Summit Reservoir Replacement

Draft Environmental Impact Report

State Clearinghouse #2010072060

East Bay Municipal Utility District

EBMUD

May 2011

May 20, 2011

NOTICE OF AVAILABILITY

Summit Reservoir Replacement Project
Berkeley, Alameda County and Kensington, Contra Costa County
Draft Environmental Impact Report
SCH #2010072060

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: Facility improvements to the Summit Reservoir and the Woods and Shasta Pumping Plants located at 416 Spruce Street in the City of Berkeley are proposed to address regulatory concerns related to hazardous materials in the reservoir liner caulking (1994 Alameda County District Attorney Agreement), to replace inefficient storage and improve water quality by downsizing with optimal storage from projected future demand and cost perspectives, and to restore operational flexibility and reliability in the greater Summit Pressure Zone. The project involves demolition of the existing 37-million gallon (MG) open-cut reservoir and appurtenances (including the roof system, roof features, and concrete lining) as well as decommissioning of the Woods and Shasta Pumping Plants located below the southwestern reservoir embankment. Construction includes a new 3.5-MG, partially buried concrete tank, replacement pumping plants (including pumps and motors, instrumentation, motor control centers, transformers and related appurtenances) in a new structure west of the new Summit tank location, a new Summit flow control valve within the pumping plant structure to access 1.5-MG storage from existing Woods Reservoir located approximately one mile to the east, and a replacement inlet/outlet pipeline from the new Summit tank. The project would also replace other water distribution pipelines and drainage facilities on the site. The project would remove portions of the dam embankments to ensure that the remaining basin would be below the California Division of Safety of Dams' (DSOD) jurisdictional size. The entire reservoir basin would be re-graded and landscaped with a mixture of drought-tolerant trees, grasses and shrubs.
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Significant Impacts: Analysis of environmental impacts associated with the Summit Reservoir Replacement Project identified potentially significant impacts in the following areas: Aesthetics/Visual Quality; Geology and Soils; Biological Resources; Cultural Resources; Transportation and Traffic; Air Quality; Hydrology and Water Quality; Hazards and Hazardous Materials; Greenhouse Gas Emissions; and Noise and Vibration. Except for Transportation and Traffic and Noise and Vibration, impacts would be mitigated to less-than-significant levels by implementation of mitigation measures. Impacts for Transportation and Traffic and Noise and Vibration would remain temporarily significant and unavoidable, even with mitigation periodically during the construction period. Cumulative impacts identified in the Draft EIR are either found to not 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.

Hazardous Waste Disclosure: Section 15087 (c)(6) of the CEQA Guidelines requires that this notice specify whether the project sites are on any of the lists enumerated under Section 65962.5 of the California Government Code. The Summit Reservoir site is not on any list.

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 Gwendolyn A. Alie, Associate Planner, EBMUD, at summiteir@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.

Berkeley Public Library - Central	*Contra Costa Public Library*	*Kensington Fire House*
2090 Kittredge Avenue	*61 Arlington Avenue*	*217 Arlington Avenue*
Berkeley, CA 94704	*Kensington, CA 94707*	*Kensington , CA 94707*

Public meetings: A public meeting is scheduled to review the Draft EIR, on June 22, 2011, from 6:30 p.m. to 8:30 p.m. at Shepherd of the Hills Lutheran Church, 401 Grizzly Peak Boulevard, Berkeley. Other meetings may be scheduled, if required.

Deadlines: The public review period is from May 20, 2011 through July 19, 2011. Comments must be received by July 19, 2011, at 4:30 p.m. Written comments should be submitted to Gwendolyn A. Alie, Associate Planner, MS #701, 375 Eleventh Street, Oakland, California 94607-4240 or emailed to summiteir@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 November 2011, at 375 Eleventh Street, Oakland, California.

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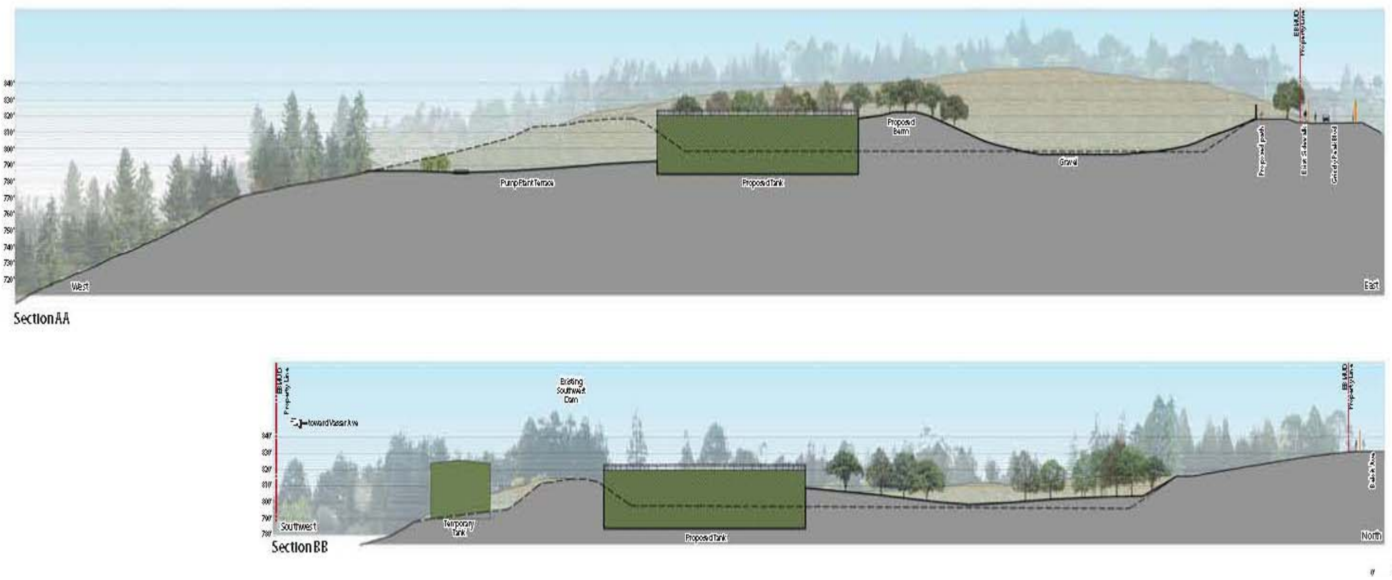

Prepared by
East Bay Municipal Utility District

May 2011

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AB	Assembly Bill
AC	Alameda-Contra Costa (Transit)
ACM	Asbestos-Containing Material
ATCM	Air Toxics Control Measures
BAAQMD	Bay Area Air Quality Management District
Basin Plan	San Francisco Bay Basin Water Quality Control Plan
BMPs	best management practices
BP	before present
°C	Celsius degrees
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalARP	California Accidental Release Program
CalOSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCCFCWCD	Contra Costa County Flood Control and Water Conservation District
CCMP	Comprehensive Conservation and Management Plan
CCR	California Code of Regulations
CCTA	Contra Costa Transportation Authority
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
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

Corps	U.S. Army Corps of Engineers
CUPA	Certified Unified Program Agency
CWA	The Clean Water Act
CY	cubic yards
DA	Alameda County District Attorney
dB	decibel
dBA	a-weighted noise levels in decibels
DPM	diesel particulate matter
DSOD	California Division of Safety of Dams
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
ESA	Environmental Site Assessment
°F	Fahrenheit degrees
FESA	Federal Endangered Species Act
g	gravity
GHG	greenhouse gases
GPS	Global Positioning System
H_2S	hydrogen sulfide
HMBPs	Hazardous Materials Business Plans
HNLs	hourly noise levels
hp	horsepower
I-80	Interstate 80
I-580	Interstate 580
IBC	International Building Code
I/O	inlet/outlet
in/sec	inches per second
IPCC	Intergovernmental Panel on Climate Change
L_{dn}	day-night average level
LDRs	land disposal restrictions
L_{eq}	noise level
LID	low impact development
L_{max}	maximum L_{eq}
LOS	level of service
MCE	maximum credible earthquake
MCLs	maximum contaminant levels

MEI	maximally exposed individual
mg	milligram
MG	million gallons
mgd	million gallons per day
mg/Kg	milligrams per kilogram
mg/L	milligrams per liter
MM	Modified Mercalli
Mmax	maximum moment magnitude
MMRP	Mitigation Monitoring and Reporting Program
mph	miles per hour
MRZs	Mineral Resource Zones
Mw	moment magnitude
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
n/m^2	Newton per square meter
NO	nitric oxide
NO_2	nitrogen dioxide
NOP	Notice of Preparation
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NWIC	California Historic Resources Information System -Northwest Information Center
O_3	ozone
OPR	California Office of Planning and Research
PCB	polychlorinated biphenyl
PERP	Portable Equipment Registration Program
PG&E	Pacific Gas and Electric Company
PM_{10}	particulate matter 10 microns in diameter or less
$PM_{2.5}$	particulate matter 2.5 microns in diameter or less
ppm	parts per million
ppmv	parts per million by volume
ppmw	parts per million by weight
PPV	peak particle velocity
PRC	Public Resources Code
RCRA	Resource Conservation and Recovery Act

RMP	risk management plan
ROGs	reactive organic gases
RWQCB	San Francisco Bay Regional Water Quality Control Board
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SF_6	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SO_2	sulfur dioxide
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
UC	University of California
UBC	Uniform Building Code
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VCAPD	Ventura County Air Pollution Control District
VOC	volatile organic compound
WGCEP	Working Group for California Earthquake Probabilities
WTP	water treatment plant

SUMMARY

S.1 Introduction

This Draft Environmental Impact Report (EIR) assesses the potential impacts of the Summit Reservoir Replacement Project (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, and shows the disposition of the distribution facilities in the Summit and Arlington Pressure Zones.

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 Project or EIR should be directed to:

Gwendolyn A. Alie, Associate Planner
East Bay Municipal Utility District
375 Eleventh Street (Mail Slot 701)
Oakland, CA 94607-4240
summiteir@ebmud.com

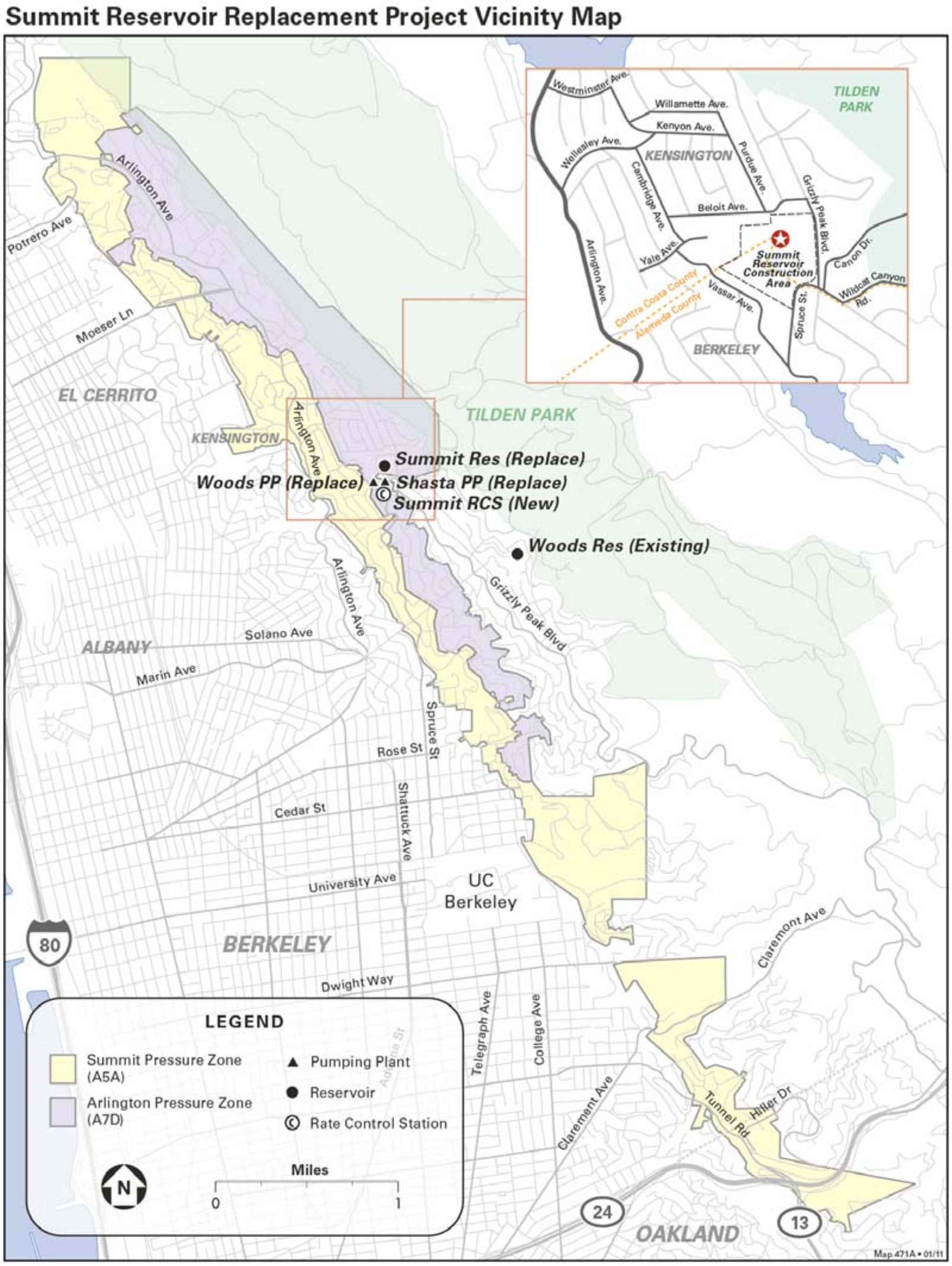
S.2 Background

Project Background

The Project would be part of a planned system of improvements through the Pressure Zone Improvements master plan program at EBMUD. The Project would address regulatory concerns, improve water quality, and increase system reliability and operating efficiency by downsizing water storage and replacing aging facilities. The Summit Reservoir site is located on approximately 17 acres of land bordered to the north by Beloit Avenue, the west by Vassar Avenue, the south by Spruce Street and to the east by Grizzly Peak Boulevard. The property is situated in both the City of Berkeley (Alameda County) and the Community of Kensington (unincorporated Contra Costa County), as shown in Figure S-1.

S.3 Project Description

The Project would include removal of the existing 37-million gallon (MG) open-cut, below grade reservoir and 7-acre hardscaped wooden roof. The existing reservoir is an earthen embankment dam built in 1891 and is under the jurisdiction of the California Division of Safety of Dams (DSOD). It will be replaced with a smaller concrete tank and associated facilities.



Source: EBMUD

Summit Reservoir Replacement Project Vicinity Map
Figure S-1

Based on projected future demands from the EBMUD 2040 Demand Study (February 2009), the storage needed at the site is approximately 5 MG. The proposed Project also includes replacement of the existing Woods and Shasta Pumping Plants, located below the existing reservoir southwestern embankment. The two pumping plants would be located in one structure on the site but at a lower elevation to match the new, lower reservoir bottom elevation. To accommodate this storage need, EBMUD would construct one partially buried 3.5-MG concrete tank incorporated into a comprehensive landscape plan. A new Summit flow control valve would be constructed within the new pump house to access approximately 1.5 MG in supplemental storage at nearby existing Woods Reservoir on high water demand days and for emergency flows.

With community input, a conceptual landscape plan was developed that addresses the visual and aesthetic impacts associated with the proposed Project. This comprehensive landscape plan includes removal of a portion of the western embankment, re-grading and contouring of the existing basin to create a more natural, rolling topography with a small hill (berm) to screen the tank and pumping plants from most vantage points, and installation of new landscaping, which together with existing large trees, would create a new aesthetic environment. In response to EBMUD's Vulnerability Assessment Program-Security Upgrades, the existing chain-link security fence along the site perimeter would be replaced. The fence height would increase from 6 to 8 feet, and the mesh size would change from 2 to 1 inch, and the fence color would be black.

Initial construction activities would involve placement of a temporary tank and relocation of utilities, followed by the removal and disposal of reservoir liner caulking materials which contain polychlorinated biphenyls (PCB), site excavation, and demolition of the existing open-cut reservoir. Once demolition activities are completed, construction would involve building one cylindrical 3.5-MG partially buried concrete tank, two pumping plants and a flow control valve housed in one structure, and associated appurtenances for the new tank and pumping plants. Finally, the site would be re-graded and landscaped. The existing pump house structure was retrofitted in 1998, so while equipment would be removed once the new pumping plant is in service, the old pump house structure may remain for other future maintenance uses. Access and parking for the existing pump house would remain in place for future maintenance use.

EBMUD explored a range of replacement tank sizes from 3.5 to 5 MG for the Project as different Project alternatives (see Chapter 4). Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the "worst case" construction footprint and potential impacts associated with the replacement tank. The differences in impacts created by the larger 5-MG tank are primarily the construction duration and the tank footprint size. There is approximately 30-feet difference in diameter between a 5-MG tank and a 3.5-MG tank of the same height. **Figure S-2** depicts the proposed site plan and cross-sections for the existing and 5-MG replacement tank and facilities at the Summit Reservoir site.

Source: EBMUD 2010

Project Plan and Section Views of Landscape Plan
Figure S-2

S.4 Summary of Impacts

Table S-1 below is a summary of all significant impacts and required mitigations identified for the Project, as well as impacts identified as less than significant impacts (including impacts identified as "not significant" or "no impact" in the analysis in Chapter 3 where mitigation is not required). For all significant impacts, the significance after mitigation is determined.

TABLE S-1
Summit Reservoir Replacement Project
Summary of Impacts and Mitigation Measures

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
AESTHETICS/VISUAL QUALITY		
Impact 3.2-1: Project construction could generate visual impacts experienced in the short-term from nearby areas during construction.	**Measure 3.2-1:** EBMUD will require the construction contractor to ensure that the construction site is clean by storing building materials and equipment within the proposed staging areas in the reservoir basin, or in areas removed from public view where feasible, and by promptly removing trash and construction debris that will not be reused on site. Construction phasing will be organized to minimize equipment storage on site.	Less than Significant.
Impact 3.2-2: Project construction could alter the site's appearance and long-term visual effects.	**Measure 3.2-2:** ▪ During the Design Phase, EBMUD will prepare a Landscape Plan for the Summit Reservoir Replacement Project consistent with the 2010 Planning Phase Architecture Design Report. The Plan will incorporate the results of a tree assessment that documents the number and condition of all protected (as defined by City of Berkeley and Contra Costa County tree ordinances) trees proposed for removal as a result of Project construction, and propose a detailed planting plan (including replacement trees) that will ensure that areas disturbed by construction are re-graded and planted to result in landforms that are non-linear/undulating and more compatible with the prevailing existing site topography, landscaping, and the neighborhood setting. The Landscape Plan will include all areas proposed for grading or construction which includes the entire reservoir basin. ▪ EBMUD will require its construction contractor to provide a warranty for new plantings for 1 year after Project completion.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	▪ EBMUD will continue to apply local City and County fire prevention vegetation management standards in its on-going site maintenance program at the Summit Reservoir site. ▪ EBMUD will ensure that the Contractor restores graded, disturbed areas to a natural-appearing landform characteristic of the larger hill setting where appropriate. ▪ EBMUD will incorporate site improvements which will include aesthetic/architectural treatment where facilities are located near to, or are visible from, public areas, sidewalks and residences, namely: - Construct a new 6-foot wide pedestrian path with a pervious surface and straight fence, set back approximately 25 feet from the existing sidewalk on Grizzly Peak Boulevard, with planted median strip between the existing sidewalk and new path. - Plant "infill" trees between the reservoir basin and the Beloit neighbors and Beloit driveway to screen the new facilities. - Replace the existing 6-foot high perimeter chain link fence with a 2-inch mesh with an 8-foot high fence with 1-inch black mesh at its existing location. ▪ For work in EBMUD right-of-ways, EBMUD will replace landscaping removed for construction pursuant to current EBMUD right-of-way agreements, the Recommended Plant List for EBMUD right-of-ways, and as feasible. Where existing trees and other facilities or structures prohibit future access and maintenance to the EBMUD facilities located within the right-of-way, in coordination with the homeowner, replacements may be re-located outside the right-of-way to a different location on the homeowner's property.	
Impact 3.2-3: Project would not have significant effects on a scenic vista.	**None Required**.	
Impact 3.2-4: Project construction could affect views from the surrounding area, including public roadways, public trails and open space and residential areas.	Mitigation Measure 3.2-2.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.2-5: Project construction could generate new sources of light and glare.	**Measure 3.2-5:** To the extent possible**,** EBMUD will ensure that stationary lighting used during nighttime construction (if required) is of limited duration, shielded and directed downward or oriented such that little or no light is directly visible from any residential street (Spruce, Vassar or Beloit) or Grizzly Peak Boulevard. No permanent nighttime lights will be constructed on the site.	Less than Significant**.**
GEOLOGY/SOILS		
Impact 3.3-1: Existing or new slopes associated with the new construction (permanent and temporary tank, pumping plants, drainage and inlet/outlet [I/O] line) may be potentially unstable.	**Measure 3.3-1a:** During the design phase, EBMUD will conduct site-specific geotechnical investigations to reduce or eliminate potential slope hazards associated with Project construction. In the construction contract documents, EBMUD will incorporate the recommendations from the geotechnical evaluation for any slope stabilization, which may include some of the following measures, although this list is not exclusive: ▪ Appropriate permanent slope inclination (not steeper than 2 horizontal to 1 vertical) ▪ Appropriate temporary slope inclination ▪ Slope terracing ▪ Fill compaction ▪ Soil reinforcement ▪ Surface and subsurface drainage facilities ▪ Retaining walls ▪ Buttresses ▪ Erosion control measures - Sub drain system - Hydroseeding and/or placing visqueen (plastic) on slopes as appropriate - Straw waddles and erosion control geotextile **Measure 3.3-1b:** For the new drain pipeline underneath Grizzly Peak Boulevard to Canon Drive, EBMUD will ensure that the top of the new drain pipeline is a minimum of 2 feet below the active slide plane of the fill materials placed for Grizzly Peak Boulevard. Construction specifications will incorporate this recommendation for trenchless construction operations. .	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.3-2: Facility damage or service interruptions resulting from strong ground shaking.	**Measure 3.3-2**: During the design phase, EBMUD will conduct site-specific geotechnical investigations and evaluations to identify the potential for secondary ground failure hazards (i.e., seismically-induced settlement). The geotechnical evaluation will provide recommendations for applicable settlement mitigation measures, and these will be incorporated in the construction contract documents for the tank, pumping plant, and I/O structures.	Less than Significant.
Impact 3.3-3: Facility damage resulting from settlement or uplift caused by loading of foundation soils and bedrock.	**Measure 3.3-3a:** EBMUD will require its construction contractor to place the tank, pumping plant, and I/O structures on 1) select engineered fill underlain by competent bedrock after removal of the soils and any weak bedrock, 2) bedrock, or 3) cast-in-place concrete pier foundations obtaining vertical support from the bedrock. **Measure 3.3-3b:** In the construction contract documents, EBMUD will specify that all fill will be selected, placed, compacted, and inspected in accordance with plans and specifications prepared by a licensed professional engineer.	Less than Significant.
Impact 3.3-4: Exposure of soils to erosion after removal of the concrete lining within the existing reservoir basin.	**Measure 3.3-4**: EBMUD and/or its construction contractor will perform all grading activities in compliance with the Stormwater Pollution Prevention Plan prepared for the Project to control/manage soil erosion and run-off. During grading construction, the construction contractor will sprinkle the site as necessary to control dust at the site. The construction contractor will perform measures for winterization, including hydro-mulching, straw bale installation, and/or other measures to minimize soil erosion during the rainy seasons.	Less than Significant.
Impact 3.3-5: Stockpiled materials from import or excavation of the existing dam could cause localized instability of slopes.	**Measure 3.3-5**: EBMUD and/or its construction contractor will temporarily stockpile materials excavated for the construction of the permanent tank, pumping plant and I/O line within the existing reservoir basin and away from top of slopes using best material management practices. These materials are likely to be suitable for use as engineered backfill materials around the tank as well as for the soil berm that will be constructed around the tank and used to reshape the existing reservoir basin. The construction contractor will off-haul all excavated materials that are not suitable for reuse on site.	Less than Significant.
Impact 3.3-6: Potential of presence of naturally occurring asbestos in serpentine rock.	**Measure 3.3-6**: EBMUD will conduct a geotechnical investigation, and if serpentine is encountered, then samples will be tested to determine if asbestos minerals are present. If such minerals are present, then EBMUD and/or its construction contractor will prepare an asbestos control plan and implement it during construction.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
BIOLOGICAL RESOURCES		
Impact 3.4-1: Impacts on Monarch Butterfly Wintering Roosts.	**Measure 3.4-1:** Prior to initiation of ground disturbance, a qualified biologist will conduct a late fall/early winter butterfly survey within the Project site. If the results of the survey do not identify any potential overwintering of the monarch butterfly on-site, no further mitigation will be required. If overwintering monarchs are determined to use the site, construction will be deferred until a qualified biologist has determined that overwintering monarchs are no longer using the site, or, in consultation with California Department of Fish and Game (CDFG), a construction-free buffer zone will be established around the roost to ensure that monarch butterflies will not be disturbed during the proposed Project implementation.	Less than Significant.
Impact 3.4-2: Nesting Special Status Bird Species.	**Measure 3.4-2:** ▪ If site clearing, demolition, and construction occur between February 1 and August 31, a qualified biologist will conduct preconstruction surveys for nesting birds to ensure that no nest will be disturbed during construction. This survey will be conducted no more than 14 days prior to the start of construction activities during the early part of the breeding season (February through April) and no more than 30 days prior to the start of construction during the late part of the breeding season (May through August). During this survey, the biologist will inspect all trees and other habitats in and adjacent to the impact areas for nests. If an active nest is encountered, the qualified biologist will develop species-specific measures in consultation with CDFG. EBMUD and/or its construction contractor will implement those measures to prevent abandonment of the active nest. ▪ If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation is required. Trees and shrubs within the construction footprint that have been determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed. Nests initiated during construction will be presumed to be unaffected, and no buffer will be necessary.	Less than Significant.
Impact 3.4-3: Special Status Bat Species.	**Measure 3.4-3:** ▪ Prior to the start of construction, a qualified biologist will survey the area within 100 feet of the worksite to identify potential bat roost habitat (old buildings, bridges, culverts, large trees (>12 inches diameter at breast height), rock crevices, mines, caves). If no potential bat roost habitat occurs in the area, no further mitigation measures will be required.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	▪ If potential bat roost habitat occurs within 100 feet of the worksite, a qualified biologist will conduct a search for suitable entry points, roost cavities or crevices; and, survey for day-roosting bats (carcasses, guano, staining, and strong odors). If no roosting is observed, no additional mitigation measures will be required. ▪ If roosting surveys are inconclusive, day roost surveys indicate potential occupation by special status bat species, and/or habitat assessment indicates a large day roosting population by any bat species, a qualified biologist will conduct focused day and night emergence surveys between April 1 and September 15. A qualified biologist will develop mitigation measures for special status bat species and large day roosting populations of any bats in consultation with CDFG. EBMUD and/or its construction contractor will implement all mitigation measures as directed.	
Impact 3.4-4: Loss of or damage to protected trees. Local Tree Policies and Ordinances.	**Measure 3.4-4:** During design, EBMUD will prepare a map indicating the trees to be removed and retained (preserved). Prior to the start of any clearing, stockpiling, excavation, grading, compaction, paving, change in ground elevation, or construction, retained trees that are adjacent to or within the proposed Project construction areas will be identified and clearly delineated by protective fencing (e.g., short post and plank walls), which will be installed at the dripline of each tree to hold back fill. The delineation markers will remain in place for the duration of all construction work. As recommended by the policies of the California Native Plant Society (CNPS) and the City of Berkeley, and in consultation with Contra Costa County, the landscape vegetation, including protected trees, removed as a result of the proposed Project will be replaced with species characteristic of historical California sagebrush scrub, coyote brush scrub, and California oatgrass vegetation series.	Less than Significant.
CULTURAL RESOURCES		
Impact 3.5-1: The Project would not cause a substantial adverse change in the significance of a historical resource.	**None required**.	
Impact 3.5-2: The Project could cause a substantial adverse change in the significance of a unique archaeological resource.	**Measure 3.5-2**: Archeological Resources Discovery. If archeological resources are discovered or accidentally disturbed during construction, the contractor will stop all work within a 50-foot radius of the discovery until a qualified archaeologist can evaluate the discovery and provide recommendations. EBMUD will provide the construction contractor with the archeologist contact information prior to initiation of construction activities.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.5-3: The Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	**Measure 3.5-3:** Paleontological Resources Discovery. If paleontological resources are discovered or accidentally disturbed during construction, the contractor will stop all work within a 50-foot radius of the discovery until a qualified paleontologist can evaluate the discovery and provide recommendations. EBMUD will provide the construction contractor with the paleontologist contact information prior to initiation of construction activities.	Less than Significant.
Impact 3.5-4: The Project could disturb human remains, including those interred outside of formal cemeteries.	**Measure 3.5-4**: Human Remains Discovery. If human remains are discovered during construction, the contractor will stop all work within a 50-foot radius of the discovery and immediately contact the appropriate County Coroner according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. In addition, a qualified forensic archaeologist will be contacted immediately to evaluate the discovery. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in California Code of Regulations (CCR) Section 15064.5(d) and (e) will be followed. EBMUD will provide the construction contractor with the archeologist contact information prior to initiation of construction activities.	Less than Significant.
TRANSPORTATION AND TRAFFIC		
Impact 3.6-1: The 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.	**Measure 3.6-1:** EBMUD construction contract documents will require preparation and implementation of a Traffic Management Plan, which will include the following elements: ▪ The work hours for each phase of Project construction, the process for notifying residents of construction activity, and the means for people to report construction-related problems. ▪ A haul route, based on the route shown on Figure 3.6-4 that will be provided to all trucks serving the site during the construction period. The haul route will indicate that Rose Street and Spruce Street are Class III bike routes, and to exercise caution when using these roads. Beloit Avenue is not included in the haul route, and may only be used by worker vehicles. ▪ Flaggers at the Project site entrance to assist with trucks entering and exiting the site. Priority should be given to trucks entering the site to minimize traffic queues on Spruce Street and the Spruce Street/Grizzly Peak Boulevard intersection. ▪ Flaggers at the Spruce Street/Rose Street intersection and the Shattuck Avenue/Rose Street intersection to improve traffic safety during peak hours (7:00 to 9:00 a.m., 4:00 to 6:00 p.m.) when semitrucks are traveling to and from the site. ▪ Flaggers at Step One Nursery School and Cragmont Elementary School during school drop-off and pickup times to minimize conflicts between trucks and school traffic. The schedule for flaggers will be coordinated with school personnel.	Significant and Unavoidable.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	▪ A plan for maintaining the existing bus stop on Spruce Street adjacent to the Project site entrance. Alternatively, the bus stop will be moved east towards Grizzly Peak Boulevard. ▪ A minimum of one month prior to construction start, signage at the Spruce Street Overlook will indicate that the Overlook will be fenced and closed to public access for the duration of Project construction due to public safety concerns. If construction will start between June 1 and September 30, then signage will be posted no later than May 1 prior to construction start. The signage will also expressly prohibit the use of the EBMUD Overlooks for bus stops or other organized activities without prior express written consent from EBMUD. ▪ EBMUD will coordinate with the City of Berkeley and may also close sidewalks along the Spruce Street Project site frontage and driveway; pedestrians will be re-directed to alternative sidewalks. ▪ Signage on Spruce Street warning motorists of the construction work ahead. ▪ Documentation of road pavement conditions for all routes that will be used by construction vehicles both before and after Project construction. Roads found to have been damaged by construction vehicles will be repaired to the level at which they existed prior to Project construction. The construction contractor will obtain necessary encroachment permits prior to construction on Canon Drive and Vassar Avenue, and the Traffic Management Plan will include the following requirements: ▪ Hours and days of lane closures on Canon Drive and Vassar Avenue (closures during peak traffic hours, 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m., should be limited to the extent possible). ▪ Canon Drive and Vassar Avenue will be restored to normal operation by covering trenches with steel plates outside of working hours or when work is not in progress. ▪ Driveway access to local residences will be maintained at all times. ▪ Maintain bus service along Canon Drive at all times. ▪ Flaggers at the lane closure locations to direct traffic around the construction area. ▪ Signage on Canon Drive and Vassar Avenue warning motorists of the construction work ahead. ▪ Equipment storage and worker parking locations that will be in designated contractor staging areas.	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.6-2: The Project would conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.	**Measure 3.6-2**: EBMUD and/or its construction contractor will limit truck trips during the a.m. and p.m. peak hours (7:00 to 9:00 a.m., 4:00 to 6:00 p.m.) to the extent practicable.	Significant and Unavoidable.
Impact 3.6-3: The Project would substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	Mitigation Measure 3.6-1.	Less than Significant.
Impact 3.6-4: The Project would result in inadequate emergency access.	Mitigation Measure 3.6-1.	Less than Significant.
Impact 3.6-5: The Project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.	**None Required.**	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
AIR QUALITY		
Impact 3.7-1: The Project would not conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan.	**None Required.**	
Impact 3.7-2: The Project would violate any stationary source air quality standard or contribute to an existing or projected air quality violation.	**Measure 3.7-2a:** Diesel Control Measures. EBMUD will incorporate the following measures into the construction contract specifications: ▪ To minimize potential diesel odor impacts on nearby receptors (pursuant to BAAQMD Regulation 1, Rule 301), construction equipment will be properly tuned. A schedule of tune-ups will be developed and performed for all equipment 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. ▪ Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) will be electrically powered unless the contractor submits documentation and receives approval from EBMUD that the use of such equipment is not practical, feasible, or available (generally contingent upon power line proximity, capacity, and accessibility). California ultra-low sulfur diesel fuel with maximum sulfur content of 15 ppm by weight, or an approved alternative fuel, will be used for on site fixed equipment not using line power. ▪ To minimize diesel emission impacts, construction contracts will require off-road compression ignition equipment operators to reduce unnecessary idling with a two-minute time limit. ▪ On-road and off-road material hauling vehicles will shut off engines while queuing for loading and unloading for time periods longer than two minutes. ▪ Off-road diesel equipment will be fitted with verified diesel emission control systems (e.g., diesel oxidation catalysts) to the extent reasonably and economically feasible. ▪ Utilize alternative fuel equipment (i.e., compressed or liquefied natural gas, biodiesel, electric) to the extent reasonably and economically feasible.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	To control emissions of particulate matter, the Project will implement the following fugitive dust and particulate matter emissions control measures suggested by the BAAQMD CEQA Air Quality Guidelines as applicable (BAAQMD 2010d). **Measure 3.7-2b**: Basic Dust Control Measures EBMUD will require its construction contractor to implement the following controls at the construction and staging sites as applicable: ▪ Water all active construction areas at least twice daily as necessitated by soil and air conditions. ▪ Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard. ▪ Apply water, as necessitated by soil and air conditions or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites as needed. ▪ Sweep daily or more frequently as necessary (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. ▪ Sweep daily or more frequently as necessary (with water sweepers) if visible soil material is carried onto adjacent public streets. ▪ All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, will be effectively stabilized to minimize dust emissions using water, nontoxic chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover. ▪ All on site unpaved roads and off site unpaved access roads will be effectively stabilized for dust emissions using water, nontoxic chemical stabilizer/suppressant or coarse rock cover. ▪ All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities will be effectively controlled for fugitive dust emissions utilizing application of water or by presoaking. ▪ When materials are transported off site, all material will be covered, or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container will be maintained. ▪ All operations will limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets as soon as practicable. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	▪ Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles will be effectively stabilized for fugitive dust emissions with a cover or by utilizing sufficient water or nontoxic chemical stabilizer/suppressant. ▪ Within urban areas, such as the greater San Francisco Bay Area, trackout will be immediately removed when it extends 50 or more feet from the site and at the end of each workday. ▪ Any construction area/site in an urban area with 150 or more vehicle trips per day will prevent carryout and trackout. **Measure 3.7-2c**: Diesel Particulate Matter Emissions Control Measures In addition, EBMUD and its construction contractor will implement the following measures to reduce particulate matter emissions from diesel exhaust: ▪ Grid power will be used instead of diesel generators where it is feasible to connect to grid power (generally contingent upon power line proximity, capacity, and accessibility); ▪ The Project specifications will include 13 CCR Sections 2480 and 2485, which limit the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds, both California- or non-California-based trucks) to 30 seconds at a school or five (5) minutes at any location. In addition, the use of diesel auxiliary power systems and main engines will be limited to five (5) minutes when within 100 feet of homes or schools while the driver is resting (however, since the BAAQMD idling limitation in Mitigation Measure 3.7-2a is more stringent, the lower limit applies); ▪ The Project specifications will include 17 CCR Section 93115, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, which specifies fuel and fuel additive requirements and emission standards for operation of any stationary, diesel-fueled, compression-ignition engines. ▪ A schedule of low-emissions tune-ups will be developed and such tune-ups will be performed on all equipment, particularly for haul and delivery trucks; and low-sulfur (≤ 15 parts per million by weight (ppmw) sulfur) fuels will be used in all stationary and mobile equipment.	
Impact 3.7-3: The Project would result in a net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state	Mitigation Measures 3.7-2a, 3.7-2b and 3.7-2c.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).		
Impact 3.7-4: The Project would expose sensitive receptors to substantial pollutant concentrations.	Mitigation Measures 3.7-2a, 3.7-2b and 3.7-2c.	Less than Significant.
Impact 3.7-5: The proposed Project would not create objectionable odors affecting a substantial number of people.	**None Required.**	
GREENHOUSE GAS EMISSIONS		
Impact 3.8-1: The Project would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	**Measure 3.8-1**: Greenhouse Gas Control Measures During construction, EBMUD and its construction contractor will implement the following measures to reduce GHG emissions from fuel combustion and construction activities: ▪ On-road and off-road vehicle tire pressures will be maintained to manufacturer specifications. Tires will be checked and re-inflated at regular intervals. ▪ Lower-carbon fuels such as biodiesel blends will be used where feasible. ▪ Engine retrofits to remove emissions such as diesel particulate matter filters with diesel oxidation catalysts will be used where feasible. ▪ Construction equipment engines will be maintained to manufacturer's specifications. ▪ Locally made construction materials will be used to the extent feasible. ▪ Construction debris will be reused to the extent feasible, as addressed in the Project Overview and above. ▪ Tree removal necessary for construction will be minimized to the extent feasible; replacement landscaping (trees, shrubs and grasses) in the basin will offset the loss of carbon sequestration associated with tree removal. Mitigation Measures 3.7-2a, 3.7-2b and 3.7-2c.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.8-2: The Project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases (GHG).	**None Required.**	
NOISE AND VIBRATION		
Impact 3.9-1: The 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.	**Measure 3.9-1a**: During construction, EBMUD and its construction contractor will implement the following measures to reduce noise levels: ▪ The construction contractor(s) will limit on-site construction work to daytime hours between 7:00 a.m. and 6:00 p.m., Monday through Friday as feasible, except during critical water service outages, other emergencies and special situations such as concrete pours which must be performed continuously without stopping until finished, and delivery of heavy equipment/vehicles anticipated to occur approximately 12 times over the course of the 2.5 year construction period. EBMUD's proposed construction hours are more restrictive than the City of Berkeley weekday criteria of 7:00 a.m. to 7:00 p.m. and consistent with Contra Costa County noise requirements. ▪ Noise-generating activities greater than 90 dBA [impact construction including hoe rams, concrete recycling activities (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 (demolition, concrete recycling) when noise is expected to exceed 90 dBA. ▪ For construction work in EBMUD right-of-ways, homeowners immediately adjacent to the right-of-way will be contacted prior to right-of-way construction work to establish preferred work hours within the 7:00 a.m. to 6:00 p.m., Monday through Friday work hours established for the Project construction. ▪ The construction contractor(s) will responsibly use best available noise control techniques (including mufflers, intake silencers, extension ducts, engine enclosures, and acoustically attenuating shields or shrouds) for all equipment and trucks as practical. ▪ If impact equipment (e.g., jackhammer) is used during demolition or construction activities, the construction contractor(s) will use hydraulically or electrically powered equipment wherever practical to avoid the noise associated with compressed-air exhaust from	Significant and Unavoidable.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	pneumatically powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed-air exhaust will be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves will be used, where feasible, which could achieve a reduction of 5 dB. Quieter procedures, such as drilling rather than impact equipment, will be used whenever practical. ▪ The construction contractor(s) will strive to locate temporary stationary noise sources (e.g., chippers, grinders, compressors) as far from sensitive receptors as possible and practicable and within the specified construction hours previously noted. If they must be located near receptors, the construction contractor(s) will use adequate exhaust muffling and other noise dampening techniques, as feasible. ▪ As practicable, the construction contractor(s) will locate material stockpiles, maintenance/equipment staging, and parking areas as far as possible from residential receptors. **Measure 3.9-1b**: EBMUD and/or its construction contractor(s) will notify all property owners and tenants within 300 feet of the edge of the construction right-of-way and along the haul route at least 2 weeks in advance of construction. Property owners and tenants will be notified by first class mail and signage placed at the site. **Measure 3.9-1c**: Consistent with the on-site work, construction contractor(s) will limit haul truck trips through residential areas to or from Project sites to the hours of 7:00 a.m. until 6:00 p.m., Monday through Friday with exceptions as noted in Mitigation Measure 3.6-2 for concrete pours and delivery of oversized vehicles/equipment, which will require earlier start times (6:30 a.m. for up to twelve times over the construction period). Thus, truck noise will have little or no contribution to the Community Noise Equivalent Level (CNEL) during the more sensitive evening and night time hours. Truck routes used during construction activities will vary from local residential streets with quiet noise environments to arterials with moderately noisy environments. In most cases, off-hauling of non- recyclable demolition debris from the site will require haul trucks to travel to and from the site along local residential streets to regional highways and freeways. **Measure 3.9-1d**: EBMUD will designate a Community Affairs contact for responding to construction-related issues, including noise. The EBMUD Community Affairs direct telephone and e-mail address will be conspicuously posted at construction areas and on all advanced notifications. Community Affairs staff will take steps to resolve complaints, including coordinating periodic noise monitoring, if necessary.	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	Measure 3.9-1e: On a case-by-case basis in response to monitored and documented noise impacts at a receptor, EBMUD will propose noise abatement techniques specifically configured for that receptor such as sound absorbing materials, sound reflective materials, sound transmission inhibiting materials, or combinations thereof. Implementation of any such noise abatement techniques at the receptor will be at EBMUD's discretion.	
Impact 3.9-2: The Project would expose persons to or generate excessive ground borne vibration or ground borne noise levels.	**Measure 3.9-2**: **Construction Vibration:** EBMUD and/or its construction contractor(s) will limit the closest distance at which a vibratory roller can operate from a residence. EBMUD and/or its construction contractor(s) will not operate vibratory rollers closer than 55 feet from any residence without conducting real-time vibration monitoring through an independent consultant — in a manner similar to road construction projects — at the receptor boundary (easement line) to ensure that the 0.5 inch per second peak particle velocity (PPV) threshold is not exceeded (California Department of Transportation [Caltrans] 2004). Corrective actions will be taken if needed, including: ▪ Modify vibratory roller, bulldozer, and hoe ram operations along Grizzly Peak Boulevard, Spruce Street and Beloit Avenue residences to reduce dynamic energy imparted into the ground (i.e., operate the equipment more slowly, or use less dynamic equipment to move material); ▪ Reduce truck speeds in the vicinity of nearby residences; and ▪ Smooth the truck route surface in the vicinity of nearby residences. ▪ Use of vibratory roller equipment 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. ▪ To prevent cosmetic or structural damage to structures adjacent to EBMUD's right-of-way, EBMUD will incorporate into contract specifications restrictions on equipment operation, whereby surface vibration will be limited to no more than 0.5 in/sec PPV, measured at the nearest residential structures. EBMUD will also monitor for excessive vibration if pipe bursting activities occur immediately adjacent to the residences. If vibration levels are found to exceed the 0.5 in/sec PPV threshold, construction will be halted immediately and alternative construction methods will be implemented to maintain vibration levels below this threshold. ▪ When pipe bursting is used within EBMUD's right-of-way and a structure is within 10 feet of the pipe bursting operation EBMUD construction specifications will require the contractor to	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	excavate around the pipe to reduce contact with the surrounding ground and avoid impacts related to soil movement and vibration. ▪ With permission of homeowners, EBMUD will conduct a preconstruction survey of homes, other sensitive structures, hardscaping, hillsides, and slide areas adjacent to EBMUD's right-of-way for potential effects due to vibration-generating activities. EBMUD will respond to any claims by inspecting the affected property promptly, but in no case more than five working days after the claim was filed. Any new cracks or other changes in structures will be compared to preconstruction conditions and a determination made as to whether the proposed Project could have caused such damage. In the event that the Project is demonstrated to have caused the damage, EBMUD will have the damage repaired to the pre-existing condition.	
Impact 3.9-3: The Project would not result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.	**None Required.**	
Impact 3.9-4: The Project would result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.	Mitigation Measures 3.9-1a through 3.9-1e.	Significant and Unavoidable.
HYDROLOGY/WATER QUALITY		
Impact 3.10-1: The Project would violate RWQCB water quality standards or waste discharge requirements.	**Measure 3.10-1**: Stormwater Treatment Control Measures with Underdrains. EBMUD and/or its construction contractor will implement the following measures: ▪ To the extent feasible, match the post-Project surface runoff and deep percolation volumes discharging from the site to the estimated pre-Project surface runoff and deep percolation volumes, by modifying the amount of impervious surfaces and by installing subdrains to capture infiltrated stormwater. ▪ For the facilities on the western slopes, install treatment controls on the new impervious surfaces, such as a swale or planter boxes with a solid bottom and underdrain connected to the	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	western municipal drainage system. ▪ All stormwater control features and facilities will be listed and the assumptions used for sizing the stormwater control facilities will be noted on the Project construction drawings. ▪ EBMUD will prepare and maintain a post-construction Stormwater Facility Operation and Maintenance Plan.	
Impact 3.10-2: The Project would not substantially alter the existing drainage pattern of the site 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.	**None Required.**	
Impact 3.10-3: The 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 (and/or infiltration to groundwater), or substantially increase the rate or amount of surface runoff (and/or groundwater recharge) in a manner which would result in flooding on- or off-site.	**Measure 3.10-3**: Bioretention Area with Underdrains. EBMUD and/or its construction contractor will implement the following measures: Design the proposed vegetated basin to include a bioretention facility with underdrains and an impermeable liner connected to the eastern municipal drainage system (Wildcat Creek side). The filtration process will provide stormwater treatment, while the underdrain will capture stormwater and minimize groundwater recharge.	Less than Significant.
Impact 3.10-4: The Project would otherwise substantially degrade water quality.	Mitigation Measure 3.10-1.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
HAZARDS/HAZARDOUS MATERIALS		
Impact 3.11-1: The Project would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	**Measure 3.11-1a**: Lead Removal. If any paint is separated from building materials (e.g., chemically or physically) during demolition of the structures, or if lead containing sand or soil is found on the Project site, EBMUD and/or its construction contractor will implement the following steps: ▪ Evaluate paint waste independently from the building material to determine whether or not lead-based paint is present and to specify its proper management. ▪ Evaluate soil and sand still present at Project site to determine if it contains lead in an amount that requires special handling. ▪ If lead-based paint or lead-containing sand or soil is found, complete abatement prior to any construction activities that will create lead dust or fume hazard. ▪ Perform lead removal in accordance with 8 CCR 1532.1, which regulates and specifies exposure limits, exposure monitoring, respiratory protection, and good worker practices by workers exposed to lead. ▪ Provide evidence by any contractor performing lead removal to the City of Berkeley City Building Official and Contra Costa County Environmental Health Department of the contractor's certified training for lead-related construction work. **Measure 3.11-1b**: Asbestos Containing Materials (ACM) Prior to demolition activities, EBMUD and/or its construction contractor will conduct an asbestos survey in compliance with the National Emission Standards for Hazardous Air Pollutants to determine the presence or absence of asbestos, and submit the results of the survey to EBMUD. In the event ACMs are found, any demolition activity that will disturb ACMs or create an airborne asbestos hazard will be performed by a licensed asbestos abatement contractor under the supervision of a certified asbestos consultant and according to EBMUD standards. This requirement will be incorporated into EBMUD construction specifications for the Project, and will be monitored by EBMUD during construction.	Less than Significant.
Impact 3.11-2: The Project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident	**None Required.**	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
conditions involving the likely release of hazardous materials into the environment.		
Impact 3.11-3: The Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing school.	**None Required.**	
Impact 3.11-4: 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.	**Measure 3.11-4:** EBMUD and/or its construction contractor will implement the following Fire Prevention Measures during construction: ▪ Equip earthmoving and portable equipment with internal combustion engines with a spark arrestor to reduce the potential for igniting a wildland fire (Public Resources Code [PRC] Section 4442). ▪ Maintain appropriate fire suppression equipment during the highest fire danger period – from April 1 to December 1 (PRC Section 4428). ▪ On days when a burning permit is required, remove flammable materials to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the contractor(s) will maintain the appropriate fire suppression equipment (PRC Section 4427). ▪ On days when a burning permit is required, do not use portable tools powered by gasoline fueled internal combustion engines within 25 feet of any flammable materials (PRC Section 4431). ▪ Compliance with the referenced sections of the PRC requirements, and any additional requirements imposed by the Contra Costa County Fire Protection District or the Berkeley Fire District.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
CUMULATIVE IMPACTS		
Aesthetics/Visual Impact C-1: No cumulative short and long-term visual impacts.	**None Required.**	
Geology/Soils Impact C-2: No cumulative geologic and seismic hazards.	**None Required.**	
Biological Resources Impact C-3: Less than significant cumulative biological impacts from loss of habitat for special-status wildlife and plants.	**None Required**.	
Cultural Resources Impact C-4: No cumulative increase in cultural resource impacts.	**None Required.**	
Transportation and Traffic Impact C-5: Potential cumulative traffic and roadway disruptions.	**Measure C-5:** Prior to construction, the EBMUD Summit Reservoir Replacement construction manager will coordinate with other EBMUD projects regarding the timing of construction projects that use the Spruce Street/Marin Street and San Pablo Avenue/University Avenue intersections. To the extent practicable, overlapping periods of peak construction truck activity between multiple projects will be avoided.	Significant and Unavoidable.
Air Quality Impact C-6: No cumulative air quality impacts from construction emissions.	**None Required.**	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Greenhouse Gas Emissions Impact C-7: No cumulative greenhouse gas emissions impacts.	**None Required.**	Less than Significant.
Noise and Vibration Impact C-8: Less than significant cumulative noise and vibration impact**s.**	**None Required.**	Less than Significant.
Hydrology and Water Quality Impact C-9: No contribution to cumulative increase in water quality impacts.	**None Required.**	
Hazards/Hazardous Materials Impact C-10: Less than significant cumulative impacts on hazards/hazardous materials.	**None Required.**	Less than Significant.

S.5 Analysis of Project and Design Alternatives

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 prior to selection of a specific project for detailed analysis in the EIR. Project objectives used to evaluate alternatives include the following: meet regulatory requirements by removing non-soluble PCB contaminants in the existing reservoir liner caulking materials (per the Alameda County District Attorney's (DA) Agreement by 2015); improve water quality; improve operational reliability and flexibility; minimize environmental impacts; and reduce costs. Screening of alternatives also included Project construction considerations such as site access, Project staging, construction schedule and other related efforts required to be implemented for a given alternative. Projects were further screened against the potential to generate impacts on key environmental factors as analyzed in this EIR, i.e., aesthetic/visual quality; geology/soils; biological resources; cultural resources; transportation and traffic; air quality; greenhouse gas emissions; noise and vibration; hydrology/water quality; and hazards/hazardous materials.

The alternatives considered in this EIR include:

- Rehabilitation of the existing Summit Reservoir and replacement of Woods and Shasta Pumping Plants at the Summit Reservoir site;
- Replacement of storage with a new 5-MG tank and replacement of the Woods and Shasta Pumping Plants at the Summit Reservoir site;
- Replacement of the liner caulking materials in the existing Summit Reservoir only to meet the agreement with the Alameda County District Attorney; and
- No Project Alternative.

Project Alternatives

Based on the ability to meet the Project requirements and with input from the community, four Project alternatives were developed: Project Alternative 1 - rehabilitate the existing reservoir to current standards; Project Alternative 2 - replace the existing reservoir with a 3.5-MG tank and utilize existing storage from Woods Reservoir, accessible via a new Summit flow control valve (proposed Project); Project Alternative 3 - replace the existing reservoir with a 5-MG tank at Summit; and Project Alternative 4 - minimum project to address the DA Agreement only.

Alternatives 1 and 4 were eliminated from consideration based on cost and the inability to meet the defined Project objectives while further reducing the potential for environmental impacts. Of the two replacement tank alternatives (2 and 3), Alternative 2, the proposed Project, has a slightly smaller construction footprint and therefore creates fewer environmental impacts than Alternative 3.

For the purposes of analyzing environmental impacts in the EIR, the 5-MG tank size was analyzed since this represents the largest construction footprint and longest construction schedule, and therefore captures the “worst case scenario” for assessing the environmental impacts within the Project study area.

Design Alternatives

EBMUD held a series of public meetings from September 2009 through April 2010 to provide information about the project and solicit input from the community on the design and configuration of the replacement tank. These meetings resulted in the development of three conceptual site design alternatives, one of which was revised slightly and is the preferred Project. The preferred Project, Design Alternative 4C, was selected because it would achieve a balanced site distance from neighbors with a consolidated design of all facilities, which would reduce the need for new infrastructure (access road, water distribution pipelines, drainage, power, and communication) and would result in lower construction and maintenance costs. A berm (small hill) would be constructed using soil from the existing dam embankment breach; the berm placement in the preferred Project also would provide good screening from all public vantage points. Views of the tank from the public vantage points would also be greatly reduced by incorporating the partially buried tank design into the overall landscape plan. Further, the process of lowering the existing embankment would reduce the storage volume of the remaining basin below the DSOD jurisdictional size, thereby removing the Summit Dam from DSOD jurisdiction. A new walking path along the east side of the site, parallel to Grizzly Peak Boulevard, would also be constructed and would give pedestrians a new, higher vantage point into the redesigned and landscaped basin.

A comprehensive discussion and analysis of Project and design alternatives is included in Chapter 4 of the EIR, Analysis of Alternatives.

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

EBMUD has conducted three community meetings to date, to discuss the Project and to solicit public input. Appendix A of this Draft EIR presents a description of public outreach efforts.

A variety of issues and concerns have been raised in response to the community outreach process, including issues related to complete or partial burial of the replacement tank, site drainage, site grading and landscaping, fire and emergency water access, preservation of existing overlooks, and creating a more enjoyable walking experience along Grizzly Peak Boulevard, compared to the public sidewalk. These issues were considered during preparation of the Draft EIR, and constitute the core analysis. A summary of the three public outreach meetings conducted by EBMUD between September 2009 and April 2010 is contained in the Final Report - Planning Phase Architecture Design Report for the Summit Reservoir Replacement Project prepared by Muller & Caulfield Architects in association with Dillingham Associates, June 2010.

The initial step in the EIR process was to issue a Notice of Preparation (NOP) for the Project. The NOP was published on July 23, 2010 and the 30-day review/comment period expired on August 23, 2010. No comments were submitted by close of the NOP period. One comment dated September 23, 2010 was received from the State Department of Water Resources addressing the requirement for a dam alteration application. The NOP is attached as Appendix B.

S.7 Resources Not Evaluated Further in the EIR

Pursuant to Sections 15128 and 15083 (a) of the CEQA Guidelines, this EIR analyzed only those effects identified as potentially significant in the Initial Study prepared for this Project. These effects include: Aesthetics/Visual Quality; Geology/Soils; Biological Resources; Cultural Resources; Transportation and Traffic; Air Quality; Greenhouse Gas Emissions; Noise and Vibration; Hydrology/Water Quality and Hazards/Hazardous Materials.

Effects found to not be significant and excluded from this EIR include: Public Services; Agricultural Resources; Recreation; Population/Housing; Land Use/Planning; Utilities/Service Systems and Mineral Resources. However, the latter is briefly described in the Geology/Soils section.

The Initial Study prepared for this Project is included in this EIR as Appendix C.

S.8 Organization of EIR

This Draft EIR has been organized into the following chapters:

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

2. **Project Description.** This chapter provides an overview of the Summit Reservoir Replacement Project, describes the need for and objectives of the 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 Summit Reservoir Replacement Project, describes impacts that could result from implementation of the Project, and identifies measures to mitigate those impacts. This chapter is divided into environmental issue areas consistent with the Initial Study (Appendix C). In order of occurrence, the resource sections addressed include:

    - Aesthetics/Visual Quality
    - Geology/Soils

- Biological Resources
- Cultural Resources
- Transportation and Traffic
- Air Quality
- Greenhouse Gas Emissions
- Noise and Vibration
- Hydrology/Water Quality
- Hazards/Hazardous Materials

4. **Analysis of Alternatives.** This chapter presents an overview of the alternatives development and evaluation process including Alternatives of the Project and the "No Project" alternative.

5. **Cumulative Impacts, Growth Inducement and Other Topics Required by CEQA.** This chapter identifies and describes other EBMUD projects, as well as projects proposed by other entities, that could contribute to significant cumulative impacts; it also indicates the potential for implementation of the Summit Reservoir Replacement Project, in combination with other projects in the vicinity, to contribute to significant cumulative impacts. This chapter also discusses the impact that the Summit Reservoir Replacement Project could have on growth inducement, population and housing.

6. **Report Preparers.** This chapter identifies those involved in preparing this Draft EIR.

Chapter 1
Introduction

1.1 Purpose of the EIR

EBMUD, as the lead agency, has prepared this Draft Environmental Impact Report (EIR) for the Summit Reservoir Replacement Project (Project) in compliance with California Environmental Quality Act (CEQA) Statutes[1] and the CEQA Guidelines[2]. The 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 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 this EIR and public comments on the content of this EIR will be reviewed and considered by the EBMUD Board of Directors prior to the ultimate decision to approve, disapprove, or modify the proposed Project.

1.2 CEQA EIR Process

1.2.1 Public Scoping/Notice of Preparation

EBMUD has conducted three community meetings to date, to discuss the Project and to solicit public input. Appendix A of this EIR presents a description of public outreach efforts. These meetings provided direction for the development of alternatives and the scope of effects to be considered in the EIR.

A variety of issues and concerns were raised in the community outreach process, including issues related to complete or partial burial of the replacement tank, site drainage, site grading and landscaping, fire and emergency water access, preservation of existing overlooks, and creating a more enjoyable, safe walking experience along Grizzly Peak Boulevard. These issues were considered during preparation of the Draft EIR, and constitute the core analysis. A summary of the public outreach meetings conducted by EBMUD between September 2009 and April 2010 is contained in the Final Report - Planning Phase Architecture Design Report for the Summit Reservoir Replacement Project prepared by Muller & Caulfield Architects in association with Dillingham Associates, June 2010.

In accordance with Sections 15063 and 15082 of the CEQA Guidelines, EBMUD prepared a Notice of Preparation (NOP) for this EIR. The NOP provided a general

1 Public Resources Code 21000-21177.
2 California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387.

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 July 23, 2010 and the required 30-day review/comment period expired on August 23, 2010. One comment dated September 23, 2010 and not related to CEQA was received from the State Department of Water Resources addressing the requirement for a dam alteration application. The NOP is attached as Appendix B.

1.2.2 Resources Not Further Evaluated in This EIR

Section 15128 of the 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."

Section 15083 Early Public Consultation

"(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 CEQA Guidelines, this EIR analyzed only those effects identified as potentially significant in the Initial Study prepared for this Project. These effects include: Aesthetics/Visual Quality; Biological Resources; Cultural Resources; Noise and Vibration; Air Quality; Greenhouses Gas Emissions; Geology/Soils; Transportation and Traffic; Hydrology/Water Quality; and Hazards/Hazardous Materials.

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

The Initial Study prepared for this Project is included in this EIR as Appendix C.

1.2.3 Draft EIR

This 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 this Draft EIR will also be sent directly to every agency, person, or organization that commented on the NOP (*none)* or requested to be informed of Project activities during the three public outreach meetings.

The publication of the Draft EIR marks the beginning of a mandatory 45-day public review period. During the review period, written comments should be emailed, mailed or hand delivered to:

Gwendolyn A. Alie, Associate Planner
East Bay Municipal Utility District
375 Eleventh Street (Mail Slot 701)
Oakland, CA 94607-4240
summiteir@ebmud.com

1.2.4 Final EIR

Written and oral comments received on this Draft EIR will be addressed in a Response to Comments document that together with this Draft EIR, will constitute the Final EIR. The Response to Comments document will also 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 on November 8, 2011, and as part of this process will adopt findings in accordance with CEQA. Upon certification, EBMUD may proceed with Project approval actions, including design and construction of the Project.

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 in order to mitigate or avoid significant effects on the environment. The CEQA Guidelines do not require that the specific reporting or monitoring program be included in the EIR. However, throughout this EIR, proposed mitigation measures have been clearly identified and presented in language that will facilitate establishment of a monitoring program.

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

Chapter 2
Project Description

2.1 Overview

The Summit Reservoir Replacement Project is part of a planned system of improvements through the Pressure Zone Improvements master plan program[3] at EBMUD. The Project would address hazardous materials concerns, water quality improvements, and system reliability and operating efficiency by downsizing storage and replacing aging facilities.

The Project would include demolition of the existing 37-MG open-cut, below grade reservoir and 7-acre wooden roof that is covered with river rock and gravel. The existing reservoir is an earthen embankment dam built in 1891, and it is under the jurisdiction of the California Division of Safety of Dams (DSOD). In its place, EBMUD would construct one partially buried 3.5-million gallon (MG) concrete tank incorporated into a comprehensive landscape plan. The Project would also include replacement of the existing Woods and Shasta Pumping Plants, located below the existing reservoir southwestern embankment, and construction of a new Summit flow control valve to access additional storage at nearby existing Woods Reservoir, located approximately one mile to the east. The two pumping plants and flow control valve would be installed in one structure adjacent to the existing location but at a lower elevation to accommodate the new lower reservoir bottom elevation. A new Summit inlet/outlet (I/O) distribution pipeline would also be placed on site in a new alignment along the site's southwestern slope, and portions of the existing I/O pipeline, including that which resides in an 8-foot right-of-way to Vassar Avenue, would be replaced. The entire reservoir basin would be re-graded and landscaped with a mixture of native and drought-tolerant trees, grasses and shrubs.

A conceptual landscape plan was developed with community input. The plan addresses the visual and aesthetic impacts associated with the proposed Project and balances the need for screening with operational and long-term maintenance issues, and site security. As part of the new landscape, the Project would remove a portion of the western embankment, re-grade and contour the existing basin, and create a natural, rolling topography with a small earthen hill (berm) to partially bury and screen the tank and pumping plants from most vantage points. Installation of the new landscaping together with existing large trees would create a new, aesthetically designed environment. Due to age and poor condition, the existing 6-foot tall chain-link security fence along the site perimeter would be replaced with a new fence that meets the latest EBMUD security requirements.

3 EBMUD also maintains a larger Distribution System Master Plan, within which the Pressure Zone Improvements Program and the Project were developed.

To prepare for the new construction, a 0.4-MG temporary tank and temporary flow control valve would be placed on site, and utilities would be relocated. The existing Woods and Shasta Pumping Plants would remain in service throughout the reservoir outage and Project construction, and the existing pumping plants would be decommissioned once the new pumping plants are in service. The existing pump house, access road and parking would remain on site for other EBMUD maintenance uses following construction.

2.2 Project Need and Objectives

2.2.1 Project Background and Need for the Project

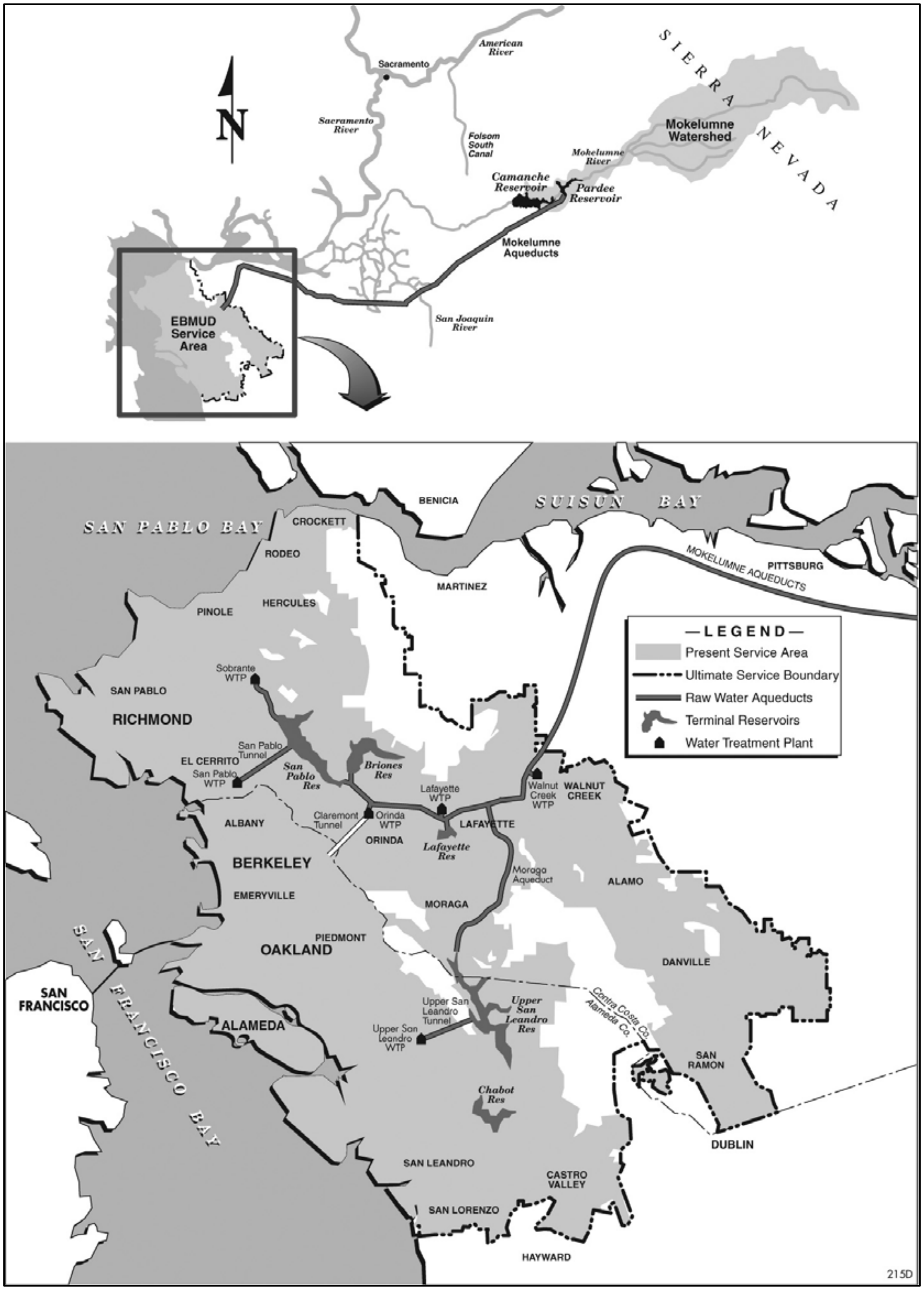
Service Area

EBMUD provides water service to 20 incorporated cities and 15 unincorporated areas in Alameda and Contra Costa Counties (**Figure 2-1**, East Bay Municipal Utility District Service Area). The Oakland-Berkeley Hills divide EBMUD's service area into the West of Hills area and East of Hills area.

Water Supply

EBMUD's primary water source is the Mokelumne River. The Mokelumne River watershed is on the western slope of the Sierra Nevada Mountains and is generally contained within national forest or other undeveloped lands. Mokelumne River water is stored at the Pardee and Camanche Reservoirs, about 90 miles east of the Berkeley area.[4] Water from Pardee Reservoir is conveyed to EBMUD's service area and terminal storage via the three Mokelumne Aqueducts. The three Mokelumne Aqueducts, constructed between 1925 and 1963, begin at the Pardee Tunnel (in Campo Seco) and terminate about 90 miles to the west, at the Lafayette Aqueducts in Walnut Creek.

4 Camanche Reservoir stores water for irrigation and stream-flow regulation, providing flood control and water to meet the needs of downstream water rights holders.



Source: EBMUD 2008

East Bay Municipal Utility District Service Area
Figure 2-1

Water Treatment

EBMUD operates six water treatment plants (WTPs), four of which supply the West of Hills area serving more than 800,000 people. **Figure 2-2** depicts the service area boundaries for the WTPs based on summer demand conditions:

- Orinda WTP **(**1935) serves the West of Hills service area[5] and the Project area via the Claremont Tunnel, and to the East of Hills service area via the Los Altos Pumping Plant.

- Sobrante WTP (1965) serves the northern part of the west service area (Pinole, Hercules, Richmond, El Sobrante, Rodeo, and Crockett).

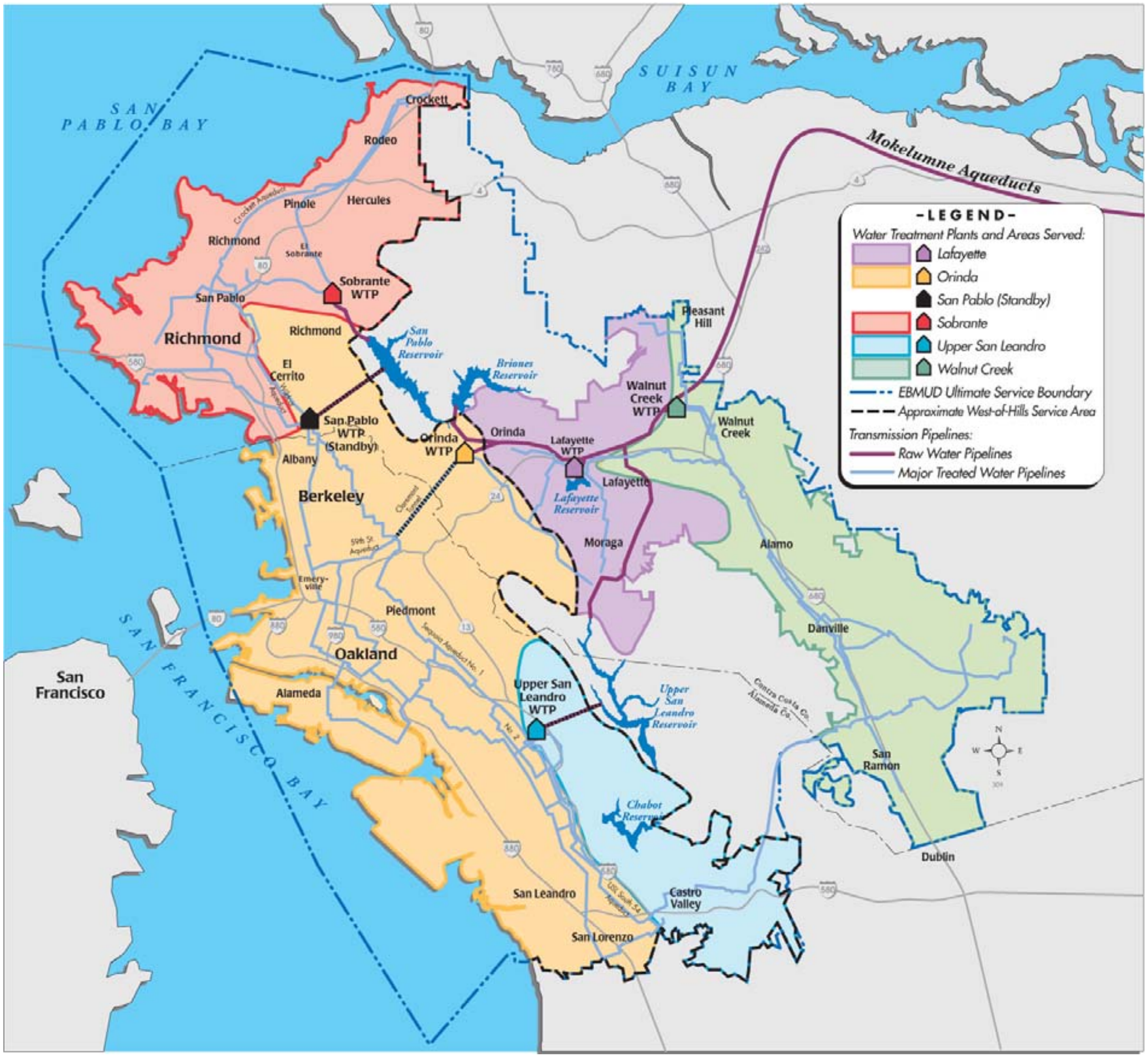
- Upper San Leandro WTP (1927) serves the southern part of the west service area (south Oakland, San Leandro, and Castro Valley).

- San Pablo WTP (1921) is not used on a regular basis, and supports outages, repairs, and upgrades of other facilities, when they are taken out of service for inspection.

- Walnut Creek WTP (1967) serves almost all EBMUD customers in the south-central Contra Costa County area (Walnut Creek/San Ramon Valley area).

- Lafayette WTP (1953) serves the central part of EBMUD eastern service area, including Lafayette, Moraga, and parts of Orinda and Walnut Creek.

5 Walnut Creek WTP and Lafayette WTP supply water to the eastern portion of EBMUD service area only.



Note: Represents summer demand conditions.

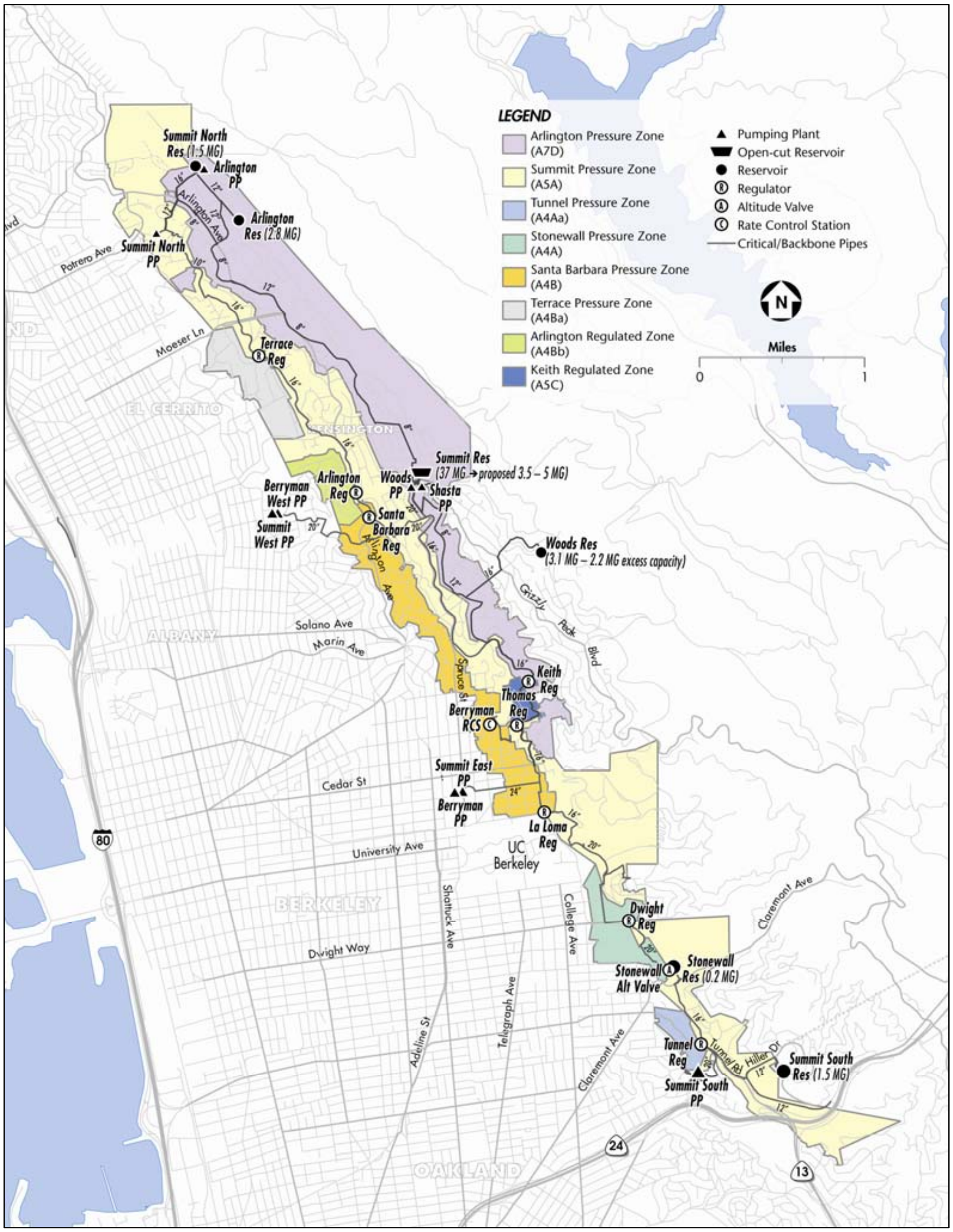
Source: EBMUD 2008

Existing Water Treatment Plant Service Area
Figure 2-2

Water Distribution

In addition to water supply and treatment facilities, there are over 4,000 miles of potable (treated) water distribution and transmission pipes, 16 tunnels, 175 potable water reservoirs, 130 pumping plants, and numerous other facilities that together provide water service to EBMUD's customers.

The Summit Pressure Zone stretches approximately 8 miles from Vista Heights Road in Richmond to Caldecott Lane in Oakland as shown in **Figure 2-3**. It provides potable water to approximately 2,800 metered services at elevations between 500 and 700 feet. The Summit Pressure Zone also serves approximately 2,200 low elevation services (380 to 500 feet) through five pressure regulated zones. The Summit Pressure Zone is largely residential but includes portions of the University of California (UC) Berkeley campus.



Source: EBMUD 2010

Summit and Arlington Pressure Zones
Figure 2-3

Summit Pressure Zone and its regulated zones are served by Summit North, Summit and Summit South Reservoirs, as well as Stonewall Reservoir in the Stonewall Regulated Zone. Summit Pressure Zone is comprised of three different subzones: Summit North, Summit Central, and Summit South. These subzones are the result of several factors including the long length of the zone (8 miles), relatively small diameter backbone pipeline (16-inch), and varying reservoir overflow elevations.

Summit Reservoir Site History

Summit Reservoir, shown in the vicinity map in Figure S-1, was originally constructed in 1891. The reservoir was formed by excavating an earthen storage basin (i.e., open-cut) and constructing earthen fill embankments at the east, south, and west sides. The reservoir has a storage capacity of 37 MG and was originally designed to collect seasonal runoff in the drainage basin for water supply purposes. EBMUD acquired the reservoir in 1923 when EBMUD was incorporated.

The existing Woods and Shasta Pumping Plants are located on the site, and sit below the existing reservoir at the base of the vehicle access road on the southwest (downstream) side of the reservoir embankment. Located in a single pump house, the two pumping plants were built in the late 1930s and mid-1940s. In the 1960s, additional pumps were added for the Shasta Pumping Plant and located in a concrete-lined pit outside the existing pump house. The existing pump house and pump pit are screened from view by a dense growth of trees planted by EBMUD. Figure S-1 also shows the location of the Woods and Shasta Pumping Plants.

The reservoir was drained and lined with concrete in the early 1940s, and a multi-tiered wood roof was installed in 1972 to help maintain water quality, and in anticipation of more stringent water quality regulations. The wood roof system is supported by concrete and steel columns and timber framing. The reflecting pond was removed from the existing reservoir roof in 1998 as required by the California Department of Health and Safety to prevent possible drinking water contamination from the reflecting pond above. The community was engaged in the design process through a series of meetings as EBMUD mitigated visual impacts related to the removal of the reflecting pond. In its place, a river rock hardscape design and metal bird sculptures were placed on the roof, and the existing Spruce and Grizzly Peak overlook areas were improved with new plantings and benches as well as a new dog watering station.

Alameda County District Attorney's Office Agreement

In July 1993, one of the basins at another EBMUD facility, the Dunsmuir Reservoir, was drained in preparation for planned reservoir rehabilitation work. During the draining, about one-third of the basin floor sediment was washed down and discharged to the drainage course. The wash down was halted due to concerns about the high turbidity[6] of the discharge, and the potential impacts on water quality in the drainage course. In August and September 1993, EBMUD collected sediment samples from the Dunsmuir Reservoir and drainage course. The results confirmed the presence of polychlorinated biphenyls (PCB) in both the reservoir sediments and drainage course. This discharge of PCBs into the drainage course resulted in enforcement action by the Alameda County District Attorney's (DA) Office.

EBMUD and the Alameda County DA's Office agreed to terms and conditions concerning reservoir rehabilitation and discharges in May 1994. EBMUD satisfactorily completed all terms and conditions of its probation on May 11, 1997, but must continue to rehabilitate or replace reservoirs according to an established schedule.

EBMUD identified 32 of its 178 drinking water reservoirs as being constructed with potentially hazardous materials, including Summit Reservoir. Although the PCB materials do not pose a public health risk or contaminate reservoir water (because they are non-soluble in water), sediment and construction materials must be properly characterized and disposed of when rehabilitating or demolishing these reservoirs. In response to this need, EBMUD established the Reservoir Rehabilitation Program to systematically evaluate, remove and replace potentially hazardous materials from its reservoirs. The plan contains procedures for maintenance, clean up, sampling, evaluation, treatment and water discharge. Based on the November 2009 letter sent by EBMUD to the DA[7] regarding the schedule, 27 of the 32 reservoirs have been successfully rehabilitated, permanently removed from service, or replaced. In 2010, 1 of the remaining 5 reservoirs was permanently removed from service, therefore only 4 reservoirs remain on the DA's schedule, including Summit Reservoir.

Dam Safety Program

EBMUD owns and manages 31 dams as part of its water system. EBMUD's open-cut reservoir dams were built from the late 1800s to the late 1960s. The larger dams are regulated by 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 reservoir embankments. EBMUD also periodically conducts an extensive seismic study of its dams and monitors the embankments for movement semi-annually[8]. EBMUD staff inspect each dam monthly. Seepage is also tracked monthly via reservoir

6 Turbidity is cloudiness or opaqueness of the discharge water which may indicate that sediments or other impurities are suspended in the water due to the high velocity of the discharge.

7 Status of EBMUD's Reservoir Rehabilitation/Replacement Program, letter from EBMUD Office of Environmental Compliance to Alameda County District Attorney's Office, City of Berkeley Planning and Development Department, Alameda County Heath Care Services Agency, and Contra Costa County Health Services Department, November 18, 2009.

8 Movements monitored via surveying monuments and inclinometers placed around site which measure lateral and vertical earth movements.

underdrain flow monitoring[9]; monthly assessments of groundwater elevations are also made based on monitors[10] located around the site.

EBMUD is in the process of evaluating the open cut reservoirs in its inventory and replacing them with tanks as appropriate. Potential benefits for replacing open cut reservoirs include more efficient management of the water distribution system, improved water quality by re-sizing the reservoirs according to customer demands, and elimination of aging embankment dams.

Summit Reservoir currently operates at normal levels based on DSOD's permitting requirements and criteria, and there is currently no issue with the stability or integrity of the earthen embankments.

Infrastructure Maintenance

In 2008, the Infrastructure Rehabilitation Program resulted in master plans for EBMUD's major water distribution facilities including reservoirs[11] and pumping plants[12]. At Summit Reservoir, the master plan identified several key infrastructure items for replacement and/or major rehabilitation, including:

- replacement of the concrete liner caulking materials and restoration of the reservoir liner joints (if rehabilitation is intended);
- re-coating of the steel columns and implementation of corrosion protection measures;
- replacement of the built-up wood roof to meet current seismic standards and mitigate areas of leakage and isolated cases of mold growth potential;
- improvements to reservoir ventilation;
- improvements to the water quality cabinet, including replacement of the entire sample pump system and inclusion of a new chlorination check valve; and
- improvements to the valve pit.

For the Woods and Shasta Pumping Plants, the master plan identified full electrical and mechanical replacements needed for each pumping plant to maintain system reliability and personnel safety. Both the Shasta and Woods motor control centers are over 45 years old, obsolete, unreliable, and there are no spare parts available. For these reasons, the replacement of the outdated electrical equipment is a high priority.

Shasta Pumping Plant has six units total. Units 1 through 3 are inside the building and are horizontal pumps, which were installed in 1946. Unit 1 has its original 1946 motor; units 2 and 3 have motors that were installed in 1982 and 1985, respectively. Units 4

9 The underdrain sits below the bottom of the reservoir and collects and conveys any unintended reservoir leakage. A monitor in the underdrain indicates the rate of flow of seepage, if any.
10 Piezometers are used for measuring the groundwater elevations.
11 Reservoir Infrastructure Rehabilitation Plan, Facility Evaluations - Summit Reservoir, EBMUD (C. Dodge, M. Toyofuku, J. Young, M. Lewis, E. Owre, B. Maggiore), September, 2008.
12 Pumping Plant Rehabilitation Master Plan, Shasta and Woods Pumping Plants, EBMUD, September 2008.

through 6 are vertical turbines located in an outdoor concrete pit. Units 4 and 5 were installed in 1962, and unit 6 was added in 1969; all have their original 1960s motors. The motors on Shasta units 4, 5, and 6 are obsolete and unreliable.

Woods Pumping Plant has four units total, all of which are horizontal pumps with complex piping configurations. Units 1 and 2 were installed in 1945 with motors of the same vintage; the motors are obsolete and unreliable. Units 3 and 4 were installed in 1937; both pumps have new motors installed in 2005.

Water Quality

EBMUD is subject to numerous federal and state regulations related to domestic water supplies, many of which stem from the Safe Drinking Water Act. Federal and state regulations impose treatment technology standards and monitoring standards which aid in protecting public health.[13] Aesthetic standards related to taste, odor and color and other non-enforceable goals which have no adverse effects on public health are also established by the state. In addition, EBMUD establishes its own water quality goals that meet or exceed state and federal requirements. EBMUD sets these independent goals to ensure it can deliver high quality potable water to its customers and to meet these regulations with a margin of safety.

Water quality may be an issue when there is a large storage volume and low water demands, which results in water aging and water treatment/disinfection dissipation. The July 2005 Pressure Zone Planning Program Study for the Summit Pressure Zone states that Summit Reservoir has a water age exceeding 25 days. This is a water quality issue not only for the Summit Pressure Zone, but also for the Arlington and Shasta Pressure Zones which are served by Summit Reservoir via the Woods and Shasta Pumping Plants, respectively. By downsizing Summit Reservoir and reducing the excess water storage, water quality would be improved, and EBMUD would be able to maintain its high water quality standards in the most cost-effective manner.

2.2.2 Project Objectives

The Project schedule is driven by the Alameda County DA's Agreement to remove the reservoir liner caulking materials by the year 2015 as described above in the "Alameda County District Attorney's Office Agreement" section. The liner caulking materials contain PCBs which do not pose a public health or safety risk and are not found in the drinking water, but which are required to be removed to eliminate potential environmental concerns related to the presence of this contaminant in sediments collected at the bottom of the existing reservoir. Additional objectives relate to water quality, water service reliability, operational flexibility, maintenance, environmental, schedule and cost considerations, as summarized in **Table 2-1**.

[13] Title 22, Division 4, Chapter 15 of the California Code of Regulations (entitled "Domestic Water Quality and Monitoring") contains key regulations for drinking water.

TABLE 2-1
Project Objectives

Issues/Concerns	Project Objectives
Hazardous Materials Compliance	▪ Remove PCB contaminants in the existing reservoir liner caulking materials per the Alameda County DA Agreement by 2015.
Water Quality	▪ Improve water quality by replacing inefficient large storage in the pressure zone with optimally sized facility. ▪ Improve water quality of upper cascades served by Summit Reservoir by utilizing excess storage at Woods Reservoir and building new Summit flow control valve to help cycle water. ▪ Improve interaction of reservoirs in the Summit Pressure Zone by increasing the depth of the new storage tank to more closely match the overflow and bottom elevations of other reservoirs in the Summit Pressure Zone, which allows them to fill and drain together.
Reliability, Operations and Maintenance	▪ Improve water service reliability, operations and maintenance by replacing aging facilities which have reached the ends of their useful lives with new facilities (reservoir and pumping plants). ▪ Ensure fire and emergency flow capabilities are met. (Install new flow control valve which allows access to additional water storage during emergencies.) ▪ Maintain water service and emergency flows during construction. (Install a temporary flow control valve for emergency use during construction.)
Environmental	▪ Minimize environmental impacts on the community during construction (noise, air quality, traffic, hazardous materials). ▪ Minimize disruption to the community during construction by phasing work and constructing new tank and pumping plants in parallel. ▪ Maintain an acceptable aesthetic site environment. ▪ Re-use or recycle structural and decorative elements on site, including concrete, river rock and bird sculptures.
Cost	▪ Minimize Project costs to EBMUD customers (e.g., use excess storage at Woods Reservoir to build smaller tank at Summit). ▪ Eliminate monitoring, permitting and other operational costs associated with managing a dam.

2.3 Project Location

Summit Reservoir is located at 416 Spruce Street on approximately 17 acres of land bordered by Beloit Avenue to the north, Vassar Avenue to the west, Spruce Street to the south, and Grizzly Peak Boulevard to the east. The property resides in both the City of

Berkeley (Alameda County) and the community of Kensington (unincorporated Contra Costa County). The reservoir is situated approximately 0.25 mile west of the entrance to Tilden Park, on the ridgeline between Wildcat Canyon and the San Francisco Bay.

The existing Woods and Shasta Pumping Plants are located on site, but sit below the existing reservoir embankment at the vehicle access road base on the southwest (downstream) side.

2.4 Project Characteristics

EBMUD explored alternatives for both rehabilitation and replacement of the Summit Reservoir. (See Chapter 4 for the Project alternatives and analysis.) The Project would include the removal and disposal of contaminated liner caulking materials, and demolition of the existing open-cut reservoir structure and wood roof. Demolition would be followed by the parallel construction of two replacement pumping plants and a new flow control valve in one structure, and one cylindrical 3.5-MG partially buried, pre-stressed concrete tank with associated appurtenances, as well as comprehensive site re-grading and landscaping. A new reservoir I/O pipeline would also be constructed from the new tank along the west side of the site and connect to the existing water distribution system on Vassar Avenue. A 0.4-MG temporary tank and temporary flow control valve would be constructed on site and operate while the existing reservoir is drained and demolished and the new reservoir and pumping plants are constructed.

Section 2.4.1 describes the Project's key facilities and design elements. Section 2.4.2 describes the construction methods and phasing that EBMUD and its contractor would employ. Section 2.4.3 outlines the Project's operating characteristics.

2.4.1 Design Characteristics

Summit Reservoir Replacement

The water storage needed at the site is approximately 5 MG based on projected future demands per the EBMUD 2040 Demand Study completed in February 2009. EBMUD determined that this storage requirement would be achieved by building a 3.5-MG tank (approximately 140 feet in diameter) at the Project site supplemented with approximately 1.5-MG storage at the existing Woods Reservoir, which is located approximately 1 mile southeast of the Project site. Woods Reservoir is an existing steel tank in the adjacent Arlington Pressure Zone with excess water storage. As such, it represents an existing opportunity for cost-effective water storage for the Summit Pressure Zone. Access to the water in Woods Reservoir would be through a new, permanent flow control valve which would be constructed as part of the Project and located in the new pump house. The valve would allow for remote opening and closing based on customer demands, and it would provide access to additional water supply during an emergency. No improvements are proposed for Woods Reservoir as part of this Project.

EBMUD explored a range of replacement tank sizes from 3.5 to 5 MG for the Project as different alternatives (see Chapter 4). Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the "worst case" construction footprint and potential impacts associated with the replacement tank. The differences in impacts created by the larger 5-MG tank are primarily the construction duration and the tank footprint size. There is approximately 30-feet difference in diameter between a 5-MG tank and a 3.5-MG tank of the same height.

Figure S-2 shows the proposed site plan and corresponding cross-sections for a 5-MG tank. The 5-MG tank would have an outside diameter of approximately 170 feet. The new tank would sit approximately 15 feet below the existing reservoir bottom elevation; excavated materials would be used to backfill and partially bury the tank. (The height and elevation of both the 3.5-MG tank and the 5-MG tank would be the same, though a 3.5-MG tank would have a smaller diameter, approximately 140 feet.)

Woods and Shasta Pumping Plants

The Woods and Shasta Pumping Plants would be replaced at a lower elevation because the new Summit tank would have a lower bottom elevation than the existing pumps. The Woods and Shasta Pumping Plants would be housed in a single structure, approximately 55 feet long by 25 feet wide, and would require approximately 480 horsepower (hp) to operate, similar to what is currently used by the existing pumping plants. The structure would be designed to accommodate three pumps for each pumping plant (six pumps total). One standby/backup pump would be allocated for each pumping plant.

The Woods Pumping Plant pumps would be sized based on a Year 2030 maximum daily demand from the EBMUD 2040 Demand Study and on operational storage requirements between Woods and Summit Reservoirs. The required capacity for Woods Pumping Plant pumps is 2.4 million gallons per day (mgd). A total of three Woods pumps would be placed in the pump house; each pump would have approximately 1.2 mgd pumping capacity and require approximately 50 hp each to operate - 150 hp total for three pumps. (The existing capacity of Woods Pumping Plant is 1.8 mgd with four pump units.)

The Shasta Pumping Plant pumps would also be sized based on a Year 2030 maximum day demand projection from the EBMUD 2040 Demand Study. The required capacity for Shasta Pumping Plant pumps is 2.8 mgd. A total of three Shasta pumps would be placed in the pump house; each pump would have approximately 1.4-mgd pumping capacity and require approximately 110 hp each to operate - 330 hp total for three pumps. (The existing capacity of Shasta Pumping Plant is 3.8 mgd with six pump units.)

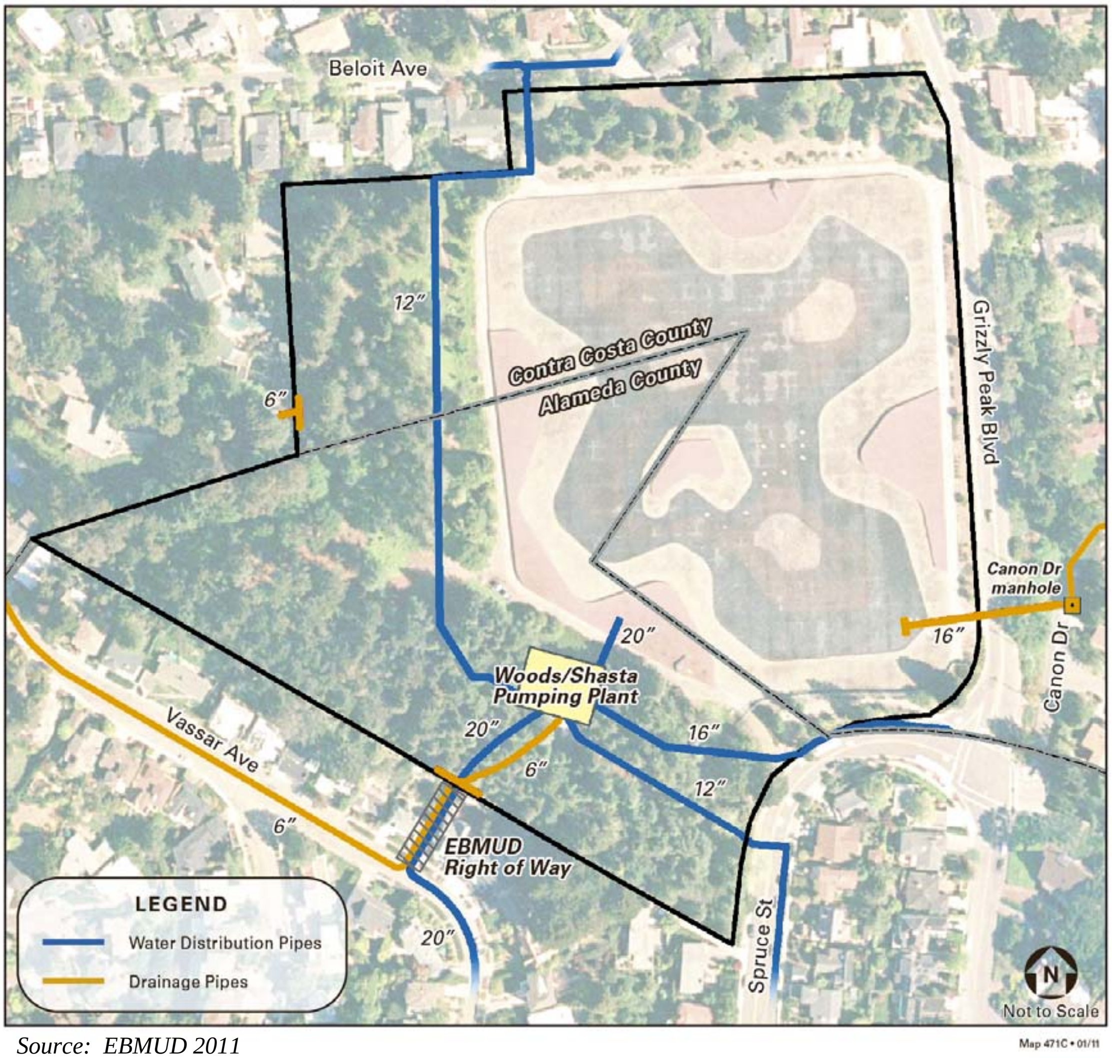
Distribution Pipelines

The existing I/O pipeline which connects the reservoir to the water distribution piping system is a 20-inch diameter steel mortar-lined and mortar-coated pipe circa 1935. The I/O pipeline connecting the new Summit tank to the existing distribution piping would be replaced. Approximately 700 feet of new I/O pipeline would be installed along the western side of the property beneath a 10-foot wide gravel maintenance road. In addition, approximately 100 feet of existing I/O pipe that runs in an 8-foot EBMUD right-of-way between two homes on Vassar Avenue as it exits the Project site would also be replaced. Construction in the EMBUD right-of-way may also require a temporary construction easement from the adjacent homeowners for temporary access and workspace. A new emergency bypass pipe would be installed on the Project site near the western property fence line for future maintenance and repair needs.

Other on-site distribution pipelines (**Figure 2-4**) from the new Woods and Shasta Pumping Plants to the Arlington and Shasta Pressure Zones would also be replaced with new steel pipes on site. Most of the new pipes would be replaced with pipes of the same diameter as the existing pipes. One distribution pipeline which runs north from the pumping plant toward Beloit Avenue would be replaced with a slightly larger 16-inch diameter pipe, consistent with the goals of the Kensington Fire Flow Improvements Project (EBMUD 1998). Connections to the existing system would be made on site, and most of the existing piping on site would be abandoned in place and filled with concrete, or removed if it lies above the new finished grade.

Summit Flow Control Valve

The new pumping plant structure would house the new flow control valve, which would have remote operations capability. Piping connections from the flow control valve would be easily accessible since the distribution piping would also be located within the new pump house.



Source: EBMUD 2011

Project Water Distribution and Drainage Lines
Figure 2-4

Remotely Operated Isolation Valve

The existing reservoir has a remotely operated isolation valve (formerly referred to as a seismic isolation valve) located near the existing pumping plants. The existing valve would be abandoned in place following construction. A new remotely operated isolation valve would be constructed for the new Summit replacement tank.

Site Grading, Breaching the Dam, and Berming

The existing reservoir basin covers nearly 7 acres and is approximately 25 feet deep from the existing access road to the existing reservoir bottom. The existing western embankment would be breached by grading the embankment down to approximately elevation 801 feet, which is approximately 20 feet below the existing reservoir access road at this location. The existing reservoir basin would be re-graded and contoured to soften its edges, with infill at some locations and excavation below the current bottom in other locations to accommodate the new tank and allow most of the site to continue to drain to the east. In total, the grading of the embankment, over-excavation for the new tank and pumping plants, and demolition and re-use of concrete and paving materials on site would generate approximately 50,000 cubic yards (CY) of material saving 4,200 truck trips to and from the site.

The cylindrical, prestressed concrete replacement tank would be partially buried as an integral part of the overall landscape design. The soil from the western embankment breach would be used to create a large earthen hill (also known as a berm) in the existing basin, which aids in screening the tank from most public vantage points. The berm and remaining basin would be planted with native and drought-tolerant grasses, shrubs and trees to aid in screening. The estimated 50,000 CY of fill needed for grading would be available on site by re-using the embankment breach soils and by re-using the concrete liner on site as fill in the new site plan.

Additionally, the area near the existing reservoir's southwest corner would be re-graded to make a clearing at about elevation 780 feet for the new pump house structure foundation and the foundation for the new tank.

The new tank foundation would require excavation below the existing reservoir bottom by approximately 15 feet. Once the tank walls and roof are constructed and the prestressing of the tank walls is complete, requisite testing of the structure would be performed. After testing the tank structure, the tank would be backfilled to a minimum of 10 feet on the west side. In addition, it would be partially buried near the top of the tank to approximately 30 to 35 feet along the east side, as part of the berm and final grading. Because the tank must be field-tested following construction and prior to backfilling, there would be temporary stockpiling of embankment soils and other fill materials on site until the new tank could be backfilled.

Final slopes of 2:1 (horizontal to vertical) or shallower would be required for slope stability as outlined by the Project Geotechnical reports[14,15]. Bedrock and a high water table are expected to be encountered in areas that would be over-excavated during construction, primarily below the new tank and pumping plants. Because the soil boring information within the existing reservoir basin is limited, several boring locations beneath the new tank location would be required during construction, once the existing reservoir is drained. The borings would be used to evaluate the appropriate foundation design for the new tank. While unlikely, should the borings indicate the materials are insufficient, EBMUD would need to over-excavate and import materials for the tank foundation.

14 Geotechnical Feasibility Assessment for Proposed Summit Tanks at Berkeley – Kensington, California, EBMUD Materials Engineering, March 12, 2009.

15 Geotechnical Review of Preliminary Grading Plan for Proposed Summit Tanks and Berkeley – Kensington, California, EBMUD Materials Engineering, September 12, 2010.

Landscape Plan and Pedestrian Pathway

The landscape plan is an integral part of the overall site plan and was developed with community input through three public meetings from September 2009 through April 2010. (See Chapter 4 Alternatives Analysis for more detailed information on community meetings and site design alternatives.) The plan calls for the site to be landscaped with a mixture of native grasses, shrubs, and trees as shown conceptually in the elevated views in Figure S-2. The landscape plan was developed based on a balance between aesthetics, operational and long-term maintenance issues, and security. Native grasses and shrubs provide fast-growing and more immediate screening and erosion control than trees, thus the approach to landscaping was to maintain the open space of the basin and restore the site to a more natural state.

Redwoods, Monterey pines, incense cedars and other trees of varying condition and size cover the downstream portion of the southwestern and western embankments and were originally planted by EBMUD. Trees also line the north, west, and southwest property fences obscuring most views into the site from the Spruce Street, Vassar Avenue, and Beloit Avenue fence lines. Most of the existing trees and plantings along the site perimeter would remain and continue to provide screening of the new facilities interior to the site, with the exception of trees which have reached the ends of their lives, are in poor condition, and/or pose a falling hazard to nearby structures or other facilities. In late 2010, an arborists' tree survey was conducted on site.[16] Because of the grading along the west embankment and construction of the new tank and pumping plants along the southwest side of the site, approximately 140-150 trees interior to the site would be removed to accommodate the new construction. Of those trees, 18 trees are "protected" species as defined by the City of Berkeley and Contra Costa County tree ordinances, namely coast live oak trees greater than 6 inches in diameter at breast height[17]. As shown on the landscape plan, some of the trees would be replaced as needed to provide screening, including along the berm and along portions of the paved access areas on site.

Based on community input, a new pedestrian path would be added along the east side of the site, parallel to Grizzly Peak Boulevard, which would give pedestrians a new, higher vantage point to view the newly redesigned and landscaped basin. The path would be compliant with the Americans with Disabilities Act standards and would connect to the public sidewalk on Grizzly Peak Boulevard at both the south and north ends of the re-contoured reservoir basin. The path would be approximately 6 feet wide and approximately 350 feet long. The path would be unpaved and made of decomposed granite or similar natural compacted material which is pervious. The existing, publicly accessible overlook areas on Spruce Street and at the northeast corner of the property on Grizzly Peak Boulevard would remain.

16 Arborist Report – Site: Summit Reservoir, Berkeley, CA, prepared for Dillingham Associates Landscape Architects, by Craig A. Hancock (Certified Arborist #2181) and Pamela Llewellyn of the Professional Tree Care Company, December 20, 2010.

17 Arborist Report – as noted above.

Site Drainage and Infiltration

Existing runoff from the site flows either to the west or to the east. Existing EBMUD storm drain lines on the west side of the property and the City of Berkeley storm drain pipelines in Vassar Avenue are 6 inches in diameter (see Figure 2-4). Drainage flows to the west in Vassar eventually discharge to Cerrito Creek further downhill. Existing west drains may not be able to accommodate an increase in flow. The drains to the east are 16 inches in diameter and are currently sized to handle the existing 7 acre reservoir roof drainage as well as the reservoir's emergency drain. The drain to the east leads from the existing reservoir spillway at the reservoir's southeast corner to a manhole on Canon Drive, eventually discharging to a tributary of Wildcat Creek in Tilden Park.

Seepage and infiltration issues for residents west of the Project site (and downhill from the reservoir) were addressed in the early 1990s by installing French drains and drop inlets along the western and southwestern property fences. Because much of the impermeable reservoir liner would be removed during demolition, the Project seeks to limit infiltration to prevent groundwater seepage impacts on neighbors.

New surface runoff requirements, Provision C.3 of the National Pollutant Discharge Elimination System (NPDES) permit, require best management practices (BMPs) for new or replaced impermeable areas. Any site which creates or replaces more than 10,000 square feet of impervious surface must implement these BMPs or Low Impact Development techniques, including source control, site design and stormwater treatment measures.

The new site drainage goal would be to maintain existing drainage patterns such that there would be little to no change in runoff volumes and overall site infiltration. (See Chapter 3, Section 3.10 on Hydrology and Water Quality.) The key to maintaining the existing drainage patterns is to ensure that the overall drainage areas both east and west do not greatly change in size.

Given the Project site plan and re-contouring of the old reservoir basin, the new vegetated basin would act as a large swale (a shallow unlined ditch), effectively allowing runoff to be filtered and treated through the soil and vegetation before being collected via French drains and discharged to the east drainage system. The new tank roof drainage would be sloped toward the east so that all runoff would also drain east.

The existing drain invert at the southeast end of the existing reservoir would be lowered (approximately 3 to 4 feet) and connected to a new manhole on Canon Drive using a trenchless construction method, which would create much less site disturbance than traditional trenching and backfilling operations, and in this case, would be more cost effective due to the depth of the pipe (over 20 feet deep) and would prevent disturbance on Grizzly Peak Boulevard.

New impermeable surfaces added to the site would include the new pumping plant structure and the parking and paved access area near the new tank. Per the C.3 Provision, runoff from these surfaces would be required to be collected and pre-treated via a BMP such as a planter boxes located to the north and west of the pumping plant, near the edges of new pavement. French drains in the planter boxes would then connect to new drains and be conveyed west, to Vassar Avenue and the Berkeley city storm drains. A new drain line parallel to the new I/O pipeline would be constructed in the gravel maintenance path proposed. The existing 6-inch drain to Vassar would also be replaced during the I/O pipeline replacement, in the 8-foot right-of-way to Vassar Avenue.

Based on California Department of Health Services water quality regulations to maintain EBMUD drinking water facilities, the area below and around the new partially buried tank would have engineered drainage rock and drain pipes to collect any seepage and ensure that groundwater would not penetrate and mix with the drinking water in the tank. The subdrain system below the tank would be connected to new French drains located in the I/O gravel maintenance road, eventually connecting to the existing west drainage system to Vassar Avenue. New drainage would be engineered to help minimize infiltration from the new tank and re-contoured site.

Access and Site Paving

The existing vehicular access points from both Spruce Street and Beloit Avenue would be maintained. New on-site parking for EBMUD vehicles and equipment would be provided in one area near the new pumping plant and valve pit, which would be screened by the new berm, the existing southwestern embankment, new plantings and the existing perimeter trees on site. The new access road would utilize the same footprint as the existing access ring road on the southwestern embankment, but would be sloped down to the new pumping plant pad and new valve pit structure which serves the new tank (approximately elevation 790 feet).

Much of the existing access road pavement would be removed. On the west embankment, the breach of the embankment would necessitate removing the existing road pavement. On the east side, moving the fence 12 to 15 feet west to incorporate a new pedestrian path would also require pavement removal to facilitate the new Grizzly Peak path. Existing access road paving along the Spruce Street fence line (to the south) is narrow (approximately 5 feet wide) and would be removed. The road pavement on the reservoir's north end, parallel to Beloit Avenue, would also be removed as the basin is re-contoured and landscaped. The existing Beloit driveway would end in a turnaround to allow for one or two maintenance vehicles to park inside the property gate.

Site Security

Site security and public safety were considered throughout the site planning and balanced with the landscape plan and aesthetic treatment of the site. The remaining basin would be re-contoured and utilize a berm for screening the new tank and facilities, but would remain largely open and visible from the publicly accessible fences along Spruce Street and Grizzly Peak Boulevard.

EBMUD conducted a condition assessment of the existing fences and concluded that more than 50 percent of the perimeter fencing, particularly those which delineate the property boundary with adjacent residences on Beloit and Vassar Avenues, are in poor condition[18]. In compliance with EBMUD's Vulnerability Assessment Program, nearly all of the site perimeter fencing would be replaced with a new 8-foot, black chain link fence (where the existing is 6 feet high), and the fence mesh size would decrease from 2 to 1 inch. EBMUD would keep the decorative steel tubular fencing and trellis bordering the Spruce Street Overlook area along the south side of the property.

The perimeter fence along the property's east side, parallel to Grizzly Peak Boulevard, would be moved approximately 12 to 15 feet west into the property. This would allow the Project to create a new pedestrian path in the existing reservoir access road footprint. The new mesh fence would be approximately 6 feet tall and would be anchored to the existing reservoir rock wall, which is approximately 2 feet tall, and thus would reach the required total height of 8 feet required for security.

2.4.2 Construction Characteristics

The proposed Project would require approximately 2.5 years for construction. Delays related to weather, protection of sensitive resources, material delivery, unforeseen underground conditions and other factors could add additional time. The goal of overlapping the construction of the new pumping plant with the new tank construction is to shorten the overall Project construction duration and associated construction impacts on the community.

Per DSOD requirements, no grading or construction that could impact the integrity of the dam embankments would be allowed prior to draining the existing reservoir. Once the temporary tank is in service, the existing reservoir would be drained, and the dam embankments would be breached and graded. At that time, the Summit Reservoir dam would no longer be in service, therefore monitoring by DSOD would no longer be required.

Schedule, Work Hours and Staging

Table 2-2 lists the Project construction activities and estimated durations. Listed activities are generally sequential, with some overlapping activities as noted. It is anticipated that the pumping plant foundation would be built first, followed by the new tank foundation construction and pumping plant structure in parallel. Additional piping, mechanical and electrical construction for the pumping plants would also overlap with the tank structure construction to help minimize the overall construction duration, although associated impacts may be intensified during the construction period.

18 Summit Reservoir Fence Condition, memo by C. Wang, EBMUD Design Division, February 9, 2010.

TABLE 2-2
Key Construction Activities, Estimated Durations and Equipment

Activity	Estimated Duration	Construction Equipment
Mobilization.	1 week	Haul truck, backhoe, generators (for trailers).
Phase I Grading/Excavation for Temporary Tank and Placement of Temporary Tank & Outage Facilities (temporary flow control valve) and water quality testing by EBMUD. In parallel, remove and stockpile river rock from existing roof [1].	17 weeks	Chain saws and wood chippers, (tree removal – first 2 weeks), backhoe, haul truck.
Drain reservoir – test heel water and sediment - dispose.	4 weeks	Portable pumps, generators, Bobcat, Roll-Off bins.
Removal of liner caulking materials and other potentially hazardous materials – PCB disposal to hazardous waste facility.	5 weeks	Chain saws, excavator with stump splitter, horizontal grinders (tree removal), Hand saws (other hand tools), haul trucks, Bobcat, Roll-Off bins, Drill Rig (for soil borings).
Demolition/Recycling - demo/haul existing reservoir wood roof, demo –recycle steel columns (off haul to metals facility), demo/recycle concrete liner, demo/recycle concrete columns and concrete footings and caissons[1].	15-20 weeks	dozers, excavators (with grapples and with excavator buckets), cranes, hoe rams[2], haul trucks, concrete grinding (recycling) machine[3].
Excavation/Grading – breach dam embankment, grade new pumping plant pad and tank pad, access roads, backfill and compact with soil where caissons removed in area of new tank.	8 weeks	dozers, excavators, cranes, hoe rams, haul trucks, soil compactors[4].
Construct PP foundation and structure (in parallel with tank). Construct one 5-MG tank foundation and column footings, walls and columns, roof, tank wrapping; continue pumping plant construction (mechanical, electrical) in parallel. Construct valve pit and piping.	36 weeks[5]	Crane, drill, concrete and shotcrete trucks, concrete pump, excavator, tractor dozer, forklift, boom truck, steel cable pre-stressing machine for tank walls, backhoe-valve pit.
Replace I/O in 8 foot right-of-way off site, build new I/O and other distribution pipelines, drainage.	8 weeks	Haul trucks, dozer on site, backhoe, bobcat in R/W.
Field testing and startup (new tank, new pumping plants).	8 weeks	
Re-grade – backfill tank, create berms.	8 weeks	Bulldozer, excavator, compactor, scraper, haul trucks.
Site Restoration, landscape, pave final access; decommission old pumping plant (remove equipment) and remove temporary tank in parallel.	8 weeks	Haul truck, backhoe, tractor dozer, asphalt pavers, rollers, and trailers.
Demobilization.	1 week	Haul truck, backhoe.
TOTAL	**124 weeks (approx. 2.5 years)**	

1. *Wheelbarrows for river rock removal – no heavy equipment allowed on existing reservoir roof.*
2. *At least 10-12 weeks of the total demolition time would be devoted to footing and caisson removal (where necessary).*
3 *2-4 days of concrete grinding near end of demolition.*
4. *Some vibration from compactor.*
5. *7 months (30 weeks) for new 5-MG tank (DYK), 15 to 19 weeks for new pumping plant. 1 month pumping plant head start – foundation work.*

Table 2-3 identifies material quantities used in estimating truck trips and durations related to demolition of the existing reservoir structure. Construction would occur between 7:00 a.m. and 6:00 p.m., five days a week (Monday through Friday), with after hours or weekend construction activity limited to unplanned/unexpected occurrences or critical shutdowns approved by EBMUD staff. Construction personnel may arrive on site and depart approximately one half-hour prior to or after regular construction times. In addition, “extra legal” trucks (e.g., oversized) are not allowed on San Francisco vicinity freeways between the hours of 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 (up to 12 times over the 2.5 years of construction), very large trucks delivering construction equipment may arrive at the Project site as early as 6:30 a.m. The few days where large continuous concrete pours are required (for the new tank foundation and the new tank roof), construction may also need to begin at 7 a.m. and concrete delivery trucks could arrive at the site as early as 6:30 a.m.

TABLE 2-3
Summit Reservoir Demolition Quantity Estimates

Reservoir Structure/Element	Estimated Volumes or Weight	Estimated Number of Truck Trips Saved* *(if material re-used on site)*
Roof Timber Framing (treated wood)– includes joists, wood beams, plywood sheathing	3,400 CY	N/A – treated wood cannot be re-used on site.
River Rock Gravel (for re-use)	200 CY	30
Concrete Columns (recycle on site)	500 CY	80
Concrete Footings, Division Wall (recycle on site)	1,200 CY	200
Steel Columns and Caissons 86 columns – hollow pipes (8-inch to 42-inch diameter, varying lengths and thicknesses)	250 tons	N/A – steel would be recycled but hauled off site.
Concrete Liner, 4-inch thick (recycle on site)	4,000 CY total	660

Source: EBMUD 2010
** Does not include material expansion/contraction. Assumes 12 CY truck bed, but size of truck loads would vary. Each 12 CY load generates 2 truck trips (one trip to and one trip from the site).*

The existing site would serve as the primary construction staging area for all Project elements. For the initial 20 to 30 weeks of construction, while the temporary tank is being constructed, the staging for construction would be limited to the existing access roads and paved areas below the southwest embankment and existing pumping plants, since significant earthwork along the existing embankments is prohibited by DSOD while the existing reservoir is in service. The earthwork required for the temporary tank would be stockpiled at the south edge of the paved parking area, near the existing pumping plants. Once the existing reservoir is drained and out of service, construction staging for the reservoir replacement would primarily occur within the open cut reservoir basin. The existing Woods and Shasta Pumping Plants, Summit Reservoir temporary tank and temporary flow control valve would remain in-service during the entire construction phase of the new tank and pumping plants. During construction, clear access to the existing pumping plants and temporary tank would be maintained to facilitate maintenance and operations.

Construction Activities

This section describes the major construction activities associated with the Project and includes:

- Mobilization, Phase I Site Grading, Placement of Temporary Tank and Temporary Flow Control Valve, and Reservoir Outage;
- Removal of Liner Caulking and other Potentially Hazardous Materials;
- Demolition of the Existing Reservoir and Potential for Recycling Demolition Materials;
- Breaching the Western Dam Embankment and Grading;
- Construction of Tank and Pumping Plants;
- Connections to Existing Distribution Pipelines and Existing Drainage; and
- Final Grading and Landscaping, Decommissioning of the Existing Pumping Plants.

Mobilization, Phase I Site Grading, Placement of Temporary Tank and Temporary Flow Control Valve, and Reservoir Outage

The first stage of construction and site grading would be required for the temporary tank foundation. A flat pad would be created, and a steel ring, approximately 50 feet in diameter, would be filled with gravel to provide a foundation for the temporary tank. Some trees including some redwoods near the existing pumping plant would be removed to provide a clearing for the temporary tank as part of this work (see “Breaching the Western Dam Embankment and Grading” section for more details on tree removal). A temporary flow control valve would also connect the Arlington Pressure Zone to the Summit Pressure Zone distribution pipelines for emergency access to water during construction. The temporary flow control valve would be located in an enclosure near the west edge of the paved access area, close to the existing pumping plants. Once the temporary tank is in service and connected via temporary pipelines to the existing Woods and Shasta Pumping Plants, the existing Summit Reservoir dam would be permanently drained and removed from service.

Draining the existing Summit Reservoir would take several weeks. The existing 37-MG reservoir would be allowed to flow into the Summit Pressure Zone and drop to a predetermined water elevation, after which the valve from the reservoir would be closed, and the temporary tank would be filled and would continue to serve the Summit Pressure Zone in conjunction with Summit West and Summit East Pumping Plants. The remaining portions of the existing reservoir water storage would be pumped into the distribution system via the existing Woods and Shasta Pumping Plants. When the reservoir reaches a low level (approximately 1-3 feet deep), the remaining reservoir water would be filtered, tested, de-chlorinated, and discharged from the reservoir in compliance with the Regional Water Quality Control Board (RWQCB) and local sanitary district permits to the sanitary sewer. Additionally reservoir sediments would be removed to barrels, tested, and disposed at the appropriate waste facilities. The existing Woods and Shasta Pumping Plants would then be connected to the temporary tank. The 0.4-MG temporary tank and existing pumping plants would remain in service until construction of the Project is complete.

Additional Phase I construction work includes temporarily moving utilities such as the Pacific Gas and Electric Company (PG&E) power and on site water distribution pipes where major construction and re-grading work would be undertaken. During mobilization, EBMUD or its contractor would typically install several trailers for office space, security systems, and sanitation facilities for use during construction. In lieu of security systems, EBMUD or its contractor may elect to have 24-hour security staff on site.

Removal of Liner Caulking and other Potentially Hazardous Materials

Prior to demolition, the liner caulking materials would be sampled and characterized to identify clean and contaminated materials. The materials would then be removed from the reservoir. PCB-laden liner caulking materials would be removed and sent to the US Ecology, Inc., Grand View, Idaho hazardous materials disposal facility, dependent on the classification of the waste and sampling results. This removal work would take place under the existing reservoir roof to contain the hazardous materials handling, although access holes large enough to allow for handheld equipment for removal work and to move barrels of waste would be developed. Other hazardous materials such as asbestos cement board used on the existing reservoir roof would be hand-separated prior to commencement of demolition activities with large equipment would also be removed at the same time and sampled and properly disposed to a hazardous waste facility.

In parallel after the existing reservoir is drained, the contractor would perform additional soil borings in the reservoir basin where the new tank would be located to confirm assumptions used to design the foundation for the new tank. If the soil borings do not confirm design assumptions, over-excavation and backfilling with competent engineered fill would be undertaken, or a drilled pier foundation would be installed, anchoring the new tank in competent material.

Demolition of the Existing Reservoir and Potential for Recycling Demolition Materials

The decorative river rock and metal bird sculptures on the existing roof would be removed and stockpiled, prior to roof demolition. The stockpiles would be protected with tarps and would reside onsite. The river rock and bird sculptures would be reused on site and incorporated into the new landscape plan.

Demolition of the existing reservoir would be comprised of removal of the roof structure including the supporting timbers, concrete and hollow steel pipe columns, concrete reservoir basin lining and underdrain, and a portion of the western reservoir embankment. (For a list of construction equipment utilized for each phase of construction, see Table 2-2.) All of the structural concrete used in the reservoir liner would be recycled and incorporated into the proposed landscape plan, along with soil removed from the western embankment. The concrete liner may be left in place in some locations where the existing reservoir basin would be filled with soil over top. In areas of the site that would be graded lower than the existing reservoir bottom, such as beneath the new tank, the concrete liner would be removed, ground into smaller pieces, and re-used on site as fill. Recycling the liner concrete on site or abandoning the liner in place is included in the grading fill calculations and would offset the amount of import fill required by approximately 4,000 CY.

The bulk of the existing roofing material, plywood sheathing, and timber framing system cannot be re-used on site because it is treated wood; instead it would be sent to an appropriate facility for disposal, likely Keller Canyon Landfill in Antioch (Contra Costa County), California. There are approximately 1.1 million board feet (3,400 CY) of treated lumber in the reservoir roof that require dismantling, transportation and disposal in accordance with regulations for the management of treated wood waste issued by the California Department of Toxic Substances Control. Due to these regulations, there appears to be little, if any, potential for reuse of the treated wood on site.

The reservoir roof framing is supported by a mix of concrete and steel hollow pipe columns. The concrete columns are approximately 12-inches square in section, and range from 4 to 19 feet in length. The concrete columns may be recycled on site where feasible. The steel pipe columns range in size from 8 inches to 42 inches in diameter, and 13 to 45 feet in length. Wall thicknesses of the steel pipe columns also vary depending on height and diameter, however, most are 0.375 inch thick. Footings for the concrete columns typically range in size from 3 to 4 feet square and nearly 1.5 to 2 feet deep and include pedestals which also vary in size. The concrete column footings are approximately 1 to 2 CY each in volume of concrete, and there are 644 concrete columns in the existing reservoir. The steel column footings are larger since they are part of the seismic framing system for the roof. Steel column footings range in volume from approximately 5 to 8 CY of concrete each. There are 86 steel columns in the existing reservoir. Total volumes and approximate weights of demolition materials are given in Table 2-3.

The steel columns range from approximately 10 to 30 feet in length above the footings and continue as caissons (concrete filled steel pipes) through the footing to prescribed depths into the ground ranging from 14 to 25 feet deep. The steel pipe columns may be sent to scrap metal facilities where the material can be recycled. All columns, footings, and caissons would be removed to approximately 2 feet below finished grade and abandoned in place where possible, except in the excavated area for the new tank, where they would be removed and recycled.

In the locations under the new tank where concrete footings and caissons must be removed, the demolition process would involve the use of an excavator to dig the footing and caisson out of the ground whole and the use of a hoe-ram to break the footings, caissons and concrete columns into smaller chunks until the rebar separates from the concrete. The concrete chunks would then be stockpiled on site for grinding and recycling. The concrete grinder would be used at the end of the demolition phase when most or all of the concrete slated for recycling has been stockpiled. The concrete grinder would crush the concrete fine enough (approximately 1.5-inch gravel sized pieces or finer) to be used for sub-base material for roads and other fill on site, including the berm and re-contouring of the basin. The ground concrete would meet Caltrans Class II Aggregate Base material specifications.

Portions of the existing reservoir perimeter rubble rock walls along the Grizzly Peak frontage would remain and be re-used to support new perimeter security fencing, such that the total height of wall and fence is approximately 8 feet high.

Breaching the Western Dam Embankment and Grading

The western dam embankment would be breached and portions of the embankment soils would be pushed into the existing reservoir basin and used for creating a berm (earthen hill) primarily along the eastern side of the new tank to partially bury and screen the tank from most public vantage points. The embankment soils would also be used to fill and soften the straight edges of the existing reservoir basin to create a more natural looking topography. Slopes of 2:1 (horizontal to vertical) or shallower are required for slope stability as outlined by the Project Geotechnical reports[19,20]. Additionally, the area near the existing reservoir's southwest corner would be re-graded to make a clearing at about elevation 780 feet for the new pump house structure foundation and the foundation for the new tank.

19 Geotechnical Feasibility Assessment for Proposed Summit Tanks at Berkeley – Kensington, California, EBMUD Materials Engineering, March 12, 2009.

20 Geotechnical Review of Preliminary Grading Plan for Proposed Summit Tanks and Berkeley – Kensington, California, EBMUD Materials Engineering, September 12, 2010.

The new tank foundation would require excavation below the existing reservoir bottom by approximately 15 to 20 feet. Once the tank walls and roof are constructed and the prestressing of the tank walls is completed, requisite testing of the structure would be performed. After testing the tank structure, the tank would be backfilled to a minimum of 10 feet on the west side. In addition, it would be partially buried near the top of the tank to approximately 30 to 35 feet along the east side, as part of the berm and final grading. There would be temporary stockpiling of embankment soils and other fill materials on site until the new tank is completely constructed, tested, and can be backfilled.

Grading for temporary and permanent access roads would be a Project component. The new permanent access road to the new tank and pumping plants would occupy the approximate footprint of the existing access road along the existing southwestern embankment. The road would be sloped down from existing elevations near the Spruce Street gate to approximately elevation 790 feet.

The dam embankment breach and re-grading would require tree removal on downstream portions of the western and southwestern embankment slopes, interior to the Project site. Based on preliminary site planning and surveys, approximately 140 to 150 trees of the over 750 trees on site were identified for removal on the embankments. Of those 140 to 150 trees, 18 are protected tree species by Contra Costa County or the City of Berkeley (i.e., coast live oak trees with trunk diameters 6 inches or larger at breast height above ground)[21]. Trees protected by the City of Berkeley or Contra Costa County would be replaced consistent with local policies, and the remainder would be replaced with native species per the planting strategy identified in the landscape plan to aid in screening the new facilities.

Construction of Tank and Pumping Plants

The new pumping plant foundation would be constructed prior to the commencing construction of the new tank. In this way, construction and placement of the smaller mechanical and electrical systems and facilities could continue at the new pump house while the new tank and its foundation are under construction. The tank would be made of prestressed concrete incorporating a mat slab foundation, and concrete columns and footings to support the tank roof. The tank walls would be painted green (Federal Standard 24159), which is stocked by EBMUD Maintenance.

Connections to Existing Distribution Pipelines and Existing Drainage

Connections to existing distribution pipes would be made as described in the Design Characteristics section and would involve trenching and backfill operations. The entire I/O would be replaced to the point where it connects to the Summit Pressure Zone water distribution system in Vassar Avenue. On site, the new I/O pipe would be placed via

21 Arborist Report – Site: Summit Reservoir, Berkeley, CA, prepared for Dillingham Associated Landscape Architects, by Craig A. Hancock (Certified Arborist #2181) and Pamela Llewellyn of the Professional Tree Care Company, December 20, 2010.

trenching and backfill operations in a new 10-foot wide gravel maintenance road that crosses the western side of the site. Hand digging and open trench construction would be used to remove and replace the existing I/O pipeline and drain line along the 8-foot EBMUD right-of-way connecting the reservoir site to Vassar Avenue. During this phase of construction, temporary bypass pipes would also be installed to maintain service.

The existing reservoir drain near the southeast corner of the basin would be lowered approximately 3 to 5 feet from the existing drain. A new 16-inch diameter drain pipe would be connected to an existing manhole on Canon Drive, east of the Project site, using trenchless construction techniques. EBMUD owns the property between Grizzly Peak Boulevard and Canon Drive, and the temporary construction pit used for receiving the new drain pipe and establishing a new manhole and connection to the existing drain line in Canon would be situated in this area and partially in the public roadway on Canon Drive. The temporary pit would be approximately 10 feet wide by 10 feet long and 5 to 10 feet deep. Encroachment permits would be necessary from Contra Costa County since construction access in the public roadway would be needed to build the new manhole.

Final Grading and Landscaping, Decommissioning of the Existing Pumping Plants

Following construction and once the new tank and new pumping plants are on-line and have been fully tested, decommissioning of the existing Woods and Shasta Pumping Plants would begin. Pumps, motors and outdated mechanical and electrical equipment would be removed and salvaged where possible by EBMUD. The existing pump house would be left in place for site maintenance uses. The existing pump house structure is made of concrete and was seismically retrofitted in 1998.

Final site grading, backfilling of the tank, and building the berm would also occur at this time. Stockpiles of embankment soils and recycled concrete materials would be moved into place and graded and compacted per the final site plan. Approximately 1,800 CY of soil amendments would be imported to prepare soils and establish plantings. Hydroseeding slopes would be a priority for erosion control as well as final landscaping. The river rock and bird sculptures would also be replaced in the basin. Trees, shrubs and native grasses would be planted to help screen the tank, pumping plants and portions of the access road.

Finally, new security standard fencing would be replaced along the property perimeter in all locations, except along the Spruce Street Overlook where existing decorative steel fencing would remain in place. The new Grizzly Peak path and planting and irrigation improvements along the property’s eastern side also would be installed following construction.

Construction Equipment and Worker Transportation

Construction activities would require the use of on site power and water sources, temporary light poles, and storage of petroleum products in above ground tanks (for example hydraulic fluids and lubricants). Pumps, hoses and temporary pipelines to deliver water to the construction area, and water tank trucks, dust control operations and other equipment and activities (construction trailers) would be required to support the construction process. Excavation at shallow depths (less than about 15 feet) is expected to be accomplished using standard earthmoving equipment; depths greater than 15 feet may require the use of hoe-rams or drilling equipment, as outlined in the Project geotechnical report. Some equipment would be stored on site for specified periods (e.g., dozers, hoe-rams and concrete breaking/crushing equipment) while other equipment such as backhoes, loaders, and maintenance vehicles would be present during all construction phases. (See Table 2-2 for list of key equipment per construction phase.)

Construction traffic would vary by type of activity and construction phase. Peak truck traffic is anticipated during off-hauling treated wood and other debris and equipment materials from demolition activities. Other periods of peak truck traffic would be associated with concrete deliveries for the floor and roof slabs, which may be poured monolithically in one day. Another period of peak truck traffic is anticipated during the process of importing top soil to complete the landscaping and grading plan. (See Chapter 3, Section 3.6 Transportation and Traffic, for potential construction truck traffic impacts.)

The construction contractor would provide a haul route (shown in Chapter 3, Section 3.6 Transportation and Traffic on Figure 3.6-4) to all trucks serving the site during the construction period. The haul route would indicate that Rose Street and Spruce Street are Class III bike routes, and to exercise caution when using these roads. All large construction equipment and haul trucks would use the Spruce Street entrance for egress to and from the site. Beloit Avenue is not included in the haul route and would only be used by worker vehicles for site access.

Workers may park on site, or on Grizzly Peak Boulevard and Spruce Street (per local parking ordinances.).

Fencing and Work Area Delineation

Temporary fencing within the site may be required during construction to provide security, but would be removed when construction is completed. On site construction office trailers would be located near the Spruce Street entrance, inside the existing gate.

Construction Staging and Stockpiling Activities

During construction, the contractor would be required to store and stage equipment and materials (concrete forms, scaffolding, etc.) and demolition debris on site. Stockpiles would typically be less than 25 feet in height from the bottom of the existing basin and would be managed using erosion and dust controls to minimize dispersal of dust. Stockpiles would be generally located in the existing basin portion of the site.

Deliveries of construction equipment, cement, drainage rock, reinforcing steel and concrete would occur throughout construction; however, most of the concrete deliveries would be required for construction of the new tank and the new pumping plants. Fueling and maintenance of construction equipment would occur daily, as required, and within the approved work hours. Construction equipment would typically be stored in the basin portion of the site.

Mitigation Measures Incorporated Into the Project Design

Pursuant to Section 15126.4 of the CEQA Guidelines, as edited, an EIR must describe measures which could minimize significant adverse impacts, and the discussion should distinguish between measures proposed by the project proponents and measures proposed by the lead, responsible or trustee agencies. EBMUD is both the Project proponent and Lead agency for the Summit Reservoir Replacement Project and EIR. As part of the Project definition, several measures have been incorporated that would specifically minimize, reduce or eliminate potential impacts associated with the Project. These are noted in Chapter 2, Project Description, and detailed throughout Chapter 3 of the Draft EIR, where applicable, and are summarized here for clarification.

Grading and Landscaping

Extensive grading is proposed to establish a lower bottom tank elevation than presently exists, and to demolish the western embankment; all areas disturbed by demolition and site preparation would be re-contoured in the final grading phase. EBMUD would use dust control measures including diligent watering of soil stockpiles throughout, as necessary. Installation of a comprehensive landscape plan includes planting a mixture of native and drought-tolerant grasses, shrubs and trees as well as re-use/installation of the existing multi-colored river rock with metal birds. The landscape plan is a fundamental component of the Project design, and serves the multiple functions of landscaping all areas disturbed by construction to stabilize soil and eliminating dust and erosion, screening the new tank and establishing new site aesthetics compatible with that of the remainder of the forested site. The plan would minimize potential adverse visual/aesthetic impacts associated with the Project, as well as accomplish the primary function of soil/slope stabilization and dust emission control (air quality, greenhouse gas emissions, hydrology/water quality, geology and soils, and aesthetics/visual quality).

Demolition and the Potential for Recycling

The Project would re-use the concrete and soil associated with demolition of the existing reservoir and western embankment. Recycling the concrete would offset the need for approximately 4,000 CY of fill import. Recycling soil from breaching the western embankment and on site grading (see discussion above) would also offset another 46,000 CY of fill import. The total number of truck trips associated with on-site recycling of demolition materials is estimated at 4,200 trips (off haul and import). At an estimated rate of 150 truck trips/day, associated traffic would span approximately 56 days and lengthen the overall Project schedule, which would in turn generate additional air and greenhouse gas impacts. Therefore, proposed recycling/re-use of demolition materials would appreciably minimize potentially adverse transportation/traffic, air quality and greenhouse gas emissions impacts.

Noise

EBMUD's standard construction hours are typically from 7:00 a.m. to 7:00 p.m., Monday through Friday. However, for the Summit Project, construction is proposed from 7:00 a.m. to 6:00 p.m., Monday to Friday except for very rare occasions when construction equipment would arrive at the site at 6:30 a.m. (estimated to be 12 times over the course of the 2.5 year construction period). The change is intended to be consistent with EBMUD's previous response to the City of Berkeley's request for work hours that are more compatible with a residentially developed area, for a different reservoir replacement project currently under construction in Berkeley. Adjusting construction hours to accommodate residential uses is therefore a proactive step to minimize potential noise disturbance associated with construction in the more "sensitive" early morning and evening periods.

Hazardous Materials

Prior to demolition of the existing reservoir, the liner caulking materials in the reservoir lining would be sampled and characterized to identify which is clean or contaminated. The materials would then be removed from the reservoir and disposed at an appropriate waste facility, pursuant to state and federal law. PCB-laden liner caulking materials would be removed and disposed of at a hazardous materials disposal facility. This removal work would take place under the existing reservoir roof to contain the hazardous materials handling though significant access holes would be developed. Similarly, the bulk of the existing roofing material, plywood sheathing, and timber framing system of the existing reservoir cannot be re-used on-site because it is treated wood; instead it would be sent to an appropriate facility for disposal.

There are approximately 1.1-million board feet (3,400 CY) of treated lumber in the reservoir roof which would require dismantling, transportation and disposal in accordance with the regulations. Due to state regulations, there appears to be little, if any, potential for reuse of the treated wood on site. EBMUD also notes that once the existing reservoir is drained, the remaining tank water would be filtered, tested, de-chlorinated, and discharged from the reservoir in compliance with the RWQCB and local sanitary district permits to the sanitary sewer. Tank sediments would also be removed to barrels, tested, and disposed of at the appropriate waste facilities. EBMUD's comprehensive and proactive approach to handling potentially hazardous materials associated with demolition of the existing Summit Reservoir would minimize potentially adverse impacts on health and human safety as well as environmental hazards associated with the Project.

Hydrology

EBMUD's goal for managing new site drainage is to maintain existing drainage patterns. The existing drain invert at the southeast end of the existing reservoir would be lowered and connected to a new manhole on Canon Drive using trenchless construction techniques, which would create much less site disturbance than a traditional cut and cover pipe trenching and backfilling operations, and in this case, would be more cost effective due to the depth of the trench and its alignment (over 10 feet deep and crossing Grizzly Peak Boulevard). This east drain would continue to collect runoff from the new basin as well as new tank roof. Drop inlets on site would be engineered and placed in such a way as to collect flows and send them to the east drain. The new tank roof would be sloped toward the east so that all runoff can also be drained east. This approach would minimize potentially adverse impacts on hydrology associated with the Project.

Construction Specifications

As a public utility, EBMUD has developed and utilized standard construction specifications to comprehensively address quality control for all construction projects. Standard specifications include industry standards and BMPs to minimize on site air, water quality, noise, traffic and greenhouse gas impacts during construction and incorporation of recommendations from geotechnical evaluations/ investigations during the Final Design Phase. However, all mitigation measures proposed for each resource impact identified in the EIR would be incorporated into the specific Project specifications during the Final Design phase for implementation and monitoring during the construction phase.

2.4.3 Operating Characteristics

Operations During Construction

Reservoir Outage Requirements

During construction, water service to the central subzone of the Summit Pressure Zone would continue to be provided by the existing Summit West and Summit East Pumping Plants. A 0.4-MG temporary tank would be located on site immediately north of the existing pumping plants to provide water during construction of the new tank, and a temporary flow control valve enclosed in a small structure would be available to provide emergency and fire flows from Woods Reservoir and the Arlington Pressure Zone. The enclosure would provide security and help mitigate any noise created by operations of the temporary flow control valve (which is expected to be minimal) during construction.

During the new pumping plant construction, the existing Woods and Shasta Pumping Plants would continue to operate, until the new pump station is complete and operational.

Operations of New Facilities (Post-Construction)

The new facilities would operate similar to existing operations. Instrumentation would remotely operate and monitor the pumping plant, flow control valve, and reservoir. The site and facilities would continue to be routinely inspected by EBMUD's Operations and Maintenance staff, EBMUD contractors and PG&E. Long-term site maintenance also involves controlling the growth of annual grasses, keeping the site clean and free of debris, and trimming shrubbery and trees to maintain clear views into the site for both fire prevention and public safety. EBMUD applies local City and County fire prevention vegetation management standards in its on-going site maintenance program.

2.5 Project Schedule and Cost

The EBMUD Board of Directors will consider certification of this EIR and Project approval at a regularly scheduled meeting in November 2011. If approved, reservoir construction would begin as early as 2013 and be completed in 2015, based on a design/bid/award process starting in 2013.

The anticipated Project cost is estimated to be $17 to $25 million for the Summit Reservoir Replacement and about $5 to $8 million for the Woods and Shasta Pumping Plant Replacements. These estimates include design, construction, construction management, outage costs and contingencies.

2.6 Approvals or Authorizations Required for This Project

Table 2-4 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 Project. This EIR is intended to provide those agencies with information to support their decision-making processes. The table also lists the types of activities that would be subject to these requirements.

TABLE 2-4
Permits and Authorizations

Agency or Other Party	Permits and Authorizations Required	Activities Subject to Regulations
Regional Water Quality Control Board (San Francisco Bay[RWQCB])	Storm Water Pollution Prevention Permit	Required for construction on sites of 10,000 square feet or more.
California Air Resources Board (CARB)	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.
Division of Safety of Dams (DSOD)	Review and approval of plans for modifying the dam embankment, lowering the embankment height, and draining the existing reservoir.	The Summit Reservoir and its embankments are currently under DSOD jurisdiction.
California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS)	Determine mitigations for nesting special species birds, roosting monarch butterflies and bat species, if necessary.	Coordinate mitigation measures in conjunction with qualified wildlife biologist.
City of Berkeley	Local encroachment permit (ministerial)	Construction access within city street/sidewalk.
Contra Costa County	Local encroachment permit (ministerial)	Construction access within Contra Costa County easements.
Private homeowners on Vassar Avenue	Temporary construction access or easement agreement on private property	Construction access within private property to access EBMUD right-of-way to Vassar Avenue.

Source: EBMUD 2009

Most of the Project does not require permits from local jurisdictions since all construction would occur on EBMUD owned property. Pursuant to Section 53091 of the California Government Planning Code, projects for water distribution facilities are exempt from zoning and building ordinances of a city or county because they involve construction of facilities for the production, generation, storage and/or transmission of water. Encroachment permits are anticipated for two different locations of pipeline replacement: one from Contra Costa County for trenchless drain pipeline construction operations for new drain connections and a new manhole on Canon Drive; and the other from the City of Berkeley to connect the new I/O pipe to the existing distribution piping and to connect the new drain pipe to the existing storm drain in Vassar Avenue. Additionally, the I/O pipeline replacement within the EBMUD right-of-way may require temporary construction access easement agreements from homeowners immediately adjacent to the right-of-way.

References

CH2M Hill, May 22, 1995. Reservoir Rehabilitation Plan, prepared by for EBMUD.

Converse Consultants, Inc., San Francisco, December, 1985. Summit Reservoir, Seismic Re-Evaluation Study, California, submitted to EBMUD.

Department of Toxic Substances Control, January 2008. CAL-EPA, January 2008 Fact Sheet, Requirements for Generators of Treated Wood Waste, California Government Code, 53091

EBMUD, revised July 2002. Dam Guide – District Dam and Location Maps, EBMUD Materials Engineering Section, prepared by A.B. Yiadom and F.M. Starr.

EBMUD, effective August 2008. Environmental Compliance Manual, Section 10.0 "Reservoir Rehabilitation," EBMUD Regulatory Compliance Office.

EBMUD, March 12, 2009. Geotechnical Feasibility Assessment for Proposed Summit Tanks at Berkeley – Kensington, California, prepared by Materials Engineering Section, Y. Prashar.

EBMUD, September 12, 2009. Geotechnical Review of Preliminary Grading Plan for Proposed Summit Tanks and Berkeley – Kensington, California, prepared by Materials Engineering Section, Y. Prashar.

EBMUD, December 1998. Kensington Fire Flow Study, prepared for Kensington Fire Protection District, prepared by EBMUD's Water Distribution Planning Division.

EBMUD, November 1998. Open Cut Reservoir Master Plan, prepared by Design Division.

EBMUD, October 2006. Open Cut Reservoir Roof Inspection Report Summary, compiled by Design Division, Daniel Wagner.

EBMUD, April 2005. Pressure Zone Planning Program Study – Arlington (A7D) Pressure Zone, prepared by Water Distribution Planning Division, A. Victoria and D. Rehnstrom.

EBMUD, July 2005. Pressure Zone Planning Program Study – Summit (A5A), Tunnel(A4Aa), Stonewall (A4A), Santa Barbara (A4B), Terrace (A4Ba), and Arlington Regulated (A4Bb) Pressure Zones, prepared by K. Gupta, L. Work, and J. Hurlburt.

EBMUD, September 2008. Pumping Plant Rehabilitation Master Plan, Shasta and Woods Pumping Plants.

EBMUD, September 2008. Reservoir Infrastructure Rehabilitation Plan, Facility Evaluations - Summit Reservoir, prepared by Design Division, C. Dodge, M. Toyofuku, J. Young, M. Lewis, E. Owre, B. Maggiore.

EBMUD, September 2008. Reservoir Infrastructure Rehabilitation Plan, Facility Evaluations - Woods Reservoir, prepared by Design Division, E. Owre, M. Lewis, J. Young, M. Toyofuku.

EBMUD, February 1995. Reservoir Materials Assessment – Final Report, prepared by CH2M Hill for EBMUD.

EBMUD, November, 18, 2009. Status of EBMUD's Reservoir Rehabilitation/ Replacement Program, letter from EBMUD Office of Environmental Compliance to Alameda County District Attorney's Office, City of Berkeley Planning & Development Department, Alameda County Heath Care Services Agency, and Contra Costa County Health Services Department.

EBMUD, January 2010. Summit Reservoir Draft Outage Plan, prepared by Water Distribution Planning Division, Angelina Wai and Robyn M. Mutobe.

EBMUD, February 2009. Water Supply Management Program 2040: 2040 Demand Study, prepared by EBMUD, Karen E. Johnson – Water Resources Planning, and EDAW|AECOM in association with CBRE Consulting, Inc. and Weber Analytical.

GEI Consultants. May 28, 2009 Geologic Hazards Evaluation, Proposed Water Storage Tanks Summit Reservoir, Berkeley-Kensington, California.

Hancock, Craig A. (Certified Arborist #2181) and Llewellyn, Pamela of the Professional Tree Care Company, December 20, 2010. Arborist Report, Summit Reservoir, Berkeley, CA, prepared for Dillingham Associated Landscape Architects.

Law/Crandall, Inc. and CH2M Hill, April 10, 1997. Management Plan for Reservoir Rehabilitation and Maintenance, prepared for EBMUD.

Chapter 3

Environmental Setting, Impacts and Mitigation Measures

3.1 Introduction

3.1.1 Organization of Chapter 3

Chapter 3 is organized by environmental discipline, as follows:

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

Each section of Chapter 3 provides the following, based on requirements of CEQA.

Approach to Analysis

This subsection describes the general approach to analyzing a given environmental topic and cross-references related issues addressed elsewhere in this EIR.

Setting/Regulatory Framework

This subsection presents a description of the existing physical environmental conditions in the vicinity of the Project and pertinent regulations including local and regional plans.

Significance Criteria

Refer to the discussion presented in Section 3.1.3.

Impacts and Mitigation Measures

Refer to the discussions presented in Sections 3.1.3 and 3.1.4.

3.1.2. Resources Not Evaluated Further in the EIR

Section 15128 of the 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."

Section 15083 Early Public Consultation

"(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 Section 15128 and 15083 (a) of the CEQA Guidelines, this EIR analyzes only those effects identified as potentially significant in the Initial Study prepared for this Project. These effects include: Aesthetics/Visual Quality; Geology/Soils; Biological Resources; Cultural Resources; Transportation and Traffic; Air Quality; Greenhouse Gas Emissions; Noise and Vibration; Hydrology/Water Quality; and Hazards/Hazardous Materials.

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

The Initial Study prepared for the Project is attached as Appendix B.

3.1.3 Impact Significance

In Chapter 3, the environmental impacts of the proposed Project are identified and classified as either significant or less than significant. Section 15382 of the 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 category of physical conditions evaluated in this EIR, criteria for significance have been developed, using the CEQA Guidelines, city and county standards and policies, or the "significance thresholds" of federal, state, regional, or local agencies. Impacts classified as significant meet the criteria for significance developed for each category of physical conditions. Impacts that are not significant (because they do not meet the significance criteria) are identified as less than significant. These less than significant impacts include conditions where there is no measurable physical change in the environment, i.e., no impact.

Impacts were determined by comparing the environmental effects of constructing and operating the Summit Reservoir Replacement Project with existing environmental conditions. Each impact is numbered, and mitigation measures identified for that impact are assigned the same number. Chapter 5 addresses cumulative impacts associated with the proposed Project.

3.1.4 Mitigation Measures

CEQA Guidelines Section 15126.4(a) (1) states that an EIR "shall describe feasible measures, which could minimize significant adverse impacts..." Section 15126.4(a) (3) also states that "mitigation measures are not required for effects, which are not found to be significant." In this EIR, mitigation measures are identified (where feasible) for all of the significant impacts and for some of the impacts labeled as less than significant, and the residual effect after mitigation is noted. In general, the mitigation measures proposed reduce potential impacts to a Less Than Significant Level After Mitigation, but for two resource issues, impacts remain Significant and Unavoidable, Even With Mitigation (Noise and Vibration and Transportation and Traffic). All mitigation measures noted are proposed as part of the Project, including the optional measures proposed for impacts considered to be less than significant.

Mitigation measures would be incorporated into contract specifications to be implemented by contractors (or EBMUD employees), and monitored by EBMUD construction inspectors and EBMUD staff. The MMRP prepared for the Project identifies the responsible parties through each Project phase, from Design and Construction to Operations and Maintenance

3.2 Aesthetics/Visual Quality

3.2.1 Approach to Analysis

This section addresses the aesthetic and visual quality impacts associated with construction and operation of the proposed Summit Reservoir Replacement Project. It includes a description of visual conditions in the Project area and an evaluation of potential effects on visual resources and public view corridors. Presumed views from private viewpoints are also discussed, based on existing visual conditions at the Project site and surroundings. This visual assessment addresses replacement of the Summit Reservoir, and construction of a new Woods and Shasta Pumping Plant/Summit flow control valve and inlet/outlet (I/O) pipeline which would entail major site disturbance and structural change. A detailed description of Project elements and construction sequencing is contained in Chapter 2, Project Description.

For purposes of this analysis, visual or aesthetic resources are generally defined as the natural and built landscape features that can be seen. The overall visual character of a given area results from the combination of natural landscape features, including landform, water, and vegetation patterns, as well as the presence of built features such as buildings, roads, and other structures.

The EIR impact analysis considers view obstruction, negative aesthetic effects, and light and glare effects. As part of the analysis, a set of computer-generated visual simulations were produced to illustrate conceptual "before" and "after" visual conditions as seen from key public vantage points. The visual simulations provide a clear depiction of the location, scale, and general appearance of proposed Project elements and changes. Digitized photographs and computer modeling and rendering techniques were used to prepare the simulation images.

The simulations are based on conceptual Project drawings and technical data developed by EBMUD and its architectural consultant Muller & Caulfield Architects and Dillingham Associates Landscape Architects as described in the EBMUD Summit Reservoir Replacement Project Final Report – Planning Phase Architecture Design Report, June 2010 (Summit Design Report).

The visual assessment is based on field observations of the Project site and surroundings in addition to a review of topographic maps, Project drawings, technical data, aerial and ground-level photographs of the Project area, and computer-generated visual simulations from representative viewing locations.

EBMUD explored a range of replacement tank sizes from 3.5 to 5 MG for the Project as different Project alternatives (see Chapter 4). Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the "worst case" construction footprint and potential impacts associated with the replacement tank. The differences in impacts created by the larger 5-MG tank are primarily the construction duration and the tank footprint size. There is approximately 30-feet difference in diameter between a 5-MG tank and a 3.5-MG tank of the same height. All of the proposed Project renderings in this EIR and used to assess visual quality and aesthetics depict the 5-MG tank.

3.2.2 Setting

Regional Setting

The Summit Reservoir site is located in the Berkeley Hills. **Figure 3.2-1** shows the regional landscape context for the Summit Reservoir Replacement Project.

Source: EBMUD 2010

Regional Landscape Context
Figure 3.2-1

The regional visual setting contains visual resources representative of California's northern Coast Range 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. Within this setting, peaks, open ridgelines and wooded hillsides are prominent landscape features that provide a visual backdrop for the region's urban and suburban development pattern.

The primary topographic feature is the Berkeley Hills, which roughly parallel the San Francisco Bay shoreline, rising to elevations of over 1,500 feet.

The major local roadway that crosses the Project area is Grizzly Peak Boulevard which stretches along the Berkeley Hills from Euclid Avenue to Skyline Boulevard in Oakland, and Spruce Street, a two lane collector north-south street. The nearest freeway is Interstate 80 (I-80), approximately 2 miles to the west, and the nearest regional roadways are Interstate 580 (I-580) and San Pablo Avenue. (Refer to Chapter 3.6 Traffic and Transportation for a complete listing and description of area-wide streets and roadways that access the Project site). The site is accessible from a network of flatland and hillside residential streets.

Project Area Setting

Visual Character and Quality

Summit Reservoir is located at the top of the Berkeley Hills, straddling the border between Kensington and Berkeley, at the intersection of Spruce Street and Grizzly Peak Boulevard. Tilden Regional Park is approximately one-quarter mile to the east. The Project site is located within a residentially developed area, consisting primarily of single family homes, with mature landscaping. Single-family homes directly abut the Beloit Avenue and Vassar Avenue property lines (to the north and west, respectively). Directly across from the site, at the intersection of Grizzly Peak Boulevard and Spruce Street is the Shepherd of the Hills Church.

The reservoir is constructed in a saddle, with higher elevations directly to the north and south. Earthen embankments, constructed in the 1890s on the east, southwest and west, define three sides of the reservoir. Grizzly Peak Boulevard is on top of the east embankment, while the west and southwest embankments slope steeply away (and to the west) of the existing reservoir basin.

The existing 17-acre site includes the 37-MG open-cut reservoir, enclosed with a wooden roof (7 acres), along with two pumping plants and an access road. There are approximately 7 acres of trees on the site of varying condition and age, mainly along the steep western slopes. There is no public access or public use of the site except for two existing overlook areas on the south and northeast edges (Spruce Street Overlook looking north, and at the

Grizzly Peak Boulevard Overlook looking southwest) and a landscaped setback between Grizzly Peak Boulevard sidewalk and the existing fence.

The public has views of the existing reservoir roof at the Spruce Street and Grizzly Peak Boulevard Overlooks. Views of the existing reservoir roof are also prominent for drivers traveling along Grizzly Peak Boulevard.

Figure 3.2-2 shows an aerial view of the existing site characteristics and features for the Summit Reservoir site, with primary public views identified with arrows.

Source: Muller & Caulfield / Dillingham Associates 2010

Aerial View of Existing Summit Reservoir Site
(with public views)
Figure 3.2-2

Summit Reservoir Site History

The history of the Summit Reservoir is detailed in Chapter 2, Project Description. The existing pump house and pump pit are screened from view by a dense growth of trees planted by EBMUD. **Figure 3.2-3** is a plan view of all elements of the proposed Project including temporary tank, permanent replacement tank, the new Woods and Shasta Pumping Plant/ Summit flow control valve, I/O pipeline alignment and new access road.

Source: Muller & Caulfield Architects/Dillingham Associates 2010

Plan View - Summit Reservoir Replacement Site
Figure 3.2-3

The reservoir was drained and lined with concrete in the early 1940s, and a multi-tiered wood roof was installed in 1972 to help maintain water quality, and in anticipation of more stringent water quality regulations. The wood roof system is supported by concrete and steel columns and timber framing. The reflecting pond was removed from the existing reservoir roof in 1998 as required by the California Department of Health and Safety to prevent possible drinking water contamination from the reflecting pond above.

The community was engaged in the design process through a series of meetings as EBMUD mitigated visual impacts related to the removal of the reflecting pond. In its place, a river rock hardscape design and metal bird sculptures were placed on the roof, and the existing Spruce and Grizzly Peak overlook areas were improved with new plantings and benches as well as a new dog watering station.

Figure 3.2-4 depicts two profile views of the proposed site facilities, conditions and features within the excavated reservoir basin.

Source: Muller & Caulfield Architects/Dillingham Associates 2010

Profile Views of Summit Reservoir Replacement Project
Figure 3.2-4

Project Viewshed and Public View Corridors

Existing

The public has views of the existing reservoir roof at the Spruce Street Overlook, looking north, and at the Grizzly Peak Boulevard Overlook, looking southwest. The northern access road to the site from Beloit Avenue provides a limited and narrow southern view into the site.

The eastern side of the reservoir is exposed to public views from Grizzly Peak Boulevard. Other public views occur along the curve at the upper end of Spruce Street, throughout the intersection of Spruce Street and Grizzly Peak Boulevard, and further south along Grizzly Peak Boulevard. Simulated views from these locations were created in order to evaluate the visual harmony of the proposed Project. A few residents to the north, along Beloit Avenue have partial views of the existing reservoir roof, but these views are mostly screened by existing trees on the northern boundary of the site. There is virtually no view to the existing reservoir from the adjacent houses on Vassar Avenue, on the west side, due to a combination of the dense tree cover along the steep slope of the western embankment and the much lower elevation (over 40 feet) of the Vassar homes compared to the existing reservoir roof.

Due to the presence of mature tree cover along the site perimeter and embankment downslope of the reservoir, views of the Project site from Beloit, Vassar and Spruce range from obstructed to partially obstructed/filtered. Pedestrian and cyclists using the Spruce Street Overlook and Grizzly Peak Boulevard have more direct, eye-level views into the site. **Figure 3.2-5** presents a site plan of the existing reservoir site showing neighbors' views (shown as arrows) identified/evaluated in the Summit Design Report, 2010. Existing views of the site from residences surrounding and overlooking the site are filtered and partially obscured; the visual focus is the tar and gravel reservoir roof, which is a "hardscape" view, surrounded by mature trees and shrubs to the north, west and south.

Proposed

Based on a design assessment conducted in 2009 (updated 2010), five primary views were identified and analyzed to determine which design concepts would best address Project impacts on site aesthetics and the community's concerns.

Based on requests, the design team visited the homes of several neighbors in order to evaluate their potential views of the new site design. Only one had a partially clear view of the site and the new tank location: the house at 524 Beloit Avenue. Views toward the new tank location from the other houses on Beloit Avenue were screened by trees.

Source: Muller & Caulfield Architects/Dillingham Associates 2010

Site Plan of the Existing Reservoir
Figure 3.2-5

All homes along Vassar Avenue are situated at elevations too low to have any view of the new tank site, and existing trees along the property perimeter would continue to provide screening.

Through analysis of the Project site, goals, and objectives, and with community input from a series of public meetings, three design alternatives were ultimately developed. Design criteria considered in the process included: balanced cut and fill of earthwork and re-use of demolition materials on site; preservation of existing perimeter trees; ease of operations and maintenance; constructability; preservation of existing overlooks and inclusion of new walking path adjacent to Grizzly Peak Boulevard; aesthetics, tank screening, and planting guidelines emphasizing use of drought-tolerant, low maintenance and native plantings and trees, balanced with site security requirements and public safety concerns.

The preferred design selected for the Project (Figure 3.2-3) would include:

- Construction of a temporary flow control valve and temporary tank immediately adjacent (west and north respectively) of the existing pump house, in a location that is fully screened by a dense bank of trees bordering the Vassar property boundary;
- Demolition of the existing open cut reservoir, roof and structures;
- Construction of one partially buried concrete tank in the excavated reservoir basin, with backfill from the concrete reservoir lining debris and the earthen embankment used to create a 25-foot high berm that screens the tank, primarily from views along Grizzly Peak Boulevard and the Spruce Street Overlook;
- Construction of a new Shasta and Woods Pumping Plant structure with a new Summit flow control valve, and a new I/O pipeline that connects the new reservoir to existing mains along Vassar Avenue, in a location downslope/west of the reservoir basin;
- A comprehensive, conceptual landscape plan for all areas disturbed by construction within the excavated reservoir basin, including a mix of native grasses, shrubs and trees, as well as a gravel feature at the lowest point of the re-contoured basin (modeled on and re-using materials from the existing river rock roof feature, including the existing metal bird sculptures);
- Construction of a new valve pit at the base of the new tank on the west (screened) side;
- Construction of a new access road west of the new tank, which follows the existing access road alignment;
- Construction of a new six foot wide pedestrian path with a pervious surface and straight fence, set back approximately 25 feet from the existing sidewalk on Grizzly Peak Boulevard, separate from but contiguous to the two existing public overlooks on Spruce Street and Grizzly Peak Boulevard with a planted median strip between the existing sidewalk and new path; and
- A new 8-foot high black plastic-coated chain link standard security fence with one inch mesh and barbed wire along the top to replace the existing fence along the reservoir property perimeter.

Additional architectural and planting guidelines are also proposed for use in the final design phase to further address potential aesthetic considerations associated with the Project.

Architectural Guidelines

The following architectural guidelines would be used in the preferred design selected for the Project:

1. Roof - A gray tar and gravel roof would be installed. A guardrail (42 inches high) would be installed on the roof in locations where the top of the tank is more than 30 inches above the adjacent ground level. Since the tank would be hidden from view by the berm and landscaping, no architectural treatment is proposed for the roof or the guardrail. The color for the guardrail would be either black or the same green proposed for the tank walls.
2. Tank walls - The 3.5-MG tank would be constructed of reinforced concrete, to current seismic code standards. The tank walls would be painted green (Federal Standard 24159), a color which is readily available for EBMUD Maintenance crews. At full height the tank wall would be 36 feet high, but the full height would not be exposed at any point because all sides of the tank walls would be partially buried. The amount of exposed tank walls would vary from approximately 30 feet on the west side to approximately 30 inches on the east side (visible from Grizzly Peak Boulevard). The high, exposed tank walls on the west side would not be visible to the public.
3. Pump house - The pump house would be screened by existing perimeter trees left intact as well as new vegetation as noted on the architectural site plan. As a result, the pump house structure would not require architectural embellishments. The structure would be rectangular and consist of either reinforced concrete or concrete masonry unit walls.

Planting Guidelines

Based on the eight planting guidelines listed in the design criteria in the Summit Design Report 2010, proposed planting for the Summit Reservoir site would include the following species:

1. Trees - Trees would be a mix of California-native broad-leafed evergreens including redwoods and native oak species such as coast live oak, canyon live oak, interior live oak and Englemann oak. Due to their drought-tolerant character and low ultimate height, oak trees are slow growing and should reach their ultimate 25-foot height in about 20 to 30 years. Redwoods are faster growing and would provide more immediate screening, if needed.
2. Shrubs - Additional screening would come from native shrubs such as Ceanothus species, silktassel, and coffeeberry. The first two plants would reach an ultimate height of 10 to 12 feet. Coffeeberry would be somewhat shorter at an ultimate height of 8 to 10 feet tall. Ceanothus are fast growing and would provide quick screening. The other two plants have moderate growth rates. Other shrubs proposed include toyon and flannelbush.

3. Grasses - The initial seed mix would include native and drought-tolerant grasses and wild flower seed and would be used to cover the ground surfaces and aid in erosion control.

Ultimately, the design goal would be to integrate the new construction within the existing site and create a visually continuous and harmonious landscape which is compatible with the open space setting that presently characterizes much of the site and larger setting in nearby Tilden Park.

3.2.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses the following standards of significance as based on CEQA Guidelines Appendix G. Would the project:

- Have a substantial, adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or night time views in the area.

The significance determination is based on several evaluation criteria, including the extent of Project visibility from sensitive viewing areas such as designated scenic routes, public open space, or residential areas; the degree to which the various Project elements would contrast with or be integrated into the existing landscape; the extent of change in the landscape's composition and character; and the number and sensitivity of viewers.

Impacts and Mitigation Measures

Impact 3.2-1: Short-term visual effects experienced from nearby areas during Project construction.

Construction activities associated with the reservoir replacement would require earthwork, stockpiling of material, and the use of heavy equipment. Earthwork could periodically create dust, however best management practices including (but not limited to) covering and watering stockpiles would be employed to minimize the impacts of dust. The construction period is projected to last 2.5 years. Reservoir construction would focus on the general area of the existing basin and the western embankment, and on access roadways within the Project site. The degree to which construction activities within the excavated reservoir basin would be noticeable would vary, depending on the view currently experienced by residents, pedestrians and drivers along streets bordering the site (as previously described), and the view that would be experienced during the construction phase. Views of equipment, material and soil stockpiles, and vehicles during demolition of the reservoir and construction of the new tank would be noticeable to passersby or drivers along Grizzly Peak, or any partial viewing point along Spruce Street or Beloit Avenue. After construction of the new tank, the steep slopes of the excavated basin would be backfilled, regraded with a series of contours and berm and comprehensively landscaped to create a new visual aesthetic and screen the new tank.

The temporary tank and temporary flow control valve, new pumping plant and new flow control valve, and I/O pipeline would be screened from view during and after construction because they would be located to the rear of the reservoir and on the western embankment (downslope) which is presently screened by existing trees bordering the Spruce, Vassar and Beloit property lines. The temporary tank and temporary flow control valve would be removed when the permanent tank is completed and in-service. During demolition and construction of the I/O pipeline, minor, temporary disruptions to existing views/aesthetics for a few residents along Vassar are anticipated for a 4 to 6 week period. Once constructed, the new I/O pipeline would not be visible since it would be buried. Although Impact 3.2-1 would be less than significant, EBMUD proposes to implement Measure 3.2-1 to further screen construction activities from off-site views, to ensure that the construction site would be maintained in an orderly manner, and to communicate the Project need to area residents.

> **Measure 3.2-1:** EBMUD will require the construction contractor to ensure that the construction site is clean by storing building materials and equipment within the proposed staging areas in the reservoir basin, or in areas removed from public view where feasible, and by promptly removing trash and construction debris that will not be reused on site. Construction phasing will be organized to minimize equipment storage on site.

Implementation of Mitigation Measure 3.2-1 would further reduce the visual impacts to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.2-2: Alteration of the site's appearance and long-term visual effects.

The changes proposed as part of the reservoir replacement would constitute a major alteration in the appearance of the Project site at Project completion, which would be a significant change. However, the change includes improvements to existing site visuals/ aesthetics, and would be less than significant. The specific modifications proposed and the resulting changes in site appearance are described below, with references to proposed site layout drawings.

Removal of the tar and gravel reservoir roof and replacement of the existing open cut reservoir with a smaller partially buried tank within the excavated, landscaped basin would noticeably alter existing visual conditions, by changing a "hardscape" view of the tar and gravel roof to a design that includes a comprehensively planted landscape area and re-created gravel feature with bird sculptures. The proposed new design would integrate the new design elements with existing mature vegetation on the site to create a varied, “soft” landscape and open space than presently exists.

Proposed landscaping and redesign of the excavated reservoir basin and new tank roof would also create visual continuity within the new reservoir site and the existing landscaped setting. Recreating the existing gravel feature within the excavated and newly landscaped basin would provide an element of design continuity (with the old roof design) as well as establish new site aesthetics. Overall, the change from the existing “hard” linear elements of the existing reservoir roof and tank form to a comprehensively landscaped basin with a reused gravel feature would create a more harmonious, natural setting that significantly improves site aesthetics and visual quality.

The new design would also return the site to an approximation of its original open-space character with non-linear, undulating landforms characteristic of a hill environment which existed before the site was dammed as an open cut reservoir and then roofed. Ultimately, the new Project elements, the site layout, and Landscape Plan would provide an improved view for most of the people who drive or walk around the site perimeter.

Reducing portions of the western dam embankment by approximately 20 to 30 feet would entail removal of shrubs, groundcover and trees. Areas disturbed by construction of the new reservoir, the new pumping plant structure, the new access road/parking area, and the new I/O pipeline would also require tree removal. However, since these construction areas are interior to the site, adjacent residents along Vassar, Beloit and most of Spruce would generally not have views of construction activities for those facilities. Exceptions would include residents across from the Spruce Overlook and Beloit driveway. Passersby, pedestrians or motorists along Grizzly Peak would have clear views into the site for all reservoir demolition and construction phases, but this would be of limited duration.

The existing 6 foot high perimeter chain link fences would be replaced with an 8 foot high fence with one inch, black plastic coated webbing. The replacement fence would alter but would not significantly reduce visibility into the site or compromise site aesthetics. The only fence which would remain is the existing decorative steel fence and trellis adjacent to the Spruce Street Overlook. The new fence would improve site security consistent with EBMUD’s Vulnerability Assessment Program.

The conceptual landscape plan proposed as part of the Project includes a recommended palette of native, drought tolerant grasses, shrubs and trees. The landscape design scheme may be refined during the final design phase, pursuant to the Architectural and Design Guidelines previously noted, but would remain consistent with the landscape plan presented in this EIR and in the 2010 consultant Summit Design Report. Overall, the landscape plan was designed to improve site aesthetics, provide screening of the replacement reservoir, and integrate the new facilities with existing landscaping, and provide a measure of erosion control for the significantly re-graded basin and new berm, while balancing these objectives with security and public safety requirements. To ensure that the Project is implemented and maintained as proposed, and that public input is incorporated into the landscape plan, the following mitigation measure is listed.

Measure 3.2-2:

- During the Design Phase, EBMUD will prepare a Landscape Plan for the Summit Reservoir Replacement Project consistent with the 2010 Planning Phase Architecture Design Report. The Plan will incorporate the results of a tree assessment that documents the number and condition of all protected (as defined by the City of Berkeley and Contra Costa County tree ordinances) trees proposed for removal as a result of Project construction, and propose a detailed planting plan (including replacement trees) that will ensure that areas disturbed by construction are re-graded and planted to result in landforms that are non-linear/undulating and more compatible with the prevailing existing site topography, landscaping, and the neighborhood setting. The Landscape Plan will include all areas proposed for grading or construction which includes the entire reservoir basin.
- EBMUD will require its construction contractor to provide a warranty for new plantings for 1 year after Project completion.
- EBMUD will continue to apply local City and County fire prevention vegetation management standards in its on-going site maintenance program at the Summit Reservoir site.
- EBMUD will ensure that the Contractor restores graded, disturbed areas to a natural-appearing landform characteristic of the larger hill setting where appropriate.
- EBMUD will incorporate site improvements which will include aesthetic/architectural treatment where facilities are located near to, or are visible from, public areas, sidewalks and residences, namely:
  - Construct a new 6-foot-wide pedestrian path with a pervious surface and straight fence, set back approximately 25 feet from the existing sidewalk on Grizzly Peak Boulevard, with planted median strip between the existing sidewalk and new path.
  - Plant “infill” trees between the reservoir basin and the Beloit neighbors and Beloit driveway to screen the new facilities.
  - Replace the existing 6 foot high perimeter chain link fence with a 2-inch mesh with an 8-foot high fence with 1-inch black mesh at its existing location.
  - For work in EBMUD right-of-ways, EBMUD will replace landscaping removed for construction pursuant to current EBMUD right-of-way agreements, the Recommended Plant List for EBMUD Right-of-Ways, and as feasible. Where existing trees and

other facilities or structures may prohibit future access and maintenance to the EBMUD facilities located within the right-of-way, in coordination with the homeowner, replacements may be re-located outside the right-of-way to a different location on the homeowner's property.

Implementation of Mitigation Measure 3.2-2 would reduce the visual impacts to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.2-3: Effects on a scenic vista.

The Project site is not within a defined scenic vista. Dense tree banks along Vassar, Beloit and Spruce allow only obstructed/filtered views into the site from adjacent residences. Mature trees of varying condition downslope of the western dam embankment block distant views of the Bay and although many trees are proposed for removal to construct the temporary tank, new pumping plants, and I/O line, these facilities would be located in the interior of the property and blocked from view of most residents. Unless public safety necessitates, trees that provide perimeter screening into the site would not be removed as part of this Project. Project demolition and construction would therefore not create or open new scenic vistas. For these reasons, there would be no impact on scenic vistas associated with the Project.

Mitigation Measure: None Required.

Impact 3.2-4: Effects on views from the surrounding area, including public roadways, public areas and residential areas.

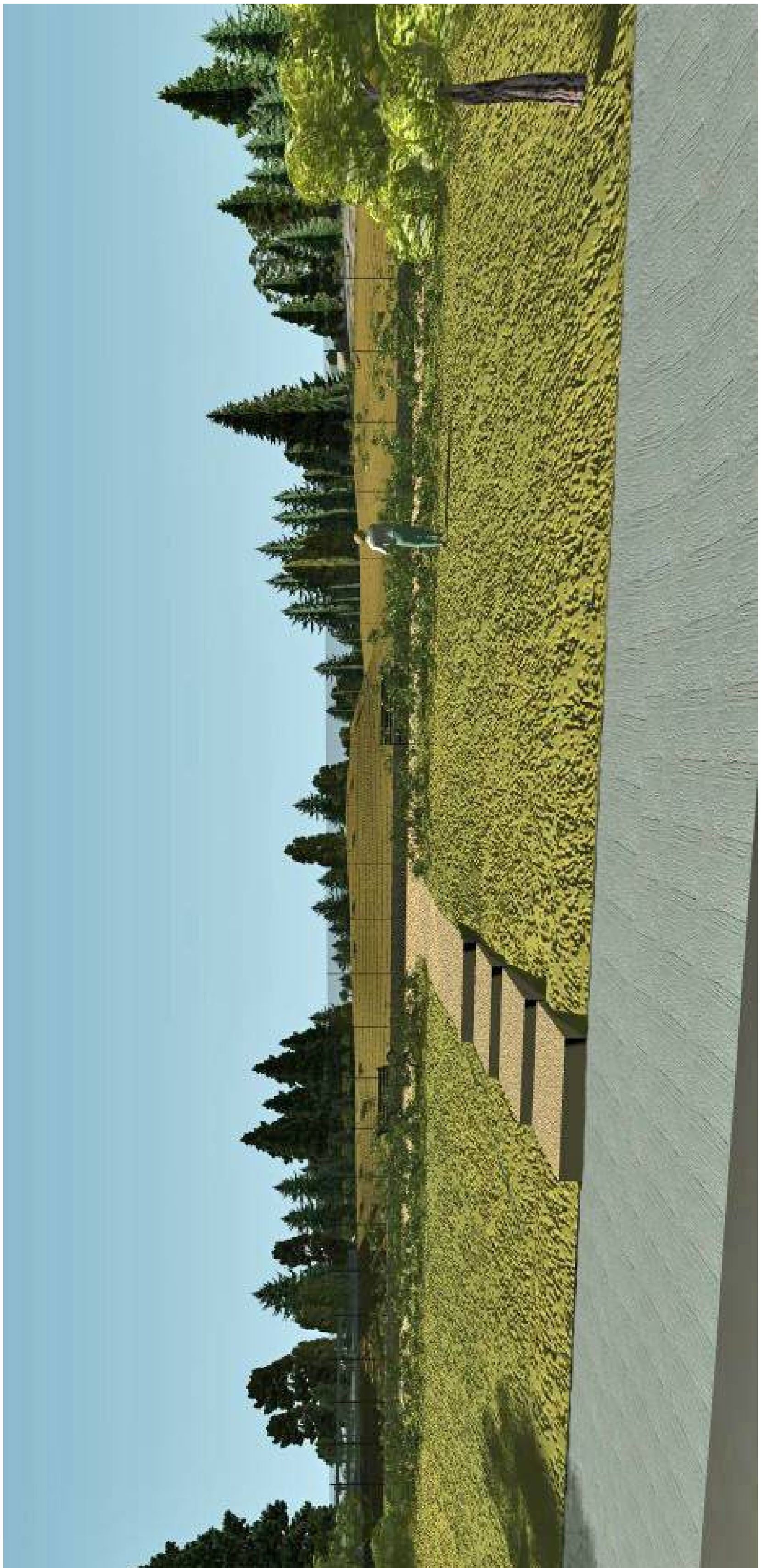
As previously described, construction of the replacement tank at the Project site would result in a significant transformation of the visual character and site aesthetics, for pedestrians, adjacent residents, and drivers along Grizzly Peak Boulevard, limited areas along Spruce Street and along Beloit Avenue. These changes would be most noticeable for construction within the reservoir basin, and less so for construction proposed downslope of the reservoir basin, notably the new pumping plant/flow control valve and I/O pipeline with gravel access road.

As part of the aesthetic impact evaluation for the proposed Project, visual simulations were produced using computer modeling and rendering techniques. As presented in **Figures 3.2-6, 3.2-7, 3.2-8 and 3.2-9,** the simulations illustrate the appearance of the proposed Project changes as seen from representative public viewing locations along Grizzly Peak Boulevard, Spruce Street and Beloit Avenue. The evaluation of potential visual impacts is based on the images portrayed in the simulations, on the proposed conceptual design and landscaping plan, and on an assessment of the degree of visual change that the Project would establish.

All simulations of the site show views of an expansive open space setting, with a re-contoured, undulating topography consisting of a large berm, planted with a mixture of grasses, shrubs and trees, framed by banks of mature trees. Views into the excavated basin show a planted basin with a recycled gravel feature and bird sculptures. Some replacement native trees would be planted on the large berm that screens the partially buried tank, to avoid a formal, linear pattern that does not reflect a natural landscape. The replacement 8-foot high black chain link fence is also represented.

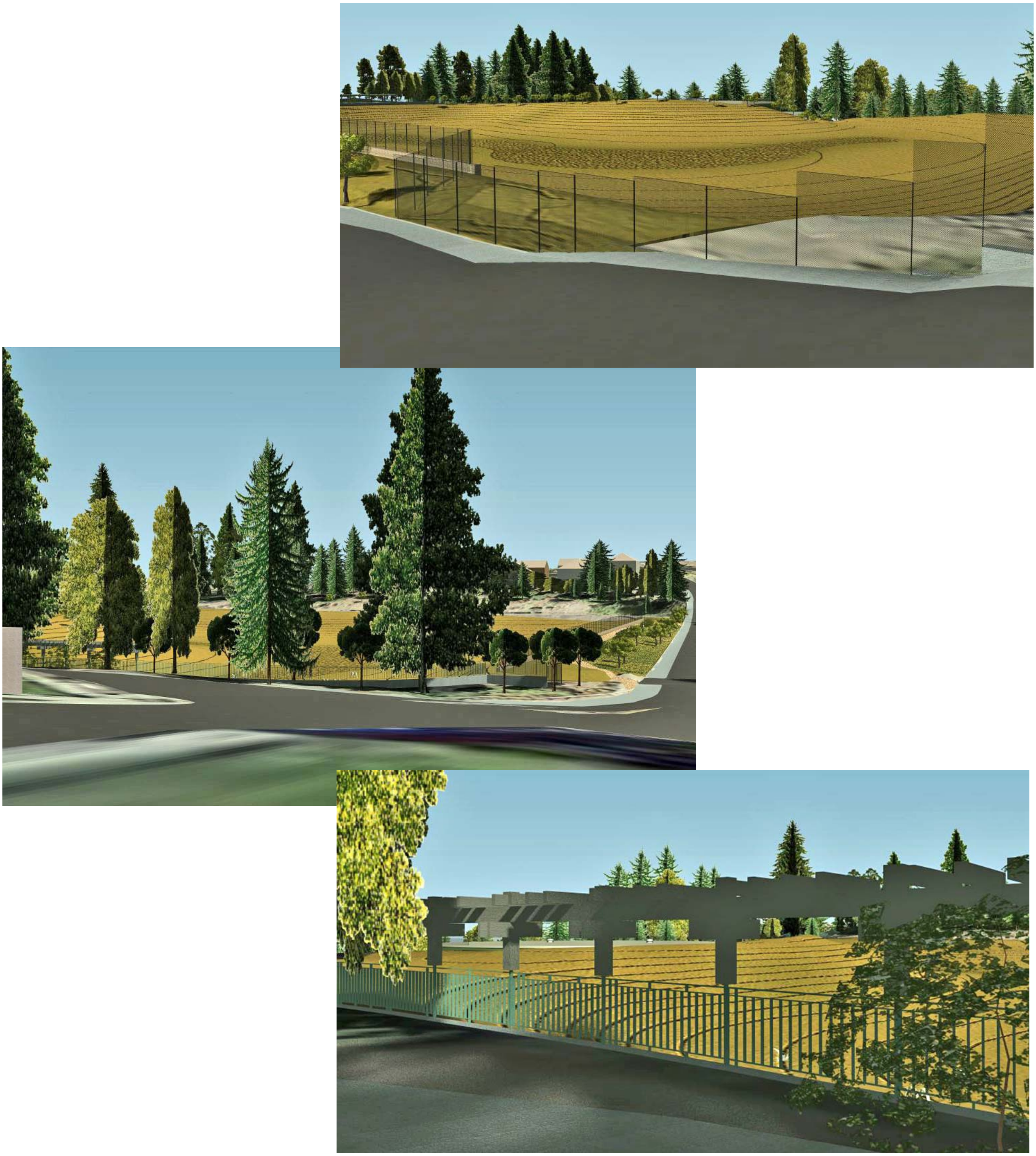
The Proposed Project - Aerial View From South
Figure 3.2-6

Source: Muller & Caulfield Architects/Dillingham Associates 2010



Source: Muller & Caulfield Architects/Dillingham Associates 2010

Grizzly Peak Boulevard to the Middle of the Site
Figure 3.2-7



Source: Muller & Caulfield Architects/Dillingham Associates 2010

Street Views as seen from Grizzly Peak Boulevard, Spruce Street and Beloit Avenue
Figure 3.2-8

Source: Muller and Caulfield Architects/Dillingham Associates 2010

Existing View of New Tank as seen from Access Drive from Beloit Avenue
Figure 3.2-9

As illustrated in the simulations, Project related visual changes would not substantially affect existing views from the surrounding residential area because existing perimeter vegetation along Beloit, Vassar and Spruce, which provides screening into the site, would remain unchanged. Views into the site from these locations would continue to be partially obstructed and filtered. As landscaping within the basin becomes mature and established, new plant material would create additional visual interest as well as screening of the partially buried tank which would enhance views from Grizzly Peak Boulevard and the public overlook areas. Over time, proposed landscaping would integrate the new tank, pumping plant structure, access roads and re-contoured embankment slope within the overall existing site landscape. For the reasons noted, the visual impact associated with this Project would be considered less than significant and no additional mitigation measures would be required. However, implementation of Mitigation Measure 3.2-2 would further reduce the visual impacts of the Project.

Significance after Mitigation: Less than Significant.

Impact 3.2-5: New sources of light and glare associated with the reservoir construction.

Project Construction

Night time construction beyond the normal construction work hours is not proposed but under unspecified or yet unknown conditions (emergencies) night time construction may be warranted. If warranted, the purpose and hours of night time construction would be defined and adjacent residents notified in advance, if feasible or if night time construction would be more than 24 hours duration. Night lighting, including the installation of temporary light poles, could be installed but would be removed when Project construction is complete.

Night time construction would affect views from adjacent residences and could be visible from residences across Spruce or along Beloit. However, given the level of existing screening provided by perimeter and intervening vegetation bordering and within the Project site, night time lighting effects on roadway and residents' views would be partial, intermittent and brief in duration, and only apply to construction within the excavated reservoir basin. Any night time construction of other Project elements (on the western embankment) would be out of view. With implementation of Measure 3.2-5, these short-term, construction related visual effects would be less than significant.

Project Operations

The proposed Project does not include installation of permanent new exterior lighting and therefore would not result in night time lighting effects. The Project would not introduce reflective surfaces, such as glass or metal, with the potential to reflect light. Therefore, the proposed Project would not result in permanent new sources of potential light and glare, and there would be no significant impact.

> **Measure 3.2-5:** To the extent possible**,** EBMUD will ensure that stationary lighting used during night time construction (if required) is of limited duration, shielded and directed downward or oriented such that little or no light is directly visible from any residential street (Spruce, Vassar or Beloit) or Grizzly Peak Boulevard. No permanent night time lights will be constructed on the site.

Implementation of Mitigation Measure 3.2-5 would reduce visual impacts to less than significant.

Significance after Mitigation: Less than Significant.

References

Hancock, Craig A. (Certified Arborist #2181) and Llewellyn, Pamela of the Professional Tree Care Company, December 20, 2010. Arborist Report, Summit Reservoir, Berkeley, CA, prepared for Dillingham Associated Landscape Architects.

Muller and Caulfield Architects/Dillingham Associates, 2010. EBMUD Summit Reservoir Replacement Project Final Report – Planning Phase Architecture Design Report.

3.3 Geology/Soils

3.3.1 Approach to Analysis

This section evaluates whether construction and operation of the proposed Summit Reservoir Replacement Project would result in potentially adverse impacts related to local geology, existing soil conditions, or seismicity. The analysis is based, in part, on review of various geologic maps and reports and other literature. The primary sources and conclusions include:

- 1981 National Dam Inspection Program – Summit Reservoir. This study deemed the reservoir to be stable and functioning satisfactorily and considered the dam to be safe for continued operation.
- 1985 Converse Consultants Seismic Re-Evaluation Study. Concluded that the materials in the foundation and reservoir vicinity are primarily clay and would not liquefy or lose shear strength under earthquake loading. This report was submitted to and approved by DSOD.
- 2009, GEI Consultants, Geologic Hazards Evaluation. Concluded the site is suitable for the proposed Project and significant seismic and geologic hazards are not present at the site.
- March 12, 2009, Geotechnical Review Feasibility Assessment for Proposed Summit Tanks at Berkeley – Kensington, California. Internal review concluded that the three alternate tank locations were feasible for the construction of the proposed tank and the south west portion of the existing reservoir basin would be the most favorable location.
- September 12, 2010, Geotechnical Review of Preliminary Grading Plan for Proposed Summit Tanks and Berkeley – Kensington, California. Internal review concluded the preliminary grading plan was feasible and outlined recommendations and a scope for a supplemental geotechnical investigation program.

Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the “worst case” construction footprint and potential impacts associated with the replacement tank.

3.3.2 Setting/Regulatory Framework

California Building Code

The 2010 California Building Code (CBC) has been codified in the California Code of Regulations (CCR) as Title 24, Part 2, which is a portion of the California Building Standards Code. The California Building Standards Commission is responsible for coordinating building standards under Title 24. Under state law, all building standards must be centralized in Title 24 or they are not enforceable.

The purpose of the CBC is to provide minimum standards to safeguard property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of building and structures within its jurisdiction. The International Building Code (IBC), published by the International Conference of Building Officials, is the widely adopted building code in the United States. The 2010 CBC is based on the 2009 IBC, with necessary California amendments. These amendments include significant building design criteria that have been tailored for California earthquake conditions and for the design of schools and hospitals.

The Project region is located within Zone 4, one of the four seismic zones designated in the United States. Zone 4 is expected to experience the greatest effects from earthquake groundshaking and therefore has the most stringent requirements for seismic design. The national standards adopted into Title 24 apply to all occupancies in California, except for modifications adopted by state agencies and local governing bodies. In addition, EBMUD has its own seismic design standards that in some areas can be more conservative than the 2010 CBC due to the critical nature of providing water service following a seismic event.

Regulatory Jurisdiction

Since 1929, the State of California has supervised the construction and operation of dams to prevent failure and to safeguard life and property. DSOD supervises the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. DSOD has jurisdiction over all dams in the state that are not federally owned, that are 25 feet or higher, and that have a storage capacity of 50 acre-feet of water or greater, with the exclusion of the dams that are 6 feet or less in height (regardless of storage) and the dams with a storage capacity of 15 acre-feet or less (regardless of height)[22]. The Summit Reservoir has a storage capacity of 113.5 acre-feet and a maximum embankment height of 65 feet and falls into the DSOD jurisdictional size.

DSOD performs annual inspections of jurisdictional dams with EBMUD staff and conducts periodic safety evaluations of these facilities. In addition, EBMUD staff performs monthly dam inspections and continuously monitors dam surveillance instrumentation. This instrumentation monitoring covers survey monuments, piezometers to measure ground water levels at the dams, underdrain flows, and reservoir water surface levels. EBMUD submits these dam surveillance instrumentation data to the DSOD for review and acceptance on an annual basis.

A seismic stability evaluation conducted by Converse Consultants in 1985 concluded that the dam embankments should perform satisfactorily in a major seismic event. An earthquake induced crest settlement was estimated to be less than 2 inches, thus providing adequate margin of safety (26 of inches freeboard) against overtopping. Based on

[22] Department of Water Resources Web Site: http://www.water.ca.gov/damsafety/docs/CHM.pdf

inspections and instrumentation data, EBMUD and DSOD consider the Summit Reservoir to be safe for continued operations.

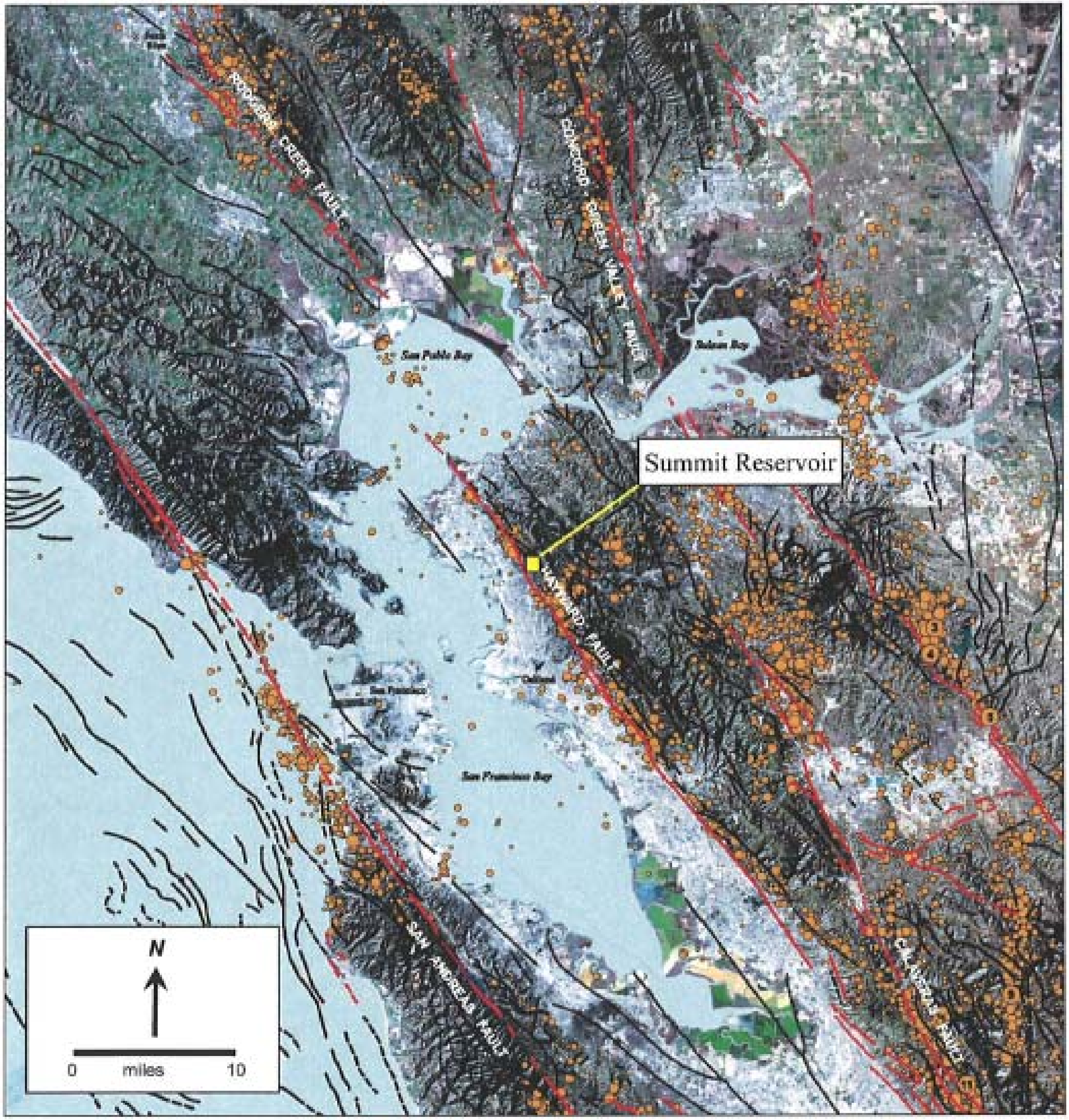
Geologic Setting

Regional Geology

Summit Reservoir and Dam are located within the seismically active San Francisco Bay region between the Pacific plate on the west and the Sierra Nevada-Central Valley ("Sierran") microplate on the east. (**Figure 3.3-1** shows the fault and seismicity maps). The Summit Reservoir site is situated in a narrow ravine near the western edge of the East Bay Hills. **Figure 3.3-2** shows the earthquake fault zone in the Project vicinity. The East Bay Hills region is within the central Coast Range geomorphic province of California and is bounded by the Hayward Fault on the west and the Northern Calaveras Fault on the east.

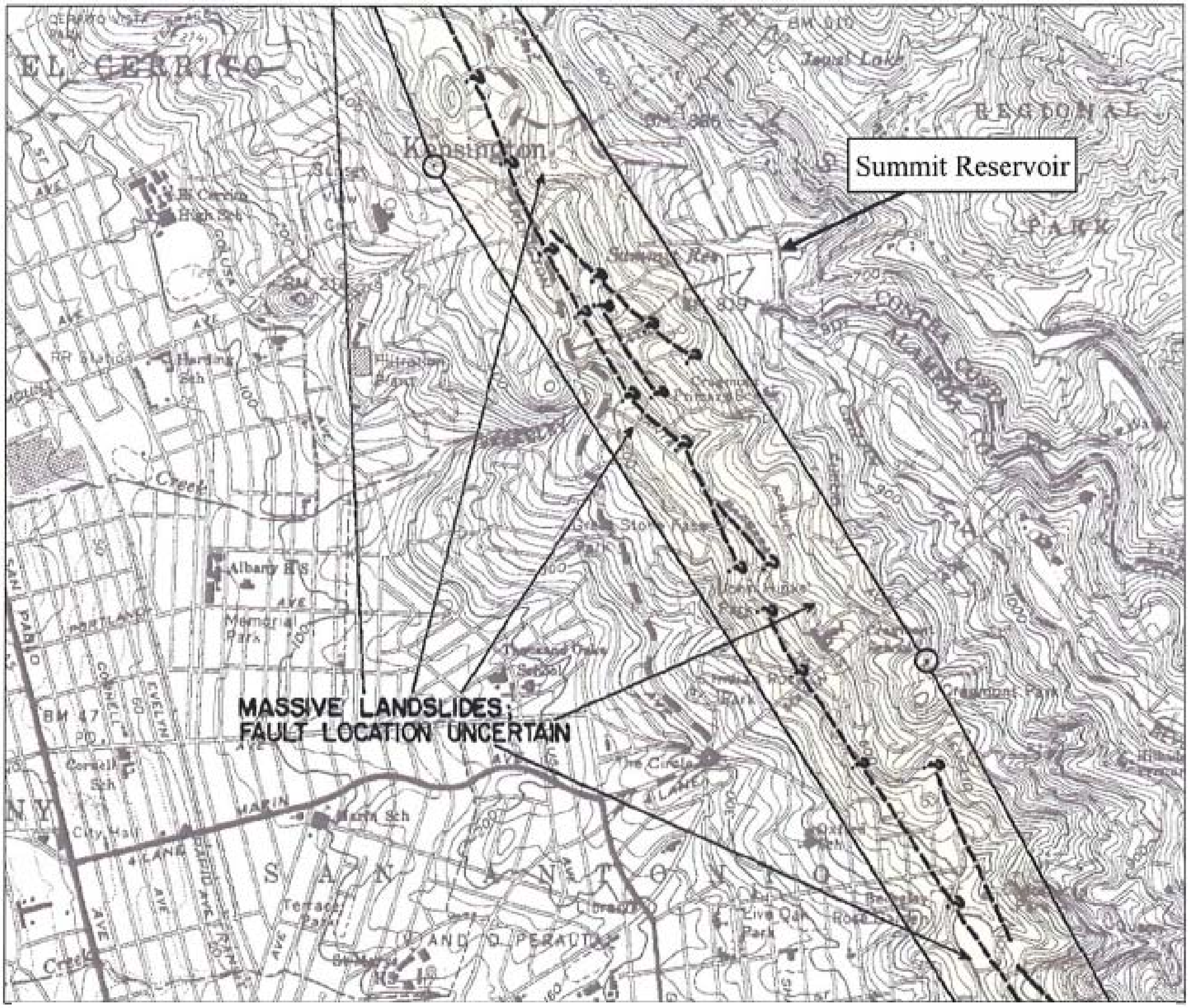
The Berkeley Hills are part of the East Bay Hills, a group of northwest-trending hills between San Francisco Bay and the Diablo Range that are characterized by highly folded and deformed sedimentary rocks and alluvial-filled stream valleys. The Berkeley Hills extend from San Pablo Bay in the north to Castro Valley in the south.

The East Bay Hills are underlain by two highly deformed Mesozoic basement rock assemblages that are overlain by Tertiary sedimentary and volcanic rocks, including the Orinda Formation. The two Mesozoic basement assemblages are the Great Valley Complex and the Franciscan Complex. The Great Valley Complex includes the Coast Range ophiolite (consisting of serpentinite, gabbro, diabase, basalt, and keratophyte) and overlying Great Valley Sequence (sandstone, conglomerate and shale). The Franciscan Complex consists of weakly to strongly metamorphosed greywacke, argillite, basalt, serpentinite, chert, limestone and other rocks. The Franciscan Complex was subducted under the Great Valley Complex, and presumably underlies the entire San Francisco Bay area east of the San Andreas Fault.



Source: U.S. Geological Survey Investigations Map 2848 (2004)

Fault and Seismicity Map
Figure 3.3-1



Faults considered to have been active in Holocene time and to have a relatively high potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred.

State of California "Special Study Zone" for Hayward fault, recommended for investigation of surface fault rupture potential.

Source: State of California Earthquake Fault Zone Map, Richmond Quadrangle (CDMV, 1982)

Earthquake Fault Zone
Figure 3.3-2

In general, the Franciscan Complex rocks are located west of the Hayward Fault, and the Great Valley Sequence rocks, overlain by Tertiary rocks, are located east of the fault. However, Summit Reservoir lies within the broad Hayward Fault zone, where faulted blocks of rock of both complexes are present. **Figures 3.3-3 and 3.3-4** (Regional Geology) depicts regional geologic conditions.

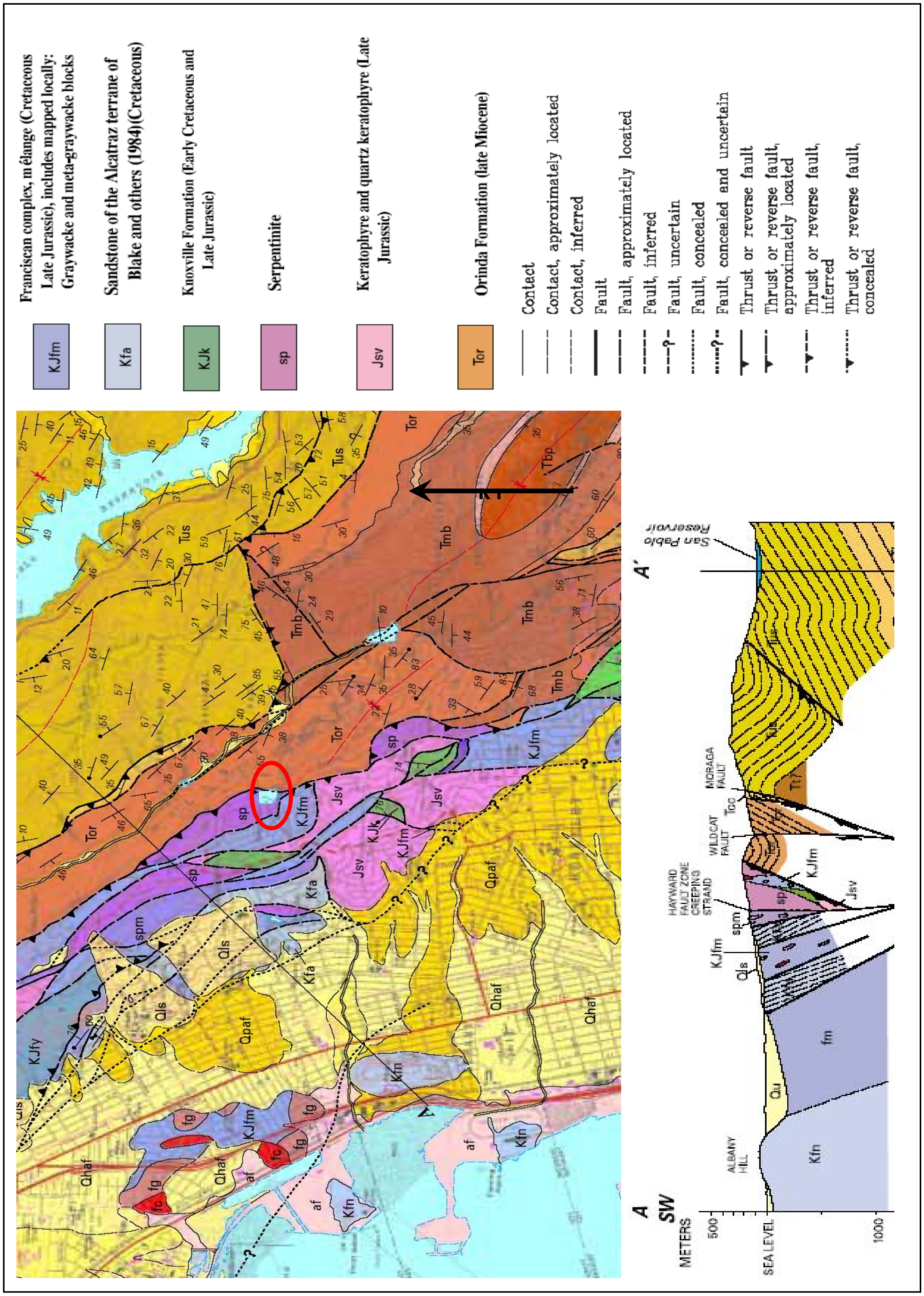
Quaternary deposits in the area include colluvium and landslides. The colluvium includes surficial material consisting of soil and weathered rock that lie within hillside drainage ravines. The landslides consist of displaced soil and rock that have been transported downslope by sliding, slumping or flowing. Two landslide types are identified on the basis of recent movement. Active landslides display indications of recent or historic movement, including fresh, unvegetated scarps, undrained depressions, broken ground, and disturbed cultural features or vegetation. Dormant landslides display indications of inactivity, including weathered or overgrown scarps, subdued irregular topography, and undisturbed cultural features. Dormant landslides may be experiencing slow downslope creep.

The distribution of the colluvium and landslides shown on the Engineering Geology Map **(Figure 3.3-5)** was determined from stereoscopic examination of historical aerial photographs and field reconnaissance.

Site Geology

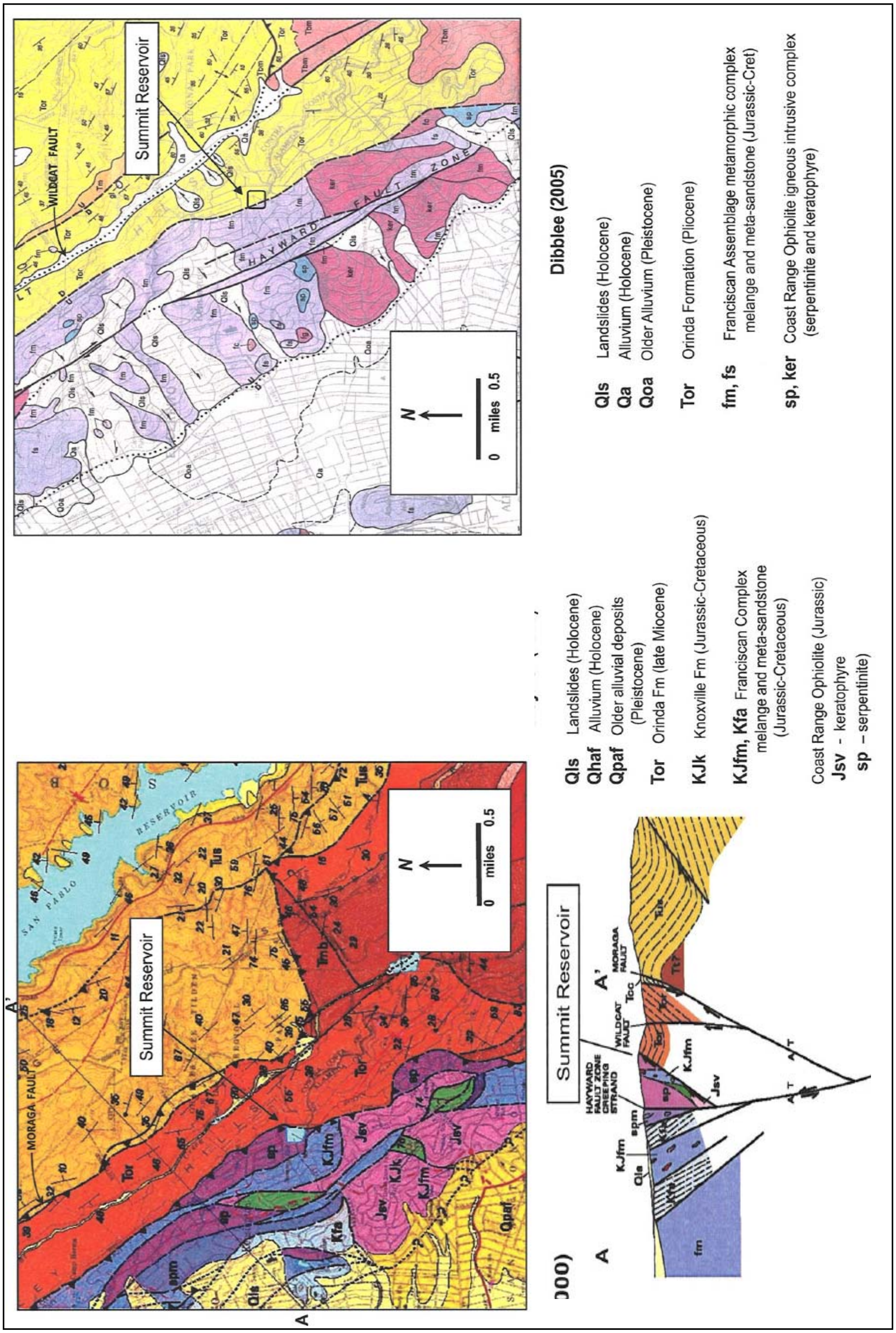
The bedrock formation underlying the reservoir is not known with certainty. The general view is that the reservoir site lies near, and possibly astride, a faulted boundary between Franciscan Complex mélange (to the west) and Orinda Formation (to the east). Two widely referenced regional geologic maps each show different distributions of these two bedrock units: Graymer, et al, 2000 depicts the site as underlain by serpentinite, and Dibblee (2005) depicts most of the site as underlain by Orinda Formation. See Figures 3.3-3 and 3.3-4 (Regional Geology) for a comparison of the two geologic maps. These figures are reproduced from the GEI Consultants (2009), Geologic Hazards Evaluation Report.

Early site reports refer to the bedrock as Franciscan rock, with local inclusions of silica-carbonate. Silica carbonate rock is formed from alteration of serpentinite, which is found in Franciscan mélange, and also in the Coast Range ophiolite that forms the base of the Great Valley Sequence. According to DSOD (1981), E. C. Marliave described the reservoir floor in 1940 (before concrete lining) as “Franciscan clay shales which contain occasional streaks and lenses of white silica-carbonate rock.” In a letter dated December 23, 1970, B. H. Marliave reported that he had reviewed exploratory core and caisson drilling samples, and concluded that the site is underlain by silica carbonate rock and “Franciscan sediments.”



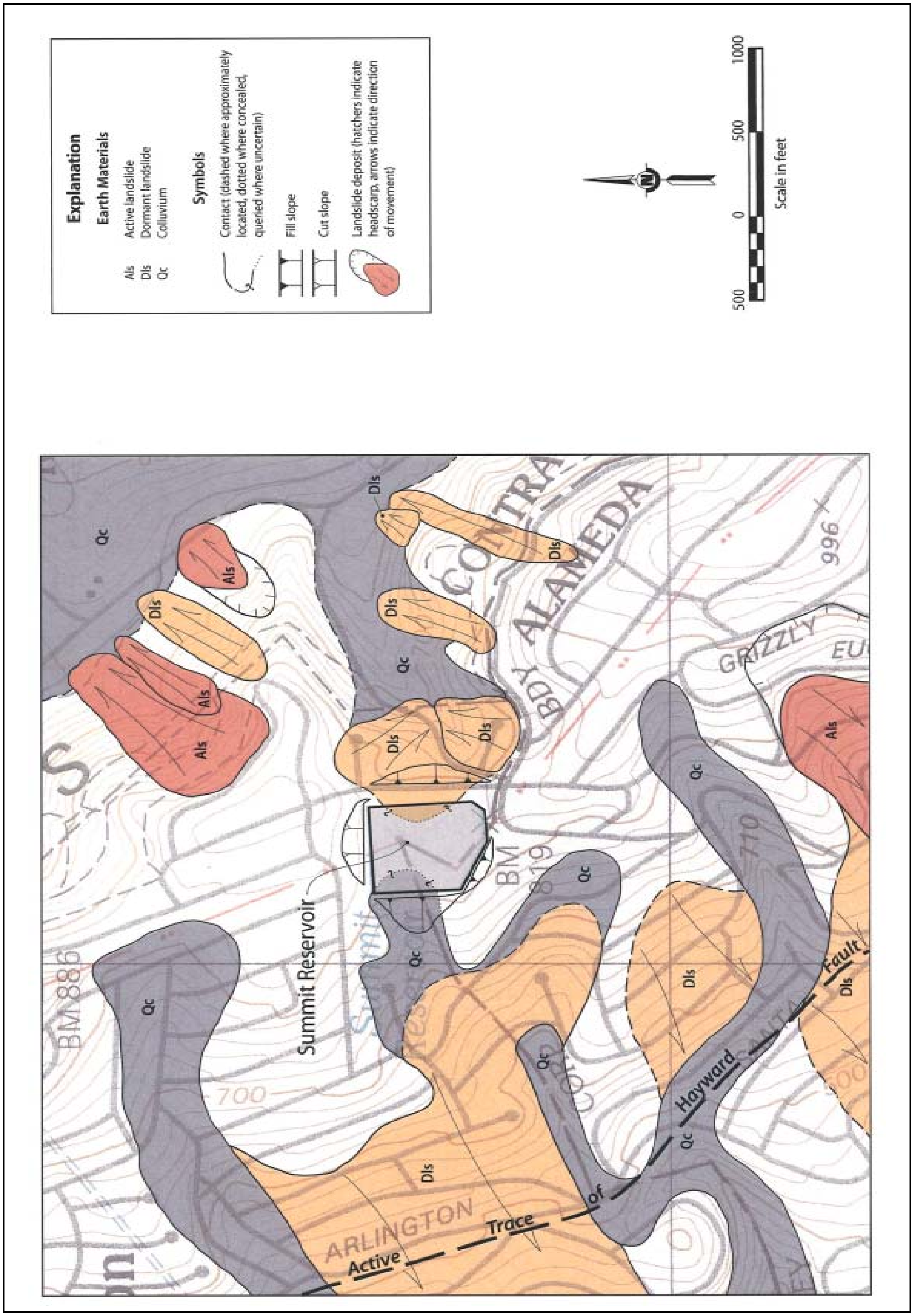
Source: Based on USGS Map by R.W.Graymer, 2000

Geologic Map
Figure 3.3-3



Source: Reproduced from GEI Consultants Geologic Hazards Evaluation 2009

Regional Geology
Figure 3.3-4



Source: Reproduced from GEI Consultants Geologic Hazards Evaluation 2009

Engineering Geology Map
Figure 3.3-5

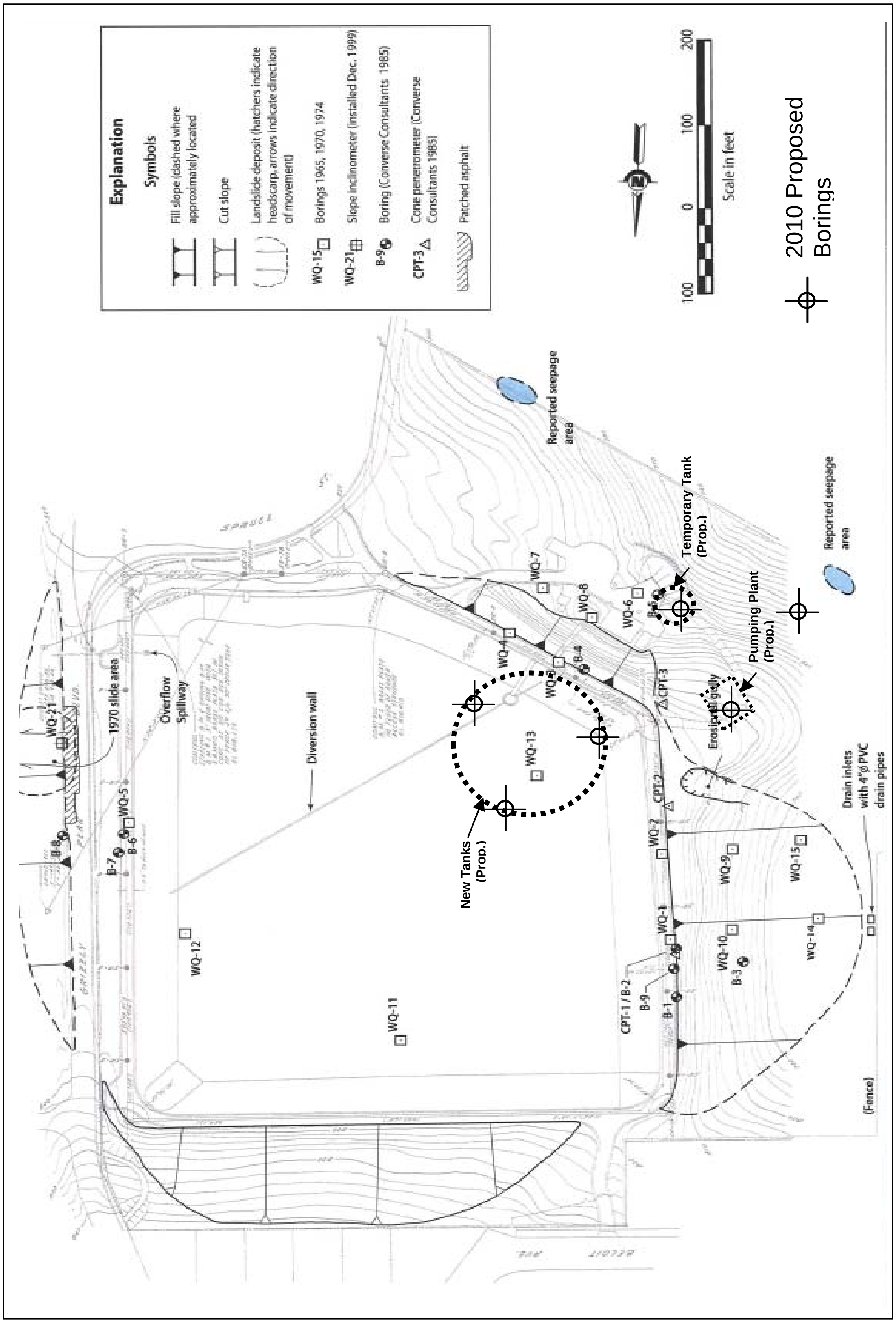
The logs of borings drilled in and around the reservoir indicate that brown to gray weathered shale was encountered during past exploratory drilling (see **Figure 3.3-6** for boring locations). Boulders of silica carbonate rock were observed north of the property during site reconnaissance, and outcrops of sandstone, presumed to be Orinda Formation, are present east of the site. National Dam Instrumentation Program (1981) reported that Orinda Formation sandstone was observed in the cut slope along the north side of the reservoir, and concluded that the Orinda Formation might underlie the eastern portion of the reservoir. The boring logs indicate that all borings drilled in the reservoir area encountered shale, locally sheared, and do not indicate that sandstone was encountered at the drill locations.

Topography

Summit Reservoir is located at the crest of the East Bay Hills at the heads of two drainage ravines (Cerrito Creek flows westward into San Francisco Bay and an unnamed tributary that flows eastward to Wildcat Creek). The reservoir was constructed using cut and fill techniques. The reservoir basin was excavated into a natural topographic saddle, and the main embankments for the reservoir were constructed across the heads of the two ravines. The reservoir site is between approximately elevations of 750 to 820 feet above mean sea level (Geologic Site Plan, Figure 3.3-6).

The descending west-, south- and east-facing hill slopes below the site are moderately steep to steep, with slope gradients typically varying between 20 and 30 percent. The cut slope on the north side of the reservoir is about 20 feet in height, with a slope gradient varying between 15 to 35 percent. Based on the field observations, the western embankment is approximately 60 feet high, with an average slope gradient of 30 to 40 percent. A smaller embankment above the operating facilities on the south-southwest side of the reservoir is approximately 20 feet in height, with a slope gradient of approximately 50 percent.

The original eastern embankment has been modified by the placement of additional fill for the construction of Grizzly Peak Boulevard, a 30-foot roadway that parallels the east side of the reservoir. The fill slope on the east side of Grizzly Peak Boulevard is about 25 feet in height with an approximate slope gradient of 60 percent. The fill slope placed during the construction of Grizzly Peak Boulevard was placed after the original construction of the reservoir. EBMUD gave a Grant of Easement (dated October 7, 1946) to the Contra Costa County where the county assumed responsibility to maintain the road and the roadway embankment.



Source: Reproduced from GEI Consultants Geologic Hazards Evaluation 2009

Geologic Site Plan
Figure 3.3-6

Soil and Rock

The soil conditions at the site generally consist of embankment fill materials placed during the construction of the reservoir that overlies the Franciscan sandstone shale and Orinda formation materials.

Embankment Fill and Native Soils

The materials in the embankment fill are primarily medium to stiff clays of medium to high plasticity.

Overburden Materials

The overburden materials (soils above bedrock) generally consist of a thin layer (1-3 feet) of relatively soft materials underlain by firmer materials. The overburden materials consist of stiff to very stiff brown silty clay with a trace of sand and gravel. Below this layer the materials transition to stiff to very stiff, brown silty clay with trace of sand and gravel. Unconfined compressive strengths vary between 2,800 and 7,800 pounds per square foot.

<u>Bedrock</u>: Weathered Franciscan shale underlies the entire reservoir. Orinda formation may exist towards the east of the site.

Seismic surveys in the dam area indicate that the shear wave velocity of the materials near the bedrock surface is about 1,500 feet per second. Most of the excavation for the proposed tank and other structures would be within weathered shale material with average shear wave velocity of 1,500 feet per second. The shear wave velocity of the bedrock indicates that the material is “rippable”; i.e., it can be excavated or removed with standard excavating equipment.

Groundwater Conditions

The groundwater level in the dam used for stability analysis was estimated based on the piezometric data corresponding to a reservoir filled to the spillway elevation of 816.2 feet. The groundwater level is at approximately Elevation 805 feet beneath the dam crest. From the dam crest, the groundwater level follows a gentle downward gradient to about Elevation 790 feet at the downstream toe of the dam but is generally 10 to15 feet below the ground surface sloping away from the reservoir. The presence of groundwater at a hillside like the Summit Reservoir site is common and the groundwater level may be subject to large seasonal fluctuations.

The embankments and Project site were inspected by EBMUD in 2010 for seepage; no measurable quantities of seepage or distinct evidence of seepage were seen anywhere in the southwest or west embankments. It should be noted that French drains were installed along the property fence line towards the western and southwestern sides of the site in the

1990s to address localized groundwater seepage. Based on on-going EBMUD inspections and evaluations, seepage does not affect the stability of the dam embankments. There are natural springs in the area that contribute to the groundwater regime at the site (see Figure 3.3.-6). These areas are labeled as “Reported Seepage area” in the figure and are judged to be too far from the embankments to affect their stability. Chapter 3.10 Hydrology/Water Quality section of this EIR specifically addresses the regional impact on surface and groundwater at the site resulting from the proposed Project demolition and grading activities.

Seismicity

Major Faults in Project Vicinity

The San Francisco Bay region is characterized by active, potentially active and inactive faults with a historical record of large and damaging earthquakes. Figure 3.3-1 shows the fault and seismicity maps. **Table 3.3-1**, Seismic Source Parameters for Major Active Faults, summarizes source parameters for each of the significant faults in the area. These parameters are based on the Working Group for California Earthquake Probabilities ([WGCEP] 1999, 2003, and 2008) and Cao et al. (2003). The most significant faults with respect to activity and distance to the site are the major faults of the San Andreas Fault system, including the San Andreas, Hayward, Rodgers Creek, and Calaveras Faults; their respective magnitudes, site distances, and the details are provided in Table 3.3-1.

The Project area, like all properties in the San Francisco Bay Area, is situated in a seismically active area. According to the WGCEP (2008), there is a 93 percent chance of at least a magnitude 6.7 (or greater) earthquake in northern California, and a 31 percent chance of a magnitude 6.7 (or greater) earthquake on the Hayward-Rodgers Creek Fault zone, before 2038.

The site could be affected by seismic shaking generated from earthquakes on any one of several major active and potentially active faults. The earthquake hazard in the San Francisco Bay Area is dominated by the San Andreas Fault system, including the San Andreas, Hayward, San Gregorio, and other related faults. The closest major active fault to the Project site is the Hayward Fault, which is located approximately 1/2 mile to the west. Due to proximity to the site and high level of earthquake activity, the Hayward Fault is considered to be the controlling fault in terms of future ground shaking estimates. The Project site is underlain primarily by firm rock. Figure 3.3-2 shows the Earthquake fault zone in the Project vicinity.

TABLE 3.3-1
Seismic Source Parameters for Major Active Faults

Fault/Fault Segment	Sense of Movement[1]	Length (km)	± (km)	Slip Rate (mm/yr)	± (mm/yr)	M_{max} (M)[2]	Fault Type	Closest Distance to Project Site (km)
San Andreas (1906)	(rl-ss)	470	47	24.0	3.0	7.9	A	31
San Andreas (North Coast)	(rl-ss)	322	32	24.0	3.0	7.6	A	31
San Andreas (Peninsula)	(rl-ss)	88	9	17.0	3.0	7.1	A	31
Hayward (N)	(rl-ss)	43	4	9.0	1.0	6.9	A	0.5
Hayward (S)	(rl-ss)	43	11	9.0	1.0	6.9	A	18.0
Hayward (total)	(rl-ss)	86	9	9.0	1.0	7.1	A	18.0
Rodgers Creek	(rl-ss)	63	6	9.0	2.0	7.0	A	27
San Gregorio (N)	(rl-ss)	130	13	5.0	2.0	7.3	B	40
Calaveras (N)	(rl-ss)	52	5	6.0	2.0	6.8	B	27
Calaveras (S)	(rl-ss)	106	11	15.0	2.0	6.2	B	63
Concord-Green Valley	(rl-ss)	66	7	6.0	3.0	6.9	B	22
Clayton (Greenville)	(rl-ss)	73	7	2.0	1.0	6.9	B	31
Mt. Diablo Thrust	(r)	25	-	2.0	-	6.7	B	35

Notes
1. rl-ss = right-lateral strike-slip. r = reverse.
2. M_{max} is the maximum magnitude calculated for coseismic slip on the fault in Moment Magnitude (**M**).

Geologic Hazards

Landslides and Slope Failure

As shown in Figure 3.3-5, there are no mapped active landslides within the Summit Reservoir property boundaries and no active landslides were identified in the vicinity of the proposed tank site. However, several dormant or inactive landslides identified in the 2009 GEI Geologic Hazards Evaluation in the area surrounding the site are shown. The downslope landslides east and west of the Project site are considered to be dormant (i.e., not actively moving), and are developed with residential structures and roadways. The future stability of the downslope landslides is unknown.

The static slope stability of the embankments was found to be satisfactory in a previous investigation (Converse Consultants, 1985). During the construction phase the reservoir would be drained and the existing Summit Reservoir embankment would be re-graded, thus breaching the reservoir. The temporary slopes created during grading /notching of the dam would conform to slope stability criteria.

The fill slope placed during the construction of Grizzly Peak Boulevard was placed after the original construction of the reservoir. EBMUD gave a Grant of Easement (dated October 7, 1946) to the Contra Costa County where the county assumed responsibility to maintain the road and the roadway embankment. No sign of instability or settlement was evident in 1980 although longitudinal road surface cracks and uneven settlement was observed on Grizzly Peak Boulevard. Since 1980, additional cracking has been observed along the asphalt concrete pavement by EBMUD, as documented in the 1985 Converse Consultants Report, Section 4.2.

An inclinometer installed by EBMUD in December 1999 to measure potential ground movement at depth shows about 1 1/2 inches of down-slope (eastward) movement since installation. The depth of the ground movement is about 17 feet below ground surface and coincides with the depth of the fill placed on top of the Summit Reservoir eastern embankment for the construction of Grizzly Peak Boulevard. The fill movement is not likely to affect the proposed tank, but has resulted in distress to Grizzly Peak Boulevard, which is maintained by Contra Costa County through a right-of-way agreement.

Other Potential Geologic Hazards

The proposed tank would be founded on bedrock. Depending on location and excavation depth, the proposed excavation(s) for below-ground structures would create a free face that may expose adjacent fill and colluvial materials, and/or sheared bedrock. The stability of excavated slopes during construction would need to be evaluated prior to final design and construction to determine the need for and type of excavation support system. Temporary shoring or special construction sequencing may be needed to maintain slope stability during construction.

Shallow groundwater may be encountered during construction, on the basis of relatively high groundwater levels monitored in the embankments and historic reports of seepage at the toes of embankments. However, water levels may decrease over time after the existing reservoir is drained. The potential for shallow groundwater to be encountered during construction would be addressed by the site-specific geotechnical investigation which would be undertaken after the reservoir is drained. De-watering may be needed to control saturated excavation sidewalls and floors, and to maintain adequate slope stability during construction.

Naturally occurring asbestos is associated with ultrabasic rocks that contain serpentine. Serpentinite rock has been mapped in the vicinity of the site, but has not been identified in borings drilled at the site. Therefore, the potential for the occurrence of naturally occurring asbestos at the site is considered to be low. However, this assessment would be re-evaluated if serpentinite is encountered in borings drilled for the geotechnical design investigation. If serpentinite is encountered, then samples may need to be tested to determine if asbestos minerals are present. If such minerals are present, then an asbestos control plan may need to be implemented during construction.

Other potential geologic hazards, including hazards posed by volcanic activity, highly expansive soils, inundation and flooding, tsunamis, and compressible soils were considered and found to be not significant to the Project site because of topographic and geologic setting and shallow bedrock materials anticipated at the tank site (see Appendix C, Initial Study for more details).

Mineral Resources

The California Geological Survey (CGS) has classified lands within the San Francisco Bay region into four Mineral Resource Zones (MRZs). The classification of MRZs is based on guidelines adopted by the California State Mining and Geology Board, as mandated by the Surface Mining and Reclamation Act of 1975. 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 from available data. MRZ-4 zones are areas where available information is inadequate for assignment to any other MRZs category. The Project site is identified as an MRZ-4 zone according to the referenced SR 146, therefore no further analysis or evaluation of mineral resources as classified by CGS is warranted.

Regarding county or local data, according to the City of Berkeley Environmental Management Element 1992, due to its long-established urban character, Berkeley has no active mineral extraction or fish and game industries. The Contra Costa General Plan (1996) notes that according to available Division of Mines and Geology and Contra Costa General Plan Maps, there are three locations within Contra Costa County (Port Costa, the Cities of Richmond and Hercules near the existing Hercules Pump Station) that have been identified as occupying significant or potentially significant mineral resources for the state and region. These areas lie outside the Summit Reservoir site and access to them would not be impaired as a result of the Project.

Based on the foregoing discussion, the Project would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local General Plan Map(s) or result in the loss of availability of a know mineral classified by the State Geologist. No impact on existing mineral resources is associated with implementation of the Project.

Seismic Hazards

Primary Hazards

Surface Fault Rupture - Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults or even along different strands of the same fault. Ground rupture is considered more likely along active faults, which are referenced in Table 3.3-1.

The Summit Reservoir site is not within an Alquist-Priolo Earthquake Fault Zone, as mapped and designated through the Alquist-Priolo Earthquake Fault Zoning Act, and no mapped active faults are known to pass through the immediate Project site (Lienkaemper 1992). As depicted on Figure 3.3-2, the Project site is not located within a state fault zone, and no known active or potentially active faults are present in the Project footprint. However, the faulted contact between Franciscan and Orinda Formation bedrock may cross a portion of the reservoir site east of the proposed tank development, as previously reported (DSOD 1981; Converse Ward Davis Dixon, 1980). As mentioned in the 2009 GEI Geologic Hazards study, the potential for primary surface fault rupture is considered to be low at the Project site.

Ground-shaking - Earthquakes in the Bay Area could produce strong ground shaking in the Project region. Ground shaking intensity is partly related to the size of an earthquake, the distance to the site, and the response of the geologic materials that underlie a site. As a rule, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of ground shaking. Violent ground shaking is generally expected at and near the epicenter of a large earthquake; however, different types of geologic materials respond differently to earthquake waves. For instance, deep unconsolidated materials can amplify earthquake waves and cause longer periods of ground shaking

While the magnitude is a measure of the energy released in an earthquake, intensity is a measure of the observed groundshaking effects at a particular location. The Modified Mercalli (MM) scale is commonly used to measure earthquake intensity due to groundshaking. **Table 3.3-2** presents a description of the MM scale. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total). MM intensities ranging from IV to X can cause moderate to significant structural damage, although the damage would not be uniform. Some structures experience substantially more damage than others. The age, material, type, method of construction, size, and shape of a structure affect its performance in an earthquake.

Based on the moment magnitude of 7.25 earthquake on the Hayward Fault and a distance of 2.9 kilometers, the median peak ground acceleration for rock is estimated to be 0.55 gravitational acceleration (g) using the Next Generation Attenuation 2008 relationships.

TABLE 3.3-2
Modified Mercalli Intensity Scale

Intensity, g-Value, Intensity Description and Average Peak Acceleration (% g)

I	Not felt except by a very few persons under especially favorable circumstances.	< 0. 17
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing	0.17–1.4
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck.	0.17–1.4
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	1.4–3.9
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	3.9–9.2
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	9.2–18
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving	18–34
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	34–65
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked. Underground pipes broken.	65–124
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed over banks.	> 124
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 124
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 124

Source: Association of Bay Area Governments 2003; CGS 2003.

Note: 1 g (gravitational acceleration) = 980 centimeters per second squared = a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

Secondary Earthquake Hazards

Secondary earthquake hazards in the Project region include earthquake-induced landslides, settlement, and liquefaction. Strong ground motions that occur during earthquakes are capable of inducing landslides and related forms of ground failure. Settlement is the gradual downward movement of an engineered structure (such as a building) due to the compaction of unconsolidated material below the foundation. Settlement accelerated by earthquakes can result in vertical or horizontal separations of structures or portions of one structure; cracked foundations, roads, sidewalks, and walls; and, in severe situations, building collapse and bending or breaking of underground utility lines. Soil liquefaction (a phenomenon in which soils lose strength) can result in ground failure. The soils most susceptible to liquefaction are clean, loose, uniformly graded, saturated, fine-grained soils that occur close to the ground surface, usually at depths of less than 50 feet.

In general, upland areas have a low liquefaction potential, except where significant alluvium is present in creek bottoms or swales. Earthquake motions can induce significant horizontal and vertical dynamic stresses in slopes that can trigger failure. Earthquake-induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. The 1989 Loma Prieta earthquake triggered thousands of landslides over an epicenter area of 770 square miles. The Oakland-Berkeley Hills could experience some earthquake induced rock falls, slumps, and debris flows during an event on the Hayward Fault or other active Bay Area fault capable of generating strong ground motion.

Liquefaction

Liquefaction is an earthquake-shaking effect that typically occurs in cohesionless and low plasticity, saturated fine-grained soils during peak ground accelerations over about 0.2 gravity (g). Cohesionless and low plasticity, fine-grained soils within about 15 meters (50 feet) of the ground surface are most susceptible to liquefaction.

Bedrock at the site is cemented, dense, and hard and not susceptible to liquefaction. Colluvial materials that may underlie portions of the west and east embankments are stiff, mostly fine-grained materials with rock fragments, and not anticipated to be susceptible to liquefaction.

Areas of potential liquefaction have been zoned by the State of California as part of the State’s Seismic Hazards Mapping Act. Liquefaction Hazard Zones depicted on the maps are based on broad regional studies and do not replace site-specific studies. However, according to the State’s Seismic Hazard Zones for the Richmond 7.5-minute quadrangle (CGS 2005), the Project site is not located within a Liquefaction Hazard Zone.

Previous seismic stability analyses of Summit Reservoir concluded that embankment and embankment foundation materials are fine-grained (clay and silty clay), and are not likely to liquefy (Converse Consultants 1985).

3.3.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses the following standards of significance as based on CEQA Guidelines Appendix G. Would the project:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - 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
  - Strong seismic ground shaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Result in substantial soil erosion or the loss of topsoil;
- 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;
- Be located on expansive soil, as defined in Table 18-1 -B of the UBC (1994), creating substantial risks to life or property;
- 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;
- 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
- 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.

Based on the geologic environment in the Project area, the proposed Project would not be impacted by fault rupture, ground shaking, liquefaction, expansive soil, wastewater disposal, or mineral resources. The Initial Study (Appendix B) concluded the following:

- **Fault Rupture -** The faults most susceptible to earthquake rupture are active faults, which have experienced surface displacement within the last 11,000 years. There is no known active fault crossing the Project site. The nearest active fault (Hayward-Rodgers Creek) is approximately 1,700 feet to the west of the site, based on maps produced (Figure 3.3-1). Therefore, the potential for fault rupture to affect the proposed Project is very low.
- **Ground Shaking -** The new facilities would be designed and constructed per the 2010 CBC which would resist potential damage caused by strong ground shaking.

- **Liquefaction -** Existing materials beneath the dam and the reservoir basin are not susceptible to liquefaction. The materials underlying the proposed temporary tanks, pumping plant and I/O lines are also not liquefiable
- **Expansive Soil -** The new permanent concrete tank, proposed temporary tank, pumping station and I/O line would either be supported on engineered fill or by drilled pier foundations embedded in bedrock. Any expansive soil at the site would not affect the structural performance or cause potential risk to life or property.
- **Wastewater Disposal -** None of the Project elements would require the use of septic or other alternative disposal wastewater systems; therefore, no impact associated with this hazard would result. The bathroom in the existing pump house would remain but its wastewater is currently carried by pipe to the local sewer system in Vassar Avenue.
- **Mineral Resources -** None of the Project elements would alter, destroy, or limit access to any existing mineral resources.

Impacts and Mitigation Measures

Impact 3.3-1: Existing or New slopes associated with the new construction (Tank (permanent and temporary), pumping plants, drainage line, and I/O line) may be potentially unstable.

The proposed Project would entail excavation of the existing ground creating a notch in the dam embankment, and would create temporary cut slopes and new fill slopes around the tanks. Without adequate design, the new slopes may be unstable, which would be a significant impact.

The Project would also include construction of a new drain pipeline underneath Grizzly Peak Boulevard and a new manhole on Canon Drive. The roadway fill placed to facilitate the construction of Grizzly Peak Boulevard has been moving and any construction within this fill material may be unstable, and a significant impact. Therefore, the following mitigation measures would be required:

Measure 3.3-1a: During the design phase, EBMUD will conduct site-specific geotechnical investigations to reduce or eliminate potential slope hazards associated with Project construction. In the construction contract documents, EBMUD will incorporate the recommendations from the geotechnical evaluation for any slope stabilization, which may include some of the following measures, although this list is not exclusive:

- Appropriate permanent slope inclination (not steeper than 2:1 horizontal to vertical)
- Appropriate temporary slope inclination
- Slope terracing
- Fill compaction
- Soil reinforcement

- Surface and subsurface drainage facilities
- Retaining walls
- Buttresses
- Erosion control measures
  - Sub drain system
  - Hydroseeding and/or placing visqueen (plastic) on slopes as appropriate
  - Straw waddles and erosion control geotextile

Measure 3.3-1b: For the new drain pipeline underneath Grizzly Peak Boulevard to Canon Drive, EBMUD will ensure that the top of the new drain pipeline is a minimum of 2 feet below the active slide plane of the fill materials placed for Grizzly Peak Boulevard. Construction specifications will incorporate this recommendation for trenchless construction operations.

Implementation of Mitigation Measures 3.3-1a and 3.3-1b would reduce risks associated with slope stability to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.3-2: Facility damage or service interruptions resulting from strong ground shaking.

Ground shaking can be a serious hazard to structures and the associated infrastructure if not adequately designed and constructed. The Project would likely experience at least one major earthquake (greater than magnitude 6.7) sometime during its operational lifetime (United States Geological Survey [USGS] 2003). The degree of hazard depends on the geologic conditions of the site, construction approaches and quality. The intensity of the ground shaking depends on the size of the causative fault, the distance to the epicenter, the magnitude of the earthquake, and the duration of the shaking.

The 1989 Loma Prieta earthquake reportedly caused more than 60 water pipeline breaks in Santa Cruz, the nearest urbanized area to the epicenter (California Division of Mines and Geology [CDMG] 1990). After the quake, EBMUD initiated a seismic evaluation program to identify seismic safety concerns of the water system and develop facility improvements. As a result of the seismic evaluation program, EBMUD has reduced the overall vulnerability of the water system to earthquakes. Project facilities would be designed using the 2010 CBC which would resist potential damage from an earthquake. Any potential interruption of service would likely be temporary in nature. This would be a significant impact, and therefore, the following mitigation measure would be required:

Measure 3.3-2: During the design phase, EBMUD will conduct site-specific geotechnical investigations and evaluations to identify the potential for secondary

> ground failure hazards (i.e., seismically-induced settlement). The geotechnical evaluation will provide recommendations for applicable settlement mitigation measures, and these will be incorporated in the design and construction contract documents for the tank, pumping plant, and I/O structures.

With implementation of Mitigation Measure 3.3-2, this impact would be reduced to a less than significant level.

Significance after Mitigation: Less than Significant.

Impact 3.3-3: Facility damage resulting from settlement or uplift caused by loading of foundation soils and bedrock.

The reservoir basin is generally underlain by weathered Franciscan shale and Orinda Formation materials. These materials are generally suitable to support the proposed tank; however this would be confirmed during the geotechnical investigation and testing phase when the reservoir is taken out of service for construction. The tank may undergo unacceptable settlement and damage if it is placed directly on potentially expansive clayey portions of the bedrock materials. Confirmatory geotechnical borings would be performed at the proposed permanent tank site (after it is drained), temporary tank site, pumping plant site, and reservoir I/O alignment locations. The following mitigation measures would ensure that impacts would be less than significant:

> **Measure 3.3-3a:** EBMUD will require its construction contractor to place the tank, pumping plant, and I/O structures on:
>
> 1. select engineered fill underlain by competent bedrock after removal of the soils and any weak bedrock,
> 2. bedrock, or
> 3. cast-in-place concrete pier foundations obtaining vertical support from the bedrock.
>
> **Measure 3.3-3b:** In the construction contract documents, EBMUD will specify that all fill will be selected, placed, compacted, and inspected in accordance with plans and specifications prepared by a licensed professional engineer.

Implementation of Mitigation Measures 3.3-3a and 3.3-3b would reduce the potential settlement or uplift to within acceptable limits and the impact would be less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.3-4: Exposure of soils to erosion after removal of the concrete lining within the existing reservoir basin.

Colluvial, residual and/or fill soils in the reservoir basin directly under the concrete lining may be subject to surface water erosion after the lining is removed**,** a significant impact. Therefore, the following mitigation measure would be required.

> **Measure 3.3-4**: EBMUD and/or its construction contractor will perform all grading activitiesin compliance with the Stormwater Pollution Prevention Plan prepared for the Project to control/manage soil erosion and run-off. During grading construction, the construction contractor will sprinkle the site as necessary to control dust at the site. The construction contractor will perform measures for winterization, including hydro-mulching, straw bale installation, and/or other measures to minimize soil erosion during the rainy seasons.

Implementation of Mitigation Measure 3.3-4 would reduce impacts on soil erosion to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.3-5: Stockpiled materials from excavation of the existing dam or import could cause localized instability of slopes.

Excessive accumulation of stockpiled materials on hillsides or slopes may be vulnerable to failure, or may cause sliding of the native ground if the stockpiling is not properly designed or adequately placed, a significant impact. Therefore, the following mitigation measure would be required:

> **Measure 3.3-5**: EBMUD and/or its construction contractor will temporarily stockpile materials excavated for the construction of the permanent tank, pumping plant and I/O line within the existing reservoir basin and away from top of slopes using best material management practices. These materials are likely to be suitable for use as engineered backfill materials around the tank as well as for the soil berm that will be constructed around the tank and used to reshape the existing reservoir basin. The construction contractor will off-haul all excavated materials that are not suitable for reuse on-site.

Implementation of Mitigation Measure 3.3-5 would reduce impacts on slope stability to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.3-6: Potential of presence of naturally occurring asbestos in serpentine rock.

Naturally occurring asbestos is associated with ultrabasic rocks that contain serpentine. Serpentine rock has been mapped in the vicinity of the site, but has not been identified in borings drilled at the site. Therefore, the potential for the occurrence of naturally occurring asbestos at the site is considered to be low. However, the following mitigation measure would ensure that any asbestos materials would be properly handled and removed.

> **Measure 3.3-6**: EBMUD will conduct a geotechnical investigation, and if serpentine is encountered, then samples will be tested to determine if asbestos minerals are present. If such minerals are present, then EBMUD and/or its construction contract will prepare an asbestos control plan and implement it during construction.

Implementation of Mitigation Measure 3.3-6 would reduce impacts on naturally occurring asbestos to less than significant.

Significance after Mitigation: Less than Significant.

References

Abrahamson, N.A. and Silva, W. J., 1997. Empirical Response Spectral Attenuation Relations for Sallow Custal Earthquakes, Seismological Research Letters, v. 68, p. 94-127.

Boore, D.M., Joyner, W.B., and Fumal, T.E., March 12, 2009. "Equations for estimating horizontal response spectra and peak acceleration from western North American earthquakes: A summary of recent work," Seismological Research Letters, v. 68, p. 128-153.

Boulanger, R.W. and Idriss, I. M., December 2004. Evaluating the potential for liquefaction or cyclic failure of silts and clays, Center for Geotechnical Modeling, Report No. UCD/CGM- 04/01, University of California, Davis.

California Department of Conservation, Division of Mines and Geology, 1986. Special Report 146 Part I, Project Description: Mineral Land Classification for Construction Aggregate in the San Francisco – Monterey Bay Area.

California Department of Conservation, Division of Mines and Geology, 1987. Special Report 146 Part II, Classification of Aggregate Resource Areas, South San Francisco Bay Production – Consumption Region.

California Department of Conservation, Division of Mines and Geology, January 1, 1982. State of California Special Studies Zones -- Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Berkeley - Kensington, Oakland East and Hayward Quadrangles.

California Department of Water Resources, Division of Safety of Dams, October 30, 2008. Annual Inspection by State of California, Inspection of Dam and Reservoir in Certified Status, Summit Dam No. 31-12.

California Department of Water Resources, Division of Safety of Dams, May 1981. National Dam Inspection Program,, Phase I, Inspection Report for Summit Dam, prepared for Department of the Army, the Corps of Engineers, Sacramento District, and prepared under National Dam Inspection Program by the State of California Department of Water Resources, Division of Safety of Dams.

California Department of Water Resources, Division of Safety of Dams, October 4, 2002. Guidelines for use of the Consequence-Hazard Matrix and Selection of Ground Motion Parameters, prepared by William A, Fraser Chief, Geology Branch, and Jeffrey K. Howard, Senior Engineering Geologist. http://www.water.ca.gov/damsafety/docs/CHM.pdf

California Department of Water Resources, Division of Safety of Dams. Statutes and Regulations Pertaining to Supervision of Dams and Reservoirs, California Water Code, Division 3, Dams and Reservoirs, Part 1, Supervision of Dams and Reservoirs, Chapter 1, Definitions, 6000-6008. http://www.water.ca.gov/damsafety/docs/statutes-regulations.pdf

Converse Consultants, Inc. San Francisco, California, December 1985. Summit Reservoir, Seismic Re-Evaluation Study, report submitted to East Bay Municipal Utility District, Oakland, California.

Dibblee, Thomas W. Jr., 1980. Preliminary Geologic Map of the Berkeley Quadrangle, U.S.G.S Open File Report 80-540.

Dibblee, Thomas W. Jr., 2005. Geologic Map of the Richmond Quadrangle, Contra Costa and Alameda Counties, California, Geology Center Map DF-147, 1:24,000.

GEI Consultants, May 28, 2009. Geologic Hazards Evaluation, Proposed Water Storage Tanks Summit Reservoir, Berkeley-Kensington, California.

Greymer, R. W., 2000. Geologic map and map database of the Oakland metropolitan area, Alameda, Contra Costa, and San Francisco Counties, California: U.S. Geological Survey Miscellaneous Field Studies MF-2343, 1:50,000.

Jones, S., September 2003. Seismic stability, Summit Dam, No. 31-10, Alameda County, Memorandum of Design Review, Division of Safety of Dams Memorandum.

Lienkaemper, J. J. and U.S. Geological Survey, 1992. Map of recently active traces of the Hayward fault, Alameda and Contra Costa Counties, California, U.S. Geological Survey Miscellaneous Field Studies Map MF-2196.

Nilsen, Tor H. and U.S. Geological Survey, 1975. Preliminary Photo interpretation Map of Landslide and Other Surficial Deposits of the Berkeley/ Kensington, Oakland East and Hayward 7 1/2’ Quadrangles, Contra Costa and Alameda Counties, California, and U.S. Geological Survey Open File Maps 75-277-47, 75-277-41 and 75-277-19, respectively.

Sadigh, K., Chang, C.Y., Egan, J.A., Makdisi, F., and Youngs, R.R., 1997. Attenuation relationships for shallow crustal earthquakes based on California strong motion data, Seismological Research Letters, v. 68, p. 180-189.

Wells, D.L. and Coppersmith, K.J., 1994. New empirical relationships among magnitude, rupture length, rupture width, rupture area, and surface displacement, bulletin of the Seismological Society of America, v. 84, p. 974-1002.

3.4 Biological Resources

3.4.1 Approach to Analysis

This section describes the existing biological resources in and near the Project site and evaluates Project-related impacts on those resources. On May 14, 2010, and July 22, 2010, the Project site was traversed on foot to determine 1) plant communities and wildlife habitat present within the Project site, 2) if existing conditions provided suitable habitat for any special status plant or wildlife species, and 3) if sensitive habitats are present.

Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the "worst case" construction footprint and potential impacts associated with the replacement tank.

Biological Communities

Prior to the site visit, the Web Soil Survey (Natural Resources Conservation Service) of the site was examined to determine if any unique soil types (e.g., limestone, serpentine, gabbro) that could support sensitive plant communities and/or aquatic features were present in the Project site. Biological communities present in the Project site 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 it was necessary to identify variants of community types or to describe non-vegetated areas that are not described in the literature. Biological communities were classified as sensitive or non-sensitive as defined by CEQA and other applicable laws and regulations.

Non-sensitive Biological Communities

Non-sensitive biological communities are those communities that are not afforded special protection under CEQA, and other state, federal, and local laws, regulations and ordinances. These communities may, however, provide suitable habitat for some plant and wildlife species.

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. Applicable laws and ordinances are discussed in Section 3.4.2.2. Pursuant to California Government Code Section 53091, 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 for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with host jurisdictions and neighboring communities during Project planning and to conform to local environmental protection policies to the extent possible.

Wetlands and Waters

The Project site was surveyed to determine if any wetlands and waters potentially subject to jurisdiction by the U.S. Army Corps of Engineers (Corps), RWQCB, or the California Department of Fish and Game (CDFG) were present. The 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.

Other Sensitive Biological Communities

The Project site was evaluated for the presence of other sensitive biological communities, including riparian areas and sensitive plant communities recognized by CDFG.

Special Status Species

Literature Review

Potential occurrence of special status species in the Project site was evaluated by first determining which special status species occur in the Project vicinity through a literature and database search. Database searches for known occurrences of special status species focused on a 1 and 5 mile area around the Project site. The following sources were reviewed to determine which special status plant and wildlife species have been documented to occur in the Project vicinity:

- California Natural Diversity Database records (CNDDB) (CDFG 2010)
- Special Vascular Plants, Bryophytes, and Lichens List (CDFG 2010)
- Special Animals List (CDFG 2009)
- United States Fish and Wildlife Service (USFWS) quadrangle species list for Oakland East, Oakland West, Briones Valley, and Richmond quads (USFWS 2010)
- California Native Plant Society (CNPS) Electronic Inventory records (CNPS 2010)
- CNPS list of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties (Lake 2010)

Site Assessment

The Project site was surveyed to search for suitable habitats for special status species identified in the literature review as potentially occurring in the vicinity. The potential for each special status species to occur in the Project site was then evaluated according to the following criteria:

1. ***No Potential***. Habitat on and adjacent to the Project site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
2. ***Unlikely***. Few of the habitat components meeting the species requirements are present, and/or most of the habitat on and adjacent to the Project site is unsuitable or of very poor quality. The species is not likely to be found on the site.
3. ***Moderate Potential***. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the Project site is unsuitable. The species has a moderate probability of being found on the site.
4. ***High Potential***. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the Project site is highly suitable. The species has a high probability of being found on the site.
5. ***Present***. Species is observed on the Project site or has been recorded (i.e., CNDDB, other reports) on the Project site recently.

The site assessment is intended to identify the presence or absence of suitable habitat for each special status species known to occur in the vicinity in order to determine its potential to occur in the Project site. The site visit does not constitute a protocol-level survey and is not intended to determine the actual presence or absence of a species; however, if a special status species was observed during the site visit, its presence was recorded and is discussed below.

3.4.2 Setting

Summit Reservoir is located in the Berkeley Hills, a range of the Pacific Coast Ranges that overlook the northeast side of the valley that surrounds San Francisco Bay. The Berkeley Hills affect the local climate by their elevation and situation. The oceanic marine layer, which is most developed during the summer months, is usually less than 2,000 feet deep and thus is blocked by the range. This produces a “fog shadow” effect on the areas directly east, which are consequently warmer than areas west of the hills. In winter during spells of tule fog inland, the reverse occurs, with the fog usually confined to areas east of the hills. The Berkeley Hills also have an effect on rainfall, increasing the amount of precipitation along the western slopes, and leaving areas east of the hills relatively drier. In the spring and fall, strongly sinking air from aloft combining with inland high pressure periodically sends hot, dry, and gusty winds across the ridges of the Berkeley Hills, posing a significant fire danger.

Soils

Summit Reservoir is located at the crest of the Berkeley Hills at the heads of two drainage ravines; Cerrito Creek, which flows westward into San Francisco Bay, and an unnamed tributary that flows eastward into Wildcat Creek. The East Bay Hills are overlain by Tertiary sedimentary and volcanic rocks. Native soils still existing, although not necessarily exposed, include the Xerorthent-Millsholm association and Gilroy clay loam. Soil depths vary from shallow to moderately deep. The Xerorthent-Millsholm complex soils are moderately acidic to slightly alkaline loams, clays and silty clay loams, developed on sandstone, siltstone or alluvium, in which runoff is rapid to very rapid and the risk of erosion is high to very high. The Gilroy series consists of moderately deep, well drained soils that formed in material weathered from basic igneous and metamorphic rocks. The surface and subsoil are mainly moderately acid to neutral throughout, tend to become less acid with depth and are moderately alkaline in some pedons just above the bedrock. It is a well drained, with medium to rapid runoff, moderately slow permeability, and has a moderate to moderate-high erosion rating depending on the steepness of slopes. Although these native soils may support special status plant species, the significant historic grading and contouring at the Project site has reduced the potential to support such species.

Biological Communities

Non-Sensitive Biological Communities

The entire Project site is considered an urban habitat as defined by Mayer and Laudenslayer (1988). A distinguishing feature of urban wildlife habitat is the mixture of native and exotic species. Urban vegetation is relatively static in species composition because of maintenance. The tree grove structure on the Project site has a continuous canopy and is composed of planted California native coast redwood (S*equoia sempervirens*), Monterey pine *(Pinus radiate),* sequoia (*sequoiadendron giganteum*), incense cedar *(Calocedrus decurrens*), Monterey cypress *(Cupressus macrocarpa)*, California bay *(Umbellaria californica*), Douglas-fir *(Pseudotsuga menziesii var. menziesii*), Pacific ponderosa pine (*Pinus ponderosa*), western hemlock (*Tsuga heterophylla*), coast live oak (*Quercus agrifolia*), and non-native eucalyptus (*Eucalyptus sp*.), juniper (*Juniperus sp*.) and deodor cedar (*Cedrus deodor*). Although many of the tree species are native to California, they are not endemic to the area. A list of plant species observed on site is included in **Table 3.4-1**.

Understory vegetation of the Project site is dominated by non-native English ivy (*Hedera helix*), a vigorous growing vine that affects all levels of disturbed and undisturbed forested areas, growing both as a ground cover and a climbing vine. As the ivy climbs in search of increased light, it engulfs and kills tree branches by blocking light from reaching the host tree’s leaves. Branch dieback proceeds from the lower to upper branches, eventually killing the tree. In addition, the added weight of the vines makes infested trees much more susceptible to blow-over during high rain and wind events. On the ground, English ivy forms dense and extensive monocultures that exclude native plants.

TABLE 3.4-1

Summit Reservoir Replacement Project Site
Plant Species Observed May 14 and July 22, 2010

Common Name	Scientific Name	Origin
Rescue grass	*Bromus catharticus*	Non-native
Ripgut grass	*Bromus diandrus*	Non-native
Incense cedar	*Calocedrus decurrens*	Native
Italian thistle	*Carduus pycnocephalus*	Non-native
Deodar cedar	*Cedrus deodara*	Non-native
Bull thistle	*Cirsium vulgare*	Non-native
Claytonia	*Claytonia sp.*	Native
Cotoneaster	*Cotoneaster* sp.	Non-native
Hawthorn	*Crataegus sp.*	Native
Monterey cypress	*Cupressus macrocarpa*	Native
Panic veldtgrass	*Ehrharta erecta*	Non-native
Broadleaf helleborine	*Epipactus helleborine*	Non-native
Eucalyptus	*Eucalyptus sp.*	Non-native
Chinese caps	*Euphorbia crenulata*	Native
Petty spurge	*Euphorbia peplus*	Non-native
Blue Fescue	*Festuca idahoensis*	Native
Ash	*Fraxinus sp.*	Native
English ivy	*Hedera helix*	Non-native
English holly	*Ilex aquifolium*	Non-native
Juniper	*Juniperus* sp.	Non-native
Privet	*Ligustrum* sp.	Non-native
Deergrass	*Muhlenbergia rigens*	Native
Oleander	*Nerium oleander*	Non-native
New Zealand flax	*Phormium tenax*	Non-native
Spruce	*Picea sp.*	Native
Pacific ponderosa pine	*Pinus ponderosa*	Native
Monterey pine	*Pinus radiata*	Native
English laurel	*Prunus laurocerasus*	Non-native
Plum/cherry	*Prunus spp.*	Non-native
Douglas-fir	*Pseudotsuga menziesii var. menziesii*	Native
Coast live oak	*Quercus agrifolia*	Native
Rosemary	*Rosmarinus officinalis*	Non-native
Common groundsel	*Senecio vulgaris*	Non-native
Coast redwood	*Sequoia sempervirens*	Native
Sequoia	*Sequoiadendron giganteum*	Native
Hedge Parsley	*Torilis nodosa*	Non-native
Western Hemlock	*Tsuga heterophylla*	Native
California bay	*Umbellularia californica*	Native
Common vetch	*Vicia sativa* ssp. *nigra*	Non-native

Sensitive Biological Communities

A review of the CNDDB indicates that three sensitive natural communities occur within 5 miles of the Project site: Northern Coastal Salt Marsh, Northern Maritime Chaparral, and Valley Needlegrass Grassland (described below). None of these communities occurs on the Project site.

Northern Coastal Salt Marsh – This community is characterized by highly productive, herbaceous and suffructescent (slightly woody at the base), salt-tolerant hydrophytes (aquatic plants) forming moderate to dense cover and up to 3 feet tall. Most species are active in summer, dormant in winter. The community is usually segregated horizontally with spartina nearer the open water, salicornia at mid-littoral elevations, and a richer mixture closer to high ground. It is usually found along sheltered inland margins of bays, lagoons, and estuaries. These hydric soils are subject to regular tidal inundation by salt water for at least part of each year. It is found along the coast from the Oregon border south to about Point Conception. It is extensively developed around Humboldt Bay and other Humboldt County areas; Tomales Bay, Marin County; Elkhorn Slough, Monterey County; Morro Bay, San Luis Obispo County; and very extensively in the San Francisco Bay Area.

Northern Maritime Chaparral – This community is a fairly open chaparral (50-80 percent cover, usually fairly easy to walk through). It is dominated by several narrowly restricted Manzanita or Ceanothus species, and associated with sandy substrates within the zone of coastal fog incursion, usually on rolling to hilly terrain. Fire appears necessary for continued reproduction. It occurs from Santa Cruz to Sonoma County near the coast, usually as islands in Mixed Evergreen Forests of coast live oak, redwood, and douglas-fir, or adjacent to Northern coastal scrub.

Valley Needlegrass Grassland – This community is a midheight (to 2 feet) grassland dominated by perennial, tussock-forming purple needlegrass (*Nassella pulchra*). Native and introduced annuals occur between the perennials, often actually exceeding the bunchgrasses in cover. Usually found on fine-textured (often clay) soils, moist or even waterlogged during winter, but very dry in summer. Often intergrades with oak woodlands on moister, better drained sites. Formerly extensive around the Sacramento, San Joaquin, and Salinas Valleys, as well as the Los Angeles Basin, but now much reduced.

Wetlands and Waters

No wetlands or waters occur within the Project site. Aquatic habitats in the Project vicinity include Cerrito Creek and Wildcat Creek. Cerrito Creek originates in two large canyons off of Arlington Avenue in the Kensington Hills, west of the Project site. There is a branch along the south side of Sunset View cemetery, and one along the south side of El Cerrito Plaza shopping mall. The two branches come together on the north side of Albany Hill where Blackberry Creek also joins in, and flows into San Francisco Bay.

Wildcat Creek is a 10-mile long creek which flows through Wildcat Canyon emptying into San Pablo Bay. The creek originates in Tilden Regional Park east of Project site. It feeds the artificial Lake Anza as well as the smaller reservoir Jewel Lake along its course. In its lower course, it passes through the city of San Pablo and portions of the city of Richmond.

Other Sensitive Biological Communities

Riparian is defined as, "on, or pertaining to, the banks of a stream;" therefore, riparian vegetation is defined as, "vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself" (CDFG ESD 1994). Riparian habitats are considered to be among the most valuable wildlife habitats due to the microhabitats that are created by the layering of trees, shrubs and herbaceous and aquatic vegetation. These areas are considered sensitive and are protected by CDFG. Of all the riparian habitats in the Bay Area, riparian forests are considered the most complex and support the greatest number of plant and animal species. Riparian forests also enhance the functions of adjacent habitats, and are considered most valuable when occurring in an unbroken corridor throughout the length of the watershed. No riparian habitat occurs within the Project site.

Fishery Resources

Summit Reservoir was originally constructed in 1891 by excavating a basin at the head of a tributary to Cerrito Creek or Wildcat Creek. While anadromous salmonids may have used Cerrito Creek historically, no direct evidence of a viable run occurring in the watershed exists (Leidy et al 2005). The system has been altered severely by development and flood control facilities, and appears incapable of supporting a viable steelhead/rainbow trout *(Oncorhynchus mykiss)* population (Leidy et al 2005). Wildcat Creek supported a steelhead run historically, but the introduction of passage barriers and habitat destruction has limited substantially the ability of the watershed to sustain a viable population (Leidy et al 2005). Steelhead/rainbow trout, probably derived from plantings of coastal anadromous stock in 1983, successfully reproduces in the portion of Wildcat Creek below Jewel Lake. Steelhead/rainbow trout are known to reproduce successfully in the area above Lake Anza. Passage improvements in lower Wildcat Creek that ensure sufficient, available habitat are necessary for a self-sustaining anadromous population of steelhead to persist in the drainage (Leidy et al 2005).

Wildlife Species

Wildlife populations at the Project site are characteristic of those adapted to northern California urban habitats. Wildlife species diversity is influenced by the amount and diversity of native plant species occurring in the area, with fewer native wildlife species and less wildlife diversity in areas dominated by non-native vegetation (Burghardt 2009). Common East Bay suburban wildlife species include eastern fox squirrel *(Sciurus niger)*, black rat (*Rattus rattus)*, deer mouse *(Peromyscus maniculatus)*, raccoon *(Procyon lotor)*, mule deer *(Odocoileus hemionus)*, turkey vulture *(Cathartes aura)*, red-tailed hawk *(Buteo jamaicensis)*, mourning dove (*Zenaida macroura)*, western scrub-jay *(Aphelocoma californica)*, American crow *(Corvus brachyrhynchos)*, American robin *(Turdus migratorius)*, northern mockingbird *(Mimus polyglottos)*, European starling *(Sturnus vulgaris)*, California towhee *(Pipilo crissalis)*, Brewer's blackbird *(Euphagus cyanocephalus)*, western fence lizard *(Sceloporus occidentalis)*, and gopher snake *(Pituophis catenifer)*. The Project site is completely surrounded by residential development and roads, with Tilden Regional Park about one-quarter mile to the east.

Although the perimeter of the Project site is fenced, there are access points for deer movement, as numerous deer use the site for cover. Deer in urban areas usually become habituated to the presence of humans when they are exposed to predictable, non-negative encounters with humans (Happe 1982). The Project site is especially hospitable for deer because there is little to no predation, plenty of forage vegetation from nearby residents' gardens, and immediate access to Tilden and Wildcat Canyon Regional Parks.

Wildlife Movement Corridors and Nursery Areas

Wildlife movement corridors link areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or by areas of human disturbance or urban development. Topography and other environmental conditions in combination with urbanization have fragmented or separated large open space areas. The fragmentation of natural habitat creates isolated “islands” of vegetation that may not provide sufficient area to accommodate sustainable populations and can adversely affect genetic and species diversity. Movement corridors mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished and promotes genetic exchange with separate populations. Wildlife movement corridors include migration corridors (i.e., usually one way per season), interpopulation movement corridors (i.e., long-term genetic flow) and small travel pathways (i.e., daily movement corridors within an animal's territory). While the small travel pathways in the Project site facilitate deer movement for daily home range activities, such as foraging or escape from predators, the extensive residential development in the Project Area and the Project site perimeter fence act as an effective barrier between outlying populations and diminishes migration and interpopulation movement. The residential development and associated surface streets act as an effective barrier to movements of smaller species.

The Project site is in a developed urban area and does not support or provide native habitat for wildlife species. Due to the urban environment and high level of human activities in the area, only common wildlife species are likely to nest or breed in the Project area.

Special Status Species

Special Status Plant Species

Table 3.4-2 lists the CNDDB occurrences of sensitive species within 5 miles of the Project site and sensitive species that may be affected by the Project (USFWS 2010). See Tables 3.4-2 for species status definition. None of the sensitive plant species identified in Tables 3.4-2 were observed on the Project site. Sensitive plant species for which CNDDB occurrences have been noted within 1 mile of the Project site are discussed individually below.

Bent-flowered Fiddleneck *(Amsinckia lunaris*) - Bent-flowered fiddleneck is an annual herb that is endemic to California. It occurs in coastal bluff scrub, cismontane woodland, and valley and foothill grassland from 9 to 1,640 feet in elevation. Associated species include dovefoot geranium (*Geranium molle*), bicolor lupine *(Lupinus bicolor)*, sand fringepod *(Thysanocarpus curvipes)*, slender tarweed *(Madia gracilis)*, yarrow *(Achillea millefolium)*, chinese houses *(Collinsia heterophylla)*, ithuriel's spear *(Criteleia laxa)*, and vernal pool blue dicks *(Dichelostemma capitatum)*. There are nine CNDDB records (last observation in 2004) of this species within 5 miles of the Project site and one record (1990s) within 1 mile of the Project site. Habitat for this species in unsuitable in the Project site and this species was not observed during site assessments.

Diablo Helianthella *(Helianthella castanea)* - Diablo helianthella is a perennial herb endemic to the San Francisco Bay Area, occurring in the Diablo Range, Berkeley Hills, and San Bruno Mountain. Diablo helianthella is associated with thin, rocky, well-drained soils. It is found in grassy openings in woodlands, chaparral, and coastal scrub, often at the transition zone between woodland and chaparral. There are nine CNDDB records (last observation in 2006) of this species within 5 miles of the Project site and one record (2004) within 1 mile of the Project site. However, none of the rocky grassland, scrub, and chaparral habitat usually associated with this species occurs on the Project site and therefore it is not expected to occur. This species was not observed during site assessments.

Robust Monardella *(Monardella villosa globosa*) - Robust monardella is a California endemic perennial herb. Robust monardella can be found in openings and along trail margins in broadleaved upland forest, chaparral, coastal scrub, cismontane woodland, and valley and foothill grasslands between 330-3,000 feet. There are two CNDDB records (last observation in 2000) of this species within 5 miles of the Project site and one record (2000) within 1 mile of the Project site. However, none of the habitat usually associated with this species occurs on the Project site and therefore it is not expected to occur. This species was not observed during site assessments.

TABLE 3.4-2
Special Status Plant Species

Common Name *Scientific Name*	**CNDDB Observations**	**Federal Status***	**State Status***	**CNPS Status***	**Occurrence Potential**
Plants					
Hall redtop *Agrostis halliu*	0	None	None	A2	**Unlikely.** Not observed during site visit.
Bent-flowered fiddleneck *Amsinckia lunaris*	9	None	Special Plant	1B.2	**No Potential** Suitable habitat not present
Pallid manzanita *Arctostaphylos pallida*	3	Threatened	Endangered	1B.1	**No Potential** Suitable habitat not present
Longtail wild ginger *Asarum caudatum*	0	None	None	A1	**Unlikely.** Not observed during site visit.
Alkali milk-vetch *Astragalus tener* var. *tener*	2	None	Special Plant	1B.2	**No Potential** Suitable habitat not present
Cascades Oregon grape *Berbis nervosa*	0	None	None	A1	**Unlikely.** Not observed during site visit.
Round-leaved filaree *California macrophylla*	1	None	Special Plant	1B.1	**Unlikely** Not observed during site visit.
Oakland star tulip *Calochortus umbellatus*	0	None	Special Plant	1B.2	**No Potential.** Suitable habitat not present.
Coastal bluff morning-glory *Calystegia purpurata* ssp. *saxicola*	1	None	Special Plant	1B.2	**No Potential** Suitable habitat not present
Hill sun cup *Camissonia graciflora*	0	None	None	A2	**Unlikely.** Not observed during site visit.
Smooth stem sedge *Carex Laeviculmis*	0	None	None	A1	**Unlikely.** Not observed during site visit.
Franciscan thistle *Cirsium andrewsii*	1	None	Special Plant	1B.2	**No Potential** Suitable habitat not present
Alameda County thistle *Cirsium quercetorum*	0	None	None	A2	**Unlikely.** Not observed during site visit.
Presidio clarkia *Clarkia franciscana*	0	Endangered	Endangered	1B.1	**No Potential** Suitable habitat not present
Point Reyes bird's-beak *Cordylanthus maritimus* ssp. *palustris*	1	None	Special Plant	1B.2	**No Potential** Suitable habitat not present
Torrey's cryptantha *Crypthanta torreyana*	0	None	None	A2	**Unlikely.** Not observed during site visit.
Western leatherwood *Dirca occidentalis*	11	None	Special Plant	1B.2	**Unlikely** Not observed during site visit.

TABLE 3.4-2
Special Status Plant Species

Common Name *Scientific Name*	**CNDDB Observations**	**Federal Status***	**State Status***	**CNPS Status***	**Occurrence Potential**
Plants					
California wheat grass *Elymus stebbinsii*	0	None	None	A2	**Unlikely.** Not observed during site visit.
Fragrant fritillary *Fritillaria liliacea*	4	None	Special Plant	1B.2	**No Potential** Suitable habitat not present
Diablo helianthella *Helianthella castanea*	9	None	Special Plant	1B.2	**Unlikely** Not observed during site visit.
Loma Prieta hoita *Hoita strobilina*	1	None	Special Plant	1B.1	**No Potential** Suitable habitat not present
Santa Cruz tarplant *Holocarpha macradenia*	11	Threatened	Endangered	1B.1	**No Potential** Suitable habitat not present
California horkelia *Horkelia californica* ssp. *californica*	0	None	None	A1	**Unlikely** Not observed during site visit.
Douglas' iris *Iris douglasiana*	0	None	None	A2	**Unlikely** Not observed during site visit.
Central Coast iris *Iris longipetala*	0	None	Special Plant	4.2	**Unlikely** Not observed during site visit.
Pointed rush *Juncus oxymeris*	0	None	None	A2	**Unlikely** Not observed during site visit.
Tall layia *Layia hieracioides*	0	None	None	A2	**Unlikely** Not observed during site visit.
Lovage *Ligusticum apiifolium*	0	None	None	A1	**Unlikely** Not observed during site visit.
Manycolored lupine *Lupinus variicolor*	0	None	None	A1	**Unlikely** Not observed during site visit.
Wooly malacothrix *Malacothrix floccifera*	0	None	None	A2	**Unlikely** Not observed during site visit.
Oregon meconella *Meconella oregana*	2	None	Special Plant	1B.1	**No Potential** Suitable habitat not present
Large leaved sandwort *Moehringia macrophylla*	0	None	None	A2	**Unlikely** Not observed during site visit.
California wax myrtle *Morella californica*	0	None	None	A2	**Unlikely** Not observed during site visit.
Robust monardella *Monardella villosa* ssp. *globosa*	2	None	Special Plant	1B.2	**Unlikely** Not observed during site visit.
Fire poppy *Papaver californicum*	0	None	None	A2	**Unlikely** Not observed during site visit.

TABLE 3.4-2
Special Status Plant Species

Common Name *Scientific Name*	**CNDDB Observations**	**Federal Status***	**State Status***	**CNPS Status***	**Occurrence Potential**
Plants					
Western coltsfoot *Petasites frigidus* var. *palmatus*	0	None	None	A2	**Unlikely** Not observed during site visit.
Dense flowered rein orchid *Piperia elongata*	0	None	None	A2	**Unlikely** Not observed during site visit.
Michael's piperia *Piperia michaelii*	0	None	Special Plant	4.2	**Unlikely** Not observed during site visit.
Golden currant *Ribes aureum* var. *gracillimum*	0	None	None	A1	**Unlikely** Not observed during site visit.
Nootka rose *Rosa nutkana* var. *nutkana*	0	None	None	A1	**Unlikely** Not observed during site visit.
California skullcap *Scutellaria californica*	0	None	None	A2	**Unlikely** Not observed during site visit.
Most beautiful jewel-flower *Streptanthus albidus* ssp. *peramoenus*	1	None	Special Plant	1B.2	**No Potential** Suitable habitat not present
California seablite *Suaeda californica*	1	Endangered	Special Plant	1B.1	**No Potential** Suitable habitat not present
White panicle aster *Symphyotrichum lanceolatum* var. *herperium*	0	None	None	A2	**Unlikely** Not observed during site visit.
Pacific trillium *Trillium ovatum* spp. *Ovatum*	0	None	None	A2	**Unlikely** Not observed during site visit.

* *Endangered – Listed as being in danger of extinction;*
Threatened – Listed as likely to become endangered in the foreseeable future;
Special Animal, Special Plant – Taxa considered by CDFG to be those of greatest conservation need;
Conservation Concern - without additional conservation actions are likely to become candidates for listing under the Endangered Species Act;
Special Concern - declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction (CDFG);
List 1A: Plants Presumed Extinct in California;
List 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere;
List 2: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere;
List 3: Plants About Which We Need More Information - A Review List;
List 4: Plants of Limited Distribution - A Watch List.
Threat Ranks: 0.1-Seriously threatened in California (high degree/immediacy of threat); 0.2-Fairly threatened in California (moderate degree/immediacy of threat); 0.3-Not very threatened in California (low degree/immediacy of threats or no current threats known)

Fragrant Fritillary *(Fritillaria liliacea)* - The range of this California endemic is over parts of southwestern Northern California, especially Solano and Sonoma Counties and at coastal locations south to Monterey County. Occurrence is typically in open hilly grasslands at elevations less than 200 meters. It prefers heavy soils including clays; for example, andesitic and basaltic soils derived from the Sonoma Volcanic soil layers. There are three CNDDB records of this species within 5 miles of the Project site and one record within 1 mile of the Project site. Habitat for this species does not occur on the Project site and therefore it is not expected to occur. This species was not observed during site assessments.

Western Leatherwood *(Dirca occidentalis)* - This California endemic is a deciduous shrub occurring in Closed-cone Pine Forest, North Coastal Coniferous Forest, and wetland-riparian. It grows on moist and shaded slopes. There are 11 CNDDB records (last observation 2004) of this species within 5 miles of the Project site and two records (last observation 2003) within 1 mile of the Project site. Habitat for this species does not occur on the Project site and therefore it is not expected to occur. This species was not observed during site assessments.

Special Status Fish and Wildlife Species

Table 3.4-3 lists the CNDDB occurrences of sensitive species within 5 miles of the Project site and sensitive species that may be affected by the Project (USFWS 2010). None of the sensitive species identified in Table 3.4-3 were observed on the Project site. Sensitive wildlife species for which CNDDB occurrences have been noted within 1 mile of the Project site are discussed individually below.

Bridges' Coast Range Shoulderband *(Helminthoglypta nickliniana bridgesii)* - This snail is known from Contra Costa and Alameda counties from Berkeley and San Pablo to the eastern base of Mount Diablo. Typically found in moist, often riparian areas under rocks, logs, woody debris, or accumulations of leaf mould. There are four CNDDB records of this species within 5 miles of the site and two records within 1 mile of the site. Habitat for this species does not occur on the Project site and therefore it is not expected to occur. This species was not observed during site assessments.

Sacramento Perch *(Archoplites interruptus)* - The Sacramento perch is a sunfish (family Centrarchidae) native to the Sacramento–San Joaquin, Pajaro, and Salinas River areas in California but widely introduced throughout the western United States. The Sacramento perch's native habitat is in sluggish, vegetated waters of sloughs and lakes. There are two CNDDB records (last observation 1980s) of this species within 5 miles of the site and one record (1980s) within 1 mile of the site. Habitat for this species does not occur on the Project site and therefore it is not expected to occur.

TABLE 3.4-3
Special Status Fish and Wildlife Species

Common Name *Scientific Name*	CNDDB Observations	Federal Status*	State Status*	Occurrence Potential
Invertebrates				
Vernal pool fairy shrimp *Branchinecta lunchi*	0	Threatened	Special Animal	**No Potential** Suitable habitat not present
Monarch butterfly *Danaus plexippus*	4	None	Special Animal	**Moderate Potential** Mature trees on site may provide suitable winter roost habitat.
Bridges' coast range shoulderband *Helminthoglypta nickliniana bridgesii*	4	None	Special Animal	**Unlikely** Open hillsides with rock piles surrounded by grass and herbaceous vegetation not present on site.
Lee's micro-blind harvestman *Microcina leei*	2	None	Special Animal	**Unlikely** Xeric habitats under sandstone rocks in open oak grassland.
Callippe silverspot butterfly *Speyeria callippe callippe*	0	Endangered	Special Animal	**Not Present** Host plant not present.
Fish				
Green sturgeon *Acipenser medirostris*	0	Threatened	Special Concern	**No Potential** Suitable habitat not present
Sacramento perch *Archoplites interruptus*	2	None	Special Concern	**No Potential** Suitable habitat not present
Tidewater goby *Eucyclogobius newberryi*	1	Endangered	Special Concern	**No Potential** Suitable habitat not present
Delta smelt *Hypomesus transpacificus*	0	Threatened	Threatened	**No Potential** Suitable habitat not present
Coho salmon *Oncorhynchus kisutch*	0	Endangered	Endangered	**No Potential** Suitable habitat not present
Steelhead *Oncorhynchus mykiss*	0	Threatened	Special Animal	**No Potential** Suitable habitat not present
Chinook salmon – spring run *Oncorhynchus tshawytscha*	0	Threatened	Threatened	**No Potential** Suitable habitat not present
Chinook salmon – winter run *Oncorhynchus tshawytscha*	0	Endangered	Endangered	**No Potential** Suitable habitat not present
Amphibians & Reptiles				
Western pond turtle *Emys marmorata*	4	None	Special Concern	**No Potential** Suitable habitat not present
California tiger salamander *Ambystoma californiense*	0	Threatened	Threatened	**No Potential** Suitable habitat not present

TABLE 3.4-3
Special Status Fish and Wildlife Species

Common Name *Scientific Name*	**CNDDB Observations**	**Federal Status***	**State Status***	**Occurrence Potential**
Alameda whipsnake *Masticophis lateralis euryxanthus*	10	Threatened	Threatened	**No Potential** Suitable habitat not present
California red-legged frog *Rana draytonii*	5	Threatened	Special Concern	**No Potential** Suitable habitat not present
Birds				
Burrowing owl *Athene cunicularia*	2	Conservation Concern	Special Concern	**No Potential** Suitable habitat not present
Cackling (=Aleutian Canada) goose *Branta hutchinsii leucopareia*	1	None	Special Animal	**No Potential** Suitable habitat not present
Western snowy plover *Charadrius alexandrinus nivosus*	0	Threatened	Special Animal	**No Potential** Suitable habitat not present
Northern harrier *Circus cyaneus*	1	None	Special Concern	**No Potential** Suitable habitat not present
Snowy egret *Egretta thula*		None	Special Animal	**No Potential** Suitable habitat not present
White-tailed kite *Elanus leucurus*	2	None	Fully Protected	**Moderate Potential.** Mature trees on site may provide habitat**.**
Bald eagle *Haliaeetus leucocephalus*	1	Conservation Concern	Endangered	**No Potential** Suitable habitat not present
Caspian tern *Hydroprogne caspia*	1	None	Special Animal	**No Potential** Suitable habitat not present
California black rail *Laterallus jamaicensis coturniculus*	1	None	Threatened	**No Potential** Suitable habitat not present
Alameda song sparrow *Melospiza melodia pusillula*	4	Conservation Concern	Special Concern	**No Potential** Suitable habitat not present
San Pablo song sparrow *Melospiza melodia samuelis*	2	Conservation Concern	Special Concern	**No Potential** Suitable habitat not present
Black-crowned night heron *Nycticorax nycticorax*	1	None	Special Animal	**No Potential** Suitable habitat not present
California brown pelican *Pelecanus occidentalis californicus*	0	Endangered	Special Animal	**No Potential** Suitable habitat not present
California clapper rail *Rallus longirostris obsoletus*	2	Endangered	Endangered	**No Potential** Suitable habitat not present
California least tern *Sternula antillarum*	0	Endangered	Endangered	**No Potential** Suitable habitat not present

TABLE 3.4-3
Special Status Fish and Wildlife Species

Common Name *Scientific Name*	**CNDDB Observations**	**Federal Status***	**State Status***	**Occurrence Potential**
Mammals				
Pallid bat *Antrozous pallidus*	5	None	Special Concern	**Moderate Potential** Mature trees on site may provide suitable roost habitat.
Berkeley kangaroo rat *Dipodomys heermanni berkeleyensis*	4	None	Special Animal	**No Potential** Suitable habitat not present
Silver-haired bat *Lasionycteris noctivagans*	1	None	Special Animal	**Moderate Potential** Mature trees on site may provide suitable roost habitat.
Hoary bat *Lasiurus cinereus*	2	None	Special Animal	**Moderate Potential** Mature trees on site may provide suitable roost habitat.
Salt-marsh harvest mouse *Reithrodontomys raviventris*	1	Endangered	Endangered	**No Potential** Suitable habitat not present
American badger *Taxidea taxus*	1	None	Special Concern	**No Potential** Suitable habitat not present

* *Endangered – Listed as being in danger of extinction;*
Threatened – Listed as likely to become endangered in the foreseeable future;
Special Anima – Taxa considered by CDFG to be those of greatest conservation need;
Conservation Concern - without additional conservation actions are likely to become candidates for listing under the Endangered Species Act;
Special Concern - declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction (CDFG).

<u>Western Pond Turtle *(Emys marmorata)*</u> - This species is found from the San Francisco Bay north, west of the crest of the Cascades and Sierras, into Washington and British Columbia. They occur in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. In streams, they prefer pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking. They may enter brackish water and even seawater. There are four CNDDB records of this species within 5 miles of the site and one record within 1 mile of the site. Habitat for this species does not occur on the Project site and therefore it is not expected to occur.

<u>California Black Rail *(Laterallus jamaicensis coturniculus*)</u> - The California black rail is small bird about the size of a sparrow. Its range extends throughout portions of California and Arizona. California black rails inhabit saltwater, brackish, and freshwater

marshes. A highly secretive and rarely observed bird, there appears to be a preference in coastal areas for tidal salt marshes dominated by dense pickleweed *(Salicornia spp.)* with an open structure below. There are two CNDDB records (last observed 2006) of this species within 5 miles of the site and one record (1922) within 1 mile of the site. Habitat for this species does not occur on the Project site and therefore it is not expected to occur.

Pallid Bat (*Antrozous pallidus*) - The Pallid Bat ranges from western Canada to central Mexico. They are found throughout California except in the high Sierra from Shasta to Kern Counties and the northwest coast, primarily at lower and mid-elevations. It occurs in a variety of habitats from desert to coniferous forest; most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California; relies heavily on trees for roosts. There are five CNDDB records (last observation 1967) of this species within 5 miles of the site and two records (last observation 1943) within 1 mile of the site. This species was not observed during site assessments, however mature trees may provide roosting habitat for this species in the Project site.

Silver-haired Bat (*Lasionycteris noctivagans)* - This species ranges from southeastern Alaska through southern Canada, south to central California and northern Mexico and east to Georgia. Wintering grounds are in the Pacific Northwest, southwestern states, and middle latitudes of the eastern United States. In spring, the western population migrates northward. Its distribution in California is limited, and remains poorly understood. Breeding populations are relatively common in northern portions of the state, along the Sacramento River drainage in Shasta and Siskiyou counties. There are also a few records of reproductive populations in the Sierra Nevada foothills and at higher elevations in the Coast Range as far south as Ventura County. The silver-haired bat is a forest-dwelling species that shows a high association with old growth habitat in the Pacific Northwest. There is one CNDDB record of this species within 5 miles and 1 mile of the site (last observed 1982). This species was not observed during site assessments, however mature trees may provide roosting habitat for this species in the Project site.

3.4.3 Regulatory Framework

Special-Status Species

Special-status species potentially occurring within or adjacent to the Project site are discussed above. This section describes the federal and state regulations, policies, and codes that afford certain species this status.

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 United States Code (USC) 1533[c]). Pursuant to the requirements of FESA, an agency reviewing a Project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the project area and determine whether the Project would have a potentially significant impact on such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]).

Project-related impacts on these species or their habitats would be significant. The USFWS also publishes a list of candidate species. Species on this list receive special attention from federal agencies during environmental review, although they are not protected otherwise under FESA. The candidate species are taxa for which the USFWS has sufficient biological information to support a proposal to list as endangered or threatened. Project impacts on such species would be considered significant in this EIR. The USFWS also maintains a list of birds of conservation concern which includes species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973."

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFG has the responsibility for maintaining a list of threatened species and endangered species (California Fish and Game Code Section 2070). The CDFG also maintains a list of candidate species, which are species that the CDFG has formally noticed as under review for addition to the threatened or endangered species lists. The CDFG also maintains lists of species of special concern that serve as watch lists. Pursuant to the requirements of CESA, an agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the project would have a potentially significant impact on such species. In addition, the CDFG encourages informal consultation on any project that may affect a candidate species. Project-related impacts on species on the CESA endangered list and threatened list would be significant pursuant to CEQA and identified as such in this EIR. Impacts on species of concern would be significant under certain circumstances, discussed below.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals. This section was included in the Guidelines primarily to deal with a situation in which a project may have a significant effect on a species that has not yet been listed by either the USFWS or CDFG. Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted. CEQA also calls for the protection of other locally or regionally significant resources, including natural communities. Although natural communities do not at present have legal protection, CEQA calls for an assessment of whether any such resources would be affected, and requires a finding of significance if there would be substantial losses. Natural communities listed in the CNDDB as "high priority for inventory" are considered by CDFG to be significant resources and fall under the CEQA Guidelines for addressing impacts. Local planning documents such as General Plans often identify these resources as well.

Other Statutes, Codes, and Policies Affording Limited Species Protection

Migratory Bird Treaty Act / California Fish and Game Code. The federal Migratory Bird Treaty Act (16 USC, Section 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. Birds of prey are protected in California under the Fish and Game Code (Section 3503.5, 1992). Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "taking" by the CDFG. Any loss of fertile eggs, nesting raptors, or any activities resulting in nest abandonment would constitute a significant impact. Non-raptor native birds receive similar protection under California Fish and Game Code Section 3503. Project impacts on these species would not be significant unless the species are known to, or have a high potential to, nest in the project area or rely on it for primary foraging.

Plants. The legal framework and authority for the state's program to conserve plants are woven from various legislative sources, including CESA, the California Native Plant Protection Act (Fish and Game Code Sections 1900–1913), the CEQA Guidelines, and the Natural Communities Conservation Planning Act. The Native Plant Protection Act of 1977 (Fish and Game Code Sections 1900 et seq.) gives the CDFG authority to designate state endangered, threatened, and rare plants and provides specific protection measures for identified populations. Sensitive plant and wildlife species that are not currently listed but would qualify for listing are afforded protection under CEQA. CEQA Guidelines Section 15065 ("Mandatory Findings of Significance") requires that a reduction in numbers of a rare or endangered species be considered a significant effect. CEQA Guidelines Section 15380 ("Rare or Endangered Species") provides for the assessment of unlisted species as rare or endangered under CEQA if the species can be shown to meet the criteria for listing. The CNPS maintains a list of special-status plant species based on collected scientific information. Designation of these species by the

CNPS has no legal status or protection under federal or state endangered species legislation. CNPS designations are defined as follows: List 1A (plants presumed extinct); List 1B (plants rare, threatened, or endangered in California and elsewhere); List 2 (plants rare, threatened, or endangered in California, but more numerous elsewhere); List 3 (plants about which more information is needed – a review list); and List 4 (plants of limited distribution – a watch list). In general, plants appearing on CNPS List 1A, 1B, or 2 meet the criteria of Section 15380 of the CEQA Guidelines; thus, substantial adverse effects to these species would be significant.

Wetlands

U.S. Army Corps of Engineers

Wetlands and other waters (e.g., rivers, streams, and natural ponds) are a subset of "waters of the U.S."[23] and receive protection under Section 404 of the Clean Water Act. The Corps has primary federal responsibility for administering regulations that concern waters of the U.S. In this regard, the Corps acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in "navigable waters,"[24] and the Clean Water Act (Section 404), which governs specified activities in waters of the U.S., including wetlands. The U.S. Environmental Protection Agency (USEPA) has the ultimate authority for designating dredge and fill material disposal sites and can veto the Corps issuance of a permit to fill jurisdictional waters of the U.S. The Corps requires a permit if a project proposes placement of structures within navigable waters and/or alteration of waters of the U.S.[25]

Regional Water Quality Control Board

The RWQCB regulates waters of the state under the Porter-Cologne Water Quality Control Act. Under Section 401 of the Clean Water Act, the RWQCB has review

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23 The term "waters of the U.S.," as defined in Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]), includes: (1) all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (2) all interstate waters, including interstate wetlands; (3) all other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce, including any such waters that are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce; (4) all impoundments of waters otherwise defined as waters of the U.S. under the definition; (5) tributaries of waters identified in numbers (1) through (4); (6) territorial seas; and (7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in numbers (1) through (6).

24 Navigable waters are defined as those waters that are subject to the ebb and flow of the tide or that are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce

25 Based on a Supreme Court ruling concerning the Clean Water Act jurisdiction over isolated waters (January 9, 2001), nonnavigable, isolated, intrastate waters, based solely on the use of such waters by migratory birds, are no longer defined as waters of the U.S. Jurisdiction over nonnavigable, isolated, intrastate waters may be possible if their use, degradation, or destruction could affect other waters of the U.S., or interstate or foreign commerce. Jurisdiction over such other waters is analyzed on a case-by-case basis. Impoundments of waters, tributaries of waters, and wetlands adjacent to waters are also analyzed on a case-by-case basis.

authority of Section 404 permits. The RWQCB 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. Dredging, filling, or excavation of isolated waters constitutes a discharge of waste to waters of the state, and prospective dischargers are required to submit a report of waste discharge to the RWQCB and comply with other requirements of the Porter-Cologne Water Quality Control Act.

California Department of Fish and Game

Under Sections 1600–1616 of the California Fish and Game Code, the CDFG regulates activities that substantially divert, obstruct the natural flow of, or substantially change rivers, streams, and lakes. The jurisdictional limits of the CDFG are defined in Section 1602 of the California Fish and Game Code as the bed, channel, or bank of any river, stream, or lake. The CDFG regulates activities that would result in the deposit or disposal of debris, waste, or other materials into any river, stream, or lake and requires a Streambed Alteration Agreement for such activities. Impacts on the jurisdictional area of the CDFG would be significant.

Local Plans and Policies

Pursuant to California Government Code Section 53091, 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 for the production, generation, storage or transmission of water. It is, however, the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies to the extent possible. The tree ordinances of cities and counties within the Project area are described below.

Oak Woodlands Conservation Act

California Senate Bill (SB) 1334, the Oak Woodlands Conservation Act, became law on January 1, 2005 and was added to the CEQA statutes as Section 21083.4. This new law, applicable to counties but not to cities or other public agencies, protects oak woodlands that are not protected under the State Forest Practice Act. This statute requires that a county determine whether or not a project would result in a significant impact on oak woodlands; if the project would result in a significant impact on oak woodlands, the county must implement one or more of the following mitigation measures:

- Conserve oak woodlands through the use of conservation easements
- Plant an appropriate number of trees, including maintenance of plantings and replacement of failed plantings
- Contribute funds to the Oak Woodlands Conservation Fund for the purpose of purchasing oak woodlands conservation easements
- Implement other mitigation measures developed by the county Contra Costa County has not developed any additional measures, except as defined in the

County Code ("Tree Protection and Preservation," Title 8, Chapters 816-4, 816-6).

Contra Costa County

Contra Costa County protects two types of trees, as defined below:

- Heritage trees are classified as trees with a circumference of 72 inches or more, equal to a diameter at breast height of 22.9 inches. Heritage trees also include any tree or grove of trees worthy of protection due to historical or ecological interest or significance, any tree specifically designated by the Board of Supervisors, trees that are dependent on each other for health or survival, or any tree considered an outstanding specimen (Contra Costa County Ordinance, Chapter 816-4).

- Protected trees include

  1. On all properties within unincorporated areas of the county
     a. Indigenous trees, including oaks, pines, buckeye, black walnut, willows, redwood, maple, elderberry, toyon, alder, cottonwood, and madrone that have a circumference of 20 inches or more - equal to a diameter at breast height of 6.5 inches and are located adjacent to or are a part of a riparian, foothill woodland, or oak savanna area or are part of a stand of four or more trees
     b. Any tree designated for preservation on an approved tract map, development or site plan, or required to be retained as a condition of approval
     c. Any tree required to be planted as a replacement for an unlawfully removed tree

  2. On any developed property within any commercial, professional office, or industrial district, on any undeveloped property within any district, in any designated open space or recreation area, or any area designated as visually significant
     a. Any tree with a diameter at breast height of 6.5 inches or greater
     b. Any multistemmed tree having an aggregate circumference of 40 inches or more
     c. Any significant grouping of trees

Alameda County

The Alameda County tree ordinance (Ordinance No.: 0-2004-23) preserves and protects trees within County rights-of-way (land, which 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 to remove or cause to be removed any tree from the right-of-way unless so authorized by an encroachment permit issued by the County.

In Alameda County Resolution No. 2008-222, the Board of Supervisors directed the Community Development Agency to encourage private landscaping projects to include Bay-Friendly landscaping elements. Bay-friendly landscaping includes landscaping in harmony with the natural conditions of the San Francisco Bay watershed and protecting and enhancing wildlife habitat and diversity

City of Berkeley

The City of Berkeley has declared a moratorium on the removal of any single stem coast live oak tree with a circumference of 18 inches or more, and any multi-stemmed coast live oak tree with an aggregate circumference of 26 inches or more at a distance of 4 feet up from the ground within the City of Berkeley. An exception may be made if the City Manager, or his designee, finds that any tree described in this Ordinance is a potential danger to life or limb due to the condition of the tree that the only reasonable mitigation would be removal of the tree (Ordinance No. 6321-N.S.).

The moratorium will stay in effect until the City Council adopts a Tree Preservation Ordinance. The City of Berkeley General Plan encourages the use of native tree and plant species to enhance ecological richness (Policy EM-30) and recommends using native landscaping in new and replacement plantings, and removing non-native plants to create ecological corridors for wildlife habitation, where appropriate.

3.4.4 Impacts and Mitigation Measures

Significance Criteria

This section addresses the following standards of significance as based on CEQA Guidelines Appendix G. Would the project:

- Substantial adverse effects, either directly or through habitat modification, to any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;
- Substantial adverse effects on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS;
- Substantial adverse effects on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Substantial interference with 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;

- Conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Impacts and Mitigation Measures

Special Status Plant Species

Natural vegetation communities do not occur on the Project site and surveys conducted in May and July 2010 did not identify any extant special status plant species. No impacts on special status plant species are anticipated as a result of the Project.

Special Status Fish and Wildlife Species

The Project would not result in significant impacts on extant wildlife species. Direct impacts include temporary habitat loss, mortality of resident species, and possibly reduced value for local wildlife movement during and immediately after construction activities. Though the Project site would continue to facilitate wildlife movement through the area, construction of facilities would result in some temporary displacement of wildlife. However, implementation of best management practices, including revegetation of disturbed areas, would avoid or minimize significant impacts on extant species. Potential impacts on special status wildlife species are discussed below.

Impact 3.4-1: Impacts on monarch butterfly wintering roosts.

Wintering sites for monarch butterflies are considered sensitive by the CDFG and have a moderate potential to occur on the Project site. Monarch butterfly winter roost sites are typically located in wind-protected tree groves (eucalyptus, pine, and cypress), with nectar and water sources nearby. Monarch butterfly observations have been reported within 5 miles of the Project site, and the site provides suitable roosting habitat for the monarch butterfly. Impacts on potential winter roosting habitat on or adjacent to the Project site could occur during construction, as a result of tree and shrub removal, ground disturbance, equipment movement, or by direct mortality. This impact could be a significant if monarch butterflies roosted within the Project site. Therefore, the following mitigation measure would be required:

> **Measure 3.4-1:** Monarch butterfly wintering roosts. Prior to initiation of ground disturbance, a qualified biologist will conduct a late fall/early winter butterfly survey within the Project site. If the results of the survey do not identify any potential overwintering of the monarch butterfly on-site, no further mitigation will be required. If overwintering monarchs are determined to use the site, construction will be deferred until a qualified biologist has determined that overwintering monarchs are no longer using the site, or, in consultation with

CDFG, a construction-free buffer zone will be established around the roost to ensure that monarch butterflies will not be disturbed during Project implementation.

Implementation of Mitigation Measure 3.4-1would reduce potential impacts on monarch butterfly roosts to less than significant.

Significance After Mitigation: Less than Significant.

Impact 3.4-2: Nesting special status bird species.

Avian species protected under the Migratory Bird Treaty Act have potential to nest within the Project site. These species include several raptors, such as the American kestrel *(Falco sparverius)*, barn owl *(Tyto alba)*, Cooper's hawk *(Accipiter cooperii)*, great horned owl *(Bubo virginianus)*, northern saw-whet owl *(Aegolius acadicus)*, red-tailed hawk *(Buteo jamaicensis)*, western screech owl *(Megascops kennicottii)*, sharp-shinned hawk *(Accipiter striatus)*, and long-eared owl *(Asio otus)*. These species may use trees, shrubs, man-made structures or the ground for nesting habitat. Cooper's hawks have been observed nesting on site (Pericoli and Fish 2004). Disruption of nesting special status avian species could occur as a result of increased human activity (e.g., due to the use of heavy equipment and human traffic) during the breeding season (approximately February through August in the Berkeley Hills). Construction activities could disturb nesting avian species and lead to nest abandonment or poor reproductive success. Impacts on potential nesting habitat on or adjacent to the Project site could occur during construction, as a result of tree and shrub removal, ground disturbance, equipment movement, or by direct mortality. This impact would be significant if special status bird species nested within the Project site during construction activities. Therefore, the following mitigation measure would be required.

Measure 3.4-2: Nesting special status bird species.

- If site clearing, demolition, and construction occur between February 1 and August 31, a qualified biologist will conduct preconstruction surveys for nesting birds to ensure that no nest will be disturbed during construction. This survey will be conducted no more than 14 days prior to the start of construction activities during the early part of the breeding season (February through April) and no more than 30 days prior to the start of construction during the late part of the breeding season (May through August). During this survey, the biologist will inspect all trees and other habitats in and adjacent to the impact areas for nests. If an active nest is encountered, the qualified biologist will develop species-specific measures in consultation with CDFG. EBMUD and/or its construction contractor will implement those measures to prevent abandonment of the active nest.

- If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation will be required. Trees and shrubs within the construction footprint that have been determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests will be removed. Nests initiated during construction will be presumed to be unaffected, and no buffer will be necessary.

Implementation of Mitigation Measure 3.4-2 would reduce impacts on nesting special status bird species to less than significant.

Significance After Mitigation: Less than Significant.

Impact 3.4-3: Special status bat species.

Roosting and foraging habitat is present for a number of special status bat species. These special status bat species typically use buildings, trees, bridges, and rock crevices for roost habitat. Foraging habitat is present over most of the adjacent habitats. Construction activities associated with the Project (including clearing, grading, trimming, and removal of trees, and other roosting habitat) could result in direct mortality of special-status bats. In addition, construction activities may result in the removal or disturbance of hibernation or maternal roost sites due to tree removal, ground disturbance, noise or human intrusion Construction noise and human disturbance within and adjacent to large trees and other potential roosting habitat could cause roost abandonment and death of young. This would be a significant impact as it may result in direct mortality and reduction in reproductive success.

Because these species are able to travel great distances to forage, impacts on foraging habitats are considered less than significant.

Measure 3.4-3: Special status bat species.

- Prior to the start of construction, a qualified biologist will survey the area within 100 feet of the worksite to identify potential bat roost habitat (old buildings, bridges, culverts, large trees (>12 inches diameter at breast height), rock crevices, mines, caves). If no potential bat roost habitat occurs in the area, no further mitigation measures will be required.
- If potential bat roost habitat occurs within 100 feet of the worksite, a qualified biologist will conduct a search for suitable entry points, roost cavities or crevices; and, survey for day-roosting bats (carcasses, guano, staining, and strong odors). If no roosting is observed, no additional mitigation measures will be required.

- If roosting surveys are inconclusive, day roost surveys indicate potential occupation by special status bat species, and/or habitat assessment indicates a large day roosting population by any bat species, a qualified biologist will conduct focused day and night emergence surveys between April 1 and September 15. A qualified biologist will develop mitigation measures for special status bat species and large day roosting populations of any bats in consultation with CDFG. EBMUD and/or its construction contractor will implement all mitigation measures as directed.

Implementation of Mitigation Measure 3.4-3 would reduce impacts on special status bat species to less than significant.

Significance After Mitigation: Less than Significant

Biological Communities

Non-sensitive biological communities - A mix of planted California native (though not necessarily native to the area) and non-native trees, shrubs and ground cover are established on the Project site. No sensitive biological communities occur on the site. Therefore, impacts on non-sensitive biological communities would be less than significant.

Sensitive biological communities **-** No sensitive biological communities occur on the site. There are no approved Habitat Conservation Plans or Natural Community Conservation Plans in the Project Area. Therefore, no impacts on sensitive biological communities would occur as a result of the Project.

Wetlands and waters - No wetlands or waters occur on the site. Therefore, no impacts on wetlands or waters would occur as a result of the Project.

Fish and Wildlife Movement, Migration and Nursery Sites

The small travel pathways in the Project site facilitate deer movement for daily home range activities, such as foraging or escape from predators. However, the extensive residential development in the Project Area and the existing perimeter fencing act as an effective barrier between outlying populations and diminishes migration and interpopulation movement. The existing residential development and associated surface streets act as an effective barrier to movements of smaller wildlife species. Restoration of native vegetation communities after construction would minimize impacts on deer movement in the site. Consequently, the Project would not 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. Therefore, impacts on fish and wildlife movement, migration and nursery sites would be less than significant.

Local Tree Policies and Ordinances

As discussed above (Section 3.4.3.3), it is the practice of EBMUD to work with local jurisdictions and neighboring communities during Project planning and to conform to local environmental protection policies to the extent possible. For the purpose of this EIR, tree ordinance policies that define protected trees, including heritage trees, are used herein as guidelines for determining significance criteria.

Impact 3.4-4: **Loss of or damage to protected trees.**

Northern coastal scrub, including (California sagebrush scrub and coyote brush scrub) and coastal prairie (California oatgrass) exist in a continuum of herbaceous to dense woody shrub cover wherever the cooling influence of the Pacific Ocean moderates summer drought from Northern Santa Barbara County north to the Oregon border and inland to the Sierra Foothills (Ford and Hayes 2007). Once widespread, particularly in the Berkeley Hills (Amme 2004) now these habitat types are increasingly rare and endangered. The Summit Reservoir site is extensively landscaped with a mix of California native (although not necessarily endemic) and non-native species, creating a vegetation community that provides little value to wildlife species or endemic plant species. It is the policy of CNPS that tree planting is not appropriate where trees have not been a historical component of the plant community. Planting should enhance an altered plant community and species selection should be of species found, or once found, naturally in the area considered for planting. Trees, shrubs, and herbaceous plants should be used that are indigenous to the general Project area.

Approximately 140 to 150 existing trees of various sizes and condition would be removed during Project construction. Of these trees, 18 are coast live oak trees which are protected per the City of Berkeley tree ordinance. This impact would be significant if these trees meet the tree ordinance criteria of the Oak Woodlands Conservation Act, Contra Costa County, and the City of Berkeley. Therefore, the following mitigation measure would be required:

> **Measure 3.4-4**: Local Tree Policies and Ordinances. During design, EBMUD will prepare a map indicating the trees to be removed and retained (preserved). Prior to the start of any clearing, stockpiling, excavation, grading, compaction, paving, change in ground elevation, or construction, retained trees that are adjacent to or within Project construction areas will be identified and clearly delineated by protective fencing (e.g., short post and plank walls), which will be installed at the dripline of each tree to hold back fill. The delineation markers will remain in place for the duration of all construction work. As recommended by the policies of the California Native Plant Society and the City of Berkeley, and in consultation with Contra Costa County, the landscape vegetation, including protected trees, removed as a result of the Project will be replaced with species

characteristic of historical California sagebrush scrub, coyote brush scrub, and California oatgrass vegetation series. Characteristic species are listed below.

Common Name	Scientific Name	Type
California brome grass	*Bromus carinatus*	Annual herb
Baby blue eyes	*Nemophila menziesii*	Annual herb
Small fescue	*Vulpia microstachys*	Annual herb
Yarrow	*Achillea millefolium*	Perennial herb
Squirreltail	*Elymus elymoides*	Perennial herb
Blue wildrye	*Elymus glaucus*	Perennial herb
Idaho fescue	*Festuca idahoensis*	Perennial herb
Red fescue	*Festuca rubra*	Perennial herb
Creeping ryegrass	*Leymus triticoides*	Perennial herb
Deer weed	*Lotus scoparius*	Perennial herb
California melic	*Melica californica*	Perennial herb
Nodding needlegrass	*Nassella cernua*	Perennial herb
Purple needlegrass	*Nassella pulchra*	Perennial herb
One-sided bluegrass	*Poa secunda*	Perennial herb
California sagebrush	*Artemisia californica*	Shrub
Coyote brush	*Baccharis pilularis*	Shrub
Brittlebush	*Encelia farinosa*	Shrub
California buckwheat	*Eriogonum fasciculatum*	Shrub
Naked buckwheat	*Eriogonum nudum*	Shrub
Bush-penstemon	*Keckiella cordifolia*	Shrub
Yellow bush lupine	*Lupinus arboreus*	Shrub
Bush monkeyflower	*Mimulus aurantiacus*	Shrub
California wax myrtle	*Morella californica*	Shrub
California coffeeberry	*Rhamnus californica*	Shrub
Lemonade berry	*Rhus integrifolia*	Shrub
White sage	*Salvia apiana*	Shrub
Purple sage	*Salvia leucophylla*	Shrub
Black sage	*Salvia mellifera*	Shrub
Blue elderberry	*Sambucus nigra* ssp. *caerulea*	Shrub
California live oak	*Quercus agrifolia*	Tree

Implementation of Mitigation Measure 3.4-4 would reduce impacts on protected trees to less than significant.

Significance after Mitigation: Less than Significant.

Habitat Conservation Plans, Natural Community Conservation Plans

There are no approved Habitat Conservation Plans or Natural Community Conservation Plans in the Project Area. Therefore, no further discussion of this topic is provided.

References

Amme, D., 2004. Grassland Heritage-Stewardship of a Changed Landscape, Bay Nature, Bay Nature Institute, Berkeley, CA.

Burghardt, K.T., D.W. Tallamy, and W.G. Shriver, 2009. Impact of Native Plants on Bird and Butterfly Biodiversity in Suburban Landscapes, Conservation Biology 23(1):219-224.

California Department of Fish and Game, 1994. A Field Guide to Lake and Streambed Alteration Agreements, California Fish and Game Code Sections 1600-1607, prepared by the Environmental Services Division (CDFG ESD).

California Department of Fish and Game (CDFG), 2010. California Natural Diversity Database (CNDDB), Biogeographic Data Branch, queried March 2010.

California Department of Fish and Game, Natural Diversity Database, July 2010. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. 71 pp.

California Department of Fish and Game, Natural Diversity Database, July 2009. Special Animals List.

Ford, L.D., and G.F. Hayes, 2007. Northern Coastal Scrub and Coastal Prairie. In Barber, M.G., T. Keeler-Wolf, and A.A. Schoenherr. Terrestrial Vegetation of California. University of California Press, Berkeley, CA.

Happe, P.J., 1982. The Use of Suburban Habitats by Columbian Black-tailed Deer, thesis submitted to Oregon State University.

Lake, D., 2010. Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties. Eight Edition, California Native Plant Society, East Bay Chapter, Pinole, CA.

Leidy, R.A., G.S. Becker, B.N. Harvey, 2005. Historical distribution and current status of steelhead/rainbow trout *(Oncorhynchus mykiss)* in streams of the San Francisco Estuary, California, Center for Ecosystem Management and Restoration, Oakland, CA.

Mayer, K.E., and W.F. Laudenslayer, Jr., 1988. A Guide to Wildlife Habitats of California. State of California, Resources Agency, Department of Fish and Game. Sacramento, CA. 166 pp.

Nowak, D.J., 1993. Historical vegetation change in Oakland and its implications for urban forest management, Journal of Arboriculture 19(5) 313-319.

Pericoli, R.V., and Fish, A. M., 2004. GGRO's East Bay Cooper's Hawk Intensive Nesting Survey – 2003. Golden Gate Raptor Observatory, Golden Gate National Parks Conservancy. Sausalito, CA.

Sawyer, J. O., Keeler-Wolf, T., and Evens, J. M., 2009. A Manual of California Vegetation, 2nd Edition, California Native Plant Society. Sacramento, CA.

U.S. Corps of Engineers Environmental Laboratory, 1987. Wetlands Delineation Manual, Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi.

U.S. Fish and Wildlife Service (USFWS), 2010. Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Briones Valley, Richmond, Oakland West and Oakland East USGS 7 1/2 minute Quads, (Document 100723122350), Sacramento Fish and Wildlife Office, Sacramento, CA, database last updated April 29, 2010.

3.5 Cultural Resources

3.5.1 Approach to Analysis

This section discusses the existing Cultural Resources in Contra Costa and Alameda Counties and the Project vicinity, and identifies potential impacts and mitigation measures associated with Project construction. Specifically, this section analyzes the potential impacts on potentially eligible historic structures, unidentified archeological resources, unique paleontological resources, unique geologic features and disturbance of human remains. This section relies on information contained in the EBMUD Summit Reservoir Replacement Project Technical Report: Cultural Resources (PAR 2010), which details the Cultural Resources analysis including a literature review and field reconnaissance by qualified cultural resource personnel.

Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the “worst case” construction footprint and potential impacts associated with the replacement tank.

3.5.2 Setting/Regulatory Framework

Prehistoric Setting

The San Francisco Bay Area is one of the most intensively studied areas in California over the past 20 years. In the discussion that follows, the information is summarized from Milliken et al. (2007:104-114). Dates have been converted from before Christ/BC and anno Domini/AD form to before present (BP).

In the Bay Area proper the earliest identified cultural components are classified as Lower Archaic cultures and appear to be of Lower Holocene age, dating to some 8,500 to 9,000 years ago. The Lower Holocene, spanning ca. 10,000 to 5,500 BP, is characterized by cultures that are thought to be generalized hunter-foragers who employed groundstone milling slabs and hand stones, and large stemmed and leaf-shaped projectile points.

Lower Archaic cultural patterns give way to Middle Archaic with the Early Period (5,500 to 2,500 BP). The mortar and pestle appear during this phase of California’s prehistory and widespread use of marine shell ornaments, possibly as a medium of exchange, first appear during this period.

Between 2,500 and about 1,500 BP, extensive changes are seen in the archaeological record throughout Central California. There are abrupt changes in marine bead and ornament designs, well developed middens appear suggesting profound changes in population mobility, economic data suggest that subsistence behaviors have shifted from mobile, generalized strategies of logistically organized "collector" patterns. Milling slabs largely vanish from the archaeological record in the region, fully replaced by mortar and pestle.

Between ca. 1,500 and 1,100 BP a transitional pattern, the Meganos, appears in many parts of Central California. The Meganos Pattern is thought to represent an acculturation process as local populations adapt new religious and economic patterns. Emergent (Late Period) is a period of regional diversification and consolidation. The earliest recognizable archaeological evidence of California's indigenous cultures at historic contact appears during the Emergent. Important changes include the appearance of the bow and arrow as hunting and warfare technology, and the adoption of the bedrock mortar.

Ethnographic Setting

The Project area lies within ethnographic territory occupied by Costanoan speakers at the time of historic contact (Kroeber 1976; Levy 1978; Milliken 1995). Costanoan is a member of the Penutian language family, several members of which were widely spoken in California. Levy names eight Costanoan dialects or "languages" occupying the Bay Area and Central Coast from the Carquinez Strait southward, extending beyond Monterey Bay in the south (Levy 1978:485), though Milliken disputes this neat partitioning (Milliken 1995:24-26).

No simple description of Costanoan subsistence is possible, due to the wide extent and environmental variability of the ethnographic Costanoan territory. Within the Project area, local populations would have relied on deer, elk, and lesser mammalian species. Littoral resources, such as fish, mollusks and migratory waterfowl, may have also been included in the diet. The acorn was a carbohydrate staple for the Costanoan-speaking people of the Bay Area, as it was throughout much of California. Historical sources quoted by Milliken report that use of both the acorn and a "grass seed" that yielded a black or very dark colored "bread" (Milliken 1995:17).

Costanoans were responsible, at least in part, for some of the largest, most extensive archaeological remains in California. Sites such as the Emeryville Shellmound measures roughly 330 by 1,000 feet with a depth of about 30 feet, attained volumes estimated in the tens of thousands of cubic meters. Max Uhle, who first studied Emeryville in the early twentieth century, noted two stratified components marked by artifact changes and different interment practices (Moratto 1984:227-230). This site and other large Bay Area shell mounds suggest very stable settlement locations that were occupied for millennia.

Historic Setting

The City of Berkeley is located in northern Alameda County and is surrounded by the cities of Oakland and Emeryville (to the south), and Albany and the unincorporated community of Kensington (to the north). The eastern city limits terminate at the Contra

Costa County /Alameda County boundary. One defining characteristic of the city is the ridgeline of the Berkeley Hills. Historically, Strawberry Creek flowed through the city into San Francisco Bay.

In 1776 the De Anza Expedition arrived in the San Francisco Bay Area, eventually leading to the establishment of the San Francisco Presidio. One of the Presidio soldiers, Luis Peralta, was granted land by the Spanish king for his services to his country. The "Rancho San Antonio," on the east shore of San Francisco Bay, encompassed what is now the City of Berkeley and focused on raising cattle for meat and hides (Beck and Haas 1974; Wollenberg 2002). Peralta eventually divided his ranch and gave each of his four sons a portion. Most of the area that included the future town site of Berkeley went to his son, Domingo, although Vicente's share included a small area as well.

By the time of the California Gold Rush, Peralta's ranch was encroached upon by squatters, reduced in size through court actions, and greatly diminished. By the late 1850s the Peraltas' properties were confined to areas around their homes, signaling an end to the large ranch. In 1853, Alameda County was created from portions of several large counties, including Contra Costa and Santa Clara. At that time, the site consisted of open land, farms, and small ranches, all spreading into the hills from a wharf by the Bay (Wollenberg 2002).

In 1866, the town site of Berkeley was laid out in anticipation of a new college campus on the hill, planned as a private institution called the College of California. While the private college never came to fruition, it set the stage for the creation of the University of California. Construction began in 1868, using the planned site for the College of California. At the same time, developers used the plat map and street grid system and began building residences and accompanying businesses and industries around the future campus. The first post office opened in 1872, and the new community, along with surrounding ranchers and farmers, incorporated as the Town of Berkeley in 1878. Ten years later the Town had all the amenities of a large city, including electric lights, telephone circuits, and electric streetcars. The infrastructure was also developed; Summit Reservoir, for example, was completed in 1891 during these expansion years (Wollenberg 2002).

The San Francisco earthquake of 1906 sent people fleeing the large city for safer ground and is responsible for Berkeley's rapid growth in the first decade of the 1900s. By 1909, the Town of Berkeley had given way to the new City of Berkeley, with the University as the city's focal point. Through the depression of the 1930s, Berkeley continued to grow, thanks to the University, but that growth was slow and focused on the existing town plat. The footprint of Berkeley changed quickly, however, following World War II (Wollenberg 2002).

During the war years many people moved into the Bay Area, drawn by employment opportunities at large shipyards and military bases that developed throughout the region. One U.S. Army Base, Camp Ashby, in fact, was sited within the Berkeley city limits. Large shipyards and navy bases were present at nearby Richmond, Port Costa, and Oakland. When the war ended many of the temporary employees chose to stay in the region, drawn by the temperate climates and sense of progress, again due to the University. In the late 1950s and

early 1960s, Berkeley, like the rest of California, enjoyed a population boom, leading to the creation of subdivisions spreading out into the Berkeley Hills. The Berkeley Woods subdivision, surrounding Summit Reservoir, was created during this post-war boom and was annexed to the City in 1959 (Wollenberg 2002).
By the 1960s, Berkeley became strongly identified with rapid social changes, civic unrest, and political upheaval due to protests held on campus to support the Civil Rights Movement and disavow the Vietnam War. As protests became more agitated and violent, they spilled out of the campus grounds and into the city streets, focusing national attention on Berkeley. Today, Berkeley is still known for its activist civilians and free-thinking population. The University of California remains the jewel of the California public college system, educating future leaders in all fields of study and remaining a central point within the City.

Architectural Setting

Summit Reservoir is a 37-MG, open-cut, below grade reservoir that spans seven acres. The reservoir was constructed in 1891 by Alameda Water Company. The reservoir was formed by excavating a basin at the head of a creek with earthen fill embankments to the east, south and west sides. It was originally used to store drinking water and collect seasonal runoff in the region. EBMUD acquired the property in 1923 when the water district was incorporated. The reservoir was drained and lined with concrete in the early 1940s.

A multi-tiered wood roof was installed in 1972 to help maintain the quality of the treated water, and in anticipation of more stringent water quality regulations. The wood roof system is supported by concrete and steel columns and timber framing, and originally featured an aesthetic reflection pond. As described in Chapter 2, Project Description, the pond was removed from the existing reservoir roof in 1998 as required by the Department of Health and Safety, and a river rock hardscape design and metal bird sculptures were installed in its place. In addition, the existing Spruce and Grizzly Peak overlook areas were improved with new plantings and benches, and a new dog watering station was added to the Spruce Street overlook.

The Woods and Shasta pump house and associated features, located on the Summit Reservoir property, comprise a small archaeological component of Summit Reservoir. The board-formed concrete structure was built in the late 1930s to early 1940s and appears to retain historic integrity in its construction. In the 1960s, additional pump units were added for the Shasta pump house and located in a pit outside the existing pump house. The roofing material has been changed through routine maintenance, but the roof structure appears to maintain its original design. The cross-gable section in the east corner of the structure may be an addition; however, no physical evidence of post-construction exterior additions were observed. The structure’s fenestration appears to be original to the building and consists of four- to eight-pane metal casement windows and a metal door with an eight-pane window. The double door, located on the southwest façade of the cross-gable section, may be a modern replacement, but is of indeterminate age. The associated features at this location include two abandoned earthen access roads, one board-formed concrete retaining wall, one mortared fieldstone retaining wall, one mortared fieldstone staircase, one decaying stacked rock wall, and six possibly modern wooden planter boxes.

Methods

Archival Research

Research included surveys of available literature, historic maps, and paper and electronic records of cultural resources within or near the Project area. A record search was conducted at the California Historic Resources Information System-Northwest Information Center (NWIC) at the California State University, Sonoma (PAR 2010).

The record search indicated that no archaeological sites were located in or within a one-quarter-mile radius of the Project site (NWIC 2010). Seven archaeological surveys previously had been conducted within a one-quarter-mile radius of the Project site, but no previous surveys had been performed on the Project site itself.

Additional organizations and individuals were contacted by letter requesting information regarding any cultural or historical resources of concern that were located within or near the Project study area. These organizations are listed in the technical report (PAR 2010). The Native American Heritage Commission sacred lands file did not indicate the presence of any cultural sites within the Project area. All other Native American individual and historical societies did not respond to the letters.

Field Work

A cultural resources survey was conducted on July 29, 2010, within the Summit Reservoir property. The surveyors used 33 to 49 foot spaced transects to cover the Summit Reservoir property in its entirety, as defined by the current fence line and the small area of exposed soil between the fence line and Grizzly Peak Boulevard to the east. Geographic Positioning System (GPS) data and digital photographs were collected for all resources using a Trimble GEO XM and Sony DSC-H50 9.1 megapixel camera. One built environment resource with a small archaeological component (Woods and Shasta pump house) was observed.

Other on site resources were documented and photographed as a precautionary measure during the survey. These resources appear to represent modern disturbance or materials that were transported to the site from the private residences that surround the Project area, and do not represent archaeological resources. These other resources include two areas with red brick and concrete fragments along the northern fence line that borders the private residential properties on Beloit Avenue. Two locations with modern glass fragments and a Coca-Cola™ bottle and one location with a modern rat trap were noted in the northern portion of the site (PAR 2010).

Regulatory Framework

The following paragraphs describe the state and local laws and regulations governing cultural resources. Government Code 53091(d) states: "(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency." In instances where this statute applies, it is the practice of EBMUD to work with host jurisdictions and agencies during Project planning to consider the local environmental protection measures and to conform to local policies to the extent possible.

California Register of Historic Places

Under California law, cultural resources are protected by CEQA, as well as Public Resources Code Section 5024.1, which established the California Register of Historic Places. Section 5024.5 requires state agencies to provide notice to, and to confer with, the State Historic Preservation Officer before altering, transferring, relocating, or demolishing historic resources.

CEQA mandates that significant impacts on historic resources be determined during the project planning stage. Guidelines for determining significant impacts are provided in Section 15064.5 and question if a resource is historically significant and would the project cause a substantial adverse change in the significance of the resource. CEQA refers to the California Register for guidance in determining if a property is significant. The California Register defines what constitutes a significant historic property and contains guidelines and criteria for determining the significance at the local level. The criteria for the California Register are as follows:

1. Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States.
2. Associated with the lives of persons important to local, California or national history.
3. Embodies the distinctive characteristics of a type, period, region or method of construction or represents the work of a master or possesses high artistic values.
4. Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation.

In addition, cultural properties must also possess integrity. As defined by the Public Resources Code 5024.1, Title 14 CCR, Section 4852(c), integrity is defined as the authenticity of a historical resource's physical identity by the survival of characteristics that existed during its period of significance. Integrity is evaluated with regard to the retention of location, design, setting, material, workmanship, feeling, and association.

Local Ordinances

The City of Berkeley adopted a Landmark Preservation Ordinance in 1974, which established criteria when considering proposed landmark and historic district designations. These criteria are similar to the California Register and include architectural merit, cultural value, educational value and historical value. Additionally, any property listed on the National Register of Historic Places is eligible to become a local landmark (Berkeley Municipal Code, Chapter 3.24).

The Contra Costa County General Plan (2005) addresses cultural and historic resources in the Open Space Element. The County's general goal is to identify and preserve important archaeological and historic resources within the County. General Plan policies for cultural resource include the following:

- Policy 9-32. Areas which have identifiable and important archaeological or historic significance shall be preserved for such uses, preferable in public ownership.
- Policy 9-33. Buildings or structures that have visual merit and historic value shall be protected.
- Policy 9-34. Development surrounding areas of historic significance shall have compatible and high quality design in order to protect and enhance the historic quality of the area.
- Policy 35. Within the Southeast County area, applicants for subdivision or for land use permits to allow non-residential uses shall provide information to the County on the nature and extent of the archaeological resources that exist in the area. The County Planning Agency shall be responsible for determining the balance between the multiple use of the land with the protection of resources.

3.5.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses the following standards of significance as based on CEQA Guidelines Appendix G. Would the project:

- Cause a substantial adverse change in the significance of a historical resource as defined in section 15064.5?
- Cause a substantial adverse change in the significance of a unique archaeological resource as defined in section 15064.5?
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
- Disturb any human remains, including those interred outside of formal cemeteries?

Impacts and Mitigation Measures

Impact 3.5-1: The Project would not cause a substantial adverse change in the significance of a historical resource.

Summit Reservoir. The reservoir was constructed in 1891 by Alameda Water Company to supply water to the surrounding area. Since its original construction, the reservoir appearance has been altered numerous times (**Figure 3.5-1**). These modifications have altered the original design and workmanship; therefore, it does not appear to meet Criterion 1 for listing on the California Register. It is not associated with any significant person and does not appear eligible under Criterion 2. The Summit Reservoir construction is similar to other reservoirs maintained by EBMUD. It does not embody distinctive architectural characteristics or represent the work of a master; therefore, it does not appear to meet Criterion 3.

Source: PAR Environmental Services 2010

Views of Summit Reservoir
Figure 3.5-1

Since the Summit Reservoir is an architectural resource and not an archaeological site, it would not qualify for Criterion 4. The reservoir does not appear eligible for listing on the California Register nor is considered a historical resource for the purposes of CEQA. Therefore, the Project would not result in a substantial adverse change in the significance of a historic resource and no mitigation measures would be required.

Mitigation Measures: None required

Woods and Shasta Pump House. Although the Woods and Shasta pump house and associated features are older than 50 years, the structure itself is not a unique type of pump house in California, nor was it significant in state or local history. Additionally, it does not embody distinctive architectural characteristics or represent the work of a master. The pump house structure does not appear to meet Criteria 1, 2 or 3 for listing on the California Register, and is not considered a historical resource for the purposes of CEQA. Therefore, the Project would not constitute a substantial adverse change in the significance of a historic resource and no mitigation measures would be required.

Mitigation Measures: None required

Impact 3.5-2: The Project could cause a substantial adverse change in the significance of a unique archaeological resource.

At this time prehistoric or ethnographic resources have not been identified within the Project site. Although there are no known archeological resources in the Project vicinity, the Project has the potential to disturb unknown or undiscovered resources because it includes ground-disturbing activities. Therefore, the following mitigation measure would be required.

> **Measure 3.5-2:** Archeological Resources Discovery. If archeological resources are discovered or accidentally disturbed during construction, the contractor will stop all work within a 50-foot radius of the discovery until a qualified archaeologist can evaluate the discovery and provide recommendations. EBMUD will provide the construction contractor with the archeologist contact information prior to initiation of construction activities.

Implementation of Mitigation Measure 3.5-2 would reduce the potential to cause a substantial adverse change in the significance of a unique archaeological resource to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.5-3: The Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

According to the University of California, Museum of Paleontology (2010) there are no known paleontological or other unique geologic features in the Project vicinity. However, the Project has the potential to disturb unknown or undiscovered resources because it includes ground-disturbing activities. Therefore, the following mitigation measure would be required.

> **Measure 3.5-3**: Paleontological Resources Discovery. If paleontological resources are discovered or accidentally disturbed during construction, the contractor will stop all work within a 50-foot radius of the discovery until a qualified paleontologist can evaluate the discovery and provide recommendations. EBMUD will provide the construction contractor with the paleontologist contact information prior to initiation of construction activities.

Implementation of Mitigation Measure 3.5-3 would reduce the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.5-4: The Project could disturb human remains, including those interred outside of formal cemeteries.

A sacred lands search for the Project completed by the Native American Heritage Commission did not identify any Native American cultural resources in the Project vicinity (PAR 2010). Similarly, the records searches did not identify any human remains or the potential to identify human remains in the Project area. However, there is the possibility of encountering human remains either in association with prehistoric occupation sites or otherwise during ground-disturbing activities. Therefore, the following mitigation measure would be required.

> **Measure 3.5-4**: Human Remains Discovery. If human remains are discovered during construction, the contractor will stop all work within a 50-foot radius of the discovery and immediately contact the appropriate County Coroner according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. In addition, a qualified forensic archaeologist will be contacted immediately to evaluate the discovery. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in California Code of Regulations Section 15064.5(d) and (e) would be followed. EBMUD will provide the construction contractor with the archeologist contact information prior to initiation of construction activities.

Implementation of Mitigation Measure 3.5-4 would reduce the potential disturb human remains, including those interred outside of formal cemeteries to less than significant.

Significance after Mitigation: Less than Significant.

References

Beck, W. and Haase, Y., 1974. Historical Atlas of California, University of Oklahoma, Norman.

City of Berkeley Municipal Code, 2007 (Revised). Chapter 3.24, Landmarks Preservation Commission.

Contra Costa County, 2005. Contra Costa County General Plan 2005-2020, Open Space Element, 2005. Available online at: http://www.co.contra-costa.ca.us/depart/cd/current/advance/GeneralPlan/CCCGeneralPlan.pdf.

Kroeber, A. L., 1976. Handbook of the Indians of California, Reprinted, Dover Publications, Inc., New York. Originally published 1925, Washington D.C., Bureau of American Archaeology and Ethnology, Bulletin 78. Smithsonian Institution.

Levy, R., 1978. Costanoan, In California, edited by R. F. Heizer, pp. 485-495. Handbook of North American Indians, No. 8, W. C. Sturtevant, general editor. Smithsonian Institution, Washington D.C.

Milliken, R., 1995. A Time of Little Choice, The Disintegration of Tribal Culture in the San Francisco Bay Area 1769-1810. Ballena Press, Menlo Park.

Milliken et al., 2007. Punctuated Culture Change in the San Francisco Bay Area, In California Prehistory: Colonization, Culture and Complexity, edited by T. L Jones and K. A. Klar, pp. 99-123. Alta Mire Press, Lanham, CA.

Moratto, M. J., 1984. California Archaeology. New World Archaeological Record. Academic Press, Orlando.

Northwest Information Center (NWIC), 2010. Records search of the California Historic Resources Information System - Northwest Information Center (NWIC) at the California State University, Sonoma.

PAR Environmental Services, October 2010. EBMUD Summit Reservoir Replacement Project Technical Report: Cultural Resources.

University of California Museum of Paleontology, 2010. Paleontological resources records search.

Wollenberg, C., 2002. Berkeley, A City History. University of California Press. Accessible at http://www.berkeleypubliclibrary.org/community/berkeley_history/a_city_in_history/

3.6 Transportation and Traffic

3.6.1 Approach to Analysis

This section analyzes the Project's potential impacts on Transportation and Traffic. The setting describes the existing traffic conditions of the Project vicinity. Project-specific impacts are identified, if any, and appropriate mitigation measures are recommended to reduce impacts to less than significant. This section is based on information and analyses contained in the EBMUD Summit Reservoir Replacement Project Technical Report: Traffic and Circulation (Fehr & Peers 2010). The Technical Report described and analyzed Project vicinity intersections and lane configurations, roadway widths, on-street parking, sight distance, pedestrian and bicycle facilities, and transit routes. The report also included peak period (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) intersection traffic volume counts and 72-hour roadway segment volume counts for local roadways and intersections on a typical weekday (Tuesday–Thursday), and estimated Project-generated daily and peak-hour trips for each construction phase.

EBMUD explored a range of replacement tank sizes from 3.5 to 5 MG for the Project as different Project alternatives (see Chapter 4). Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the "worst case" construction footprint and potential impacts associated with the replacement tank. The differences in impacts created by the larger 5-MG tank are primarily the construction duration and the tank footprint size. The estimated Project truck trips used in the traffic and transportation analyses are based on the quantities and construction duration estimated to build a 5-MG tank.

Cumulative impacts on traffic and circulation are discussed in Section 5.1, Cumulative Impacts.

3.6.2 Setting/Regulatory Framework

Locations Analyzed

The Project traffic analysis study area focused on the route that construction vehicles would take to/from the Project site. Construction vehicles would travel from I-80 to the Project site using University Avenue, Shattuck Avenue, Rose Street, and Spruce Street. Truck route selection is discussed later in this section. Four roadway segments and seven intersections in the Project study area were selected for analysis, as these locations are the major intersections and roadways on the proposed truck route and could be impacted during Project construction. The locations are listed and also shown on **Figure 3.6-1.**

Roadway Segments

A. University Avenue, West of Sacramento Street
B. Shattuck Avenue, North of Virginia Street
C. Spruce Street, South of Keith Avenue
D. Spruce Street, South of Alamo Avenue

Study Intersections

1. 6th Street/University Avenue (signalized)
2. San Pablo Avenue/University Avenue (signalized)
3. Shattuck Avenue/University Avenue (signalized)
4. Shattuck Avenue/Cedar Street (signalized)
5. Shattuck Avenue/Vine Street (signalized)
6. Shattuck Avenue/Shattuck Place (unsignalized)
7. Spruce Street/Marin Street (unsignalized)

Source: Fehr & Peers, 2010

Project Study Area and Locations Analyzed
Figure 3.6-1

Methodology

Roadway operations are described using "level of service" (LOS). LOS is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (i.e., best operating conditions) to LOS F (worst operating conditions). LOS E corresponds to operations "at capacity." When volumes exceed capacity, stop-and-go conditions result and operations are designated as LOS F.

Different criteria and methods were used to assess operating conditions for the various types of facilities analyzed in this study, including signalized and unsignalized intersections, and roadway segments. The LOS criteria and methods for each of these facilities are described in the following sections.

Signalized Intersections

Traffic conditions at signalized intersections were evaluated using the Highway Capacity Manual Signalized Intersection Capacity Analysis method of the Transportation Research Board's 2000 Highway Capacity Manual. This operations analysis method uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 3.6 1** summarizes the relationship between average delay per vehicle and LOS for signalized intersections.

TABLE 3.6-1
Signalized Intersection Level of Service Criteria

Level of Service	Description	Average Control Delay per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0
E	Operations with long delays indicating poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0

Source: Highway Capacity Manual (Transportation Research Board 2000).

Unsignalized Intersections

Traffic conditions at unsignalized intersections were evaluated using the Highway Capacity Manual Unsignalized Intersection method from the 2000 Highway Capacity Manual. With this method, operations are defined by the average control delay per vehicle (measured in seconds) for each movement that must yield the right-of-way. For all-way stop-controlled intersections, the average control delay is calculated for the intersection as a whole. Delay associated with deceleration, acceleration, stopping, and moving up in the queue is incorporated. At two-way or side street-controlled intersections, the control delay (and LOS) is calculated for each controlled movement, the left-turn movement from the major street, and the entire intersection. For controlled approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. The delays for the entire intersection and for the movement or approach with the highest delay are reported. **Table 3.6-2** summarizes the relationship between delay and LOS for unsignalized intersections.

TABLE 3.6-2
Unsignalized Intersection Level of Service Criteria

Level of Service	Description	Average Control Delay per Vehicle (Seconds)
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	>50.0

Source: Highway Capacity Manual (Transportation Research Board 2000).

Roadway Segments

Roadway segments were evaluated by comparing added Project volumes to existing roadway segment volumes. An increase in traffic volume caused by the Project of fewer than the typical daily fluctuations in traffic volume would be considered imperceptible. Typical daily fluctuations in traffic volume are based on percentages of the average daily traffic volume recorded over a 3 day period on each roadway segment.

Existing Conditions

This section discusses the existing transportation network in the Project vicinity.

Regional Roadways

<u>Interstate 80/Interstate</u> - is a north-south freeway that runs through the City of Berkeley where I-80 and I-580 connect at Interstate 880. The two freeways diverge

from each other just north of Berkeley in Albany. This portion of freeway generally provides five travel lanes in each direction and has a posted speed limit of 65 miles per hour (mph).

State Route 123/San Pablo Avenue - classified as a Major Street, is a north-south street that runs from I-580 in the south and I-80 in the north. It is a four-lane road that provides two travel-lanes in each direction and is divided by a raised median. On-street parking is generally provided on both sides of San Pablo Avenue and the adjacent land use is primarily retail. The posted speed limit on San Pablo Avenue is 30 mph.

Local Roadways

University Avenue - classified as a Major Street and designated truck route, is an east-west street that extends from UC Berkeley in the east to Berkeley Marina in the west with a posted speed limit of 25 mph. It is a four-lane road that provides two travel-lanes in each direction and is divided by a raised median. On-street parking is generally provided on both sides of University Avenue and the adjacent land use ranges from retail to residential.

6th Street - classified as a Collector Street, is a north-south two-lane road that extends from Read Oak Avenue in the north to Dwight Way in the south, with a posted speed limit of 25 mph. On-street parking is generally provided on both sides of 6th Street and the adjacent land use is primarily residential.

Shattuck Avenue - classified as a Major Street and designated truck route, is a north-south street that connects Marin Avenue in the north to Telegraph Avenue in the south. Through the study area, it is a four-lane road that provides two travel-lanes in each direction and is divided by a raised median, with a posted speed limit of 25 mph. On-street parking is generally provided on both sides of Shattuck Avenue and the adjacent land use ranges from retail to residential.

Cedar Street - classified as a Collector Street, is an east-west two-lane street that extends from La Loma Avenue in the east to I-80 in the west, with a posted speed limit of 25 mph. On-street parking is generally provided on both sides of Cedar Street and the adjacent land use is primarily residential.

Vine Street - classified as a Local Street, is an east-west two-lane street that extends from Hawthorne Terrace in the east to McGee Avenue in the west, with a posted speed limit of 25 mph. On-street parking is generally provided on both sides of Vine Street and the adjacent land use is primarily residential.

Shattuck Place/Henry Street - classified as a Major Street and designated truck route, is a short north-south street that connects Eunice Avenue in the north to Shattuck Avenue in the south with a posted speed limit of 25 mph. It is a four-lane road that provides two travel-lanes in each direction and is divided by a raised median. On-street parking is generally provided on both sides of Shattuck Place/Henry Street and the adjacent land use ranges from retail to residential.

Rose Street - classified as a Collector Street, is an east-west two-lane street that extends from Arch Street in the east to Hopkins Street in the west, with a posted speed limit of 25 mph. On-street parking is generally provided on both sides of Rose Street and the adjacent land use is primarily residential. Rose Street is a designated Class III Bike Route (street with bike route sign/shared with cars) between Walnut Street and California Street.

Spruce Street - a two-lane Collector Street, is a north-south street that extends from Summit Reservoir in the north to Hearst Avenue in the south with a posted speed limit of 25 mph. On-street parking is generally provided on both sides of Spruce Street and the adjacent land use is primarily residential. Spruce Street is a designated Class III Bike Route from Grizzly Peak Boulevard to Montrose Road. Cragmont Elementary School is located on Spruce Street at Marin Avenue and Step One Nursery School is located on Spruce Street at Vassar Avenue.

Marin Avenue - a two-lane Collector Street, is an east-west road that connects Berkeley Hills to Albany. The adjacent land use is mostly residential. On-street parking is provided on both sides of Marin Avenue. A Class II Bike Lane (dedicated lane painted on roadway) is provided on both sides of Marin Avenue west of The Circle. The speed limit on Marin Avenue is 25 mph, with a 20 mph segment between Grizzly Peak Boulevard and The Circle. Trucks 4 tons and over are prohibited on the 20 mph segment of Marin Avenue.

Grizzly Peak Boulevard - is a two-lane Collector Street, is a north-south road that begins just north of Summit Reservoir, extends along the eastern side of the reservoir, and continues along the Berkeley Hills and into Oakland. The adjacent land use is mostly residential as well as recreational due to the proximity of Tilden Regional Park. On-street parking is provided on both sides of Grizzly Peak Boulevard in the Project vicinity. Grizzly Peak Boulevard is a designated Class III Bike Route.

Wildcat Canyon Road - is a two-lane road that begins at Summit Reservoir and extends along the western edge of Tilden Regional Park before heading through the park and east to the city of Orinda. The adjacent land use is residential and recreational due to the proximity of Tilden Regional Park. On-street parking is provided off pavement in several locations along the road. Wildcat Canyon Road is a designated Class III Bike Route connecting western Alameda and Contra Costa counties with central Contra Costa County.

Canon Drive - is a two-lane, east-west road with a posted speed limit of 25 mph that begins just east of Summit Reservoir and is one of several roads providing access to Tilden Regional Park. The adjacent land use is residential.

Beloit Avenue - is a two-lane, east-west road with a posted speed limit of 25 mph that serves residences along the northern side of Summit Reservoir. A secondary access driveway to Summit Reservoir is provided from Beloit Avenue near the Purdue Avenue intersection.

Vassar Avenue - is a two-lane, east-west road with a posted speed limit of 25 mph that serves residences along the western side of Summit Reservoir. Parking is permitted on both sides of Vassar Avenue; however, in locations where vehicles are parked on both sides of the road, traffic is constrained to one lane. In several locations, a raised median or retaining wall separate each direction of traffic.

Traffic Volumes

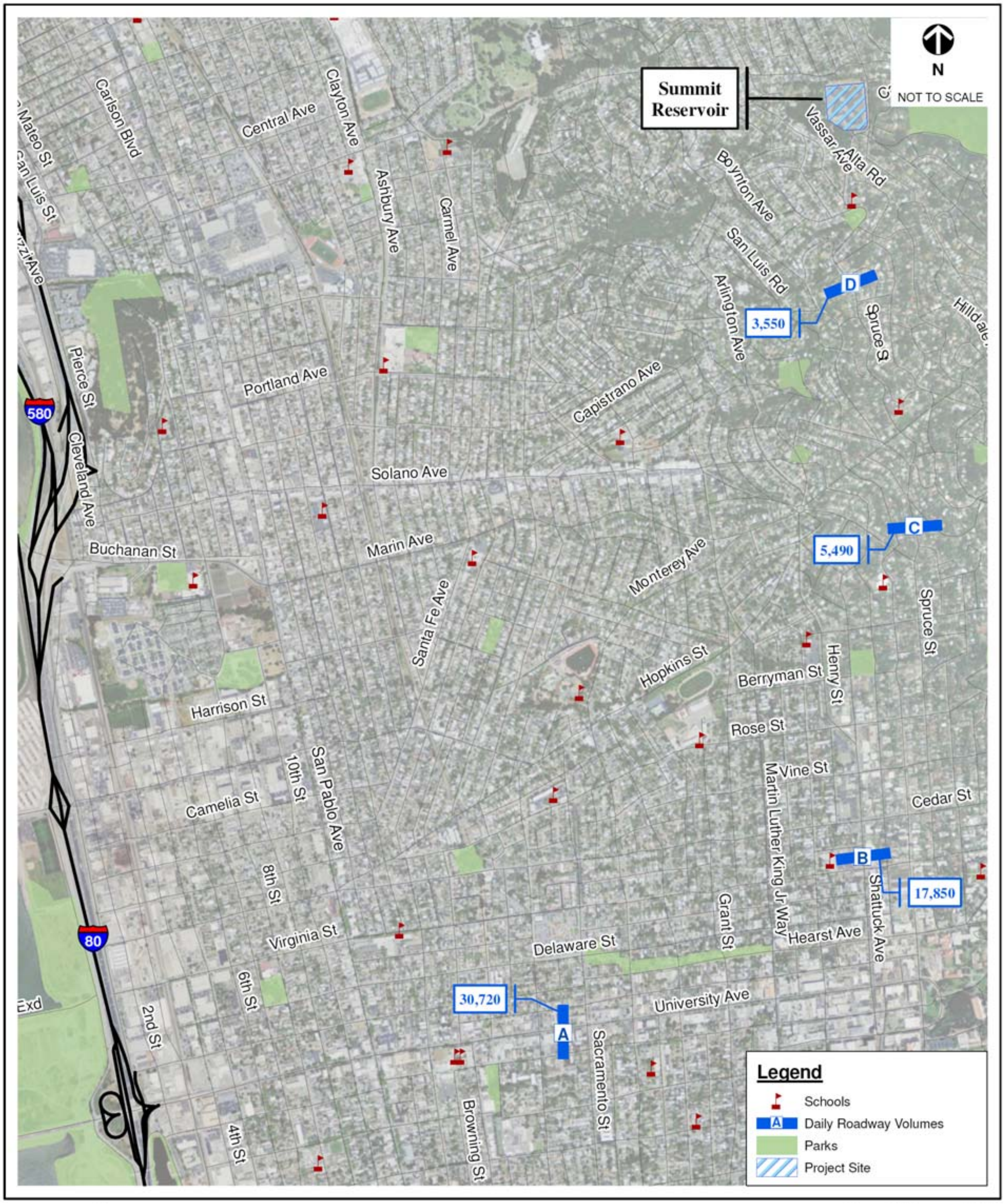
Automatic machine traffic counts were conducted over a 72-hour period on clear days with area schools in normal session on the analyzed roadway segments near Summit Reservoir. The average daily traffic volumes on these roadways are summarized below in **Table 3.6-3** and on **Figure 3.6-2**. Spruce Street experiences traffic volumes consistent with residential collectors. University Avenue and Shattuck Avenue both carry traffic volumes consistent with their roadway classifications.

Table 3.6-3
Existing Daily Traffic Volumes

Roadway	Location	Average Daily Traffic[1]	Percent Daily Fluctuation[1]	AM Peak Hour[2]	PM Peak Hour[3]
A. University Avenue	West of Sacramento Street	30,720	±6%	1,784	2,058
B. Shattuck Avenue	North of Virginia Street	17,850	±3%	1,284	1,398
C. Spruce Street	South of Keith Avenue	5,490	±2%	554	505
D. Spruce Street	South of Alamo Avenue	3,550	±2%	298	302

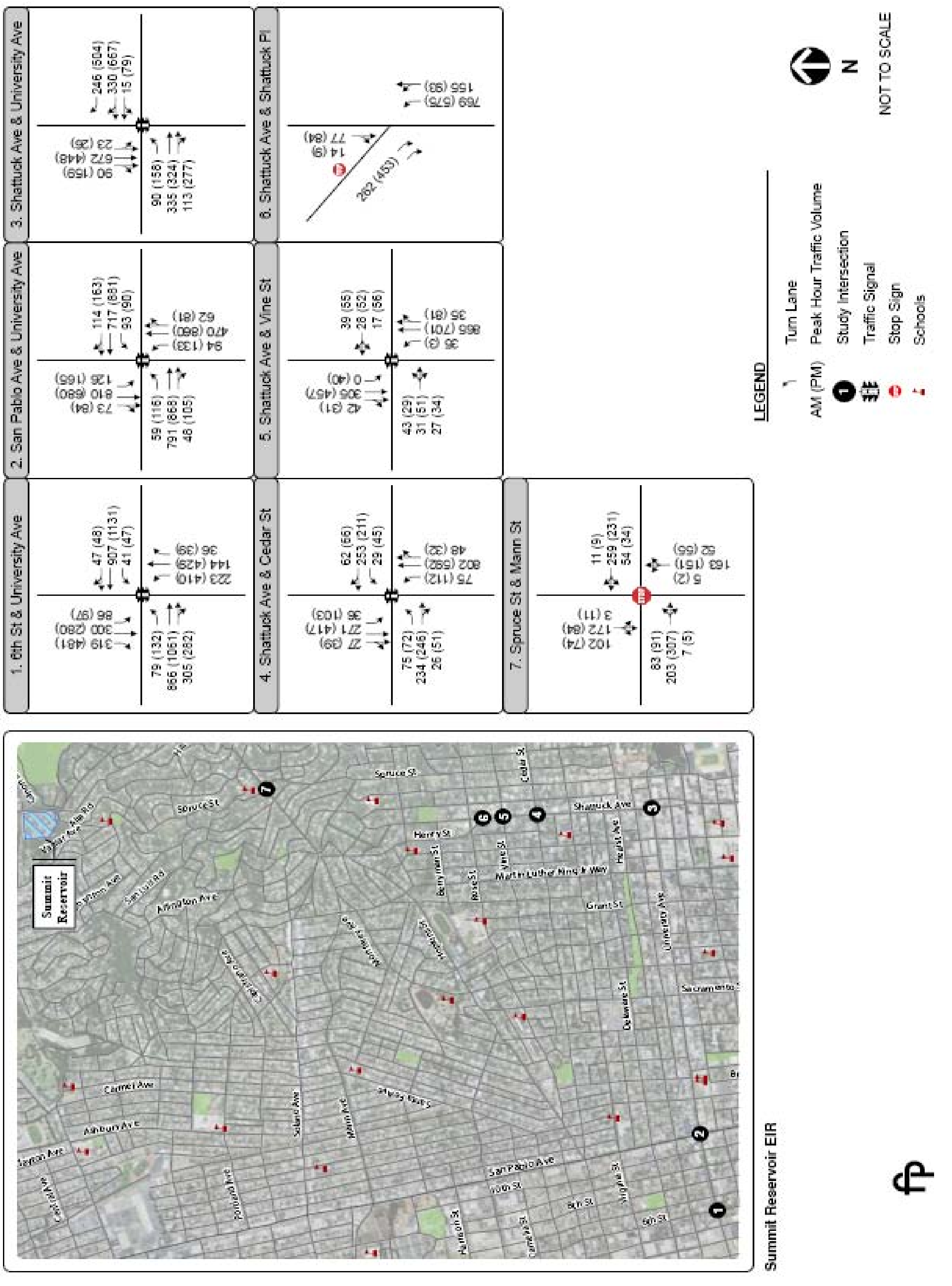
Source: Fehr & Peers 2010, based on counts taken by Auto-Census.
Notes: 1 Average of daily two-way traffic over the course of 3 consecutive days. Percent fluctuation based on daily deviation from average for each day.
2 Maximum hourly volume between the hours of 7 a.m. and 9 a.m.
3 Maximum hourly volume between the hours of 4 a.m. and 6 p.m.

Peak period traffic counts were conducted between 7:00 and 9:00 a.m. and 4:00 and 6:00 p.m. on a clear day with area schools in normal session at the study intersections. For each intersection, the single hour with the highest traffic volumes during the two count periods was identified. The peak-hour volumes are presented on **Figure 3.6-3**. The peak-hour data are used as the basis for intersection operations analysis. Existing intersection lane configurations and traffic control are also shown on Figure 3.6-3. Traffic count worksheets are included in the Technical Report (Fehr & Peers 2010).



Source Fehr & Peers 2010

Existing Daily Roadway Volumes
Figure 3.6-2



Source: Fehr & Peers 2010

Existing Conditions - Peak Hour Traffic Volumes, Lane Configurations, and Traffic Controls
Figure 3.6-3

Existing peak-hour intersection operations are summarized in **Table 3.6-4,** corresponding to the same intersection designations labeled on Figure 3.6-1. Many of the study intersections currently operate at acceptable LOS. One of the signalized study intersections currently operates at LOS E during the p.m. peak hour (Intersection 1).

The unsignalized intersection of Shattuck Avenue/Shattuck Place (Intersection 6) operated at an overall acceptable LOS during both the a.m. and p.m. peak hours. However, vehicles traveling southbound on Shattuck Avenue and turning right or traveling through the intersection experience deficient conditions with high delays during the a.m. peak hour.

TABLE 3.6-4
Existing Intersection Operations

Intersection	Control	Peak Hour	Delay	LOS
6th Street/University Avenue	Signal	AM	39.5	D
		PM	57.0	E
San Pablo Avenue/University Avenue	Signal	AM	42.1	D
		PM	53.0	D
Shattuck Avenue/University Avenue	Signal	AM	14.6	B
		PM	14.2	B
Shattuck Avenue/Cedar Street	Signal	AM	12.0	B
		PM	11.4	B
Shattuck Avenue/Vine Street	Signal	AM	10.0	A
		PM	14.3	B
Shattuck Avenue/Shattuck Place	Side-Street Stop*	AM	4.7 (66.5)	A (F)
		PM	2.1 (27.2)	A (D)
Spruce Street/Marin Street	All-Way Stop	AM	26.7	D
		PM	15.6	C

Source: Fehr & Peers 2010
*Note * For side-street-stop intersections, average delay is listed first followed by (delay for the worst approach)*

Pedestrian/Bicycle Circulation

Pedestrian facilities include sidewalks, crosswalks, and pedestrian signals. Sidewalks are generally provided on both sides of the road along the proposed truck route and on Spruce Street adjacent to Summit Reservoir. Sidewalks are also provided on both sides of Vassar Avenue, but only on the west side of Grizzly Peak Boulevard along the Reservoir frontage. This sidewalk extends from Spruce Street to the northeast corner of the Reservoir where a pedestrian overlook is also provided. Sidewalks are provided on both sides of Beloit Avenue near the north reservoir access, but are discontinuous and do not extend to Grizzly Peak Boulevard. Sidewalks are not provided on Canon Drive.

Bicycle facilities include:

- Bike paths (Class I) – Paved trails that are separated from roadways
- Bike lanes (Class II) – Lanes on roadways designated for use by bicycles through striping, pavement legends, and signs
- Bike routes (Class III) – Designated roadways for bicycle use by signs only; may or may not include additional pavement width for cyclists

Near the Project site, Class III bicycle routes are designated on Spruce Street, Grizzly Peak Boulevard, and Wildcat Canyon Road. These routes are heavily used by cyclists traveling to Tilden Park and central Contra Costa County.

A portion of Marin Avenue has designated Class II bicycle lanes within the study area.

Future Traffic Projections

To evaluate the potential impact of the Project on the local street system, estimates of traffic conditions were developed both with and without the Project.

Project Traffic Volume

This section describes the trip generating potential of the site during Project construction and at Project completion.

Trip Generation

Project trips would be generated during the construction phase as trucks and workers travel to and from the site. Construction hours are designated between 7:00 a.m. and 6:00 p.m., 5 days a week (Monday through Friday), with after hours or weekend construction activity limited to unexpected occurrences or critical shutdowns approved by EBMUD staff. EBMUD identified a preliminary construction schedule and the number of trucks and workers anticipated for each phase. Construction personnel may arrive/depart approximately one half-hour prior to or after the designated operating hours. Large concrete pours would also need to begin at 7:00 a.m. requiring that concrete delivery trucks arrive at the site as early as 6:30 a.m. In addition, “extra legal” trucks (e.g., oversized) are not allowed on San Francisco vicinity freeways between the hours of 7 a.m. and 9 a.m. per Section 502.2 of the Transportation Permits Manual (Caltrans 1995). Estimates are that approximately 12 times over the course of the 2.5 year construction period, very large trucks delivering construction equipment such as excavators may arrive at the Project site as early as 6:30 a.m.

Truck trip estimates were based on the amount of material at the site that would require removal and disposal, and the amount of new material that would be imported. The following assumptions were used in the development of the trip generation estimates by phase:

- All of the estimated 50,000 CY of fill needed to implement the grading plan would be available on site by reusing the embankment breach soils and by reusing all of the concrete on site as fill in the new site plan.
- Single dump haul trucks with a 12-CY capacity would be used to remove construction debris (no dual trailer “slam bangs” due to narrow access roads).
- Concrete trucks with an average 9-CY capacity would be used to transport concrete to the site.
- Haul trucks for steel columns would be long-beds (25-CY capacity) given length of columns and tonnage of steel.
- Worker vehicles for reservoir construction consist of vehicles for trades, laborers, equipment operators, contractor superintendant, foreman, and district inspector.

Based on the anticipated construction schedule summarized in **Table 3.6-5**, the expected maximum number of daily trips would be 108 truck trips and 64 on-site worker trips for a total of 172 one-way trips. The expected maximum number of peak hour trips would be 15 truck trips and 32 worker trips for a total of 47 one-way trips.

Peak traffic rates related to the demolition and construction phases would not extend over the entire duration of each phase. For example, peak traffic conditions associated with deliveries for the temporary tank foundation peak over 1 day. Peak traffic related to the hauling of sediment and caulking materials to a waste facility peak over 3 days only.

TABLE 3.6-5
Construction Schedule and Trip Generation Estimates
(Includes Trips To and From the Project Site)

Construction Phase	Duration (weeks)	Daily Trips Trucks[2]	Daily Trips Workers	Hourly[1] Trips Trucks[2]	Hourly[1] Trips Workers[3]
Mobilization	1	8	4	1	2
Temporary Tank					
Temporary Tank Excavation	3	0	10	0	5
Temporary Tank Construction	14	64	10	9	5
Drain Reservoir	4	6	4	1	2
Demolition					
Remove Liner Caulking	5	6	46	1	23
Demolish Roofing Materials	3	38	46	5	23
Remove Concrete Columns and Footings	10	20	46	3	23
Remove Concrete Liner	7	0	42	0	21
Installation					
Excavation and Grading	8	0	20	0	10
Pumping Plant Foundation	4	14	20	2	10
Reservoir Foundation	6	70	30	10	15
Reservoir Walls	16	24	64	3	32
Reservoir Roofing	8	108	24	15	12
Reservoir Wrapping	2	16	16	2	8
Valve Pit Piping	8	58	16	8	8
Field Testing and Startup	8	2	12	0	6
Backfilling and Berming	8	0	20	0	10
Site Restoration and Landscaping	8	66	40	9	20
Demobilization	1	8	8	1	4

1 Hourly trips refer to the number of trips expected to occur during the a.m. and p.m. peak hours.
2 Truck trips are over 7 hours multiplied by 2-trips (in/out), rounded.
3 Worker trips are over 2 hours multiplied by 2-trips (in/out), rounded.

The traffic generation characteristics for the Project were also determined for a “typical” or average day, which represents the level of activity that the area would experience on a day-to-day basis. The proposed Project is expected to generate 34 daily truck trips and 29 daily worker trips for a total of 63 daily one-way trips. The expected peak hour trips would be 5 truck trips and 14 worker trips for a total of 19 hourly one-way trips.

Trucks behave differently than passenger vehicles as they take longer to accelerate, decelerate, and negotiate turns. Therefore, they also affect intersection and roadway operations differently. Truck behavior was accounted for in the assessment of roadway and intersection operations.

Workers may park on site, or on Grizzly Peak Boulevard and Spruce Street (per local parking ordinances). It is expected that even during peak construction periods, worker vehicles would be accommodated in these locations. Up to 40 vehicles could be accommodated adjacent to the Project site on Grizzly Peak Boulevard and Spruce Street.

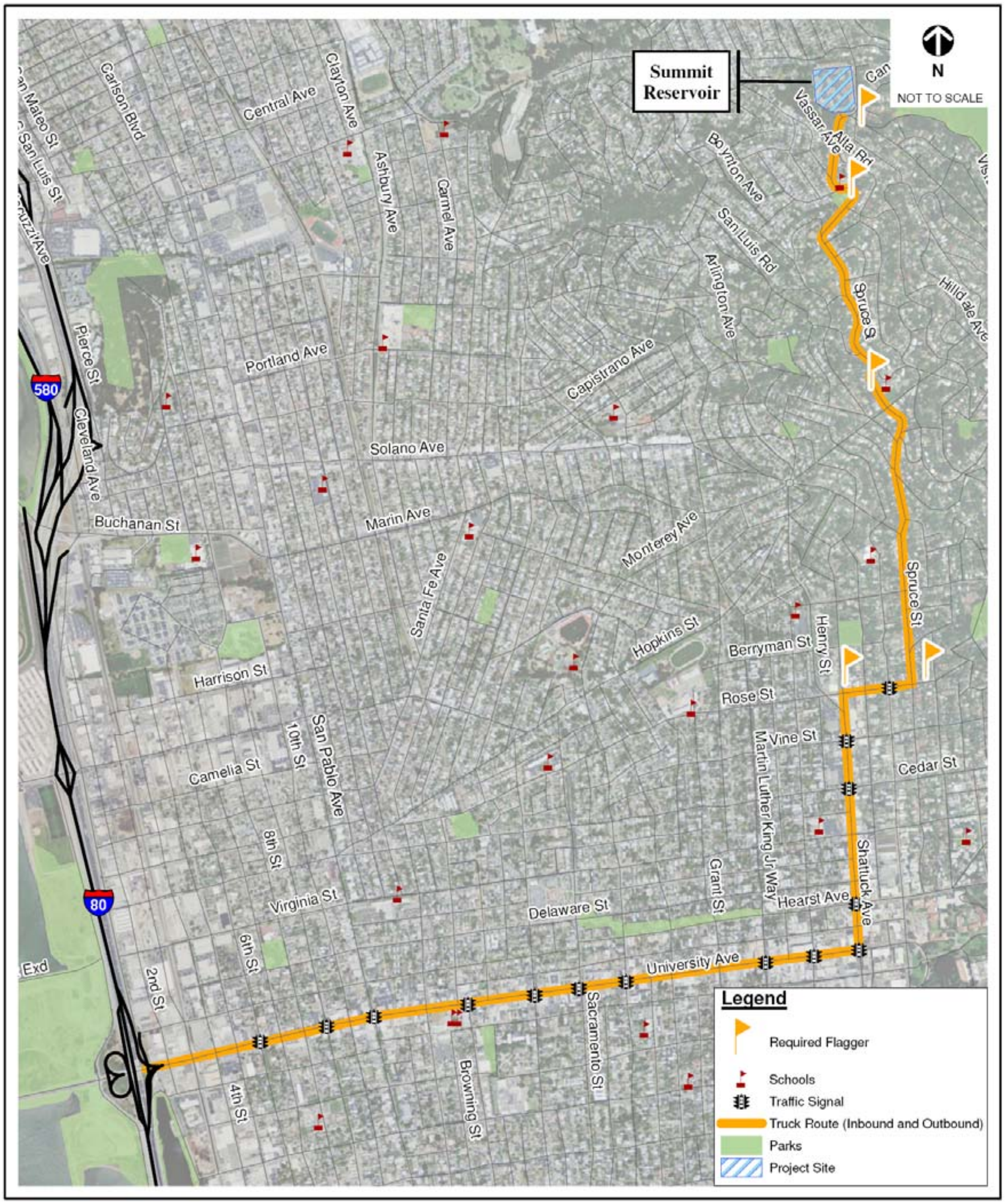
At Project completion, no new trips to the Project site would occur. Trip generation would be the same as before construction, because the Project would replace existing facilities that currently generate fewer than five vehicle trips per day.

Trip Distribution

The Project would generate two types of trips: construction worker trips and truck trips. This section describes the distribution pattern of each.

Truck Trip Distribution

City of Berkeley staff provided EBMUD with a preferred truck routing plan. It was assumed that all truck trips would use I-80/I-580 to access the site (Caltrans 2007). The preferred route plan identified by the City of Berkeley, shown on **Figure 3.6-4,** considered topography, roadway width, and designated City of Berkeley truck routes along University Avenue and Shattuck Avenue. While many of the residential streets leading towards Summit Reservoir are narrow with constrained two-way traffic flow, a centerline stripe on Spruce Street and Rose Street along the truck route separates directions of travel. A detailed map of the truck route near the Project site is presented on **Figure 3.6-5**.



Source: Fehr & Peers 2010

Recommended Truck Routing Plan
Figure 3.6-4

Source: Fehr & Peers 2010

Project Site Vicinity
Figure 3.6-5

Alternative truck routes were also considered, including Grizzly Peak Boulevard, Wildcat Canyon Road through Tilden Park, and Arlington Avenue. Grizzly Peak Boulevard has significant curves that would be difficult for large trucks to negotiate with limited connections to designated truck routes on Shattuck Avenue, University Avenue, and Ashby Avenue; therefore, this truck route was not considered feasible. Wildcat Canyon Road is a narrow two-lane road with limited shoulders and significant curves and grades that connects Berkeley and Orinda through Tilden Regional Park. Construction vehicles would have difficulty negotiating the curves and conflict with the significant recreational and bicycle traffic using this road; therefore, this truck route was not considered feasible. To reach the Project site from Arlington Avenue, construction trucks would need to negotiate narrow residential streets, making this route infeasible. All other streets near the Project site are too narrow to support construction trucks.

Inbound and outbound truck traffic would be directed to use the I-80/University Avenue interchange. A channelized right-turn lane would allow trucks to turn right and continue along University Avenue to Shattuck Avenue. A traffic signal at Shattuck Avenue/University Avenue would allow trucks to make left turns and continue along Shattuck Avenue to Rose Street. A flagger may be needed at the intersection of Shattuck Avenue/Rose Street due to the tight right-turn radius from Shattuck Avenue to Rose Street to allow semitrucks to continue along Rose Street to Spruce Street during peak hours. A flagger may be needed at the intersections of Spruce Street/Rose Street during peak hours due to the tight left-turn radius from Rose Street to Spruce Street to allow trucks to continue along Spruce Street to the Project site as well as the tight right-turn radius from Spruce Street to Rose Street when semitrucks are returning to I-80. A flagger would also be present at the Project driveway during construction hours.

This truck route also passes by two schools on Spruce Street. Step One Nursery School is located on Spruce Street near Vassar Avenue and Cragmont Elementary School is located on Spruce Street and Marin Avenue. Flaggers should be used at these locations to minimize conflicts between construction traffic and school traffic during school drop-off and pickup times. Shepherd of the Hills Lutheran Church is located at the Spruce Street/Grizzly Peak Boulevard intersection. Activity at the church is primarily limited to weekends; therefore, construction traffic is not expected to significantly interfere with church operations.

Outbound trucks would be directed to exit the site towards Spruce Street south, and travel on Spruce Street to Rose Street, where they would turn right onto Rose Street. They would travel on Rose Street to Shattuck Avenue, where they would turn left onto Shattuck Avenue and continue to University Avenue. At University Avenue, they would turn right onto University and continue westbound until they reach the I-80 ramps.

<u>Construction Worker Trip Distribution</u>. It is expected that all site worker trips would generally access the site along the same designated truck route described above. While workers would be encouraged to remain on the main travel route, some may deviate and

travel on minor residential streets, such as Marin Avenue, as these streets may provide a more direct route to the site.

Existing Plus Average Construction Activity Traffic Projections

The existing plus average construction activity traffic scenario represents the existing traffic conditions with the addition of the proposed average construction activity Project traffic volumes. The Project trip generation and trip distribution described above were used to assign the Project trips to the network.

Existing Plus Maximum Construction Activity Traffic Projections

The existing plus maximum construction activity traffic scenario represents the existing traffic conditions with the addition of the proposed maximum construction activity Project traffic volumes. The Project trip generation and trip distribution described above were used to assign the Project trips to the network.

Regulatory Framework

The following paragraphs describe the state and local laws and regulations governing transportation/traffic. Government Code 53091(d) states: “(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency.” In instances where this statute applies, it is the practice of EBMUD to work with host jurisdictions and agencies during Project planning to consider environmental protection measures and to conform to local policies to the extent possible.

City of Berkeley

Based on City of Berkeley significance criteria (City of Berkeley Undated), a project is considered to cause a significant impact at signalized and all-way stop controlled intersections if it causes the following:

- Intersection operations degrade from LOS D to LOS E or worse and more than a 2-second increase in delay; or
- More than a 3-second increase in delay at intersections operating at LOS E without and with the project; or
- Intersection operations degrade from LOS E to LOS F and more than 3-second increase in delay; or
- At intersections operating at LOS F without the project, a change in the volume-to-capacity ratio of more than 0.01.

Since construction traffic would use Berkeley roads exclusively, the analysis did not consider Contra Costa County significance criteria for LOS changes.

3.6.3 Impacts and Mitigations Measures

Significance Criteria

This section addresses the following standards of significance based on CEQA Guidelines Appendix G. Would the project:

- 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.
- 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.
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Impacts and Mitigation Measures

Impact 3.6-1: The 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 nonmotorized 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.

Roadway and Intersection Analysis

Existing Plus Average Construction Activity Conditions (Road Segments) - Daily traffic volumes during average construction activity trip generation were added to the existing daily traffic volumes based on the trip generation and trip distribution percentages and are presented in **Table 3.6-6**. Roadway Segments A and B would experience an increase of 0.5 and 0.6 percent, respectively, which is less than the daily traffic volume fluctuation and would be considered imperceptible. Segments C and D would experience a slightly higher increase of 2.1 and 3.2 percent, respectively.

TABLE 3.6-6
Existing Daily Traffic Volumes Plus Construction Traffic

Roadway	Location	Existing Daily Traffic	Average Percent Increase	Average Percent Increase	Maximum Percent Increase	Percent Daily Fluctuation
A. University Avenue	West of Sacramento Street	30,720	0.5%	30,831	1.1%	±6%
B. Shattuck Avenue	North of Virginia Street	17,850	0.6%	17,962	1.9%	±3%
C. Spruce Street	South of Keith Avenue	5,490	**2.1%**	5,603	6.1%	±2%
D. Spruce Street	South of Alamo Avenue	3,550	**3.2%**	3,667	9.4%	±2%

Source: Fehr & Peers 2010.

These increases exceed the daily fluctuation in traffic volume; therefore, the addition of construction traffic would have a significant impact on these segments and the following mitigation measure would be required. Additionally, partial roadway closures due to construction on Vassar Avenue and Canon Drive would impact traffic flows and have a significant impact on those roadway segments and mitigation measures would be required.

Measure 3.6-1: EBMUD construction contract documents will require preparation and implementation of a Traffic Management Plan, which will include the following elements:

- The work hours for each phase of Project construction, the process for notifying residents of construction activity, and the means for people to report construction-related problems.
- A haul route, based on the route shown on Figure 3.6-4 that will be provided to all trucks serving the site during the construction period. The haul route will indicate that Rose Street and Spruce Street are Class III bike routes, and to exercise caution when using these roads. Beloit Avenue is not included in the haul route, and may only be used by worker vehicles.
- Flaggers at the site entrance to assist with trucks entering and exiting the site. Priority should be given to trucks entering the site to minimize traffic queues on Spruce Street and the Spruce Street/Grizzly Peak Boulevard intersection.
- Flaggers at the Spruce Street/Rose Street intersection and the Shattuck Avenue/Rose Street intersection to improve traffic safety during peak hours (7:00 to 9:00 a.m., 4:00 to 6:00 p.m.) when semitrucks are traveling to and from the site.
- Flaggers at Step One Nursery School and Cragmont Elementary School during school drop-off and pickup times to minimize conflicts between trucks and school traffic. The schedule for flaggers will be coordinated with school personnel.
- A plan for maintaining the existing bus stop on Spruce Street adjacent to the Project site entrance. If necessary the bus stop will be moved east towards Grizzly Peak Boulevard.

- A minimum of one month prior to construction start, signage at the Spruce Street Overlook will indicate that the Overlook will be fenced and closed to public access for the duration of Project construction due to public safety concerns. If construction will start between June 1 and September 30, then signage will be posted no later than May 1 prior to construction start. The signage will also expressly prohibit the use of the EBMUD Overlooks for bus stops or other organized activities without prior express written consent from EBMUD.
- EBMUD will coordinate with the City of Berkeley and may also close sidewalks along the Spruce Street Project site frontage and driveway; pedestrians will be re- directed to alternative sidewalks.
- Signage on Spruce Street warning motorists of the construction work ahead.
- Documentation of road pavement conditions for all routes that will be used by construction vehicles both before and after Project construction. Roads found to have been damaged by construction vehicles will be repaired to the level at which they existed prior to Project construction.

The construction contractor will obtain necessary encroachment permits prior to construction on Canon Drive and Vassar Avenue, and the Traffic Management Plan will include the following requirements:

- Hours and days of lane closures on Canon Drive and Vassar Avenue (closures during peak traffic hours, 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m., should be limited to the extent possible).
- Canon Drive and Vassar Avenue will be restored to normal operation by covering trenches with steel plates outside of working hours or when work is not in progress.
- Driveway access to local residences will be maintained at all times.
- Maintain bus service along Canon Drive at all times.
- Flaggers at the lane closure locations to direct traffic around the construction area.
- Signage on Canon Drive and Vassar Avenue warning motorists of the construction work ahead.
- Equipment storage and worker parking locations that will be in designated contractor staging areas.

The Traffic Management Plan would be enforced by EBMUD construction managers. Implementation of Mitigation Measure 3.6-1 would be employed to reduce impacts on road segments from construction activity; however, Impact 3.6-1 would remain temporarily significant and unavoidable during the construction period, as the addition of Project traffic would exceed the significance criteria.

Significance after Mitigation: Significant and Unavoidable during the construction period.

Existing Plus Average Construction Activity Conditions (Intersections) - Peak-hour intersection operations with average and maximum construction traffic volumes assigned to the roadway network are summarized in **Table 3.6-7**. Project construction traffic would not significantly degrade intersection operations at any of the study intersections. Therefore, a significant impact would not occur during average construction activity.

Table 3.6-7
Existing Plus Construction Traffic Intersection Operations

Roadway	Control	Peak Hour	Existing		Existing Plus Average Construction Activity		Existing Plus Maximum Construction Activity	
			Delay	LOS	Delay	LOS	Delay	LOS
1. 6th Street/ University Avenue	Signal	AM	39.5	D	39.8	D	40.4	D
		PM	57.0	E	57.3	E	58.0	E
2. San Pablo Avenue/ University Avenue	Signal	AM	42.1	D	42.3	D	42.5	D
		PM	53.0	D	53.9	D	**55.7**	**E**
3. Shattuck Avenue/ University Avenue	Signal	AM	14.6	B	14.6	B	14.6	B
		PM	14.2	B	14.5	B	14.9	B
4. Shattuck Avenue/ Cedar Street	Signal	AM	12.0	B	12.1	B	12.1	B
		PM	11.4	B	11.3	B	11.1	B
5. Shattuck Avenue/ Vine Street	Signal	AM	10.0	A	10.1	B	10.2	B
		PM	14.3	B	14.3	B	14.4	B
6. Shattuck Avenue/ Shattuck Place	Side-Street Stop*	AM	4.7 (66.5)	A (F)	5.4 (73.2)	A (F)	7.4 (90.5)	A (F)
		PM	2.1 (27.2)	A (D)	2.9 (31.0)	A (D)	4.4 (39.1)	A (E)
7. Spruce Street/ Marin Street	All-Way Stop	AM	26.7	D	30.2	D	**40.0**	**E**
		PM	15.6	C	16.3	C	17.7	C

Source: Fehr & Peers 2010, based on counts taken by NDS.
** For side-street-stop intersections, average delay is listed first followed by the delay for the worst approach.*

The narrow width of the reservoir access driveway would require flaggers to control two-way traffic flow of trucks entering and exiting the site during construction hours. Inbound trucks should be given priority over outbound trucks to minimize truck queuing on Spruce Street and into the Spruce Street/Grizzly Peak Boulevard intersection. Although minimal construction traffic is expected through the Spruce Street/Grizzly Peak Boulevard intersection, queue spillback from the Project driveway could negatively affect the intersection, which provides access to Tilden Regional Park and points beyond. Flaggers are also recommended at the Spruce Street/Rose Street and Shattuck Avenue/Rose Street intersections to aid semitrucks in making wide turns at these tight intersections during peak hours (7:00 to 9:00 a.m., 4:00 to 6:00 p.m.).

Flaggers should be used at Cragmont Elementary School and Step One Nursery School to minimize conflicts between construction traffic and school traffic during school drop-off and pickup times. Shepherd of the Hills Lutheran Church is located at the Spruce Street/Grizzly Peak Boulevard intersection. Activity at the church is primarily limited to weekends; therefore, construction traffic is not expected to significantly interfere with church operations. The Project would also include construction of a manhole on Canon Drive, near Parkside Court. Construction in this location is expected to last 5 to 10 days. During construction, Canon Drive would likely be reduced to a single lane of traffic. Flaggers should be used to direct traffic around the construction area. Access to residential driveways should be maintained at all times, as well as access for through traffic to Tilden Park. Construction vehicles traveling to Canon Drive would use the proposed truck route, continuing on Spruce Street, through the Spruce Street/Grizzly Peak Boulevard intersection onto Wildcat Canyon Road, and left onto Canon Drive. Flaggers would assist construction trucks making turns in and out of Canon Drive.

Similar to Canon Drive, construction on Vassar Avenue would likely require reduction of the roadway to a single lane of traffic. Flaggers should be used to direct traffic around the construction area. Near the construction area, northbound and southbound traffic is separated by a retaining wall for 350 feet. If two-way traffic cannot be restored before the roadway divides, one-way traffic control would need to be extended for the entire length of the retaining wall. Kentucky Avenue intersects southbound Vassar Avenue adjacent to the retaining wall. This intersection would either require an additional flagger or could temporarily be closed to traffic during construction hours. Access to residential driveways on Vassar Avenue should be maintained at all times and parking adjacent to the construction and traffic control areas should be restricted. Construction vehicles would reach Vassar Avenue from the Spruce Street/Vassar Avenue intersection. Flaggers at the Step One Nursery School would assist trucks turning left onto Vassar Avenue.

Implementation of Mitigation Measure 3.6-1 would reduce impacts on intersections from average construction activity to less than significant.

Upon the completion of Project construction, the Project site’s trip generation would revert to existing levels and, therefore, no long-term impacts would occur.

Significance after Mitigation: Less than Significant.

<u>Existing Plus Maximum Construction Activity Conditions</u> - Daily traffic volumes during maximum construction activity trip generation were added to the existing daily traffic volumes based on the trip generation and trip distribution percentages (Fehr & Peers 2010). The results are presented in Table 3.6-6. Roadway Segments A and B would experience an increase of 1.1 and 1.9 percent, respectively, which is less than the daily traffic volume fluctuation and would be considered imperceptible. Segments C and D would experience a slightly higher increase of 6.1 and 9.4 percent, respectively. These increases exceed the daily fluctuation in traffic volume; therefore, the addition of construction traffic would have a significant impact on these segments. Peak-hour intersection operations with average and maximum construction traffic volumes assigned to the roadway network are summarized in Table 3.6-7.

As shown in Table 3.6-7, Project construction traffic would significantly degrade the operations of the following intersections under maximum construction activity from an acceptable level to an unacceptable level:

- Intersection 2: San Pablo Avenue/University Avenue (p.m. Peak Hour)
- Intersection 7: Spruce Street/Marin Street (a.m. Peak Hour)

Thus, the added maximum Project traffic would have a significant impact on intersection operations under the City of Berkeley significance criteria and mitigation measures would be required.

The narrow width of the reservoir access driveway would require flaggers to control two-way traffic flow of trucks entering and exiting the site during construction hours. Inbound trucks should be given priority over outbound trucks to minimize truck queuing on local streets. Flaggers are also recommended at the intersections of Spruce Street/ Rose Street and Shattuck Avenue/Rose Street to assist the trucks in making wide turns at these tight intersections.

The Traffic Management Plan would be enforced by EBMUD construction managers. However, even with implementation of Mitigation Measure 3.6-1, Impact 3.6-1 would remain significant and unavoidable during the construction period, as the addition of Project traffic would exceed the significance criteria. Implementation of the Traffic Management Plan would help reduce the impacts on residential streets in the Project study area.

Upon the completion of Project construction, the Project site's trip generation would revert to existing levels and, therefore, no long-term impacts would occur.

Significance after Mitigation: Significant and Unavoidable during portions of the construction period.

Parking Assessment

Approximately 40 worker vehicles could park on the western side of Grizzly Peak Boulevard and on Spruce Street adjacent to the Project site. This availability would accommodate projected worker parking demand during all construction phases, which is projected to reach a maximum of 32 worker vehicles. Parking in this area is not time restricted and does not require a permit. Approximately 30 additional parking spots are available on the eastern side of Grizzly Peak Boulevard and southern side of Spruce Street adjacent to the Project site and may require city/county permits. On-site parking should also be provided when possible to reduce the number of on-street parking spaces taken by construction activity. Therefore, Project impacts on parking would be less than significant and no mitigation measures would be required.

Mitigation Measures: None Required.

Pavement Assessment

Large trucks would be used to haul material to and from the Project site. Although major roads such as University Avenue and Shattuck Avenue are designed to withstand substantial truck volumes, residential roads such as Spruce Street and Rose Street are not. These roadways would likely experience increased wear-and-tear as a result of Project construction traffic. Therefore, the impact would be significant and mitigation measures would be required. Mitigation Measure 3.6-1 requires 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 prior to Project construction.

Implementation of Mitigation Measure 3.6-1 would reduce impacts on pavement from construction activity to less than significant.

Significance after Mitigation: Less than Significant.

Public Transit

Transit service is provided along Spruce Street with a bus stop adjacent to the Project driveway. Transit riders could be delayed when buses along the proposed haul routes travel behind construction trucks or are blocked by queuing of construction trucks into the Project site. The bus stop adjacent to the Project driveway may conflict with construction trucks. Construction on Canon Drive would also conflict with transit service to Tilden Park. Therefore, the impact would be significant and mitigation measures would be required.

As a result of the Project planning effort, it recently came to the attention of EBMUD that the Spruce Street Overlook is currently used by several private schools in the area as an informal bus stop and queuing area for school children. No access permit or other agreement between EBMUD and the schools currently exists. Construction vehicles accessing the Project site from the Spruce Street/Project driveway may conflict with public access and use of the Spruce Street Overlook, including informal private school bus stops for school children, thereby creating public safety concerns. Therefore, the impact would be significant and mitigation measures would be required.

Mitigation 3.6-1 includes flaggers located at the Project site and specified intersections to reduce queuing of construction trucks that could block transit vehicles and relocation of the bus stop adjacent to the Project site if necessary. However, even with implementation of Mitigation Measure 3.6-1, impacts on transit would remain temporarily significant and unavoidable during portions of the construction period, as the addition of Project construction traffic would continue to reduce transit speeds along the haul route.

Upon the completion of Project construction, the Project site's trip generation would revert to existing levels and, therefore, no long-term impacts would occur.

Implementation of Mitigation Measure 3.6-1 would be employed to reduce impacts during construction.

Significance after Mitigation: Significant and Unavoidable during portions of the construction period.

Bicycle Traffic

Rose Street and Spruce Street are designated as Class III bicycle routes, with bicycle traffic traveling to and from Tilden Park and beyond. Construction trucks could conflict with bicycle traffic along the haul route. Therefore, the impact would be significant and mitigation measures would be required. Mitigation Measure 3.6-1 includes notification to truck drivers of bicycle routes along the haul route to reduce impacts on bicyclists. Implementation of Mitigation Measure 3.6-1 would reduce impacts to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.6-2: The Project would conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

As described in Impact 3.6-1, the addition of maximum construction activity traffic during Project construction would cause the Spruce Street/Marin Street intersection in the a.m. peak hour and San Pablo Avenue/University Avenue intersection in the p.m. peak hour to operate unacceptably. Based on City of Berkeley significance criteria, this impact would be significant and the following mitigation measure would be required.

> **Measure 3.6-2**: EBMUD and/or its construction contractor will limit truck trips during the a.m. and p.m. peak hours (7:00 to 9:00 a.m. 4:00 to 6:00 p.m.) to the extent practicable.

While construction traffic would be limited during peak hours, there are discrete periods of peak construction activity such as during demolition and concrete pours where it may not be feasible to limit truck traffic. In addition, periodically (up to a maximum of 12 times over the 2.5 year construction period) any oversized vehicles/equipment would need to be off area freeways and could arrive on the Project site as early as 6:30 a.m. Therefore, even with implementation of Mitigation Measure 3.6-2, Impact 3.6-2 would remain significant and unavoidable during portions of the construction period, as the addition of Project traffic would exceed the significance criteria.

Significance after Mitigation: Significant and Unavoidable during portions of the construction period.

Impact 3.6-3: The Project would substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Construction trucks may have difficulty negotiating narrow residential streets that are not designed for large vehicles. Construction trucks would need to make wide turns at the Shattuck Avenue/Rose Street and Spruce Street/Rose Street intersections, which would conflict with traffic during peak traffic periods. The proposed haul route passes by Cragmont Elementary School and Step One Nursery School. Construction truck traffic would conflict with traffic associated with the schools during pickup and drop-off times. Therefore, the impact would be significant and mitigation measures would be required. Mitigation Measure 3.6-1 includes flaggers located at the Project site, specified intersections, and schools to assist construction trucks negotiating turns and school traffic. Implementation of Mitigation Measure 3.6-1 would reduce this impact to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.6-4: The Project would result in inadequate emergency access.

Construction vehicle queuing at the Project driveway and along the truck route could block emergency vehicles. Therefore, the impact would be significant and mitigation measures would be required. Mitigation Measure 3.6-1 includes flaggers located at the Project site and specified intersections to reduce queuing of construction trucks that could block emergency vehicles and facilitate emergency vehicle movement around work areas. Flaggers would give priority to trucks entering the Project site from Spruce Street to minimize queuing of construction trucks outside of the site. Implementation of Mitigation Measure 3.6-1 would reduce this impact to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.6-5: The Project would conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

All impacts are short-term, construction-related, and do not conflict with any long-term policies or plans. Therefore, the Project would have no impact on adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities and no mitigation measures would be required.

Mitigation Measures: None Required.

References

AC Transit, 2010. Alameda-Contra Costa Transit District Bus System Map. Available online at http://www.actransit.org.

Caltrans, 1995. Transportation Permits Manual: Chapter 5 – Routing and Safety Requirements. February 15. Available online at http://www.dot.ca.gov/hq/traffops/permits/pdf_documents/policy/tpm/19950215%20Ch05revision.pdf.

Caltrans, 2007. Truck Networks on California State Highways. Available online at http://www.dot.ca.gov/hq/traffops/trucks/truckmap/truckmap-d04.pdf.

City of Berkeley. Undated. Guidelines for Development of Traffic Impact Reports. Available online at http://www.ci.berkeley.ca.us/uploadedFiles/Public_Works/Level_3_-_General/TIRGuidelines_v.1_09-16-2005.pdf.

Fehr & Peer, 2010. EBMUD Summit Reservoir Replacement Project Technical Report: Traffic and Circulation. December.

Transportation Research Board, 2000. Highway Capacity Manual.

3.7 Air Quality

3.7.1 Approach to Analysis

This section analyzes potential impacts of the Project on Air Quality. The setting describes the existing conditions of the Project site and vicinity. Project-specific impacts are identified, and appropriate mitigation measures are recommended to reduce impacts to less than significant. This section is based on the EBMUD Summit Reservoir Replacement Project Technical Report: Air Quality (ENTRIX 2010). The Technical Report contains detailed quantitative information on criteria pollutant emissions associated with the Project and their significance to local and national air quality management programs.

Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the "worst case" construction footprint and potential impacts associated with the replacement tank.

3.7.2 Setting/Regulatory Framework

The Project site is located in both Contra Costa and Alameda counties, which are in the San Francisco Bay Area Air Basin (SFBAAB), under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD).

Meteorology and the Atmosphere

The Project area climate is characterized by moderately wet winters and dry summers. About 90 percent of the annual total rainfall is received in the November through April period. Precipitation averages 21.4 inches at the Berkeley gage (located at UC Berkeley), although annual precipitation varies markedly from year to year (National Climatic Data Center 2010). Temperatures in the Project area average about 60 degrees Fahrenheit (^{o}F) annually, with average summer highs in the low 70s and average winter lows in the low 40s. Annual average wind speeds in the Project area are about 8 miles per hour or 3.6 meters per second. The predominant direction of air pollution transport in the Project area is inland from the coastal areas (National Oceanic Atmospheric Administration 2008).

Criteria Air Pollutants

A criteria or regulated air pollutant is any air pollutant for which ambient air quality standards have been set by the USEPA or the California Air Resources Board (CARB). Criteria pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$). The six most prevalent criteria pollutants and their potential health effects are described below.

Ozone

Ground-level O_3 is a secondary pollutant formed in the atmosphere by a series of complex chemical reactions and transformations in the presence of sunlight above urban areas due to the mixing effects of temperature inversions. Nitrogen oxides (NO_X) and reactive organic gases (ROGs)[26] are the principal constituents in these reactions. NO_X and ROG emissions are predominantly attributed to mobile sources (on-road motor vehicles and other mobile sources). Thus, regulation and control of NO_X and ROGs from these sources is essential to reduce the formation of ground-level O_3.

Nitrogen Dioxide

NO_2 is formed in the atmosphere primarily by the rapid reaction of the colorless gas nitric oxide (NO) with atmospheric oxygen. NO_2 participates in the photochemical reactions that result in O_3. The greatest source of NO, and subsequently NO_2, is the high-temperature combustion of fossil fuels such as in motor vehicle engines and power plant boilers. NO_2 and NO are referred to collectively as NO_X.

Carbon Monoxide

CO is a common, colorless, odorless, highly toxic gas that is produced by natural and anthropogenic (caused by human activity) combustion processes. The major source of CO in urban areas is incomplete combustion of carbon-containing fuels (primarily gasoline, diesel fuel, and natural gas). Traffic-congested intersections have the potential to result in localized high CO levels. CO also results from combustion processes including forest fires and agricultural burning.

Sulfur Dioxide

SO_2 can react in the atmosphere to produce sulfuric acid and sulfates and to the formation of PM_{10}. Most of the SO_2 emitted into the atmosphere is from burning sulfur-containing fossil fuels by mobile sources such as marine vessels and farm equipment and stationary fuel combustion.

Respirable Particulate Matter, 10 Micron

PM_{10} consists of particulate matter, fine dusts and aerosols, 10 microns or smaller in diameter. The primary sources of PM_{10} include dust from paved and unpaved roads and construction and demolition operations. Lesser sources of PM_{10} include wind erosion, agricultural operations, residential wood combustion, smoke, tailpipe emissions, and industrial sources. Diesel particulate matter (DPM) contains many

26 Also referred to as reactive organic compounds (ROCs) or volatile organic compounds (VOCs).

toxic particle and elemental carbon (soot), and is considered a toxic air contaminant in California.

Fine Particulate Matter, 2.5 Micron

$PM_{2.5}$ is a mixture of particulate matter, fine dusts and aerosols, 2.5 microns or smaller in aerodynamic diameter. $PM_{2.5}$ particles are emitted from activities such as industrial and residential combustion processes, wood burning, and from diesel and gasoline-powered vehicles. They are also formed in the atmosphere from gases such as SO_2, NO_X, ammonia, and volatile organic compound (VOC) that are emitted from combustion activities and then become particles as a result of chemical transformations in the air (secondary particles)[27].

Ambient Air Quality

Air quality is affected by a variety of sources in the Project vicinity. Large stationary sources such as oil refineries and power plants emit substantial amounts of NO_X and ROCs, along with PM_{10} and $PM_{2.5}$. Light motor vehicles, diesel-powered construction equipment, and commercial trucks used in the Project area are another source of these pollutants. Noncombustion sources of PM_{10} and $PM_{2.5}$ include fugitive dust from roads, construction, demolition, and earthmoving. Finally, commercial and general aviation aircraft generate emissions that affect air quality.

BAAQMD operates an extensive regional air monitoring networks comprised of monitoring stations that collectively measure the ambient concentrations of six criteria air pollutants: O_3, NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$. For this assessment, BAAQMD's San Francisco station was used as representative. It is located 11 miles to the southwest and is a fully-instrumented, all-pollutant station collecting data that are historic and representative of the Coast and Central Bay Zone, which includes the Berkeley area. Existing and probable future air quality in the Project area can generally be inferred from ambient air quality measurements taken at this site.

During the period between 2002 and 2008 (2009 data are not yet available), there were no daily violations of state or federal ambient air quality standards for O_3, NO_2, SO_2, or CO recorded at the San Francisco station; however, there were exceedences of PM_{10} and $PM_{2.5}$ standards. **Table 3.7-1** shows the incidence of daily violations of ambient PM_{10} and $PM_{2.5}$ standards for this period (BAAQMD 2010a).

[27] Ventura County Air Pollution Control District (VCAPCD), 2003. Ventura County Air Quality Assessment Guidlines.

TABLE 3.7-1
Ambient Air Quality in Project Vicinity - Days Over Standards During Year

Pollutant	Standard	Total	2008	2007	2006	2005	2004	2003	2002
Resp. Particulates (as PM_{10})	Federal	0	0	0	0	0	0	0	0
	California	9	0	2	3	0	1	1	2
Fine Particulates (as $PM_{2.5}$)	Federal	12	0	5	3	0	0	0	4
	California	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: BAAQMD 2010a
Notes: The 0.08 parts per million by volume (ppmv) federal 8-hour ozone standard applied until 2008; 0.075 ppmv thereafter

Sensitive Receptors

Certain population groups are considered more sensitive to air pollution and odors than others; in particular, children, elderly, and acutely ill and chronically ill persons, especially those with cardio respiratory diseases such as asthma and bronchitis are at risk of impaired health due to air pollution. Sensitive receptors (land uses) indicate locations where such individuals are typically found, namely schools, daycare centers, hospitals, convalescent homes, residences of sensitive persons, and parks with active recreational uses, such as youth sports.

The Project site is located in a residential area near the entrance to Tilden Park. Homes are adjacent to the Project site on all sides, across the streets on Grizzly Peak Boulevard, Spruce Street, Vassar Avenue, and Beloit Avenue. In addition to the nearby residences, there is a senior citizens facility and a library within 2 miles of the site, along with parks, schools, and daycare facilities. There are no hospitals within 2 miles of the Project site. **Table 3.7-2** lists the distance and direction to all non-residential receptors within 2 miles of the Project site. Eighteen receptors, including ten parks and five schools, are within 1 mile.

TABLE 3.7-2
Non-Residential Sensitive Receptors within Two Miles of Project Site

Facility Name	Receptor Type	Distance to Project Site (miles)	Direction to Project Site
Public Library, Claremont Branch	Library	1.29	South
Public Library, Kensington Branch	Library	0.75	Northwest
Community Center, Kensington	Multipurpose	0.75	Northwest
Shepherd of the Hills	Church	0.02	South
Albany Hill Park	Park	1.88	West
Hillside Natural Area	Park	1.61	Northwest
Tilden Regional Park	Park	0.24	Northeast
Dorothy Bolte Park	Park	0.17	South
Great Stone Face Park	Park	0.64	Southwest
John Hinkel Park	Park	0.58	South
Frederick Mini Park	Park	0.65	Southwest
Indian Rock Park	Park	0.8	South
Mortar Rock Park	Park	0.73	South
Grotto Rock Park	Park	0.73	South
Cragmont Park	Park	0.84	Southeast
Remillard Park	Park	0.93	Southeast
Live Oak Park	Park	1.31	South
Codornices Park	Park	1.27	Southeast
Terrace Park	Park	1.54	Southwest
Memorial Park	Park	1.21	Southwest
San Gabriel Municipal Park	Park	1.44	Southwest
Albany Cougar Athletic Field	Park	1.36	West
Harding Park	Park	1.26	West
Central Park	Park	1.99	West
Fairmont Park	Park	1.76	West
El Cerrito Community Swim Center	Park	1.88	Northwest
Cerrito Vista Park	Park	1.7	Northwest
Huber Park	Park	1.26	Northwest
Hillside Primary School	School	1.24	Southeast
Berkeley Hills Nursery School	School	1.25	Southeast
Cragmont Elementary School	School	0.7	South
Edible School Yard	School	1.63	South
Martin Luther King Elementary	School	1.6	South
St. Mary’s College High School	School	1.59	Southwest
MacGregor High School	School	1.9	West
Albany Middle School	School	1.44	West
Albany High School	School	1.34	West
El Cerrito High School	School	1.33	West
Fairmont Elementary	School	1.87	West
Kensington Elementary	School	0.65	Northwest

TABLE 3.7-2
Non-Residential Sensitive Receptors within Two Miles of Project Site

Facility Name	Receptor Type	Distance to Project Site (miles)	Direction to Project Site
Growing Light Montessori	School	0.65	Northwest
Prospect Sierra Middle School	School	1.67	Northwest
Portola Middle School	School	1.83	Northwest
Sycamore Christian Preschool	School	1.91	Northwest
Andrew University	School	0.92	Southwest
Marin Elementary	School	1.47	Southwest
Blake Garden	School	1.01	Northwest
Jefferson Elementary	School	1.91	Southwest
Oxford Primary School	School	1.16	South
Hopkins Pre-School	School	1.36	Southwest
East Bay Sierra	School	1.72	Northwest
Little Inti Daycare	School	1.74	West
Step One Nursery School	School	0.15	South
Claremont Day Nurseries	School	0.99	Northwest
St. Jerome's	School	1.04	West
Harding Child Care	School	1.29	West
School of the Madeleine	School	1.31	South
Bright Star Montessori School	School	1.47	Southwest
Albany Child Care Center	School	1.28	Southwest
Albany Senior Center	Senior Facility	1.55	Southwest

Source: ENTRIX 2010

Regulatory Framework

The following describes federal, state, and local agencies and the laws and regulations governing air quality. Government Code 53091(d) states: “(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency.” In instances where this statute applies, it is the practice of EBMUD to work with host jurisdictions and agencies during Project planning to consider the local environmental protection measures and to conform to local policies to the extent possible.

Standards and Attainment Status

The Clean Air Act of 1970 (CAA, amended 1977 and 1990, 42 USC 7401 et seq.) established National Ambient Air Quality Standards (NAAQS), and individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in the state, there is considerable difference between the federal and the state standards currently in effect in California, as shown in tables in the technical report (ENTRIX 2010). California Ambient Air Quality Standards (CAAQS) tend to be at least as protective as national standards and are often more stringent.

The ambient air quality standards, included in the technical report (ENTRIX 2010), are designed to protect those segments of the public most susceptible to respiratory distress (known as sensitive receptors), including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise.

Air districts in California are required to monitor air pollutant levels to assure that NAAQS and CAAQS are met and, in the event that they are not, to develop strategies to meet these standards. If the standards are met, the local air basin is classified as being in "attainment"; if the standards are exceeded, it is classified as "nonattainment." Where insufficient data exist to make a determination, an area is deemed "unclassified."

In general, the San Francisco Bay Area experiences low concentrations of most pollutants when compared to state and federal standards, except for O_3 and particulate matter, for which standards are exceeded periodically. The attainment status of the region is shown in **Table 3.7-3**.

Table 3.7-3
Attainment Status Summary – Bay Area Region

Criteria Pollutant	Federal Designation	State Designation
Ozone (O_3) (1-hour)	n/a	Nonattainment
Ozone (O_3) (8-hour)	Nonattainment*	Nonattainment
Nitrogen Dioxide (NO_2) (1-hour)	Unclassified**	Attainment
Nitrogen Dioxide (NO_2) (Annual)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Carbon Monoxide (CO)	Attainment	Attainment
Resp. Particulates (as PM_{10}) (24-hour)	Unclassified	Nonattainment
Resp. Particulates (as PM_{10}) (annual)	n/a	Nonattainment
Fine Particulates (as $PM_{2.5}$) (24-hour)	Nonattainment	n/a
Fine Particulates (as $PM_{2.5}$) (annual)	Attainment	Nonattainment
Lead (Pb)	Attainment	Attainment
Sulfates (as SO_4)	(no federal standard)	Attainment
Hydrogen Sulfide (H_2S)	(no federal standard)	Unclassified**
Vinyl Chloride (C_2H_3Cl)	(no federal standard)	n/d
Visibility	(no federal standard)	Unclassified**

Source: BAAQMD 2010b.
*Notes: * The 0.08 ppmv federal 8-hour ozone standard applied until 2008; 0.075 ppmv thereafter*
*** At the time of designation, if the available data do not support a designation of attainment or nonattainment, the area is designated as unclassified.*
n/a - not applicable
n/d - no data/information available

Under the 1990 CAA amendments, areas that did not meet the original federal 1-hour O_3 standard were classified according to the severity of each area's respective O_3 problem. The 1-hour classifications were Marginal, Moderate, Serious, Severe, and Extreme. Marginal areas were closest to meeting the 1-hour O_3 standard and extreme areas had the worst air quality problems. Areas with severe O_3 problems had progressively more stringent control requirements to meet under the Act. Under the Act, the Bay Area Air Basin is a "Serious" federal nonattainment area for O_3 and a federal nonattainment area for $PM_{2.5}$.

Similar to the federal CAA, the California CAA also classifies areas according to pollution levels. Under the Act, the Bay Area is a "Serious" O_3 nonattainment area and state PM_{10} and $PM_{2.5}$ nonattainment areas.

Federal Authority

The 1977 CAA amendments required that regional planning and air pollution control agencies prepare regional air quality plans to outline the measures by which both stationary and mobile sources of pollutants can be controlled to achieve all standards by the deadlines specified in the act.

For the SFBAAB, the Association of Bay Area Governments, the Metropolitan Transportation Commission, and BAAQMD jointly prepare the Bay Area Clean Air Plan and Ozone Attainment Plan (BAAQMD 2000, 2001). On March 11, 2010, BAAQMD released the Draft Bay Area 2010 Clean Air Plan which was adopted in final form by the BAAQMD Board of Directors on September 15, 2010 (BAAQMD 2010c). These plans contain control strategies that demonstrate attainment with the NAAQS by the deadlines established in the federal CAA.

State Authority

Pursuant to the federal CAA, states have the right to establish and enforce their own air quality standards; state standards may be equal to or more stringent, but not less stringent than federal standards. In 1988, the state legislature passed the California CAA (California Health and Safety Code Section 39600 et seq.), which, like its federal counterpart, called for designations of areas as attainment or nonattainment based on state rather than federal standards.

CARB is the state agency responsible for regulating air quality, and its responsibilities include establishing state ambient air quality standards, emissions standards, and regulations for mobile emissions sources (e.g., autos, trucks, etc.) as well as overseeing the efforts of countywide and multi-county air pollution control districts, which have primary responsibility over stationary sources. The emission standards most relevant to the Project are those related to automobiles, light- and medium-duty trucks, and California heavy-duty truck and construction equipment engines.

Local Authority

BAAQMD is the regional agency responsible for air quality regulation within the San Francisco Bay Area. 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.

The BAAQMD also indirectly regulates construction projects that use mobile sources via the statewide Portable Equipment Registration Program (PERP), discussed below. Since the Project does not meet the definition of a permanent stationary source, no Authority to Construct (Permit) would be required from the BAAQMD.

The "Serious" classifications triggers various plan submittal requirements and transportation performance standards. One such requirement is that each district update its air quality attainment plan every three years (triennially) to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data.

Source Specific Regulations

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 prior to 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 DPM 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 $PM_{2.5}$ and PM_{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) - The BAAQMD CEQA Air Quality Guidelines, adopted June 2010 (BAAQMD 2010d), 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 following thresholds would be considered to have a significant air quality impact for receptors within 1,000 feet of a source boundary. These thresholds, which are based on the BAAQMD CEQA Air Quality Guidelines (2010d), are as follows:

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) which exceeds 10 in 1 million. The MEI is a hypothetical person exposed for 70 years continuously (24 hours per day, 365 days per year).
- Ground-level concentrations of chronic or acute noncarcinogenic toxic air contaminants which result in a Hazard Index greater than one for the MEI.
- An ambient $PM_{2.5}$ increase of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average.

DPM is considered a toxic air contaminant in California (BAAQMD 2004). Due to the relatively small scale of the proposed construction activity and its short-term, temporary nature, emissions of DPM would not be sufficient to pose a significant risk to sensitive receptors from construction equipment operations.

A screening-level Health Risk Assessment for DPM was performed for the Project (ENTRIX 2010, Addendum 2011). This Health Risk Assessment was performed for average activity over the entire Project duration and peak activity (new tank and pumping plant construction). Although the methodology used is "conservative" and tends to overestimate impacts, the analysis indicates that actual impacts would be lower than the established regulatory thresholds:

- For average activity emission rates (620 working days), maximum excess cancer risk would not exceed 0.89 in 1 million for any receptor within 1,000 feet, which is below the 10 in 1 million threshold.
- For peak activity emission rates (180 working days), maximum excess cancer risk would not exceed 0.15 in 1 million for any receptor within 1,000 feet, which is below the 10 in 1 million threshold.
- Ambient $PM_{2.5}$ increase from fugitive dust would not exceed 0.20 μg/m3 on an annual average basis (entire Project), which is below the 0.30 μg/m3 threshold.

3.7.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses the following standards of significance as based on CEQA Guidelines Appendix G. Would the project:

- Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?
- Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?
- Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?
- Expose sensitive receptors to substantial pollutant concentrations?
- Create objectionable odors affecting a substantial number of people?

For this Project, the following determinations have been made with respect to the list of effects, as documented in the following sections.

Methodology

Impacts on air quality would result from engine exhaust and fugitive dust (particulate) emissions of criteria pollutants caused by operation of off-road construction equipment and on-road vehicles. Detailed lists of construction equipment, anticipated construction schedules, and emission calculations are provided in the technical report (ENTRIX 2010). Equipment lists and work schedules are detailed in Chapter 2, Project Description.

In the technical report, emissions were calculated for calendar year 2014 using the most recent emission factors published by the South Coast Air Quality Management District ([SCAQMD] 1993, updated 2008)[28] and USEPA 2006 (ENTRIX 2010). It was assumed that Project construction would last 2.5 years beginning in late 2013; however, extending the schedule longer than 2.5 years would not affect the air quality analysis because it is based on maximum daily emissions (pounds per day) and total emissions (tons per year), which would remain relatively unchanged.

Air quality impacts were assessed using significance thresholds established by BAAQMD for nonattainment pollutants and USEPA for attainment pollutants, which are listed in **Table 3.7-4**. The greatest potential for impacts would occur during the construction activities that result in ground disturbances (earthmoving), which causes fugitive dust to be entrained in the wind.

TABLE 3.7-4
Emissions Significance Thresholds – Bay Area Region

Criteria Emission	**Tons per Year**	**Pounds per Day**
Volatile Organic Compounds (VOCs as CH_4)	10	54
Carbon Monoxide (CO)	Violation of CAAQS for CO**	
Oxides of Nitrogen (NO_X as NO_2)	10	54
Sulfur Dioxide (SO_X as SO_2)	40*	n/a
Particulates (PM_{10})	15	82**
Particulates ($PM_{2.5}$)	10	54**
Lead (Pb)	0.6*	n/a

Sources: *BAAQMD 2010d, 40 CFR 51.166*
Notes: *Annual (tons per year) applies only to operational emissions; for construction projects only daily thresholds (pounds per day) apply*
* *Prevention of Significant Deterioration*
** *For construction projects, applies to exhaust emissions only, not fugitive dusts; no threshold for carbon monoxide*

28 BAAQMD does not publish its own emission factors per se; the SCAQMD off-road factors are based on federal standards pursuant to 40 CFR 89.112; SCAQMD on-road factors are based on 40 CFR 86 et seq. vehicle category standards; the SCAQMD factors are output from CARB's OFFROAD and EMFAC applications, respectively, which reference the above cited regulations, respectively.

Impacts and Mitigation Measures

Impact 3.7-1: The Project would conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan.

The Project would not conflict with the Draft Bay Area 2010 Clean Air Plan and Ozone Attainment Plan (BAAQMD 2010c, 2001), because general construction activity-related emissions (i.e., temporary sources) are accounted for in the emission inventories included in the plan. Therefore, impacts on air quality plan objectives are less than significant.

General estimated basin-wide construction-related emissions are included in BAAQMD's emission inventories (which, in part, form the basis for the air quality plans cited above) and are not expected to prevent attainment or maintenance of the O_3, particulate matter, and CO standards within the Bay Area. Therefore, construction impacts related to air quality plans for these pollutants would be less than significant, and no extra mitigation measures would be required, since they are presently estimated and accounted for in BAAQMD's emission inventories.

Mitigation Measure: None Required.

Impact 3.7-2: The Project would violate any stationary source air quality standard or contribute to an existing or projected air quality violation.

The Project would have a limited potential to incrementally contribute to existing violations of state and federal air quality standards in the Project vicinity for O_3, PM_{10}, and $PM_{2.5}$. However, incremental impacts would be small, temporary, and would permanently cease upon completion of Project construction.

Consistent with the equipment lists and work schedules in Chapter 2, Project Description of this Draft EIR, estimated (mitigated) emissions for criteria emissions and fugitive dusts are shown in **Tables 3.7 5 and 3.7-6**, respectively. Construction activity emissions would be temporary, lasting 2.5 years, and would permanently cease upon completion of work. There would be no new operational emissions, only emissions from periodic inspection and maintenance activities (i.e., vehicle travel) which are presently performed on the Project site.

TABLE 3.7-5
Estimated Maximum Demolition and Construction Emissions - Project (mitigated)

Criteria Emissions	Peak lbs/day	Total tons	Thresholds lbs/day	Thresholds tons	Significant (Yes/No) lbs/day	Significant (Yes/No) tons
Volatile Organic Compounds (VOCs as CH_4)	11	2.1	54	10	No	n/a
Carbon Monoxide (CO)	47	9.3	Violation of CAAQS for CO		No	n/a
Oxides of Nitrogen (NO_X as NO_2)	94	17.8	54	10	Yes	n/a
Sulfur Dioxide (SO_X as SO_2)	0.2	0.03	n/a	40	n/a	n/a
Combustion Particulates (C-PM_{10})	4.5	0.9	82	15	No	n/a
Combustion Particulates (C-$PM_{2.5}$)	4.0	0.8	54	10	No	n/a
Fugitive Dust (F-PM_{10})	227	25.8	n/a	15	n/a	n/a
Fugitive Dust (F-$PM_{2.5}$)	33	3.8	n/a	10	n/a	n/a

Sources: SCAQMD 2008; USEPA 2006
Notes: Fugitive dust and combustion particulates are determined separately
Fugitive dust comprises both on site (earthmoving and unpaved roads) and off site (streets and highways) sources

TABLE 3.7-6
Estimated Fugitive Dust Emissions Summary – Project (mitigated)

Fugitive Dust Emissions	Peak lbs/day	Total tons	Thresholds lbs/day	Thresholds tons	Significant (Yes/No) lbs/day	Significant (Yes/No) tons
Fugitive Dust (F-PM_{10}) - All On sites	17	1.6	n/a	n/a	n/a	n/a
Fugitive Dust (F-PM_{10}) - All Off sites	210	24.1	n/a	n/a	n/a	n/a
Fugitive Dust (F-PM_{10}) - All Combined Totals	227	25.7	n/a	n/a	n/a	n/a
Fugitive Dust (F-$PM_{2.5}$) - All On sites	2.6	0.34	n/a	n/a	n/a	n/a
Fugitive Dust (F-$PM_{2.5}$) - All Off sites	30.6	3.50	n/a	n/a	n/a	n/a
Fugitive Dust (F-$PM_{2.5}$) - All Combined Totals	33.2	3.84	n/a	n/a	n/a	n/a

Source: USEPA 2006
Notes: Fugitive dust comprises both on site (earthmoving and unpaved roads) and off site (streets and highways) sources
No thresholds apply to fugitive dust emissions

As shown in Tables 3.7-5 and 3.7-6, Project construction would have a limited potential to contribute to existing violations of state and federal air quality standards in the Project vicinity for O_3, PM_{10} and $PM_{2.5}$, primarily through diesel engine exhaust and fugitive dust emissions during construction activities. Except for peak daily NO_X emissions comprising on site and off site sources, no applicable quantitative emissions thresholds would be exceeded in BAAQMD. Due to off site geographic dispersion and effective on site fugitive dust mitigation measures, no ambient air quality violations would occur solely due to Project emissions for any pollutant, including CO, NO_X, PM_{10}, and $PM_{2.5}$.

As discussed in Source Specific Regulations, the use of newer, less polluting Tier 1, 2, and 3 engines in most construction equipment used on site is a mitigating factor for combustion emissions of NO_X, VOCs, CO, PM_{10}, and $PM_{2.5}$. California ultra-low sulfur diesel fuel with a maximum sulfur content of 15 parts per million (ppm) by weight would be used in all diesel-powered equipment to minimize SO_2 and particulate emissions. However, since Tiered emission standards and California ultra-low sulfur diesel fuel are the current baseline for the state, their use does not comprise a mitigation per se.

The impact would be significant and would require the following mitigation measures, which are based on BAAQMD emission control measures.

Measure 3.7-2a: Diesel Control Measures. EBMUD will incorporate the following measures into the construction contract specifications:

- To minimize potential diesel odor impacts on nearby receptors (pursuant to BAAQMD Regulation 1, Rule 301), construction equipment will be properly tuned. A schedule of tune-ups will be developed and performed for all equipment 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.
- Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) will be electrically powered unless the contractor submits documentation and receives approval from EBMUD that the use of such equipment is not practical, feasible, or available (generally contingent upon power line proximity, capacity, and accessibility). California ultra-low sulfur diesel fuel with maximum sulfur content of 15 parts per million by weight (ppmw), or an approved alternative fuel, will be used for on site fixed equipment not using line power.
- To minimize diesel emission impacts, construction contracts will require off-road compression ignition equipment operators to reduce unnecessary idling with a two minute time limit.
- On-road and off-road material hauling vehicles will shut off engines while queuing for loading and unloading for time periods longer than two minutes.
- Off-road diesel equipment will be fitted with verified diesel emission control systems (e.g., diesel oxidation catalysts) to the extent reasonably and economically feasible.
- Utilize alternative fuel equipment (i.e., compressed or liquefied natural gas, biodiesel, electric) to the extent reasonably and economically feasible.

To control emissions of particulate matter, the Project will implement the following fugitive dust and particulate matter emissions control measures suggested by the BAAQMD CEQA Air Quality Guidelines as applicable (BAAQMD 2010d).

Measure 3.7-2b: Basic Dust Control Measures. EBMUD will require its construction contractor to implement the following controls at the construction and staging sites as applicable:

- Water all active construction areas as necessitated by soil and air conditions.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Apply water as necessitated by soil and air conditions, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites as needed.
- Sweep daily or more frequently as necessary (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep daily or more frequently as necessary (with water sweepers) if visible soil material is carried onto adjacent public streets.
- All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, will be effectively stabilized to minimize dust emissions using water, nontoxic chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
- All on-site unpaved roads and off-site unpaved access roads will be effectively stabilized for dust emissions using water, nontoxic chemical stabilizer/suppressant or coarse rock cover.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities will be effectively controlled for fugitive dust emissions utilizing application of water or by presoaking.
- When materials are transported off-site, all material will be covered, or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container will be maintained.
- All operations will limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets as soon as practicable. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)
- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles will be effectively stabilized for fugitive dust emissions with a cover or by utilizing sufficient water or nontoxic chemical stabilizer/suppressant.
- Within urban areas, such as the greater San Francisco Bay Area, trackout will be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
- Any construction area/site in an urban area with 150 or more vehicle trips per day will prevent carryout and trackout.

Measure 3.7-2c: Diesel Particulate Matter Emissions Control Measures. In addition, EBMUD and its construction contractor will implement the following measures to reduce particulate matter emissions from diesel exhaust:

- Grid power will be used instead of diesel generators where it is feasible to connect to grid power (generally contingent upon power line proximity, capacity, and accessibility);
- The Project specifications will include 13 CCR Sections 2480 and 2485, which limit the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds, both California- or non-California-based trucks) to 30 seconds at a school or five (5) minutes at any location. In addition, the use of diesel auxiliary power systems and main engines will be limited to five (5) minutes when within 100 feet of homes or schools while the driver is resting (however, since the BAAQMD idling limitation in Mitigation Measure 3.7-2a is more stringent, the lower limit applies);
- The Project specifications will include 17 CCR Section 93115, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, which specifies fuel and fuel additive requirements and emission standards for operation of any stationary, diesel-fueled, compression-ignition engines.
- A schedule of low-emissions tune-ups will be developed and such tune-ups will be performed on all equipment, particularly for haul and delivery trucks; and
- Low-sulfur (≤ 15 ppmw sulfur) fuels will be used in all stationary and mobile equipment.

With implementation of Mitigation Measures 3.7-2a, 3.7-2b, and 3.7-2c, this impact would be less than significant. The Project would implement the required BAAQMD emission control measures, i.e., diesel engine and fugitive dust controls (per BAAQMD CEQA Air Quality Guidelines) and compliant epoxy-based coatings for the new tank and applicable parts of the pumping plant structure and equipment, such as pumps, piping, and structural supports (per BAAQMD Regulation 8, Rule 3: Architectural Coatings). The agencies have determined that these measures reduce impacts from contributions to an existing air quality violation to less than significant (BAAQMD 2010d).

Significance after Mitigation: Less than Significant.

Impact 3.7-3: The Project would result in a net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

The Project would result in a small temporary incremental contribution to a cumulative effect for several criteria pollutants for which the SFBAAB is in nonattainment under an applicable federal or state ambient air quality standard (i.e., O_3, PM_{10}, and $PM_{2.5}$).

As shown in Table 3.7-5, except for marginal NO_X, none of the significance thresholds shown in Table 3.7-4 would be exceeded by the Project, either daily or annually, as applicable. Since the emissions would be mitigated (Mitigation Measures 3.7-2a, 3.7-2b and 3.7-2c) and would be short term in nature, they would not be cumulatively considerable and are thus less than significant.

Localized impacts would be less than significant because the Project would implement applicable fugitive dust controls listed under Mitigation Measure 3.7-2b. The use of newer, less polluting Tier 1, 2, and 3 engines in most construction equipment used on site is a measure for reducing combustion emissions of NO_X, VOCs, CO, PM_{10}, and $PM_{2.5}$. Although not a CEQA mitigation measure per se, California ultra-low sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight would be used in all diesel-powered equipment, which would minimize SO_2 and particulate emissions. Therefore, the impact would be less than significant with implementation of Mitigation Measures 3.7-2a, 3.7-2b, and 3.7-2c.

Significance after Mitigation: Less than Significant.

Impact 3.7-4: The Project would expose sensitive receptors to substantial pollutant concentrations.

The Project site is located in a populated suburban area. The nearest houses relative to the Project site are approximately 60 to 130 feet from the existing fence line. The nearest school is the Step One Nursery School, which is approximately 0.15 mile south of the site. The nearest park is approximately 0.2 mile south. There are no libraries, senior facilities, day care centers, or hospitals within 0.75 mile of the site.

Due to the relatively small scale of the proposed construction activity, its short-term temporary nature and its 17-acre footprint, the aforementioned mitigation measures would lower the concentrated release of particles such that the exposure of sensitive receptors to substantial pollutant concentrations would be less than significant. BAAQMD control measures for diesel exhaust would be implemented as described in Mitigation Measures 3.7-2a, 3.7-2b, and 3.7-2c in combination with the fugitive dust controls described above. Therefore, the Project would not expose sensitive receptors to substantial pollutant concentrations. The impact would be less than significant with implementation of Mitigation Measures 3.7-2a, 3.7-2b, and 3.7-2c.

Significance after Mitigation: Less than Significant.

Impact 3.7-5: The Project would create objectionable odors affecting a substantial number of people.

California ultra-low sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight would be used in all diesel-powered equipment which minimizes emissions of sulfurous gases (SO_2, hydrogen sulfide, carbon disulfide, and carbonyl sulfide). Therefore, no objectionable odors are anticipated from construction activities or normal maintenance. The Project would not create objectionable odors affecting a substantial number of people; therefore, there would be no impact and no mitigation measures would be required.

Mitigation Measure: None Required.

References

Bay Area Air Quality Management District (BAAQMD), 2000. Bay Area 2000 Clean Air Plan and Triennial Assessment. Available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Ozone-Attainment-Plans/2000-Clean-Air-Plan.aspx.

Bay Area Air Quality Management District (BAAQMD), 2001. Revised San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard. Available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Ozone-Attainment-Plans/2001-Ozone-Attainment-Plan.aspx.

Bay Area Air Quality Management District (BAAQMD), 2004. Toxic Air Contaminants Inventory. Available online at http://www.baaqmd.gov/Divisions/Engineering/Air-Toxics/Toxic-Air-Contaminant-Control-Program-Annual-Report.aspx.

Bay Area Air Quality Management District (BAAQMD), 2010a. Annual Bay Area Air Quality Summaries. Available online at http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx.

Bay Area Air Quality Management District (BAAQMD), 2010b. Air Quality Standards and Attainment Status. Available online at http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm.

Bay Area Air Quality Management District (BAAQMD), 2010c. Bay Area 2010 Clean Air Plan. Available online at http://www.baaqmd.gov/Help/~/~/link.aspx?_id=947A5F5A997140D4961127148D82FCE6&_z=z.

Bay Area Air Quality Management District (BAAQMD), 2010d. BAAQMD CEQA Air Quality Guidelines. Available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx.

California Air Resources Board (CARB), 2005. Characterization of Ambient PM_{10} and $PM_{2.5}$ in California. Available online at http://www.arb.ca.gov/pm/pmmeasures/pmch05/stateover05.pdf.

California Air Resources Board (CARB), 2010. Mobile and Stationary Source Airborne Toxic Control Measures (ATCMs). Available online at http://www.arb.ca.gov/toxics/atcm/atcm.htm.

ENTRIX, Inc., October, 2010. EBMUD Summit Reservoir Replacement Project Technical Report, Air Quality. Addendum Health Risk Assessment, January 6, 2011.

National Climatic Data Center, 2010. Precipitation data for Berkeley gage #040693. Available online at http://www.ncdc.noaa.gov/oa/ncdc.html.

National Oceanic and Atmospheric Administration (NOAA), 2008. Average Wind Speed Data. Available online at http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html.

South Coast Air Quality Management District (SCAQMD) 1993 (updates 2008). CEQA Air Quality Handbook. No longer available online pending development of new Air Quality Analysis Guidance Handbook (see http://www.aqmd.gov/ceqa/hdbk.html). Emission factors from this reference are included in the technical report (ENTRIX 2010).

U.S. Environmental Protection Agency (USEPA), 2006. Compilation of Air Pollution Emission Factors (AP-42), Fifth Edition (1995-2006). Available online at http://www.epa.gov/ttn/chief/ap42/.

Ventura County Air Pollution Control District (VCAPCD), 2003. Ventura County Air Quality Assessment Guidelines. Available online at http://www.vcapcd.org/pubs/Planning/VCAQGuidelines.pdf.

3.8 Greenhouse Gas Emissions

3.8-1 Approach to Analysis

This section analyzes potential impacts of the Project related to Greenhouse Gas (GHG) Emissions. The setting describes the existing conditions of the Project site and vicinity. Project-specific impacts are identified, if any, and appropriate mitigation measures are recommended to reduce impacts to less than significant. This section is based on the EBMUD Summit Reservoir Replacement Project Technical Report: Greenhouse Gas Emissions (ENTRIX 2010). The Technical Report contains detailed quantitative information on GHG emissions associated with the Project and their significance to state and national GHG inventories and reduction programs.

Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the “worst case” construction footprint and potential impacts associated with the replacement tank.

3.8.2 Setting/Regulatory Framework

The environmental setting for GHG emissions and climate change is larger than the immediate Project area. The sections below describe the context for climate change as being the Earth and the properties of GHGs to affect global climate change.

Common Greenhouse Gases

GHGs include CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (Health and Safety Code, Section 38505[g]). The most common GHG that results from human activity is CO_2, followed by CH_4 and N_2O (Governor’s Office of Planning and Research 2008). These common GHGs and their potential environmental effects are described below.

Carbon Dioxide (CO_2)

In nature, carbon is cycled between various atmospheric, oceanic, land biotic, marine biotic, and mineral reservoirs. Atmospheric CO_2 is part of this global carbon cycle. CO_2 concentrations in the atmosphere increased from 278 parts per million by volume (ppmv) in pre-industrial times to 365 ppmv in 1998, a 31 percent increase. The Intergovernmental Panel on Climate Change (IPCC) notes that “this concentration has not been exceeded during the past 420,000 years, and likely not during the past 20 million years. The rate of increase over the past century is unprecedented, at least during the past 20,000 years.” The IPCC definitively states that “the present atmospheric CO_2 increase is caused by anthropogenic emissions of CO_2” (USEPA 2010).

Methane

CH_4 is primarily produced through anaerobic decomposition of organic matter in biological systems. Agricultural processes such as wetland rice cultivation, enteric fermentation in animals, and the decomposition of animal wastes emit CH_4, as does the decomposition of municipal solid wastes. CH_4 is also emitted during the production and distribution of natural gas and petroleum, and is released as a byproduct of coal mining and incomplete fossil fuel combustion. Atmospheric CH_4 concentrations have increased by about 150 percent since pre-industrial times, although the rate of increase has been declining. The IPCC estimated that slightly more than half of the current CH_4 flux to the atmosphere is anthropogenic from human activities such as agriculture, fossil fuel use, and waste disposal.

Nitrous Oxide

Anthropogenic sources of N_2O emissions include agricultural soils, especially the use of synthetic and manure fertilizers; fossil fuel combustion, especially from mobile combustion; adipic (nylon) and nitric acid production; wastewater treatment and waste combustion; and biomass burning. The atmospheric concentration of N_2O has increased by 16 percent since 1750, from a pre-industrial value of about 270 parts per billion to 314 parts per billion in 1998, a concentration that has not been exceeded during the last thousand years.

Climate Change

The American Meteorological Society refers to climate change as any systematic change in the long-term statistics of climate elements (such as temperature, pressure, or winds) sustained over several decades or longer. The Society also indicates that climate change may be due to natural external forcings, such as changes in solar emission or slow changes in the Earth’s orbital elements; natural internal processes of the climate system; or anthropogenic forcing. The climate system can be influenced by changes in the concentration of various GHGs in the atmosphere that affect the Earth’s absorption of radiation (American Meteorological Society 2010).

The United Nations Framework Convention on Climate Change (2010) defined climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods and their radiative forcing have continued to increase as a result of human activities.”

In its most recent report (Fourth Assessment Report), IPCC stated that warming of the Earth’s climate is unequivocal and that warming is very likely attributable to increases in atmospheric GHGs caused by human activities (IPCC 2007). IPCC further stated that changes in many physical and biological systems, such as increases in global temperatures, more frequent heat waves, rising sea levels, coastal flooding, loss of wildlife habitat, spread of infectious disease, and other potential environmental impacts are linked to changes in the climate system, and that some changes might be irreversible.

The IPCC reports that the global average surface temperature of the Earth has increased by 1.1 ± 0.4 °F (0.6 ± 0.2 degrees Celsius [°C]) over the 20th century. This value is about 0.27°F (0.15°C) larger than that estimated by the Second Assessment Report, which reported for the period up to 1994, "owing to the relatively high temperatures of the additional years (1995 to 2000) and improved methods of processing the data."

The Project GHG technical report included tables that show aggregated U.S. and California CO_2 equivalents emissions for all fossil fuel combustion, respectively. As shown in that report, California accounts for about 7.2 percent of fossil fuel CO_2 equivalents emissions in the U.S. annually (ENTRIX 2010).

Regulatory Framework

The following paragraphs describe the laws and regulations governing GHG emissions. Government Code 53091(d) states: "(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency." In instances where this statute applies, it is the practice of EBMUD to work with host jurisdictions and agencies during Project planning to consider the local environmental protection measures and to conform to local policies to the extent possible.

Currently, there are no federal, state, or local regulatory standards relating to GHG emissions from temporary sources such as construction - only projects where there would be no quantifiable long-term operational emissions. Summaries of other principal federal and state GHG statutes and programs are presented below.

Federal Programs – U.S. Environmental Protection Agency

In response to the FY2008 Consolidated Appropriations Act (HR 2764; Public Law 110-161), USEPA has issued 40 Code of Federal Regulations (CFR) Part 98, which requires reporting of GHG emissions from large sources and suppliers in the United States. Part 98 is intended to collect accurate and timely emissions data to inform future policy decisions. Part 98 included reporting requirements for 31 of the 42 source categories listed in the April 10, 2009 proposed rule. However, since the Project is not a stationary source, the new federal reporting rule would not apply.

Global Warming Solutions Act (Assembly Bill 32)

The Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) codifies California's goal of reducing statewide emissions of GHGs to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012 to achieve maximum technologically feasible and cost-effective GHG emission reductions. In order to effectively implement the cap, AB 32 directs the CARB to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels.

At present, no enforceable rules or regulations have been promulgated by CARB or other state agencies which defines a significant source of GHG emissions. In addition, there are no enforceable facility-specific emission limitations or caps for GHG emissions, either statewide or at the local Air Pollution Control District or Air Quality Management District level. Thus, there is no present state or local regulatory mechanism for determining whether a project advances or hinders California's GHG reduction goals; no statewide standards of significance for GHG impacts have been established under CEQA (California Air Pollution Control Officers Association 2008).

On September 25, 2009, CARB adopted the AB 32 Cost of Implementation Fee Regulation (Health and Safety Code 38597). The regulation became effective on July 19, 2010. Since the Project is not an affected facility (i.e., not a stationary source), the AB 32 fee regulation would not apply (CARB 2010).

Assembly Bill 939

California AB 939, known as the Integrated Waste Management Act of 1989, was enacted due to increasing waste stream volumes and decreasing landfill capacities in the state. As a result of AB 939, the California Integrated Waste Management Board was created. AB 939 mandated that sanitation districts (jurisdictions) meet diversion goals of 25 percent by 1995 and 50 percent by 2000, primarily through recyclables collection and green waste composting.

Senate Bill 1368

Senate Bill (SB) 1368 provides a mechanism for reducing the GHG emissions of electricity providers, both in-state and out-of-state, thereby assisting CARB in meeting its mandate under AB 32.

Senate Bill 97

California SB 97 directs the Office of Planning and Research to prepare, develop, and transmit to the Resources Agency CEQA guidelines for the feasible mitigation of GHG emissions or their effects by July 1, 2009. The Resources Agency adopted new CARB Guidelines in 2010.

Senate Bill 375

California SB 375 aims to reduce GHG emissions by curbing sprawl, because the largest sources of GHG emissions in California are passenger vehicles and light trucks. SB 375 enhances CARB's ability to reach AB 32 goals by requiring metropolitan planning organizations to include defined sustainable community strategies in their regional transportation plans for the purpose of reducing GHG emissions, aligns planning for transportation and housing, and creates specified incentives for the implementation of the strategies.

Senate Bills 1078 and 107

California SB 1078 was signed into legislation in 2002 and required California load serving entities to procure 20 percent of their retail customer load with renewable energy by the year 2017. Four years later (2006), SB 107 accelerated the 20 percent renewable deadline to 2010.

Executive Order S-20-04

On July 27, 2004, Governor Arnold Schwarzenegger signed Executive Order S-20-04 committing the state to aggressive action to reduce state-owned building electricity usage by retrofitting, building and operating the most energy and resource efficient buildings by taking all cost-effective measures described in the Green Building Action Plan with the goal of reducing grid-based energy purchases by 20 percent by 2015. This order also directed the California Public Utilities Commission to support a campaign to improve commercial building energy efficiency in order to help achieve the 20 percent goal and to develop a benchmarking methodology.

Executive Order S-3-05

On June 1, 2005, Governor Schwarzenegger signed Executive Order S-3-05, which established the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels.

Executive Order S-13-08

On November 14, 2008, Governor Schwarzenegger signed Executive Order S-20-04 directing the California Resources Agency, in cooperation with the Department of Water Resources, the California Energy Commission, California's Coastal Management agencies, and the Ocean Protection Council to request that the National Academy of Sciences convene an independent panel to complete the first California Sea Level Rise Assessment Report by December 1, 2010.

Adopted BAAQMD CEQA Guidelines

On June 2, 2010, BAAQMD adopted new CEQA Air Quality Guidelines (BAAQMD 2010) for consideration by lead agencies tasked with evaluating the air quality and climate change impacts of proposed new projects. The proposed guidelines supersede the former December 1999 Guidelines. As guidelines, they do not comprise enforceable rules or regulations per se. Project status is as follows:

- The pumping plant facility does not meet the regulatory definition of a stationary source of air contaminants, therefore, the 10,000 metric tonne CO_2 equivalents per year stationary source GHG threshold would not apply to the Project.
- For nonstationary source land use development projects, BAAQMD's adopted "bright-line" threshold of significance differs from other proposed GHG thresholds currently under consideration in California. Under this threshold, in order to conclude that a project's GHG impacts are less than significant, a project would need to be in compliance with a "Qualified Greenhouse Gas Reduction Strategy," emit less than 1,100 metric tonnes CO_2 equivalents per year, or emit less than 4.6 metric tonnes CO_2 equivalents per year per capita service population (residents + employees). However, the Project does not qualify as a land use development project; therefore, these GHG thresholds do not apply.
- There are no GHG thresholds for construction emissions, either daily or annually, whether for stationary or nonstationary source projects.

Thus, no GHG significance thresholds apply to the Project (BAAQMD 2010).

3.8.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses the following standards of significance as based on CEQA Guidelines Appendix G. Would the project:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

For the Project, the following determinations have been made with respect to the list of effects, as documented in the following sections.

Methodology

GHGs would result from engine exhaust emissions caused by operation of off-road construction equipment and on-road vehicles. Detailed lists of construction equipment, anticipated construction schedules, and emission calculations are provided in the technical report (ENTRIX 2010).

Emission calculations were performed using the most recent (2008) emission factors published by the SCAQMD[29] and USEPA (2010). For the Project, actual construction is expected to require about 2.5 years of planned work activities, and potential delays related to weather, protection of sensitive resources, material delivery, and unforeseen underground conditions could occur as well. Extending the schedule longer than 2.5 years would not affect the GHG analysis, because it is based on maximum daily emissions (pounds per day) and total emissions (tons per year), which would remain relatively unchanged.

Impacts and Mitigation Measures

Impact 3.8-1: The Project would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

As previously described, there are no promulgated standards of significance for GHG impacts established under CEQA for construction-only projects. Thus, Project emissions are compared against existing GHG inventories for context.

As shown in **Table 3.8-1,** construction emissions would be approximately 2,830 short tons (2,570 metric tonnes) CO_2 equivalents occurring over the course of 2.5 years. These emissions would be temporary and would permanently cease upon Project completion. Compared to national and statewide GHG inventories for fuel combustion (included in the technical report), mitigated construction emissions would comprise about 0.00005 and 0.0006 percent of the national and state inventories, respectively. Such small percentage contributions are well within the estimation error of emissions inventories, generally plus or minus 10 percent (CARB 2007).

TABLE 3.8-1
Estimated Maximum Construction GHG Emissions – Project (mitigated)

Greenhouse Gas Emissions	Peak pounds per day	Total tons	Threshold tons	Significant Yes/No
Carbon Dioxide (GHG - CO_2)	14,729	2,800	n/a	n/a
Methane (GHG - CH_4)	0.9	0.2	n/a	n/a
Nitrous Oxide (GHG - N_2O)	0.4	0.1	n/a	n/a
Carbon Dioxide Equivalents (CO_2e)	14,884	2,831	n/a	n/a

Sources: SCAQMD 2008; USEPA 2010

During operation of the completed facility, the new pumping plant would utilize a maximum of 480 motor horsepower and consume approximately 400 kilowatts of electric

29 BAAQMD does not publish its own emission factors per se; the SCAQMD off-road factors are based on federal standards pursuant to 40 CFR 89.112; SCAQMD on-road factors are based on 40 CFR 86 et seq. vehicle category standards; the SCAQMD factors are output from CARB's OFFROAD and EMFAC applications, respectively, which reference the above cited regulations, respectively.

power at peak demand (all pumps running). This is about the same total power as presently used by the existing Woods and Shasta Pumping Plants. Based on this information, electric power consumption is not expected to increase over existing levels. Energy requirements would remain about the same or decrease because newer, more efficient, mechanical equipment would be consolidated at a single location. Thus, there would be no net increase (i.e., no impact) of indirect GHG emissions from the fossil fuel component of mixed electric power generation as a result of the Project. At 60 percent average annual capacity factor (2,100 MWh per year), indirect GHG emissions from electric power used by the pumping plant would be about 840 metric tonnes CO_2 equivalents annually[30] (The Climate Registry 2008, USEPA 2010), or about 1.6 percent of EBMUD's current overall GHG emissions (below).

To further the goals of AB 32, EBMUD has adopted a diverse energy program, reducing indirect and direct CO_2 equivalents emissions 24 percent, from about 70,000 metric tonnes per year in 2003 to about 53,000 metric tonnes in 2009. EBMUD also produces and uses "green" renewable energy. For example, EBMUD produces and sells hydroelectric power from the Pardee and Camanche Reservoirs. Pipelines delivering water from the Sierra Nevada to the East Bay all flow by gravity rather than pump stations. EBMUD converts raw CH_4 (biogas) from its wastewater operations into clean-burning fuel gas. EBMUD has purchased hybrid vehicles, reducing automobile CO_2 emissions by 92 percent and is experimenting with biodiesel fuel in its heavy-duty trucks. EBMUD is also installing solar energy systems and more efficient heating and cooling systems in its buildings (EBMUD 2010). Given these long-term offsets and increases in fuel efficiency, the impact of this Project's short-term GHG emissions on the environment would be less than significant.

To further the goals of California AB 939, EBMUD proposes to recycle as much of the construction debris as feasible on site to minimize truck trips off-site and thereby reduce carbon emissions and other GHGs, as noted in Table 2-2 in Chapter 2, Project Description. This would include re-use of concrete and soil associated with demolition of the existing reservoir and western embankment. Recycling the concrete liner would offset the need for approximately 4,000 CY of fill import. Recycling soil from breaching the western embankment and on-site grading would also offset another 46,000 CY of fill import. The total number of truck trips associated with on-site recycling of demolition materials is estimated at 4,200 round trips (off haul and import). At an estimated rate of 150 truck trips/day, associated traffic would span approximately 56 days and lengthen the overall Project schedule, which would in turn generate additional air quality and GHG impacts. Therefore, proposed recycling/re-use of demolition materials would appreciably minimize potentially adverse traffic/transportation, air quality and GHG emission impacts.

Due to its small temporary scale and GHG mitigations, the Project would not individually affect the environment or impede the state's ability to meet its 2020 GHG emission reduction goal; thus, the individual impact would be less than significant with

30 Calculation: 0.60 x 8,760 hrs/yr x 0.400 MW x 0.40 tonne CO2e /MW-hr = 840 tonnes/yr CO2e (rounded).

implementation of Mitigation Measure 3.8-1, as well as Mitigation Measures 3.7-2a, 3.7-b and 3.7-2c in Section 3.7, Air Quality, and the incremental cumulative impact would not be considerable.

Measure 3.8-1: Greenhouse Gas Control Measures. During construction, EBMUD and its construction contractor will implement the following measures to reduce GHG emissions from fuel combustion and construction activities:

- On-road and off-road vehicle tire pressures will be maintained to manufacturer specifications. Tires will be checked and re-inflated at regular intervals.
- Lower-carbon fuels such as biodiesel blends will be used where feasible.
- Engine retrofits to remove emissions such as diesel particulate matter filters with diesel oxidation catalysts will be used where feasible.
- Construction equipment engines will be maintained to manufacturer's specifications.
- Locally made construction materials will be used to the extent feasible.
- Construction debris will be reused to the extent feasible, as addressed in the Project Overview and above.
- Tree removal necessary for construction will be minimized to the extent feasible; replacement landscaping (trees, shrubs and grasses) in the basin will offset the loss of carbon sequestration associated with tree removal.

Implementation of Mitigation Measures 3.8-1, as well as 3.7-2a, 3.7-2b and 3.7-2c would reduce this impact to less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.8-2: The Project would conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

On a local and statewide basis, agencies in California are in the process of implementing identified strategies to reduce GHG emissions. **Table 3.8-2** identifies strategies included in BAAQMD's 2010 CEQA Air Quality Guidelines and the California Energy Commission's 2009 Draft Climate Action Team Report to the Governor and Legislature that would apply to the Project. As shown below, the Project would maintain consistency with the applicable GHG emission reduction strategies identified by the California Climate Action Team and BAAQMD.

TABLE 3.8-2
Consistency of Project with Applicable State and Local Climate Change Emission Reduction Strategies

Responsible Agency	Strategy	Consistency
Bay Area Air Quality Management District	GHG Reduction Strategies Recommended in adopted CEQA Air Quality Guidelines.	**Consistent:** Notwithstanding temporary status and non-applicability, annualized GHG emissions from the 2.5-year Project would likely fall below the 1,100 metric tonne threshold contingent upon actual activity levels during any year.
Department of Water Resources	Water Use Efficiency	**Consistent:** The Project would indirectly aid in water conservation by reducing or eliminating reservoir leakage along with installation of more efficient pumping technology, both of which conserve electric power and thus reduce indirect GHG emissions from fossil fuel generating resources.

Sources: BAAQMD 2010; California Energy Commission 2009.

Due to its small scale and temporary status, the Project would not conflict with local plans, policies or regulations aimed at curbing GHG emissions. Therefore, the individual impact would be less than significant and no mitigation measures would be required.

Mitigation Measures: None Required.

References

American Meteorological Society, 2010. Glossary of Meteorology. Available online at http://amsglossary.allenpress.com/glossary/search?id=climate-change1.

Bay Area Air Quality Management District (BAAQMD), 2010. BAAQMD CEQA Air Quality Guidelines. Available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx.

California Air Pollution Control Officers Association, 2008. CEQA and Climate Change. Available online at http://www.capcoa.org/wp-content/uploads/downloads/2010/05/CAPCOA-White-Paper.pdf.

California Air Resources Board (CARB), 2010. AB 32 Cost of Implementation Fee Regulation (HSC 38597). Available online at http://www.arb.ca.gov/cc/adminfee/adminfee.htm.

California Air Resources Board (CARB), 2007. Emission Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program. Available online at http://www.arb.ca.gov/ab2588/final/reg.pdf.

California Energy Commission, 2009. Draft Climate Action Team Report to the Governor and Legislature. Available online at http://www.energy.ca.gov/2009publications/CAT-1000-2009-003/CAT-1000-2009-003-D.PDF.

East Bay Municipal Utility District (EBMUD), 2010. Alternative Energy Programs: Saving Energy While Keeping Rates Low (draft 2). February.

ENTRIX, Inc., 2010. EBMUD Summit Reservoir Replacement Project Technical Report: Greenhouse Gas Emissions. October. Addendum January 2011.

Governor's Office of Planning and Research, 2008. CEQA and Climate Change: Addressing Climate Change through CEQA Review. Available online at http://opr.ca.gov/index.php?a=ceqa/index.html.

Intergovernmental Panel on Climate Control (IPCC), 1990-2007. IPCC Assessment Reports, Climate Change 1990, 1995, 2001, 2007 (Reports 1-4). Available online at http://www.ipcc.ch/publications_and_data/publications_and_data_reports.htm.

South Coast Air Quality Management District (SCAQMD), 1993 (updates 2008). CEQA Air Quality Handbook. No longer available online pending development of new Air Quality Analysis Guidance Handbook (http://www.aqmd.gov/ceqa/hdbk.html). Emission factors from this reference are included in the technical report (ENTRIX 2010).

The Climate Registry, 2008. The Climate Registry General Reporting Protocol, Version 1.1, Chapter 14. Available online at http://www.theclimateregistry.org/downloads/GRP.pdf.

United Nations Framework Convention on Climate Change, 2010. Glossary of Climate Change Acronyms. Available online at http://unfccc.int/essential_background/glossary/items/3666.php#G.

U.S. Environmental Protection Agency (USEPA), 2010. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008. Available online at http://epa.gov/climatechange/emissions/usinventoryreport.html

3.9 Noise and Vibration

3.9.1 Approach to Analysis

This section discusses the existing noise environment in Contra Costa and Alameda Counties and the Project vicinity, describes applicable regulations, and identifies potential impacts and mitigation measures associated with Project construction. Analyses and conclusions in this section are based on the EBMUD Summit Reservoir Replacement Project Technical Report: Noise (ENTRIX 2010), which described the existing noise environment in the general Project vicinity, detailed local noise regulations and ordinances and their relevance to the Project, analyzed potential short- and long-term noise and vibration impacts from Project sources on nearby receptors, and listed recommended mitigation measures for suppressing and managing noise impacts from demolition, construction, and ongoing operation.

EBMUD explored a range of replacement tank sizes from 3.5 to 5 MG for the Project as different Project alternatives (see Chapter 4). Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the “worst case” construction footprint and potential impacts associated with the replacement tank. The differences in impacts created by the larger 5-MG tank are primarily the construction duration and the tank footprint size. The noise and vibration analyses in this EIR are based on the quantities and construction duration estimated to build a 5-MG tank.

Noise Descriptors

Noise is typically described as any unwanted or objectionable sound. Sound is technically described in terms of the loudness (amplitude) and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Because the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity (A-weighted decibel scale [dBA]). **Table 3.9-1** lists common sources of sound and their intensities in dBA.

TABLE 3.9-1
Typical Sound Level Characteristics

Pressure N/m^2	Level dBA	Sound Level Characteristic
2000	160	Rocket Launch
600	150	Military Jet Plane Takeoff
200	140	Threshold of Pain
60	130	Commercial Jet Plane Takeoff
20	120	Industrial Chipper or Punch Press
6	110	Loud Automobile Horn
2	100	Passing Diesel Truck
0.6	90	Factory - Heavy Manufacturing
0.2	80	Factory - Light Manufacturing
0.06	70	Open Floor Office – Cubicles
0.02	60	Conversational Speech
0.006	50	Private Office – Walled
0.002	40	Residence in Daytime
0.0006	30	Bedroom at Night
0.0002	20	Recording or Broadcasting Studio
0.00006	10	Threshold of Good Hearing – Adult
0.00002	0	Threshold of Excellent Hearing – Child

In most situations, a 3-dBA change in sound pressure is considered a "just-detectable" difference. A 5-dBA change (either louder or quieter) is readily noticeable, and 10-dBA change is a doubling (if louder) or halving (if quieter) of the subjective loudness. Sound from a small localized source (a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates (drops off) at a rate of 6 dBA for each doubling of the distance.

The duration of noise and the time period at which it occurs are important factors in determining the impact of noise on sensitive receptors. A single number called the equivalent continuous noise level (L_{eq}) may be used to describe sound that is changing in level. It is also used to describe the acoustic range of the noise source being measured, which is accomplished through the maximum L_{eq} (L_{max}) and maximum L_{eq} (L_{max}) indicators.

In determining the daily measure of community noise, it is important to account for the difference in human response to daytime and night time noise. Noise is more disturbing at night than during the day, and noise indices have been developed to account for the varying duration of noise events over time as well as community response to them. The Community Noise Level Equivalent (CNEL) adds a 5 dB penalty to the "night time" hourly noise levels (HNLs) (i.e., 7:00 p.m. to 10:00 p.m.) and the Day-Night Average Level (L_{dn}) adds a 10 dB penalty to the evening HNLs.

Vibration

Vibration is a unique form of 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 man-made 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, while a strong earthquake can produce PPVs in the range of 10 inches per second. Minor cosmetic damage to buildings can begin in the range of 0.5 inch per second.

3.9.2 Setting/Regulatory Framework

Existing Noise Environment and Sensitive Receptors

The Project site is located in the City of Berkeley (Alameda County) and the Community of Kensington (unincorporated Contra Costa County) in a residential area, approximately 0.25 mile west of Tilden Park. The primary source of noise at the Project site itself is noise from existing operation of the Project facilities, such as the pumping plant. An additional source of primary noise in the Project vicinity is vehicle traffic by both residents and recreational users of Tilden Park, along with several other nearby recreational facilities shown in Table 3.7-2 in Section 3.7, Air Quality.

Existing noise level data for the Project site and surrounding area were obtained from noise levels measurement data included in both the Contra Costa County General Plan Noise Element (2005) and the City of Berkeley General Plan Environmental Management Element (2001). Based on these local studies, 60 dB L_{dn} was used as the existing ambient daytime background noise level in the Project vicinity for the technical report analyses. In addition, night time ambient background noise levels were assumed to be 10 dB lower, which is typical in urban areas (ENTRIX 2010).

Sensitive Receptors

Some land uses are generally regarded as being more sensitive to noise than others due to the types of population groups or activities involved. Sensitive population groups include children and the elderly. The Contra Costa County General Plan (2005) also includes residential areas as noise-sensitive land uses. Other sensitive land uses generally include hospitals, schools, child care facilities, senior facilities, libraries, churches, and parks.

There are residences adjacent to the Project site on all sides, across the streets on Grizzly Peak Boulevard, Spruce Street, Vassar and Beloit Avenues. Some residential property boundaries are about 50 feet from the Project site fence line (boundary) along Vassar Avenue and about 120 feet from the Project site fence line along Grizzly Peak Boulevard and Beloit Avenue. Spruce Street receptors are about 100 feet from the Project site fence line. Table 3.7-2 in Section 3.7, Air Quality, lists the distance and direction to all residential and non residential receptors within 2 miles of the Project site. Receptors further than 1,300 feet (0.25 mile) from the Project site are unlikely to experience significant amounts of noise due to attenuation by intervening terrain and landscape vegetation.

These receptor zones are at different elevations than the Project site. To the east (Grizzly Peak Boulevard), receptors are about 25 feet down slope from the Project site fence line. On the west and southwest (Vassar Avenue), receptors are about 50 feet down slope from the proposed pumping plant location. Receptors on the north (Beloit Avenue) are about 25 feet up slope from the Project site fence line, while southerly and southeasterly (Spruce Street) receptors are level for all practical purposes. In general, numerous trees are located between the Project site and the receptors on all four sides.

Regulatory Framework

The following paragraphs describe the federal, state, and local agencies and the laws and regulations governing noise. Government Code 53091(d) states: "(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency." In instances where this statute applies, it is the practice of EBMUD to work with host jurisdictions and agencies during Project planning to consider the local environmental protection measures and to conform to local policies to the extent possible.

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 CCR has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure.

<u>California Department of Transportation)</u> - Construction vibration is regulated at the state level in accordance with standards established by the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans 2004). Continuous sources include the use of vibratory compaction equipment and other construction equipment that creates vibration other than in single events. Transient sources create a single

isolated vibration event, such as blasting. Thresholds for continuous sources are 0.5 and 0.1 inch per second PPV for structural damage and annoyance, respectively. Thresholds for transient sources are 1.0 and 0.9 PPV for structural damage and annoyance, respectively.

Local

Contra Costa County General Plan - Noise standards within unincorporated Contra Costa County are set forth in the Noise Element of the Contra Costa County General Plan 2005–2020. This element contains goals and policies to reduce or eliminate the effects of excessive noise in the community. Policy 11-8 of the Noise Element specifies that construction should be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods.

The General Plan also specifies that noise levels in residential areas are normally acceptable up to 60 dBA and conditionally acceptable up to 70 dBA. However, Contra Costa County does not have a quantitative noise ordinance.

City of Berkeley General Plan - The City of Berkeley General Plan (2001) does not contain a Noise Element, but instead incorporates noise policies and actions into the Environmental Management Element. Policy EM-47 seeks to eliminate existing noise problems and prevent significant future degradation of the acoustic environment. Policy EM-48 seeks to reduce local and regional traffic, “which is the single largest source of unacceptable noise in the City.” Policy EM-49 states that the City will “require operational limitations and all feasible noise buffering for new commercial, industrial, institutional, or recreational uses that generates significant noise impacts near residential uses.”

City of Berkeley Municipal Code - The City of Berkeley Municipal Code, Chapter 13.40, Community Noise, establishes level limits for developed lands within the City of Berkeley that are subject to the regulations. With respect to daytime activities in residential areas, the L50 limits range from 55 dBA to 60 dBA during the hours between 7:00 a.m. and 10:00 p.m. The noise ordinance specifically regulates construction and demolition noise. According to Section 13.40.070, construction activities between 7:00 p.m. and 7:00 a.m. would violate the ordinance, except for emergency work of public service utilities or by obtaining a variance. The ordinance also requires that where technically and economically feasible, construction activities 10 days or longer shall be conducted in such a manner that the maximum sound levels at affected property levels (land uses) not exceed those listed in **Table 3.9-2**.

TABLE 3.9-2
Maximum Not-to-Exceed Sound Levels from Stationary Equipment

	Single and Two-Family Residential	Multi-Family Residential
Weekdays 7:00 a.m. to 7:00 p.m.	60 dBA	65 dBA
Weekends 9:00 a.m. to 8:00 p.m. and legal holidays	50 dBA	55 dBA

Note: Stationary equipment refers to repetitively scheduled and relatively long term operation (period of 10 days or more).

The City's Noise Ordinance sets limits for permissible noise levels during the day and night according to the area's zoning. The Project site is located in an R1 zone, Single Family Residential, and the daytime noise limitations described above apply to non-exempt projects. Since no work is planned for night hours, night time noise standards do not apply regardless of exemption status.

Section 13.040.070 of the City of Berkeley Noise Ordinance also regulates vibration, which prohibits operating or permitting the operation of any device that creates a vibration that annoys or disturbs at least two or more reasonable persons of normal sensitiveness who reside in separate residences.

3.9.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses the following standards of significance as based on CEQA Guidelines Appendix G. Would the project:

- 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?
- Expose persons to or generate excessive ground borne vibration or ground borne noise levels?
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Impacts and Mitigation Measures

Impact 3.9-1: The 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.

Construction Noise

Construction activity would contribute to increased noise in the Project vicinity with the use of stationary and mobile equipment and vehicles. The Project site is located in a single-family residential area which would be subjected to elevated daytime noise levels during construction. Table 2-2 in Chapter 2, Project Description, lists the equipment that would likely be used during each construction phase along with the estimated length of the construction phase. The technical report includes a table that shows typical reference noise levels generated by construction equipment proposed for use during the Project (ENTRIX 2010).

In addition to construction equipment and vehicle noise, EBMUD would use temporary equipment to perform the reservoir outage for construction of the new facilities. A temporary flow control valve would only be used to access water from Woods Reservoir for fire flows and emergency situations during the reservoir outage. Therefore, noise associated with operating this facility would be minimal, if noticeable at all. Further, the temporary flow control valve would be housed inside a small enclosure for security, which would also serve to attenuate noise if operation became necessary during construction and the outage.

The existing Woods and Shasta Pumping Plants are located on the site, and sit below the existing reservoir at the base of the vehicle access road on the southwest (downstream) side of the reservoir embankment. Located in a single pump house, the two pumping plants were built in the late 1930s and mid-1940s. In the 1960s, additional pumps were added for the Shasta Pumping Plant and located in a pit outside the existing pump house. The existing pump house and pump pit are screened from view by a dense growth of redwood trees. Noise levels associated with the temporary flow control valve would be similar to but likely less than that of the existing exposed pumps installed in the outdoor pit.

For the analysis, a worst-case scenario was used to identify and assess potential environmental impacts. Construction would occur in numerous stages over the course of the planned work and each stage would have a unique combination of construction equipment operating. Based on the noise levels for typical construction equipment shown in the technical report, the loudest pieces of equipment used at the site would be the hoe ram and the concrete recycler, at 90 dBA at 50 feet (ENTRIX 2010). The hoe ram would be used during two phases of construction while the concrete recycler would be used during a single phase. The next loudest piece of equipment would be the wood chipper at 87 dBA at 50 feet. The wood chipper would be used during the initial necessary tree removal phase of construction. During other phases of construction, the loudest pieces of equipment would produce noise levels of 85 dBA at 50 feet.

In addition to the noise levels for each piece of equipment, for the construction phases expected to be the noisiest (Demolition/Recycling and Grading/Excavation) calculations were performed to determine the noise level for the combination of equipment used simultaneously to represent the estimated worst-case scenario at the fence line of the Project site. These results are presented in **Table 3.9-3.**

TABLE 3.9-3
Construction Equipment Maximum Combined Noise Levels
(On Site L_{max})

Phase	Equipment	Estimated Maximum Fence line Noise Level (dBA)
Demolition/Recycling	Dozer, Excavator, Crane, Hoe Ram, Front End Loader, Concrete Saw/Grinder/Recycler, Air Compressor, Haul/Water/Materials Trucks, Street Sweeper	87
Grading/ Excavation	Dozer, Excavator, Crane, Hoe Ram, Vibratory Soil Compactor, Front End Loader, Chain Saw, Concrete Saw, Haul/Water/Materials Trucks, Street Sweeper	87

Source: ENTRIX 2010.

For this analysis, interference with daytime activities is based upon criteria outlined in the Noise Element of the Contra Costa County General Plan and the City of Berkeley General Plan and Municipal Code.

As previously described, there are residences adjacent to the Project site on all sides that vary in distance and elevation from the Project site fence line. Since the Project site would be used for construction staging, which would encompass most of the Project site, construction activity was assumed to extend to the Project boundaries (fence line), again to represent a worst-case scenario.

As discussed in Chapter 2, Project Description, construction would occur during daytime hours (between 7:00 a.m. and 6:00 p.m.), Monday through Friday, with after hours or weekend construction activity limited to unplanned/unexpected occurrences or critical shutdowns approved by EBMUD staff (i.e., emergencies). This schedule is compliant with the time restrictions specified by Contra Costa County and the City of Berkeley. Per EBMUD specifications, work in excess of eight hours per day, on Saturdays, on Sundays, or on EBMUD holidays requires prior consent of EBMUD and is subject to Cost of Overtime Construction Inspection.

During both the Demolition/Recycling and Excavation/Grading phases of construction (up to 20 weeks and 8 weeks, respectively) maximum daytime noise levels at adjacent receptors could be up to:

- Project Site Fence line (all sources simultaneously) – 87 dBA L_{max} or 81 dBA L_{eq}
- Grizzly Peak Boulevard (120 feet lateral, -25 feet vertical) – 78 dBA L_{max} or 72 dBA L_{eq}
- Spruce Street (100 feet lateral, -5 feet vertical) – 82 dBA L_{max} or 76 dBA L_{eq}
- Vassar Avenue (50 feet lateral, -25 feet vertical) – 81 dBA L_{max} or 75 dBA L_{eq}
- Beloit Avenue (120 feet lateral, +25 feet vertical) – 81 dBA L_{max} or 75 dBA L_{eq}

In all of the above determinations, L_{eq} is 6 dBA lower than L_{max}, so the perceived average sound level is half of the maximum at any given receptor. However, depending on actual acoustic conditions, the Contra Costa County and City of Berkeley L_{max} standards may still be exceeded and therefore would be significant and unavoidable.

A natural mitigating factor for noise is the presence of mature perimeter trees and vegetation and topography which would shield many receptors from line-of-sight noise transmission from construction activities, particularly receptors at lower elevations than the Project site. Because the analysis used to arrive at the above estimates conservatively implements (understates) attenuation factors related to vegetation and topography, actual noise levels at receptors would likely be lower than estimated above, as actual attenuation would be greater than assumed. The technical report contains calculations of the above values (ENTRIX 2010).

Construction activity would also require haul truck and construction vehicle and equipment traffic (collectively known as truck traffic). Truck noise levels 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, truck noise is mainly a single event disturbance; although the hourly average associated with short, single events is not very high, individual noise peaks of up to 91 dBA at 50 feet can occur during a single truck passage. 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.

It is important to note that truck volumes would vary from day to day, and by construction phase. Analyses contained in the technical report estimated the maximum volumes per construction phase, which would be most concentrated during the demolition phase (ENTRIX 2010). As an R1 zone, the neighborhood surrounding the Project site is considered a relatively quiet environment. As such, construction-related truck volumes may be noticeable on the residential streets in the Project vicinity (generally average L_{eq} of 50 to 60 dBA), since even one truck per hour may be noticeable.

The noise levels for construction equipment, either as a single piece of equipment or operating simultaneously, as well as truck traffic would result in levels that are above the limits set by Contra Costa County and the City of Berkeley. This equipment would expose persons to and generate noise levels in excess of standards established in the local general plan or noise ordinance. As such, construction activity associated with the Project would result in a significant noise impact on sensitive receptors. Implementation of Mitigation Measure 3.9-1a would reduce noise levels generated during the operation of construction equipment and would ensure that construction would take place in the daylight hours, in compliance with the Contra Costa County and City of Berkeley noise requirements that exempt construction noise. Mitigation Measures 3.9-1b, 3.9-1c, and 3.9-1d would reduce impacts from truck traffic noise. Mitigation Measure 3.9-1e would be implemented in response to monitored and documented noise impacts at a sensitive receptor and would help reduce impacts on a case-by-case basis.

Measure 3.9-1a: During construction, EBMUD and its construction contractor will implement the following measures to reduce noise levels:

- The construction contractor(s) will limit on-site construction work to daytime hours between 7:00 a.m. and 6:00 p.m., Monday through Friday as feasible, except during critical water service outages, other emergencies, and special situations such as concrete pours which must be performed continuously without stopping until finished. This is more restrictive than the City of Berkeley weekday criteria of 7:00 a.m. to 7:00 p.m. and consistent with Contra Costa County noise requirements.
- Noise-generating activities greater than 90 dBA [impact construction including hoe rams, concrete recycling activities (concrete breakup, pulverizing, separation, crushing)] would be limited to between 8:00 a.m. and 4:00 p.m., Monday through Friday, and would 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 (demolition, concrete recycling) when noise is expected to exceed 90 dBA.
- For construction work in EBMUD right-of-ways, homeowners immediately adjacent to the right-of-way will be contacted prior to right-of-way construction work to establish preferred work hours within the 7:00 a.m. to 6:00 p.m., Monday through Friday work hours established for the Project construction.
- The construction contractor(s) will responsibly use best available noise control techniques (including mufflers, intake silencers, extension ducts, engine enclosures, and acoustically attenuating shields or shrouds) for all equipment and trucks, as practical.
- If impact equipment (e.g., jackhammer) is used during demolition or construction activities, the construction contractor(s) will use hydraulically or electrically powered equipment wherever practical to avoid the noise associated with compressed-air exhaust from pneumatically powered

tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed-air exhaust will be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves will be used, where feasible, which could achieve a reduction of 5 dB. Quieter procedures, such as drilling rather than impact equipment, will be used whenever practical.

- The construction contractor(s) will strive to locate temporary stationary noise sources (e.g., chippers, grinders, compressors) as far from sensitive receptors as possible and practicable and within the specified construction time limits previously noted. If they must be located near receptors, the construction contractor(s) will use adequate exhaust muffling and other noise dampening techniques as feasible.
- As practicable, the construction contractor(s) will locate material stockpiles, maintenance/equipment staging, and parking areas as far as possible from residential receptors.

Measure 3.9-1b: EBMUD and/or its construction contractor(s) will notify all property owners and tenants within 300 feet of the edge of the construction right-of-way and along the haul route at least 2 weeks in advance of construction. Property owners and tenants will be notified by first class mail and signage placed at the site.

Measure 3.9-1c: Consistent with the on-site work, construction contractor(s) will limit haul truck trips through residential areas to or from Project sites to the hours of 7:00 a.m. until 6:00 p.m., Monday through Friday, with exceptions as noted in Mitigation Measure 3.6-2 for concrete pours and delivery of oversized vehicles/equipment, which will require earlier start times (6:30 a.m. for up to twelve times over the construction period.) Thus, truck noise will have little or no contribution to the CNEL during the more sensitive evening and nighttime hours. Truck routes used during construction activities will vary from local residential streets with quiet noise environments to arterials with moderately noisy environments. In most cases, off-hauling of non-recyclable demolition debris from the site will require haul trucks to travel to and from the site along local residential streets to regional highways and freeways.

Measure 3.9-1d: EBMUD will designate a Community Affairs contact for responding to construction-related issues, including noise. The EBMUD Community Affairs direct telephone and e-mail address will be conspicuously posted at construction areas and on all advanced notifications. Community Affairs staff will take steps to resolve complaints, including coordinating periodic noise monitoring, if necessary.

Measure 3.9-1e: On a case-by-case basis in response to monitored and documented noise impacts at a receptor, EBMUD will propose noise abatement techniques specifically configured for that receptor such as sound absorbing materials, sound reflective materials, sound transmission inhibiting materials, or combinations thereof. Implementation of any such noise abatement techniques at the receptor will be at EBMUD's discretion.

While overall impacts on the ambient noise environment would be reduced with implementation of Mitigation Measures 3.9-1a through 3.9-1e, some temporary impacts would remain significant due to the proximity to the nearest residential receptors as well as those receptors listed in Table 3.7-2 in Section 3.7, Air Quality, which are specifically along the haul truck routes.

Significance after Mitigation: Significant and Unavoidable during portions of the construction period.

Operational Noise

Permanent operational impacts would include long-term noise levels and vibration levels associated with the operation and maintenance of Project facilities once construction is complete. Noise levels associated with Project operation would be subject to the maximum noise levels in Table 3.9-2, while vibration levels would be subject to the City of Berkeley and Contra Costa County standards described above.

Potential sources of noise and vibration during operation include working equipment such as pumps, a pad-mounted transformer adjacent to the pump house, a flow control valve inside the pump house, and maintenance activity including vehicles accessing the site, landscaping, etc. Impacts are determined based on the expected change in noise levels resulting from operation and maintenance of the Project compared with existing conditions and activities at the site. However, the presence of mature perimeter trees and vegetation and topography would shield many receptors from line-of-sight noise transmitted from new facilities which are interior to the Project site, serving as natural mitigation.

As described in Chapter 2, Project Description, the Project includes replacement of the existing Woods and Shasta Pumping Plants and a new flow control valve. The two pumping plants, presently located in a single structure below the southwestern embankment of the existing reservoir, would be combined into a single facility at a slightly lower elevation. Because some of the existing pumps are housed in an outdoor concrete-lined pit, emitted noise is not presently attenuated by any type of enclosure or shielding.

The new facility would be quieter because all pumps would be inside a new pump house structure, which typically attenuates noise by at least 15 dBA at the source, sometimes as much as 20 dBA. In addition, energy requirements would remain about the same, and newer, quieter, mechanical equipment would be consolidated and installed inside a building, which would reduce noise overall. The new flow control valve would also be installed inside the new pump house to attenuate intermittent noise. If feasible, the pump house interior may be lined with acoustic material to enhance absorption of pump motor and flow control valve noise. No enclosure would be necessary for the transformer since it would not emit sufficient noise (i.e., low-volume 60 H_z hum) to affect sensitive receptors at their respective distances from the new facility.

On the northeast side of Vassar Avenue there are residential receptors about 200 feet from the proposed pumping plant location at about 50 feet lower elevation. During facility operation, outside noise levels at adjacent receptors would be about 60 dBA during the daytime and about 50 dBA at night, taking into account existing noise levels of 60 dB L_{DN}, as described in the "Existing Noise Environment" section. Since existing noise would essentially mask the attenuated noise from the pumping plant, there would be no impact on receptors during facility operation, and the pumping plant would not be audible to most persons. The background 60 dB L_{dn} would be maintained regardless of pumping plant operation. Calculations based on EBMUD reference value measurements can be found in the technical report (ENTRIX 2010).

The City of Berkeley Municipal Code, Chapter 13.40, Community Noise, specifies L_{50} limits ranging from 55 dBA to 60 dBA during the hours between daytime (7:00 a.m. and to 10:00 p.m.) and 45 dBA to 55 dBA during the night time (10:00 p.m. to 7:00 a.m.). Thus, attenuated pumping plant noise would not contribute to exceedances of these limits and any minor increase would be minimal. Therefore, there would be no impact and no additional mitigation measures would be required.

Maintenance activity that would result in noise would include vehicles accessing the site, and maintenance activities such as landscaping, as well as potential deliveries to the site. None of these sources would be expected to result in increased noise levels perceptible over existing vehicle traffic, delivery trucks, and residential landscaping in the Project vicinity. Additionally, Project operation would not expose persons to or generate noise levels in excess of standards established in the local general plans or noise ordinance. Therefore, impacts would be less than significant and no mitigation measures would be required.

Mitigation Measure: None Required.

Impact 3.9-2: The Project would expose persons to or generate excessive ground borne vibration or ground borne noise levels.

Construction Vibration

Project construction activities would generate vibration within the Project Area due to use of heavy equipment, including haul trucks. Equipment with the highest vibration level during construction would be a vibratory roller used during the Site Restoration Phase towards the end of construction, with 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 hoe ram, both of which have a reference PPV value of 0.089 inch per second at a distance of 25 feet. Vibration levels were calculated for the nearest receptors based on the distance to the receptor and the reference PPV values and determined on a worst-case basis for the vibratory equipment. Ground borne vibration levels would be significant if they exceeded a PPV of 0.5 inch per second which risks minor cosmetic damage to structures and annoyance to receptors.

The technical report contains the vibratory levels expected for Project construction activities at the nearest residential sensitive receptors. These levels are based on the reference PPV value and the distance. Levels would slightly exceed vibration standards for annoyance if a vibratory roller was used at the perimeter of the Project site boundary across from residences along Grizzly Peak Boulevard, Spruce Street, and Beloit Avenue. Use of the vibratory roller across from these residences would not exceed structural damage standards, and use of other construction equipment would not exceed any vibration standards. All other equipment proposed for construction would have a lower vibration level and impacts would be less than significant, including at the closest receptor listed in Table 3.7-2 in Section 3.7, Air Quality (namely, Shepherd of the Hills Church).

> **Measure 3.9-2**: EBMUD and/or its construction contractor(s) will limit the closest distance at which a vibratory roller can operate from a residence. EBMUD and/or its construction contractor(s) will not operate vibratory rollers closer than 55 feet from any residence without conducting real-time vibration monitoring through an independent consultant — in a manner similar to road construction projects — at the receptor boundary (easement line) to ensure that the 0.5 inch per second PPV threshold is not exceeded (Caltrans 2004). Corrective actions will be taken if needed, including:

- Modify vibratory roller, bulldozer, and hoe ram operations along Grizzly Peak Boulevard, Spruce Street, and Beloit Avenue residences to reduce dynamic energy imparted into the ground (i.e., operate the equipment more slowly, or use less dynamic equipment to move material);
- Reduce truck speeds in the vicinity of nearby residences; and
- Smooth the truck route surface in the vicinity of nearby residences.
- Use of vibratory roller equipment 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.
- To prevent cosmetic or structural damage to structures adjacent to EBMUD’s right-of-way, EBMUD will incorporate into contract specifications restrictions on equipment operation, whereby surface vibration will be limited to no more than 0.5 in/sec PPV, measured at the nearest residential structures. EBMUD will also monitor for excessive vibration if pipe bursting activities occur immediately adjacent to the residences at 421 and 417 Vassar. If vibration levels are found to exceed the 0.5 in/sec PPV threshold, construction will be halted immediately and alternative construction methods will be implemented to maintain vibration levels below this threshold.

- When pipe bursting is used within EBMUD's right-of-way and a structure is within 10 feet of the pipe bursting operation EBMUD construction specifications will require the contractor to excavate around the pipe to reduce contact with the surrounding ground and avoid impacts related to soil movement and vibration.
- With permission of homeowners, EBMUD will conduct a preconstruction survey of homes, other sensitive structures, hardscaping, hillsides, and slide areas adjacent to EBMUD's right-of-way for potential effects due to vibration-generating activities. EBMUD will respond to any claims by inspecting the affected property promptly, but in no case more than five working days after the claim was filed. Any new cracks or other changes in structures will be compared to preconstruction conditions and a determination made as to whether the proposed Project could have caused such damage. In the event that the Project is demonstrated to have caused the damage, EBMUD will have the damage repaired to the pre-existing condition.

Implementation of Mitigation Measure 3.9-2 would reduce exposure of noise-sensitive land uses to generation of excessive ground vibration due to construction and hauling activities and impacts would be less than significant.

Significance after Mitigation: Less than Significant.

Operational Vibration

During Project operation, facility maintenance and mechanical equipment operation may result in ground borne noise and vibration in the Project vicinity. Most sources would include maintenance or delivery trucks. None of these sources would be expected to exceed any vibration standards and impacts would be less than significant. Operational vibration would also be reduced with implementation of Mitigation Measure 3.9-2.

Significance after Mitigation: Less than Significant.

Impact 3.9-3: The Project would result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.

Construction Noise

Construction activity would be temporary and therefore 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 3.9-1), therefore no additional mitigation measures would be required.

Operational Noise

As discussed under Impact 3.9-1, during Project operation, facility operation and maintenance of the mechanical equipment would result in a less-than-significant increase in noise in the Project vicinity, and operational noise emanating from the new facility is expected to be less than from the present facility since all new pumps and the new flow control valve would be located within the new pump house. Therefore, no additional mitigation measures would be required.

Mitigation Measures: None Required**.**

Impact 3.9-4: The Project would result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.

Construction Noise

As detailed in Impact 3.9-1, construction activity would contribute to increased daytime (i.e., 7:00 a.m. to 6:00 p.m. weekdays) noise levels in the Project vicinity due to the use of stationary and mobile equipment powered by diesel engines. This noise increase would be temporary and intermittent in nature, and would cease upon completion of Project construction.

Implementation of Mitigation Measures 3.9-1a through 3.9-1e as outlined above would reduce noise impacts during construction. However, those impacts would remain significant and unavoidable during construction due to the proximity to the nearest residential receptors as well as those receptors listed in Table 3.7-2 in Section 3.7, Air Quality, which are specifically located along the haul truck route.

Significance after Mitigation: Significant and Unavoidable during portions of the construction period.

Operational Noise

Noise from operation and maintenance of permanent facilities at the site would not result in significant increases over existing noise levels in the vicinity of the facility, and operational noise levels would be less than existing due to improved design of the pumping plant. See analysis of less than significant long-term impacts from operational activity under Impact 3.9-1.

Mitigation Measure: None Required.

References

Broch, Jens, 1971. Acoustic Noise Measurements. Bruel & Kjaer.

California Department of Transportation (Caltrans), 2004. Transportation and Construction-Induced Vibration Guidance Manual. Available online at http://www.dot.ca.gov/hq/env/noise/pub/vibrationmanFINAL.pdf.

City of Berkeley. City of Berkeley General Plan, Environmental Management Element, 2001. Available online at http://www.ci.berkeley.ca.us/contentdisplay.aspx?id=478.

Contra Costa County. Contra Costa County General Plan 2005-2020, Noise Element, 2005. Available online at: http://www.co.contra-costa.ca.us/depart/cd/current/advance/GeneralPlan/CCCGeneralPlan.pdf.

ENTRIX, Inc., October, 2010. EBMUD Summit Reservoir Replacement Project Technical Report: Noise.

Plog, Barbara, Ed., 1988. Fundamentals of Industrial Hygiene - 3rd Edition. National Safety Council.

3.10 Hydrology/Water Quality

3.10.1 Approach to Analysis

This section analyzes the Project's potential impacts on Hydrology and Water Quality. The setting describes the existing conditions of the Project site and vicinity. Project-specific impacts are identified, if any, and appropriate mitigation measures are recommended to reduce impacts to less than significant. This section is based on information and analyses contained in the EBMUD Summit Reservoir Replacement Project Technical Report: Hydrology/Water Quality (ENTRIX 2010).

The Technical Report analyzed stormwater runoff from new impervious surfaces, drainage area characteristics, hydrograph transformation, hydrologic water balance, changes in groundwater recharge, and water quality from pollutant loads. It predicted changes in peak flow and volume runoff, and recommended mitigation measures to reduce impacts from hydrologic changes to the site.

Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the "worst case" construction footprint and potential impacts associated with the replacement tank.

3.10.2 Setting

Hydrology

Climate

The Project site and vicinity has a Mediterranean climate with mild winters and hot dry summers. Cool waters of the Pacific Ocean and San Francisco Bay moderate summer- and wintertime temperatures. In the East Bay area for example, average temperatures generally range between 50 and 66°F.

Precipitation varies greatly across Contra Costa and Alameda Counties. According to Contra Costa County Public Works Department precipitation records, the annual average precipitation along the Berkeley Hills is 25 inches (Contra Costa County Flood Control and Water Conservation District [CCCFCWCD] 1977). According to the National Climatic Data Center precipitation data for the Berkeley gage (#040693) located at UC Berkeley, the maximum rainfall for a single year has been 39 inches, with a minimum annual rainfall of 10 inches. Data are available from 1931 to the present. The average annual rainfall at the gage location (310 feet above mean sea level) is 21.4 inches. In terms of total rainfall by storm event, the maximum amount of rainfall in a 24-hour period has been 6.98 inches. The total for a 6-hour storm event has been 2.74 inches (National Climatic Data Center 2010).

Local Drainage and Surface Water Bodies

The Project site drains to two separate watersheds and creek systems: Wildcat Creek to the east and Cerrito Creek to the west. The drain to the east is a 16-inch-diameter storm drain and is currently designed to handle the existing 7-acre roof drainage and the northern and eastern perimeter road drainage. The drain to the east leads from the existing reservoir spillway at the reservoir's southeastern corner to a manhole on Canon Drive, eventually discharging to Wildcat Creek in Tilden Park. The drain to the west is a 6-inch-diameter storm drain and collects a small amount of runoff from the west-side perimeter road and part of the reservoir roof, the reservoir subdrain, shallow subsurface water from a French drain at the property's edge, as well as floor drains from the existing pump and valve housing. Currently, the reservoir subdrain discharges about 2.5 gallons per minute, or 0.006 cubic feet per second (cfs), to the Vassar Avenue storm drain system. The west-side drain connects to the City of Berkeley's storm drain system below Vassar Avenue.

The Project would reduce the amount of impervious surface by replacing the existing 7-acre reservoir tar-and-gravel roof with a smaller 0.55-acre concrete tank, new pump house, and paved access areas, with the remainder converted to open space. The new site drainage goal is to maintain existing drainage patterns in such a way as to not increase peak flows and runoff volumes, or impact water quality. For hydrology and water quality, the key physical characteristics include the catchment area and the amount of impervious surfaces.

The total amount of impervious surfaces on site is currently 8.2 acres, consisting of a 7-acre rooftop, and 1.2 acres for the entrance, perimeter road, existing pump house, and access pavement. The Project would reduce the impervious surfaces to approximately 5.2 acres (Table 3.10-1). Of the existing impervious surfaces, 1 acre would remain unchanged and 3.3 acres of existing concrete lining would be left in place but covered with soil and planted. For purposes of this analysis, the covered existing concrete lining was treated as impervious surface. Approximately 3.9 acres of existing impervious surface would be removed and 0.9 acre would be added back as new impervious surface. Overall, 1.9 acres of impervious surface would be exposed.

TABLE 3.10-1
Summary of Modified and New Impervious Surfaces

Proposed Conditions	Acres	Percentage of Existing 8.2 Acres	Comments
IMP area not modified	1.0	13	Perimeter road, entrance, existing pump house, and access paving
Concrete lining left in place	3.3	40	Remains onsite, but covered with soil and planted
Total replaced IMP surface	0.9	11	New pump house, access pavement, and tank roof
Total on-site IMP surface	5.2	63	Old plus new IMP
Area of existing IMP surface removed	3.9	48	Old IMP surface area removed from site
Total Exposed IMP Surface	**1.9**	**23**	**Not including covered concrete lining**

Source: ENTRIX 2010
IMP = Impervious or imperviousness

Surface Water Bodies

Wildcat Creek

The Wildcat Creek watershed drains 6,848 acres. The upper watershed is Wildcat Canyon within the East Bay Regional Park District lands. The lower watershed enters the alluvial plain at Alvarado Park in the City of Richmond. Wildcat Creek then flows through San Pablo and Richmond to San Francisco Bay. The Project site drains to Wildcat Creek via a small side tributary.

Cerrito Creek

The Cerrito Creek watershed drains 2,200 acres originating from the Berkeley Hills and travels 2.5 miles through El Cerrito and then to San Francisco Bay. Currently, the creek marks part of the boundary between Alameda County and Contra Costa County. Cerrito Creek is believed to originate above the 800-foot-mean-sea-level elevation somewhere near the Project site. Although most of the drainage system is enclosed in a pipe, a portion of the creek channel downstream from the Project is natural and potentially susceptible to changes in watershed runoff quality and quantity. No creek channel exists on-site.

San Francisco Bay

San Francisco Bay is the largest bay/estuary on the West Coast of the United States. The estuary is approximately 1,600 square miles in area, and ranges from 3 to 12 miles east-to-west and between 48 and 60 miles north-to-south. The Bay is a shallow estuary receiving most of its water from the Sacramento and San Joaquin rivers of the great Central Valley, draining from the Sierra Nevada Mountains to the Pacific Ocean. Both rivers flow into Suisun Bay, which flows through San Pablo Bay and then to San Francisco Bay. Many small rivers and streams also convey fresh water to the Bay, including Wildcat Creek and Cerrito Creek. Flows in the region are highly seasonal, with more than 90 percent of the annual runoff occurring during the winter rainy season between October and April. Many streams go dry during the middle or late summer. The rate and timing of these flows are important factors influencing physical, chemical, and biological conditions in the estuary.

Because of the dynamic conditions of fresh and saline waters, the Bay supports a diverse and productive ecosystem. Within each section of the Bay, lie deepwater areas that are adjacent to large expanses of very shallow water. These factors greatly increase the number of species that live in the estuary and enhance its biological stability. The Bay's deepwater channels, tidelands, marshlands, freshwater streams, and rivers provide a wide variety of habitats that have become increasingly vital to the survival of several plant and animal species. These areas sustain rich communities of crabs, clams, fish, birds, and other aquatic life and serve both as important wintering sites for migrating waterfowl and as spawning areas for anadromous fish. Because of its unique characteristics, the San Francisco Bay estuarine system merits special protection.

Water Quality

Past studies have identified urban runoff as a major contributor to the degradation of urban streams and rivers. The quality of runoff varies depending on local conditions, such as hydrology, soils, land use, season, and timing and duration of storm events. Pollutants of concern generally include heavy metals, sediments, petroleum hydrocarbons, pathogens, pesticides, nutrients, dissolved oxygen, ammonia, and trash. It has been known for many years that the vast majority of stormwater toxicants and many of the conventional pollutants are associated with automobile use and maintenance activities. Some pollutants originate from vehicle emissions and atmospheric deposition. Polycyclic aromatic hydrocarbons are products of internal combustion engines; heavy metals, such as copper, originate from vehicle brake pads, zinc from vehicle tire wear and roofing materials, and mercury from atmospheric deposition. These pollutants can be deposited on paved surfaces, rooftops, and other impervious surfaces as fine airborne particles. Urban landscaping, another source of pollutants, can include vegetation, litter, fertilizers, and pesticides.

Impervious surfaces can contribute the most runoff and a large percentage of the pollutants during small to moderate sized storms. Streets, parking areas, and rooftops collect atmospheric fallout and vehicle emissions, which are directly connected to storm drains and water bodies. Pervious surfaces can contribute pollutants during large storms when infiltration capacity is exceeded.

The relative importance of the different source areas is a function of area characteristics, pollutant washoff potential, and rainfall characteristics.

Regulatory Framework

The following section summarizes key federal, state, and local regulations and associated requirements governing water quality and hydrologic management for projects in the San Francisco Bay region. Government Code 53091(d) states: "(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency." In instances where this statute applies, it is the practice of EBMUD to work with host jurisdictions and agencies during Project planning to consider the local environmental protection measures and to conform to local policies to the extent possible.

Federal

Clean Water Act - The Clean Water Act (CWA) is 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 USEPA authority to implement pollution control programs. The USEPA has delegated authority to California.

In 1972, the CWA was amended to require NPDES permits for the discharge of pollutants to waters of the United States from any point source. In 1987, the CWA was amended to require the USEPA to establish regulations for permitting municipal and industrial stormwater discharges under the NPDES program. The USEPA published final regulations on November 16, 1990. In 2009, California adopted the General Construction Permit for regulating stormwater discharges and controlling erosion on construction sites.

The CWA requires the State of California to adopt water quality standards for receiving water bodies and to have those standards approved by the USEPA. Water quality standards consist of designated beneficial uses for select water bodies. Water quality criteria are prescribed concentrations of constituents or narrative statements that represent the quality of water legally required to support beneficial uses. Beneficial uses and criteria are described in the RWQCB's San Francisco Bay Basin Water Quality Control Plan (Basin Plan).

CWA Section 303(d) requires the State of California to develop a list of water quality-impaired segments of waterways. The list includes waters that do not meet water quality standards necessary to support the 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 (CWA 2007).

State

California Porter-Cologne Act - The Porter-Cologne Water Quality Control Act is California's statutory authority for protecting water quality. Under this act, the State of California must adopt water quality policies, plans, and objectives protecting California's waters for the use and enjoyment of people. Obligations of the State Water Resources Control Board (SWRCB) and RWQCB to adopt and periodically update their Basin Plans are set forth in the act. A Basin Plan identifies the designated beneficial uses for specific surface water and groundwater resources, applicable water quality objectives necessary to support the beneficial uses, and implementation programs that are established to maintain and protect water quality from degradation for each of the RWQCBs.

This act also requires waste dischargers to notify the RWQCBs of their activities through filing reports of waste discharge, and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements, NPDES permits, Section 401 water quality certifications, or other approvals. The Basin Plan regulates waters of the state located within the study area (SFBRWQCB 2007).

2007 Water Quality Control Plan - The Basin Plan is the 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 RWQCB finds stormwater discharges from urban areas in the San Francisco 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 RWQCB found that 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 (RWQCB 2006).

Basin Plan and Beneficial Uses - The Basin Plan designates beneficial uses and water quality objectives for water bodies. Numeric water quality objectives are provided for the larger water bodies within the region. The Basin Plan provides beneficial uses for San Francisco Bay as well as Wildcat Creek, but does not state beneficial uses for Cerrito Creek. However, the Basin Plan indicates that the beneficial uses of any specifically identified water body generally apply to its tributary streams (RWQCB 2007).

Regional and Local

The San Francisco Estuary Project - The San Francisco Estuary Project produced a revised Comprehensive Conservation and Management Plan (CCMP) in August 2007 for the preservation, restoration, and enhancement of the San Francisco Bay-Delta Estuary (San Francisco Estuary Project 2007). The CCMP includes recommended actions for aquatic resources, wildlife, wetlands, water use, pollution prevention and reduction, dredging, and waterways. The recommended actions of interest include the following:

- Implement a comprehensive strategy to reduce pesticides entering the estuary.
- Develop and implement programs to prevent pollutants like trash, bacteria, sediments, and nutrients.
- Improve the management and control of urban runoff from public and private sources.
- Local General Plans should incorporate watershed protection goals for wetlands and stream environments and to reduce pollutants in runoff.
- Provide incentives and promote the use of building, planning, and maintenance guidelines for site planning and implementation of best management practices related to stormwater.
- Continue and enhance training and certification for planners, public works departments, consultants, and builders on sustainable design and building practices with the goal of preventing or minimizing alteration of watershed functions (e.g., floodwater conveyance, groundwater infiltration, stream channel and floodplain maintenance), and preventing construction-related erosion and post-construction pollution.

Municipal Regional Stormwater Permit - In October 2009, the RWQCB adopted Order No. R2-2009-0074, the Municipal Regional Stormwater NPDES Permit, No. CAS612008 (RWQCB 2009). This regional permit includes the counties of Contra Costa and Alameda, as well as the cities of El Cerrito and Berkeley. The regional permit initially describes receiving water limitations that are in common to each of the stormwater management programs. The pertinent section of interest is Provision C.3 New Development and Redevelopment. The permit includes Attachment B that describes the limitations that are program specific (RWQCB 2009).

Provision the C.3 goal 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.

3.10.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses the following standards of significance based on CEQA Guidelines Appendix G. Would the project:

- Violate Regional Water Quality Control Board water quality standards or waste discharge requirements?
- Substantially alter the existing drainage pattern of the site 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?
- Substantially alter the existing drainage pattern of the site, including through the alteration of the course of a stream or river (and/or infiltration to groundwater), or substantially increase the rate or amount of surface runoff (and/or groundwater recharge) in a manner that would result in flooding on- or off-site?
- Otherwise substantially degrade water quality?

Impacts and Mitigation Measures

Impact 3.10-1: The Project would violate RWQCB water quality standards or waste discharge requirements.

For the existing site, the perimeter road, parking areas, and the reservoirs tar-and-gravel roof are the likely contributors of potential pollutants. The Project would reduce the amount of impervious surfaces by 35 percent, and the painted tar-and-gravel roof would be completely eliminated (ENTRIX 2010).

The Project would also cause changes in peak flow and runoff volume. Runoff volume to the Cerrito Creek watershed would be reduced by 15 percent, while runoff volume to the Wildcat Creek watershed would be reduced by 35 percent. Overall discharge volume would be reduced 28 percent, and pollutant loads would, therefore, be reduced by an equivalent amount: about 15 percent to Cerrito Creek and 35 percent to Wildcat Creek (ENTRIX 2010).

The impervious surfaces associated with the new pump house and access road paving would require treatment control measures to address the regulatory requirements for stormwater quality. A variety of control measures are possible, but must be limited to those without percolation to groundwater. Flow or volume control measures must have a solid bottom with an underdrain connected to the municipal system.

Stormwater runoff from the new impervious surfaces in the eastern portion would be directed through the vegetated basin, which would function in a similar manner to a biofiltration swale (an LID control measure). As stormwater travels through the vegetated bottom, it would undergo physical, chemical, and biological processing. Pollutants would be filtered, adsorbed onto vegetated material, infiltrated into soils, and otherwise biologically processed.

The basin is not currently designed to function as a treatment control measure, but according to Contra Costa Clean Water Program's Stormwater C.3 Guidebook (2008) for sites subject to stormwater treatment requirements, a 2:1 ratio of impervious to pervious area (such as a lawn) is acceptable as an LID control measure to meet the C.3 requirements. The area of impervious surface draining to the vegetated basin is 0.55 acre and 50 percent would be 0.275 acre. The basin bottom area available for this function is more than 2 acres.

According to the Stormwater C.3 Guidebook (2008), a bioretention facility for treatment purposes should be around 4 percent of the contributing impervious area. A 700-foot-long by 3-foot-wide swale type device would be sufficient. However, if the entire basin bottom included a subdrain to prevent deep percolation, then the entire basin could be considered a bioretention facility. The actual design and dimensions would be defined during Project design with all other treatment best management practices. In either case, 2 acres are available to implement a treatment control measure, much more than would be required following standard design procedures.

Therefore, to comply with discharge requirements the Project would need to implement the following mitigation measure.

> **Measure 3.10-1:** Stormwater Treatment Control Measures with Underdrains.
>
> EBMUD and/or its construction contractor will implement the following measures:
>
> - To the extent feasible, match the post-Project surface runoff and deep percolation volumes discharging from the site to the estimated pre-Project surface runoff and deep percolation volumes, by modifying the amount of impervious surfaces and by installing subdrains to capture infiltrated stormwater.
> - For the facilities on the western slopes, install treatment controls on the new impervious surfaces, such as a swale or planter boxes with a solid bottom and underdrain connected to the western municipal drainage system.

- All stormwater control features and facilities will be listed and the assumptions used for sizing the stormwater control facilities will be noted on the Project construction drawings.
- EBMUD will prepare and maintain a post-construction Stormwater Facility Operation and Maintenance Plan.

With implementation of Mitigation Measure 3.10-1, the Project would result in a less-than-significant impact on water quality standards or waste discharge requirements.

Significance after Mitigation: Less than Significant.

Impact 3.10-2: The Project would substantially alter the existing drainage pattern of the site 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.

As described in the discussion for Impact 3.10-1, the Project would reduce the amount of impervious surfaces by 35 percent, and the painted tar-and-gravel roof would be completely eliminated. Runoff volume to the Cerrito Creek watershed would be reduced by 15 percent, while runoff volume to the Wildcat Creek watershed would be reduced by 35 percent. Overall discharge volume would be reduced 28 percent (ENTRIX 2010).

Stormwater discharges would not cause an increase in the erosion potential of Cerrito or Wildcat Creeks over the pre-Project (existing) condition because of the reduction in impervious surfaces, reduction in runoff volume, and draining of most of the impervious surfaces to vegetated areas. The Project would also reduce the existing magnitude of stormwater discharges as well as the volume of these discharges. Therefore, the Project would not result in substantial erosion or siltation on- or off-site and no mitigation measures would be required.

Mitigation Measures: None Required.

Impact 3.10-3: The 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 (and/or infiltration to groundwater), or substantially increase the rate or amount of surface runoff (and/or groundwater recharge) in a manner which would result in flooding on or off site.

Concerns have been raised in the past regarding seepage into the basements of a few homes downgradient from the Project site. The public also has raised questions regarding the potential to impact springs and baseflows to adjacent creeks. To address the questions regarding groundwater recharge, seepage, and spring flows, the pre- and post-Project hydrologic water balance, including infiltration quantities, were compared and changes in the groundwater table and flow quantities near houses along Vassar Avenue were evaluated (ENTRIX 2010).

Standard engineering hydrologic procedures were used to evaluate potential modifications in surface runoff and infiltration rates and volumes resulting from the Project. A hydrologic model was set up using the U.S. Army Corps of Engineers Hydrologic Modeling System and the hydrologic guidelines provided by Contra Costa County (CCCFCWCD 2010). Both Contra Costa and Alameda counties' guidelines are similar and based on standard engineering practices. A water balance was performed to evaluate potential changes in average annual runoff, infiltration, and losses to the atmosphere. The water balance was used to investigate the quantity of rainfall that infiltrates soils and could affect groundwater seepage issues (ENTRIX 2010).

Tables 3.10-2 and 3.10-3 outline the pre- and post-Project conditions. Under existing conditions, 16 percent of the western drainage and 76 percent of the eastern drainage are impervious. The overall Project site has an estimated 48 percent imperviousness. Under the Project, a large amount of the Project site would be converted to open space. The site would be 14 percent impervious for the western drainage and 44 percent impervious for the eastern drainage. The overall Project site would have an estimated 31 percent imperviousness (ENTRIX 2010).

TABLE 3.10-2
Pre-Project Summit Reservoir Drainage Area Characteristics

Name	Total Area (sq ft)	Pervious Area (sq ft)	Impervious Surface Area (sq ft)	Impervious Surface Area (%)
Draining West				
Total Project site draining west to the Cerrito Creek watershed	351,513	294,772	56,741	16
Draining East				
Total Project site draining east into the Wildcat Creek watershed	394,562	92,834	301,728	76
Total Delineated Area (sq ft)	746,075	387,606	358,469	48
Total Delineated Area (acres)	17.1			

Source: ENTRIX 2010

TABLE 3.10-3
Post-Project Summit Reservoir Drainage Area Characteristics

Name	Total Area (sq ft)	Pervious Area (sq ft)	Impervious Surface Area (sq ft)	Impervious Surface Area (%)
Draining West				
Total Project site draining west to the Cerrito Creek watershed	335,109	288,066	47,043	14
Draining East				
Total Project site draining east into the Wildcat Creek watershed	404,240	225,486	178,754	44
Total Delineated Area (sq ft)	739,349	513,552	225,797	31
Total Delineated Area (acres)	17.0			

Source: ENTRIX 2010

The existing site drainage relies on a 6-inch-diameter pipe on the western side and a 16-inch-diameter pipe on the eastern side. The capacities of these two drainpipes are 1 cfs and 6 cfs, respectively. **Tables 3.10-4 and 3.10-5** summarize the hydrologic model results for the pre- and post-Project conditions, respectively. Both peak flows and storm volumes are presented. The current reservoir underdrain water (0.006 cfs) is a small quantity and would be eliminated by the Project.

TABLE 3.10-4
Pre-Project Stormwater Runoff Model Results

	Peak Flow (cfs)			Discharge Volume (acre-feet)		
	5-year	**10-year**	**25-year**	**5-year**	**10-year**	**25-year**
West Drain to Vassar Avenue	1.0	1.2	1.5	0.39	0.47	0.59
Total west to Cerrito Creek	3.2	4.1	5.6	0.51	0.64	0.88
Total east to Wildcat Creek	4.2	5.1	6.4	2.1	2.5	3.2

Source: ENTRIX 2010

TABLE 3.10-5
Post-Project Stormwater Runoff Model Results

	Peak Flow (cfs)			Discharge Volume (acre-feet)		
	5-year	**10-year**	**25-year**	**5-year**	**10-year**	**25-year**
West Drain to Vassar Avenue	1.0	1.1	1.4	0.33	0.40	0.51
Total west to Cerrito Creek	3.1	4.0	5.4	0.45	0.57	0.79
Total east to Wildcat Creek	4.0	4.9	6.4	1.3	1.6	2.2
West Drain to Vassar Avenue Percent Reduction from Existing	0%	8%	7%	15%	15%	14%
Total west to Cerrito Creek Conditions	3%	2%	4%	12%	11%	10%
Total east to Wildcat Creek	5%	4%	0%	38%	36%	31%

Source: ENTRIX 2010

Comparing the peak flows between pre- and post-Project conditions shows that the Project would not affect peak flows from typical storms in a significant way. The model results suggest a 0 to 8 percent reduction in peak flows depending on location and storm size.

Comparing storm volumes shows that the Project would not increase runoff volume, but would result in a moderate decrease, ranging from 10 to 38 percent depending on location and storm size. These results illustrate the effect of reducing the amount of impervious surfaces.

Because of the reduction in impervious surfaces, reduction in runoff volume, and draining of most of the impervious surfaces to vegetated areas, the Project would not result in flooding on or off site. Also, the Project is designed to maintain the existing distribution of runoff between Cerrito Creek and Wildcat Creek drainages as demonstrated in Tables 3.10-2 and 3.10-3.

Therefore, the Project would not result in substantial flooding on or off site and no mitigation measures would be required.

Mitigation Measures: None Required.

Groundwater Recharge

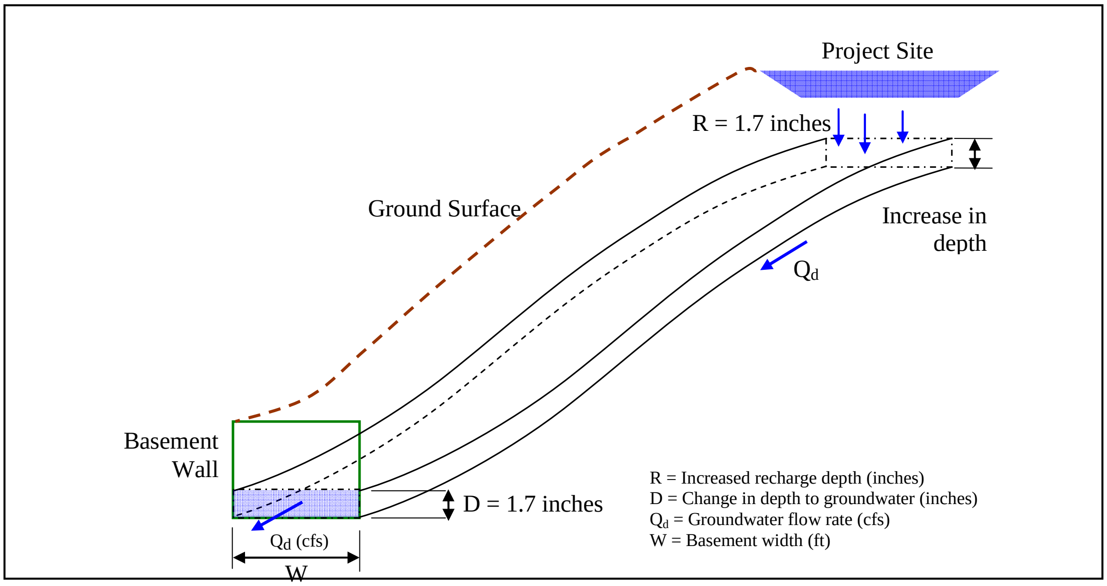
Because of the reduction in impervious surfaces, the Project would increase the annual quantity of infiltration and groundwater recharge, and would increase the amount of seepage water present at downgradient homes with basements.

To quantify the potential change in the water table elevation due to the Project, the estimated increase in groundwater recharge from the water balance was applied, as previously described. This annual quantity is equally distributed over an area defined by the Project site boundary. This area includes the distance from the reservoir to the houses along Vassar Avenue (ENTRIX 2010).

The current water table has an average depth from the surface of 14.4 feet, but could be within a few feet from the ground surface at certain times in wet years. With a basement depth of 10 feet, at times the groundwater surface could intersect with the basement floors. **Figure 3.10-1** presents a conceptual model illustrating the concept used to address seepage into basements.

The expected increase in groundwater recharge from the Project could create a substantial impact on the downgradient residences and would require mitigation measures.

Ultimately, given the various stormwater requirements for LID (minimizing impervious surfaces and runoff), together with the limited ability for infiltration due to the proximity of the groundwater table, the Project would need to balance the surface runoff and deep percolation volumes with the pre-Project surface runoff and deep percolation volumes. Both individual storm events as well as the annual hydrologic water balance should be addressed in this assessment.



Source: ENTRIX 2010

Schematic Illustration Of Groundwater Recharge Effects
Figure 3.10-1

Mitigation would reduce the amount of surface infiltration and, thus, groundwater recharge to existing levels. Typically, the management of stormwater runoff includes infiltration and is considered one of the best choices for offsetting the increased runoff associated with additional impervious surfaces. However, infiltration is not a viable option for the Summit Reservoir Project for two reasons: (1) the groundwater table is seasonally within 10 feet of the ground surface, and (2) any increase in groundwater recharge could result in increased seepage flows at nearby homes with basements. Therefore, the following mitigation measure would be required.

Measure 3.10-3: Bioretention area with underdrains

EBMUD and/or its construction contractor will implement the following measures:

Design the proposed vegetated basin to include a bioretention facility with underdrains or impermeable liner connected to the eastern municipal drainage system (Wildcat Creek side). The filtration process will provide stormwater treatment, while the underdrain will capture stormwater and minimize groundwater recharge.

With implementation of Mitigation Measure 3.10-3, the Project would result in a less-than-significant impact on seepage at nearby residences.

Significance after Mitigation: Less than Significant.

Spring Flows

The Project's potential impacts on spring flows were evaluated (ENTRIX 2010). The analysis assumed that because of the reduction in impervious surfaces the Project would increase the annual quantity of infiltration and groundwater recharge, and would increase the amount of spring flows. The groundwater gradient under the reservoir is assumed to be mostly directed toward Cerrito Creek; the increased recharge would benefit Cerrito Creek and would not affect Wildcat Creek.

However, with Mitigation Measure 3.10-3 proposed to address seepage, the annual recharge quantities would remain unchanged. Therefore, no change in spring flows would occur for either Cerrito Creek or Wildcat Creek.

Significance after Mitigation: Less than Significant.

Impact 3.10-4: The Project would otherwise substantially degrade water quality.

Because of the reduction in impervious surfaces, reduction in runoff volume, and draining of most of the impervious surfaces to vegetated areas, the Project would not degrade water quality.

With implementation of Mitigation Measure 3.10-1 (treatment controls in the western subcatchment and routing runoff into the vegetated basin in the eastern subcatchment), the Project would not substantially degrade water quality.

Refer to the discussion for Impact 3.10-1 for a more detailed explanation and evaluation.

Significance after Mitigation: Less than Significant.

References

Contra Costa Clean Water Program, September 2008. Stormwater C.3 Guidebook. Stormwater Quality Requirements for Development Applications.

Contra Costa County Flood Control and Water Conservation District (CCCFCWCD), 1977. Mean Seasonal Isohyetal Maps. Drawing No. B-166.

Contra Costa County Flood Control and Water Conservation District (CCCFCWCD), July 2010. HEC-HMS Guidance, Unit Hydrograph Method.

ENTRIX, Inc., October 2010. EBMUD Summit Reservoir Replacement Project Technical Report: Hydrology/Water Quality.

National Climatic Data Center, 2010. Precipitation data for Berkeley gage #040693. Available online at: http://www4.ncdc.noaa.gov/.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), 2006. CWA Section 303(d) List of Water Quality Limited Segments Requiring TMDLs.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), 2007. San Francisco Bay Basin Water Quality Control Plan (Basin Plan).

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), October 2009. Municipal Regional Stormwater Permit, Order R2-2009-0074. NPDES Permit, No. CAS612008.

San Francisco Estuary Project, August 2007. Comprehensive Conservation and Management Plan (CCMP).

U.S. Environmental Protection Agency (USEPA), 2007, approval date, June 28, 2007. Clean Water Act Section 303(d) List of Water Quality Limited Segments. .

3.11 Hazards/Hazardous Materials

3.11.1 Approach to Analysis

This section describes the current site conditions relating to Hazards/Hazardous Materials on the Project site, discusses potential human health risks associated with Project construction, and identifies corresponding mitigation measures to address identified health risks. Included in this analysis is a review of exposure to conventional hazards and to hazardous waste and materials (including potential risk of upset or accidental release).

Alisto Engineering Group prepared a Phase I Environmental Site Assessment (ESA) for the Project site (2009). The Phase I ESA includes the following methodology: a reconnaissance site survey on July 9, 2009; review of aerial photographs and maps; and review of relevant EBMUD documents. The major findings of this Phase I ESA are summarized in this section. This section is also based on information and analysis included in the EBMUD Summit Reservoir Replacement Project Technical Report: Hazards/Hazardous Materials (AGS 2010).

Although EBMUD plans to build a 3.5-MG tank, the EIR analyzes the largest tank size of 5-MG in order to capture the “worst case” construction footprint and potential impacts associated with the replacement tank.

In this section, “sealant” and “caulk” are used interchangeably throughout the text.

3.11.2 Setting/Regulatory Setting

Hazardous materials and waste can result in public health and environmental hazards if released to the soil, groundwater, surface water, or air in vapors, fumes, or dust. Hazardous Materials, defined in Section 25501(h) of the California Health and Safety Code, are materials that, because of their quantity, concentration, or physical or chemical characteristics, pose a substantial present or potential hazard to human health and safety or to the environment if released. A waste is any material that is relinquished, recycled, or inherently waste-like. Title 22 of CCR, Division 4.5, Chapter 11 contains regulations for the classification of hazardous wastes. A waste is considered a hazardous waste if it is toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases) in accordance with the criteria established in Article 3.

Summit Reservoir

Summit Reservoir is an open-cut reservoir with a built-up wooden roof and concrete lining. The entire surface of the roof is covered with engineered gravel roofing materials laid over a hypalon membrane which is in turn underlain by asphalt-impregnated felt material. Areas of the roof intended to be used as walkways are reportedly covered with cement asbestos board.

In December 1994, samples of various construction materials were collected from Summit Reservoir and analyzed for PCBs and metals. Two samples of a "rubbery gray sealant" and two samples of a "sticky rubbery brown sealant" were analyzed for PCBs and metals. The two samples of the "rubbery gray sealant" contained PCBs at concentrations of 0.014 and 6,300 milligrams per kilogram (mg/Kg). One of the two samples of "sticky rubbery brown sealant" contained PCBs at a concentration of 0.003 mg/Kg, while the other sample did not contain PCBs above the laboratory reporting limits. The sample of the "rubbery gray sealant" in which PCBs were detected at 6,300 mg/Kg was the only sample where the concentration of PCBs was above the hazardous waste regulatory level of 50 mg/Kg (Total Threshold Limit Concentration), and thus it would be classified as a hazardous waste. In addition, low concentrations of various metals were detected in three of the four sealant samples. However, there could be additional types of sealant in the reservoir that have not yet been identified.

Between August 1994 and July 1996, multiple samples were collected from four areas located in close proximity to where piles of non-native sandy material and/or sand blast material had been deposited on the ground surface during maintenance activities at the reservoir. The piles of material were described as brown, coarse-grained sand, mixed with gravel, without any paint particles observed in the sand. The piles of material, as well as the four areas where the samples were collected, were located as follows:

1. adjacent to the southern side of the transformer;
2. approximately 40 feet northwest of the transformer;
3. adjacent to the paved driveway directly south of the reservoir; and
4. at the north side of the paved driveway near the northwest corner of the reservoir.

Three of the samples were analyzed for PCBs, and 31 were analyzed for lead. PCBs were not detected, but lead was detected in 28 of the samples at concentrations up to 980 mg/Kg. One sample collected southeast of the area adjacent to the southern side of the transformer did not contain lead above the reporting limit. Two of four samples collected about 30 feet apart from the area approximately 40 feet northwest of the transformer contained lead at 58 and 130 mg/Kg. All 12 of the samples collected from an area of about 60 square feet adjacent to the paved driveway directly south of the reservoir contained lead from 50.2 to 730 mg/Kg. All 14 of the samples collected from an area of about 50 by 150 feet at the north side of the paved driveway near the northwest corner of the reservoir contained lead from 16.4 to 980 mg/Kg.

The locations of the piles of material, as well as the four areas where the samples were collected were identified and mapped in the ESA prepared by Alisto, 2009. One of the actions recommended by Alisto included collecting additional soil samples from the shallow soils around the perimeter of the site to determine the vertical and lateral extent of lead in the soil.

The overall quantity of sealants and caulk which potentially could contain PCBs is unknown. The reservoir was lined with reinforced concrete in the 1940s (EBMUD 2001). This could be the earliest time at which caulk might have been used to seal concrete construction joints in the liner. Other periods when caulk was known to have been used to repair cracks in the concrete liner was in 1968 and 1974 (EBMUD 2009). During periodic dive inspections of the reservoir, any cracks observed in the liner were repaired underwater at the time of the inspection (EBMUD 2010). The roof structure was added to Summit Reservoir in 1972. According to as built drawings, caulk was used to seal the locations where the roof columns penetrated the concrete liner (EBMUD 1970a, 1970b).

Hazardous Materials

Polychlorinated Biphenyls

PCBs belong to a broad family of human-made organic chemicals known as chlorinated hydrocarbons. PCB-containing caulk was used in some buildings, including schools, primarily between 1950 and 1980. PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; and as plasticizers in paints, plastics, rubber products, sealants, and caulk. PCBs were a common additive to caulk because of their water and chemical resistance, durability, and elasticity (USEPA 2010a).

Although PCBs have a very low solubility in water, they are highly lipophilic,[31] with the consequence that more than 99 percent of PCB mass is found in soil. Volatilization of PCBs in liquids from spills, landfills, road oils, and other sources results in measurable atmospheric emissions, so that atmospheric transport is recognized as the primary mode of global distribution of PCBs (Travis and Hester 1991).

PCBs have been demonstrated to cause a variety of adverse health effects and have been shown to cause cancer in animals. PCBs have also been shown to cause a number of serious noncancer health effects in animals, including effects on the immune system, reproductive system, nervous system, endocrine system and other health effects. Studies in humans provide supportive evidence for potential carcinogenic and noncarcinogenic effects of PCBs (USEPA 2010b).

General human exposure to PCBs occurs primarily by low-level food contamination. PCBs have been found in the soil, air, and water, and in many environmental matrices, including marine plants and animals, fish, mammals, birds, wildlife, and humans (Erickson 1997). It is very important to note that the composition of PCB mixtures changes following their release into the environment. The types of PCBs that tend to bioaccumulate in fish and other animals and bind to sediments happen to be the most carcinogenic components of PCB mixtures. As a result, people who ingest PCB-contaminated fish or other animal products and contact PCB-contaminated sediment may

31 A substance that dissolves in or is attracted to fats, oils or other lipids.

be exposed to PCB mixtures that are even more toxic than the PCB mixtures contacted by workers and released into the environment (USEPA 2010a).

Exposure to PCB-containing caulk can also occur by directly touching it and surrounding building materials or soil (dermal contact), hand to mouth contact after touching PCB-containing caulk and surrounding building materials or soil (ingestion), and breathing in air or dust contaminated with PCBs (inhalation) (USEPA 2010b).

PCBs may be released into the surrounding soil from caulk. Caulk that is not intact and is peeling, brittle, cracking, or visibly deteriorating in some way has a high potential to release PCBs into the surrounding soil. PCB-contaminated soil can be a source of exposure for individuals who visit adjacent play areas or gardens (USEPA 2010b).

Indoor air quality may also be affected by PCBs. PCBs can slowly be released into the air from caulk and be inhaled. Dust particles from the caulk can come into contact with people in the building. They can also enter the air handling system and move to other areas of the building. In addition to deteriorating caulk, caulk with the highest PCB concentrations should also receive a high priority for removal, as these materials may pose a greater potential for direct exposure and release of PCBs to indoor air (USEPA 2010b). Such indoor air quality concerns can also be applicable to confined-space areas, such as the interior of the Summit Reservoir.

Although the risk of exposure to PCBs is very low, EBMUD is undertaking this Project to comply with the District Attorney's Agreement (see Alameda County District Attorney's Office Agreement in Chapter 2, Project Description).

Lead

Until 1978, when the U.S. Consumer Product Safety Commission phased out the sale and distribution of residential paint containing lead, many structures were coated with paint containing some amount of lead. When removed from structures, lead-based paint can become a potential health hazard if removed improperly. Although most of the lead containing sand discovered in 1994 was removed from the Project site, there may still be paint and sand blast debris in soil around the reservoir, and sediment in the reservoir bottom that contains lead as well as areas on the Project site as described above (Alisto 2009).

Asbestos

Asbestos is a strong, incombustible and corrosion-resistant material that was used in many commercial products prior to the 1940s and up until the early 1970s. If inhaled, asbestos fibers can result in serious health problems. Asbestos-containing materials (ACMs) are defined as building materials containing more than one percent asbestos (some state and regional regulators impose a one-tenth of one percent threshold).

According to the ESA, there could be ACMs in the asphalt impregnated felt on the roof and mortar used to build the rubble wall around the reservoir (Alisto 2009).

The National Emission Standards for Hazardous Air Pollutants mandate that, prior to the commencement of any remedial work (including demolition), building owners conduct an asbestos survey to determine the presence of ACMs and recommends that areas be sampled as part of an asbestos survey.

Any demolition, renovation or other activity that may disturb the suspect ACMs must comply with state law, which requires that a contractor to be certified and that certain procedures regarding the removal of asbestos be followed by those who would remove the material.

Concrete, cement mortar, cement asbestos board, caulk, bedrock (Franciscan), and sediment in the reservoir bottom could contain asbestos.

Bedrock underlying Summit Reservoir reportedly consists of Franciscan sandstone and shale; however, during removal and over excavation for the future tank, areas of serpentine or other Franciscan assemblage materials that could contain asbestos may be encountered.

Treated wood (Pentachlorophenol)

The existing Summit Reservoir roof structure contains treated wood, with preservatives including pentachlorophenol. Pentachlorophenol was one of the most widely used biocides in the United States prior to regulatory actions to cancel and restrict certain nonwood preservative uses of pentachlorophenol in 1987. Its commercial uses include: utility poles, fences, shingles, walkways, building components, piers, docks and porches, and flooring and laminated beams. Additionally, there are agricultural uses (which are sometimes referred to as “outdoor residential”), i.e., wood protection treatment to buildings/products, and fencerows/hedgerows.

Pentachlorophenol is mostly hazardous to workers as it is being applied not as it is handled during demolition. However, general precautions for handling treated wood should be taken during demolition such as wearing gloves when handling wood, wearing goggles and dust-masks when sawing and sanding, and not burning treated wood. As a waste product, pentachlorophenol treated wood is subject to the Regulations for the Management of Treated Wood Waste issued by the California Department of Toxic Substances Control, and must be disposed of at a designated treated wood waste landfill such as Keller Canyon where it would be treated as Special Waste. The regulations state that treated wood waste may only be reused at its original site and in the same manner as its original use. There are approximately 1.1 million board feet of treated lumber and 310,000 square foot of plywood in the reservoir which would require handling, on-site storage, transportation and disposal in accordance with the regulations. Due to state regulations, there appears to be little (if any) potential for reused of treated wood at the site.

Other Hazardous Materials

Hazardous materials, including paints, solvents, cements, adhesives, and petroleum products such as oil and fuel would be used in varying amounts during Project construction. With implementation of the legally required Hazard Communication Program and Injury and Illness Prevention Program by the construction contractor, construction worker exposure to hazardous materials during Project construction would be reduced (California Department of Industrial Relations 2010). All hazardous wastes generated by the construction contractor would be handled in compliance with applicable federal, state, and local laws and regulations, including licensing, training of personnel, accumulation limits and times, and reporting and record keeping. These laws include the federal Resource Conservation and Recovery Act specified in Title 40 of the Code of Federal Regulations, Section 260, et seq., and the California Hazardous Waste Control Law specified in Health and Safety Code Section 25100, et seq., implemented through the local Certified Unified Program Agency (CUPA) agencies.

Regulatory Setting

Hazardous materials and hazardous wastes are subject to numerous federal, state, and local laws and regulations intended to protect health, safety, and the environment. The major federal, state, and regional agencies enforcing these regulations include the USEPA (federal), the California Department of Toxic Substances Control and the Regional Water Quality Control Board of the California Environmental Protection Agency (state), and the BAAQMD (regional). Local regulatory agencies enforce many federal and state regulations through the CUPA program.

The following paragraphs describe the state and local laws and regulations governing hazards and hazardous materials. Government Code 53091(d) states: “(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency.” In instances where this statute applies, it is the practice of EBMUD to work with host jurisdictions and agencies during Project planning to consider the local environmental protection measures and to conform to local policies to the extent possible.

Federal

PCBs are regulated under the Toxic Substances Control Act, which became law in 1976. This act bans the manufacture, processing, use and distribution in commerce of PCBs, and gives USEPA the authority to regulate the use, manufacture, cleanup, storage, and disposal of PCBs under 40 CFR Section 761. USEPA does not have information on the extent of the use of PCB-containing caulk or whether it was primarily used in certain geographic areas (USEPA 2010c). Self-implementing cleanup of PCBs requires notification and approval by the USEPA in accordance with 40 CFR Section 761.61(a), in addition with the appropriate lead state agency. For Land Disposal Restrictions (LDRs) under 40 CFR part 268, the Resource Conservation and Recovery Act (RCRA) does not regulate PCBs as a listed waste unless the waste exhibits one of the four waste characteristics as toxic, ignitable, corrosive, or reactive.

<u>Hazardous Materials Business Plans (HMBP)</u> - Businesses that handle specified quantities of chemicals are required to submit a HMBP in accordance with community right-to-know laws. This plan allows local agencies to plan appropriately for a chemical release, fire, or other incident. The HMBP must include the following:

An inventory of hazardous materials with specific quantity data, storage or containment descriptions, ingredients of mixtures, and physical and health hazard information.

- Site and facility layouts that must be coded for chemical storage areas and other facility safety information.
- Emergency response procedures for a release or threatened release of hazardous materials.
- Procedures for immediate notification of releases to the administering agency.
- Evacuation plans and procedures for the facility.
- Descriptions of employee training in evacuation and safety procedures in the event of a release or threatened release of hazardous materials consistent with employee responsibilities, and proof of implementing such training on an annual basis.
- Identification of local emergency medical assistance appropriate for potential hazardous materials incidents.

Under the CUPA regulations, the Contra Costa County Health Services Department is responsible for implementing the HMBP requirements in Contra Costa County. The City of Berkeley Fire Department is responsible for implementing these regulations in Berkeley.

State

<u>Hazardous Waste Classification</u> - In accordance with CCR, Title 22, Division 4.5, Chapter 11, Article 3, excavated soil and hazardous building materials would be classified as a hazardous waste if they exhibit the characteristics of ignitability, corrosivity, reactivity, or toxicity. In accordance with Section 66261.24 of these regulations, a waste is considered toxic if representative samples of the waste have any of the following properties:

1. when using the RCRA test for toxicity, Toxicity Characteristic Leaching Procedure, the extracts from representative samples of the waste contain any of the certain listed at a concentration equal to or greater than the respective value given in that

list unless the waste is excluded from classification as a solid waste or hazardous waste or is exempted from regulation pursuant to 40 CFR section 261.4. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering using the methodology outlined in Method 1311, is considered to be the extract for the purposes of this section;

2. it contains a certain listed at a concentration in milligrams per liter of waste extract, as determined using the Waste Extraction Test, which equals or exceeds its listed soluble threshold limit concentration or at a concentration in milligrams per kilogram in the waste which equals or exceeds its listed total threshold limit concentration;
3. it has an acute oral LD50[32] less than 2,500 mg/Kg;
4. it has an acute dermal LD50 less than 4,300 mg/Kg;
5. it has an acute inhalation LC50[33] less than 10,000 parts per million as a gas or vapor;
6. it has an acute aquatic 96-hour LC50 less than 500 milligrams per liter when measured in soft water (total hardness 40 to 48 milligrams per liter of calcium carbonate) with fathead minnows (Pimephales promelas), rainbow trout (Salmo gairdneri) or golden shiners (Notemigonus crysoleucas) according to standard test methods;
7. it contains any a certain listed substances at a single or combined concentration equal to or exceeding 0.001 percent by weight;
8. it has been shown through experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bioaccumulative properties or persistence in the environment.

<u>San Francisco Bay Area Region, California Regional Water Quality Control Board</u> - The municipal stormwater permit requires development of BMPs for managing PCBs in caulk during building demolition and renovation. A stakeholder involvement process has begun to develop these BMPs. The San Francisco Estuary Partnership is the lead organization for preparing these BMPs.

<u>California Accidental Release Program (CalARP)</u> - The CalARP includes regulatory requirements for facilities that handle regulated substances.[34] 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 includes a hazard assessment to evaluate the potential effects of an accidental release. The RMP is filed with and administered by CUPA, which ensures review by and distribution to other potentially affected agencies.

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32 LD50 is an index of toxicity (lethal dose 50 percent), the amount of the substance that kills 50 percent of the test population of experimental animals when administered as a single dose.

33 LC50 is an index of toxicity (lethal concentration 50 percent), the concentration of the substance that kills 50 percent of the test population of experimental animals in a given time (usually four hours).

34 CalARP incorporates the requirements of the Federal Risk Management Program, but is more stringent with respect to the threshold quantities of chemicals requiring RMPs.

Control of Asbestos during Construction - Section 19827.5 of the California Health and Safety Code, adopted January 1991, 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 in the Bay Area, including asbestos. BAAQMD is vested by the California legislature with authority to regulate airborne pollutants, including asbestos, through both inspection and law enforcement, and is to be notified 10 days in advance of any proposed demolition or abatement work.

Notification includes the names and addresses of operations and persons responsible; description and location of the structure to be demolished/altered including size, age, and prior use, and the approximate amount of friable asbestos; scheduled starting and completion dates of demolition or abatement; nature of planned work and methods to be employed; procedures to be employed to meet BAAQMD requirements; and the name and location of the waste disposal site to be used. BAAQMD randomly inspects asbestos removal operations. In addition, BAAQMD will inspect any removal operation that is the subject of a complaint.

Contractors who conduct asbestos-related work activities (including abatement) in buildings and structures must follow state regulations contained in 8 CCR 1529 and 8 CCR 341.6 through 341.14 where the work would involve 100 square feet or more of ACMs. Specifically, under 8 CCR 341.6, the California Division of Occupational Safety and Health (CalOSHA) must be notified of asbestos-related work activities to be carried out. Contractors must be licensed as an Asbestos Qualified Contractor by the Contractors Licensing Board of the State of California, and registered as such with CalOSHA. In addition, a one-time report of the use of carcinogens must be made to CalOSHA 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 hauling of the material from the site and its disposal.

Asbestos Airborne Toxic Control Measure - BAAQMD is the public agency entrusted with regulating stationary sources of air pollution in these nine counties. The Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying and Surface Mining Operations was signed into law on July 22, 2002 (17 CCR 93015) and became effective in BAAQMD on November 19, 2002. The purpose of this regulation is to reduce public exposure to naturally occurring asbestos from construction and mining activities that emit dust which may contain it. The Asbestos Airborne Toxic Control Measure requires regulated operations engaged in road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas where naturally occurring asbestos is likely to be found, to employ the best available dust mitigation measures in order to reduce and control dust emissions.

Lead Based Paint Abatement - Federal regulations addressing lead-based paint are specified in USEPA's Residential Lead-Based Paint Hazard Reduction Act of 1992 – Title X; the U.S. Department of Housing and Urban Development (1995) document Guidelines for the Evaluation and Control of Lead-Based Paint Hazardous in Housing provides technical information and guidance for implementation of these regulations. State requirements for lead-based paint abatement in residential and public use buildings are specified in 17 CCR 35001–36000. However, current federal, state, and local regulations do not address the abatement of lead-based paint in nonresidential or nonpublic buildings.[35]

Wildland Fire - The California Public Resources Code (PRC), beginning with Section 4427, includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors[36] on construction equipment with an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on site for various types of work in fire-prone areas. The PRC requirements would apply to construction activities because the site is located in an area designed by the California Department of Forestry and Fire Protection (2008) as a "Very High Fire Hazard Severity Zone."

EBMUD Policies and Procedures

EBMUD's policies and procedures related to the management of hazardous materials are described below.

EBMUD Emergency Operations Plan - EBMUD has prepared an Emergency Operations Plan (EBMUD 1999) outlining procedures to be followed in the event of natural disasters, severe storms, major system failures, or terrorist attacks. EBMUD prepares a site-specific emergency response plan for individual facilities, using the EBMUD-wide program as a guide; the plan identifies staff people to perform emergency duties and lists the resources needed to accomplish emergency tasks. As described in Chapter 2, Project Description, Summit Reservoir has been equipped with remote sensors and shutoff equipment in the event an earthquake or other on-site emergency requires the reservoir to be taken off-line.

EBMUD Construction Specifications - Sections 0135 24 (Project Safety Requirements) and 0135 44 (Environmental Requirements) of the EBMUD construction specifications,

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35 Senate Bill 460, passed in 2002, and effective as of January 1, 2003, added text to the California Health and Safety Code specifying that lead-based paint above certain quantities cannot be disturbed without providing containment, but does not address specific requirements for abatement or containment of lead-based paint. The requirements of this legislation are not enforceable through permit conditions. CCR Title 17 does include requirements for the abatement of lead-based paint, but these requirements apply only to residential and public-use buildings.

36 A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

Site Safety and Regulatory Requirements, requires the contractor to provide plans, procedures and controls when encountering hazardous conditions and hazardous substances during the performance of work. EBMUD reviews submittals for general conformance with the requirements of the contract documents and specified laws and regulations. Specific planning documents related to hazards and hazardous materials that are required include a health and safety plan, materials management and disposal plan, water control and disposal plan, and spill prevention and response plan.

Local

City of Berkeley - The City of Berkeley General Plan (2001) includes a number of policies intended to prevent and respond to hazardous materials incidents. These policies state the City's intention to establish truck routes, provide emergency access routes, control and regulate the use, storage and transport of hazardous materials. Several policies address reducing the risk of hazardous materials exposure through the use of environmental investigations, risk reduction practice and the use of warning systems. Additional policies in the General Plan are intended to encourage a reduction in the quantities of hazardous waste generated in the City.

Contra Costa County - Similar to the City of Berkeley, the Safety Element of the Contra Costa County General Plan (2005) includes policies regarding hazardous materials transport and storage. Of particular relevance, the General Plan states that in the event of an emergency, the County Office of Emergency Services should be contacted as soon as possible.

3.11.3 Impacts and Mitigation Measures

Standards of Significance

This section addresses the following standards of significance as based on CEQA Guidelines, Appendix G. Would the project:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
- 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?
- Reasonably be anticipated to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
- 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?

Impacts and Mitigation Measures

Impact 3.11-1: The Project would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

PCBs

EBMUD previously developed a standard sampling plan for all its reservoirs, including those on the District Attorney's agreement list that defines how sampling of reservoir materials must be conducted (Law/Crandall, Inc. and CH2M Hill 1997). This sampling plan would be followed and testing of caulk types would be conducted at Summit Reservoir prior to construction. Once the reservoir is drained, the caulk stripping would take place based on the sampling results. Any caulk known to contain PCBs and which is observed to contact soil directly would be noted and logged. A visual inspection would be conducted to assess whether the caulking is in poor condition and whether or not pieces of caulking are intermixed with the soil. Concrete cores and soil tests would be conducted based on a sampling following the visual inspection. If additional soils or concrete are found to contain PCBs, these materials would also be removed per protocols in the plan.

PCB-containing materials discovered above the regulatory action level would be handled, stored, transported and disposed of by EBMUD in accordance with applicable federal, state and local regulations designed to protect public health and the environment. Based on 40 CFR Section 761.62(b)(1)(i), PCB bulk product wastes may be disposed at a facility permitted, licensed, or registered by a state and appropriately classified for PCBs. For this reason, the removal of any potential PCB-containing materials would not create health and safety concerns to the general public or become co-mingled with construction and demolition wastes. Compliance with federal, state, and local regulations (implemented through EBMUD contract specifications) would reduce the impacts of hazards to the public or the environment through the routine transport, use or disposal of PCBs to a less-than-significant level, and no mitigation measures would be required.

Lead

As reported by Alisto (2009), "It appears that the majority of the lead containing sand discovered in 1994 has been removed from the site, as no piles of the material were observed and areas where the materials were previously deposited appeared to be native soil." However, it still is possible that lead containing sand, soil or sediment, or lead-based paint could be encountered during Project construction, particularly in the following areas

1. about 40 feet northwest of the transformer;
2. adjacent to the paved driveway directly south of the reservoir; and
3. at the north side of the paved driveway near the northwest corner of the reservoir.

This impact would be significant and would require the following mitigation measure.

Measure 3.11-1a: Lead Removal

If any paint is separated from building materials (e.g., chemically or physically) during demolition of the structures, or if lead containing sand or soil is found on the Project site, EBMUD and/or its construction contractor will implement the following steps:

- Evaluate paint waste independently from the building material to determine whether or not lead-based paint is present and to specify its proper management.
- Evaluate soil and sand still present at Project site to determine if it contains lead in an amount that requires special handling.
- If lead-based paint or lead-containing sand or soil is found, complete abatement prior to any construction activities that will create lead dust or fume hazard.
- Perform lead removal in accordance with 8 CCR 1532.1, which regulates and specifies exposure limits, exposure monitoring, respiratory protection, and good worker practices by workers exposed to lead.
- Provide evidence by any contractor performing lead removal to the City of Berkeley City Building Official and Contra Costa County Environmental Health Department of the contractor’s certified training for lead-related construction work.

Implementation of Mitigation Measure 3.11-1a as needed would reduce potential impacts to less than significant.

Asbestos

Based on the findings of the ESA, ACMs could be found in the roof, mortar, and liner and would need to be sampled and disposed of properly (Alisto 2009). Therefore, the Project would have a significant impact regarding ACMs and the following mitigation measure would be required.

Measure 3.11-1b: Asbestos Containing Materials

Prior to demolition activities, EBMUD and/or its construction contractor will conduct an asbestos survey in compliance with the National Emission Standards for Hazardous Air Pollutants to determine the presence or absence of asbestos, and submit the results of the survey to EBMUD. In the event ACMs are found, any demolition activity that will disturb ACMS or create an airborne asbestos hazard will be performed by a licensed asbestos abatement contractor under the supervision of a certified asbestos consultant and according to EBMUD standards. This requirement will be incorporated into

EBMUD construction specifications for the Project, and will be monitored by EBMUD during construction.

Implementation of Mitigation Measure 3.11-1b would reduce this impact to less than significant.

Treated Wood

The existing Summit Reservoir roof structure contains treated wood, with preservatives including pentachlorophenol. State and federal regulations limit reuse of pentachlorophenol-treated lumber to the site of origin for its intended use and storage no longer than the allowed time limits. The proposed landscape plan for the reservoir does not include reuse of any pentachlorophenol-treated wood for ancillary landscape features, but there may be potential reuse for retaining walls and shoring applications during construction. Any wood not appropriately reused on site would be handled, transported and disposed of at an appropriate waste disposal facility. No unregulated hazardous substances would be used or present when new Project components are in service. Therefore, impacts from treated wood would be less than significant and no mitigation measures would be required.

Significance after Mitigation: Less than Significant.

Impact 3.11-2: The Project could 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.

Routine maintenance of distribution facilities entails dechlorination of potable water from reservoirs prior to release into the sewer or storm water system. For reservoir outages, tank heel water is tested prior to disposal, and sediment from tanks is containerized and disposed of in compliance with state and federal regulations. Any hazardous waste generated during Project demolition would be handled, stored, and transported from the site according to state and federal regulations to minimize potential contamination. These requirements would be included in the Project contract specifications and monitored by EBMUD construction inspectors. Therefore, the impact would be less than significant and no mitigation measures would be required.

Mitigation Measure: None Required.

Impact 3.11-3: The Project could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing school.

Project construction could involve the temporary use of hazardous materials such as paints, solvents, cements, adhesives, and petroleum products such as oil and fuel.

Although there is one school, the Step One Nursery School, within one-quarter mile of the Project site, the hazardous materials that would be used during construction are commonly used and would only be used in relatively small quantities and on a temporary basis. Also, any hazardous waste generated during Project demolition would be handled, stored, and transported from the site according to state and federal regulations to minimize potential contamination or releases. These requirements would be included in the Project contract specifications and monitored by EBMUD construction inspectors. Therefore, the potential for emissions would be minimized, and the impact would be less than significant and no mitigation measures would be required.

Mitigation Measure: None Required.

Impact 3.11-4: 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.

The Project site is located 0.25 mile west of Tilden Park and undeveloped areas of the Berkeley Hills in an area classified as "Very High Fire Hazard Severity Zone". EBMUD maintains site landscaping in compliance with the Berkeley and Kensington Fire Department Fire Abatement Regulations. However, the use of construction equipment and temporary onsite storage of diesel fuel could pose a wildland fire risk in the Project Area. The time of the greatest fire danger is during the clearing phase, when people and machines are working among vegetative fuels that can be highly flammable. If piled onsite, the cleared vegetative materials could also become a fire fuel.

Potential sources of ignition include equipment with internal combustion engines, gasoline powered tools, and equipment or tools that produce a spark, fire, or flame. Such sources include sparks from blades or other metal parts scraping against rock, overheated brakes on wheeled equipment, friction from worn or unaligned belts and drive chains, and burned out bearings or bushings. Sparking as a result of scraping against rock is difficult to prevent. The other hazards result primarily from poor maintenance of the equipment. Smoking by onsite construction personnel is also a potential source of ignition during construction. To conform to California Department of Forestry and Fire Protection's Fire and Resource Assessment Program and applicable regulations, the following mitigation measure would be required:

Measure 3.11-4: EBMUD and/or its construction contractor will implement the following Fire Prevention Measures during construction:

- Equip earthmoving and portable equipment with internal combustion engines with a spark arrestor to reduce the potential for igniting a wildland fire (PRC Section 4442).
- Maintain appropriate fire suppression equipment during the highest fire danger period – from April 1 to December 1 (PRC Section 4428).

- On days when a burning permit is required, remove flammable materials to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the contractor(s) will maintain the appropriate fire suppression equipment (PRC Section 4427).
- On days when a burning permit is required, do not use portable tools powered by gasoline fueled internal combustion engines within 25 feet of any flammable materials (PRC Section 4431).
- Compliance with the referenced sections of the PRC requirements, and any additional requirements imposed by the Contra Costa County Fire Protection District or the Berkeley Fire District.

Implementation of Mitigation Measure 3.11-4 would ensure that potential impacts related to wildland fires due to construction activities would be less than significant.

Significance after Mitigation: Less than Significant.

References

AGS, Inc., October 2010. EBMUD Summit Reservoir Replacement Project Technical Report: Hazards/Hazardous Materials.

Alisto Engineering Group, September 15, 2009. Reconnaissance Survey for Potential Hazardous Materials, EBMUD Summit Reservoir, 416 Spruce Street, Berkeley, California.

California Department of Forestry and Fire Protection, 2008. Alameda County: Very High Fire Hazard Severity Zones in LRA. Available online at http://frap.cdf.ca.gov/webdata/maps/alameda/fhszl_map.1.jpg.

California Department of Industrial Relations, 2010. Injury & Illness Prevention Model Program for Non-High Hazard Employers. Available online at http://www.dir.ca.gov/dosh/dosh_publications/iipnonhigh.html.

City of Berkeley, 2001. City of Berkeley General Plan, Environmental Management Element. Available online at http://www.ci.berkeley.ca.us/contentdisplay.aspx?id=478.

Contra Costa County, 2005. Contra Costa County General Plan 2005-2020, Safety Element. Available online at http://www.co.contra-costa.ca.us/depart/cd/current/advance/GeneralPlan/CCCGeneralPlan.pdf.

EBMUD, May 13, 1970a. Summit Reservoir Roof, Seismic Column & Footing Details. As Built Drawing No. 5784-G-29.

EBMUD, May 13, 1970b. Summit Reservoir Roof, Pier & Footing Details. As Built Drawing No. 5784-G-31.

EBMUD, April 1999. Emergency Operations Plan, Basic Plan.

EBMUD, 2001. EBMUD Dam Guide, Summit, 416 Spruce Street, Berkeley, Materials Engineering Section, December.

EBMUD, 2009. Geotechnical Feasibility Assessment for Proposed Summit Tanks at Berkeley – Kensington, California. (Internal) Memo to Robyn Mutobe from Yogesh Prashar (EBMUD), March 12.

EBMUD, 2010. Email to Darcy Kremin (ENTRIX, Inc.) from Robyn Mutobe (EBMUD) based on questions about Summit Reservoir from AGS, August 26.

Erickson, M.D., 1997. Analytical Chemistry of PCBs, 2nd Edition. Lewis Publishers (CRC Press).

Law/Crandall, Inc. and CH2M Hill. 1997. Management Plan for Reservoir Rehabilitation and Maintenance. Prepared for EBMUD, April 10.

Travis, C.C. and S.T. Hester, 1991. Global Chemical Pollution. In Environmental Science & Technology. Volume 25, Number 5.

U.S. Environmental Protection Agency (USEPA), 2010a. Polychlorinated Biphenyls (PCBs). Available online at http://www.epa.gov/epawaste/hazard/tsd/pcbs/index.htm.

U.S. Environmental Protection Agency (USEPA), 2010b, accessed on October 5, 2010. Health Effects of PCBs. Available online at http://www.epa.gov/osw/hazard/tsd/pcbs/pubs/effects.htm.

U.S. Environmental Protection Agency (USEPA), 2010c. Current Best Practices for PCBs in Caulk Fact Sheet - Removal and Clean-Up of PCBs in Caulk and PCB-Contaminated Soil and Building Material. Available online at http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/caulk/caulkremoval.htm.

U.S. Department of Housing and Urban Development, 1995. Guidelines for the Evaluation and Control of Lead-Based Paint Hazardous in Housing. Available online at http://www.hud.gov/offices/lead/lbp/hudguidelines/index.cfm.

Chapter 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 Summit Reservoir Replacement Alternatives, and identifies the environmentally superior alternative.

4.1.1 CEQA Requirements for Alternatives Analysis

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. The CEQA Guidelines, Section 15126.6, set 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 Project, are feasible, and would attain most of the basic objectives of the Project. 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 reasonable range of 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 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 environmental effects of each alternative. If an alternative would cause one or more significant effects not 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.

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 rather than the project or modified project.
- Alternatives of the Project that include modified project components, such as alternative project locations or modified facilities, layout, size and scale within the same site.

The objectives of this Project are defined in Chapter 2.

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 prior to selection of a specific project for detailed analysis in the EIR.

In 2009, EBMUD began an 18-month engineering planning effort for Summit Reservoir that included consideration of several Project alternatives during the development stage. Sources of the Project alternatives considered included background reports prepared for improvements to the Summit Pressure Zone (i.e., the 2005 Pressure Zone Planning Program, the 2008 Pumping Plant Master Plan, and the 2008 Reservoir Rehabilitation Master Plan). Each Project alternative was chosen in an effort to reduce some environmental impacts associated with the proposed Project, and each alternative is considered a feasible alternative to the Project. Each alternative was further evaluated with respect to the Project objectives including cost, design and construction considerations which ultimately led to the selection of the proposed Project for analysis in this EIR.

The proposed Project alternative was selected based on its ability to feasibly meet the Project purpose and objectives, with input from EBMUD staff (Engineering and Construction, Operations and Maintenance). Subsequently the site planning process commenced and design alternatives were developed. Comments made from September 2009 through April 2010 site planning community meetings informed many components of the design alternatives developed and summarized in the June 2010 Architectural Design Report for Summit Reservoir, by Muller & Caulfield Architects and Dillingham Associates. The alternatives investigated placement of the new tank and pumping plant facilities within the existing reservoir basin and were screened and reduced to several reasonable alternatives consistent with the requirements of CEQA.

4.1.3 Alternatives Considered in this EIR

The alternatives identified during the alternatives analysis phase are discussed in this EIR, consistent with the requirements of CEQA. The alternatives considered in this EIR include:

- Project Alternative 1: Rehabilitation of the existing Summit Reservoir and replacement of Woods and Shasta pumping plants at the Summit Reservoir site.
- Project Alternative 3: Replacement of storage with a new 5-MG tank and replacement of the Woods and Shasta pumping plants at the Summit Reservoir site;
- Project Alternative 4: Replacement of the liner caulking materials in the existing Summit Reservoir to meet the agreement with the Alameda County District Attorney; and
- No Project Alternative.

Section 4.2 describes the Project Alternatives and related assessments against Project needs and objectives including environmental impacts, while Section 4.3 describes and assesses the Design Alternatives of the Project (also referred to as concept design alternatives) for replacement storage at the Summit Reservoir site. Section 4.4 describes the No Project Alternative and Section 4.5 compares the alternatives and identifies the environmentally preferred alternative.

4.1.4 Alternatives Not Considered in this EIR

No alternative sites to the Project were analyzed in this EIR. Alternative sites are not cost effective and would not meet fundamental project objectives; the alternatives analysis discussed herein only evaluates alternatives of the Project on the existing reservoir site to develop a reasonable range of alternatives for evaluation in this EIR.

A survey of maps in the subject area indicated that there are no undeveloped alternative sites for the Project with the necessary design requirements, including close proximity to Summit Pressure Zone transmission pipelines, required ground surface elevation to match the other tanks in the Summit Pressure Zone, minimum footprint size for the pumping plants and tank replacements, and located close to the customers in the Summit Central subzone.

Locating the Project on another site would require EBMUD to negotiate and purchase property incurring considerable additional expense for EBMUD and its ratepayers. Any sites that meet the design criteria would require demolition of existing residential development because the Berkeley/Kensington hills are largely built out with little or no open space for development.

A new project site would also require EBMUD to invest in new off-site infrastructure incurring additional expenses for EBMUD and its ratepayers. These include drainage infrastructure for the new site and additional pipeline improvements in the public streets to connect to the existing EBMUD water distribution system to the new facilities, thereby creating more environmental impacts than the proposed Project.

Vacating the Summit Reservoir site would not only impose unnecessary expenditure (and generate needless controversy) related to site acquisition, but would also pose new considerations of future use of the vacated site which would have the potential to cloud the primary project objectives.

4.2 Project Alternatives

Description of Project Alternatives

A brief description of each of the Project Alternatives is given below. The storage need for the Summit central subzone is approximately 5 MG based on the 2040 Demand Study (EBMUD 2009).

Project Alternative 1 - Rehabilitate Existing Reservoir to Current Standards

Project Alternative 1 would address all the previously identified repair work and would rehabilitate major structural components of the existing Summit Reservoir, thereby bringing the existing facility up to current standards and greatly improving service life (maintenance and reliability) of all the facilities on site, including the Woods and Shasta Pumping Plants.

Some of the major work (and cost) components of Project Alternative 1 would include:

- outage of the existing Summit Reservoir;
- removal and disposal of the contaminated liner caulking materials;
- restoration of the reservoir liner joints and replacement of the liner caulking;
- seismic retrofit and replacement of the built-up wood reservoir roof;
- re-coating of the steel columns and implementation of corrosion protection measures;
- construction of a new replacement for the Woods and Shasta Pumping Plants and associated access for parking and maintenance;
- improvement of the reservoir ventilation system;
- improvements to the water sampling cabinet for water quality testing, including replacement of the entire sample pump system and inclusion of a new chlorination check valve;
- improvements to the valve pit; and
- removal and stockpiling of hardscape materials to restore the aesthetics of the wood roof following roof replacement work.

Additionally, Alternative 1 would not utilize water storage at Woods Reservoir. Under a separate project in the future, Woods Reservoir would be demolished and a new flow control valve to supply the customers currently served by Woods Reservoir would be constructed.

Project Alternative 1 was selected for evaluation in the EIR alternatives analysis because the visual quality/aesthetic environment following construction would return to the status quo; the existing hardscape roof design and bird sculptures would be returned to the replacement roof structure following rehabilitation of the reservoir, thereby minimizing the long-term visual impact compared to the proposed Project. Also, since reservoir demolition would be limited to the treated wooden roof and liner caulking materials and less site re-grading and excavation would be required, noise and vibration impacts would be less than the proposed Project.

Project Alternative 3 - Replace Existing Reservoir with a 5-MG Tank at Summit

Project Alternative 3 would replace the existing 37-MG Summit Reservoir with a 5-MG concrete tank. The existing reservoir would be drained, and the dam embankments would be breached. The Woods and Shasta Pumping Plants would be replaced in a new structure on site.

Some of the major work (and cost) components of Project Alternative 3 would include:

- outage of the existing Summit Reservoir;
- removal and disposal of the contaminated liner caulking materials;
- demolition of the existing reservoir;
- earthwork and grading to re-contour the existing basin and screen the new facilities;
- construction of the new 5-MG concrete tank;
- construction of a new replacement for the Woods and Shasta Pumping Plants and associated access and parking for maintenance;
- replacement of the inlet/outlet pipe for the reservoir and other distribution piping from the new pumping plants;
- replacement of the drain pipes to Canon Drive; and
- landscaping.

Project Alternative 3 would be nearly identical to the proposed Project, garnering similar benefits, except that the new tank would be sized at 5 MG based on the maximum projected demands, and no new Summit flow control valve would be needed, (i.e., no supplemental storage would be required from Woods Reservoir). The tank height would remain the same as that of the proposed Project, but the diameter of the tank would be approximately 30 feet larger to accommodate the maximum 5-MG storage volume.

Project Alternative 3 would not utilize water storage at Woods Reservoir. Under a separate project in the future, Woods Reservoir would be demolished and a new flow control valve to supply the customers currently served by Woods Reservoir would be constructed at another site.

Project Alternative 3 was selected for evaluation in the EIR alternatives analysis because it represents the maximum storage required at the site based on the 2040 Demand Study and is a feasible storage replacement alternative for the Project. While the environmental impacts would be similar to the proposed Project, it remained under consideration for the alternatives analysis since it would eliminate the need for Woods Reservoir and the new Summit flow control valve, compared to the proposed Project. Additionally, when Project Alternative 3 is compared to Project Alternative 1 (rehabilitation), the hydrology/water quality impacts following construction would be reduced since Alternative 3 would greatly reduce the impervious surface of the reservoir roof compared to the existing, rehabilitated reservoir (see Chapter 3.10 Hydrology/Water Quality).

Project Alternative 4 - Minimum Project to Address Alameda County District Attorney Agreement Only

Project Alternative 4 would be the “minimum project” required to address the DA Agreement only. Project Alternative 4 assumed the following work only:

- outage of the existing Summit Reservoir;
- removal and disposal of the contaminated liner caulking materials; and
- replacement of the liner caulking.

The 37-MG Summit Reservoir would be returned to service following this alternative. The construction of the replacement Woods and Shasta Pumping Plants would be done under a separate project on a different schedule. Project Alternative 4 would not utilize water storage at Woods Reservoir. Under a separate project in the future, Woods Reservoir would be demolished and a new flow control valve to supply the customers currently served by Woods Reservoir would be constructed at another site.

Project Alternative 4 was selected for evaluation in the EIR alternatives analysis because it would minimize several of the impacts of the proposed Project construction, including the visual quality/aesthetic change to the Project site, the construction-related impacts to air quality and greenhouse gas emissions, and construction-related impacts to noise and vibration and traffic and transportation. Project Alternative 4 would keep the existing wood roof in place. In doing so, the hydrology/water quality impacts would be minimal since new stormwater requirements would not be triggered by this alternative.

Evaluation of Project Alternatives

The Project purpose and Project objectives as discussed in Chapter 2, Project Description, were used to evaluate the Project alternatives. Objectives include whether the alternative would remove non-soluble PCB contaminants in the existing reservoir liner caulking materials per the Alameda County District Attorney's Agreement by 2015, improve water quality, improve operational reliability and flexibility, minimize environmental impacts, and reduce costs. Hydraulic modeling was performed to verify existing conditions and to evaluate alternative system changes involving various reservoirs, flow control valves and pumping plants, as well as reservoir outage configurations.

Screening of alternatives also included Project construction considerations such as site access, Project staging, construction schedule and other related efforts required to be implemented for a given alternative. Projects were further screened against the potential to generate impacts on key environmental factors as analyzed in Chapter 3 of this EIR, i.e., Aesthetic/Visual Quality, Geology/Soils, Biological Resources, Hydrology/Water Quality, Hazards/Hazardous Materials; Cultural Resources, Transportation and Traffic, Air Quality, Greenhouse Gas Emissions, and Noise and Vibration.

An alternatives analysis matrix was developed to select an alternative that would meet the Project objectives in the most cost-effective manner and with the fewest environmental impacts. The alternatives matrix, shown in Table 4.1**,** compares the proposed Project against the other feasible alternatives to the Project. The No Project Alternative is listed in Table 4.1, but evaluated in Section 4.4.

TABLE 4-1
Evaluation of Project Alternatives and Comparison to the Proposed Project

	Proposed Project *Replace with 3.5-MG tank*	**Project Alternative 1** *Rehabilitate to current standards*	**Project Alternative 3** *Replace with 5-MG Tank*[1]	**Project Alternative 4** *Minimum Project to Address DA Agreement only*	**No Project Alternative**
Project Purpose and Objectives					
Meets DA Agreement	Yes	Yes	Yes	Yes	No
Water Quality Improvements	Improved	None	Improved	None	None
Operational Reliability and Flexibility	Improved	Improved pumping plant reliability only	Improved	None	None
Eliminates future DSOD requirements	Yes	No	Yes	No	No
Project Cost, $ (in Millions)[2]	$22M-33M	$40M	$25M-$35M	$6M	--[3]
Project Construction					
Site Access	Good	Difficult	Good	Adequate	N/A
Staging/Stockpiling	Good	Difficult	Good	Adequate	N/A
Construction Time Frame	2-3 years	2-3 years	2-3 years	6 months	N/A
Replace Inlet-Outlet Pipeline, other Water Distribution Pipelines on site	Required	Not required, but pipes aging	Required	No	N/A
Replace Pumping Plants	Required	Required	Required	Required in future separate project	Required in future separate project
Construct New Summit Flow Control Valve	Yes	No	No	No	No
Demolish Woods Reservoir & Construct New Arlington Flow Control Valve	No	Yes	Yes	Yes	Yes

TABLE 4-1
Evaluation of Project Alternatives and Comparison to the Proposed Project

	Proposed Project *Replace with 3.5-MG tank*	**Project Alternative 1** *Rehabilitate to current standards*	**Project Alternative 3** *Replace with 5-MG Tank[1]*	**Project Alternative 4** *Minimum Project to Address DA Agreement only*	**No Project Alternative**
Potential Impacts					
Visual Quality	LTSM	--	LTSM	--	--
Geology	LTSM	LTSM	LTSM	LTSM	--
Biological Resources	LTSM	LTSM	LTSM	LTSM	--
Cultural Resources	--	--	--	--	--
Traffic Circulation	SUM	SUM	SUM	LTSM	--
Air Quality, Greenhouse Gases	LTSM	LTSM	LTSM	--	--
Noise and Vibration	SUM	LTSM	SUM	LTSM	--
Hazards and Hazardous Materials	LTSM	LTSM	LTSM	LTSM	PSI
Hydrology and Water Quality	LTSM	PSI	LTSM	--	--

Note: *1. Five (5) MG tank analyzed in EIR in conjunction with other Proposed Project facilities (new Summit flow control valve) to establish largest construction envelope and longest construction duration for replacement Project.*
2. Project cost estimates are order of magnitude in 2009 dollars.
3. No capital cost for this alternative; however, increasing annual permitting fees and monthly monitoring fees are incurred by EBMUD to keep the existing facility in service. Additional on-going site maintenance is also part of the operational costs of the No Project alternative.

Legend: *LTSM Less than Significant with Mitigation*
PSI Potentially Significant Impact
SUM Significant/Unavoidable with Mitigation
-- Less than Significant or No Impact

Project Alternative 1 - Rehabilitate Summit Reservoir To Current Standards

Rehabilitating Summit Reservoir is not recommended because this alternative would not meet the water quality Project objective and would not reduce excess storage in the reservoir. This alternative is also the most costly because it would require demolition and re-construction of a new reservoir roof to meet current seismic structural codes, additional maintenance and operations upgrades to rehabilitate the facility to meet current standards, and long-term permitting and monitoring costs associated with maintaining dam embankments under DSOD jurisdiction.

Project Alternative 3 – Build one 5 MG tank at Summit

Construction of one 5-MG replacement tank at the Summit Reservoir site would generate greater impacts as identified for the Project site and a longer construction period resulting from the larger construction envelope imposed by the replacement facilities. This alternative would meet all the Project objectives, however, it was not preferred because it would be more costly and would have a greater overall environmental impact than Alternative 2 due to the larger sized tank.

Although EBMUD plans to build the 3.5-MG tank, since the 5-MG tank represents the maximum storage need at the site, the EIR analyzed and addressed the larger 5-MG tank, which captures the “worst case” construction footprint and potential impacts associated with the replacement tank.

Project Alternative 4 – Minimum Project Alternative (Remove liner caulking materials from Summit Reservoir)

This alternative is not recommended; while it would meet the DA Agreement, it would not meet any other Project objectives. Project Alternative 4 would not improve water quality nor the service life, and therefore the operations, maintenance or reliability of the facilities on site. The dam would be returned to service at its current 37 MG size and would, therefore, remain under DSOD jurisdiction.

Future projects, including rehabilitating the pumping plants and other significant repair and maintenance to the reservoir, would create an inefficient site configuration and necessitate increased disruptions to the community and additional costs associated with another reservoir outage, additional environmental documentation, and associated construction contract administration. Other structural elements such as the reservoir roof and maintenance and operational concerns related to the aging facilities and appurtenances would not be addressed with this alternative, leaving the remaining service life for the existing facility uncertain.

Environmental Assessment

While Alternatives 1 and 4 would have lower impacts on noise and vibration than Alternative 3 and the proposed Project, they were eliminated from consideration based on cost and the inability to meet the other fundamental Project objectives, including improving drinking water quality through downsizing the storage and improving the operations and maintenance reliability. If Alternative 1 or 4 was implemented, EBMUD would continue to operate the system as it does today. The current excess storage problem in the Summit Pressure Zone would continue to create water quality challenges in the distribution system. By continuing to maintain an oversized facility, resources would be diverted from investment in other, necessary system-wide improvements. Aging systems would become increasingly inefficient and costly to operate and maintain, and could eventually pose public safety hazards. Future DSOD requests for improvements to resolve any dam embankment issues would be costly. DSOD would retain regulatory responsibility for the dam and, by extension, the reservoir, and that oversight would in turn entail unspecified future expenditures to ensure on-going compliance.

The replacement tank Alternative 3 has a larger construction envelope and would take longer to build and therefore create more environmental impacts to noise and vibration, traffic and transportation, and the associated greenhouse gas emissions and air quality impacts than the proposed Project. Alternative 3, similar to the proposed project, optimizes the potential to reuse existing materials on site, thus minimizing impacts on traffic, air quality and greenhouse gas emissions. Alternative 3 also meets all the fundamental Project objectives, similar to the proposed Project. Alternative 3 was not chosen over the preferred Project because of the larger footprint, longer construction duration, and the additional cost associated with building a larger tank.

For purposes of this EIR and as discussed previously, the construction envelope for Alternative 3 was used to assess the impacts since it represents the maximum storage requirement at the site, the largest construction footprint and longest construction duration, and therefore represents a “worst case” for potential environmental impacts for the Project.

4.3 Design Alternatives of the Proposed Project

Description

Community input from a series of public meetings conducted from September 2009 through April 2010, resulted in the development of three conceptual design alternatives, one of which was revised slightly and is the preferred Project. Details of the site design process are contained in Appendix A- Public Involvement, and the EBMUD Summit Reservoir Replacement Project - Planning Phase Architecture Design Report (June 2010), prepared by Muller & Caulfield Architects in association with Dillingham Associates.

The four conceptual design alternatives are shown graphically in **Figure 4-1**. The existing reservoir outline served as the boundaries for the new tank alternative placement. Alternatives 1, 3A and 4A were initially presented at the second community meeting in January 2010. Alternative 4C, the preferred Project, is a refinement of Alternative 4A with the access road moved to the west side of the new tank.

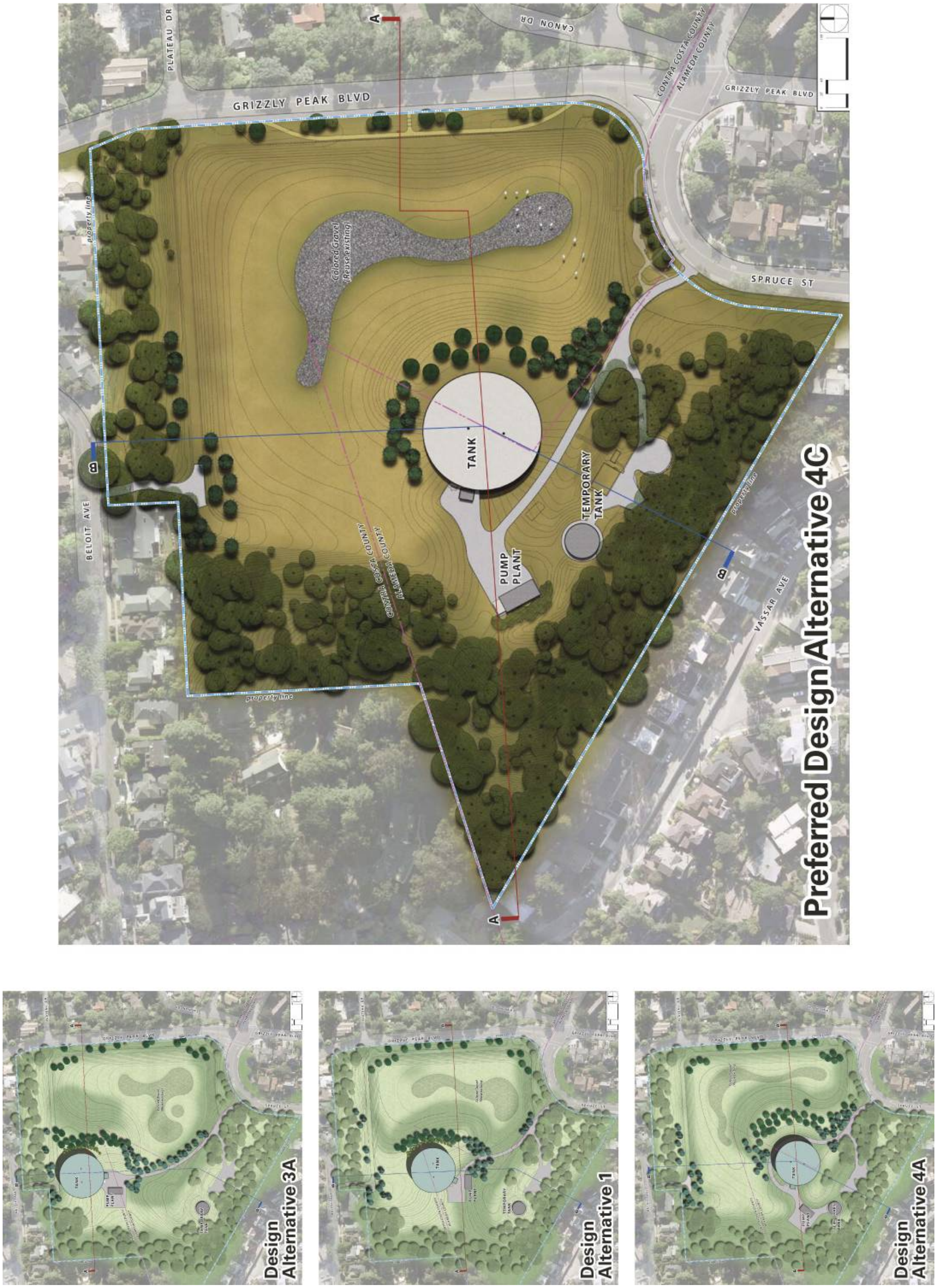
Several tank locations were evaluated and subsequently screened out of the process. Screening criteria included consideration of preliminary geotechnical information which indicated a potential faulted contact between bedrock formations close to the eastern side of the site (see Chapter 3, Section 3.3 Geology/Soils for further details). As such, locations toward the west side of the site were preferred. Other design alternatives included splitting the storage volume between two new tanks on site. After analysis and study, it was determined that two tanks would not be needed on site; one tank would be sufficient and could be taken out of service in the future for maintenance, with the utilization of a temporary tank and other storage in the pressure zone.

For all four design alternatives, the basic site design concepts were similar. The new tank would be located along the western side of the existing reservoir basin, from the north to south/southwest. A portion of the existing western embankment would be excavated and removed to create a flat area where the new tank and pumping plants would be located.

To the east of the tank, a large berm (hill) would partially bury the tank to help screen the new facilities from most public vantage points around the site. A comprehensive landscape plan was also developed for each alternative to improve site aesthetics, provide screening of the replacement reservoir relative to the vantage points identified, and integrate the new facilities with the existing landscaping, as well as provide a measure of erosion control for the significantly re-graded basin. A new walking path parallel to Grizzly Peak Boulevard would also be added to the east side of the site and give pedestrians a new, higher vantage point into the newly redesigned and landscaped basin.

Environmental Assessment

A more detailed assessment of the Project construction and potential environmental impacts for each site design alternative (Alternatives 1, 3A and 4C) was undertaken to select the preferred site design and therefore define the preferred Project for analysis in the EIR. Since overall earthwork quantities and re-use of embankment soils and concrete would be approximately the same for all the site design alternatives, there were no large differences in environmental impacts between the site design alternatives except as related to the new tank location; hence, only preferred Design Alternative 4C is shown in **Table 4.2**.



Source: EBMUD 2010

Summit Reservoir Design Alternative
Figure 4-1

TABLE 4.2
Summit Reservoir Replacement
Alternatives of the Project

	Preferred Design Alternative 4C[1] *Build new tank and pumping plants on southwest side of existing reservoir*
Schedule and Cost	
Construction Schedule	2.5 years demolition and replacement of reservoir and pumping plants
Project Cost	$22 Million - $33 Million[2]
Potential Environmental Impacts	
Visual Quality	Less than Significant – With Mitigation
Geology/Soils	Less than Significant – With Mitigation
Biological Resources	Less than Significant – With Mitigation
Cultural Resources	Less than Significant
Traffic and Transportation	Significant/Unavoidable – With Mitigation
Air Quality	Less than Significant – With Mitigation
Greenhouse Gas Emissions	Less than Significant – With Mitigation
Noise and Vibration	Significant/Unavoidable – With Mitigation
Hazards and Hazardous Materials	Less than Significant – With Mitigation
Water Quality/Hydrology	Less than Significant – With Mitigation

Notes: 1. *Similar impacts for all Design Alternatives (1, 3A, 4A, and 4C)*
2. *Project Cost based on Project Alternative 2*

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Design Alternative 4C was selected as the preferred Project because it would achieve a balanced site distance from adjacent neighbors, and it would collect and consolidate all the facilities on site in close proximity, thereby reducing construction and future maintenance costs related to new infrastructure (access road, water distribution pipelines, drainage, power and communication) required for the Project. Because the tank location would be a balanced distance from neighbors, it would help the long-term visual impacts of the new facilities for adjacent residents as well as the short term noise and vibration impacts during construction.

4.4 No Project Alternative

Description

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.

Environmental Assessment

In the near term, the No Project Alternative would avoid all the construction-related impacts associated with the Proposed Project. However, the No Project Alternative is not feasible since it does not address the Alameda County DA Agreement and remove non-soluble PCB contaminants in the existing reservoir liner caulking materials by 2015. EBMUD must comply with water quality regulations and permit conditions to maintain its business functions as a water company. Non-compliance with the DA Agreement is not an option; thus, a project is required at Summit Reservoir.

4.5 Comparison of Selected Alternatives and Identification of the Environmentally Preferred Project

CEQA requires that an EIR identify an environmentally preferred alternative (Guidelines 15126.6 (e) (2)). The analysis presented in Chapter 3 of the EIR indicates that most of the impacts associated with the preferred Project (Design Alternative 4C) are construction-related and can be mitigated to a less than significant level. Exceptions include short-term construction-related noise and vibration impacts at the Project site, and short-term off-site traffic impacts on the surrounding neighborhood. After implementing mitigation measures, these impacts would remain significant and unavoidable.

In the near term, the No Project Alternative would avoid the construction-related impacts associated with the proposed Project. However, the No Project Alternative would not address the Project purpose and need or any key objectives as stated in Chapter 2 of this EIR and causes EBMUD to be non-compliant in meeting its regulatory obligations and maintaining its business goals, objectives and operations as a water company. Therefore, the No Project alternative is not feasible.

The preferred Project (Project Alternative 2, Design Alternative 4C) was selected because it would achieve a balanced site distance from adjacent neighbors, and it would collect and consolidate all the facilities and water distribution functions on one site in close proximity, thereby reducing construction and future maintenance costs related to new infrastructure (access road, water distribution pipelines, drainage, power and communication) required for the Project. The process of lowering the existing embankment to provide onsite fill removes the Summit Dam from DSOD jurisdiction, while providing the necessary soils to create the new berm on site without importing additional fill to the site. Combined with other recycling and reuse of materials onsite, the preferred Project would greatly reduce the number of trucks required for the site regrading, which would substantially reduce subsequent traffic, air quality, and greenhouse gas impacts on the community during construction.

The removal of the existing 37-MG concrete-lined Summit Reservoir would be an overall benefit to water quality because of the net reduction in size of the reservoir and resulting operational and maintenance efficiencies, while meeting regulatory requirements associated with the Alameda County DA Agreement and hazardous materials concerns. Additionally, the impervious area onsite would be substantially reduced, and runoff and infiltration would meet the latest stormwater treatment and control requirements by incorporating recognized best management practices for drainage and infiltration.

Because the tank location would be a balanced distance from all neighbors, it would help reduce the long-term visual impacts of the new facilities for adjacent residents as well as the short term noise and vibration impacts during construction. The berm placement for the preferred alternative would provide screening of the tank and access road from most public vantage points identified in the site planning process, while allowing the basin to remain largely as an "open space," landscaped with native and drought-tolerant grasses, shrubs and trees. The landscaping plan would balance screening and aesthetic concerns with biological concerns related to providing native habitat and vegetation. The open space aspect of the new site would continue to aid in public safety and site security since the site would remain visible from the public vantage points along the south and east sides of the site. A new pedestrian path would be added along the east side of the site, parallel to Grizzly Peak Boulevard, which would give pedestrians a new, higher vantage point to view the redesigned and landscaped basin.

The preferred Project would cost-effectively meet the Project purpose and need and other key Project objectives, while minimizing construction duration impacts. Therefore, the preferred Project would be the environmentally superior, feasible alternative since it minimizes environmental impacts relative to the other alternatives analyzed, by addressing the reservoir as well as pumping plant replacements and pipelines in one construction project, thereby reducing overall environmental impacts on the community, including hazardous materials, air quality, greenhouse gas emissions, visual quality and aesthetics, cultural resources, water quality/hydrology, geology/soils, and biological resources. Only temporary potential impacts related to noise and vibration and traffic may be experienced during construction, after which impacts on the community would be less than significant.

References

EBMUD, July 2005. Pressure Zone Planning Program Study – Summit (A5A), Tunnel(A4Aa), Stonewall (A4A), Santa Barbara (A4B), Terrace (A4Ba), and Arlington Regulated (A4Bb) Pressure Zones, prepared by K. Gupta, L. Work, and J. Hurlburt, Water Distribution Planning Division.

EBMUD, September 2008. Pumping Plant Rehabilitation Master Plan, Shasta and Woods Pumping Plants.

EBMUD, September, 2008. Reservoir Infrastructure Rehabilitation Plan, Facility Evaluations - Summit Reservoir, prepared by Design Division, C. Dodge, M. Toyofuku, J. Young, M. Lewis, E. Owre, B. Maggiore.

EBMUD, September 2008. Reservoir Infrastructure Rehabilitation Plan, Facility Evaluations - Woods Reservoir, prepred by Design Division, E. Owre, M. Lewis, J. Young, M. Toyofuku.

EBMUD, February 2009. Water Supply Management Program 2040, 2040 Demand Study, prepared by Karen E. Johnson, Water Resources Planning, and EDAW|AECOM in association with CBRE Consulting, Inc. and Weber Analytical.

Muller & Caulfield Architects June 2010. EBMUD Summit Reservoir Replacement Project – Final Report – Planning Phase Architecture Design Report prepared in association with Dillingham Associates.

CHAPTER 5

Cumulative Impacts, Growth Inducement and Other Topics Required by CEQA

5.1 Cumulative Impacts

5.1.1 Approach to Analysis

A cumulative impact is defined as an impact caused by implementation of a proposed project in conjunction with other projects with related environmental effects. The purpose of this analysis is to disclose the potential for significant cumulative impacts resulting from the Summit Reservoir Replacement Project in combination with other projects or conditions, and to indicate the severity of the impacts and their likelihood of occurrence.

The CEQA Guidelines (Section 15130) require 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 should 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 impact 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 issues not analyzed for the Project, i.e., for issues not found to be potentially significant and therefore excluded from analysis in the EIR. Issues excluded include: Land Use/Planning; Public Services; Agricultural Resources; Recreation; Population and Housing; Mineral Resources and Utilities/Service Systems.

5.1.2 Projects with Potentially Related or Cumulative Effects

This evaluation considers cumulative impacts associated with construction and operation of the proposed Project based on the geographic scope of the affected environmental resource and the proposed Project schedule. The cumulative analysis considers the impacts of the Project described in Chapter 3 in combination with potential environmental effects of other projects proposed within the Project area.

The Project sponsors contacted for this chapter include service districts (PG&E), local jurisdictions (Cities of El Cerrito and Berkeley; Contra Costa County), responsible and other agencies (Caltrans, Alameda-Contra Costa [AC] Transit), Alameda County Transportation Authority; Metropolitan Transportation Authority; Contra Costa Transportation Authority (CCTA); and East Bay Regional Park District. Proposed EBMUD projects were also 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 websites. Projects with a potential for cumulative impact within the proposed construction time frame are assumed to be those within a 1 to 3 mile radius of the Summit Reservoir site. The complete list of projects provided by jurisdiction and agencies is available for reference upon request.

Of the ten agencies contacted, only five provided a response. The City of Berkeley noted that there were no existing or proposed projects within the defined area of concern. Contra Costa County provided overview data and assumed that based on historic patterns of development and land availability, development activity was primarily related to single family home renovation, and that an average of two new homes per year could be assumed for construction within the Kensington area. Information provided by Caltrans, CCTA, the City of El Cerrito and EBMUD (FY 2010-2011 Capital Improvements Projects) are provided in Table 5.

The criteria used to determine the potential for cumulative impacts for the Summit Reservoir Replacement Project EIR is to identify whether there are development projects proposed within a 1, 2 or 3 mile radius of the Project site, and whether development is proposed to occur within the Project construction schedule. **Table 5-1** lists projects within the 3 mile radius of the Summit Reservoir site, and **Figure 5-1** shows their approximate location. Projects in the table and figure include: 10 EBMUD projects, 4 Caltrans projects 8 CCTA Projects, and 4 City of El Cerrito projects.

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 construction schedule. Given the existing and continuing local, statewide and national economic recession and financial crisis, there is even greater uncertainty about construction schedules for all projects listed.

TABLE 5-1
Projects with the Potential for Cumulative Impacts
(Summit Reservoir Replacement – Construction Schedule 2013-2015)

Agency	Number	Project Name	Project Description/Location	Project Schedule/ Status	Source
Caltrans	1	Caldecott Tunnel Fourth Bore	Add a fourth bore to the Caldecott Tunnel on Highway 24, north side	2011-2013	Caltrans - 2008
	2	Gilman Street Stormwater Mitigation	Stormwater mitigation, in Berkeley south of Gilman Street	2013-2014	Caltrans - 5/2010
	3	Oakland Pavement Rehabilitation	Rehabilitate Pavement. near Oakland from the 80/580 Junction in Albany to the 80/580 Junction in Emeryville	2010-2011	Caltrans - 5/2010
	4	Alameda County I-80 Gilman Roundabout	Alameda County I-80 modify interchange and roundabout at Gilman Street in Berkeley	2013-2015	Caltrans - 5/2010
Contra Costa Transportation Authority	5	Richmond- Carlson Boulevard Improvements.	Reduce super elevation and add features to improve liveability of adjoining neighborhood. (Could include bicycle lanes, median).	2012-	CCTA 5/2010
	6	El Cerrito	Construct a bicycle and pedestrian facility to connect the Ohlone Greenway to the San Francisco Bay Trail. The project would start at the Ohlone Greenway at El Cerrito Creek and continue west along El Cerrito Creek as a Class III bike trail .	2012-	CCTA 5/2010
	7	Caltrans	Construction of interchange modifications at the I-80/Central Avenue interchange consisting of the addition of a loop-on-ramp for westbound Central Avenue traffic to westbound I-80 traffic and associated realignments of the westbound I-80 off-ramp	Not begun	CCTA 5/2010
	8	Contra Costa County- Arlington Blvd. Improvements	Install signals and improve intersections	Not begun	CCTA 5/2010
	9	Alameda CMA- I-80 corridor	Utilize state-of-the-practice Intelligent Transportation System (ITS) technologies to enhance the effectiveness of the existing transportation network along I-80 and parallel /crossing arterials in Alameda and Contra Costa counties	2012	CCTA 5/2010
	10	El Cerrito Realignment - Ashbury Fairmount Intersection	Realign northbound lanes for better through and turning movements. Replace traffic signal to accommodate new geometry. Eliminate separate right turn lane and pork chop island.	2012	CCTA 5/2010
	11	El Cerrito Upgrades Ohlone Greenway	Construct major upgrades, realignments, intersections, lighting, surveillance, amenities, and landscaping along Ohlone Greenway in wake of BART seismic retrofit project.	Not begun	CCTA 5/2010
	12	El Cerrito Improvements - San Pablo Avenue	Develop pedestrian, transit stop, and streetscape improvements. The project includes pedestrian access improvements, including: new landscaped medians,	Under construction 2010	CCTA /2010

TABLE 5-1
Projects with the Potential for Cumulative Impacts
(Summit Reservoir Replacement – Construction Schedule 2013-2015)

Agency	Number	Project Name	Project Description/Location	Project Schedule/ Status	Source
			pedestrian countdown signals, pedestrian refuge islands, bulb outs, and in pavement flashing crosswalks.		
City of El Cerrito	13	Creekside - 128 unit condominum	El Cerrito Plaza	Unknown	El Cerrito 5/2010
	14	Hatlen Center – 57 residental units	6431 and 6495 Portola Drive	Unknown	El Cerrito 5/2010
	15	Vitale Mixed Use Development- 31 residential units with 3,400 square feet of office/retail	10520-10536 San Pablo Avenue	Unknown	El Cerrito 5/2010
	16	Eddie Biggs Townhouse – 13 residential units	1715 Elm Street	Unknown	El Cerrito 5/2010
	17	Safeway/Target store conversion	11450 San Pablo	Unknown	El Cerrito 5/2010
East Bay Municipal Utility District	18	Trilane Pressure Zone Rezoning / Trilane Reservoir #2 Rehabilitation	Valley View and San Pablo Dam Road; La Colina and San Pablo Dam Road; Tri Lane and San Pablo Dam Road - El Sobrante. San Pablo Recreation Area and San Pablo Dam Road	2010-2015	EBMUD 7/2010
	19	New Berryman Reservoir	1375 Euclid, Berkeley	FY 2010-15	EBMUD 7/2010
	20	Central 6- San Pablo Clearwell Rehabilitation	San Pablo, Kensington	FY 2015-20	EBMUD 7/2010
	21	University Reservoir Rehabilitation	West end Bancroft Place, Oakland	FY 2018	EBMUD 7/2010
	22	Berkeley View Regulator Rehabilitation	Shasta/Hills Road, Berkeley	FY 2013-14	EBMUD 7/2010
	23	La Loma Regulator Rehabilitation	La Loma/Hearst, Berkeley	FY 2020	EBMUD 7/2010
	24	Potrero Regulator Rehabilitation	6626 Potrero Avenue, Berkeley	FY 2018-19	EBMUD 7/2010
	25	Berryman Rate Control Station Rehabilitation	1330 Euclid Avenue, Berkeley	FY 2012	EBMUD 7/2010
	26	Summit North Pumping Plant Rehab.	7600 Potrero Avenue, El Cerrito	FY 18-19	EBMUD 7/2010

It is important to note that for a group of projects to generate cumulative impacts, they must be spatially and temporally proximate. Only 2 of the 26 projects identified in Table 5.1 are located within a 1 mile radius of the Project site (EBMUD-San Pablo Clearwell Improvements, and CCTA Arlington Boulevard Improvements). Seven projects are located within a 2 mile radius of the Project site (4 CCTA, 2 EBMUD and 1 City of El Cerrito). The remaining 17 projects are located within a 3 mile radius of the Project site, most to the west, along the densely developed urbanized Berkeley to El Cerrito foothill/flatlands corridor.

Prior to Project construction, EBMUD would develop detailed scheduling guidelines for planned and proposed EBMUD activities in the Project vicinity, to minimize the potential for disruptions/delays near the Summit Reservoir site. EBMUD would also coordinate with the appropriate departments of local jurisdictions in Berkeley, El Cerrito and Contra Costa County (Kensington) and with other utility districts and agencies regarding the timing of other construction projects that would occur near the Project site. Such coordination would help to minimize multiple construction disruptions to the same area, at the same time.

Source: EBMUD 2008

Projects with the Potential for Cumulative Impacts
Figure 5-1

5.2 Cumulative Impacts and Mitigation Measures

Cumulative impacts are discussed below by resource area. Due to the generalized level of project information in Table 5-1 (and the lack of response from other agencies) discussions are qualitative in nature. A discussion of the secondary effects of growth potentially induced by the Project are included later in this Chapter.

Aesthetics/Visual Quality

Impact C-1: Cumulative short- and long-term visual impacts.

The geographic scope of this resource is the general Project vicinity of and the viewsheds for adjacent/nearby residents.

As described in Chapter 3, Mitigation Measures 3.2-1 and 3.2-2 would be employed to reduce short- and long-term visual effects of the Project to an less than significant level, through managing construction debris on site to maintain a clean, clear area and installing a cohesive, low maintenance landscape plan that creates an open-space, park-like setting in conjunction with a gravel fixture with metal bird sculptures, interesting architectural detail in the existing perimeter rockwalls, drainage features, perimeter fencing and parking areas.

As noted in Figure 5-1, the project in closest proximity to the Summit Reservoir site is CCTA's Arlington Boulevard Improvements; the other closest project is EBMUD's San Pablo Clearwell Rehabilitation. A construction date was not provided for the CCTA project; EBMUD's Clearwell Rehabilitation project is scheduled for construction in the 2015-20 time frame, when Summit Reservoir construction should be completed. Because the CCTA project consists of street/roadway improvements in an existing right-of-way, no permanent cumulative visual impact is associated with that project. EBMUD's Clearwell Rehabilitation project would similarly occur on an already developed site and project planning and environmental documentation for that project would include consideration of potential site specific visual impacts and mitigations. The net effect is that the potential for cumulative visual impacts associated with either of the two projects is remote.

Since the Summit Reservoir site is screened from many surrounding vantage points by intervening topography and mature vegetation, the likelihood of any cumulative adverse visual effects on local viewsheds during construction would be low. EBMUD would develop detailed scheduling and phasing guidelines to minimize short-term visual impacts on the surrounding area during construction of the Project. Therefore, there would be no significant cumulative visual impact.

Geology/Soils

Impact C-2: Cumulative geologic and seismic hazards.

The geographic scope of this resource is the immediate embankment and soils within the reservoir basin because none of the other proposed projects is close enough to the Project site to generate additional hazards to people or structures in the Project Area.

As described in Section 3.3, the proposed Project could create areas with unstable slopes, expose soils to erosion and loss of topsoil during construction activities, and cause subsidence of native soils underneath stockpiled materials. However, these impacts are short-term and would be mitigated to a less-than significant level with the implementation of Mitigation Measures 3.3-1 through 3.3-6.

Since none of the Projects shown in Table 5-1 are located within the Project's area of impact, there would be no significant cumulative geologic or seismic impacts.

Biological Resources

Impact C-3: Cumulative loss of habitat for special-status wildlife and plants.

The geographic scope of this resource is the Project site.

Potentially significant short-term impacts on biological resources identified for this Project include damage to monarch butterfly roots, damage to roosting and foraging habitat for special status bat species, loss of or damage to protected trees and disturbances to nesting raptors or special status nesting birds. Mitigation Measures 3.4-1 through 3.4-4 would reduce these impacts on a less than significant level. Disturbed areas would be revegetated and disturbances to nesting species, roosts and habitats would be monitored, avoided or buffered.

As noted in Table 5.1, the projects listed in proximity to the Project site are located on already developed sites or in urban areas. Therefore, the combined impact of the proposed Project and other projects on biological resources would not be significant.

Cultural Resources

Impact C-4: Cumulative cultural resources impacts.

The geographic scope considered for potential cumulative impacts on cultural resources is Alameda and Contra Costa Counties with secondary reference to the State of California.

As described in Section 3.5, the Project would have no impacts on historic or cultural resources. Therefore the Project would not contribute to cumulative cultural or historic resources impacts for the City of Berkeley, Contra Costa County or the State of California.

The potential for impacts on prehistoric or archeological resources or to unearth human remains exists and would be mitigated to a less than significant level by applying Mitigation Measures 3.5-2 through 3.5-4 as applicable. Consequently, the combined impact of the Project and other projects would not be significant, and the Project's incremental effect is not cumulatively considerable.

Transportation and Traffic

Impact C-5: Cumulative traffic and roadway disruption.

The geographic scope of cumulative traffic impacts includes access routes to area freeways, and arterial and collector roadways used for haul routes and construction equipment/vehicle access to the Summit Reservoir site. All of the Projects listed in Table 5.1 could affect traffic and circulation on Interstates 80 and 580, and University and Solano Avenues.

As described in Section 3.6, the proposed Project would generate short-term vehicle trips by trucks and construction workers and would represent an increased traffic load on the roadways surrounding the Project site. Based on City of Berkeley significance criteria, the Project would also exacerbate existing traffic/circulation deficiencies at the Spruce/Marin Streets and San Pablo/University Avenue intersections in the a.m. and p.m. peak periods, respectively. While most traffic and circulation Project impacts would be reduced to a less than significant level with implementation of Mitigation Measures 3.6-1 and 3.6-2, impacts on these two intersections would remain significant and unavoidable even with mitigation. Increased traffic to and from the Project site would also generate significant and unavoidable impacts on Public Transit, but these impacts would cease upon completion of construction. The following mitigation measure would be implemented to reduce the contribution of the Project to cumulative traffic impacts to the extent feasible:

> **Measure C-5:** Prior to construction, the EBMUD Summit Reservoir Replacement construction manager will coordinate with other EBMUD projects regarding the timing of construction projects that use the Spruce Street/Marin Street and San Pablo Avenue/University Avenue intersections. To the extent practicable, overlapping periods of peak construction truck activity between multiple projects will be avoided.

Even with implementation of Mitigation Measure C-5, impacts in the a.m. and p.m. peak hour under cumulative conditions would remain temporarily significant and unavoidable since periods of peak construction activity such as demolition and concrete pours may occur at different project sites within the same time frame.

EBMUD would also submit plans related to, and comply with the requirements of, encroachment permits with local jurisdictions, which would provide further opportunities to coordinate multiple projects. Specific additional measures to mitigate significant impacts would be determined as part of the interagency coordination. Upon completion of the Project, traffic generated by site construction activity would return to current levels, and the long-term cumulative traffic impact would be less than significant.

Air Quality

Impact C-6: Cumulative construction emissions.

The geographic scope of this resource is the San Francisco Bay Area Air Basin. As discussed in Section 3.7, the Project would result in temporary increases in criteria air pollutant emissions during construction as well as potential exposure of sensitive receptors to diesel engine exhaust emissions from construction equipment and haul trucks. However, implementation of Mitigation Measures 3.7-2a through 3.7-2c, as developed by the Bay Area Air Quality Management District and the California Air Resources Board, would mitigate the Project's contribution to regional air quality impacts. The Project's contribution to cumulative air quality impacts would not be cumulatively considerable.

Other projects listed in Table 5-1 also have the potential to result in the same types of air quality impacts as the Summit Reservoir Project, with the extent of impact depending on individual project characteristics. However, all planned and proposed projects in the region are subject to BAAQMD regulations and the Clean Air Plan guidelines. Therefore, assuming implementation of appropriate mitigation measures for all projects in the region, cumulative air quality impacts would be less than significant.

Greenhouse Gas Emissions (GHG)

Impact C-7: Cumulative Greenhouse Gas Emissions

The geographic scope of this resource is the San Francisco Bay Area Air Basin and the Earth.

As discussed in Section 3.8, the Project would not impede the state's ability to meet its 2020 greenhouse gas emissions goal. Implementation of Mitigation Measure 3.8-1 to reduce GHG from fuel combustion, in addition to diesel exhaust control measures (Mitigation Measures 3.7-2a through 3.7c) would reduce and sequester GHG associated with vehicle and equipment use. On-going maintenance activities would remain the same and would not increase above the baseline. For these reasons, cumulative impacts to greenhouse gas emissions is not expected, and the Project's impacts to greenhouse gas emissions would not be cumulatively considerable.

Noise and Vibration

Impact C-8: Cumulative construction Noise and Vibration

The geographic scope of potential cumulative noise impacts encompasses the Project site 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 reservoir site.

As described in Section 3.9, the Project would result in intermittent and temporary noise above existing ambient noise levels due to construction activities in the Project vicinity. With implementation of Mitigation Measures 3.9-1a through 3.9-1e and 3.9-2, the Project's short-term construction noise impacts would generally be less than significant. However, impacts for the closest noise-sensitive receptors across Beloit Drive and Spruce Street, adjacent to the reservoir site as well as those receptors listed in Table 3.7-2 in Section 3.7, Air Quality along the haul truck routes would remain significant and unavoidable, despite implementation of Mitigation Measures 3.9-1a through 3.9-1e.

While there is a remote potential for the proposed Project to combine with construction noise levels generated by the cumulative projects listed in Table 5-1, the distant location of projects and uncertain construction timing suggests that the potential for cumulative noise impacts would be remote to non-existent.

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 the Summit Reservoir site. With early and ongoing coordination, EBMUD would avoid conflicts with other projects to the extent possible, and the Project's contribution to cumulative construction noise impacts, as mitigated, would not be considered significant.

Similarly, while excavation activities for the Project could generate perceptible vibration levels, implementation of Mitigation Measures 3.9-1a through 3.9-1e and 3.9-2) would reduce those impacts to a less than significant level. The distant location of other projects and uncertain construction timing suggests that the potential for cumulative vibration impacts would be even more remote to non-existent.

Hydrology and Water Quality

Impact C-9: Cumulative increase in water quality

The geographic scope of potential cumulative hydrology and water quality impacts encompasses the drainage areas on the Summit Reservoir site and drainage systems adjacent to the site.

As described in Section 3.10, with implementation of Mitigation Measure 3.10-1, the Project would result in less than significant impacts on hydrology and water quality.

Little change would occur in stormwater runoff peak flows and runoff volumes or in infiltration quantities and groundwater recharge.

The current site condition has 8.2 acres of impervious surfaces (asphalt pavement, tar and gravel roof) with no stormwater treatment controls. With the reduction in impervious surfaces to 5.2 acres and the implementation of stormwater treatment control measures on all new impervious areas, the pollutant load discharging from the site would decrease. A reduction in impervious surfaces would result in a reduction in stormwater runoff peak flows and volumes and, therefore, a reduction in pollutant loads. The inclusion of treatment controls on the new impervious surfaces would reduce the amount of pollutants coming in contact with stormwater, further reducing the discharge of pollutants from the site.

Therefore, the Project would not contribute to a cumulative impact on hydrology and water quality.

Hazards/Hazardous Materials

Impact C-10: Cumulative Hazards/Hazardous Materials Impacts

The geographic scope of impacts associated with hazardous materials generally encompasses the Summit Reservoir site, including the construction zone and the area within a quarter mile radius. The geographic scope for wild land fire risk is the high hazard area identified by the California Department of Forestry and Fire Protection.

As described in Section 3.11, the proposed Summit Project could expose workers and the public to hazardous materials that may be present in excavated materials and soil during the demolition phase. However, compliance with applicable laws and regulations and implementation of Mitigation Measures 3.11-1a, 1b, and 3.11-2 and 3.11-3 would ensure that the potential for hazardous materials impact is reduced to a less than significant level. Similarly, implementation of Department of Forestry and Fire Protection’s Fire and Resource Assessment Program and applicable regulations and any additional requirements imposed by local agency fire departments would ensure that potential impacts related to wild land fires due to construction activities would be less than significant; thus, no mitigation measures are required.

The projects listed in Table 5-1 would be variable in scope, and are likely to use and transport hazardous materials and could result in accidental releases from construction equipment. However, because all projects would be required to comply with regulatory requirements, which mandate the implementation of measures to prevent or respond to hazardous conditions, the Project’s cumulative impact is expected to be less than significant.

5.3 Growth Inducement Potential and Secondary Effects of Growth

The CEQA Guidelines require 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 proposed 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." Section 15126.2(d)

The environmental effects of a proposed project's induced growth are secondary or indirect impacts. Secondary effects of growth can result in significant increased demand on community and public service infrastructure; increased traffic and noise; degradation of air and water quality; and conversion of agricultural land to urban 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 could cause significant environmental effects. The CEQA Guidelines require analysis of the characteristics of projects that may encourage or facilitate other activities that could in turn significantly affect the environment, either individually or cumulatively. The 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.

Based on the CEQA definition above, assessing the growth-inducement potential of the Summit Reservoir Replacement Project involves answering the question: Would construction and/or operation of planned improvements remove an obstacle to growth and thus directly or indirectly support more economic or population growth or residential construction?

The Project's purpose is to address hazardous materials concerns, improve water quality, and increase system reliability and operating efficiency by downsizing storage and replacing aging facilities in the Summit Pressure Zone. Proposed improvements also include replacing the oversized open cut Summit Reservoir and embankment dam with a smaller reservoir sized to meet customer demands and improve water quality which results in more efficient management of the EBMUD water distribution system.

Implementation of the proposed Project would allow EBMUD to continue to provide quality water service to existing customers in the Summit Pressure Zone and 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 Project's purpose and the 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 at the site would be reduced with implementation of the Project.

The Project would contribute to local economic growth from construction expenditures for labor and materials. Construction contracts would go to bid in 2013, and it is expected that construction labor force would come from workers within commute distance to the site. Additional housing would not be constructed in the Project vicinity. Workers may purchase goods and services from nearby, established retail services in Kensington and El Cerrito, within proximity to the site.

5.4 Other Topics Required by CEQA

5.4.1 Population and Housing

Construction activities would occur on EBMUD property, and no housing exists on the Project site. The proposed replacement of Summit Reservoir and the Woods and Shasta Pumping Plants and construction of a new Summit flow control valve would continue to serve the same existing customers within the Summit and Arlington Pressure Zones. Since the proposed Project would not induce any population growth, displace substantial numbers of existing housing, or displace substantial numbers of people, there would be no impact on population and housing.

5.4.2 Significant Irreversible Environmental Changes

Section 15126.2(c) of the 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.

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 replacement reservoir and pumping plants are constructed. Project implementation would not alter land uses, nor would it commit future generations to undesirable uses.

CHAPTER 6
Report Preparers

6.1 Lead Agency

East Bay Municipal Utility District
375 Eleventh Street (Mail Slot 701)
Oakland, CA. 94607-4240

This document was prepared under the direction of:

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Karla Lund, Graphic Designer, Drafting Division
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6.2 EIR Consultants

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PAR Environmental Services
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Muller & Caulfield Architects in association with Dillingham Associates
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Dinwidde and Associates
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Oakland, CA 94619

APPENDIX A

Public Involvement

Public Review under CEQA

Public involvement is an essential feature of the California Environmental Quality Act (CEQA) process. The CEQA environmental review process has greatly expanded the opportunities for interested citizens to participate in project planning and government decision-making. CEQA encourages public involvement as early as possible in the Project planning phase. The Environmental Impact Report (EIR) is a well-established tool to evaluate and define a broad variety of projects, including the proposed EBMUD Summit Reservoir Replacement Project. EBMUD's outreach efforts for the Project, described below, exceed CEQA requirements.

Public Involvement for the Project

EBMUD has provided and will continue to provide opportunities for the public to participate in the CEQA process through meetings, public notices on and public review of the Draft EIR, an additional public meeting, and preparation of the Final EIR. A summary of the public involvement process to date is provided below.

EBMUD held a total of three community meetings, two in Kensington and one in Berkeley, to involve the public in the Summit Reservoir Replacement Project, prior to initiating preparation of the EIR. Community meeting dates and locations were:

September 24, 2009	Kensington Community Center, 59 Arlington Ave.
January 20, 2010	Kensington Elementary, 90 Highland Blvd.
April 12, 2010	Shepherd of the Hills Lutheran Church, 401 Grizzly Peak Blvd., Berkeley.

At the first meeting, the consultant design team presented five vantage points into the site using a 3D model and illustrations showing the site without the existing reservoir facilities, and one or two replacement tanks with various screening designs. Neighbors expressed a preference to have the new tank(s) fully or partially buried.

At the second public meeting, the design team presented three design options and invited participation using large poster boards. Neighbors had questions about site drainage, site grading and landscaping, fire and emergency water access, as well as preserving the existing overlooks and creating an improved walking experience along Grizzly Peak Boulevard. Alternative 4A was preferred because it hid the tank better than the other design alternatives. After a series of internal meetings between EBMUD and the design team, Alternative 4A evolved to the Preferred Alternative (4C). During January and February 2010, EBMUD also met with individual homeowners to discuss views.

At the third public meeting, the design team presented the final design for a single tank, as well as two options for a new Grizzly Peak walkway. Residents selected Option One because it represented a more straightforward design and longer route, away from the Grizzly Peak Boulevard car traffic.

The process of developing the concept design is documented in the Summit Reservoir Replacement Project Final Report – Planning Phase Architecture Design Report, June 2010, available for reference on EBMUD's web site (www.ebmud.com) or at EBMUD offices. EBMUD also posted an information page for the Summit Reservoir Replacement Project on its website.

EIR Process

Once the Draft EIR is completed, and in conjunction with circulating the Notices of Availability and Draft EIRs to agencies, community residents and interested parties, the Draft EIR will be posted on EBMUD's website, to optimize opportunities for public review.

EBMUD has attempted in good faith to involve the public in reviewing and commenting on the proposed Project. At each stage of the environmental review process, EBMUD has invited (and continues to invite) the public to provide input. EBMUD welcomes and encourages comments concerning the Project and respects the input that members of the community have to offer.

APPENDIX B

Notice of Preparation

Summit Reservoir Replacement Project

July 23, 2010

NOTICE OF PREPARATION
ENVIRONMENTAL IMPACT REPORT
SUMMIT RESERVOIR REPLACEMENT PROJECT
EAST BAY MUNICIPAL UTILITY DISTRICT
July 23, 2010

Project: The East Bay Municipal Utility District (EBMUD) proposes to prepare a project level Environmental Impact Report (EIR) for the replacement of Summit Reservoir and the Woods and Shasta Pumping Plants located at 416 Spruce Street in the City of Berkeley. The project involves demolition of the existing 37-million gallon (MG) open-cut reservoir (constructed in 1891) and appurtenances (including the roof system, roof features, and concrete lining) and the Woods and Shasta Pumping Plants located below the southwestern reservoir embankment. New construction includes a new 3.5- to 5-MG partially buried concrete tank, replacement pumping plants and related appurtenances in one structure adjacent to the existing location, and a new Summit regulator/rate control station within the pumping plant structure to access storage from the existing Woods Reservoir located approximately one mile to the east. The entire reservoir bowl will be regraded and landscaped with a mixture of drought-tolerant trees, grasses and shrubs. See attached location/vicinity map.

Objective: The objectives of the Summit Reservoir Replacement Project are to: (1) address regulatory concerns by removing polychlorinated biphenyls in the reservoir liner caulking per the1994 Alameda County District Attorney's Agreement with EBMUD; (2) reduce maintenance costs and improve operational reliability associated with operating the open-cut reservoir under the California Division of Safety of Dams' (DSOD) jurisdiction by replacing the reservoir (120 years old) and the Woods and Shasta Pumping Plants (70 years old) on site with new facilities; and (3) improve water quality by downsizing the reservoir and replacing it with optimal storage based on projected future demands. The project will remove portions of the dam embankments to ensure that the remaining small basin will be below the DSOD's jurisdictional threshold.

Project Location/Setting: Summit Reservoir is located at 416 Spruce Street on approximately 17 acres of land bordered to the north by Beloit Avenue, the west by Vassar Avenue, the south by Spruce Street, and to the east by Grizzly Peak Boulevard. The property resides in the City of Berkeley (Alameda County) and Kensington (unincorporated Contra Costa County). The reservoir is situated just west of the entrance to Tilden Park, on the ridgeline between Wildcat Canyon and the East Bay. Surrounding uses are primarily single-family residential. The Shepherd of the Hills Church is directly opposite on Grizzly Peak Boulevard. Pine, oak, and redwood trees and shrubbery are interspersed along the southwestern and western embankments, obscuring or filtering views into the site.

EIR Process: EBMUD, acting as lead agency under the California Environmental Quality Act (CEQA), will prepare an EIR. With this Notice of Preparation (NOP), input regarding the scope of the environmental review in the EIR is being solicited from interested parties, including responsible, resource and trustee agencies. Responsible, resource and trustee agencies under

CEQA and other interested agencies include the City of Berkeley, Contra Costa County, Alameda County, Regional Water Quality Control Board, Bay Area Air Quality Management District and the DSOD.

The environmental factors that could potentially be affected by this project (i.e., involving at least one impact that is a "Potentially Significant Impact") include Aesthetics, Biological Resources, Greenhouse Gas Emissions, Hazards/Hazardous Materials, Hydrology/Water Quality, Cultural Resources, Geology/Soils, Transportation/Traffic, Noise/Vibration, and Air Quality. Additional elements may be added to this list as a result of scoping.

EBMUD requests your input regarding the scope and content of the environmental information that should be considered or included in the proposed EIR. CEQA requires that your response be submitted to EBMUD at the earliest possible date, but no later than August 30, 2010.

Responses to or questions regarding this NOP should be directed to:

Gwen Alie, Associate Planner
East Bay Municipal Utility District
375 Eleventh Street, MS 701
Oakland, CA 94607-4240
(510) 287-1053, galie@ebmud.com
or summiteir@ebmud.com

The Draft EIR is targeted for circulation in late spring 2011, with action by EBMUD's Board of Directors anticipated in the fall of 2011. Notice will be given of public meetings, including a public hearing during the Draft EIR comment period. At the end of the review and comment process, EBMUD's Board of Directors will determine whether to adopt the Summit Reservoir Replacement Project and certify the EIR. Additional information about the Summit Reservoir Replacement Project can also be obtained from the EBMUD website.

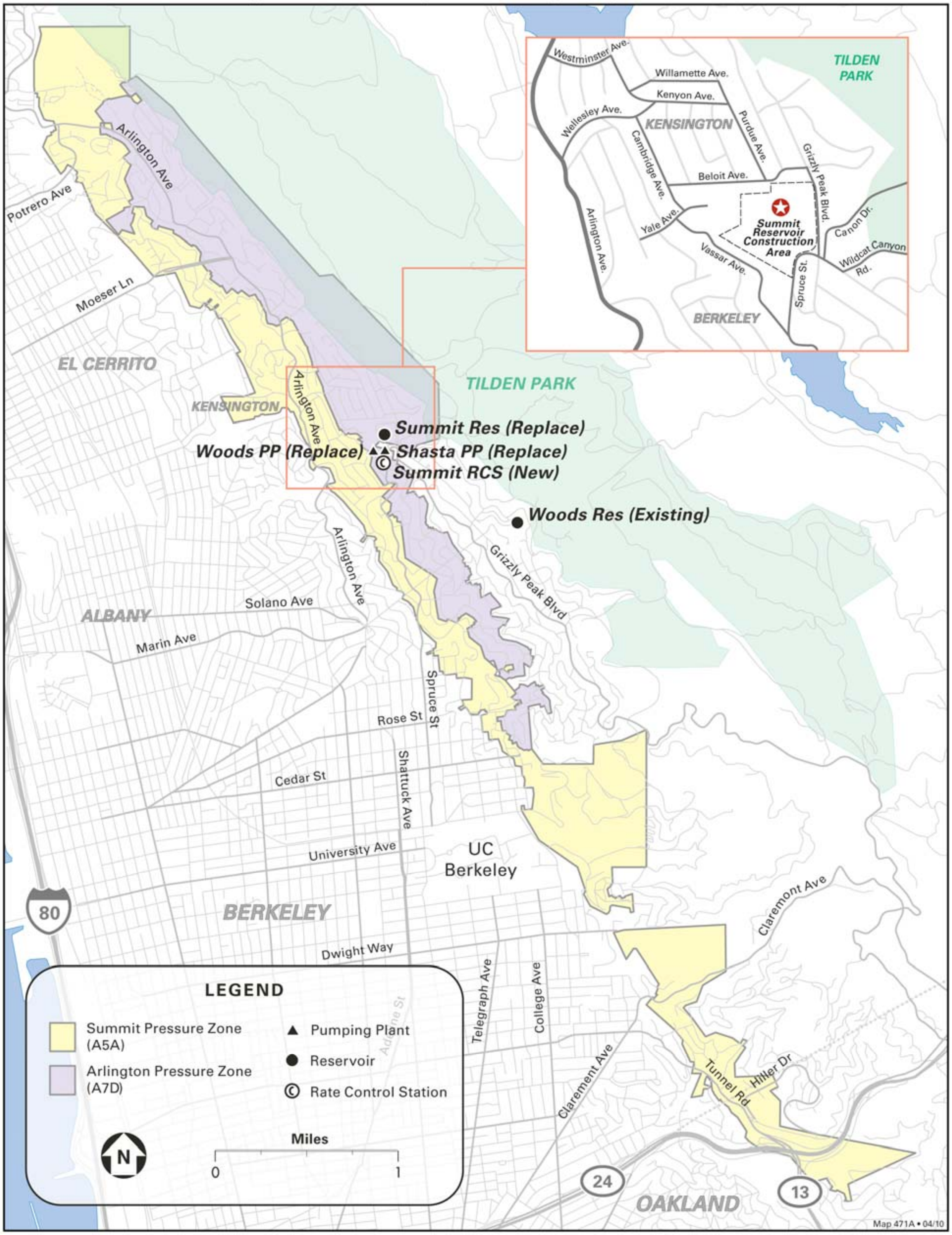
7-1-10

Xavier J. Irias, Director of Engineering and Construction
East Bay Municipal Utility District

Date

XJI:WRK:sb
sb10_139.doc

Summit Reservoir Replacement Project Vicinity Map



APPENDIX C

Initial Study

Summit Reservoir Replacement Project

2010

ENVIRONMENTAL CHECKLIST FORM

1. **Project Title:** Summit Reservoir Replacement Project

2. **Lead Agency Name and Address:** East Bay Municipal Utility District
Water Distribution Planning Division – MS 701
375 11th Street
Oakland, CA 94607

3. **Contact Person:** Robyn Mutobe, Associate Engineer

4. **Project Location:**

The Summit Reservoir is located at 416 Spruce Street, Berkeley, on 17 acres of land bordered to the north by Beloit Avenue, to the west by Vassar Avenue, to the south by Spruce Street and to the east by Grizzly Peak Boulevard. The property falls within the jurisdiction of the City of Berkeley (Alameda County) and Kensington (unincorporated Contra Costa County). Refer to Initial Study Figures.

Project Sponsor's Name and Address: East Bay Municipal Utility District
Water Distribution Planning Division – MS 701
375 11th Street
Oakland, CA 94607

5. **General Plan Designation:**

The Summit Reservoir site is designated Low Density Residential in the City of Berkeley General Plan, and Public/Semi-Public (PS) in the Contra Costa General Plan.

6. **Zoning:**

The Summit Reservoir site is zoned R1-H (Single family, Hillside Residential) in the City of Berkeley General Plan and R-6: Single Family Residential District in the Contra Costa County General Plan.

7. **Description of Project** (Describe the whole action involved, including, but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary):

The Summit Reservoir Replacement Project entails demolition of the existing 37-MG open-cut concrete reservoir with a replacement 3.5 MG partially buried concrete tank, replacement of the existing Woods and Shasta Pumping Plants, addition of a new Summit flow control valve (within the pumping plant structure) to access storage from Woods Reservoir, and related pipelines.

8. **Surrounding land uses and setting (briefly describe project's surroundings):**

Land uses surrounding the Summit Reservoir site are primarily single family residential. There is a church located at the corner of Grizzly Peak Boulevard, Spruce Street and Wildcat Canyon, directly south of the reservoir site. Tilden Park is approximately 1/4 mile to the east. A detailed project description is included in the Summary Section and Chapter 2, Project Description, of the EIR.

9. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement):**

- Regional Water Quality Control Board: Stormwater Pollution Prevention Permit
- Division of Safety of Dams: review and approval of plans for modifying Summit Dam
- California Air Resources Board: registration of portable engines, air compressors and generators.
- California Department of Fish and Game & U.S. Fish and Wildlife Service: pre-construction surveys for raptors or special species birds if construction occurs during the February 1-August 31 breeding season.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below could potentially be affected by this project, but would be mitigated to a less than significant level as indicated by the checklist on the following pages.

☒	Aesthetics	☐	Agriculture Resources	☒	Air Quality
☒	Biological Resources	☒	Cultural Resources	☒	Geology/Soils
☒	Greenhouse Gas Emissions	☒	Hazards/Hazardous Materials	☒	Hydrology/Water Quality
☐	Land Use/Planning	☐	Mineral Resources	☒	Noise
☐	Population/Housing	☐	Public Services	☐	Recreation
☒	Transportation/Traffic	☐	Utilities/Service Systems	☒	Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment because all potentially significant effects (a) have been analyzed adequately in an earlier Environmental Impact Report pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier Environmental Impact Report, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_______________________________ Signature

_______________________________ Date

_______________________________ Printed Name

_______________________________ For

EVALUATION OF ENVIRONMENTAL IMPACTS

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) is required.
4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section this is standard language…does not mean its applicable to this EIR XVII, "Earlier Analyses," may be cross-referenced).
5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other California Environmental Quality Act (CEQA) process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c) (3) (D). Earlier analyses are discussed in the Earlier Analysis Section at the end of the environmental checklist forms.
6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different ones.
9. The analysis of each issue should identify:
   a) The significance criteria or threshold used to evaluate each question; and
   b) The mitigation measure identified, if any, to reduce the impact to less than significance.

ENVIRONMENTAL IMPACT CHECKLIST

I. AESTHETICS / VISUAL QUALITY **Would the Project:**	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
a) Have substantially adverse effect on a scenic vista?				X
b) Damage scenic resources, including but not limited to, trees, rock outcropping, and historic buildings within a state scenic highway?			X	
c) Substantially degrade the existing visual character or quality of the Site and its surroundings?			X	
d) Create a new source of substantial light or glare which would adversely affect day or night time views in the area?			X	

DISCUSSION

Ia. **No Impact.** Neither the Berkeley nor Contra Costa County General Plan .designates the Summit Reservoir site as a Scenic Route. Construction of the proposed project would occur within boundaries of the existing Summit Reservoir site. Therefore, the project would not impact a scenic vista.

Ib. **Less than Significant Impact**. The proposed project would occur within boundaries of the existing Summit Reservoir site and would not be located within a state scenic highway; no impacts on tree, rock outcrops or historic buildings within a state scenic highway would result from the project. Trees removed from the reservoir site during construction will be replaced at a three to one ratio. Therefore, the project would have a less-than-significant impact on scenic resources within a state scenic highway.

Ic. **Less than Significant Impact.** The project will change the visual character of the site due to the removal of the existing 7 acre reservoir roof, river rock design and bird sculptures, and construction of a new partially buried 3.5 MG concrete tank with a total roof surface area of 0.4 acres. The views from the streets and surrounding residences into the site will remain open and will be improved since the entire reservoir bowl and buried tank will be re-graded, re-contoured, and planted with grasses and native shrubs as part of an integrated “natural” landscape design. Therefore, the project would have a less-than-significant impact on the existing visual character or quality of the site and its surroundings.

Id. **Less than Significant Impact**. No permanent light sources would be created by the proposed project. Although paint on the partially visible tank could reflect some light from existing sources in the area, no significant glare would be produced that would adversely affect daytime views in the area. Therefore, the project would have a less-than-significant impact related to light or glare on day or night time views.

Detailed analyses of potential impacts associated with Aesthetic/Visual Quality are contained in the Summit Reservoir Replacement Draft EIR.

II. AGRICULTURE AND FOREST RESOURCES **Would the Project:**	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use? (The Farmland Mapping and Monitoring Program in the California Resources Agency, Dept. of Conservation, maintains detailed maps of these and other categories of farmland.)				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220[g]) or timberland (as defined in Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could individually or cumulatively result in loss of Farmland, to non-agricultural use?				X

DISCUSSION

IIa - e **No Impact.** The General Plan designation of the Summit Reservoir site in the City of Berkeley is Low Density Residential, with zoning of R1H (single family residential hillside).In Contra Costa County, the General Plan designation is Public/Semi-Public (public and private utilities) with zoning R-6, Single Family Residential District. The proposed project would replace existing utility facilities (reservoir, pumping plants and pipelines) and construct a new flow control valve, all within the footprint of the existing site. No change in land use on the site or surrounding areas would occur, and the project would not convert farmland to a non-agricultural use. Therefore, the project would have a less-than-significant impact on farmland, agricultural use, forestry or forest land.

IIb. **No Impact.** The project site is not currently zoned for agricultural use nor is it under a Williamson Act contract for agricultural preservation. Therefore there is no potential for significant impact and additional analysis is not required.

III. AIR QUALITY **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?			**X**	
b) Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?		X		

c) Result in a net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		X		
d) Expose sensitive receptors to substantial pollutant concentrations?		X		
e) Create objectionable odors affecting a substantial number of people?		X		

DISCUSSION

IIIa - e. Detailed analyses of the impacts and mitigation measures associated with Biological Resources are contained in the Summit Reservoir Replacement Project Draft EIR, Chapter 3, Section 3.4.

IV. BIOLOGICAL RESOURCES **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse impact, 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 the California Dept. of Fish & Game or U.S. Fish & Wildlife Service?		X?		
b) Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Dept. of Fish & Game or U.S. Fish & Wildlife Service?			X	
c) Have a substantial adverse impact on federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?		X		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	

IV. BIOLOGICAL RESOURCES **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?			X	

DISCUSSION

IVa - f. Detailed analyses of the impacts and mitigation measures associated with Biological Resources are contained in the Summit Reservoir Replacement Project Draft EIR, Chapter 3, Section 3.4.

V. CULTURAL RESOURCES **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource as defined in section 15064.5?			X	
b) Cause a substantial adverse change in the significance of a unique archaeological resource as defined in section 15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d) Disturb any human remains, including those interred outside of formal cemeteries?		X		

DISCUSSION

Va - d. Detailed analyses of the impacts and mitigation measures associated with Cultural Resources are contained in the Summit Reservoir Replacement Project Draft EIR, Chapter 3, Section 3.5.

VI. GEOLOGY AND SOILS **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:		X		
i) 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?		X		
ii) Strong seismic ground shaking?		X		
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?		X		
b) Would the project result in substantial erosion or the loss of topsoil?		X		

VI. GEOLOGY AND SOILS **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
c) Is the project located on strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		X		
d) Is the project located on expansive soil as defined in Table 18-1-B of the Uniform Building Code, 1994, creating substantial risks to life or property?		X		
e) Where sewers are not available for the disposal of wastewater, is the soil capable of supporting the use of septic tanks or alternative wastewater disposal systems?				X

DISCUSSION

VIa - e. Detailed analyses of the impacts and mitigation measures associated with Geology and Soils are contained in the Summit Reservoir Replacement Project Draft EIR, Chapter 3, Section 3.3.

VII. GREENHOUSE GAS EMISSIONS **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, based on any applicable threshold of significance?			X	
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

DISCUSSION

VIIa-b. Detailed analyses of the impacts and mitigation measures associated with Greenhouse Gas Emissions are contained in the Summit Reservoir Replacement Draft EIR for the project, Chapter 3, Section 3.8.

VIII. HAZARDS AND HAZARDOUS MATERIALS **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		X		
b) 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?		X		

VIII. HAZARDS AND HAZARDOUS MATERIALS **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?		X		
d) Be located on a site which is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and as a result, would it create a significant hazard to the public or the environment?				X
e) 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 result in a safety hazard for people residing or working in the project area?				X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?		X		
h) Expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?			X	

DISCUSSION

VIIIa - h. Detailed analyses of the impacts and mitigation measures associated with Hazards and Hazardous Materials are contained the Summit Reservoir Replacement Project Draft EIR, Chapter 3, Section 3.11.

IX. HYDROLOGY AND WATER QUALITY **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Violate Regional Water Quality Control Board water quality standards or waste discharge requirements?			X	
b) 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 (i.e., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?			X	

IX. HYDROLOGY AND WATER QUALITY **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
c) Substantially alter the existing drainage pattern of the site area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite?			X	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?			X	
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems to control?			X	
f) Otherwise substantially degrade water quality?				X
g) Place housing within a 100-year flood plain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood plain structures which would impede or redirect flood flows?				X
i) 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?				X
j) Inundation by seiche, tsunami, or mudflow?				X

DISCUSSION

IXa - j. Detailed analyses of impacts and mitigation measures associated with Hydrology and Water Quality are contained in the Summit Reservoir Replacement Project Draft EIR, Chapter 3, Section 3.10.

X. LAND USE AND PLANNING **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X

X. LAND USE AND PLANNING **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
c) Conflict with any applicable habitat conservation plan or natural communities' conservation plan?				X

DISCUSSION

Xa. **No Impact.** The project site is already developed with a reservoir, and the proposed project is a replacement of the same use; thus the project is an established land-use within an established residential community. There would be no change of land–use, and the project would not physically divide an established community. The reservoir has been in existence since 1898 and preceded residential development of the area.

Xb. **No Impact.** EBMUD is not subject to the building and zoning ordinances of local jurisdictions for projects involving the storage of water (refer to section 53091 of California State Planning, Development, and Zoning Regulations). However, it is EBMUD's practice to be consistent with the regulations of all local jurisdictions to the extent feasible, where such actions would not compromise EBMUD's public purpose or responsibilities.

Xc. **No Impact**. Refer to item g) in the Biological Resources section above.

XI. MINERAL RESOURCES **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) 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?				X
b) 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?				X

DISCUSSION

XIa - b. **No Impact.** The California Geological Survey (CGS) has classified lands within the San Francisco Bay region into four Mineral Resource Zones (MRZs). The classification of MRZs is based on guidelines adopted by the California State Mining and Geology Board, as mandated by the Surface Mining and Reclamation Act of 1975. No MRZs were identified on the Project site according to the DMG Open File Report 96-03 (Ref Plate 9 of 13, Richmond Quadrangle).

According to the City of Berkeley Environmental Management Element, 1992, due to its long-established urban character, Berkeley has no active timber harvesting, mineral extraction or fish and game industries. The Contra Costa General Plan 1996 notes that according to available Division of Mines and Geology and Contra Costa General Plan Maps, three areas located in Port Costa, the City of Richmond, and Hercules (near the existing Hercules Pump Station) have been identified as occupying significant or potentially significant mineral resources that are of value for both the state and the region. Each of these areas lies outside of the existing Summit Reservoir site and access to them would not be impaired as a result of the Project.

XII. NOISE **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?		X		
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e) 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?				X
f) 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?				X

DISCUSSION

XIIa - f. Detailed analyses of impacts and mitigation measures related to Noise/Vibration are contained in the Summit Reservoir Replacement Project Draft EIR, Chapter 3, Section 3.9.

XIII. POPULATION AND HOUSING **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X

DISCUSSION

XIIIa. **No Impact.** The proposed project is a replacement of existing water distribution facilities at approximately the same location on the existing reservoir site. The proposed project does not include any residential, commercial, or other component that could alter regional or local population characteristics. The proposed project would not change the capacity of the existing pressure zone or larger distribution system.

XIIIb & c. **No Impact.** All construction activities would occur on and within the existing Summit Reservoir site. Temporary construction access, stockpiling, and staging areas would affect only the Summit Reservoir site. No housing presently exists at the project site or is proposed for the project site; therefore, the proposed project would not displace people or housing from the site and no relocation would be required.

XIV. PUBLIC SERVICES **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?				X
ii) Police protection?				X
iii) Schools?				X
iv) Parks?				X
v) Other public facilities?				X

DISCUSSION

XIVa.i-v. **No Impact.** The project would not induce population growth by making additional water supply available for new development. The project refurbishes and replaces existing facilities to improve water quality and reliability of the existing water distribution system that currently serves customers in the City of Berkeley and Contra Costa County. Only planned growth, approved and permitted by these two local government agencies would be served by these improved facilities.

XV. RECREATION **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Would the project 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?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

DISCUSSION

XVa. **No Impact.** The project would not generate or attract additional populations, as would be associated with residential, commercial or industrial uses; therefore it would not affect demand for recreational facilities.

XVb. **No Impact**. There are existing, publicly accessible overlook areas at two locations along the reservoir site perimeter (on Spruce Street and at the northeast end of the property along Grizzly Peak Boulevard.). A new landscaped pedestrian path is proposed along Grizzly Peak Boulevard, inboard of the existing public sidewalk. However, no increase to recreational facilities is proposed by the project therefore no increase in the number of pedestrians that walk the site or adverse effect to the environment is anticipated.

XVI. TRANSPORTATION / TRAFFIC **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?		X		
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?		X		
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		X		

XVI. TRANSPORTATION / TRAFFIC **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
e) Result in inadequate emergency access?		X		
f) Result in inadequate parking capacity?		X		
g) Conflict with adopted policies supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X

DISCUSSION

XVIa - g. Detailed Transportation/Traffic impact assessments and mitigation measures are contained in the Summit Reservoir Replacement Project Draft EIR, Chapter 3, Section 3.6.

XVII. UTILITIES AND SERVICE SYSTEMS **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
e) Has the wastewater treatment provider which serves or may serve the project determined that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Is the project served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X

DISCUSSION

XVIIa, b & e. **No Impact.** The project does not include any wastewater facilities.

XVIIc. **Less than Significant** with Mitigation Incorporated. Existing storm drain facilities would be reused. Connections from new facilities to existing storm drain facilities on site would be made. A major goal of the site planning engineering included maintaining existing drainage patterns. Because the impermeable 7 acre roof of the existing reservoir would be removed and replaced with a much smaller reservoir tank (roof area equal to approx. 0.4- 0.5 acre) the storm water runoff would be substantially reduced from the existing conditions, with a commensurate increase in percolation.

XVIId. **No Impact.** The project would not result in the need for new additional water supply.

XVIIf & g. **No Impact.** Solid waste generated in the form of construction debris that cannot be reused at the project site would be disposed of at appropriate receiving locations identified by the contractor in response to standard EBMUD construction specification regarding material off-haul and disposal. On site recycling of concrete would reduce the amount of construction debris off-hauled from the site. Since EBMUD is reusing as much of the construction debris as feasible and legally permitted, solid waste generation would be a less than significant construction related impact of the project. The project would dispose of all demolition debris in accordance with all applicable state and local rules and regulations. No additional solid waste would be generated after the completion of project. Therefore, the project would not conflict with federal, state, and local statutes and regulations related to solid waste.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		
b) Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?		X		
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

DISCUSSION

XVIIIa & b. **Less than Significant with Mitigation Incorporated.** The project includes the downsizing of a large open cut reservoir (from 37 MG to 3.5 MG), replacement of two existing pumping plants, a new flow control valve and related pipeline improvements. With implementation of mitigation measures referenced in the relevant sections of Chapter 3 of the Draft EIR, the project would not significantly or adversely impact a sensitive environmental resource.

XVIIIc. **Less than Significant Impact.** The project would not result in substantial adverse effect on human beings or their environment.

EARLIER ANALYSIS

Earlier analyses may be used where, pursuant to the tiering, a program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration (Section 15063 (c)(3)(D)).

Data from the following documents were used in the development of the above environmental checklist forms. These documents are available for review at the offices of the East Bay Municipal Utility District, 375 11th Street, Oakland, California 94607; Contact Bill Maggiore, Senior Engineer (510) 287-1021.

REFERENCES

Bay Area Air Quality Management District (BAAQMD), 1999. BAAQMD CEQA Guidelines for Assessing the Air Quality Impacts of Projects and Plans. Available online at http://www.baaqmd.gov/pln/ceqa/ceqa_guide.pdf

Bay Area Air Quality Management District (BAAQMD), 2000. Bay Area 2000 Clean Air Plan and Triennial Assessment. Available online at http://www.baaqmd.gov/pln/plans/index.htm

Bay Area Air Quality Management District (BAAQMD), 2001. Revised San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard. Available online at http://www.baaqmd.gov/pln/plans/index.htm

Bay Area Air Quality Management District (BAAQMD), 2009c. California Environmental Quality Act Draft Air Quality Guidelines. Available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/Planning-Programs-and-Initiatives/CEQA-GUIDELINES.aspx

California Air Resources Board (CARB), 2007. Emission Inventory Criteria and Guidelines for the Air Toxics “Hot Spots” Program. Available online at http://www.arb.ca.gov/ab2588/final/reg.pdf

California Air Resources Board (CARB), 2009a. California Ambient Air Quality Standards (CAAQS). Available online at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf

California Air Resources Board (CARB), 2009b. Area Designations Maps / 2006 State and 2009 National. Available online at http://www.arb.ca.gov/desig/adm/adm.htm#state

California Air Resources Board (CARB), 2009c. Greenhouse Gas Inventory for 2000-2006 Summary by IPCC Category. Available online at http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_ipcc_00-06_sum_2009-03-13.pdf

California Energy Commission (CEC), 2009. Draft Climate Action Team Report to the Governor and Legislature. Available online at http://www.energy.ca.gov/2009publications/CAT-1000-2009-003/CAT-1000-2009-003-D.PDF

California Integrated Waste Management Board, 2007. Available online at http://www.ciwmb.ca.gov/Publications/General/53008003.pdf

Central California Information Center, 2010. Cultural resources records search.

Contra Costa County, 2005. Contra Costa County General Plan 2005-2020. Available online at http://www.co.contra-costa.ca.us/depart/cd/current/advance/GeneralPlan/CCCGeneralPlan.pdf

Contra Costa County, 2007. 2007 Agricultural Preserves Map. Available online at http://www.co.contra-costa.ca.us/depart/cd/current/advance/williamsonact/2006Map.pdf

Contra Costa Transportation Authority (CCTA), 2009. Countywide Comprehensive Transportation Plan. Available at online http://www.ccta.net/EN/main/planning/countywideplan.html accessed on November 23.

Department of Toxic Substance Control (DTSC), 2003. Available online at http://www.dtsc.ca.gov/HazardousWaste/Projects/upload/CWM_B19_DP.pdf

East Bay Municipal Utility District, February 2010b. Alternative Energy Programs: Saving Energy While Keeping Rates Low (draft 2).

Federal Highway Administration (FHWA). Highway Construction Noise Handbook. Available online at http://www.fhwa.dot.gov/environment/noise/handbook/09.htm

Native American Heritage Commission, 2010. Sacred lands file search.

Northwest Information Center, 2010. Cultural resources records search.

South Coast Air Quality Management District (SCAQMD), 1993 (updates 2008). CEQA Air Quality Handbook. Available online at http://www.aqmd.gov/ceqa/hdbk.html

U.S. Environmental Protection Agency (USEPA), 2006. Compilation of Air Pollution Emission Factors (AP-42), Fifth Edition (1995-2006). Available online at http://www.epa.gov/ttn/chief/ap42/

U.S. Environmental Protection Agency (USEPA), 2009a. National Ambient Air Quality Standards. Available online at http://www.epa.gov/air/criteria.html

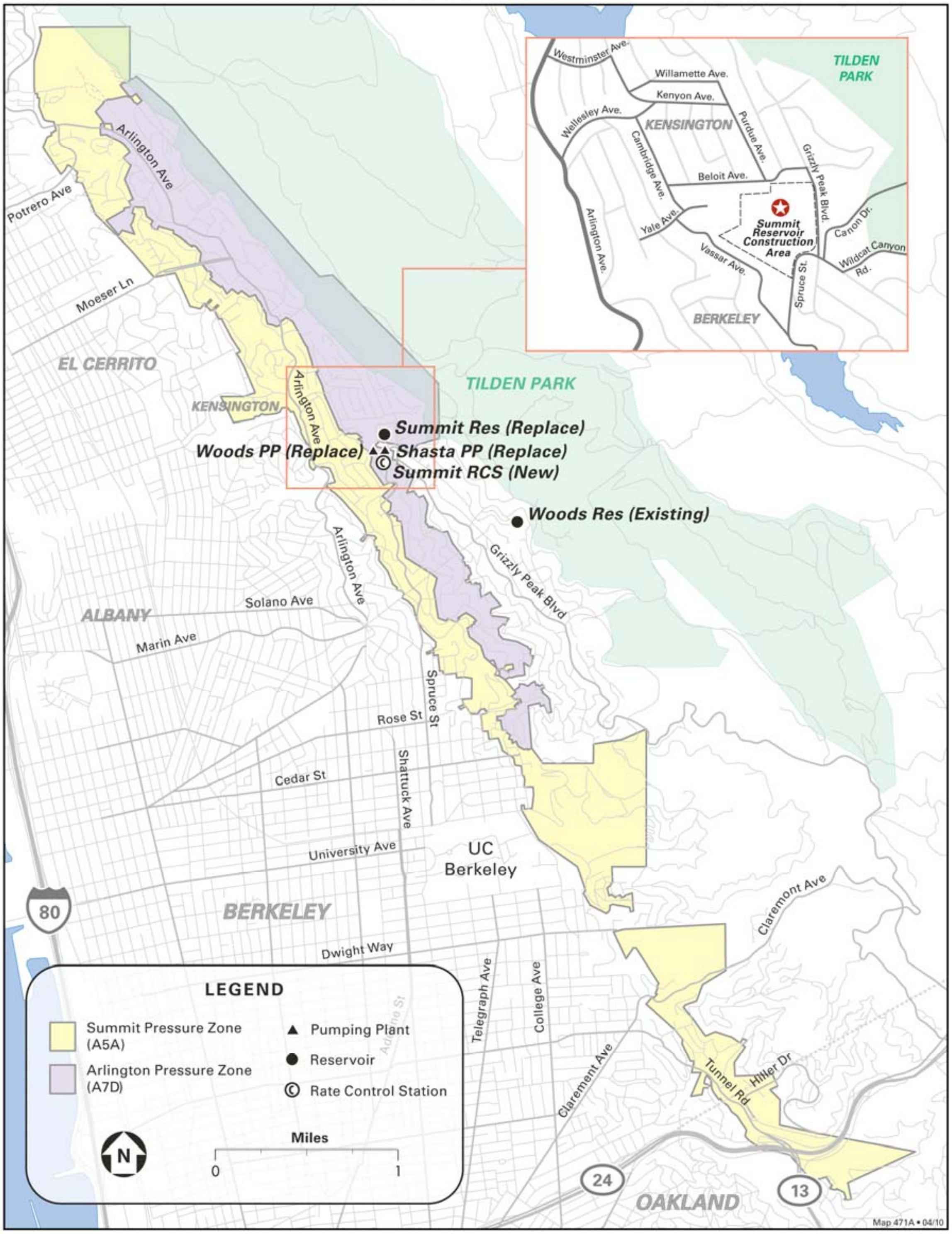
U.S. Environmental Protection Agency (USEPA), 2009b. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007. Available online at http://epa.gov/climatechange/emissions/usinventoryreport.html

University of California Museum of Paleontology, 2010. Paleontological resources records search
.

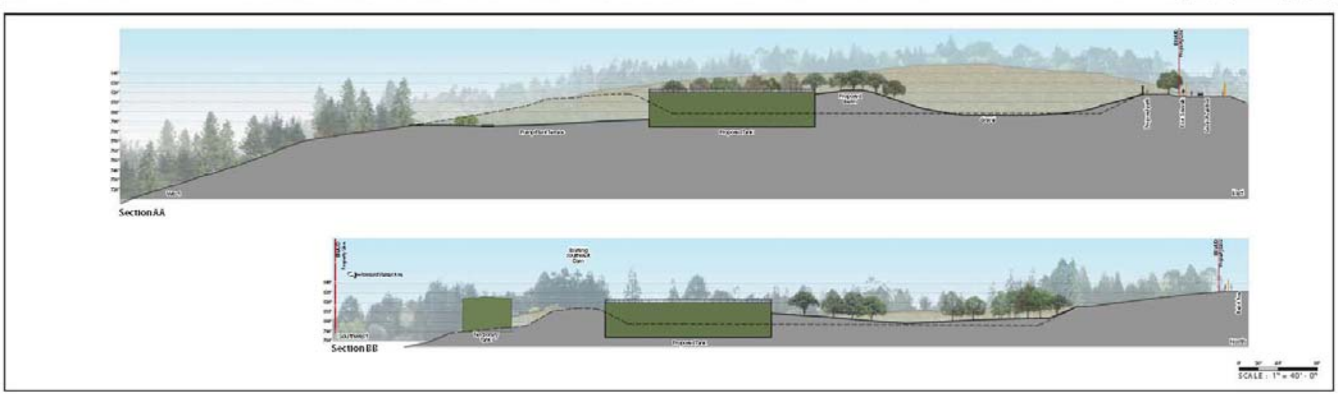
FIGURES

Summit Reservoir Replacement Project
Initial Study

Summit Reservoir Replacement Project Vicinity Map




BELOIT AVE
property line
PLATEAU DR
GRIZZLY PEAK BLVD
Colored Gravel
(Reuse existing)
CONTRA COSTA COUNTY
ALAMEDA COUNTY
TANK
PUMP
PLANT
TEMPORARY
TANK
CANON DR
SPRUCE ST
VASSAR AVE
property line


Section AA
Section BB

Existing Resevoir Basin with Aerial Photo

Summit Reservoir Project
Prepared for EBMUD by Dillingham Associates
September 24, 2009