifies the environmentally superior alternative.

4.1.1 CEQA Requirements for Alternatives Analysis

The State CEQA Guidelines require EIRs to describe and evaluate a reasonable range of alternatives to a project, or to the location of a project, which could feasibly attain most of the basic project objectives and avoid or substantially lessen significant project impacts. Section 15126.6 of the State CEQA Guidelines sets forth the following criteria for alternatives:

- **Identifying Alternatives:** The range of alternatives is limited to those that would avoid or substantially lessen any of the significant effects of the proposed project, are feasible, and would attain most of the basic objectives. Factors that may be considered when addressing the feasibility of an alternative include site suitability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, economic viability, and whether the proponent can reasonably acquire, control, or otherwise have access to an alternative site. An EIR need not consider an alternative whose impact cannot be reasonably ascertained and whose implementation is remote and speculative. The specific alternative of "no project" must also be evaluated along with its impact.
- **Range of Alternatives**: An EIR need not consider every conceivable alternative, but must consider a range of reasonable alternatives that will foster informed decision-making and public participation. The "rule of reason" governs the selection and consideration of EIR alternatives, requiring that an EIR set forth only those alternatives necessary to permit a reasoned choice. The lead agency (in this case, EBMUD) is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasons for selecting those alternatives.
- **Evaluation of Alternatives**: EIRs are required to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the project. Matrices may be used to display the major characteristics of each alternative and significant environmental effects of each alternative to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project as proposed.

In general, there are two types of alternatives that may be reviewed in an EIR:

- alternatives to the project that are other projects entirely, or other approaches to achieving the project objectives; and
- alternatives of the project that include modified project components, such as alternative project sites or processes and/or modified facilities, layout, size and scale within the same site.

This alternatives analysis for the proposed project evaluates both types of alternatives to develop a reasonable range of alternatives.

4.1.2 Approach to Alternatives Analyses

The alternatives analysis and screening phase consisted of a systematic process that examined the overall project objectives and identified a range of alternatives for review before selection of the ones presented in detail in this Draft EIR.

In 2005, EBMUD completed studies on the seismic stability of Chabot Dam and Chabot Tower, in coordination with the California Department of Water Resources, Division of Safety of Dams (DSOD). The seismic stability of the dam was evaluated using site-specific earthquake ground motions, estimated for a maximum credible earthquake with a moment magnitude of 7.25 on the Hayward Fault, at a distance of approximately 0.3 miles from Chabot Dam. For the dam, the stability analysis indicated that the top of the dam would settle less than 4 feet but would remain stable; however, local displacements of several feet may occur in the sluiced fill buttress at the toe of the dam in the direction of the downstream channel. The outlet works tower was evaluated for a maximum design earthquake. The results for the tower indicated that the reinforced concrete pavilion would suffer severe damage and probably would collapse, the masonry tower could completely separate from the rock, and the valve shafts or shaft supports could be damaged, causing accidental blockage of the sluice valves, thus blocking release of water from Chabot Lake, which could become a safety concern. After completion of these analyses, DSOD required seismic upgrades to the dam and outlet works. EBMUD began to evaluate options for modifying the dam and tower to improve performance under earthquake conditions.

Dam Construction Alternatives

EBMUD prepared conceptual designs that propose two improvement options for meeting the seismic upgrade objectives of the dam: a cement deep soil mixing option (CDSM option) and Conventional Earthwork option. The constructability and environmental review of these options were evaluated by Terra Engineers, Inc. in association with AECOM (Terra Engineers 2013). Both options have been retained for evaluation under CEQA as part of the proposed project, and they are discussed in Chapter 2, Project Description. Following the EIR certification, the preferred project, including the preferred construction method for the dam (CDSM or Conventional Earthwork) and stockpile and haul route options will be selected and recommended to the EBMUD Board of Directors. As part of both construction methods, both on-site and off-site stockpiles and haul routes were reviewed. On-site stockpiles and haul routes (Lower Haul Route and Upper Haul Route) are part of the proposed project and area discussed in Chapter 2. Off-site stockpiles and haul routes are considered in the discussion under Section 4.2, Alternative 1.

Outlet Works Alternatives

EBMUD prepared conceptual designs that discuss four improvement options for meeting the seismic upgrade objectives of the tower. The constructability and environmental review of these options were evaluated in a report prepared by Water Resources Engineering (WRE) with AECOM in March 2013 (WRE and AECOM 2013). The four tower alternatives were:

- Tower Alternative 1: lining the shaft and removing the pavilion
- Tower Alternative 2: lining the shaft and retrofitting the pavilion
- Tower Alternative 3: lining the shaft and removing the pavilion and tower
- Tower Alternative 4: filling the shaft and building a new outlet tower

Subsequent to the constructability report, an additional tower alternative was considered:

- Tower Alternative 5: lining the shaft, removing the pavilion, and retrofitting the tower

Tower Alternative 3 was selected as the proposed project component and is described in Section 2.5.1, Outlet Works and Section 2.6.1, Outlet Works Design. The other four alternatives are discussed in Section 4.3, Alternative 2: Outlet Works—Pavilion and Tower. These were renumbered Alternative 2a (Tower Alternatives 1 and 5), Alternative 2b (from Tower Alternative 2), and Alternative 2c (from Tower Alternative 4). Tower Alternatives 1 and 5 were combined in Alternative 2a because they are similar except for the treatment of the tower. Alternative 2a includes an option to retrofit the tower.

4.1.3 Alternatives Evaluated in This Draft EIR

The following alternatives, identified during the alternatives analysis phase and subsequently further refined, are discussed in this document, in compliance with CEQA:

- Alternative 1: Off-Site Stockpiles and Haul Routes
    - Alternative 1a: Covington Stockpile and Off-site Haul Routes
    - Alternative 1b: Quarry Stockpile and Off-site Haul Routes
- Alternative 2: Outlet Works—Pavilion and Tower
    - Alternative 2a: Line Shaft, Remove Pavilion with option to Retrofit Tower
    - Alternative 2b: Line Shaft, Retrofit Pavilion
    - Alternative 2c: Fill Shaft, Remove Pavilion and Tower, Build New Tower
- No Project Alternative

Sections 4.2 and 4.3 discuss Alternatives 1 and 2, respectively, and related assessments against project needs and objectives including environmental impacts for seismic retrofit of the dam and outlet works. Section 4.4 discusses the No Project Alternative, and Section 4.5 compares the alternatives and identifies the environmentally preferred alternative.

4.1.4 Alternatives Considered but Not Evaluated in This Draft EIR

No alternative sites to the proposed project are analyzed in this document. Alternative sites would not meet the fundamental project objectives or be cost effective. Other alternatives not considered in this Draft EIR include:

- adding a haul route for the Quarry Stockpile;
- using a conveyance system for transporting material to the Quarry Stockpile;
- using the Benedict Drive segment of the haul route to the Covington Stockpile;
- using a cofferdam for outlet works construction;
- decommissioning Chabot Dam;
- draining Lake Chabot; and
- transferring ownership of the dam and surrounding property to another entity.

The following is a brief discussion of these alternatives and why they have not been considered further.

Haul Route from Dam to Quarry Stockpile on Lake Chabot Road (East Haul Route): Material could be transported to the Quarry Stockpile (see Alternative 1) using a haul route on an existing access road from the dam directly to Lake Chabot Road. A 1,600-foot segment of this access road east of the dam is paved and is part of the West Shore Trail. The remaining 900-foot unpaved segment is open to the public, but it is used primarily by EBMUD service vehicles. This haul route was found to be infeasible because it would present critical safety hazards, caused by a limited right-of-way and a steep roadway grade (18 percent). The necessary road improvements to enable large construction truck and equipment access would be cost prohibitive because this hillside road is bordered by steep slopes on both sides; thus, this alternative was not considered further.

Conveyance System from Dam to Quarry Stockpile: Construction material could be transported to the Quarry Stockpile using a conveyance system from the toe of the dam to the quarry. The dam is separated from the quarry by Lake Chabot Dam Road and a wooded valley wall with steep side slopes. A belt conveyor system would have to be installed in a zigzag arrangement with switch backs because of the steep terrain, and the last segment of the conveyor would need to be elevated above Lake Chabot Road. Material from the end of one segment would be dropped to the beginning of the next segment. The height of the beginning and end points of each segment would need to be adjusted to bring the material back from the quarry because the material would need to be dropped from one segment to the next. A conveyor system was found to be infeasible because it would be cost prohibitive; thus, this alternative was not considered further.

Benedict Drive Segment of the Covington Stockpile Haul Route: EBMUD evaluated transporting material to the Covington Stockpile on an off-site haul route that included a 4,230-foot segment of Benedict Drive between Estudillo Avenue and Covington Street. Because of a much higher incidence of residential and pedestrian traffic, narrow roadways, and the high cost of safety and traffic mitigation compared to the availability of a more cost effective off-site haul route to the Covington site (see Alternative 1), the Benedict Drive Haul Route was rejected as a potential haul route, and thus this alternative was not considered further.

Cofferdam for Outlet Works Construction Activities: A temporary cofferdam could be installed within Lake Chabot to maintain a dry work space for outlet works construction. The construction required for the installation of the cofferdam would add approximately 14 weeks (over 3 months) to the construction schedule before the outlet works retrofit could begin. Removal of the cofferdam would add another 8 weeks (2 months) to the overall schedule. Therefore, the temporary cofferdam alternative would extend the construction schedule by approximately 5 months, generating greater temporary construction impacts over a longer duration than those for the proposed project. The use of a cofferdam was found to be infeasible; it would be cost prohibitive and would require a USACE CWA Section 404 permit. Because of a higher project cost, longer schedule, and greater environmental impact, this alternative construction method was not included as part of the proposed project or Alternatives 1 and 2. Thus, this alternative was not considered further.

Decommissioning Chabot Dam: Decommissioning Chabot Dam would preclude any seismic deformation of the dam. As part of decommissioning, Chabot Lake would be drained, the dam facilities would be removed, and San Leandro Creek flow would be restored. New flood management features would be required to protect downstream land uses from uncontrolled flow through the Chabot Lake area. Although watershed grazing and land-based recreation opportunities could be enhanced, water-based recreation would no longer be available.

Because the dam would not be upgraded, the significant impacts of the proposed project would be avoided. Decommissioning Chabot Dam would remove Chabot Lake's water supply functions, which include providing up to 10,000 acre-feet of emergency standby water storage or drought supply, and a source of raw water for the irrigation of two golf courses. It also would remove an important regional recreational facility that supports water-based recreation (i.e., fishing and boating). It would no longer store runoff from San Leandro Creek, which currently helps reduce the risk of flooding downstream by attenuating storm hydrographs. Other EBMUD facilities would need to be upgraded or new facilities would need to be added to replace the function of Chabot Lake, and construction and operation of the upgraded/new facilities could result, in turn, in potential environmental impacts greater than those identified for the proposed project. Thus, this alternative was not considered further.

Draining Lake Chabot: Draining the lake would involve removing the gates from the outlet works to allow water to flow through the outlet works and leaving the dam in place. Because the elevation of the outlet works is more than 25 feet above the base of the lake, approximately 2,640 acre feet of water would continue to be impounded by the dam; therefore, the dam would continue to be under DSOD jurisdiction and require their mandated seismic upgrades. Thus, this alternative was not considered further.

Transfer of Ownership of the Dam and Surrounding Property: EBMUD could transfer ownership of the dam and surrounding property to another entity. However, transferring ownership to another entity/agency would not be feasible without addressing the deficiency of the dam or decommissioning the dam. Thus, this alternative was not considered further.

4.1.5 Evaluation of Alternatives

The project purpose and project objectives (discussed in Chapter 2, Project Description) were used to evaluate the alternatives. The project objectives are to:

- improve the sluiced fill buttress at the embankment toe to withstand shaking generated by the maximum credible earthquake on the Hayward Fault without significant strength loss;
- prevent damage to the outlet works from the design level earthquake so that the outlet works remain operational following the earthquake; and
- continue use of Lake Chabot and outlet works during the dam construction.

The tower was evaluated considering the following additional objectives:

- All structures should serve operational functions. The project should avoid building, retrofitting, or maintaining features not related to the storage or conveyance of water.
- The outlet works retrofit should minimize the potential for earthquake damage to outlet works.
- The outlet works retrofit should minimize future maintenance requirements.

Screening criteria also included project construction-related considerations including feasibility schedule, risk, permitting requirements, and other efforts required to be implemented for each alternative. The alternatives also were screened for the potential to generate impacts in key environmental resource areas, as analyzed in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures (i.e., Aesthetics, Geology and Soils, Biological Resources, Cultural Resources, Transportation and Circulation, Air Quality, Greenhouse Gas Emissions, Noise and Vibration, Recreation, Hydrology and Water Quality, and Hazards and Hazardous Materials).

An alternatives matrix was developed to portray and help identify a feasible alternative that would meet project objectives with the fewest significant environmental impacts. The alternatives matrix, shown in **Table 4-1**, compares the proposed project (including both dam construction options) with the feasible alternatives. The table identifies whether the alternatives would result in the same (=), lesser (<), or greater (>) impacts compared to the proposed project. The No Project Alternative also is included in **Table 4-1** and is evaluated in Section 4.4. The constructability and preliminary environmental review of these options were evaluated by Terra Engineers, Inc. with AECOM (2013).

The impacts associated with the alternatives are generally short-term and temporary construction impacts with the exception of the cultural resources impacts and impacts from tree removal (biological resources, recreation, aesthetics). Operational activities following project construction would be the same as the existing activities. Following construction, the project area would be restored to a similar appearance as pre-construction conditions, as stated in Section 2.11.14, Site Restoration. Operational activities would continue to include occasional inspection and maintenance, and vehicle trips to the dam facilities. Because long-term operation and maintenance would not result in a net increase in maintenance activities, no impacts would be associated with the operations. Therefore, long-term operation and maintenance impacts are not discussed further in this section.

4.2 Alternative 1: Off-Site Stockpiles and Haul Routes

4.2.1 Description of Alternative 1

Alternative 1 would be similar to the proposed project, but rather than use on-site stockpile sites and on-site haul routes, off-site stockpile sites and associated off-site haul routes would be used (see **Figure 4-1**). The two off-site stockpile sites would be the Quarry Stockpile (Alternative 1a) and the Covington Stockpile (Alternative 1b). Use of either off-site haul stockpile and haul route still would require use of the on-site haul routes to transfer soil and spoils to and from the dam site. Alternative 1 would include the two construction options, the same as the proposed project, which are the CDSM and Conventional Earthwork options. Alternatives 1a and 1b are referred to collectively as Alternative 1.

Under Alternative 1, the treatment of the outlet works component would be the same as the proposed project (line shaft, remove pavilion and tower). Impacts from the outlet works component would result in the same impacts as the proposed project; therefore, the outlet works component is not discussed further under Alternative 1.

The Quarry Stockpile site is a former quarry located at 13575 Lake Chabot Road in Castro Valley, and it is owned by the San Leandro Rock Company. The capacity of the Quarry Stockpile site is large enough to easily accommodate 155,000 cubic yards, the maximum total volume of storage that would be required for the Conventional Earthwork option. This stockpile would cover an area of approximately 4 to 5 acres, depending on stockpile height. Some grading would be required to build access roads; however, no tree or vegetation removal would be required.

Using the Quarry Stockpile site under Alternative 1a would involve hauling material to the stockpile via Estudillo Avenue and Lake Chabot Road. The haul route would include an approximately 1,040-foot segment of Estudillo Avenue from EBMUD property to the intersection of Lake Chabot Road, and an approximately 4,410-foot segment of Lake Chabot Road from the intersection with Estudillo Avenue to the Quarry. Flaggers would be required at selected locations.

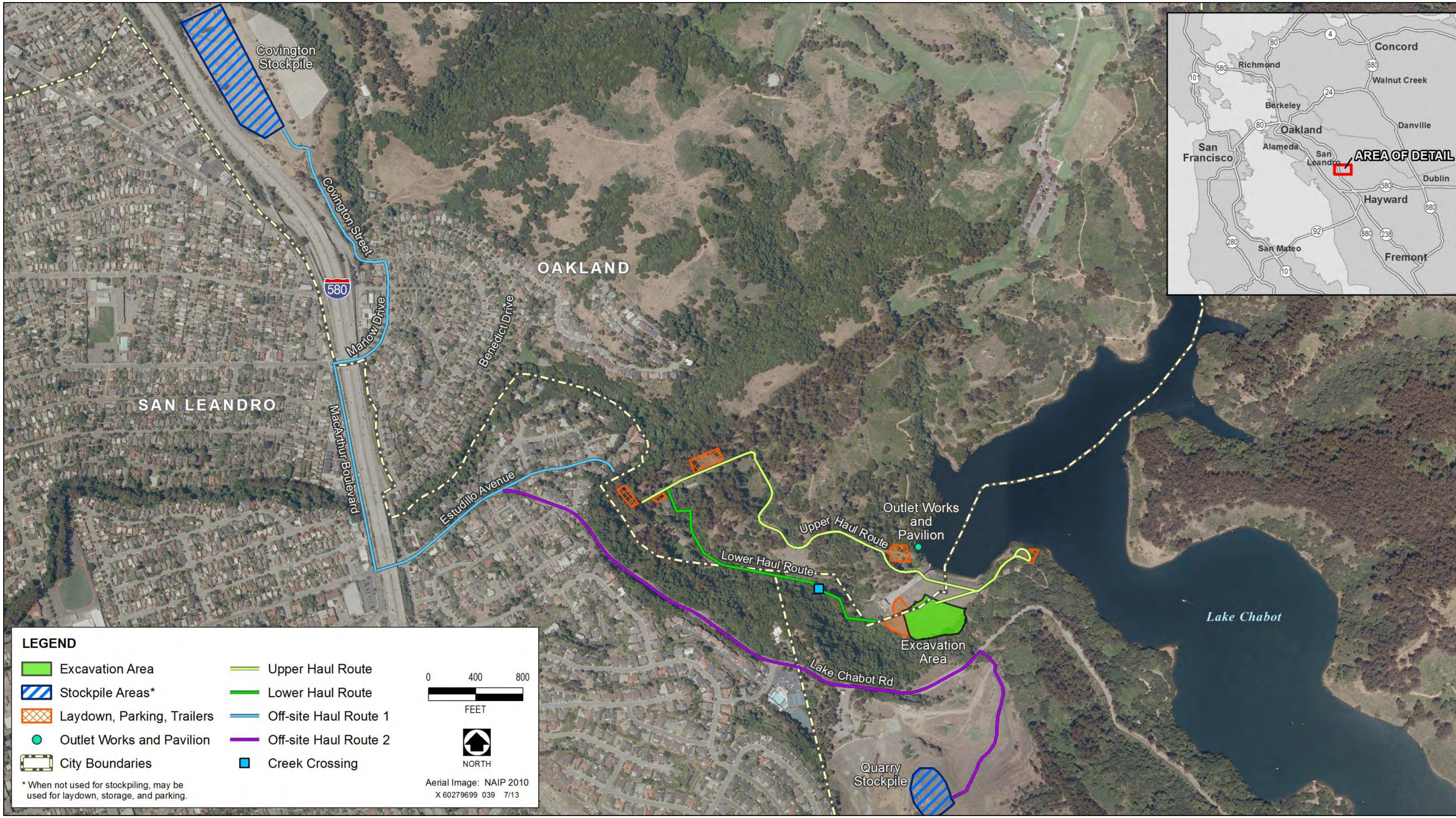
Table 4-1
Comparison of the Proposed Project and Alternatives

	Proposed Construction Options		Alternative 1 Off-Site Stockpiles and Haul Routes		Alternative 2 Outlet Works: Pavilion and Tower[6]			No Project
	CDSM Option Upper & Lower Haul Route, On-Site Stockpiles, Remove Pavilion and Tower	Conventional Earthwork Option Upper & Lower Haul Route, On-Site Stockpiles, Remove Pavilion and Tower	Alternative 1a Covington Stockpile and Off-Site Haul Routes	Alternative 1b Quarry Stockpile and Off-Site Haul Routes	Alternative 2a Line Shaft, Remove Pavilion with Option to Retrofit Tower[5]	Alternative 2b Line Shaft, Retrofit Pavilion	Alternative 2c Fill Shaft, Remove Pavilion and Tower, Build New Outlet Tower	
Project Objectives								
Improve Sluiced Fill at Embankment Toe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Prevent Damage to Outlet Works from Design Earthquake	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Continue Lake Operation during Dam Construction	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A
Project Construction								
Construction Duration[1]	26-38 weeks	60 weeks	N/A	N/A	N/A	N/A	N/A	N/E
Dam[2]	26-38 weeks	40 weeks	N/A	N/A	N/A	N/A	N/A	N/E
Tower	15 weeks	15 weeks	N/A	N/A	15 weeks	15 weeks	16 weeks	N/E
External Truck Trips (average round trips per day)[3]	3–12 depending on construction phase and haul route	7–29 depending on construction phase and haul route	N/A	N/A	N/E	N/E	N/E	N/E
External Material and Equipment Delivery Trips (average round trips per day)	0–40 depending on construction phase and haul route	0–37 depending on construction phase and haul route	N/A	N/A	N/E	N/E	N/E	N/E
External Construction Worker Trips (average round trips per day)[1]	20–72 depending on construction phase and haul route	20–63 depending on construction phase and haul route	N/A	N/A	N/E	N/E	N/E	N/E
Internal Hauling Truck Trips (average round trips per day)	114–228 depending on construction phase and haul route	175–583 depending on construction phase and haul route						
External Hauling Truck Trips To Covington or Quarry Stockpile[4]	0	0	297-505 depending on construction phase and haul route	297-505 depending on construction phase an haul route	N/A	N/A	N/A	N/A

Table 4-1
Comparison of the Proposed Project and Alternatives

	Proposed Construction Options		Alternative 1 Off-Site Stockpiles and Haul Routes		Alternative 2 Outlet Works: Pavilion and Tower[6]			No Project
	CDSM Option Upper & Lower Haul Route, On-Site Stockpiles, Remove Pavilion and Tower	Conventional Earthwork Option Upper & Lower Haul Route, On-Site Stockpiles, Remove Pavilion and Tower	Alternative 1a Covington Stockpile and Off-Site Haul Routes	Alternative 1b Quarry Stockpile and Off-Site Haul Routes	Alternative 2a Line Shaft, Remove Pavilion with Option to Retrofit Tower[5]	Alternative 2b Line Shaft, Retrofit Pavilion	Alternative 2c Fill Shaft, Remove Pavilion and Tower, Build New Outlet Tower	
Additional Tower Objectives								
All Structures Serve Operational Functions	Yes	Yes	N/A	N/A	No	No	Yes	N/A
Potential for Earthquake Damage to Outlet Works	None	None	N/A	N/A	Low	High	Low	N/A
Future Maintenance Requirements	Low	Low	N/A	N/A	Medium	High	Medium	N/A
Potential Impacts								
Aesthetics	LTSM	LTSM	LTSM >	LTSM >	LTSM =	LTSM =	LTSM =	NI <
Geology and Soils	LTSM	LTSM	LTSM =	LTSM =	LTSM >	LTSM >	LTSM >	NI >
Biological Resources	LTSM	LTSM	LTSM =	LTSM =	LTSM =	LTSM =	LTSM =	NI <
Cultural Resources	SU	SU	SU =	SU =	SU	SU	LTSM <	NI <
Transportation and Circulation	LTSM	LTSM	LTSM >	LTSM>	LTSM =	LTSM=	LTSM >	NI <
Air Quality	SU	SU	SU >	SU >	SU =	SU =	SU >	NI <
Greenhouse Gas Emissions	LTS	LTS	LTS >	LTS>	LTS =	LTS =	LTS >	NI <
Noise and Vibration	LTSM	LTSM	LTSM >	LTSM >	LTSM <	LTSM <	LTSM =	NI <
Recreation	SU	SU	SU <	SU <	SU =	SU<	SU <	NI <
Hydrology and Water Quality	LTSM	LTSM	LTSM >	LTSM >	LTSM <	LTSM <	LTSM >	NI <
Hazards and Hazardous Materials	LTSM	LTSM	LTSM >	LTSM >	LTSM =	LTSM =	LTSM =	NI <

Notes:
N/A = Not Applicable; N/E Not Estimated (because alternative was not selected for other reasons); NI= No Impact; LTS=Less than significant; LTSM = Less than significant with mitigation; SU = Significant and Unavoidable;
< Alternative component lessens the severity of the impact compared to the proposed project; > Alternative component increases the severity of the impact compared to the proposed project; = Alternative component impact is similar to the impact of the proposed project; CDSM = cement deep soil mixing
[1] Tower work would be concurrent with work at the dam in the CDSM option. Tower work would be concurrent with dewatering, but would precede earthwork at the dam in the Conventional Earthwork option.
[2] Includes dewatering for Conventional Earthwork option.
[3] Daily round trips. One daily round trip equals half the number of daily one way trips.
[4] Calculation is for 10-cubic yard trucks for a range of 100,000- to 140,000-cubic yard excavation. Soil in the haul trucks is estimated to bulk 25 percent more than the excavation volume.
[5] The analysis assumes retrofit of the tower because it would result in slightly greater construction impacts, and would represent a conservative scenario for Alternative 2a.
[6] For the proposed project, most of the impacts are a result of the dam construction (Conventional Earthwork or CDSM options). Therefore, the outlet works alternatives would not result in a change in the findings for all resource areas except for Cultural Resources. Nevertheless, this discussion compares the different impacts and identifies the relative difference between Alternatives 2a, 2b, and 2c.
Source: Data compiled by EBMUD and AECOM in 2013



Source: Terra Engineers 2013, EBMUD 2013, compiled by AECOM in 2013

Figure 4-1: Alternative 1 Features (Off-Site Stockpiles and Off-Site Haul Routes)

The Covington Stockpile is located on EBMUD property, adjacent to Dunsmuir Reservoir, located north of the right-of-way at Covington Street in Oakland. Using the Covington Stockpile under Alternative 1b would require clearing, grubbing, and grading of approximately 4 to 5 acres of land to accommodate the maximum total storage volume of 155,000 cubic yards for the Conventional Earthwork option. Tree removal would not be required.

Using the Covington Stockpile site would involve hauling material to the stockpile via Estudillo Avenue, MacArthur Boulevard, Marlow Drive, and Covington Street. The haul route would include an approximately 2,020-foot segment of Estudillo Avenue from EBMUD property to the intersection of MacArthur Boulevard, an approximately 1,780-foot segment of MacArthur Boulevard from the intersection with Estudillo Avenue to Marlow Drive, an approximately 1,140-foot segment of Marlow Drive from the intersection with MacArthur Boulevard to Covington Street, and an approximately 540-foot segment of Covington Street from the intersection with Marlow Drive to the Covington Stockpile site. Flaggers would be required at selected locations.

4.2.2 Environmental Assessment of Alternative 1

Alternative 1: Aesthetics

The Covington Stockpile site is an open space hill that slopes towards the west, adjacent to the east side of Interstate 580 (I-580) (**Photo 4-1**). If the maximum volume of soil is placed at this site, the size of materials would equal about one football field in length and would be approximately five stories high. The existing site is covered in grass. I-580, the MacArthur Freeway, is a designated California Scenic Highway, and the 11 mile-segment from the City of San Leandro border to State Route 24 has received several aesthetic awards for attractive landscaping. The driving time for this 11-mile segment is listed as 13 minutes at 50 miles per hour, and use of the site could be noticed by motorists.

Commercial buildings are located on the other side of I-580, to the west. The East Bay Regional Park District office building is located directly north of this site, and the stockpile under Alternative 1a would be visible from this office building. However, office workers are not considered sensitive receptors, compared to residents. Therefore, this impact to visual quality would be *less than significant*.

Open space also is located directly to the south, and the east side of the hill drops off steeply, sloping down to an area with a few large private residences and open space. This part of the hillside would obscure the view of the perspective stockpile from these residences, and *no impact* would occur.

The Covington Stockpile site generally is not visible, except from a small portion where the Foothill Boulevard on-ramp merges into I-580. **Photo 4-2** shows the view from I-580 looking east toward the Covington Stockpile site at this point. Scenic highways are protected under categories that include careful attention to and control of earthmoving and landscaping. The presence of stockpiles and disturbance of landscaping adjacent to the highway could be a short-term impact on a state scenic highway. However, the majority of the Covington stockpile site is not visible from surrounding areas because of elevation changes and intervening landscaping. The portion that would allow visibility from I-580 would be minor. Therefore, the impact on a scenic highway under Alternative 1a would be a *less than significant*, but it would be greater than that for the proposed project because no state scenic highways are within the project area.

Source: AECOM 2012

Photo 4-1: Alternative 1a—Covington Stockpile (looking northwest toward Interstate 580)

Source: Google Earth 2013

Photo 4-2: Alternative 1a—Covington Stockpile (looking east on Interstate 580)

Photo 4-3 shows the Quarry Stockpile (Alternative 1b). The Quarry Stockpile is located in a terraced, disturbed, and formerly surface-mine pit within the quarry, adjacent to the south side of Lake Chabot Road. However, this stockpile site is uphill from Lake Chabot Road and is not readily visible to motorists from the road because of the steepness of the hillside. The west side of the Quarry Stockpile site is screened from the neighborhood by trees and the steep, hilly topography of the quarry. South of the site, the land is terraced uphill and surrounded by open space (part of quarry). The large pile of soil would fill in the disturbed pit at the stockpile site and would not be readily visible to residences in the surrounding vicinity.

Source: AECOM 2012

Photo 4-3: Alternative 1b—Quarry Stockpile

Under Alternative 1b, the Quarry Stockpile would have no effect on a viewshed or the visual quality of the site because the site is obscured from viewers by the topography and trees. The Quarry Stockpile is not located along a state scenic highway. Therefore, Alternative 1b would have *no impact* on a state scenic highway, similar to the proposed project.

The movement of large haul trucks to both off-site alternatives would be readily visible to residents in the nearby San Leandro and Oakland neighborhoods, and potentially would have a short-term impact on visual quality because the residents are not used to daily viewing of many large haul trucks traveling through the residential streets. However, this impact would be short-term and only during construction. Therefore, the impact would be *less than significant,* but it would be greater than that for the proposed project because it would cover an expanded area outside the project area.

Alternative 1 would require using on-site haul routes to transfer soils and spoils to and from the dam excavation site. As under the proposed project, trees would be removed along the haul routes and implementation of **Mitigation Measures AE-1.1, BR-4.1, BR-4.2, and BR-4.3** would reduce potential impacts on scenic vistas as a result of tree removal and landform modifications to a *less-than-significant* level.

As under the proposed project, nighttime work could occur under the CDSM option. Similar to the proposed project, **Mitigation Measure AE-4.1**, which would require directing lighting away from residential areas, would reduce construction lighting and nighttime views in the area to a *less-than-significant* level.

The impact related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 would be greater than the proposed project because the off-site haul routes would result in additional aesthetic impacts for surrounding neighborhoods.

Alternative 1: Geology and Soils

Similar to the proposed project, the off-site stockpile areas could be subject to intense seismic ground-shaking, associated with seismic events on active regional faults. A seismic event could damage the stockpile areas or harm workers in the area of the stockpiles (e.g., through exposure to falling debris or unstable equipment). Project construction would not increase the risks to workers substantially over typical risks of exposure throughout the region. Earthquake safety training (pursuant to Occupational Safety and Health Administration regulations) would minimize potential impacts on workers to the extent possible.

Impacts from Alternative 1 would be the same as for the proposed project because the on-site and off-site stockpile areas would be similar in terms of the amount of material stored, the types of materials stored, and the equipment and worker exposure at the sites. The off-site stockpiles would be subject to similar levels of ground-shaking in the event of a major earthquake because of the relative proximity of all stockpile sites (both on-site and off-site) to the Hayward fault. Similar to the proposed project, the impact would be *less than significant*.

The off-site stockpile alternative would have similar potential for short-term loss of topsoil, and for wind and water erosion, as the proposed project. The Covington Stockpile site under Alternative 1a likely would need vegetation removal and grading to create a suitable stockpile area. Preparation work would be similar to that required for the two on-site stockpiles for the proposed project. The Quarry Stockpile under Alternative 1b would not need vegetation removal or grading; however, a stockpile at this site could be subject similarly to wind and soil erosion during storm events. A Storm Water Pollution Prevention Plan (SWPPP) would be prepared and implemented for both the alternative and the proposed project, to control and manage soil erosion, sedimentation, and runoff. BMPs included in the SWPPP would be used in the management of stockpiled topsoil to minimize erosion. The impact would be *less than significant*.

The off-site stockpile locations would be subject to similar loads from stockpiled materials as would the on-site stockpile locations for the proposed project. The on-site stockpiles (Filter Pond Stockpile and Park Stockpile) are located on clay loams in an area flanked by steep slopes. The soils at the Park Stockpile location include a rock outcrop component, which, in combination with the existing slopes, would result in greater potential for erosion and slope instability. **Mitigation Measure GE-3.1** would require performing a geotechnical evaluation to identify the maximum size and distribution of stockpiling permissible at the stockpile locations to prevent landslides or other slope instabilities and excessive land settlement. **Mitigation Measure GE-3.1** for the proposed project's on-site stockpiles would require using the results of the evaluation during design to specify appropriate preventative efforts in the design drawings to reduce the potential for impacts from slope instability and ground failure to a *less-than-significant* level.

Alternative 1b (the Quarry Stockpile) likely would have less potential for landslides, slope instability, and excessive land settlement than would the on-site stockpiles and the off-site Covington Stockpile. The Quarry Stockpile would be located within a quarried area and directly on bedrock. Landslides, slope instability, and land settlement would not be a risk for stockpiling at this location, and the mitigation described above would not be required. The stability of the Covington Stockpile is unknown at this time; however, the location is on sloped topography, and risk of slope failure would be *potentially significant*, similar to that of the proposed on-site stockpiles. Similar to the proposed project, **Mitigation Measure GE-3.1** would be required at the Covington Stockpile to reduce the impact. The impact would be *less than significant with mitigation incorporated*.

Similar to the proposed project, **Mitigation Measures GE-2.1 and GE-2.2**, which require including provisions for topsoil and soil stockpiling in the SWPPP as well as including provisions for site restoration and rainy season and long-term erosion control in the SWPPP, respectively, would be required for the off-site stockpiles to reduce the soil erosion impact to a *less-than-significant* level.

Under Alternative 1, the on-site haul road upgrades that would be required for the proposed project during project construction also would be necessary because the on-site haul routes would be required to transport materials to and from the excavation areas. Additional off-site haul roads would be needed to access the off-site stockpiles; however, these would be the existing paved roads and, therefore, their use would not result in any additional impacts related to seismicity, soil erosion, topsoil loss, or slope stability. The impact would be *less than significant*, the same as for the proposed project.

The impact related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 generally would be the same as for the proposed project. The Quarry Stockpile would have a reduced risk of landslide, slope instability, and land settlement than the proposed on-site stockpiles.

Alternative 1: Biological Resources

Impacts to special-status plants and wildlife and associated mitigation measures would be similar to those for the on-site stockpiles, but overall they would be reduced slightly. Grading and ground disturbance would be required for both the Quarry and Covington stockpiles, as they would at the on-site stockpile locations.

Focused surveys for special-status plant species were not performed at either the Quarry or Covington stockpile site. A survey would be necessary to determine impacts on special-status plant species, and additional mitigation measures may be necessary to address impacts on special-status plant populations at either location.

The off-site stockpile locations would require similar mitigation measures as the on-site stockpile locations. The on-site stockpiles are composed of grasslands, woodlands, and developed areas. The off-site stockpiles are composed of scrub and grassland habitats. A few large oak trees are present within the footprint for the Covington stockpile. Construction of the off-site stockpiles would not impact California red-legged frog, Western pond turtle, San Francisco dusky footed woodrat, or Central California Coast Steelhead DPS due to lack of habitat. However, these species would still be expected at on-site construction locations as described in Section 3.4. **Mitigation Measures BR-1.1, 1.2, 1.3, 1.4, 1.5, 1.9, and HY-1.1 and 1.2** would be required to reduce the impact on these species to a *less-than-significant* level. At Quarry Stockpile, no potential habitat exists for special-status bats and thus no mitigation would be necessary. At the Covington Stockpile, a lower potential generally exists for occurrence of special-status bats, compared to on-site stockpiles due to the poor quality of available roost sites. However, special-status bat species would still be expected at on-site construction locations as described in Section 3.4. **Mitigation Measures BR-1.4 and 1.8** would be required to reduce the impact on these species to a *less-than-significant* level.

There is no potential habitat for bald eagle or olive-sided flycatcher at either the Quarry Stockpile, or the Covington Stockpile due to the lack of habitat and large trees for nesting. However, the potential still exists for nesting birds protected by the Migratory Bird Treaty Act and **Mitigation Measures BR-1.4, BR-1.6, and BR-1.7** would still be required.

The Quarry Stockpile is located in a terraced, disturbed, and formerly surface-mine pit within the quarry, adjacent to the south side of Lake Chabot Road. The Quarry Stockpile consists of scrub habitat, suitable to support Alameda whipsnake. A higher potential exists for Alameda whipsnake to occur at the Quarry Stockpile, and grading would directly impact existing scrub habitat. Additional mitigation measures may be required for the Quarry Stockpile to address this impact.

No additional impact would occur on wetlands and waters at the Covington Stockpile. However, a potential impact on wetlands still would occur as part of this alternative at the outlet works, with either the CDSM or Conventional Earthwork option. A greater impact would occur on wetlands and waters at the Quarry Stockpile. During reconnaissance surveys, wetland-indicator plant species and a drainage ditch were identified within the boundary of the Quarry Stockpile. Additional surveys and a wetland delineation would be necessary to determine the potential impact on wetlands. Because wetlands potentially exist at other project work sites and the Quarry Stockpile, similar to the proposed project, implantation of **Mitigation Measures BR-3.1** would be required to reduce the construction-related impact to a *less-than-significant* level.

As with the proposed project, no conflict would exist with local policies and ordinances protecting biological resources. The number of trees estimated for removal would be decreased by approximately 80 trees (the number of trees that would need to be removed at the Park Stockpile). Considering that areas surrounding the project site are primarily woodlands, this would not be a substantial comparative reduction in the number of trees to be removed and the potential impact, and similar to the proposed project, **Mitigation Measures BR-4.1, BR-4.2, and BR-4.3** would be required to reduce the construction-related impact to a *less-than-significant* level.

Alternative 1 would use existing roadways for haul routes, thus, no additional impact would occur on biological resources. The use of the off-site haul routes would not eliminate the need for, nor the potential impact associated with, use of on-site haul routes. All the mitigation measures required for the proposed project also would be required to reduce the construction-related impact to a *less-than-significant* level. Therefore, the impact related to use of off-site stockpile locations and off-site haul routes for Alternative 1 would be the same as for the proposed project.

Alternative 1: Cultural Resources

Under Alternatives 1a and 1b, the off-site haul routes and stockpiles would be outside the boundaries of the Lake Chabot Waterworks Historic District. However, the on-site haul routes still would be required to transport materials between the excavation site and the off-site stockpiles. As for the proposed project, the use of the Upper Haul Route and Lower Haul Route would not result in an adverse change to the Lake Chabot Waterworks District. Implementation of **Mitigation Measure CR-1.1** still would require an interpretive/educational document about the history of Lake Chabot

Waterworks District for Alternative 1. As for the proposed project, both Alternatives 1a and 1b would result in a *significant and unavoidable* impact associated with the outlet tower.

Alternative 1 would require grading at the Covington Stockpile (Alternative 1a) to create sufficient storage capacity and grading to construct access roads for the Quarry Stockpile (Alternative 1b). Although these stockpiles would be located outside the boundaries of the Lake Chabot Waterworks Historic District, the potential of encountering or inadvertently damaging previously undocumented archaeological resources, or discovering human remains still exists. Similar to the proposed project, implementation of **Mitigation Measures CR-1.2 and CR-4.1** would require halting work and consulting with the appropriate agencies in the event that any prehistoric or historic archaeological resources or human remains were uncovered during construction, respectively. These mitigation measures would reduce the impact on archaeological resources and human remains to a *less-than-significant* level. Because the degree of grading associated with this alternative's off-site stockpiles would be minimal, very little potential would exist for an impact on previously undocumented cultural resources. Therefore, the impact related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 generally would be the same as for the proposed project.

Alternative 1: Transportation and Circulation

The estimated number of construction-related vehicle trips would be greater for Alternative 1 because hauling truck trips (that were contained within the project area between the on-site stockpiles and excavation site for the proposed project) would now travel outside the project area between the dam excavation site and off-site stockpiles. Thus, Alternative 1 would generate approximately 297-505 additional external daily hauling truck trips during excavation and replacement, respectively.[1]

Table 4-2 compares the estimated external vehicle trips of the proposed project and Alternative 1. Additional hauling truck trips would occur only on local roadways; therefore, the impact on freeway mainline segments or on-ramps would be the same as the proposed project. However, the total of up to approximately 156 external truck trips during the AM and PM peak hours for Alternative 1 (as opposed to 105 external vehicle trips for the proposed project) would degrade the intersection operating conditions at study intersections, and the impact on intersection operating conditions would be greater than that for the proposed project. Because of the increase in vehicle trips for Alternative 1, the impact associated with public transit, bicycle flows, and pavement conditions also would be greater than that for the proposed project.

The additional truck trips generated for Alternative 1 would occur along local roadways that connect the project site and off-site stockpile locations, including Estudillo Avenue, Lake Chabot Road, MacArthur Boulevard, Marlow Drive, and Covington Street. The presence of heavy hauling trucks on these roadways would increase the safety hazards for motorists, bicyclists and pedestrians. Therefore, the impact on safety hazards would be greater than that for the proposed project. Similar to the proposed project, implementation of **Mitigation Measure TR-1.1** would be required for this alternative. The mitigation measure could require additional safety measures, such as deploying flaggers at select locations (e.g., the intersection of Lake Chabot Road and Estudillo Avenue, the intersection of Marlow Drive and Covington Street, and in front of the gate to the Quarry Stockpile on Lake Chabot Road) and installing warning lights or signs along residential roadways (e.g., Estudillo

1 During project excavation, 20 trucks would each make 15 daily round trips to an off-site stockpile, for a total of 505 one-way trips per day. During replacement, 12 trucks would each make 15 round trips to an off-site stockpile, for a total of 297 one-way trips per day (300 if rounded to the nearest 5).

Avenue and Marlow Drive) to alert pedestrians and bicyclists about oncoming vehicles. This mitigation measure would reduce the impact related to a hazardous pedestrian and vehicle condition, to a *less-than-significant* level.

Table 4-2
Proposed Project and Alternative 1 External Trip Generation

Trips	Proposed Project			Alternative 1		
	Daily	AM Peak-Hour	PM Peak-Hour	Daily	AM Peak-Hour	PM Peak-Hour
Material Delivery	60	6	6	60	6	6
Workers	198	99	99	198	99	99
Hauling Truck[1]	0	0	0	297–505	30–51	30–51
Total	**256**	**105**	**105**	**555-763**	**135-156**	**135-156**

Note:
[1] Higher number in the range represents the number of hauling truck trips during the excavation period (over 36-day period), and the lower number represents the number of hauling truck trips during the replacement period (over 60-day period).
Source: CHS Consulting Group 2013

The transportation and traffic impact related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 would be greater than that for the proposed project.

Alternative 1: Air Quality

Construction

Under Alternative 1, construction activities would be similar to those of the proposed project; however, the soil stockpiles would be located off-site rather than at the on-site Filter Ponds and Park stockpile sites. Under this alternative, construction equipment use, cut/fill operations, and construction worker trips would be similar to those of the proposed project, but on-road haul trucks would travel further distances to import and export soil materials from the project site. In addition, Alternative 1 would require more on-road haul truck trips than the proposed project. Therefore, construction-related GHG emissions would be expected to be slightly higher than those of the proposed project as a result of the additional vehicle trips and vehicle miles traveled (VMT) by haul trucks. After completion of construction, operational activities associated with Alternative 1 would be similar to those of the proposed project because no net increase would occur.

Construction of Alternative 1 would include all the same components as those of the proposed project. The total construction work days and pace of construction for Alternative 1 also would be the same as those for the proposed project. However, criteria air pollutant emissions associated with on-road haul trucks would be higher than those for the proposed project as a result of additional haul truck trips and longer trip distances to off-site stockpile sites. Although soil material hauling would not occur every day during construction, the total construction emissions for Alternative 1 are anticipated to be slightly greater than those of the proposed project. Because the total construction work days would remain constant, Alternative 1 is anticipated to result in slightly higher average daily construction emissions than those shown in **Table 3.7-3,** in Section 3.7, Air Quality.

Thus, Alternative 1 also is anticipated to result in average daily nitrogen oxides (NO_x) emissions that would exceed the Bay Area Air Quality Management District's (BAAQMD) threshold of significance. Because the average daily NO_x emissions are anticipated to be greater than those of the proposed project, implementation of **Mitigation Measure AQ-2.1** (that would require implementation of BAAQMD's Basic and Additional Construction Control Measures), also is not anticipated to reduce those emissions to a *less-than-significant* level. Thus, similar to the proposed project, Alternative 1's construction-related mass emissions of NO_x are anticipated to be *significant and unavoidable*, and would be slightly higher than those of the proposed project.

CO Hotspots

Alternative 1 would result in additional on-road haul truck trips that would contribute a greater volume of vehicles to local intersections, beyond those of the proposed project. As cited in the transportation and traffic analysis, Alternative 1 would generate approximately 60 additional daily external haul truck trips compared with the proposed project. These additional trips to the off-site stockpiles associated with Alternative 1 would be expected to affect different intersections than those of the proposed project. Therefore, Alternative 1 would have an additional 60 on-road haul truck trips during the peak AM or PM hours. However, even if all 60 trips were assumed to arrive simultaneously at one intersection at the same hour and added with the annual average daily vehicle trips in the project vicinity (7,401 vehicle trips per day); the theoretical hourly volume would be substantially below BAAQMD's screening threshold. Therefore, Alternative 1 traffic contributions to local intersections would be similar to that of the proposed project because the maximum traffic volumes that would occur at potentially affected intersections would be substantially below BAAQMD's hourly volume screening threshold, even when using the maximum daily trips from Alternative 1 and surrounding roadways.

Therefore, although Alternative 1 would generate more on-road truck trips than the proposed project, Alternative 1 would not be expected to generate traffic volumes that would contribute to a potential carbon monoxide (CO) hotspot. Similar to the proposed project, this impact would be *less than significant*.

Construction-Related Toxic Air Contaminants

Alternative 1 would not involve construction activities that would be substantially more intense than those of the proposed project, which could generate substantially more toxic air contaminant (TAC) emissions (i.e., diesel particulate matter [diesel PM]). Although haul truck emissions would be greater than those for the proposed project, these emissions would be dispersed along local roadways and would not be concentrated at the project site, where they would be additive with off-road construction equipment diesel PM emissions to affect nearby receptors. The incremental increase to local roadways would be temporary and would cease following construction. Furthermore, these haul truck trips would be dispersed throughout the construction work day and are not anticipated to constitute a substantial increase in vehicle emissions on local roadways. In addition, the on-site construction activities and subsequent TAC emissions for Alternative 1 are anticipated to be comparable to those of the proposed project.

Accordingly, the construction-related TAC emissions and health risk impacts under Alternative 1 would be *potentially significant* before mitigation, similar to the proposed project. Implementation of **Mitigation Measure AQ-2.1** would help reduce construction-related TAC emissions for Alternative 1 to a *less-than-significant* level.

Odors

Similar to the proposed project, Alternative 1 construction activities could generate diesel particulate emissions that could cause an odor impact. These construction activities would occur at a similar intensity to those of the proposed project, with additional external haul trucks trips as discussed previously. However, the haul truck trips would be dispersed throughout regional roadways and would not be concentrated at the project area. Therefore, Alternative 1 would not be anticipated to result in additional diesel-fueled equipment operating at one time that could generate potentially significant odor emissions. Considering the intermittent use of construction equipment under Alternative 1 and that construction activities would occur at similar intensity as those of the proposed project, construction activities for Alternative 1 would not be expected to expose a substantial number of people to objectionable odors. Similar to the proposed project, the odor impact would be *less than significant*.

Alternative 1: Greenhouse Gas Emissions

Under Alternative 1, construction activities would be similar to those of the proposed project; however, the soil stockpiles would be located off-site rather than at the on-site Filter Pond Stockpile and Park Stockpile. Construction equipment use, cut/fill operations, and worker trips would be similar to that of the proposed project, but on-road haul trucks would travel further distances to import and export soil materials from the project area, using off-site haul routes. Therefore, construction-related greenhouse gas (GHG) emissions are anticipated to be slightly higher than those of the proposed project as a result of the additional trips and VMT by haul trucks. After completion of construction, operational activities associated with Alternative 1 would be similar to the proposed project because no net increase would occur.

Construction of Alternative 1 would include all the same components as the proposed project. The total construction work days for Alternative 1 also would be the same as those for the proposed project. However, GHG emissions associated with on-road haul trucks would be higher because of additional trips and longer trip distances to off-site stockpile sites. Although soil material hauling would not occur every day during construction, the total construction GHG emissions for Alternative 1 are anticipated to be slightly greater than those for the proposed project. However, even with the increase in GHG emissions as a result of the hauling emissions, amortized construction emissions over the lifetime of Alternative 1 are not anticipated to exceed the values shown in **Tables 3.8-1 and 3.8-2,** in Section 3.8, Greenhouse Gas Emissions. Thus, Alternative 1 also is anticipated to result in amortized annual construction GHG emissions that would not exceed BAAQMD's threshold of significance. Therefore, the impact would be *less than significant*.

The GHG impact related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 would be greater than that of the proposed project.

Alternative 1: Noise and Vibration

Excavated material would be stockpiled at the Covington (Alternative 1a) and Quarry stockpiles (Alternative 1b) for Alternative 1. The nearest residence to the Quarry Stockpile location is 950 feet away, and the perceived noise from a dump truck at the stockpile area would be 58.4 A-weighted decibels (dBA). The Covington Stockpile location is adjacent to the east of I-580, across the freeway from residences. Noise from the Covington Stockpile would not be expected to contribute substantially to noise levels experienced by the nearest residents on the west side of I-580 because they are within the 75 dB day-night sound level rating noise contour (City of San Leandro 2002). Noise exposure from construction activities at the off-site stockpiles would be less than from the proposed project because the Quarry Stockpile location is farther away from residences and the Covington Stockpile location is in an area with higher ambient noise levels. The impacts from this alternative would be *less than significant* and less than the proposed project.

Excavated material would be transported to off-site locations at the Covington and Quarry stockpiles. Up to 120 external round trip truck trips would occur for 20 weeks during the AM and PM peak hours for Alternative 1. Haul trucks would traverse Lake Chabot Road adjacent to residences to reach the Quarry Stockpile. Trucks would traverse residential areas along Lake Chabot Road, Estudillo Avenue, and MacArthur Boulevard to reach the Covington Stockpile. Noise exposure from haul trucks traveling through residential areas would be substantially greater than the proposed project, in which dump trucks would use on-site haul routes and stockpiles. Similar to the proposed project, implementation of **Mitigation Measures NO-1.1, NO-1.2, NO-1.3, and NO-1.4** would be required to implement construction noise control techniques, notify residents, generally limit haul truck trips through residential areas from 7:00 a.m. until 7:00 p.m. Monday through Friday, and designate a Community Affairs contact.

The noise and vibration impact related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 would be *potentially significant* even with mitigation and would be greater than the proposed project.

Alternative 1: Recreation

No recreational facilities are at the two off-site stockpile locations, thus recreation opportunities would not be reduced or displaced at either location. In comparison with the proposed project, using off-site stockpiles would avoid removing and reinstalling recreational facilities at Chabot Park, as well as would reduce modifications to the recreation setting of the park because of less required tree removal.

No recreational facilities are in the vicinity of the MacArthur Boulevard, Marlow Drive or Covington Street off-site haul routes. These routes would not affect recreational facility access or recreation opportunities. The off-site haul route from the Chabot Park entrance to the Quarry Stockpile via Lake Chabot Road would not affect recreational facility access or recreation opportunities; access to Lake Chabot Marina would be available from Fairmont Drive. However, an impact from closure of Chabot Park would still occur for this alternative as on-site haul routes also would need to be used and, therefore, Chabot Park and portions of trails within Lake Chabot Regional Park would need to be closed. In addition, dam excavation under this alternative also would require drawing down the lake, which could result in physical damage to the public boat launch at the marina and other fishing piers, depending on the lake level and duration of drawdown. The impact would be *potentially significant*.

Overall, the impact on recreation from this alternative would be similar to that of the proposed project; the park and trails would still be closed, and the public boat launch and other fishing piers could still be damaged, although reinstallation of recreational facilities in Chabot Park would not occur, which would decrease any potential benefits to recreation from potential reconfiguration of facilities within the park. Therefore, the impact of this alternative would be *significant and unavoidable* for physical deterioration of recreational facilities. **Mitigation Measures TR-1.1** and **RE-1.1** would be required for Alternative 1, similar to the proposed project. *No impact* would occur from construction of recreational facilities.

Trees still would need to be removed from Chabot Park for use of the on-site haul routes, but fewer trees would be removed because the park would not be used as a stockpile. Considering that areas surrounding the site are primarily woodlands, this would not be a substantial reduction in the number of trees to be removed. Changes to the recreation setting would be less dramatic at Chabot Park because of the removal of fewer trees. Therefore, the impact would be *less than significant*. **Mitigation Measures BR-4.1, 4.2, 4.3, and AE-1.1** still could be implemented for this alternative, but would not be required.

The impact on recreational resources related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 generally would be the same as the proposed project, except the impact to recreation experiences at Chabot Park would be less and would not require mitigation.

Alternative 1: Hydrology and Water Quality

Similar to the proposed project, Alternative 1 could result in temporary impacts on water quality. The increased hauling distance to the Covington (Alternative 1a) or Quarry Stockpile (Alternative 1b) could lead to a greater potential for water quality contamination because of accidental spills and chemicals from the haul trucks, and the additional area of haul routes could result in additional stormwater runoff, containing soil or fill material and contaminants such as oil or antifreeze from trucks.

The use of off-site stockpiles instead of the Filter Pond Stockpile or Park Stockpile would place stockpiled materials further from San Leandro Creek, and therefore the potential for sediment discharges into the creek would be reduced. Similar to the proposed project, **Mitigation Measure HY-1.1** (requiring preparation of an SWPPP) would be implemented for Alternative 1 to prevent potential impacts related to erosion and run off and reduce the impact to a *less-than-significant* level. The on-site haul routes still would be required for Alternative 1, to transport materials between the excavation site and the stockpiles. Similar to the proposed project, Alternative 1 would require ground disturbing activities at the off-site stockpiles and within the project area, resulting in a potential impact on receiving waters, wetlands and streambeds, as well as on Chabot Lake water quality. Implementation of **Mitigation Measures HY-1.2, HY-1.3, 1.4, 1.5, and 3.1** would require grading of staging areas to prevent migration of contaminants, maintaining a spill kit adjacent to the lake waters, and grading the project site after construction to match or improve pre-existing draining conditions, respectively. Similar to the proposed project, implementation of these mitigation measures would reduce the hydrology and water quality impact to a *less-than-significant* level.

More area used for haul routes could lead to a marginal increase in polluted runoff and contamination potential caused by accidental spills of soil material and chemicals from trucks. The hydrology and water quality impact related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 generally would be slightly greater than that of the proposed project.

Alternative 1: Hazards and Hazardous Materials

Alternative 1 would not require the use of the Filter Pond Stockpile or the Park Stockpile, and therefore hazards from the potential presence of polychlorinated biphenyls in a pole-mounted transformer would not occur. Implementation of **Mitigation Measure HZ-1.2** for evaluation of the pole-mounted transformer at the Park Stockpile would not be required for Alternative 1. However, the off-site stockpile at the Quarry could be affected by the potential presence of underground storage tanks (UST). The presence and location of USTs would have to be determined and, if the USTs were present, a mitigation measure analyzing soils for potential impacts from releases from the USTs would need to be implemented. Implementation of the mitigation measure would reduce the impact on hazards and hazardous materials to *less than significant with mitigation incorporated*, similar to the proposed project.

Alternative 1 would make use of the off-site haul routes, but it still would require use of the Upper Haul Route and/or the Lower Haul Route, and therefore hazards impacts from other hazardous waste, NOA, emergency access and evacuation, and wildland fire risk still would be *potentially significant*. Implementation of **Mitigation Measures HZ-1.1, HZ-1.3, and HZ-2.1** (that would be implemented for the proposed project for preparation of a Habitat Conservation Plan (HCP), an Injury and Illness Prevention Plan (IIPP), and a Hazardous Materials Control and Spill Prevention and Response Plan; evaluating the outlet works for lead-based paint and ACM; and implementation of an Asbestos Dust Mitigation Plan) still would be required for Alternative 1. The implementation of **Mitigation Measures HZ-2.1** would extend off-site to paved surface streets. Removal of soil from trucks traveling off-site using rumble-plates and street sweeping would have to be implemented. Implementation of **Mitigation Measure HZ-4.1** to prepare a site-specific emergency response plan and **Mitigation Measure HZ-5.1** for precautions for flammable materials and maintaining fire-fighting tools at the project site would reduce emergency access and wildland fire risks to a *less-than-significant* level, similar to the proposed project.

Implementation of the mitigation measures would reduce this alternative's impact on hazards and hazardous materials to *less than significant with mitigation incorporated*. Because Alternative 1 would cover an expanded area outside the project area, the hazards and hazardous materials impacts related to use of off-site stockpile locations and associated off-site haul routes for Alternative 1 would be greater than that of the proposed project.

4.3 Alternative 2: Outlet Works—Pavilion and Tower

4.3.1 Description of Alternative 2

Alternative 2 would be similar to the proposed project, but would differ in construction of the outlet works. Although both Alternative 2 and the proposed project would include lining the vertical shaft adjacent to the outlet tower, Alternative 2 would include subalternatives for the following:

- Alternative 2a: line the shaft, remove the pavilion with option to retrofit the tower;
- Alternative 2b: line the shaft, retrofit the pavilion; or
- Alternative 2c removing the pavilion and tower and building a new outlet tower.

The proposed project would remove the tower and pavilion to address seismic hazards at the outlet works.

Alternative 2 would include the two construction options, same as the proposed project which includes CDSM and Conventional Earthwork, Lower and Upper Haul Routes, and Park and Filter Pond stockpiles. Impacts from these components would result in the same impacts as the proposed project and would require the same mitigation measures; therefore these components are not discussed further under Alternative 2. The Alternative 2 analysis focuses on the outlet works and associated mitigation measures. Alternatives 2a, 2b, and 2c are referred to collectively as Alternative 2.

Alternative 2a—Line Shaft, Remove Pavilion with option to Retrofit Tower: This alternative is similar to the proposed project; however, it would include the option for the tower to be retrofitted or not, instead of being removed (**Figure 4-2**). If the tower is not retrofitted, only the abandoned waste tunnel would be filled with low strength concrete. The tower retrofit would involve filling the tower and abandoned waste tunnel with low strength concrete and reinforcing the masonry walls to lower the risk that the masonry walls would crack and fall from the structure in an earthquake. Under Alternative 2a, the remaining tower would serve no operational function, would require continued maintenance, and some risk would remain that the masonry walls would crack and fall from the structure in an earthquake and would need to be repaired subsequently. Unless otherwise noted, the analysis will assume retrofit of the tower because the construction activities under this option would result in slightly greater construction impacts, and would represent a conservative scenario for Alternative 2a.

Alternative 2b—Line Shaft, Retrofit Pavilion: This alternative is similar to Alternative 2a; however, the pavilion would be retrofitted instead of removed (**Figure 4-3**). The roof slab of the pavilion would be removed, a new reinforced concrete collar would be doweled into the existing concrete beams under the pavilion, and the pavilion columns would be fiber-wrapped. Only the abandoned waste tunnel would be filled with low strength concrete. Under this alternative, the pavilion and tower would serve no operational function, would require continued maintenance, and because the tower is not retrofit, it likely would be damaged in a design-level earthquake. Such damage could include cracking and separation from the rock, which would diminish its load-resisting capabilities, and require repair or demolition after such an earthquake.

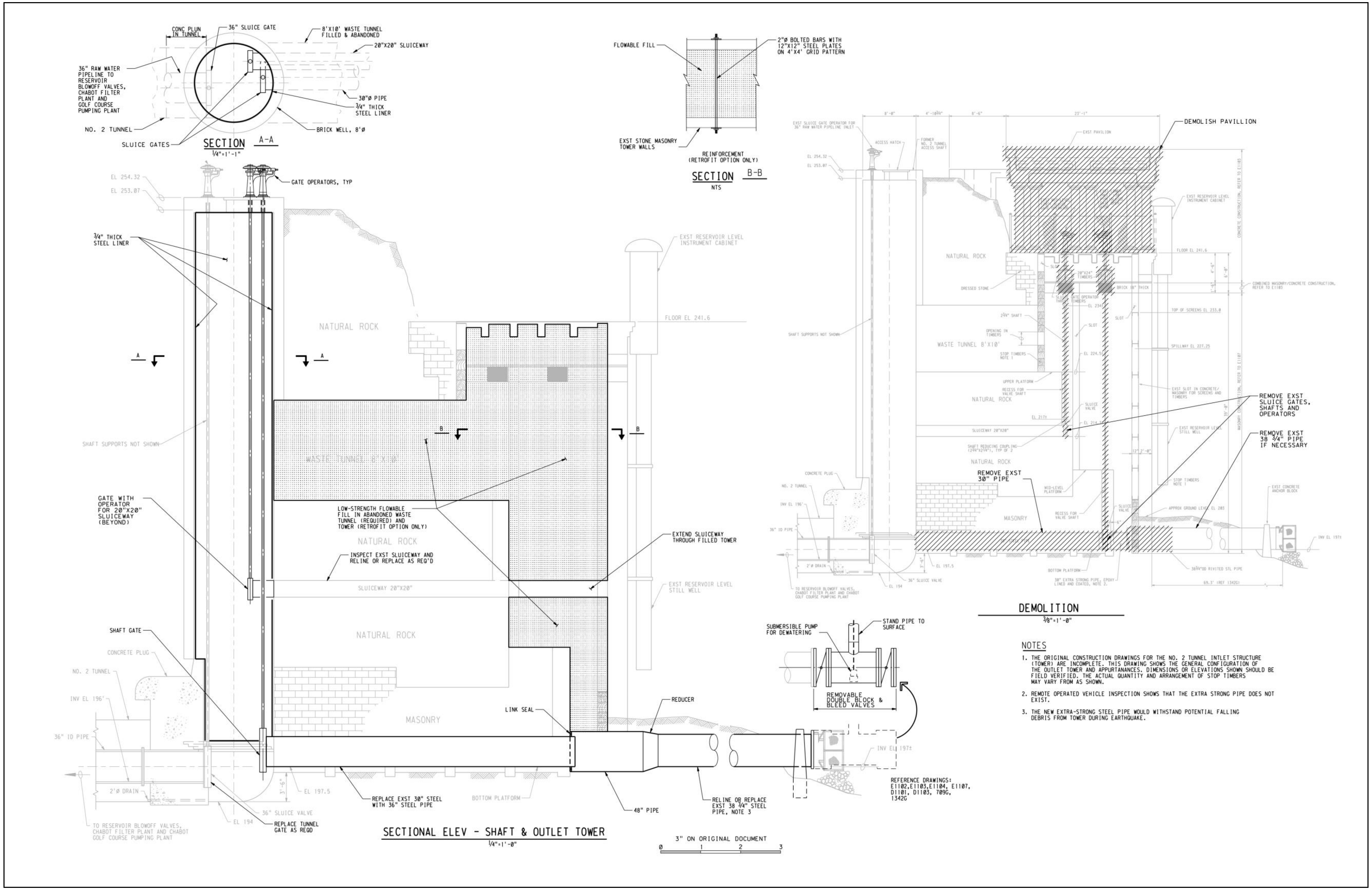
Alternative 2c—Fill Shaft, Remove Pavilion and Tower, Build New Outlet Tower: The vertical shaft, waste tunnel, and sluiceway adjacent to the outlet tower would be filled with low-strength concrete or flowable fill, and a new outlet tower would be built (**Figure 4-4**). The pavilion, outlet tower, and existing gates would be removed entirely. A new 8-square foot concrete tower would be constructed, with a concrete intake channel at the bottom and an access bridge and platform on top. Water would enter the tower through a gated 36-square inch opening at the bottom, with a trash rack in front. Water would leave the tower through the bottom pipe, a new 36-inch-diameter steel pipe. A gate in the new tower would control flow into the pipe. A transition would be constructed from the bottom pipe to the outlet pipe. A lightweight steel-frame, pitched-roof structure would be built over the new tower.

4.3.2 Environmental Assessment of Alternative 2

For the proposed project, most of the impacts are a result of the dam construction (Conventional Earthwork or CDSM options). Therefore, the outlet works alternatives would not result in a change in the findings for all resource areas except for Cultural Resources. Nevertheless, this discussion compares the different impacts and identifies the relative difference between Alternatives 2a, 2b, and 2c.

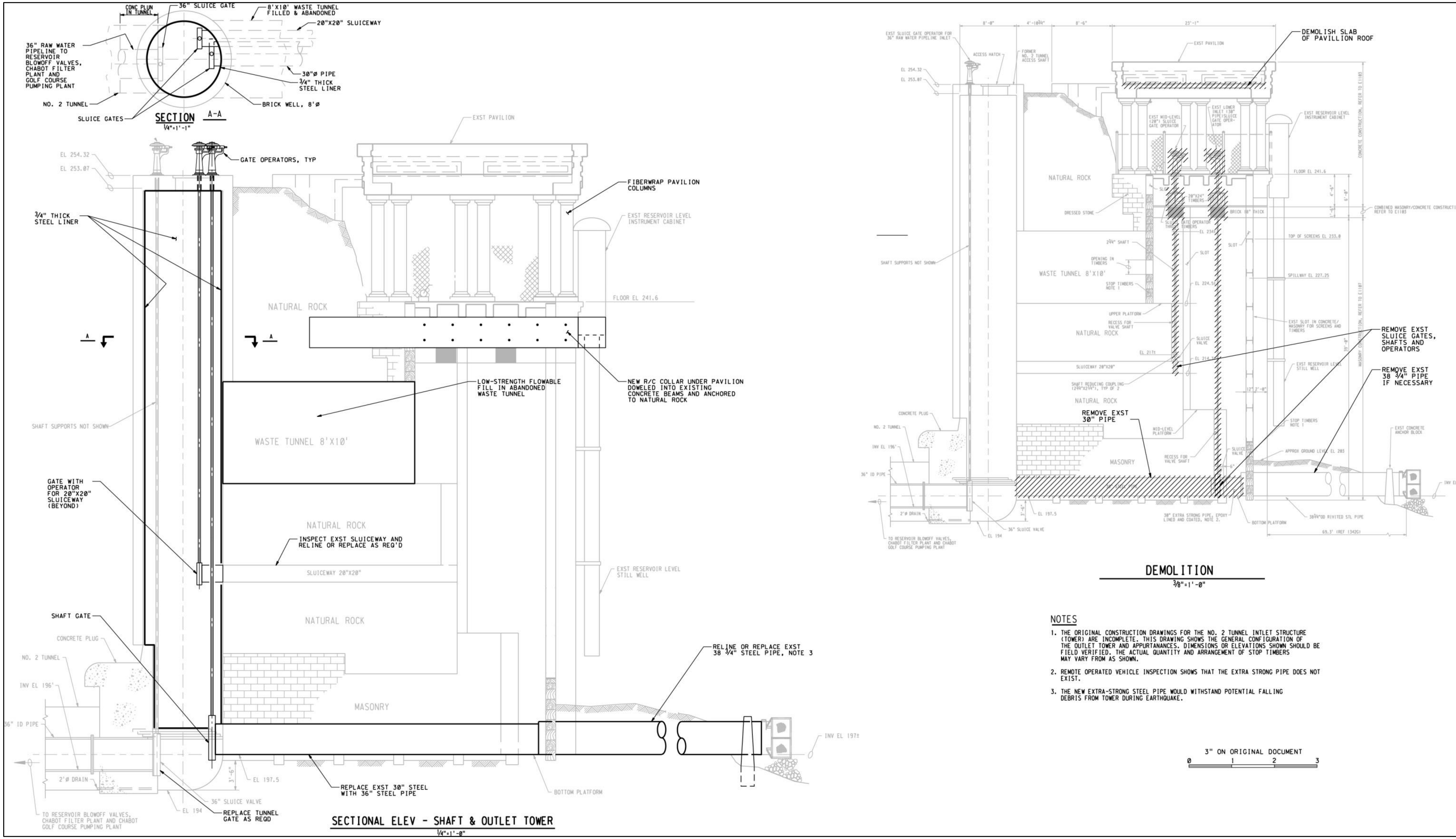
Alternative 2: Aesthetics

Alternative 2a would have a similar visual impact as that of the proposed project, if the pavilion is removed, and the impact would be *less than significant*. Under Alternative 2b, if the pavilion is not removed and is retrofitted instead, no visible alterations would be made to the landscape and *no impact* would occur. The lightweight, steel-framed, pitched-roof structure over the new tower under Alternative 2c would no longer be the style of the existing pavilion. The pavilion and tower are not large prominent features in scenic views observed from across Lake Chabot.



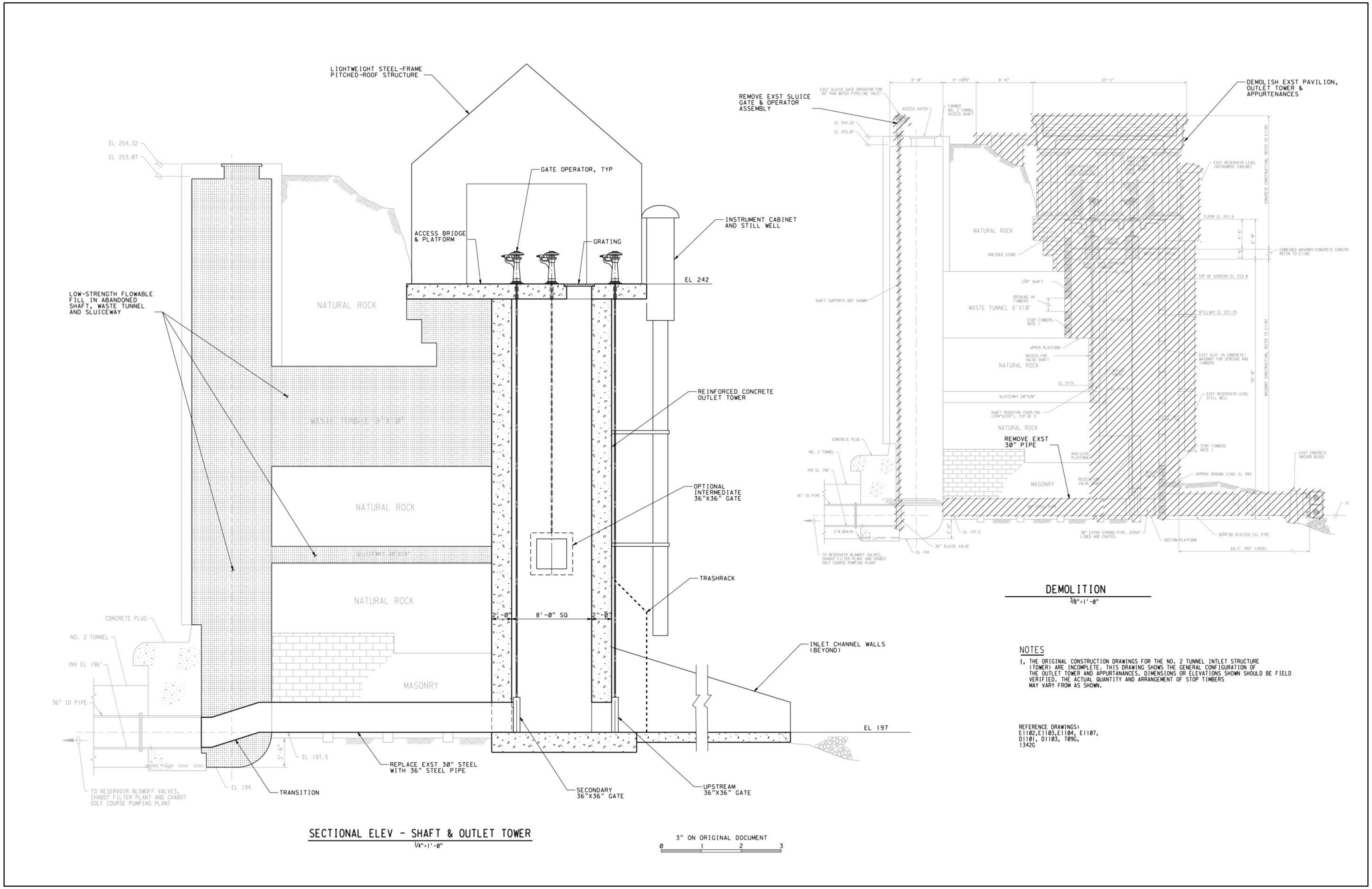
Source: EBMUD 2013, compiled by AECOM in 2013

Figure 4-2: Alternative 2a – Line Shaft, Remove Pavilion with option to Retrofit Tower



Source: EBMUD 2013, compiled by AECOM in 2013

Figure 4-3: Alternative 2b - Line Shaft, Retrofit Pavilion



Source: EBMUD 2013, compiled by AECOM in 2013

Figure 4-4: Alternative 2c – Fill Shaft, Remove Pavilion and Tower, Build New Outlet Tower

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The changes to the tower and pavilion under Alternative 2 may be perceptible to recreationists from the West Shore Trail or by boaters from the lake. However, these changes would not substantially alter scenic views or the visual character of the area. The aesthetic impacts related to the outlet works for Alternative 2 could be either less than or equal to the proposed project, depending on whether the pavilion is removed. All other project components would be the same for Alternative 2. Therefore, similar to the proposed project, the impacts on scenic vistas, visual quality or character, and lighting would be *less than significant*.

Alternative 2: Geology and Soils

The proposed project includes removal of the pavilion and tower, which would eliminate the long-term potential for impacts on life or property from failure of the structures in the event of a maximum credible earthquake. Under Alternatives 2a and 2c, the pavilion would be removed and the tower would be retrofitted; or the pavilion and tower would be removed and replaced with a new outlet tower and lightweight, steel-framed, pitched roof structure, respectively. The tower under Alternatives 2a and 2c would be built to withstand the maximum credible earthquake, reducing the likelihood of damage to people or structures in the event of an earthquake. By retrofitting the tower or building a new tower to seismic standards, the impact would be *less than significant*. However, because Alternatives 2a and 2c both include structures, some risk would remain of damage or harm to people during an earthquake and impacts would be slightly greater than the proposed project, whereas no risk of structure failure would occur for the proposed project because the structures would be removed and control valves would be moved into the vertical shaft in the rock behind the tower.

Under Alternative 2b, the pavilion would be retrofitted to withstand the maximum credible earthquake, reducing the likelihood of damage to people or structures in the event of an earthquake, and the impact would be *less than significant*. However, both structures would remain. Therefore, some risk would remain of potential damage or harm to people during an earthquake, and impacts would be greater than the proposed project, whereas no impact would occur if the structures are removed.

Impacts associated with topsoil loss and erosion would be the same for Alternative 2 as for the proposed project. Construction associated with the outlet works for both the proposed project and Alternatives 2a and 2b would occur within the same area, using the same standard construction methods (e.g., excavators, concrete demolition, and concrete pouring). The tower and pavilion are located adjacent to the dam, within the Chabot Lake footprint. Under Alternative 2, work would be completed with lowered lake levels at 211 feet msl or greater. Minimal ground disturbance would be required for Alternatives 2a and 2b and the proposed project. Under Alternative 2c, there would be a slightly greater amount of ground disturbance due to construction of a new tower. Any potential erosion from soil exposure during construction would be minimized for both the proposed project and Alternative 2, through implementation of a SWPPP. The impact would be *less than significant*.

No slope stability impact would occur for the proposed project because the structures would be removed with minimal ground disturbance. Removal of the pavilion and retrofit of the tower (or removal and replacement of the pavilion and tower) for Alternatives 2a and 2c also would have no slope stability impact. Retrofit of the existing structures would not increase slope instability. All other project components would be the same for Alternative 2. As for the proposed project, **Mitigation Measures GE-3.1,** which requires conducting a geologic evaluation of stockpile locations, and **GE-2.1 and GE-2.2**, which require including provisions for topsoil and soil stockpiling in the SWPPP and including provisions for site restoration and rainy season and long-term erosion control in the SWPPP, respectively, would be required for the project components to reduce the soil erosion impact to a *less-than-significant* level.

The geology and soils impacts related to the outlet works for Alternative 2 would be greater than that of the proposed project because all options would include structures, and some risk would remain of damage or harm to people during an earthquake. No risk of structure failure would occur for the proposed project because the structures would be removed and control valves would be moved into the vertical shaft in the rock behind the tower. Therefore, geology and soils impacts related to the outlet works would be *less than significant with mitigation* incorporated and slightly greater than the proposed project.

Alternative 2: Biological Resources

Because the footprint of the outlet works/pavilion, and parking/laydown area during construction would not differ between the proposed project and Alternative 2, all impacts and mitigation measures would be the same as for the proposed project. Otherwise, all impacts would be similar to the proposed project, and all mitigation measures outlined for the proposed project also would be required for Alternative 2.

Alternative 2: Cultural Resources

Under Alternative 2a and 2b, the tower would serve no operational function, but either the historic tower structure (2a and 2b) or a replacement (2c) would visually represent the historical relationship of an outlet tower within the Lake Chabot Water Works Historic District. Under the proposed project, the tower would be demolished with no replacement constructed, leading to the loss of the historic district's ability to convey its historical significance because viewers would not be able to see the outlet tower's role in the control of water levels and other aspects of operations.

Under Alternative 2a, leaving the tower in place but retrofitting the tower could result in inadvertent damage to portions of the tower. Such inadvertent damage has the potential to impair the ability of the tower to convey its significance within the Lake Chabot Waterworks Historic District because retrofit activities could result in changes to the physical materials, design, or workmanship of the tower; as stated above, if the tower is unable to contribute to the historic district this option potentially could result in a substantial adverse change to a historical resource, and the impact would be *potentially significant*. Under Alternative 2b, leaving the tower in place but retrofitting the pavilion would not impair the ability of the district to convey its historical significance because the viewer would still understand the historical operations of the Lake Chabot Waterworks; thus, *no impact* would occur. Under Alternative 2c, removal of the outlet tower and adding a new tower would alter a major physical characteristic of the historical resource and would add a new feature in the historic Lake Chabot Waterworks District boundaries whose design is not yet known, and thus may be incompatible with the historic district. This would impair the ability of the district to convey its historical importance (i.e., character-defining features), and consequently would result in a substantial adverse change to the historical resource. The impact would be *potentially significant*.

CEQA Guidelines Section 15064.5(2)(b) state that any project that meets the Secretary of the Interior's Standards for the Treatment of Historic Properties (Secretary's Standards) shall be considered mitigated to a level of less than significant. The Secretary's Standards include guidelines for four treatment types, including two that would apply to the Alternative 2 options: Rehabilitation and Reconstruction. Aspects of Alternative 2 related to the tower that would cause a *potentially significant* impact on the historical resource (Alternative 2a and 2c) could be mitigated to *less than significant* through application of the Secretary's Standards. If the retrofit activities in Alternative 2a are completed in accordance with the Standards for Rehabilitation, these standards would prevent the type of potential inadvertent damage that would lead to the loss of the tower's ability to convey its role in the historic district. Likewise, if the tower reconstruction activities in Alternative 2c are performed in accordance with the standards for Reconstruction, the potential for the new structure to be incompatible with the historic district would be avoided. The reintroduction of a tower that would help the observer understand the historical relationships of the system's features (in accordance with the U.S. Secretary of Interior's Standards) would be better than having no visual representation of this historically important structure. Completion of the retrofit in accordance with the Secretary's Standards would be a new mitigation measure (**Mitigation Measure ALT-CR-1**), but would not be required for the proposed project because there are no preservation standards that apply to demolition without a proposed reconstruction.

Removal and replacement of the 30-inch-diameter pipe under Alternative 2—if the new pipe is located in a new alignment—potentially could lead to encountering previously undocumented archaeological resources or discovering human remains; if this occurred and such resources were deemed to be important, the impact would be *potentially significant*. Similar to the proposed project, implementation of **Mitigation Measures CR-1.2 and CR-4.1** would require halting work and consulting with the appropriate agencies if any prehistoric or historic archaeological resources or human remains were uncovered during construction, respectively. These mitigation measures would reduce the impact on archaeological and human remains to a *less-than-significant* level.

Although the pavilion would be removed, retrofitted, or replaced under the Alternative 2 options, the outlet tower itself would remain in place. Therefore, the impact on cultural resources related to the outlet works for Alternative 2 would be *less than significant* and less than the proposed project.

Alternative 2: Transportation and Circulation

As stated in Section 4.3.1, Alternative 2 would include options to remove the pavilion and retrofit the tower, retrofit the pavilion, or remove and replace the pavilion and tower.

The estimated number of construction-related vehicle trips generated for Alternatives 2a and 2b would be similar than the proposed project because. Although these two alternatives would not involve demolition activities associated with the removal of both the pavilion and tower; it would require similar hauling truck trips and material delivery trips to the proposed project for the retrofit and cement fill. Alternative 2c would generate a greater number of construction-related vehicle trips than the proposed project because the filler materials for the abandoned shaft, waste tunnel, sluiceway and construction of a new tower would require additional material delivery trips to the work site. These material delivery trips for Alternative 2 could affect both freeway and intersection operating conditions as well as could create safety hazards on local roadways. Because Alternatives 2a and 2b would generate similar construction-related trips, these alternatives would result in similar impacts on freeway mainline segments, on-and off-ramps, intersection operating conditions, and the safety of motorists, bicyclists and pedestrian than the proposed project because less trips would be associated with the outlet works component. Similar to the proposed project, implementation of **Mitigation Measure TR-1.1** for preparing and implementing a traffic control plan would be required for Alternative 2, to reduce any *potentially significant* impact to *less than significant with mitigation incorporated*. Alternative 2c also would require implementation of **Mitigation Measure TR-1.1** and would have a greater impact on transportation and circulation. The transportation and circulation impacts related to the outlet works for Alternative 2a and 2b would be similar to the proposed project, but would be greater for Alternative 2c.

Alternative 2: Air Quality

Construction

Under Alternatives 2a and 2b, rather than the removal of the pavilion and tower as planned for the proposed project, the pavilion would have the option of being retrofitted or removed and the tower would be retrofitted or not. Thus, Alternatives 2a and 2b would not involve demolition activities associated with removal of the tower and potentially would not include demolition of the pavilion as well. Under Alternative 2c, filling the shaft would require construction of a new outlet tower.

Retrofitting the tower and pavilion (Alternatives 2a and 2b, respectively) is anticipated to require similar off-road construction equipment as the proposed project. The retrofitting option is anticipated to result in comparable material haul truck trips. The proposed project's demolition of the features presumably would require similar haul truck trips to remove materials as the Alternative 2a and 2b material delivery trips for retrofitting the features and concrete fill. Therefore, Alternatives 2a and 2b are anticipated to result in similar construction-related emissions than those of the proposed project, with respect to air quality. Alternative 2c would include construction of a new outlet tower and filling the outlet tower shaft rather than lining the shaft, as for the proposed project. These additional activities are anticipated to result in a higher level of construction emissions than the proposed project because of the new outlet tower construction. Construction of Alternatives 2a and 2b would include an option to retrofit the tower, and either removing or retrofitting the pavilion rather than removal of both features, as for the proposed project. Because retrofitting the tower and the pavilion would require similar construction equipment and material haul truck trips, Alternatives 2a and 2b are anticipated to result in similar total construction-related emissions. The total construction work days and pace of construction for Alternatives 2a and 2b would be similar to the proposed project. Thus, because the total construction work days would remain constant, Alternatives 2a and 2b are anticipated to result in similar lower average daily construction emissions than those shown in **Table 3.7-3**, in Section 3.7, Air Quality. However, the bulk of construction activities for Alternatives 2a and 2b would be similar to those for the proposed project, and therefore Alternatives 2a and 2b also are anticipated to result in average daily NO_x emissions that would exceed BAAQMD's threshold of significance. Alternative 2c would have the same impacts as Alternatives 2a and 2b, but is anticipated to result in slightly higher total and average daily construction-related emissions than the proposed project because of Alternative 2c having a greater amount of construction activities.

The pavilion and tower elements of Alternatives 2a and 2b are anticipated to result in similar emissions because the majority of construction emissions would be similar in scope to those of the proposed project, even with implementation of **Mitigation Measure AQ-2.1** (that would require implementation of BAAQMD's Basic and Additional Construction Control Measures), NO_x emissions are anticipated to continue to exceed BAAQMD's threshold of significance. Thus, construction-related mass emissions of NO_x would be *significant and unavoidable* for Alternatives 2a and 2b, similar to the proposed project. Alternative 2c also would continue to exceed BAAQMD's threshold of significance, and construction-related mass emissions of NO_x would be *significant and unavoidable,* and would be higher than those of the proposed project.

CO Hotspots

Alternatives 2a and 2b would result in similar vehicle trips as those of the proposed project. Therefore, the traffic volume contribution to local intersections would be similar to the proposed project. Alternative 2c would result in a larger amount of vehicle trips than the proposed project because of increased construction activities. However, the maximum hourly traffic volumes that would occur at potentially affected intersections would be substantially below BAAQMD's hourly volume screening threshold, even when using the maximum daily trips from Alternative 2 and surrounding roadways (see Impact AQ-4 in Section 3.7, Air Quality). Alternatives 2a and 2b would be expected to have similar volume contribution than the proposed project. Alternative 2c would contribute a higher volume of vehicle trips than the proposed project.

Thus, Alternative 2 is not expected to generate traffic volumes that would contribute to a potential CO hotspot beyond those of the proposed project. Alternative 2 is not expected to generate traffic volumes that could lead to a CO hotspot, and this impact would be *less than significant*, similar to the proposed project.

Construction-Related Toxic Air Contaminants

Alternative 2a and 2b would not involve construction activities that would be similar to those of the proposed project, and would generate similar TAC emissions. Alternatives 2a and 2b are anticipated to result in similar off-road construction equipment as the proposed project, as a result of removing the pavilion/retrofitting the tower or retrofitting the pavilion and retaining the tower with associated concrete fill. Therefore, on-site construction activities for Alternatives 2a and 2b are anticipated to be comparable to the proposed project, and TAC emissions also would be comparable to the proposed project. Although the on-site construction activities for Alternative 2c are anticipated to be higher than those of the proposed project, construction of the new outlet tower is not anticipated to require a substantially larger amount of construction equipment or to have substantially greater construction intensity than the proposed project.

Accordingly, construction-related TAC emissions and health risk impacts would be *less than significant*, similar to the proposed project for Alternatives 2a and 2b. The construction-related TAC emissions for Alternative 2c would be higher than those of the proposed project, but would remain *less than significant*. Similar to the proposed project, implementation of **Mitigation Measure AQ-2.1** would help reduce construction-related TAC emissions for Alternative 2. The impact would be *less than significant with mitigation incorporated*.

Impacts related to construction-related TAC emissions for the outlet works under Alternatives 2a and 2b would be similar to the proposed project, while Alternative 2c would result in higher impacts than the proposed project.

Odors

Similar to the proposed project, construction activities could generate diesel PM emissions that could cause an odor impact. The construction activities would occur at a similar intensity than that of the proposed project for Alternatives 2a and 2b, and greater than those of the proposed project for Alternative 2c. The bulk of construction activities for Alternative 2c would be similar to the proposed project; the additional outlet tower construction activity is not anticipated to generate odor emissions at a level that would be substantial. Therefore, Alternative 2 is not anticipated to result in additional diesel-fueled equipment operating at one time (more than the proposed project) that would generate potentially significant odor emissions. Considering that intermittent use of construction equipment and construction activities would occur at a similar intensity as the proposed project as result of the retrofitting options (Alternatives 2a and 2b), construction activities would not be expected to expose a substantial number of people to objectionable odors. Alternative 2c would occur at a higher intensity than the proposed project; however, the additional outlet tower construction is not anticipated to generate odor emissions at a level that would be substantial.

The odor impact for Alternatives 2a and 2b would be similar to the proposed project, and greater than that of the proposed project for Alternative 2c. The impact would be *less than significant* for Alternative 2.

Alternative 2: Greenhouse Gas Emissions

Alternatives 2a and 2b would include removing the pavilion/retrofitting the tower and retrofitting the pavilion rather than removal of both features, as for the proposed project. Thus, Alternatives 2a and 2b would not involve demolition activities associated with removal of the tower. Alternative 2b would not include demolition of the pavilion. Retrofitting the pavilion and tower are anticipated to require similar off-road construction equipment as the proposed project. In addition, the retrofitting option is anticipated to result in comparable material haul truck trips. The proposed project's demolition of the features are anticipated to require similar haul truck trips to remove materials as the material delivery trips for retrofitting the features. Therefore, Alternatives 2a and 2b are anticipated to result in similar construction-related GHG emissions than those of the proposed project.

Alternative 2c is anticipated to result in a higher level of construction-related GHG emissions because of the removal of the pavilion and tower, and new outlet tower construction. Because retrofitting the tower and potentially the pavilion would require similar construction equipment and material haul truck trips, Alternatives 2a and 2b are anticipated to result in similar total construction-related GHG emissions. Therefore, annual amortized construction emissions associated with Alternatives 2a and 2b are expected to be similar to the values shown in **Tables 3.8-1 and 3.8-2**, in Section 3.8, Greenhouse Gas Emissions. Even considering the increase in total construction emissions associated with Alternative 2c, the annual amortized emissions are not expected to exceed the values shown in **Tables 3.8-1 and 3.8-2,** in Chapter 3.8, Greenhouse Gas Emissions. None of the Alternative 2 options are anticipated to result in annual amortized GHG emissions that would exceed BAAQMD's threshold of significance.

Thus, similar to the proposed project, construction-related GHG emissions associated with Alternatives 2a and 2b are anticipated to be *less than significant* and would be similar to the proposed project. Construction-related GHG emissions associated with Alternative 2c would be *less than significant* and slightly higher than the proposed project.

Alternative 2: Noise and Vibration

Under Alternative 2, the maximum noise levels for construction equipment (drill rig, bulldozer, crane, excavator, grader, and jackhammer) would be 85 dBA at 50 feet. A hydraulic backhoe, with maximum noise level of 90 dBA, would not be required for Alternatives 2a and 2b because the outlet tower would not be demolished. Construction noise levels would have an aggregate maximum of about 88 dBA that would be attenuated to about 59 dBA at the nearest residences, located 1,500 feet from the dam excavation area. This daytime noise exposure would be slightly lower than for the proposed project, but would not be a perceptible difference at the nearest residence. Alternative 2c would have similar noise impacts as the proposed project because the existing pavilion and tower would be removed. The construction duration may increase because a new outlet tower would be constructed. However, all other project components would be the same for the Alternative 2 options. Similar to the proposed project, implementation of **Mitigation Measures NO-1.1, NO-1.2, NO-1.3, and NO-1.4** would be required to reduce construction noise levels, notify residents, generally limit haul truck trips through residential areas to 7:00 a.m. until 7:00 p.m. Monday through Friday, and designate a Community Affairs contact.

The noise impacts would be *less than significant with mitigation incorporated* and would be less than the proposed project for Alternatives 2a and 2b, and similar to the proposed project for Alternative 2c.

Alternative 2: Recreation

The outlet works construction for all Alternative 2 options would result in a temporary impact on the recreation setting for the open portions of the Bass Cove and West Shore trails and on the lake (outside the restricted dam area) because of changes to the recreation setting where construction activities were audible or visible, or where vegetation removal was notable in the landscape. This impact would negatively affect the recreational experiences of users on the two trails, boaters on the lake, and anglers in the area, similar to the impact of the proposed project.

A long-term impact on the recreation setting would occur from removal of the pavilion under Alternatives 2a and 2c, primarily on the West Shore Trail where the outlet works pavilion would have been visible previously, and thus would be considered as a component of the recreation setting for the trail. The impact would be *less than significant*, similar to that of the proposed project. The impact on recreation for Alternative 2b to retrofit the pavilion would be less than that of the proposed project; a long-term impact on the recreation setting at the West Shore Trail would not occur because no removal of a visible outlet works feature would occur, and thus no long-term change to the recreation setting would occur. Replacement of the tower under Alternative 2c would have less impact on recreation, compared to the proposed project, because the pavilion and tower would remain part of the recreation setting for trail users. However, a *potentially significant* impact still would occur from substantially degrading recreation experiences caused by recreation setting changes at Chabot Park under all Alternative 2 options.

Similar to the proposed project, the impact for all Alternative 2 options would be *significant and unavoidable* for physical deterioration of recreational facilities from trail closures and physical damage to fishing piers. **Mitigation Measures TR-1.1** and **RE-1.1** would be required for all Alternative 2 options, similar to the proposed project. *No impact* would occur from construction of recreational facilities. Similar to the proposed project, **Mitigation Measures BR-4.1, BR-4.2, BR-4.3, and AE-1.1** would be implemented for all Alternative 2 options to reduce the impact on Chabot Park to a *less-than-significant* level.

Overall, the impact from Alternative 2 would be similar to the proposed project, except Alternatives 2b and 2c would have less impact on recreation experiences for West Shore Trail users.

Alternative 2: Hydrology and Water Quality

Similar to the proposed project, Alternative 2 would have water quality and hydrology impacts and would use the same mitigation measures. The only notable difference would be the potential for increased construction dust and Lake Chabot/creek contamination as a result of tower or pavilion retrofit work, but a decrease in dust and contamination if the pavilion or tower was not demolished.

This additional impact would be *less than significant* and less than the proposed project, assuming demolition work decreased. Alternative 2c would require additional transport of construction materials and increased construction dust would result from filling the shaft and constructing a new outlet tower. Similar to the proposed project, implementation of **Mitigation Measure HY-1.1**, which would require the preparation of an SWPPP, and **Mitigation Measure HY-1.2**, which would require the installation of a protective silt curtain and containment boom to lessen pollution of Lake Chabot during construction, would be required for all Alternative 2 options. All other project components would be the same for Alternative 2. Therefore, implementation of **Mitigation Measures HY-1.3, HY-1.4, HY-1.5, and HY-3.1**, would be required for Alternative 2. The impact would be *less than significant with mitigation incorporated*.

Overall, the hydrology and water quality impacts from Alternative 2 would be slightly less than the proposed project, except Alternative 2c would have greater impacts because of the additional construction associated with a new tower.

Alternative 2: Hazards and Hazardous Materials

Alternative 2 still would require construction activities to occur at the outlet works. Implementation of **Mitigation Measure HZ-1.3** would be required for the evaluation, and if found, abatement of the outlet works for the potential presence of lead-based paint (LBP) and asbestos-containing material (ACM). All other project components would be the same for Alternative 2. Implementation of **Mitigation Measures HZ-1.1** (that would be implemented for the proposed project for preparation of a Hazard Communication Plan, an Injury and Illness Prevention Plan, and a Hazardous Materials Control and Spill Prevention and Response Plan), and **Mitigation Measure HZ-1.2** for evaluation of the pole-mounted transformer at the Park Stockpile would be required for all Alternative 2 options, similar to the proposed project. Implementation of **Mitigation Measure HZ-4.1** to prepare a site-specific emergency response plan and **Mitigation Measure HZ-5.1** for precautions for flammable materials and maintaining fire-fighting tools at the project site would reduce emergency access and wildland fire risks to a *less-than-significant* level.

Implementation of the mitigation measures would reduce this alternative's impact on hazards and hazardous materials to a *less-than-significant* level. Overall, the hazards and hazardous materials impacts from Alternative 2 would be similar to the proposed project.

4.4 No Project Alternative

4.4.1 Description of the No Project Alternative

Under the No Project Alternative, the proposed project would not be implemented. None of the proposed facility improvements described in Chapter 2, Project Description would occur.

4.4.2 No Project Alternative - Environmental Assessment

In the near term, the No Project Alternative would avoid all construction-related impacts associated with the proposed project. Therefore, *no impacts* would occur. Under the No Project Alternative, the stability and performance of Chabot Dam would not be improved, and the dam would not meet DSOD seismic safety requirements or mandates. Therefore, the No Project Alternative is not feasible because it does not address DSOD's requirements. Permanent restriction of the lake level without upgrades would not be acceptable to DSOD. EBMUD must comply with DSOD's requirements to maintain

Chabot Dam. Non-compliance with the DSOD requirements is not an option; thus, a project is required at Chabot Dam.

4.5 Discussion of Alternatives and Identification of the Environmentally Superior Project

Section 15126.6(e)(2) of the State CEQA Guidelines requires that an EIR identify an environmentally superior alternative. **Table 4-1** includes a summary description of the proposed project options, identifies alternatives to the proposed project, and compares the potential impacts of each alternative, by resource topic.

The analysis presented in Chapter 3 of the EIR indicates that impacts associated with the proposed project are construction-related. Most of these construction-related impacts can be mitigated to a *less-than-significant* level. Exceptions include cultural resource impacts related to demolition of the tower, and temporary construction-related air quality and recreation impacts at the project site. After implementing mitigation measures, these impacts would remain *significant and unavoidable*.

4.5.1 No Project

The No Project Alternative would avoid the construction-related impacts associated with the proposed project. However, the No Project Alternative would not improve the sluiced fill materials to reduce liquefaction in the embankment toe, and would not prevent damage to the outlet works from the design level earthquake so that the outlet works remain operational following the earthquake.

If the No Project Alternative were to be selected, deformation of the dam would occur as a result of the maximum credible earthquake. The construction impacts associated with potentially draining the lake, restoring flow, repairing damages, and rebuilding the downstream embankment with Conventional Earthwork or CDSM post-earthquake would have greater impacts than the proposed project because of the greater level of effort required to repair the damaged facility and because of the potential need to drain the lake.

The No Project Alternative would not improve the seismic performance of the outlet works and would not prevent collapse of the pavilion and tower during a major earthquake. The No Project Alternative does not meet the basic project objectives of dam improvement and the DSOD would not allow continued long-term operation of Chabot Dam without a seismic upgrade.

4.5.2 Alternative 1

Alternative 1 generally would have greater impacts than the proposed project. As shown in **Table 4-1**, the impacts associated with Alternatives 1a and 1b would be similar. The off-site haul routes and stockpiles would result in a greater number of external truck trips and longer trip distances, resulting in greater construction-related traffic, air quality, GHG, and noise impacts. Use of haul routes outside the project area could result in a marginal increase in hydrology and water quality impacts associated with runoff. The outlet works under Alternative 1 would be the same as the proposed project and would have the same impacts. Alternative 1 would meet all of the basic project objectives; however, it would have greater impacts than the proposed project and would not reduce the *significant and unavoidable* impacts identified for cultural resources, air quality, GHG, and recreation.

4.5.3 Alternative 2

Alternative 2a (Line Shaft, Remove Pavilion with option to Retrofit Tower) and Alternative 2b (Line Shaft, Retrofit Pavilion)

Alternatives 2a and 2b generally would have similar to slightly less impacts than the proposed project because of fewer construction activities associated with the outlet works. As shown in **Table 4-1**, the impacts associated with Alternatives 2a and 2b would be similar. The removal of the pavilion and retrofit of the tower for Alternative 2a would yield lower risk because it would have low potential for earthquake damage to the tower and medium future maintenance requirements. Retrofitting the pavilion for Alternative 2b would yield higher risks because it would have high potential for earthquake damage to the tower. Under Alternatives 2a and 2b, the pavilion and tower would serve no operational function and would require continued maintenance; with higher maintenance requirements for Alternative 2b. Alternative 2a and 2b would meet most of the basic project objectives; however, it would not reduce the *significant and unavoidable* impacts identified for air quality and recreation to a *less-than-significant* level.

Alternative 2c (Fill Shaft, Remove Pavilion and Tower, Build New Tower)

Alternative 2c would have greater impacts than the proposed project, because it would require constructing a new tower in addition to removing the pavilion and outlet tower. All structures would serve operational functions. This alternative would have low potential for earthquake damage to the tower and medium future maintenance requirements. Alternative 2c would meet all of the basic project objectives; however it would not reduce the *significant and unavoidable* impacts identified for air quality and recreation.

The *significant and unavoidable* impact identified for cultural resources, associated with the outlet tower for the proposed project, would not occur for all Alternative 2 options because, if retrofitted or reconstructed in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings*, the impact would be mitigated to a *less-than-significant* level.

4.5.4 Conclusion

Pursuant to the State CEQA Guidelines, Alternative 2a with the tower retrofit option would be the environmentally superior alternative. However, under Alternative 2a the potential for earthquake damage to the outlet works would remain, it would have higher future maintenance requirements, and results in a structure with no operational function. Under the proposed project, five significant and unavoidable impacts would occur (one of which is cumulative), three of which would remain for Alternative 2 (**Table 4-3**).

Table 4-3
Significant and Unavoidable Impacts by Alternative

	Number of Significant & Unavoidable Impacts
Proposed Project	4
Alternative 1a	4
Alternative 1b	4

Table 4-3 Significant and Unavoidable Impacts by Alternative	
Alternative 2a	3
Alternative 2b	3
Alternative 2c	3

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5 Other CEQA Considerations

5.1 Cumulative Impacts

5.1.1 Approach to Analysis

A "cumulative impact" is defined as an impact caused by implementation of a project in conjunction with other projects with related environmental effects. The purpose of this analysis is to determine the potential for significant cumulative impacts resulting from the Chabot Dam Seismic Upgrade Project (proposed project) in combination with other projects or conditions, and to indicate the severity of the impacts and their likelihood of occurrence.

Section 15130 of the State CEQA Guidelines requires that EIRs discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. The discussion of cumulative impacts must include:

- Either 1) a list of past, present, and probable future projects producing related or cumulative impacts, or 2) a summary of projections contained in an adopted general plan or similar document, or in an adopted or certified environmental document, which described or evaluated conditions contributing to a cumulative impact
- A discussion of the geographic scope of the area affected by the cumulative effect
- A summary of expected environmental effects to be produced by these projects
- Reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects

This cumulative impacts analysis uses a list of probable future projects under the purview of various agencies with jurisdiction in the project area, including other EBMUD projects. The analysis does not address cumulative impacts for resource areas not analyzed for the proposed project (i.e., for areas not found to be potentially significant, and therefore excluded from analysis in the Draft EIR). Resource issues excluded include: Public Services; Agricultural and Forestry Resources; Population and Housing; Land Use and Planning; Utilities and Service Systems, and Mineral Resources. However, mineral resources are briefly addressed in Section 3.3, Geology and Soils.

5.1.2 Projects with Potentially Related or Cumulative Effects

This analysis considers cumulative impacts associated with construction and operation of the proposed project based on the geographic scope of the affected environmental resource and the project schedule. The cumulative analysis considers the impacts of the proposed project, described in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures, in combination with potential environmental impacts of other projects proposed in the project vicinity.

The project sponsors contacted for analysis included: local jurisdictions (City of San Leandro, City of Oakland, and Alameda County), and other responsible agencies (California Department of Transportation [Caltrans]). Other EBMUD-proposed projects also were considered. Projects were generally identified by the planning, community development, and public works/engineering departments of these agencies, as well as through information posted on Web sites. Projects with a potential for cumulative impacts within the proposed project's construction time frame were those within a 3-mile radius of the project area. This radius was selected for the cumulative projects due to the proximity to the same neighborhoods/residents as the proposed project, and effects on the same roadways. The complete list of projects provided by jurisdiction and agency is available for reference on request. Of the four agencies contacted, three provided a response.

The process used to determine the potential for cumulative impacts for the Draft EIR was to identify development projects proposed within a 3-mile radius of the project area, and to determine whether development is proposed to occur within the project construction schedule. This process was used for all resources except cultural resources, air quality, and greenhouse gas emissions; please see these resource discussions in Section 5.1.3 below for how cumulative impacts for these resources were identified. **Table 5-1** lists projects within the 3-mile radius, and **Figure 5-1** shows their approximate location. Projects shown in the table and figure include 10 EBMUD projects, 12 City of San Leandro projects, and 43 Caltrans projects.

The projects are described in terms of location, description, status, and construction schedule (where provided). In general, for future projects, construction schedules are broadly estimated and subject to change; therefore, the cumulative analysis is based on the conservative assumption that construction activities could occur within a 3-year window of the proposed project's construction schedule. Construction schedules for many of the projects are uncertain because of a lack of funding.

Table 5-1
Projects with Potential to Contribute to Cumulative Impacts

Agency/ Project #	Project Name	Project Description/Location	Project Status	Construction Schedule[1]
EBMUD				
1	Almond PP	Reconstruction, 17421 President Drive, Castro Valley	Proposed	2014–2016
2	Almond Reservoir	Rehabilitation, south of Lamson Road, east of Almond Rd in Castro Valley	Planning Phase	2016–2018
3	El Portal Reservoir	Rehabilitation, 17241 President Drive, Castro Valley	Proposed	2014–2016
4	Castro Valley Pipeline	Replacement, 1,500 feet of 36-inch pipeline	Proposed	2014–2016
5	Peralta PP	Reconstruction, 1800 Estudillo, Oakland	Proposed	2014–2016
6	Bayfair PP	Reconstruction, 1800 Estudillo, Oakland	Proposed	2014–2016
7	98th Avenue RCS	Rehabilitation, Bancroft and 98th Avenue, Oakland	Proposed	Unknown
8	Sequoia RCS	Rehabilitation, Bancroft and 98th Avenue, Oakland	Proposed	Unknown
9	Gramercy Regulator	Rehabilitation, 15939 Gramercy Drive, San Leandro	Proposed	Unknown
10	Upper San Leandro Reservoir Outlet Tower Retrofit	Structural and mechanical retrofits, and improvements to the Upper San Leandro Reservoir Outlet Tower	-	2014–2015

Table 5-1
Projects with Potential to Contribute to Cumulative Impacts

Agency/ Project #	Project Name	Project Description/Location	Project Status	Construction Schedule[1]
City of San Leandro				
11	Village Marketplace	1550 E 14th Street, San Leandro	Proposed; planning approvals obtained	Unknown
12	Cornerstone Residences	1400 San Leandro Boulevard; 200 units, San Leandro	-	2014
13	OSIsoft Tech Campus	Martinez Street, west of BART station; 200,000 sq. feet of office space and parking, San Leandro	Undergoing planning review 2013	Unknown
14	Kaiser Hospital	1701 Marina Boulevard (west of 880), San Leandro	Construction underway	Construction completed by summer 2014
15	BART Downtown Pedestrian Improvements	Streetscape improvements along San Leandro Boulevard between Davis Street and Williams Street, San Leandro	-	2014–2016 time frame, plus or minus a year
16	Intersection Improvements	E. 14th Street/Hesperian Boulevard/150th Avenue, San Leandro	-	2014–2016 time frame, plus or minus a year
17	Utility Undergrounding	E. 14th Street (150th Avenue to Thornton Street), San Leandro	-	2014–2016 time frame, plus or minus a year
18	Bicycle Network East Construction	Bancroft/Sybil Avenue Safety Upgrade, San Leandro	-	2014–2016 time frame, plus or minus a year
19	Traffic Signal Upgrade	Washington Avenue/Monterey Boulevard, San Leandro	-	2014–2016 time frame, plus or minus a year
20	Traffic Circle Upgrade	McArthur Boulevard/Superior Avenue, San Leandro	-	2014–2016 time frame, plus or minus a year
21	HOV Project	880, San Leandro	-	2014–2016 time frame, plus or minus a year
22	Street Sealing/ Rehabilitation	Various streets, San Leandro	-	2014–2016 time frame, plus or minus a year
Caltrans				
23	-	Route 580 BP 31.3 EP 35.7; in Alameda County, in and near the City of San Leandro at various locations	-	-
24	Fairmont Drive Slipout	Install tieback retaining wall, Route 580 BP 31.8 EP 31.8	-	5/30/2014–11/27/2017
25	Benedict Drive Off-Ramp	Re-build embankment, Route 580 BP 32.4 EP 32.5	-	6/16/2014–12/12/2017

Table 5-1
Projects with Potential to Contribute to Cumulative Impacts

Agency/ Project #	Project Name	Project Description/Location	Project Status	Construction Schedule[1]
26	150th Street Slipout	Construct soldier bean tieback wall Route 580 BP 32.5 EP 32.5	-	6/16/2014–12/13/2017
27	Rte. 580 Rehab	Roadway rehabilitation (2R), Route 580 BP R30.8 EP R41.5	-	4/23/2018–8/1/2021
28	3G710 Roadside Safety ALA580,680,880	Roadside safety improvements, Route 580 BP R32.9 EP R46.5	-	4/24/2015–8/31/2017
29	San Leandro. O/S Soundwall	Construct soundwall (both sides), Route 580 BP R33.5 EP R34.6	Construction underway	4/1/2009–3/1/2013
30	Connections to New Rte 238	Route 580 BP TO29.5 EP TO31.7; in Alameda County near San Leandro from 0.2 mile east of Castro Valley Boulevard undercrossing to 0.1 mile east of 167th Avenue undercrossing	-	-
31	-	Route 880 BP 3.3 EP 20.8; in Alameda County at various locations	-	-
32	-	Route 880 BP 13 EP 23.8; in Alameda County in and near Union City, Hayward, and San Leandro at various locations	-	-
33	-	Route 880 BP 13.4 EP 24.1; in Alameda County at various locations from 0.5 km south of Whipple Road undercrossing to 0.8 km north of Route 880 and 112 separation	-	-
34	-	Route 880 BP 20.8 EP 20.9; in Alameda County on Route 880 at the southbound off-ramp to Washington Street in the City of San Leandro	-	-
35	Marina Boulevard Interchange Project	Route 880 BP 22.5 EP 23.3; add 3 signalized intersections and a left turn lane on Marina, realign I-880 northbound and southbound onramps and southbound loop ramp	-	-
36	S/B HOV S. Unit	Replace overcrossing, widen freeway, Route 880 BP 22.6 EP 24	Construction underway	4/20/2012–1/1/2017
37	I-880 S/B HOV Lane Extension (Landscaping)	Highway landscaping, Route 880 BP 22.6 EP 24; Marina Boulevard to Davis Street	-	-
38	Marina Boulevard to Hegenberger Road – extend HOV	Route 880 BP 22.6 EP 25.5; in Alameda County from 1,000 feet south of Marina Boulevard in the City of San Leandro to Hegenberger Road in the City of Oakland	-	-

Table 5-1
Projects with Potential to Contribute to Cumulative Impacts

Agency/ Project #	Project Name	Project Description/Location	Project Status	Construction Schedule[1]
39	-	Route 880 BP 23.6 EP 31.6; in Alameda County in Oakland and San Leandro from Route 112/880 separation to Madison Street	-	-
40	880 S/B HOV Hovl N. Unit	Widen mainline and bridge for HOV, Route 880 BP 24 EP 25.5	Construction underway	5/21/2012–2/1/2017
41	-	Route 880 BP 24.2 EP 24.5; in Alameda County in San Leandro And Oakland from 0.8 km north of Route 112/880 separation to 0.5 km south of 98th Avenue overcrossing	-	-
42	CC-4 TV Camera	Route 112 BP 0 EP 1.2; in Alameda County in San Leandro at various locations from Doolittle Road to East 14th Street and in Contra Costa County in Pittsburg at Loveridge Road	-	-
43	-	Route 112 BP R0.0 EP 1.7; in Alameda County in San Leandro on Route 112 (Davis Street) from Junction Route 61/112 (Doolittle Drive) to Junction Route 112/185 (E 14th St) (KP 0.0/2.86)	-	-
44	-	Route 112 BP 0.4 EP 0.8; on Davis Street (Route 112) overcrossing at Route 880 between Timothy Drive and Route 880 North on-ramp	-	-
45	-	Route 185 BP 0 EP 5.7; in Alameda County in Hayward and San Lorenzo from Route 92.238 to Route 61 (KP 0.0/9.2)	-	-
46	-	Install solar operated vehicle speed feedback signs, Route 185 BP 0.51 EP 5.16	-	-
47	-	Route 185 BP 0.8 EP 5.7; in Alameda, Contra Costa, Marin, Santa Clara, Solano, San Mateo, and San Francisco counties at various locations	-	8/30/2013–4/1/2016
48	Rte 185 Oversight 1	Highway beautification (local), Route 185 BP 0.9 EP 3.8	-	-
49	-	Route 185 BP 4.1 EP 4.6; in Alameda County in City of San Leandro on Route 185 (east 14th Street) between 136th Avenue and 145th	-	-

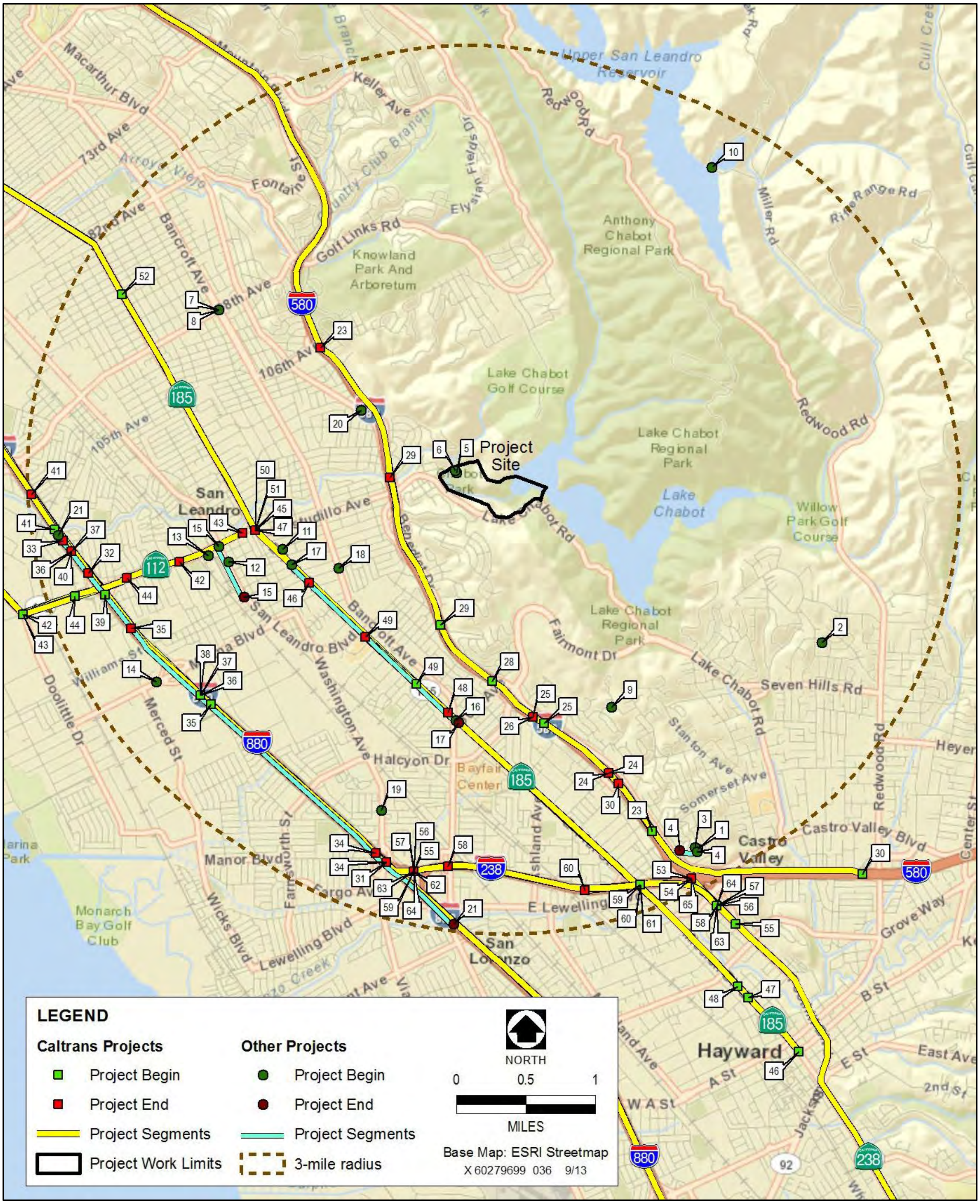
Table 5-1
Projects with Potential to Contribute to Cumulative Impacts

Agency/ Project #	Project Name	Project Description/Location	Project Status	Construction Schedule[1]
50	-	Route 185 BP 5.7 EP 10.1; in Alameda County in San Leandro and Oakland at various locations	-	4/1/2014–10/1/2017
51	ALA BRT Project	Bus rapid transit, Route 185 BP 5.7 EP 10.6	Construction underway	10/1/2012–11/30/2016
52	Rte. 185 Oversight 2	Modification of conventional highway, Route 185 BP 7.7 EP 10.7	-	-
53	-	Route 238 BP 9.2 EP 14.5; in Hayward from Industrial Parkway to Route 580 (*PR & ED ONLY)	-	-
54	-	Route 238 BP 9.2 EP 14.5; in and near Hayward from Industrial Parkway to Route 238/580 interchange	-	-
55	-	Route 238 BP 14 EP 16.7; in Alameda County in and near San Leandro on Route 238 from 238/580 I/C to Route 238/880 I/C	-	-
56	-	Route 238 BP 14.2 EP 16.7; in Alameda County on Route 238, 580 in Hayward, San Leandro from Route 880/238 separation to Redwood Road (Route 580) and on Route 880 from 880/238 separation to Hacienda Avenue	Construction underway	12/28/2005–1/2/2013
57	STPL-6204(057) Widen I-238, Rehab I-238 and Add Aux Ln on I-880	Widening and rehabilitate, Route 238 BP 14.2 EP 16.7	-	-
58	OE990 to Treat Bridge Decks w/ Methacry Late, Replace Joint	Treat bridge decks, Route 238 BP 14.3 EP 16.3	-	-
59	-	Route 238 BP 14.9 EP 16.7; in Alameda County in and near San Leandro from Route 238/185 separation to Route 880/238 separation	-	-
60	-	Route 238 BP 14.9 EP 15.3; in Alameda County near Hayward from Routes 238/185 separation to 0.1 km east of Kent Avenue overhead	-	-
61	-	Route 238 BP 14.9 EP 15.4; in Alameda County near San Leandro from 238/185 separation to Kent Avenue overhead (KP 24.0/24.8)	-	-

Table 5-1
Projects with Potential to Contribute to Cumulative Impacts

Agency/ Project #	Project Name	Project Description/Location	Project Status	Construction Schedule[1]
62	-	Route 238 BP 15.6 EP 16.7; in Alameda County in Ashland and San Leandro from Ashland Avenue undercrossing to Route 880 and 238 separation	-	-
63	-	Route 238 BP R014.2 EP R016.7; in Alameda County in and near San Leandro from Route 580 to Route 880	-	-
64	-	Route 238 BP R014.2 EP R016.7; in Alameda County from Route I-580 to Route 1-880 in and near San Leandro	-	-
65	Bridge Preservation	Bridge preservation, Route 238 BP R14.5 EP R14.5	-	11/28/2016–6/13/2023

Notes:
WTP = water treatment plant; PP = pumping plant; RCS = rate control station; BP = begin postmile; EP = end postmile; MBGR = metal beam guard rail; S/B = southbound; HOV = high occupancy vehicle; MTC = Metropolitan Transportation Commission; BRT = bus rapid transit; Rte = Route; km = kilometers; - = no information provided
[1] For Caltrans projects, the construction schedule spans from the ready-to-list date to the closeout date.
Sources: EBMUD 2013, California Department of Transportation 2013, City of San Leandro 2013, data compiled by AECOM in 2013



Sources: Caltrans 2013, City of San Leandro 2013, EBMUD 2013, compiled by AECOM 2013

Figure 5-1: Cumulative Projects within a 3-Mile Radius

5.1.3 Cumulative Impacts and Mitigation Measures

Cumulative impacts are discussed in this section by resource topic. Because of the generalized level of project information presented in **Table 5-1**, the following discussions are limited to a qualitative evaluation. The geographic context for analysis of cumulative impacts is identified at the beginning of each resource topic discussion in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures. A discussion of the secondary effects of growth potentially induced by the proposed project is included at the end of this chapter.

Aesthetics

Impact AE-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on visual character/quality or scenic resources. (No Cumulative Impact)

Cumulative aesthetics impacts are limited to site-specific effects because the viewers and viewsheds that could be affected would differ between project locations. If a substantial number of projects are occurring within the same viewshed or impacting the same viewers, then a cumulative impact could potentially occur.

The majority of the planned and proposed projects that may contribute to a cumulative impact are not located in the vicinity of the project area. Two of the planned projects are within the project area (Peralta Pumping Plant [PP] and Bayfair PP), which would implement upgrades to the respective pumping plants. These upgrades would occur at the existing facilities in the project area after the Chabot Dam Seismic Upgrade construction time frame, and they would not result in adverse visual changes. These projects, combined with the proposed project, would be compatible with existing land uses and would not degrade the visual character and quality of the area.

As discussed under Section 3.2, Aesthetics, the proposed project would have short-term visual effects during project construction from distant views of construction activities, and potential long-term visual effects after construction from removal of the pavilion, disturbance to park features, and removal of trees. However, implementation of mitigation measures would reduce impacts to scenic vistas, visual character, and light and glare to a less-than-significant level. The proposed project would not result in a cumulatively considerable contribution to aesthetic impacts.

Geology and Soils

Impact GE-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on geology and soils. (No Cumulative Impact)

The geographic context for cumulative impacts is limited to locations in and adjacent to the project area because seismic, topsoil loss, erosion, and geologic/soil stability impacts from the proposed project would be confined to the immediate vicinity of the project area. Two of the planned projects, Peralta PP and Bayfair PP are within the geographic scope of the project area. These projects are scheduled to begin construction after the proposed project's construction is completed.

The proposed project is located in a seismically active region and could be subject to seismic impacts and hazards that could threaten life or property. The two PP projects located in the immediate vicinity of the project site would be susceptible to similar seismic impacts. However, the two PP projects would be constructed to meet the California Building Code or other seismic requirements, reducing the potential for impacts on people or property in the event of an earthquake. The proposed project would have less-than-significant impacts related to seismic impacts and hazards because the project would include upgrading the dam facilities to meet current seismic standards and DSOD requirements.

Construction of the proposed project would require ground disturbing activities that could result in short-term temporary loss of topsoil, erosion, and slope stability by exposing disturbed areas. Implementation of mitigation measures would reduce these impacts to a less-than-significant level. Construction of the two PP projects and associated ground disturbance could contribute to cumulative impacts related to topsoil loss, erosion, and slope stability. These projects would be constructed after the completion of the dam retrofit; therefore, construction-related impacts would not compound with any construction-related impact of the proposed project. Once construction of the PP projects and the proposed project are completed, no impacts related to topsoil loss, erosion, and slope stability from operation of any of these projects would occur.

The federal, state, and local regulations described in Section 3.3, Geology and Soils, would apply equally to all developments. Because each project is required to meet building requirements and comply with applicable regulations, no additive impact would result. Therefore, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on geology and soils.

Biological Resources

Impact BR-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on special-status plant or wildlife species. (No Cumulative Impact)

As described in Section 3.4, the proposed project would result in potentially significant impacts on California red-legged frog (CRLF), Western pond turtle, Central California Coast Steelhead Distinct Population Segment (DPS), San Francisco dusky-footed woodrat, nesting birds, and roosting bats. The potential would exist for impacts related to mortality or injury of individuals of these protected species during project construction. In addition, the potential impacts on water quality from construction activities could result in temporary habitat degradation for CRLF and Central California Coast Steelhead DPS.

The project region has undergone substantial conversion of natural habitats to development. The majority of the 65 other projects in the project vicinity are linear transportation or utility maintenance projects in developed areas of the City of San Leandro and unincorporated communities of Ashland and Castro Valley, in Alameda County. Because of the highly urbanized nature of these projects' sites, only a small portion potentially would impact special-status species habitat. In addition, future projects with potentially significant impacts on wildlife species would be required to comply with federal, state, and local regulations and ordinances protecting biological resources through implementation of mitigation measures during construction.

The proposed project's construction activities could result in a temporary loss of special-status species habitat. Construction-related mitigation measures would incorporate pre-construction surveys, avoidance of sensitive habitats, establishment of protective buffers, installation of exclusion fencing, and worker training, reducing impacts to a less-than-significant level.

Therefore, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on special-status plant or wildlife species.

Impact BR-CU-2: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on sensitive vegetation communities. (Less-than-Significant Cumulative Impact)

The proposed project would result in the removal of up to 0.85 acres of riparian habitat in the project area. Although the area would be returned to pre-project conditions after construction, a temporal loss of riparian habitat would occur for approximately 10 to 15 years while replacement vegetation matured. Because of the long time period that is required for trees to reach maturity, removal of large trees would be considered a permanent, potentially significant impact. The loss of riparian habitat with implementation of the project is considered a *potentially significant* impact.

Of the 65 pending projects listed in **Table 5-1**, some presumably would include vegetation removal in riparian areas. Lower San Leandro Creek has undergone substantial conversion of riparian habitats to development. The majority of the 65 cumulative projects in the project vicinity are linear transportation or utility maintenance projects in developed areas of the City of San Leandro and unincorporated communities of Ashland and Castro Valley, in Alameda County. Because of the highly urbanized nature of these projects' sites, only a small number of them have the potential to affect riparian habitat.

Projects that do affect riparian habitat are subject to regulation under California Department of Fish and Game Code 1600, and they are required to replace riparian vegetation as applicable. Therefore, no additive impact would result and no cumulative considerable impacts to riparian habitat would occur.

Impact BR-CU-3: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on wetlands and other aquatic habitats. (Less-than-Significant Cumulative Impact)

The proposed project would result in potential temporary impacts on approximately 0.05 acre of wetlands and aquatic habitat in Lower San Leandro Creek and the freshwater emergent wetland directly below the Lake Chabot spillway, during installation of a subdrain outfall for the dam, and Lower San Leandro Creek would be disturbed for construction of the Lower Haul Route temporary stream crossing. Both of these project work sites would be returned to pre-project conditions after completion of construction. Because the wetland and aquatic habitats within the project area are regulated by water releases from Lake Chabot, effects on these wetland and aquatic habitats will not disturb wetland creation or functionality in the Lower San Leandro Watershed.

Of the 65 pending projects listed in **Table 5-1**, some presumably would include grading and filling of wetlands and other aquatic habitat. As stated previously, the majority of the 65 cumulative projects in the project vicinity are linear transportation or utility maintenance projects in developed areas. Because of the highly urbanized nature of these projects' sites, only a small portion of them would potentially affect wetlands and other aquatic habitats. Construction activities associated with the other projects could result in a temporary or permanent loss of wetlands and aquatic habitat.

However, projects that impact jurisdictional resources are subject to regulation under Section 404 of the Clean Water Act by USACE, Section 401 of the Clean Water Act by RWQCB, and potentially Section 1600 of the California Department of Fish and Game Code. Implementation of mitigation in accordance with the USACE no net loss of wetlands policy would reduce the proposed project's contribution to a cumulatively significant impact on wetlands and other aquatic habitat to less than considerable, and the cumulative impact would be *less than significant*.

Impact BR-CU-4: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact related to local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (No Cumulative Impact)

The proposed project would result in the removal of 6.73 acres of trees from the project area. All project work sites would be returned to a similar appearance as their pre-construction conditions after completion of construction. The removal of trees would not conflict with local policies. Considering that areas surrounding the project site are primarily woodlands, this would not be a substantial comparative reduction in the number of trees to be removed. With implementation of mitigation measures the impact would be less than significant. Of the 65 pending projects listed in **Table 5-1**, some presumably could result in the loss of trees. However, each of the other projects may be subject to local tree preservation ordinances and replacement of street trees as applicable. Implementation of mitigation to replace protected trees removed during construction would reduce the proposed project's contribution to a significant cumulative impact related to local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, to less than considerable. Therefore, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

Cultural Resources

Impact CR-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on historical resources. (No Cumulative Impact)

The geographic scope of cultural resource includes the facilities owned and managed by EBMUD, as these structures would have the potential to be historical resources similar to others in the project area that are associated with the same historically important themes. As described in Section 3.5, Cultural Resources, the proposed project would demolish the outlet tower, a prominent contributing element of the Lake Chabot Waterworks Historic District. Mitigation would reduce impacts related to the potential to disturb archaeological deposits that could be associated with the Lake Chabot Waterworks Historic District to a less-than-significant level. Furthermore, implementation of mitigation would provide the public with information about the heritage of the historic district as a means of offsetting the loss of the outlet tower. Because demolition would represent a permanent loss of a portion of the Lake Chabot Waterworks Historic District, the proposed project would have a significant and unavoidable impact on historical resources associated with the heritage of EBMUD and the role it has played since the nineteenth century in providing water supply for the development of surrounding communities.

The earliest facility in EBMUD's system, the Temescal Reservoir, has been altered several times in the past and retains little historical integrity. EBMUD is performing facility upgrades throughout its system to address operational needs that are posed by the limitations of aging infrastructure, and to address public safety needs through seismic retrofits, including the Estates, Schapiro, Summit, Berryman, and South reservoirs as well as the San Pablo Dam (EBMUD 2013). The Berryman Reservoir replacement included removal of an earthen dam dating from the same time period as Chabot Dam. The Estates Reservoir Replacement Project has been reviewed under CEQA and found to pose significant unavoidable impacts on CEQA historical resources (through demolition of a structure designed by a noted architect). Other projects that are still in the planning stages and have not yet been analyzed under CEQA would involve reconstruction and rehabilitation activities, including physical alteration or demolition. Four of EBMUD's projects (shown in **Table 5-1**) include facilities that are of a historic age and may include buildings and structures that qualify as CEQA historical resources (i.e., Almond Pumping Plant, 1946; Almond Reservoir, 1954; El Portal Reservoir, 1941; and Peralta Pumping Plant, 1930). However, such determinations are beyond the scope of the environmental analysis of the proposed project and so it has not been determined if those projects will result in significant impacts to historical resources.

Overall, the project impacts described above indicate that a trend exists for cumulative impacts on the historical resources associated with EBMUD's role in the history of water supply to East Bay communities. The proposed project's significant and unavoidable impact would contribute to the overall significant cumulative impacts on historical resources. However, because the proposed project would only result in the loss of a single contributor to a historic district that still would retain its eligibility for listing on the California Register of Historical Resources, the Lake Chabot Waterworks Historic District would still be able to convey the heritage represented by this class of historical resource. Therefore, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on historical resources.

Impact CR-CU-2: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on paleontological resources. (No Cumulative Impact)

Fossil discoveries resulting from excavation and earthmoving activities associated with development are occurring with increasing frequency throughout California. The value or importance of different fossil groups varies depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions, such as part of a research project. Unique, scientifically important fossil discoveries are relatively rare, and the likelihood of encountering them is specific to each site and is based on the type of specific geologic rock formations that are present. These geologic formations vary from location to location.

The project area does not contain paleontologically sensitive rock formations. Therefore, the proposed project implementation would not result in a cumulatively considerable incremental contribution to a significant cumulative impact.

Transportation and Circulation

Impact TR-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on transportation and circulation. (No Cumulative Impact)

The proposed project's construction period would be from fall 2015 to the end of 2016 For the purposes of the cumulative analysis of transportation and circulation impacts, only those other projects that make or would make a substantial contribution to traffic on the same public roadway segments as the proposed project (Interstate 580, Estudillo Avenue, MacArthur Boulevard, and Grant Avenue) were considered. Therefore, any potential cumulative impacts on transportation and circulation conditions would be a result of overlapping construction activities and an increase in traffic from the proposed project and other future projects within the geographic scope (see **Table 5-1**). The temporal scope for cumulative traffic impacts would include construction of the proposed project, which would occur over a maximum of 2 years.

Of the 65 present and probable future projects reviewed (see **Table 5-1**), none was determined to have a potentially overlapping construction schedule or combined impact on transportation and circulation with the proposed project. The proposed project could have potentially significant impacts related to construction traffic; however, this impact would be reduced to a less-than-significant level with mitigation. Therefore, based on these findings, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on transportation and circulation.

Air Quality

Impact AQ-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment. (Significant and Unavoidable Cumulative Impact)

The proposed project is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD) and is located in the San Francisco Bay Area Air Basin. By its nature, air pollution would be a significant and unavoidable cumulative impact. The air basin's nonattainment status from regional pollutants is a result of past and present development within the air basin, and this regional impact is a cumulative impact; projects within the air basin would contribute to this impact only on a cumulative basis. No single project would have sufficient emissions, by itself, to result in nonattainment of regional air quality standards. Instead, an individual project's emissions may be limited but cumulatively considerable when considered in combination with past, present, and future development projects. All new development that would result in an increase in air pollutant emissions above those assumed in regional air quality plans would contribute to a significant and unavoidable cumulative impact on air quality.

Cumulative Regional Construction Emissions

The determination of a cumulative air quality impact for construction-generated ozone emissions is based on whether the proposed project would generate emissions that would exceed the applicable project-level thresholds of significance. BAAQMD has determined that projects not generating substantial emissions and consistent with regional air quality planning efforts would not generate cumulatively considerable emissions. As discussed under **Impact AQ-2**, even with implementation of mitigation, the proposed project's construction-related nitrogen oxide (NO_x) emissions would exceed BAAQMD's threshold of significance.

Thus, considering the nonattainment status of the region with state and federal ozone standards (**Table 3.7-2**) and that the proposed project's construction-related emissions would exceed BAAQMD's thresholds of significance under both the CDSM and Conventional Earthwork options, construction of the proposed project would result in a cumulatively considerable incremental contribution to a significant cumulative impact on regional construction mass emissions. Therefore, the cumulative impact would be *significant and unavoidable*.

Cumulative Regional Operational Emissions

Operation and maintenance of the proposed project would not result in a net increase of criteria air pollutant emissions beyond existing conditions. The proposed project's operational emissions would not exceed any of BAAQMD's operational thresholds of significance, and thus it would not result in a cumulatively considerable incremental contribution to a significant cumulative long-term operational air quality impact.

Cumulative CO Hotspots

Cumulative carbon monoxide (CO) emission factors in future years are expected to be lower than current levels because of more stringent vehicle emissions standards and improvements in vehicle emissions technology. Ambient local CO concentrations under cumulative conditions are expected to continue to decline. Thus, 1- and 8-hour CO concentrations for the future cumulative conditions are not expected to exceed the significance thresholds of 20 ppm and 9.0 ppm, respectively. Consequently, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact from exposure of sensitive receptors to CO emissions from mobile sources.

Cumulative Construction-Related Toxic Air Contaminants

Activities related to temporary, short-term construction of the proposed project could expose nearby off-site or on-site sensitive receptors to toxic air contaminants (TAC). Because the use of mobilized equipment would be temporary and construction-related diesel PM emissions would not exceed any of BAAQMD's thresholds of significance, diesel particulate matter from construction activities would not expose sensitive receptors to substantial levels of TACs. Thus, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to construction-generated TACs.

Cumulative Operational Toxic Air Contaminants

The proposed project would not generate a net increase in operational emissions that would exceed existing conditions. Furthermore, the proposed project's long-term operational emissions would not exceed any of BAAQMD's operational thresholds of significance for TAC or fine particulate matter 2.5 microns or less in diameter ($PM_{2.5}$). In addition, the proposed project would not include a residential or commercial land use that would site any sensitive receptors who could be exposed to TACs or $PM_{2.5}$ emissions in the project area. Thus, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to operational-related TACS.

Cumulative Odors

As discussed in further detail under **Impact AQ-5**, the proposed project would not create objectionable odors affecting a substantial number of people. Therefore, the proposed project would not result in a considerable incremental contribution to a significant cumulative impact on cumulative odors.

Greenhouse Gas Emissions

Impact GH-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a cumulatively considerable net increase of greenhouse gas emissions. (Less-than-Significant Cumulative Impact)

By its nature, greenhouse gas (GHG) emissions have a cumulative global impact. The increase in global GHG emissions in the atmosphere is in large part a result of past and present development, and this global impact is a cumulative impact; all development projects contribute to this impact on a cumulative basis. An individual project's emissions may be limited but cumulatively considerable when considered in combination with past, present, and future development projects. All new development that would result in an increase in GHG emissions above those levels assumed less than significant in regional air quality plans would contribute to a cumulative GHG impact. The following cumulative analysis focuses on whether the proposed project would result in cumulatively considerable GHG emissions.

Cumulative Construction Greenhouse Gas Emissions

The determination of a cumulative impact for construction-generated GHG emissions is conservatively based on whether the proposed project would generate emissions that would exceed the operational project-level GHG thresholds of significance. BAAQMD has determined that projects not generating significant emissions on a project level would not generate cumulatively considerable emissions. As discussed under **Impact GH-1,** the proposed project's annual amortized, construction-related GHG emissions would not exceed BAAQMD's threshold of significance. Thus, construction of the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact. Therefore, the construction GHG emissions' cumulative impact would be *less than significant*.

Cumulative Operational Greenhouse Gas Emissions

Operation and maintenance of the proposed project would not result in a net increase of GHG emissions beyond existing conditions. As discussed under **Impact GH-2**, the proposed project's operational emissions also would not exceed BAAQMD's operational thresholds of significance, and thus, it would not result in a cumulatively considerable incremental contribution to a significant cumulative long-term operational GHG emissions impact.

Cumulative Consistency with Greenhouse Gas Emissions Reduction Plans

As discussed under **Impact GH-3**, the proposed project would have a less-than-significant impact in relation to proposed project consistency with BAAQMD's and California's (Assembly Bill 32, Climate Change Scoping Plan) GHG reduction plans, policies, and regulations. Therefore, the proposed project would not result in a considerable incremental contribution to a significant cumulative impact on consistency with applicable, adopted GHG emissions reduction plans.

Noise and Vibration

Impact NO-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact related to noise and vibration. (No Cumulative Impact)

The geographic scope of potential noise and vibration impacts encompasses the project area and vicinity (within the range of audible noise from the facilities during construction and operation), as well as along haul and access routes to the project site. As described in Section 3.9, Noise and Vibration, the proposed project would result in intermittent and temporary noise above existing ambient noise levels because of construction activities. With implementation of mitigation, the proposed project's short-term construction noise impacts would be less than significant.

Of the 65 projects listed in **Table 5-1**, the two within the project area (Peralta PP and Bayfair PP) would involve upgrades to two pumping plants. These upgrades would occur at existing facilities after the proposed project's construction time frame. As previously noted and as customary, EBMUD would coordinate with the appropriate departments of the neighboring jurisdictions and with other utility districts and agencies regarding the schedule and timing of construction projects that would occur near Chabot Dam, which would include the Peralta PP and Bayfair PP. With early and ongoing coordination, EBMUD would avoid conflicts with other projects to the extent possible. Therefore, no cumulative construction noise impacts would occur. The distance of the other projects listed in **Table 5-1** and uncertain construction timing suggests that the potential for cumulative noise impacts would be remote to non-existent.

Therefore, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to noise and vibration.

Recreation

Impact RE-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on recreation. (No Cumulative Impact)

The geographic scope of recreational resources would include recreational facilities around the project area, including regional and local parks. As described in Section 3.10, Recreation, the proposed project would temporarily displace recreation users from Chabot Park and two trails within Lake Chabot Regional Park, which could increase use of other facilities to the extent that substantial physical deterioration of these facilities would occur or could be accelerated. The proposed project also would result in temporary and long-term impacts on the recreational setting because of vegetation removal for haul route widening, use of Chabot Park as a stockpile location, and other construction activities. The proposed project would not result in substantially degraded recreational experiences for trail users, boaters, and anglers and would have a less-than-significant impact on park users with mitigation incorporated.

Most of the other projects proposed in the project area are road projects that may limit access to recreational facilities, but they are not anticipated to require closure of any local or regional park, which could increase the use of existing neighborhood and regional parks or other recreational facilities to the extent that substantial physical deterioration of the facility would occur or be accelerated. These other projects also are not anticipated to include recreational facilities or require the construction or expansion of recreational facilities. Construction activities for the other projects proposed in the project area would not affect the recreational setting of Lake Chabot Regional Park, and thus would not substantially degrade recreational experiences within the park.

Two of the planned projects are within the project area (Peralta PP and Bayfair PP) and would include upgrades to the pumping plants in Chabot Park. These upgrades would occur at the existing facilities within the project area after the proposed project's construction time frame. Closure of a portion of the West Shore Trail adjacent to Chabot Park may be required for these upgrades; however, the Bass Cove Trail and the West Shore Trail over the dam would remain open. Although a portion of the West Shore Trail would be closed temporarily, preventing access to Lake Chabot Regional Park from Chabot Park and vice versa, such a closure would occur after the proposed project was completed. Upgrading the pumping plants would not include recreational facilities or require the construction or expansion of recreational facilities. Construction traffic and noise may affect the recreation setting and thus recreational experiences of park users. These effects would be temporary and would occur after the proposed project was completed.

Although the proposed project would have a significant and unavoidable impact on recreation, the other projects proposed in the project area would not affect recreation or would occur after the proposed project would be completed; therefore, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on recreation.

Hydrology and Water Quality

Impact HY-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact on hydrology and water quality. (No Cumulative Impact)

The geographic scope of water quality and hydrology impacts from the proposed project includes Lake Chabot, the lower reaches of San Leandro Creek, and the groundwater table of the San Leandro Creek Watershed. Because all impacts would be less than significant, the cumulative impacts would need to fall within the same geographic area and occur sometime between 2014 and 2016 to have a cumulative impact.

Of the present and future EBMUD projects, few fall into the geographical area affected by the proposed project, and those that are geographically close do not have an overlapping construction timeline. The only projects with the potential for any cumulative water quality or hydrological impact would be the Peralta PP and Bayfair PP projects. The scope of these projects has yet to be determined, but is envisioned to be reconstruction of the two pumping plants at the same site or adjacent to the existing pumping plants and is expected to take approximately 2 years to complete. The project locations would be adjacent to Chabot Dam, and project construction likely would occur just after the proposed project's construction activities are completed.

Of the present and future City of San Leandro projects, the following projects are located within the San Leandro Creek watershed, although none is immediately adjacent to the creek:

- Village Marketplace, 1550 E. 14th Street (date unknown)
- Cornerstone Residences, 1400 San Leandro Blvd. (2014)
- OSIsoft Tech Campus, Martinez Street, west of San Leandro BART (date unknown)
- BART Pedestrian Improvements, between Davis Street and Williams Street (2014–2016)
- Utility Undergrounding, E. 14th Street, 15th Avenue to Thornton Street (2014–2016)

All of these projects have the potential to generate water quality impacts caused by sediment accumulation from ground disturbance and construction activities, resulting in increased pollutant loading in stormwater runoff. Assuming these projects comply with Low Impact Development requirements that would be specified by Provision C.3 of the Municipal Regional Stormwater NPDES Permit, the cumulative impact of these projects would be *less than significant*.

Hydrology and water quality cumulative impacts generally are site-specific because each project area has a different set of physical considerations, limiting development and construction. As described above, the proposed project would not: provide substantial additional sources of polluted runoff or otherwise degrade water quality; place housing or structures in a Special Flood Hazard Area; or expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.

With implementation of mitigation, the proposed project would have a less-than-significant impact related to stormwater runoff or erosion, or degradation of water quality. The federal, state, and local regulations described in Section 3.11, Hydrology and Water Quality, would apply equally to all developments in the San Leandro Watershed. Compliance with these regulations by the cumulative projects, as required, would reduce or avoid cumulative impacts to the extent practicable.

Therefore, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on hydrology and water quality.

Hazards and Hazardous Materials

Impact HZ-CU-1: The proposed project, in combination with past, present, and reasonably foreseeable development, would not result in a significant cumulative impact related to hazards and hazardous materials. (No Cumulative Impact)

The geographic scope of impacts associated with hazards and hazardous materials generally encompasses the project area, including the project work sites and the surrounding area within a quarter-mile radius. The geographic scope for wildland fire risk is the high hazard area identified by the California Department of Forestry and Fire Protection (CDF 2008).

Two projects, Peralta PP and Bayfair PP, are within the geographic scope of the project area. These projects are scheduled to begin construction in 2016, after the proposed project's construction is completed. Because the projects' schedules would not overlap, the cumulative impacts of the proposed project with the Peralta PP and Bayfair PP projects on hazards and hazardous materials would be less than significant.

The 65 proposed projects listed in **Table 5-1** could involve the storage, use, and transport of hazardous materials, release of hazardous materials, impairment of emergency access routes, and wildland fire hazards. However, the proposed project and cumulative projects would be required to comply with federal, state, and local hazardous materials regulations that would apply equally and would be site-specific. Compliance with these regulations by cumulative projects, as required, would reduce or avoid the cumulative impact to the maximum extent practicable.

As described in Section 3.12, Hazards and Hazardous Materials, the proposed project could expose workers and the public to hazards or hazardous materials because of construction activities. However, compliance with applicable laws and regulations and implementation of mitigation would reduce the potential for an impact to a less-than-significant level.

Therefore, the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to hazards and hazardous materials.

5.2 Other Topics Required by CEQA

5.2.1 Growth Inducement

Section 15126.2(d) of the State CEQA Guidelines requires that an EIR evaluate the growth-inducing impacts of a proposed action. A "growth inducing impact" is defined as follows:

> The ways in which the project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are [public works] projects which would remove obstacles to population growth... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

The environmental effects of a proposed project's induced growth are secondary or indirect impacts. Secondary effects of growth can result in a substantial increased demand on community and public services that exceed currently available and planned capacity, increase traffic and noise, degrade air and water quality, and convert agricultural land and open space to developed uses.

Growth-inducing effects can result from projects that remove obstacles to population growth. Increases in population can tax existing community service facilities, requiring construction of new facilities that can cause substantial environmental effects. The State CEQA Guidelines require analysis of the characteristics of projects that may encourage or facilitate other activities, which in turn can substantially affect the environment, either individually or cumulatively. The State CEQA Guidelines also encourage analysis of housing impacts, including displacement of substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere.

Implementation of the proposed project would allow EBMUD to continue to provide non-potable water supply, emergency water supply for drinking or fire suppression, conservation/storage of local runoff for flood management benefits to areas downstream from Chabot Lake, and recreation use in the form of fishing, boating, hiking, biking, and picnicking.

After completion of construction, Chabot Lake's water level would be returned to normal levels and no changes would occur to operation of the outlet works as compared to existing conditions. The proposed project would not expand its service beyond the projections contained in the 2040 Demand Study. The 2040 Demand Study estimates projected future demands, consistent with approved local land use planning, which is subject to separate CEQA analyses and documentation by other local entities/agencies. The proposed project's purpose and its implementation would have no potential to directly or indirectly foster population growth or to result in the construction of additional housing because the amount of water storage in Chabot Lake would remain the same as existing conditions.

The proposed project would contribute to local economic growth from construction expenditures for labor and materials. Construction contracts would go to bid in 2014, and construction workers are expected to come from the local and regional labor pool, without requiring construction workers from areas beyond the project vicinity. Because the number of workers with applicable skills would be adequately supplied from the local and regional labor market, relocation of other workers from beyond the project vicinity and an additional housing supply would not be required. Construction workers may purchase goods and services from nearby, established retail services in Oakland, San Leandro and Castro Valley, within proximity to the project area.

Operation of the project after completion of construction would be similar to existing conditions. EBMUD staff would continue managing operations at Chabot Dam and its facilities.

Therefore, the impacts to Growth Inducement are less than significant.

5.2.2 Significant Irreversible Environmental Changes

Section 15126.2(c) of the State CEQA Guidelines states the following:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

Generally, a project would result in significant irreversible environmental changes if any of the following would occur:

- The primary and secondary impacts generally would commit future generations to similar uses.
- The project would result in irreversible changes from environmental actions.
- The project would involve a large commitment of nonrenewable resources and the proposed consumption of resources is not justified (e.g., the project would involve the wasteful use of energy).

Because the Chabot Dam area is already developed and serves four main functions (non-potable water supply, emergency water supply, conservation/storage of local runoff, and recreation), the proposed project would not result in any land use change that would commit future generations to uses that are not already in the project vicinity.

No substantial, irreversible environmental damage, such as an accidental spill or explosion of hazardous materials, is anticipated to occur with implementation of the proposed project. As discussed in Section 3.12, Hazards and Hazardous Materials, the proposed project would require quantities of hazardous materials that typically are required for similar projects. Use of hazardous materials on-site would be subject to applicable federal, state, and local regulations and would be implemented by EBMUD and/or its contractors.

Compliance with federal, state, and local regulations would reduce the possibility that hazardous substances from construction activities would cause significant and unavoidable environmental damage. No other irreversible permanent changes, such as those that may result from construction of a large-scale mining project, a hydroelectric dam, or other industrial project, would result from development of the proposed project. Consumption of nonrenewable resources includes increased energy consumption of fossil fuels, conversion of agricultural lands to urban uses, and loss of access to mineral reserves. No agricultural lands would be converted and no access to mining reserves would be lost with construction of the proposed project because the project area is within a completely urbanized location and no such nonrenewable land resources are in the project vicinity.

Project construction would result in an irretrievable and irreversible commitment of natural resources through the direct consumption of fossil fuels and use of materials. That commitment of resources would substantially end when the dam and outlet works upgrades are completed. Project implementation would not alter land uses, nor would it commit future generations to undesirable uses.

5.2.3 Significant and Unavoidable Impacts

In accordance with Section 21100(b)(2)(A) and Section 15126.2(b) of the State CEQA Guidelines, the purpose of this section is to identify environmental impacts that could not be eliminated or reduced to a less-than-significant level by mitigation measures to be included as part of the proposed project, if it was implemented. The significance findings described in this section are subject to final determination by the EBMUD Board of Directors as part of its certification of the Draft EIR.

As detailed in Chapter 3, Environmental Setting, Impacts and Mitigation Measures, the proposed project would result in the significant and unavoidable project-related and/or cumulative impacts shown in **Table 5-2**.

Table 5-2 **Chabot Dam Seismic Upgrade Project Significant and Unavoidable Impacts**
Cultural Resources
Impact CR-1: The proposed project would cause a substantial adverse change in the significance of a historical resource.
Air Quality
Impact AQ-1: The proposed project would conflict with or obstruct implementation of the regional Clean Air Plan.
Impact AQ-2: The proposed project would violate an air quality standard (nitrogen dioxide ambient air quality standard) and would contribute substantially to an existing or projected air quality violation.
Recreation
Impact RE-1: The proposed project would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
Air Quality—Cumulative Impact
Impact AQ-CU-1: The proposed project would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment.
Source: Compiled by AECOM in 2013

6 References

Summary Chapter

No references notes

Chapter 1 Introduction

No references notes

Chapter 2 Project Description

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7 Report Preparers

7.1 Lead Agency

East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

This document was prepared under the direction of:

Xavier J. Irias, Director, Engineering and Construction Department
William R. Kirkpatrick, Manager, Water Distribution Planning Division
Elizabeth Bialek, Manager Engineering Services
Atta Yiddom, Senior Civil Engineer
Sean Todaro, Associate Civil Engineer
Bill Maggiore, Senior Civil Engineer
Gwendolyn Alie, Associate Planner

Support Work Units:

Derek Lee, Environmental Health and Safety Specialist
Cynthia Adkisson, Environmental Health and Safety Specialist
Bill Hossfeld, Supervising Administrative Engineer
Jimi Yoloye, Manager, Construction Division
James R. Smith, Supervising Wildlife Biologist
Bert Mulchaey, Wildlife Biologist
Scott Hill, Manager, Watershed and Recreation
Timothy McGowan, Associate Civil Engineer
Michelle Blackwell, Community Affairs Representative

7.2 EIR Consultants

AECOM
300 California Street, Suite 400
San Francisco, CA 94104

Burleson Consulting, Inc.
950 Glenn Drive, Suite 245
Folsom, CA 95630

CHS Consulting Group
130 Sutter Street, Suite 468
San Francisco, CA 94104

Ninyo and Moore
1956 Webster Street, Suite 400
Oakland, CA 94612

Sustain Environmental, Inc.
3104 O Street, Suite 164
Sacramento, CA 95816-6519

TERRA Engineers, Inc.
350 Sansome Street, Suite 830
San Francisco, CA 94104

Underwater Resources, Inc.
Pier 26, The Embarcadero
San Francisco, CA 94105

Water Resources Engineering, Inc.
44 Montgomery Street, Suite 730
San Francisco, CA 94104