EAST BAY MUNICIPAL
UTILITY DISTRICT

Alameda–North Bay Farm Island Pipeline Crossings Project

Draft Environmental Impact Report

JULY 2016

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ENVIRONMENTAL, INC.

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Draft Environmental Impact Report

JULY 2016

Prepared for:
East Bay Municipal Utility District
Water Distribution Planning Division
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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter

A

A-P Act	Alquist-Priolo Earthquake Fault Zoning Act
AB	Assembly Bill
ACFCD	Alameda County Flood Control District
ACTC	Alameda County Transportation Commission
ADT	average daily traffic
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Air Basin	San Francisco Bay Area Air Basin
amsl	above mean sea level
APE	Area of Potential Effects
AWSC	all-way-stop-control

B

BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
Basin Plan	Water Quality Control Plan for the San Francisco Bay Basin
BCDC	San Francisco Bay Conservation and Development Commission
BMP	best management practice

C

C&D	Construction and Demolition
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emission Estimator Model Version 2013.2.2
CAFE	corporate average fuel economy
Caltrans	California Department of Transportation

ACRONYMS AND ABBREVIATIONS

CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
CAL OSHA	California Occupational Safety and Health Administration
CANAGPRA	California Native American Graves Protection and Repatriation Act
CAP	Clean Air Plan
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDC	California Department of Conservation
CDFW	California Department of Fish and Wildlife
CDMG	California Division of Mines and Geology
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CFS	Underwater Pipeline Crossings Feasibility Study
CGS	California Geologic Survey
CH_4	methane
CHRIS	California Historical Resources Information System
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPUC	California Public Utilities Commission
CRHP	California Register of Historic Places
CRHR	California Register of Historic Resources
CTMP	Construction Traffic Management Plan
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CWC	California Water Code

D

dB	decibels
dBA	A-weighted decibels
dbh	diameter at breast height
DPM	diesel particulate matter
DPS	Distinct Population Segment
DTSC	California Department of Toxic Substances Control

E

EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Parks District
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
ESA	Endangered Species Act

F

FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations

G

g	the acceleration due to Earth's gravity
GDP	gross domestic product
GHG	greenhouse gas
GIS	geographic information system
GWP	global warming potential

H

H_2S	hydrogen sulfide
HAPC	Habitat Area of Potential Concern
HCP	Habitat Conservation Plan
HCM	Highway Capacity Manual
HDD	horizontal directional drilling
HDPE	high-density polyethylene
HFC	hydrofluorocarbon

HRI	California Historical Resources Inventory

I

I-80	Interstate 80
I-280	Interstate 280
I-880	Interstate 880
IHA	Incidental Harassment Authorization
in/sec	inches per second

K

KG	kindergarten

L

L_{01}	noise level exceeded 10 percent of the specific period of time
L_{10}	noise level exceeded 10 percent of the specific period of time
L_{50}	noise level exceeded 50 percent of the specific period of time
L_{90}	noise level exceeded 90 percent of the specific period of time
L_{eq}	equivalent noise level
L_{max}	maximum noise level
L_{min}	minimum noise level
LOA	Letter of Authorization
LOS	Level of Service
LUP	Linear Underground/Overhead Project
LUST	Leaking Underground Storage Tank

M

MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MISA	Marine Invasive Species Act
MLD	Most Likely Descendant
MMPA	Marine Mammal Protection Act
MMRP	Mitigation Monitoring and Reporting Plan
$MTCO_2e$	metric tons of CO_2e

$MMTCO_2e$	million metric tons of CO_2e
mph	miles per hour
MRP	Municipal Regional Stormwater NPDES Permit
MTS	Metropolitan Transportation System
MY	model years

N

NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	California Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NPSC	Non-Point Source Control Program
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NWIC	Northwest Information Center

O

O_3	ozone
OSHA	Occupational Safety and Health Administration

P

PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl

PFC	perfluorocarbon
PG&E	Pacific Gas & Electric
pH	measure of the molar concentration of hydrogen ions in a solution; a measure of the acidity or basicity of the solution
PM	particulate matter
$PM_{2.5}$	particulate matter up to 2.5 micrometers in size
PM_{10}	particulate matter up to 10 micrometers in size
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code

R

RCRA	Resource Conservation and Recovery Act
RNA	Regulated Navigation Area
ROG	reactive organic gases
RORS	Routes of Regional Significance
ROW	right-of-way
RTU	remote terminal unit
RWQCB	Regional Water Quality Control Board

S

Scoping Plan	California Air Resources Board Climate Change Scoping Plan
SF_6	sulfur hexafluoride
SFRWQCB	San Francisco Bay Regional Water Quality Control Board
SHM	Seismic Hazard Mapping
SIP	State Implementation Plan
SR-61	State Route 61
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board

T

TAC	toxic air contaminant
TMDL	total maximum daily load
TWSC	two-way-stop-control

U

US	United States
US DOT	United States Department of Transportation
USACE	United States Army Corps of Engineers
USA North	Underground Services Alert of Northern California
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank

V

v/c	volume-to-capacity ratio
VPD	vehicles per day
VTS	Vessel Traffic Service

W

WTP	Water Treatment Plant

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EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This Draft Environmental Impact Report (EIR) assesses the potential impacts of the Alameda–North Bay Farm Island Pipeline Crossings Project (proposed project) proposed by the East Bay Municipal Utility District (EBMUD). Figure ES-1 shows the proposed project location, as well as nearby cities and major roadways in the proposed project's vicinity.

This document has been prepared in accordance with the California Environmental Quality Act (CEQA) Statue, Public Resources Code Sections 21000-21178, Statutes and Guidelines, 14 California Regulations Section 15000-15387. EBMUD is the lead agency for the CEQA process. Written comments about the proposed project or Draft EIR should be directed to:

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375 Eleventh Street, MS 701
Oakland, CA 94607
alamedacrosssings@ebmud.com

ES.2 BACKGROUND

The proposed project includes the abandonment of seven existing underwater pipeline crossings and the construction of three new underwater pipeline crossings and their associated pipeline alignments in roadways. Construction of new pipelines would facilitate repair and replacement of aging infrastructure, to ensure the long-term reliability and redundancy of EBMUD's water distribution system, and to meet existing and future water needs. The proposed project is located in the City of Oakland and the City of Alameda, including Alameda Island and North Bay Farm Island.

ES.3 PROJECT DESCRIPTION

The proposed project involves the construction and operation of three transmission pipelines (24-inch inner diameter) in Alameda County within the Cities of Oakland and Alameda (see Figure ES-1). Each pipeline is described below:

- ***Crossing #1.*** Crossing #1, known as the Estuary Park–Marina Village Crossing, is approximately 2.3 miles long. The new pipeline would connect to existing transmission pipelines in Oakland, cross under the Oakland Inner Harbor, and continue through Alameda to its connection point. Proposed project activities associated with Crossing #1 would include abandoning and replacing an existing pipeline. One alternate route option for the replacement of an existing pipeline in Oakland is being considered. Construction activities would occur within city streets, one business park parking lot (the Telecare Corporation), and Estuary Park.

- ***Crossing #2.*** Crossing #2, known as the Alameda–North Bay Farm Island Crossing, is approximately 1-mile long. The new pipeline would connect to existing transmission pipelines on Alameda Island, cross under the San Leandro Bay Channel, and continue on North Bay Farm Island to its connection point. Construction activities would occur within city streets and within Towata Park.
- ***Crossing #3.*** Crossing #3, known as the Derby Crossing, is approximately 1-mile long. The new pipeline would connect to existing transmission pipelines in Oakland, cross under the Tidal Canal, and continue in Alameda to its connection point. Proposed project activities associated with Crossing #3 would include replacing an existing pipeline. One alternate route option for open trench construction in Alameda is being considered. Construction activities would occur within city streets.

Seven existing underwater pipeline crossings would be abandoned. Pipeline abandonment would require the excavation of construction pits. For the most part, construction of the pipelines would utilize open trench construction methods.

Open trench construction consists of locating utilities, potholing for utilities, saw-cutting the pavement, excavating a trench, removing and stockpiling soils, installing the pipeline, backfilling the trench and applying temporary paving, pressure testing and disinfecting the pipeline, and repaving.

Horizontal directional drilling (HDD) would be required for each underwater pipeline crossing. HDD entails the following steps:

- Ramming a steel conductor casing approximately 200 feet long into the ground on both sides of the drilling operation to support the pipeline until the pipeline reaches deeper and more stable soil and to prevent hydraulic fracturing (“frac-out”) at the surface
- Drilling a pilot hole from the entry pit across the water to the insertion pit or from both entry and ends;
- Enlarging the pilot hole through a reaming process;
- Laying down, fusing together, and pressure testing the pipeline;
- Pulling the pipeline into the insertion pit, through the enlarged pilot hole, and to the receiving pit;
- Injecting grout between the pipeline and casing;
- Injecting jet-grouted columns to provide additional support to the casing between the entry pit and the shoreline;
- Backfilling the HDD pit; and
- Temporary paving, disinfecting the pipeline, and repaving.

Figure ES-1 Proposed Project Location

z

Jack and bore construction would be required at three locations (1) on the Oakland side of Crossing #1 to cross underneath railroad tracks, (2) on the Alameda Island side of Crossing #2 to cross underneath Otis Street, and (3) on the Alameda side of Crossing #3 (as a mitigation measure) to cross underneath Tilden Way on Everett Street. Jack and bore construction entails excavating a temporary jacking and receiving pit, constructing a temporary jacking platform in the jacking pit, drilling or jacking a casing through the earth under the road or railroad to be avoided, installing the new pipeline in the casing, connecting the new pipeline-to-pipeline segments on either end of the underwater pipeline crossing, backfilling the jacking and receiving pit and temporary paving, pressure testing and disinfecting the pipeline, and repaving.

A pre-construction geotechnical investigation would be conducted for the HDD crossings and jack and bore locations. Exploratory borings would be made at the HDD entry and insertion pit locations and along the underwater alignment as well as at each jack and bore pit. The geotechnical borings on land would be conducted using a truck-mounted drill rig and the in-channel geotechnical borings would be conducted using a drill rig on a barge.

Construction would typically occur from 7:00 a.m. to 7:00 p.m. Construction of Crossing #1 is the highest priority because it would replace the oldest and most vulnerable existing underwater pipeline crossing. Construction of Crossing #1 is anticipated in 2018–2019 and construction would last between 13 and 22 months. The schedule for construction of Crossings #2 and #3 would be determined at a future date (i.e., after 2020 but before the existing pipelines reach the end of their useful lives). Crossings #2 and #3 would not be constructed at the same time as each other. Construction of Crossing #2 is estimated to last between 9 and 18 months and construction of Crossing #3 is estimated to last between 9 and 19 months.

ES.4 SUMMARY OF IMPACTS

Table ES-1, which is provided at the end of the Executive Summary, is a summary of all significant impacts and EBMUD Practices and Procedures that would be applied for the proposed project. Table ES-2, also provided at the end of the Executive Summary, is a summary of all significant impacts following implementation of EBMUD Practices and Procedures and required mitigations identified for the proposed project, as well as impacts identified as less than significant. For all significant impacts, the significance after mitigation is determined. Tables ES-1 and ES-2 identify the crossings to which each of the EBMUD Practices and Procedures and mitigation measures is applicable.

ES.5 ANALYSIS OF PROPOSED PROJECT AND DESIGN ALTERNATIVES

Alternatives considered in this EIR were drawn from the planning report for the proposed project (*Alameda-North Bay Farm Island Crossings Master Plan*) and discussions with EBMUD staff. Alternatives were developed through consideration of the potential environmental impacts of the proposed project. Public input during the scoping process did not yield any suggestions for alternatives, other than a request by the City of Oakland for an alternative alignment that does not pass through Estuary Park. A range of alternatives were considered and those that did not meet most of the basic proposed project objectives, were infeasible, or did not avoid or substantially lessen the proposed project's potential environmental impacts were eliminated from further consideration. Based on the potential to reduce potentially significant impacts, the following alternative alignments were chosen for further review:

- **Oakland Inner Harbor Crossing in the Vicinity of Posey Tube with Microtunneling (Alternative 1A from the Master Plan).** This alternative was selected for its potential to reduce construction-related impacts to Estuary Park since the alignment would not pass through the park. This alternative would also reduce (less than significant) traffic impacts associated with pipeline laydown for HDD, as pipeline laydown would not be needed for microtunneling.
- **Oakland Tidal Canal Crossing in the Vicinity of Derby Avenue with Microtunneling (Alternative 3A from the Master Plan).** This microtunneling alternative would not require pipeline laydown; therefore, the significant and unavoidable traffic impacts of Alternative #3 caused by HDD pipeline laydown would be eliminated. However, microtunneling would have other, greater impacts to or from air quality, greenhouse gases, hazards, and noise.

ES.6 ISSUES RAISED DURING PUBLIC OUTREACH AND SCOPING PERIOD

In accordance with Sections 15063 and 15082 of the CEQA Guidelines, EBMUD prepared a Notice of Preparation (NOP) for this Draft EIR. The NOP provided a general description of the proposed project, a map of the proposed project location, and a preliminary list of potential environmental impacts. The NOP was published on August 20, 2015, and the required 30-day review/comment period expired on September 21, 2015. The NOP was sent out as a postcard mailer to the approximately 1,760 residents and property owners and the full NOP and the NOP postcard were sent to an additional 37 agencies and special interest stakeholders. The NOP is included in Appendix A. Comment letters were received from two residents as well as the City of Oakland and Caltrans. Key concerns included property impacts, cumulative impacts from other nearby projects that could occur at the same time, traffic and highway impacts, noise impacts, and parks and recreational impacts.

EBMUD conducted two community meetings in September 2015 to discuss the proposed project and to solicit public input. Appendix A of this Draft EIR presents a description of public outreach efforts. Attendance at the scoping meeting was minimal, with no attendees at the Alameda meeting and one attendee at the Oakland meeting. Traffic, dust, and noise impacts were raised as key areas of concern.

ES.7 RESOURCES NOT EVALUATED FURTHER IN THE EIR

Pursuant to Sections 15128 and 15083 (a) of the CEQA Guidelines, this Draft EIR analyzes only the potentially significant effects identified in the Initial Study prepared for the proposed project. The resources include: Aesthetics; Air Quality; Biological Resources; Cultural

Resources; Energy Use; Geology, Soils and Seismicity; Greenhouse Gases; Hazards and Hazardous Materials; Hydrology and Water Quality; Noise; Recreation; and Transportation and Traffic.

The proposed project would have no impacts on several resources including: Agriculture and Forestry Resources, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, and Utilities and Service Systems. A detailed discussion of these resources has been excluded from this Draft EIR.

ES.8 ORGANIZATION OF THE EIR

This Draft EIR has been organized into the following chapters:

1. **Introduction**. This chapter discusses the CEQA process and the purpose of the Draft EIR.
2. **Project Description**. This chapter provides an overview of the proposed project, describes the need for and objectives of the proposed project, and describes the proposed construction process in detail.
3. **Environmental Setting, Impacts, and Mitigation Measures**. This chapter presents a description of the physical and regulatory setting of the proposed project, describes impacts that could result from implementation of the proposed project, and identifies measures to mitigate those impacts. In order of occurrence, the resource sections addressed include:
   - 3.2 Aesthetics
   - 3.3 Air Quality
   - 3.4 Biological Resources
   - 3.5 Cultural Resources
   - 3.6 Energy Use
   - 3.7 Geology, Soils, and Seismicity
   - 3.8 Greenhouse Gas Emissions
   - 3.9 Hazards and Hazardous Materials
   - 3.10 Hydrology and Water Quality
   - 3.11 Noise
   - 3.12 Recreation
   - 3.13 Transportation and Traffic
4. **Project Alternatives.** This chapter presents an overview of the alternatives development and evaluation process including alternatives of the proposed project and the "No Project" alternative. The environmentally superior alternative is identified.
5. **Other CEQA Considerations.** This chapter includes a discussion of cumulative impacts. The cumulative impacts portion describes the potential for the proposed project, in combination with other projects in the vicinity, to contribute to significant cumulative impacts. This chapter also includes a discussion of growth inducement impacts, significant irreversible environmental changes, and significant and unavoidable impacts
6. **Report Preparers.** This chapter identifies those involved in preparing the Draft EIR.

7. **Mitigation Monitoring and Reporting Plan.** This chapter summarizes the Standard Construction Specifications and Mitigation Measures that would apply to the proposed project.

The Appendices for this Draft EIR has been organized as follows:

- Appendix A: Summary of Public Scoping
- Appendix B: Initial Study
- Appendix C: Construction Details
- Appendix D: EBMUD Standard Construction Specifications
- Appendix E: Air Quality and Greenhouse Gases Technical Report
- Appendix F: Biological Resources Technical Report
- Appendix G: Cultural Resources Technical Report
- Appendix H: Geotechnical Assessment
- Appendix I: Noise and Vibration Technical Report
- Appendix J: Transportation and Traffic Technical Report

Table ES-1 Summary of Impacts and EBMUD Practices and Procedures

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
Air Quality							
Impact Air-3: Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard.	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** 1.1 (B) Site Activities 11. All construction equipment shall be properly serviced and maintained in good operating condition to reduce emissions. Contractor shall make copies of equipment service logs available upon request. 3.3 (B) Dust Control 1. Contractor shall implement all necessary dust control measures, including but not limited to the following: a. Water and/or coarse rock all dust-generating construction areas as directed by Engineer to reduce the potential for airborne dust from leaving the site. b. Cover all haul trucks entering/leaving the site and trim their loads as necessary. c. Using wet power vacuum street sweepers to: 1) Sweep all paved access road, parking areas and staging areas at the	X	X	X	X	Potentially Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		construction site daily or as often as necessary. 2) Sweep public roads adjacent to the site at least twice daily or as often as necessary. d. Gravel or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. e. Water and/or cover soil stockpiles daily. f. Hydroseed or otherwise stabilize exposed soil/rock side slopes. g. Restrict on-site construction vehicle speeds to fifteen (15) mph or less. 3.3 (C) Dust Monitoring During Demolition and Construction: 1. Provide air monitoring per the Dust Control and Monitoring Plan along the perimeter of the job site. A minimum of 4 stations, one on each side of the District property, shall be established, capable of daily measurement of total particulate concentration when any dust generating activity is occurring. a. All environmental and personal air sampling					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		equipment shall be in conformance with the Association of Industrial Hygiene and National Institute of Safety and Health (NIOSH) standards. b. All analysis shall be completed by a California Department of Health Services certified laboratory for the specific parameters of interest. c. The Contractor shall provide to the Engineer, within 72 hours of sampling all test results. 3.4 (A) Air Quality and Emissions Control 1. The Contractor shall ensure that line power is used instead of diesel generators at all construction sites where line power is available. 2. The Contractor shall ensure that for operation of any stationary, compression-ignition engines as part of construction, comply with Section 93115, Title 17, California Code of Regulations, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, which specifies fuel and fuel					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		additive requirements as well as emission standards. 3. Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) shall be electrically powered unless the Contractor submits documentation and receives approval from the Engineer that the use of such equipment is not practical, feasible, or available. All portable engines and equipment units used as part of construction shall be properly registered with the California Air Resources Board or otherwise permitted by the appropriate local air district, as required. 4. Contractor shall implement standard air emissions controls such as: a. Minimize the use of diesel generators where possible. b. Limit idling of off-road compression ignition vehicles to 5 minutes or less. c. Minimize unnecessary idling of mobile construction equipment. d. Follow applicable regulations for fuel, fuel additives, and emission					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		standards for stationary, diesel-fueled engines. e. Locate generators at least 100 feet away from adjacent homes and ball fields. f. Perform regular low-emission tune-ups on all construction equipment, particularly haul trucks and earthwork equipment. 5. Contractor shall implement the following measures to reduce greenhouse gas emissions from fuel combustion: a. On road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and re-inflated at regular intervals. b. Construction equipment engines shall be maintained to manufacturer's specifications. c. Demolition debris shall be recycled for reuse to the extent feasible (excluding wood treated with preservatives).					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
Impact Air-4: Potential to expose sensitive receptors to substantial pollutant concentrations	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (11); (3.3) (B); (3.3) (C); 3.4 (A) (Details as previously listed)	X	X	X	X	Potentially Significant
Biological Resources							
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** 1.1 (B) (1) No debris, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan. 1.3 (B) Water Control and Disposal Plan: 1. Submit a detailed Water Control and Disposal Plan for the Engineer's acceptance prior to any work at the jobsite. a. Plan shall comply with all requirements of the Specification and with	X	X	X	X	Potentially Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		regulations of the California Regional Water Quality Control Board, California Department of Fish and Wildlife, County Flood Control Districts, and any other regulatory agency having jurisdiction. b. Plan shall include the sampling and analytical program for characterization of any wastewater, as needed, prior to disposal. c. Plan shall describe measures for containment, handling, and disposal of groundwater (if encountered), runoff of water used for dust control, tank heel water, wash water, sawcut slurry, test water and construction water or other liquid that has been in contact with any interior surfaces of District facilities. 2. Obtain and provide to the Engineer documentation from the agency having jurisdiction, authorizing the Contractor to dispose of the liquid and describing the method of disposal. Where applicable, provide documentation indicating					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		acceptance for disposal by a wastewater treatment plant or other disposal facility. 3. All information pertinent to the characterization of the liquid shall be disclosed to the District and the disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the disposal facility. 4. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing. 1.3 (C) Construction and Demolition Waste Disposal Plan. 1. Prepare a Construction and Demolition Waste Disposal Plan and submit a copy of the plan for the Engineer's acceptance prior to disposing of any material (except for water wastes which shall be					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		addressed in the Water Control and Disposal Plan). a. The plan shall identify how the Contractor will remove, handle, transport, and dispose of all materials required to be removed under this contract in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the disposal of removed materials. b. Include a list of reuse facilities, recycling facilities and processing facilities that will be receiving recovered materials. c. Identify materials that are not recyclable or not recovered which will be disposed of in a landfill (or other means acceptable by the State of California and local ordinance and regulations). d. List the permitted landfill, or other permitted disposal facilities, that will be accepting the disposed waste materials.					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		e. Identify each type of waste material to be reused, recycled or disposed of and estimate the amount, by weight. f. Plan shall include the sampling and analytical program for characterization of any waste material, as needed, prior to reuse, recycle or disposal. 2. Materials or wastes shall only be recycled, reused, reclaimed, or disposed of at locations approved of by the District. 3. Submit permission to reuse, recycle, reclaim, or dispose of material from reuse, recycling, reclamation, or disposal site owner along with any other information needed by the District to evaluate the acceptability of the proposed reuse, recycling, or disposal site and obtain acceptance of the Engineer prior to removing any material from the project site. 4. All information pertinent to the characterization of the material or waste shall be disclosed to the District and the reuse, recycling,					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		reclamation, or disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the reuse, recycling, reclamation, or disposal facility. 5. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing.					
Impact Bio-2: Potential to have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations or by CDFW or USFWS	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (B); (1.3) (C) (Details as previously listed)	X	X	X	X	Potentially Significant
Impact Bio-3: Potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (B); (1.3) (C) (Details as previously listed)	X	X	X	X	Potentially Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable				Significance After Practices and Procedures
			Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	
(including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means							
Impact Bio-4: Potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or could impede the use of native wildlife nursery sites	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (B); (1.3) (C) (Details as previously listed)	X	X	X	X	Potentially Significant
Geology, Soils, and Seismicity							
Impact Geology Soils-1: Potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; or landslides.	Potentially Significant	**EBMUD Engineering Standard Practices 512.1 and 550.1** EBMUD uses two primary Engineering Standard Practices for the design of water pipelines in its distribution system to address geologic hazards. Engineering Standard Practice 512.1 Water Main and Services Design Criteria, establishes basic criteria for the design of water pipelines and establishes minimum requirements for pipeline construction materials. Engineering Standard Practice 550.1 Seismic Design Requirements		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		addresses seismic design of the pipelines to withstand seismic hazards including fault rupture, ground shaking, liquefaction-related phenomena, landslides, seiches and tsunamis and requires that EBMUD establish project-specific seismic design criteria for pipelines with a diameter of greater than 12-inches, such as the water mains that would be installed under the proposed project. The text of the Engineering Standard Practices is provided in Appendix D.					
Impact Geology Soils-2: Potential to result in substantial soil erosion or the loss of topsoil.	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1) to (1.1) (B) (12) 1.1 Description B. Site Activities 1. No debris, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan. 2. Excess material shall be disposed of in locations approved by the Engineer consistent with all applicable legal requirements and disposal facility permits. 3. Do not create a nuisance or pollution as defined in the California Water Code. Do not cause a violation of any applicable water quality standards for receiving waters adopted by the Regional Board or the State Water Resources Control Board, as required by the Clean Water Act. 4. Clean up all spills and immediately notify the Engineer in the event of a spill. 5. Stationary equipment such as motors, pumps, and generators, shall be equipped with drip pans. 6. Divert or otherwise control surface water and waters flowing from existing projects, structures, or surrounding areas from coming onto the work and staging areas. The method of diversions or					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		control shall be adequate to ensure the safety of stored materials and of personnel using these areas. Following completion of Work, ditches, dikes, or other ground alterations made by the Contractor shall be removed and the ground surfaces shall be returned to their former condition, or as near as practicable, in the Engineer's opinion. 7. Maintain construction sites to ensure that drainage from these sites will minimize erosion of stockpiled or stored materials and the adjacent native soil material. 8. Furnish all labor, equipment, and means required and shall carry out effective measures wherever, and as often as necessary, to prevent Contractor's operations from causing visible dust emissions to leave the work areas. These measures shall include, but are not limited to, providing additional watering equipment, reducing vehicle speeds on haul roads, restricting traffic on haul roads, covering haul vehicles, and applying an Engineer-approved, environmentally					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		safe, dust palliative to well-traveled haul roads. The Contractor shall be responsible for damage resulting from dust originating from its operations. The dust abatement measures shall be continued for the duration of the Contract. Water the site in the morning and evening, and as often as necessary, and clean vehicles leaving the site as necessary to prevent the transportation of dust and dirt onto public roads. Dust control involving water shall be done in such a manner as to minimize waste and runoff from the site. 9. Construction staging areas shall be graded, or otherwise protected with Best Management Practices (BMPs), to contain surface runoff so that contaminants such as oil, grease, and fuel products do not drain towards receiving waters including wetlands, drainages, and creeks. 10. Furnish all labor, equipment and means required to prevent excessive noise from its Work activities. Comply with all local noise ordinances.					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		11. All construction equipment shall be properly serviced and maintained in good operating condition to reduce emissions. Contractor shall make copies of equipment service logs available upon request. 12. Any chemical or hazardous material used in the performance of the Work shall be handled, stored, applied, and disposed of consistent with all applicable federal, state, and local laws and regulations.					
Impact Geology Soils-3: Potential to be located on a geologic unit or soil that is unstable or that would become unstable as a result of the proposed project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse.	Potentially Significant	**EBMUD Engineering Standard Practices 512.1 and 550.1** The text of the Engineering Standard Practices is provided in Appendix D.		X	X	X	Less than Significant
Impact Geology Soils-4: Potential to be located on expansive or corrosive soils that would create substantial risks to life or property.	Potentially Significant	**EBMUD Engineering Standard Practices 512.1 and 550.1** The text of the Engineering Standard Practices is provided in Appendix D.		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
Greenhous Gases							
Impact GHG-1: Potential to generate annual GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	Less than Significant	**EBMUD's Standard Construction Specification 01 35 44** Sections (3.4) (A) (5) (a-c) a. On road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and re-inflated at regular intervals. b. Construction equipment engines shall be maintained to manufacturer's specifications. c. Demolition debris shall be recycled for reuse to the extent feasible (excluding wood treated with preservatives).		X	X	X	Less than Significant
Hazards and Hazardous Materials							
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 24** 1.3 (C) Excavation Safety Plan 1. Submit detailed plan for worker protection and control of ground movement for the Engineer's review prior to any excavation work at jobsite. Include drawings and details of system or systems to be used, area in which each type of system will be used,		X	X	X	Potentially Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		de-watering, means of access and egress, storage of materials, and equipment restrictions. If plan is modified or changed, submit revised plan. 2. All surface encumbrances that are located and determined to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees. 3. Tunnel work shall comply with the Tunnel Safety Orders. 1.3 (H) Electrical Safety Plan 1. Submit a detailed plan for worker protection from hazardous voltages on pipelines and appurtenances as a result of electromagnetic induction from nearby electrical transmission lines and short-circuits at the high-voltage lattice steel towers and tubular steel poles. 2. The safety plan shall include the following details at minimum: a. Procedures to limit worker contact with the bare metal on the pipeline and appurtenances, either through direct body contact or via equipment					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		which has a direct metallic path to the pipeline (e.g., a crane or backhoe using metallic slings or chains). b. Procedures to avoid placing equipment and materials near any PG&E lattice towers or tubular steel poles. c. Details of protective equipment and clothing to be used when worker contact with the pipeline is unavoidable. d. Temporary pipeline grounding and bonding details to be used during construction. e. Procedures for the installation of temporary pipeline grounding and bonding by qualified personnel (e.g., electrician). f. Procedures to notify all persons on the job site of the electrical hazard. g. Procedures to limit access to the pipeline to the public and unqualified personnel.					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		EBMUD Environmental Compliance Manual Section 9 of the Environmental Compliance Manual includes a Trench Spoils Best Management Practices (BMP) program that describes procedures to ensure that worker exposure to contaminants of concern is minimized and that trench spoils are disposed of properly. The program involves a site assessment and investigations to collect and analyze soil and groundwater samples to determine if health and safety precautions are required and to determine disposal methods for both trench spoils and/or groundwater.					
		EBMUD's Standard Construction Specification 01 35 44 1.3 (B) Water Control and Disposal Plan: 1. Submit a detailed Water Control and Disposal Plan for the Engineer's acceptance prior to any work at the jobsite. a. Plan shall comply with all requirements of the Specification and with regulations of the California Regional Water Quality Control Board, California Department of					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		Fish and Wildlife, County Flood Control Districts, and any other regulatory agency having jurisdiction. b. Plan shall include the sampling and analytical program for characterization of any wastewater, as needed, prior to disposal. c. Plan shall describe measures for containment, handling, and disposal of groundwater (if encountered), runoff of water used for dust control, tank heel water, wash water, sawcut slurry, test water and construction water or other liquid that has been in contact with any interior surfaces of District facilities. 2. Obtain and provide to the Engineer documentation from the agency having jurisdiction, authorizing the Contractor to dispose of the liquid and describing the method of disposal. Where applicable, provide documentation indicating acceptance for disposal by a wastewater treatment plant or other disposal facility.					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		3. All information pertinent to the characterization of the liquid shall be disclosed to the District and the disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the disposal facility. 4. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing. 1.3 (C) Construction and Demolition Waste Disposal Plan: 1. Prepare a Construction and Demolition Waste Disposal Plan and submit a copy of the plan for the Engineer's acceptance prior to disposing of any material (except for water wastes which shall be addressed in the Water Control and Disposal Plan). a. The plan shall identify how the Contractor will remove,					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		handle, transport, and dispose of all materials required to be removed under this contract in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the disposal of removed materials. b. Include a list of reuse facilities, recycling facilities and processing facilities that will be receiving recovered materials. c. Identify materials that are not recyclable or not recovered which will be disposed of in a landfill (or other means acceptable by the State of California and local ordinance and regulations). d. List the permitted landfill, or other permitted disposal facilities, that will be accepting the disposed waste materials. e. Identify each type of waste material to be reused, recycled or disposed of					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		and estimate the amount, by weight. f. Plan shall include the sampling and analytical program for characterization of any waste material, as needed, prior to reuse, recycle or disposal. 2. Materials or wastes shall only be recycled, reused, reclaimed, or disposed of at locations approved of by the District. 3. Submit permission to reuse, recycle, reclaim, or dispose of material from reuse, recycling, reclamation, or disposal site owner along with any other information needed by the District to evaluate the acceptability of the proposed reuse, recycling, or disposal site and obtain acceptance of the Engineer prior to removing any material from the project site. 4. All information pertinent to the characterization of the material or waste shall be disclosed to the District and the reuse, recycling, reclamation, or disposal facility. Submit copies of any profile forms and/or					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		correspondence between the Contractor and the reuse, recycling, reclamation, or disposal facility. 5. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing.					
Impact Hazards-2: Potential to create a significant hazard to the human health and/or the environment through the routine transport, use, or disposal of hazardous materials	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 24** Sections (1.3) (C) and (1.3) (H) (Details as previously listed)		X	X	X	Potentially Significant
		EBMUD's Standard Construction Specification 01 35 44 Sections (1.3) (B) and (1.3) (C) (Details as previously listed)					
Hydrology and Water Quality							
Impact Hydro-1: Potential to violate water quality standards or waste discharge requirements.	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** 1.1 (B) (1) No debris, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan. 1.3 (A) (2) (a) Alameda County Stormwater Permit: In addition to the State's General Construction Stormwater Permit, the Contractor shall obtain and comply with Alameda County Public Works Agency's Stormwater Permit to enable the inspection of C.6 construction stormwater BMPs. 1.3 (A) (3) (a) Storm Water Pollution Prevention Plan: Submit for acceptance a Stormwater Pollution Prevention Plan that describes measures that shall be implemented to prevent the discharge of contaminated storm water runoff from the jobsite. Contaminants to be addressed include, but are not limited to soil, sediment, concrete residue, pH less than 6.5 or greater than 8.5, and chlorine residual. 1.3 (B) Water Control and Disposal Plan:					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		1. Submit a detailed Water Control and Disposal Plan for the Engineer's acceptance prior to any work at the jobsite. a. Plan shall comply with all requirements of the Specification and with regulations of the California Regional Water Quality Control Board, California Department of Fish and Wildlife, County Flood Control Districts, and any other regulatory agency having jurisdiction. b. Plan shall include the sampling and analytical program for characterization of any wastewater, as needed, prior to disposal. c. Plan shall describe measures for containment, handling, and disposal of groundwater (if encountered), runoff of water used for dust control, tank heel water, wash water, sawcut slurry, test water and construction water or other liquid that has been in contact with any interior surfaces of District facilities.					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		2. Obtain and provide to the Engineer documentation from the agency having jurisdiction, authorizing the Contractor to dispose of the liquid and describing the method of disposal. Where applicable, provide documentation indicating acceptance for disposal by a wastewater treatment plant or other disposal facility. 3. All information pertinent to the characterization of the liquid shall be disclosed to the District and the disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the disposal facility. 4. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing.					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
		1.3 (D) Spill Prevention and Response Plan 1. Submit plan detailing the means and methods for preventing and controlling the spilling of known hazardous substances used on the jobsite or staging areas. The plan shall include a list of the hazardous substances proposed for use or generated by the Contractor on site, including petroleum products, and measures that will be taken to prevent spills, monitor hazardous substances, and provide immediate response to spills. Spill response measures shall address notification of the Engineer and appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup. 2. Submit a Material Safety Data Sheet (MSDS) for each hazardous substance proposed to be used prior to delivery of the material to the jobsite.					

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
Impact Hydro-3: Potential to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.	Less than Significant	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (A) (2) (a); (1.3) (A) (3) (a); (1.3) (B); (1.3) (D) (Details as previously listed)		X	X	X	Less than Significant
Impact Hydro-4: Potential to create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (A) (2) (a); (1.3) (A) (3) (a); (1.3) (B); (1.3) (D) (Details as previously listed)		X	X	X	Less than Significant
Noise							
Impact Noise-1: Potential to expose persons to or generate noise levels in excess of standards established in the local General Plan or noise ordinance or applicable standards of other agencies, and potential	Potentially Significant	**EBMUD's Standard Construction Specification 01 35 44** 1.3 (F) Noise Control and Monitoring Plan 1. Submit a plan detailing the means and methods for controlling and monitoring noise generated by		X	X	X	Potentially Significant

Environmental Impact	Impact Significance Before Mitigation	EBMUD Practices and Procedures	EBMUD Practices and Procedures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Practices and Procedures
to result in a substantial temporary or periodic increase in ambient noise levels in the proposed project vicinity above levels existing without the proposed project		demolition and other work on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan. 1.3 (G) Vibration Control and Monitoring Plan 1. Submit a plan detailing the means and methods for controlling and monitoring surface vibration generated by demolition and other work on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan.					

Table ES-2 Summary of Impacts and Mitigation Measures

<table>
<tr><th rowspan="2">Environmental Impact</th><th rowspan="2">Impact Significance Before Mitigation</th><th rowspan="2">Mitigation Measure</th><th colspan="4">Mitigation Measures Applicable</th><th rowspan="2">Significance After Mitigation</th></tr>
<tr><th>Pre-Construction Geotechnical Investigation</th><th>Crossing #1</th><th>Crossing #2</th><th>Crossing #3</th></tr>
<tr><td colspan="8">Aesthetics</td></tr>
<tr><td>Impact Aesthetics-1: Potential to substantially degrade the existing visual character or quality of the site and its surroundings</td><td>Potentially Significant</td><td>Mitigation Measure Aesthetics-1. Tree Replacement.
EBMUD shall replant trees or landscaping vegetation that are removed as a result of construction activities, consistent with the following guidelines:
1. If any mature native tree (i.e., trees that are 6 inches in diameter at breast height [dbh] or ten inches aggregate dbh for multi-trunk trees) is removed, replanting shall be with the same species at a 1:1 ratio. To allow for access to the pipeline, replanted trees shall not be located within 20 feet of the pipeline.
2. All non-native protected trees that are removed shall be replaced at a 1:1 ratio with a non-invasive or native tree species.
3. All disturbed plant, bush, and ground cover landscaping shall be restored to pre-project conditions, using similar plants and materials.</td><td></td><td>X</td><td>X</td><td>X</td><td>Less than Significant</td></tr>
</table>

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
Impact Aesthetics-2: Potential to introduce new sources of substantial light or glare which could adversely affect day or nighttime views in the area	Potentially Significant	**Mitigation Measure Aesthetics-2. Shield Night Lighting.** Stationary lighting used during nighttime construction (if required) shall be shielded and directed downward or oriented such that the light source is not directed toward residential areas or into streets where glare could impact motorists or pedestrians.		X	X	X	Less than Significant
Air Quality							
Impact Air-1: Potential to conflict with or obstruct implementation of the applicable regional air quality plan (Clean Air Plan)	Less than Significant	None Required					Less than Significant
Impact Air-2: Potential to violate an air quality standard and contribute substantially to an existing or projected air quality violation	Less than Significant	None Required					Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
Impact Air-3: Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard	Potentially Significant	**Mitigation Measure Air-1. Best Management Practices.** The construction crew shall implement the following Best Management Practices that are required of all construction projects: 1. When moisture content is low enough to create dust, all exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. All vehicle speeds on unpaved roads shall be limited to 15 mph. 5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible and feasible. Building pads shall be laid as soon as possible and feasible, as well, after grading unless seeding or soil binders are used. 6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. 8. A publicly visible sign with the telephone number and email address to contact EBMUD regarding dust complaints will be posted at the site. If dust exceeds specified limits, EBMUD shall respond and take corrective action within 48 hours.					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
Impact Air-4: Potential to expose sensitive receptors to substantial pollutant concentrations	Potentially Significant	**Mitigation Measure Air-1. Best Management Practices.**		X	X	X	Less than Significant
		Mitigation Measure Air-2. Selection of equipment during demolition, grading and open trench construction phases to minimize emissions. 1. All diesel-powered off-road equipment larger than 50 horsepower and operating during construction for more than 2 days continuously shall, at a minimum, meet USEPA particulate matter emissions standards for Tier 4 engines or equivalent. 2. The number of hours that equipment operates shall be minimized. Note that other measures may be used to minimize construction period DPM emissions to reduce the predicted cancer risk below the thresholds. Such measures may be the use of alternative powered equipment (e.g., liquefied petroleum gas-powered lifts), alternative fuels (e.g., biofuels), added exhaust devices, or a combination of measures, provided that the measures are approved by the lead agency and demonstrated to reduce community risk impacts to less than significant.		X		X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
Impact Air-5: Potential to create objectionable odors affecting a substantial number of people	Less than Significant	None Required					Less than Significant
Biological Resources							
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW or USFWS	Potentially Significant	**Mitigation Measure Biology-1. Conduct a Pre-Construction Monarch Butterfly Survey.** Prior to tree removal at HDD sites for Crossing #2 and pipeline abandonments near Crossing #2, during the monarch butterfly overwintering period from October 1 through March 1, a qualified biologist shall conduct a late fall/early winter butterfly survey within all potential habitats within 200 feet of the proposed project area. If the results of the survey do not identify any potential overwintering of the monarch butterfly on-site, no further mitigation shall be required. If overwintering monarch butterflies are determined to use the site, tree removal shall be deferred until a qualified biologist has determined that overwintering monarch butterflies are no longer using the site, or, per the direction of CDFW.			X		Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		Mitigation Measure Biology-2. Seasonal In-Channel Work Window. In-channel pre-construction geotechnical borings shall be conducted between June 1 and November 30 to avoid impacts to special-status fish species. If work must occur between June 1 and November 30, EBMUD shall implement additional minimization measures, such as buffer zones and monitoring for herring spawn, in consultation with NMFS, USFWS, and CDFW.	X				
		Mitigation Measure Biology-3. Pile Driving. No impact or vibratory pile driving shall occur within 200-feet of the Oakland Inner Harbor, Tidal Canal, or San Leandro Bay Channel.		X	X	X	
		Mitigation Measure Biology-4. Pre-Construction Special-Status Bird Survey. A pre-construction survey shall be performed prior to construction activities that would require vegetation or tree removal during the nesting season. The following measures shall be implemented: 1. If construction activities (i.e., ground clearing and grading, including removal of trees or shrubs) are scheduled to occur during the nonbreeding season (September 1 through January 31), no measures are required. 2. If construction activities are scheduled to occur during the nesting season (February 1 through		X	X	X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		August 31), the following measures shall be implemented to avoid potential adverse effects on special-status birds: A qualified wildlife biologist shall conduct pre-construction surveys of all potential nesting habitat within 500 feet of construction activities. If active nests are found during pre-construction surveys, a no- disturbance buffer shall be created (acceptable in size to the CDFW) around active raptor nests and nests of other special-status birds during the breeding season, or until it is determined that all young have fledged. Typical buffers include 500 feet for raptors, 250 feet for other nesting birds, and 50 feet for passerines. The size of the buffer zones may be further modified in coordination with the CDFW. Nests initiated during construction are presumed to be unaffected, and no buffer would be necessary. 3. Trees shall be removed outside of the nesting season to the extent feasible.					
		Mitigation Measure Biology-5. Marine Mammal Harassment Consultation. EBMUD shall consult with the National Marine Fisheries Service (NMFS) to determine whether an Incidental Harassment Authorization (IHA) or Letter of Authorization (LOA) for marine mammals is necessary prior to initiation of in-channel	X				

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		pre-construction geotechnical borings. All IHA or LOA conditions and requirements shall be adhered to by EBMUD and its contractors.					
		Mitigation Measure Biology-6. Marine Mammal Monitoring Plan. EBMUD and its contractors shall prepare and implement a Marine Mammal Monitoring Plan. The Marine Mammal Monitoring Plan shall include the following elements: 1. Establishment of an appropriate buffer zone around the work area, generally 400 feet or as defined in consultation with NMFS, that would require work be slowed or otherwise modified if a marine mammal approaches the established buffer zone. 2. A qualified biologist shall be on board the geotechnical drilling vessel during construction. 3. The qualified biologist shall monitor marine mammal presence and behavior in the vicinity of the vessel and the surface above drilling operations. The qualified biologist shall have the authority to stop work until the marine mammal has left the buffer zone.	X				
		Mitigation Measure Biology-7. Pre-Construction Bat Surveys. A pre-construction survey shall be performed within 2 weeks prior to tree removal in the Telecare corporation		X	X	X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		parking lot and in Towata Park, and prior to construction near Otis Drive bridge, High Street bridge, Fruitvale Avenue bridge, and Park Street bridge. Areas within 200 feet of the construction work limits shall be surveyed. The biologist shall conduct a search for suitable entry points, roost cavities or crevices, and, survey for evidence of day roosts, and maternity roosts. The following measures shall be implemented: 1. If no roosting is observed, no additional mitigation is required. 2. If roosting surveys are inconclusive, indicate potential occupation by a special-status bat species, and/or identify a large day roosting population or maternity roost by any bat species within 200 feet of an active construction work area, a qualified biologist shall conduct focused day- and night-emergence surveys. 3. If active maternity roosts or day roosts are found in areas that would be removed or modified as part of project construction, activities shall commence before maternity colonies form (before March 1) or after young are flying (after July 31). Disturbance-free buffer zones (determined by a qualified biologist in coordination with CDFW) shall be observed during the maternity roost season (March 1 through July 31) for any active maternity colony					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		identified during the surveys to protect maternity roosts. 4. If a non-breeding bat roost is found in a structure scheduled for modification or removal, the individual(s) shall be safely evicted, under the direction of a qualified biologist (as determined in consultation with CDFW) in such a way that ensures individuals are not injured.					
		Mitigation Measure Biology-8. Protection of Northern Coastal Salt Marsh. Silt and exclusion fencing shall be installed at the edges of work areas where the work areas are near salt marsh habitat to delineate the areas and ensure that work does not occur in sensitive habitats or wetland areas, such as at the Alameda Island side of Crossing #2, Bay Farm 1 pipeline abandonment, and Bay Farm 2 pipeline abandonment locations.			X		
		Mitigation Measure Hydro-1. Frac-Out Contingency Plan.		X	X	X	
Impact Bio-2: Potential to have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in	Potentially Significant	**Mitigation Measure Biology-8. Protection of Northern Coastal Salt Marsh.**			X		Less than Significant
		Mitigation Measure Biology-9. Eelgrass Surveys and Avoidance. A survey for eelgrass shall be conducted by a qualified biologist prior to pre-construction geotechnical drilling at Crossing #2, as described in the California Eelgrass Mitigation Policy and Implementing Guidelines (NOAA Fisheries	X				

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
local or regional plans, policies, or regulations or by CDFW or USFWS.		2014). If eelgrass is observed within the pre-construction geotechnical investigation work area, an alternative work area outside of eelgrass shall be chosen. The eelgrass survey shall be conducted during the growing season between April to October. The pre-construction geotechnical investigation shall commence within 60 days of completion of the eelgrass survey or anytime between November and March if the survey was completed in October.					
		Mitigation Measure Biology-10. Control of Invasive Marine Species. In order to prevent introduction and spread of invasive marine species, EBMUD shall utilize a geotechnical contractor that can provide vessels that originate and operate in the San Francisco Bay. If the vessels to be used for pre-construction geotechnical borings have been operating outside the San Francisco Bay, then EBMUD shall develop an Invasive Marine Species Control Plan in order to effectively limit the introduction and spread of invasive marine species. The plan shall require that vessels or in-channel equipment originating or recently operating outside the San Francisco Bay prior to project use follow existing compliance measures established by the California State Lands Commission as part of the Marine Invasive Species Program relating to hull fouling and ballast water control. The plan shall also require that vessels and in-channel equipment	X				

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		originating or operating outside of San Francisco Bay be examined and any invasive species handled and disposed of according to the developed plan prior to vessel or equipment use on the project.					
Impact Bio-3: Potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means.	Potentially Significant	**Mitigation Measure Biology-8. Protection of Northern Coastal Salt Marsh.**			X		Less than Significant
		Mitigation Measure Hydro-1. Frac-Out Contingency Plan.		X	X	X	
Impact Bio-4: Potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species	Potentially Significant	**Mitigation Measure Hydro-1. Frac-Out Contingency Plan.**		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
or with established native resident or migratory wildlife corridors, or could impede the use of native wildlife nursery sites.							
Impact Bio-5: Potential to conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	Less than Significant	None required					Less than Significant
Cultural Resources							
Impact Cultural-1: Potential to cause a substantial adverse change in the significance of a historical resource.	Potentially Significant	**Mitigation Measure Cultural-1. Cultural Resources Sensitivity Training.** A professional archaeologist shall provide sensitivity training to supervisory staff, prior to initiation of site preparation and/or construction, to alert construction workers to the possibility of exposing significant historic and/or prehistoric archaeological resources within the proposed project area. The training shall include any prehistoric or historic objects that could be exposed, the need to stop excavation at		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		the discovery and within 100 feet of the discovery, and the procedures to follow regarding discovery protection and notification. An "Alert Sheet" shall be posted in staging areas, such as in construction trailers, to alert personnel to the procedures and protocols to follow for the discovery of a potentially significant historic and/or prehistoric archaeological resources.[1]					
		Mitigation Measure Cultural-2. Cultural Resources Inadvertent Discoveries. In the event that a historical or cultural resource is identified during pre-construction geotechnical investigation borings or during excavation for construction, all work within 100 feet of the resource shall be halted until a professional archaeologist, retained by		X	X	X	

[1] Significant prehistoric cultural resources may include:

a. Human bone, either isolated or intact burials.
b. Habitation, occupation or ceremonial structures as interpreted from rock rings/features, distinct ground depressions, differences in compaction (e.g., house floors).
c. Artifacts including chipped stone objects such as projectile points and bifaces; groundstone artifacts such as manos, metates, mortars, pestles, grinding stones, pitted hammerstones; and, shell and bone artifacts including ornaments and beads.
d. Various features and samples including hearths (fire-cracked rock; baked and vitrified clay), artifact caches, faunal and shellfish remains (which permit dietary reconstruction), distinctive changes in soil stratigraphy indicative of prehistoric activities.
e. Isolated prehistoric artifacts (Basin 2015).

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		EBMUD, can review, identify, and evaluate the resource for its significance. Should the archaeologist determine that a cultural resource has the potential to be a tribal cultural resource, then a Native American monitor shall be retained by EBMUD to monitor work in the area where the tribal cultural resource was discovered. If the historical resource can be preserved in place and no further impacts would occur, the resource shall be documented on California State Department of Parks and Recreation cultural resource record forms and no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, the professional archaeologist shall evaluate the resource and determine whether it is: (1) eligible for the CRHR (and thus a historical resource for purposes of CEQA), and/or (2) a unique archaeological resource as defined by CEQA. If the resource is determined to be neither a unique archaeological nor an historical resource, work may commence in the area. If the resource meets the criteria for either an historical or unique archaeological resource, or both, work shall remain halted, and the professional archaeologist shall consult with EBMUD regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA Guidelines Section 15064.5(b). Methods to be considered shall include preservation in place or					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		evaluation, collection, recordation, and analysis of any significant cultural materials in accordance with a Cultural Resources Work Plan (known as data recovery) prepared by the professional archaeologist. The methods and results of evaluation or data recovery work at an archaeological find shall be documented in a professional level technical report to be filed with CHRIS. Work may commence upon completion of treatment, as approved by EBMUD. A Monitoring Closure Report shall be filed by EBMUD at the conclusion of ground-disturbing construction if archaeological and Native American monitoring of excavation was undertaken.					
		Mitigation Measure Noise-2. Vibration.		X	X	X	
Impact Cultural-2: Potential to cause a substantial adverse change in the significance of an archaeological resource.	Potentially Significant	**Mitigation Measure Cultural-2. Cultural Resources Inadvertent Discoveries.**		X	X	X	Less than Significant
Impact Cultural-3: Potential to disturb human remains, including those	Potentially Significant	**Mitigation Measure Cultural-3. Human Remains Inadvertent Discoveries.** a. The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
interred outside of formal cemeteries.		disturbing activity within the proposed project area shall comply with applicable state laws. Treatment shall include halting all work within 100 feet of the discovery and immediate notification of the Alameda County Medical Examiner and the City of Alameda and/or the City of Oakland and EBMUD. b. In the event of the coroner's determination that the human remains are Native American, notification of the Native American Heritage Commission is required, who shall appoint a Most Likely Descendant (MLD) (PRC §5097.98). c. EBMUD, the professional archeologist, the landowner and MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5[d]). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. If the MLD and the other parties do not agree on the disposition of the remains, the					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		reburial method will follow PRC §5097.98(b) which states that: . . . the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance.					
Impact Cultural-4: Potential to directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature.	Potentially Significant	**Mitigation Measure Cultural-4. Paleontological Resources.** a. A professional paleontologist shall provide sensitivity training to supervisory staff to alert construction workers to the possibility of exposing significant paleontological resources within the proposed project area. The training shall be conducted as defined by the Society of Vertebrate Paleontology's Conformable Impact Mitigation Guidelines Committee (1995), to recognize fossil materials in the event that any are uncovered during construction. b. An "Alert Sheet" shall be posted in staging areas, such as in construction trailers, to alert personnel to the procedures and protocols to follow for the discovery of unique paleontological resources.		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		c. In the event that a paleontological resource is uncovered during project construction, all ground-disturbing work within 100 feet shall be halted. A qualified paleontologist shall inspect the discovery and determine whether further investigation is required. d. If the discovery can be avoided and no further impacts will occur, no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, a qualified paleontologist shall evaluate the resource and determine whether it is “unique” under CEQA, Appendix G, part V. e. If the resource is determined not to be unique, work may commence in the area. If the resource is determined to be a unique paleontological resource, work shall remain halted, and the paleontologist shall consult with EBMUD staff regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA. f. Other methods may be used but must ensure that the fossils are recovered, prepared, identified, catalogued, and analyzed according to current professional standards under the direction of a qualified paleontologist. All					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		recovered fossils shall be curated at an accredited and permanent scientific institution according to Society of Vertebrate Paleontology standard guidelines. Work may commence upon completion of treatment.					
Impact Cultural-5: Potential to cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resource Code Section 21074.	Potentially Significant	**Mitigation Measure Cultural-2. Cultural Resources Inadvertent Discoveries.**		X	X	X	Less than Significant
Energy Use							
Impact Energy Use-1: Potential to result in a significant consumption of energy.	Less than Significant	None Required					Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
Impact Energy Use-2: Potential to result in a significant impact on local and regional energy supplies or on requirements for additional capacity.	Less than Significant	None Required					Less than Significant
Impact Energy Use-3: Potential to result in a significant impact on peak and base period demands for electricity and other forms of energy.	Less than Significant	None Required					Less than Significant
Impact Energy Use-4: Potential to conflict with existing energy standards.	Less than Significant	None Required					Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable				Significance After Mitigation
			Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	
Impact Energy Use-5: Potential to result in a significant impact related to transportation energy use or use of efficient transportation alternatives.	Less than Significant	None Required					Less than Significant
Geology, Soils, and Seismicity							
Impact Geology Soils-1: Potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; or landslides.	Potentially Significant	**Mitigation Measure Geology-1. Incorporation of Geotechnical Investigation into Construction and Design Requirements.** EBMUD shall incorporate the recommendations and results from the geotechnical investigation into construction and design of the pipeline, shoring systems, and dewatering methods to comply with current seismic standards and to withstand geologic and seismic hazards. Recommendations shall also be incorporated into the proposed project specifications for implementation during construction and shall be verified during construction by a qualified geotechnical engineer who shall monitor construction activities.		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
Impact Geology Soils-2: Potential to result in substantial soil erosion or the loss of topsoil	Less than Significant	None Required.					Less than Significant
Impact Geology Soils-3: Potential to be located on a geologic unit or soil that is unstable or that would become unstable as a result of the proposed project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse.	Potentially Significant	**Mitigation Measure Geology-1. Incorporation of Geotechnical Investigation into Construction and Design Requirements.**		X	X	X	Less than Significant
		Mitigation Measure Noise-2. Vibration.		X	X	X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
Impact Geology Soils-4: Potential to be located on expansive or corrosive soils that would create substantial risks to life or property.	Potentially Significant	**Mitigation Measure Geology-1. Incorporation of Geotechnical Investigation into Construction and Design Requirements.**		X	X	X	Less than Significant
Greenhouse Gases							
Impact GHG-1: Potential to generate annual GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	Less than Significant	None Required.					Less than Significant
Impact GHG-2: Potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.	Less than Significant	None Required.					Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
Hazards and Hazardous Materials							
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials.	Potentially Significant	**Mitigation Measure Hazards-1. Identifying Buried Utilities.** While any excavation is open, EBMUD shall protect, support, or remove underground utilities as necessary to safeguard employees. EBMUD shall notify local fire departments whenever damage to a gas utility results in a leak or suspected leak, or whenever damage to any utility results in a threat to public safety. EBMUD shall also contact utility owners if any damage occurs as a result of the project and coordinate repair with approval of the owner. EBMUD shall request as-built documents, drawings, and maps from all utilities within the proposed project vicinity; shall conduct a site visit; contact city, county, and utility owners in writing to inform them of the proposed project; and shall locate utilities including utilities under the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel by subsurface geophysical methods, potholing, test holes, or other excavation methods as determined by the site conditions.	X	X	X	X	Less than Significant
		Mitigation Measure Hazards-2. Excavation and Electrical Safety Plans. The construction crew shall prepare and implement a project-specific Excavation Safety Plan and Electrical Safety Plan. The plans shall include the location of buried utilities identified in the proposed project vicinity, as described under Mitigation	X	X	X	X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		Measure Hazards-1. The Excavation Safety Plan shall include safety measures to protect the health of workers and the structural integrity of the buried utilities at the site. The Electrical Safety Plan shall include measures to protect workers from hazardous voltages on pipelines and appurtenances as a result of electromagnetic induction from nearby electrical transmission lines.					
		Mitigation Measure Hazards-3. Site Assessment. EBMUD shall perform a Site Assessment to identify potential soil and groundwater contamination that could be encountered during excavation for proposed project construction activities. The Site Assessment shall be performed in accordance with ASTM International's Standard Practice Method E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Assessment Process, which shall augment the existing Site Assessment procedures described in the Environmental Compliance Manual. The Site Assessment shall identify areas of concern where soil and/or groundwater contamination could be encountered during proposed project construction activities. The Site Assessment shall be prepared and evaluated by a licensed professional.	X	X	X	X	
		Mitigation Measure Hazards-4. Site Investigation.	X	X	X	X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		EBMUD shall perform a Site Investigation to evaluate the chemical quality of soils and/or groundwater in the areas of concern identified during the Site Assessment (see Mitigation Measure Hazards-3). Based on the analytical results, the Site Investigation shall include an evaluation of potential health risks to construction workers and shall pre-characterize groundwater for disposal. In areas where soil will not be reused as excavation backfill, soil shall also be pre-characterized for disposal. The Site Investigation shall be prepared and evaluated by a licensed professional.					
		Mitigation Measure Hazards-5. Project Safety and Health Plan. The construction crew shall prepare and implement a Project Safety and Health Plan. The plan shall incorporate the findings of the Site Assessment and Site Investigation (see Mitigation Measures Hazards-3 and Hazards-4) and describe appropriate monitoring measures, establishment of exclusions zones, and personal protective equipment for workers (as needed) who may encounter hazardous materials in soil and/or groundwater to ensure that workers and the public are protected.	X	X	X	X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
Impact Hazards-2: Potential to create a significant hazard to the human health and/or the environment through the routine transport, use, or disposal of hazardous materials.	Significant	**Mitigation Measure Hazards-3. Site Assessment.** **Mitigation Measure Hazards-4. Site Investigation.** **Mitigation Measure Hazards-5. Project Safety and Health Plan.**	X	X	X	X	Less than Significant
Impact Hazards-3: Potential to create a potentially significant hazard to children at nearby schools from the emissions and handling of hazardous or acutely hazardous materials.	Significant	**Mitigation Measure Air-2. Selection of equipment during demolition, grading and open trench construction phases to minimize emissions.**		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
Impact Hazards-4: Potential to create a potentially significant aviation hazard to nearby public-use airports.	Less than Significant	None Required.					Less than Significant
Impact Hazards-5: Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan	Significant	**Mitigation Measure Traffic-6. Maintain Emergency Access.**		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
Impact Hazards-6: Potential to substantially increase boating hazards due to changes in vessel traffic	Significant	**Mitigation Measure Hazards-6. Notify the US Coast Guard.** EBMUD shall notify the US Coast Guard and VTS of when, where, and the type of work that would be conducted within the Oakland Inner Harbor and San Leandro Bay Channel 90 days prior to any vessel work being conducted. As a part of the notification process, the US Coast Guard may require the establishment of a vessel safety zone. If required by the US Coast Guard, EBMUD shall establish a vessel safety zone, which may be delineated by fixed limits, such as buoys.	X				Less than Significant
Hydrology and Water Quality							
Impact Hydro-1: Potential to violate water quality standards or waste discharge requirements.	Less than Significant	None Required.					Less than Significant
Impact Hydro-2: Potential to substantially deplete groundwater supplies or interfere substantially with groundwater recharge to cause a net	Less than Significant	None Required.					Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
deficit in aquifer volume or a lowering of the local groundwater table level.							
Impact Hydro-3: Potential to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.	Less than Significant	None Required.					Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
Impact Hydro-4: Potential to create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.	Less than Significant	None Required.					Less than Significant
Impact Hydro-5: Potential to substantially degrade water quality during construction due to releases of drilling lubricants during horizontal directional drilling.	Potentially Significant	**Mitigation Measure Hydro-1. Frac-Out Contingency Plan.** A Frac-Out Contingency Plan shall be prepared by a qualified California-licensed professional geologist or engineer to address the potential for drilling fluids to be released during horizontal directional drilling operations. The plan shall include the following: 1. A monitor shall be on site during drilling operations to look for observable inadvertent release, frac-out conditions or lowered pressure readings on drilling equipment that may indicate a potential frac-out. 2. If the construction crew and/or drilling-machine operator suspect		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		that there is a frac-out (i.e., notices a loss of circulation of drilling fluid) or drilling fluid is observed at the surface, all work shall stop, including the recycling of drilling fluid. The location and extent of the frac-out shall be determined. The construction crew shall implement measures to stop the frac-out, such as reducing the drilling pressure or thickening the drilling fluid (e.g., by using less water). 3. If the drilling fluid does not surface, no other actions shall be needed. 4. If the drilling fluid surfaces, EBMUD shall notify the regulatory agencies (NMFS, USACE, BCDC, CDFW, SFRWQCB) and if so directed, the affected area shall be surrounded with a barrier (e.g., silt fence) to prevent further dissemination of the fluid. If there is a visible plume in the waterway, a sediment boom or curtain shall be installed around the plume to attempt to capture the released drilling fluid. The drilling fluid shall then be removed using the minimum amount of equipment needed to remove it (e.g., manually or by suction hose using a vacuum truck) in order to minimize impacts to the surface area where the frac-out occurred. 5. Upon implementation of the response measures described					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		above, and once the frac-out is contained, drilling may resume. 6. EBMUD shall ensure that the frac-out plan also includes notification procedures to applicable regulatory agencies for reporting frac-outs. EBMUD shall consult with the regulatory agencies to implement the most appropriate measures to protect water quality in the event of a frac-out. EBMUD shall provide a copy of the plan to the USACE, RWQCB, NMFS, BCDC and CDFW prior to construction.					
Impact Hydro-6: Potential to 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.	Less than Significant	None Required.					Less than Significant
Noise							
Impact Noise-1: Potential to expose persons to or generate noise levels in excess of standards	Potentially Significant	**Mitigation Measure Noise-1. Noise Control.** EBMUD shall implement the noise control measures described below: **Time Limits** 1. All construction activities shall be limited to the daytime weekday		X	X	X	Significant and Unavoidable

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
established in the local general plan or noise ordinance or applicable standards of other agencies, and could result in a substantial temporary or periodic increase in ambient noise levels in the proposed project vicinity above levels existing without the proposed project.		hours (7:00 a.m. - 7:00 p.m.) to the extent feasible. The HDD pullback operations, the pipeline connection work, and work in arterial intersections may extend or take place beyond these hours. 2. All haul and delivery truck operations shall be prohibited during the evening and nighttime hours (7:00 p.m. - 8:00 a.m.) to the extent feasible. 3. Equipment and vehicular activities (e.g., concrete saws, jackhammers, tractors, loaders, backhoes, excavators, pavers, rollers, and all other equipment identified in Tables 3.11-7 to 3.11-9) identified as generating noise levels in excess of an L_{eq} of 65 dBA in the vicinity of residential uses or an L_{eq} of 80 dBA in the vicinity commercial uses shall be limited to weekday hours between 8 a.m. – 7 p.m., and Saturdays between 8 a.m. – 5 p.m. to the extent feasible. **Noise Level Reduction** EBMUD shall implement a combination of the following source control measures such that noise is reduced by a minimum of 5 dBA: 1. Best available noise-control techniques (including but not limited to mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) shall be used for all equipment and trucks					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		to reduce construction noise impacts. 2. If impact equipment such as jack hammers, pavement breakers, and rock drills are proposed to be used during construction, hydraulically- or electric-powered equipment shall be used wherever feasible to avoid the noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically-powered tools is unavoidable, the construction crews shall place exhaust mufflers on the compressed-air exhaust and external jackets on the tools themselves where feasible. 3. If vibratory sheet piles are used for construction, pre-drill pile holes for shoring systems to eliminate or reduce noise and vibration from vibratory pile driving. 4. Stationary noise sources (e.g., pumps, compressors) shall be located as far from sensitive receptors as possible and practicable, and within the specified construction time limits. If they must be located near receptors, adequate muffling (with enclosures) shall be used. Enclosure openings or venting shall face away from sensitive receptors. A registered engineer qualified in noise control					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		analysis and design shall design the enclosures. 5. If pipe-cutting equipment must be operated at pipeline tie-ins outside the hours of 8 a.m. - 7 p.m., temporary noise barriers or noise enclosures shall be used to minimize disturbance when construction occurs adjacent to residential uses. Operation of trucks and noisier types of heavy equipment shall be minimized to the extent feasible. EBMUD shall implement the following noise barrier measure, such that noise is reduced by 10 dBA: 6. Noise barriers (e.g., sound walls, sound curtains, etc.) shall be provided at the perimeter of HDD entry and insertion work areas and jack and bore construction sites. Administrative Controls 7. Residents located within one block of the project construction shall be notified at least 7 days in advance of extreme noise-generating activities, about the estimated duration of the activity and to update them prior to noise producing phases, such as open trench construction, pipeline connections, pipeline abandonment, HDD, or jack and bore construction. 8. Where pipeline construction zones are within 100 feet of school classrooms or childcare facilities					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		(e.g., Earhart Elementary), construction crews shall coordinate with the school and schedule the operation of heavy equipment (including pumps, generators with no noise enclosures, tractors, loaders, backhoes, cement trucks) when the classroom windows facing or perpendicular to construction activities are closed, and students are indoors. 9. An EBMUD contact person shall be designated as a project liaison for responding to noise complaints during construction. The liaison's name and phone number shall be posted at construction areas and included in all advance notifications. The contact shall take steps to resolve complaints, which could include measuring noise levels, if necessary. The coordinator shall be available during normal business hours (8 a.m. - 5 p.m.) and shall work with residents and business owners and the construction crews to determine the noise problem and resolve conflicts. 10. Provide alternative lodging for residents, if requested, that are adversely affected by nighttime construction; this measure would only be used if nighttime construction occurs. EBMUD shall make a concerted attempt to notify residents located within one block of potential nighttime project					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		construction at least 10 days in advance. Notified residents may request alternative lodging for the night(s) of the potential nighttime construction from EBMUD; alternative lodging shall consist of a standard room at a hotel located within 6 miles of the affected residence or as close as feasible. Alternative lodging shall be provided and approved by EBMUD the day before the known nighttime construction would occur, or sooner, based upon the types of construction activities that may occur during the nighttime hours (7:00 p.m. - 7:00 a.m.). 11. Noise monitoring will be conducted during HDD, jack and bore construction, and during the first 500 feet of open trench construction.					
Impact Noise-2: Potential to expose persons to or generate excessive groundborne vibration or groundborne noise levels.	Potentially Significant	**Mitigation Measure Noise-2. Vibration.** Vibration limits are specified as follows: **For Cosmetic Damage to Property** Any Buildings or Structures: 0.3 in/sec PPV (continuous vibration); 0.5 in/sec PPV (single-source vibration		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		For Impacts to Historical Significance Potentially historic buildings or structures and/or buildings/structures older than 50 years — 0.4 in/sec PPV (continuous source vibration); 0.5 in/sec PPV (single-source vibration) **For Damage to Utilities** Adjacent utilities — 4.0 in/sec PPV (continuous source) EBMUD shall implement the following: 1. Vibration monitoring shall be conducted for the first 500 feet of pipeline construction for each side of the crossings to confirm vibration levels do not exceed vibration thresholds at the nearest receptors. If vibration levels exceed the limits of this mitigation measure, then construction practices shall be modified (i.e., use smaller types of construction equipment, operate the equipment in a manner to reduce vibration, or use alternate construction methods), and monitoring shall continue for an additional 200 feet or until					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		construction practices meet the required vibration levels. The monitoring in this mitigation measure shall be repeated if the construction methods change in a manner that would increase vibration levels, or when structures are closer to the limits of construction than previous vibration monitoring has confirmed is below the vibration thresholds. 2. Smaller vibratory compactors and/or non-compacting materials (i.e., some types of gravel) will be used to minimize vibration levels during repaving activities where needed to meet vibration limits. Clam shovel drops and heavy trucks and loaders shall not be used within 15 feet of unreinforced masonry or non-engineered timber and/or plaster buildings, and alternative methods shall be used such as saw cutting and use of smaller equipment that causes less vibration. 3. Sheet piles shall be installed with vibratory drivers instead of impact drivers where feasible. Impact sheet pile installation shall be prohibited within 35 feet of the closest structures. Vibration monitoring shall be conducted within 100 feet of any buildings where impact sheet pile installation occurs, and within 35 feet of any building where vibratory sheet pile installation occurs to ensure that the above applicable					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		performance standard is not exceeded. If vibration levels exceed the applicable threshold, the construction crews will use alternative construction methods. 4. With permission and at the request of homeowners, EBMUD shall conduct a preconstruction survey of homes and other sensitive structures within 15 feet of continuous vibration generating activities (vibratory roller/compactor) for potential effects due to vibration-generating activities. EBMUD shall respond to any claims by inspecting the affected property promptly. 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 proposed project is determined to have caused the damage, EBMUD shall coordinate with the owner to have the damage repaired to pre-existing conditions.					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
Recreation							
Impact Recreation-1: Potential to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility could occur or be accelerated.	Less than Significant	None Required.					Less than Significant
Impact Recreation-2: Potential to substantially degrade recreational experiences.	Potentially Significant	**Mitigation Measure Recreation-1: Coordination with Cities.** EBMUD shall coordinate with the City of Oakland Department of Parks and Recreation and the City of Alameda Department of Recreation and Parks regarding temporary park closures prior to construction within Estuary Park and Towata Park. EBMUD shall implement park closure methods after consultation with each City, and shall notify the members of the public of temporary park closures via the methods provided by the City of Oakland Department of Parks and Recreation and the City of Alameda Department of Recreation and Parks.		X	X		Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		Mitigation Measure Recreation-2. Park Restoration. Construction activities shall be located to avoid trees to the extent feasible. After completion of construction activities, public parks shall be restored to pre-project conditions in coordination with the City of Oakland or the City of Alameda. Park restoration shall include replacement of any other park amenities (park benches, sidewalks, signage, etc.) that were removed or impacted during construction.		X	X		
		Mitigation Measure Aesthetics-1. Tree Replacement.		X	X		
		Mitigation Measure Traffic-5. Minimize Impacts to Pedestrians, Bicyclists, and People Using Public Transit.			X		
Transportation and Traffic							
Impact Traffic-1: Potential to conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking	Potentially Significant	**Mitigation Measure Traffic-1. Construction Traffic Management Plan.** EBMUD shall develop and implement a project-specific Construction Traffic Management Plan (CTMP). EBMUD shall submit the plan to the Cities of Alameda and Oakland for review and approval at least 30 days prior to construction. The CTMP shall conform to the California Manual on Uniform Traffic Control Devices, and shall include provisions for the following: 1. Implementation of appropriate barriers and/or cones between		X	X	X	Significant and Unavoidable

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
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.		vehicles and construction areas along partially or fully closed streets. 2. Installation of temporary lane delineation to direct traffic flows through construction areas. 3. Installation of “No Stopping Anytime” and “No Parking Anytime” signs (time and duration) in construction zones 48-hours prior to construction. 4. Use of flaggers and/or signage to guide vehicles through or around construction zones. 5. Use and location of changing message boards and/or appropriate signage indicating preferred detour routes. 6. Timing of material deliveries to use non-peak hours of traffic flow (9:00 a.m. to 4:00 p.m.). 7. Methods for keeping roadways clean. 8. Storage of all equipment and materials in designated work areas in a manner that minimizes traffic obstructions and maximizes sign visibility. 9. Methods and locations for limiting of vehicles to safe speed levels according to posted speed limits, road conditions, and weather conditions 10. Coordination with public transit providers to implement bus detours, bus stop modifications, and to					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		inform public transit providers of potential construction related delays. 11. Methods and locations for routing trucks to avoid minor roads, where possible, to reduce congestion and potential asphalt damage in accordance with EBMUD's specifications and the Cities of Alameda and Oakland permit requirements. 12. Repair of asphalt and other road damage (e.g., curb and gutter damage, rutting in unpaved roads) caused by construction vehicles. Roadway pavement conditions will be documented for all affected roadways before and after project construction. Roads found to have been damaged by construction vehicles will be repaired to the level at which they existed before project construction. 13. Detours for cyclists and pedestrians when bike lanes or sidewalks must be closed. 14. Abiding by any encroachment permit conditions (e.g., Union Pacific Railroad, Caltrans, City of Oakland, City of Alameda), which shall supersede conflicting provisions in the CTMP. 15. Requirement that heavy equipment brought to the construction site shall be transported by truck, where feasible.					

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		16. Notification procedures for adjacent property owners and public safety personnel related to major equipment deliveries, vehicle detours, and lane closures. 17. A process for responding to and tracking complaints pertaining to construction activities, including identification of an EBMUD contact person, designated as a project liaison for responding to traffic complaints. The liaison's name and phone number shall be posted at construction areas and included in all advance notifications. The project liaison shall determine the cause of the complaints and shall take prompt action to correct the problem.					
		Mitigation Measure Traffic-2. Traffic Control at Crossing #1. EBMUD shall maintain a minimum of one open lane of southbound traffic flow during construction activities between 8th Street and 5th Street to reduce overall traffic impacts on Jackson Street.		X			
		Mitigation Measure Traffic-3. Provide flag persons at un-signalized intersections at Crossing #1 and Crossing #3. EBMUD shall ensure that the construction contractor deploys flag persons at the following un-signalized intersections to facilitate the flow of directional traffic and improve vehicle progression through the		X		X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		intersection, improving overall operations (to the extent possible): 1. Oak Street and Embarcadero West 2. Blanding Avenue and Broadway					
		Mitigation Measure Traffic-4. Traffic Control and Maintaining Traffic Flow at Crossing #3. Pipeline installation across Tilden Way at Everett Street shall use jack and bore construction methods so as to avoid closure of Tilden Way to through traffic.				X	
		Mitigation Measure Traffic-5. Minimize Impacts to Pedestrians, Bicyclists, and People Using Public Transit. The following measures would be implemented to minimize impacts to pedestrians, bicyclists, and public transit: 1. Flaggers shall be used to direct pedestrians and bicyclists using the bicycle lane during construction when material deliveries must cross the bicycle lane. 2. Warning signs shall be posted on sidewalks where construction limits pedestrian access and to identify which side of the street can be safely accessed at intersections prior to construction zones. 3. EBMUD and its contractors shall use “share the road” signs within the construction zones where partial closures would occur; obtain a temporary permit to allow bicyclists to use the sidewalks to bypass the		X	X	X	

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
		construction zones where allowed by the local jurisdiction; and provide detours for bicyclists around areas with discontinuous sidewalks. 4. EBMUD shall post signs at the affected bus stop on Island Drive and at other bus stops along the route of AC Transit Line 21. The signs will be posted at least 2 weeks in advance of the HDD pipeline pull through activity at Crossing #2 and shall indicate when the bus stop at Island Drive would be unavailable and where the nearest bus stop for AC Transit Line 21 is located. 5. EBMUD shall coordinate with AC Transit to re-locate bus stops and/or re-route affected transit services via parallel streets during construction when affected transit service is subject to delays resulting from partial street closure or inaccessible transit stops due to full street closure. 6. EBMUD shall post signs at affected pedestrian intersections and bike routes at least 2 weeks in advance of construction. These signs shall state the date range of construction and shall indicate the route of pedestrian and/or bike path detours during construction.					
Impact Traffic-2: Potential to substantially increase hazards due to	Less than Significant	**Mitigation Measure Traffic-1. Construction Traffic Management Plan.**		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3	Significance After Mitigation
a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.							
Impact Traffic-3: Potential to result in inadequate emergency access.	Significant	**Mitigation Measure Traffic-6. Maintain Emergency Access.** 1. Emergency responders (i.e., local police, fire, and ambulance services) shall be notified at least 7 days in advance of any activities requiring full or partial roadway closures. Emergency access detour routes shall be determined in consultation with emergency responders as part of the notification process. Businesses, commercial offices, and residents located within one block of construction shall be notified at least 7 days in advance of activities requiring roadway closures, outlining the proposed project schedule and the duration of construction activities. EBMUD will send notices to the individuals and businesses on the proposed project's mailing list to update them prior to any roadway closures. 2. Temporary barricades and directional cones that can be readily removed shall be used during full or partial roadway closures.		X	X	X	Less than Significant

Environmental Impact	Impact Significance Before Mitigation	Mitigation Measure	Mitigation Measures Applicable: Pre-Construction Geotechnical Investigation	Mitigation Measures Applicable: Crossing #1	Mitigation Measures Applicable: Crossing #2	Mitigation Measures Applicable: Crossing #3	Significance After Mitigation
		3. Road barricades shall be removed and open trenches shall be covered (plated) at the end of the day on a daily basis to provide access to businesses and residents. A portion of the on-street parking zones may be retained to allow for storage and/or staging of construction equipment					

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1 INTRODUCTION

1.1 PURPOSE OF THE ENVIRONMENTAL IMPACT REPORT

East Bay Municipal Utilities District (EBMUD), as the lead agency, has prepared this Draft Environmental Impact Report (EIR) for the Alameda–North Bay Farm Island Pipeline Crossings Project (proposed project) in compliance with California Environmental Quality Act (CEQA) Statute and CEQA Guidelines. An EIR is a public document that identifies and evaluates the potential environmental effects of a project, identifies mitigation measures to lessen or eliminate adverse impacts, and examines feasible alternatives to a project. The impact analyses in this Draft EIR are based on a variety of sources listed as references at the end of each technical section. The information contained in this Draft EIR and the public comments on it will be reviewed and considered by EBMUD's Board of Directors prior to the ultimate decision to approve, disapprove, or modify the proposed project.

1.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT PROCESS

1.2.1 Public Scoping/ Notice of Preparation

Public scoping per CEQA Guidelines Section 15083: Early Public Consultation is not required, but is presented as an option, which:

> …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.

In accordance with CEQA Guidelines Sections 15063 and 15082, EBMUD prepared a Notice of Preparation (NOP) for this Draft EIR. The NOP provided a general description of the proposed project, a map of the project location, and a preliminary list of potential environmental impacts. The NOP was published on August 20, 2015, and the required 30-day review/comment period expired on September 21, 2015. The NOP was sent out as a postcard mailer to approximately 1,760 residents and property owners. The full NOP and the NOP postcard was sent to an additional 40 individuals representing agencies and special interest stakeholders. The NOP is included in Appendix A. Comment letters were received from two residents as well as the City of Oakland and the California Department of Transportation (Caltrans). Key concerns included property impacts, cumulative impacts from other nearby projects that could occur at the same time, traffic and highway impacts, noise impacts, and parks and recreational impacts.

EBMUD conducted two community meetings in September 2015 to discuss the proposed project and to solicit public input. Appendix A of this Draft EIR presents a description of public outreach efforts. Attendance to the scoping meeting was minimal with no attendees at the Alameda meeting and one attendee at the Oakland meeting. Traffic, dust, and noise impacts were raised as key areas of concern in Oakland.

1.2.2 Resources Not Evaluated Further in EIR

CEQA Guidelines Section 15128 addresses effects not found to be significant and states:

> 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 statements may be contained in an attached copy of an Initial Study.

Pursuant to CEQA Guidelines Section 15128, this Draft EIR analyzed those effects identified as potentially significant in the Initial Study prepared for the proposed project. The Initial Study is included in Appendix B of the Draft EIR. The effects found to be potentially significant and that are analyzed in this Draft EIR include Aesthetics, Air Quality, Biological Resources, Cultural Resources, Energy Use, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Recreation, and Transportation and Traffic. Effects found to not be significant and excluded from this Draft EIR include Agriculture and Forestry Resources, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, and Utilities and Service Systems.

The following Appendices are included as a part of this Draft EIR:

- Appendix A: Notice of Preparation, Notice of Completion, and Summary of Public Scoping
- Appendix B: Initial Study
- Appendix C: Construction Details
- Appendix D: EBMUD Standard Construction Specifications
- Appendix E: Air Quality and Greenhouse Gases Technical Report
- Appendix F: Biological Resources Technical Report
- Appendix G: Cultural Resources Technical Report
- Appendix H: Geotechnical Assessment
- Appendix I: Noise and Vibration Technical Report
- Appendix J: Transportation and Traffic Technical Report

1.2.3 Draft Environmental Impact Report

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 it. The Notice of Availability (NOA) of this Draft EIR has been sent directly to every agency, person, or organization that commented on the NOP or requested to be informed of project activities. The NOA identifies the time and location of public meetings where EBMUD will summarize the findings of the Draft EIR.

The publication of the Draft EIR marks the beginning of a mandatory 45-day public review period ending on August 15, 2016. During the review period, written comments should be emailed, mailed or hand delivered to:

Aaron Hope, Project Manager
East Bay Municipal Utility District
375 Eleventh Street, MS 701
Oakland, CA 94607
(510) 287-1496
alamedacrosssings@ebmud.com

1.2.4 Final Environmental Impact Report

Written 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 set forth any changes to the Draft EIR analysis and mitigation measures resulting from public and agency input.

EBMUD's Board of Directors will consider certification of the Final EIR at a regularly scheduled Board meeting in December 2016, 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 proposed 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 level that is less than significant, 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 have not been mitigated to a level that is less than significant, the agency must state the reasons for its action in writing, i.e., a Statement of Overriding Considerations. The Statement of Overriding Considerations is not part of the Final EIR but must be included in the record of project approval.

1.2.5 Mitigation Monitoring and Reporting

If the proposed project is approved, 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 Draft EIR, proposed mitigation measures have been clearly identified and presented in language that will facilitate establishment of a monitoring program. 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 will be monitored by the EBMUD staff to ensure completion.

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2 PROJECT DESCRIPTION

2.1 INTRODUCTION

The Alameda–North Bay Farm Island Pipeline Crossings Project (proposed project) involves the construction and operation of three transmission pipelines (24-inch inner diameter) in Alameda County within the cities of Oakland and Alameda (see Figure 2.1-1). Each pipeline is described below.

- **Crossing #1.** Crossing #1, known as the Estuary Park–Marina Village Crossing, is approximately 2.3 miles long. The new pipeline would connect to existing transmission pipelines in Oakland, cross under the Oakland Inner Harbor, and continue through Alameda to its connection point. One alternate route option for the replacement of an existing pipeline in Oakland is being considered (see Figure 2.1-2). Construction activities would occur within city streets, one business park parking lot (the Telecare Corporation), and Estuary Park.
- **Crossing #2.** Crossing #2, known as the Alameda–North Bay Farm Island Crossing, is approximately 1 mile long. The new pipeline would connect to existing transmission pipelines on Alameda Island, cross under the San Leandro Bay Channel, and continue on North Bay Farm Island to its connection point (see Figures 2.1-3 and 2.1-4). Construction activities would occur within city streets and Towata Park.
- **Crossing #3.** Crossing #3, known as the Derby Crossing, is approximately 1 mile long. The new pipeline would connect to existing transmission pipelines in Oakland, cross under the Tidal Canal, and continue in Alameda to its connection point. Project activities associated with Crossing #3 would include replacing an existing pipeline (see Figure 2.1-5). One alternate route option for open trench construction in Alameda is being considered. Construction activities would occur within city streets.

Construction activities would also include abandoning the existing underwater pipeline crossings (see Figure 2.1-1).

Figure 2.1-1 Project Location

Figure 2.1-2 Crossing #1 Alignment

Figure 2.1-3 Crossing #2 Alignment

Figure 2.1-4 Detail of Crossing #2 Alignment

Figure 2.1-5 Crossing #3 Alignment

2.2 PROJECT LOCATION

The proposed project's pipeline alignments would be installed within Oakland and Alameda (North Bay Farm Island and Alameda Island) city streets, a business park parking lot, Estuary Park, Towata Park, and underneath the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel between Alameda Island, Oakland, and North Bay Farm Island. The project location is shown in Figure 2.1-1. The locations of each crossing are shown in the following figures: Crossing #1: Figure 2.1-2; Crossing #2: Figures 2.1-3 and 2.1-4; and Crossing #3: Figure 2.1-5.

2.3 PROJECT BACKGROUND

2.3.1 Service Area

EBMUD provides water service to 20 incorporated cities and 15 unincorporated areas in Alameda and Contra Costa Counties. Water is conveyed to customers via a network of untreated water reservoirs, aqueducts, water treatment plants (WTPs), transmission mains, and distribution facilities stretching from the foothills of the Sierra Nevada to the San Francisco Bay Area (Figure 2.3-1).

2.3.2 Overview of Existing Water System Operations

2.3.2.1 Water Supply

EBMUD's principal water source is the Mokelumne River watershed, a 575-square-mile area of the Sierra Nevada foothills in Alpine, Amador, and Calaveras Counties. Mokelumne River water is stored at the Pardee and Camanche Reservoirs, about 40 miles northeast of the city of Stockton. Untreated water flows by gravity via the Mokelumne Aqueducts from Pardee Reservoir to the San Francisco Bay Area. Additional water (less than 10 percent of total supply) comes from local watersheds in Alameda and Contra Costa Counties. During droughts, EBMUD is able to draw water from the Sacramento River via the Freeport Regional Water Project, which connects to the Mokelumne Aqueducts (EBMUD 2011).

2.3.2.2 Water Treatment

EBMUD operates five WTPs: Walnut Creek, Lafayette, Orinda, Sobrante, and Upper San Leandro. EBMUD also operates a sixth WTP, the San Pablo WTP, a facility used during drought operations and planned outages of key facilities such as the Claremont Tunnel. Substantial overlap occurs in the service areas of the Sobrante, Orinda, and Upper San Leandro WTPs, as well as between the service areas of the Lafayette and Orinda WTPs. The overlap notwithstanding, on any given day, production from one WTP could offset some or all of the production from another depending on actual demands and daily operations decisions.

2.3.3 Treated Water Transmission and Distribution

The WTPs and transmission mains constitute the backbone of EBMUD's water treatment and transmission system. After passing through the WTPs, water is distributed to customers

Figure 2.3-1 EBMUD Service Area

throughout EBMUD's service area via a network of transmission and distribution pipelines. The water distribution network contains approximately 4,150 miles of distribution pipelines, 140 pumping plants, and 170 distribution reservoirs (EBMUD 2011).

Water service to Alameda is currently provided by four underwater pipeline crossings at three separate locations between Oakland, Alameda Island, and North Bay Farm Island. Seven underwater pipeline crossings have been constructed, but only four remain in service (EBMUD 2014). No dedicated water storage is located on Alameda Island.

2.4 NEED FOR THE PROJECT

Failure of one of the existing underwater pipeline crossings could reduce both the level of service for customers as well as the available water supply to Alameda Island and North Bay Farm Island. Therefore, the project includes replacement of three existing underwater pipeline crossings to ensure the long-term reliability and redundancy of the water distribution system, to meet existing water needs, to meet future water needs created by currently planned developments, and to facilitate repair and replacement of aging infrastructure.

2.5 PROJECT OBJECTIVES

The fundamental purpose of the project is to improve long-term reliability and redundancy of the water distribution system and maintain high in-service reliability after a seismic event for Alameda Island and North Bay Farm Island. As summarized below, additional objectives that relate to operational, environmental and economic considerations in implementing the project include:

- Reliability
  - Improve long-term reliability and redundancy of the water distribution system
  - Maintain high in-service reliability after a seismic event
- Operations
  - Maintain water service pressures on Alameda Island and North Bay Farm Island
- Environmental
  - Locate new pipelines to avoid areas of geologic hazards and high-priority utilities (high-pressure gas and fuel pipelines) to the extent practicable
  - Reduce environmental impacts by minimizing the length of new pipelines
  - Reduce community disruptions during construction to the extent practicable by minimizing construction near residences, businesses, public recreational areas, and busy roadways
- Economics
  - Maximize the useful life of existing facilities in a manner that reduces costs for customers
  - Minimize life-cycle costs (capital, operating, and maintenance) to EBMUD's customers

2.6 PROJECT DESIGN

2.6.1 Pipeline Design Features

The main component of the proposed project is the construction of water transmission pipelines. The sections of pipeline installed underwater would be 24-inch-inner-diameter and 30-inch-outer-diameter fused high-density polyethylene (HDPE). The pipelines installed in streets would be steel or HDPE with an approximate outer diameter of 30 inches.

2.6.2 Pipeline Appurtenances

Standard pipeline appurtenances would be installed, including:

- Air valves
- Test stations
- Blow-offs
- Cathodic protection
- Inline valves
- Bypass valves
- Markers for pipelines in landscaped areas, such as in Towata Park
- Manhole vault structures
- Above ground cabinet, telephone terminal cabinet, and electric service panel

The pipelines would have air valves at high points and certain sharp grade breaks, and blow-offs at low points. Air valves include above-grade vents that are approximately 2 inches in diameter and 4 feet tall (Figure 2.6-1). Test stations would be included as required. Test stations are used to monitor the cathodic protection system, which controls corrosion of the buried metallic pipelines. Wires attached to two pipeline segments (or attached to a segment of pipeline and a corrosion protection device called an anode) are brought to the surface to allow technicians to test the electrical current. EBMUD uses three types of test stations. By preference, a conduit attached to a standard plastic marker post (6-foot-tall, 4- by 4-inch post) is used in off-road applications, and a water meter box is used for sidewalk installations. If neither of these options is available, the test station is installed in the street under a metal lid, known as a valve pot cover; these lids would be flush with the street pavement.

A manhole vault structure would be located at the terminus of the buried section of the underwater pipeline. The vault structure would be installed below ground and only the access manhole hatch, installed flush with the existing ground surface, would be visible. An above ground remote terminal unit (RTU) cabinet, Pacific Gas and Electric (PG&E) electric service panel, and a cellular modem box would be installed near the manhole vault structure on the Oakland and North Bay Farm Island sides of the crossings. The RTU, electric, and cellular modem box would be used to communicate pipeline flow and pressure information to EBMUD's operational control center (see Figure 2.6-1).

Blow-offs (or pumping tees) are similar to fire hydrants without the hydrant body on top. These small connections to the bottom of the pipeline at low points in the alignment allow EBMUD to

Figure 2.6-1 Above Ground Appurtenances: Air Valve Vent, Marker Post, RTU Cabinet, and Electrical Service Panel

pump or drain water out of the pipeline. Blow-offs are not surge- or pressure-protection devices that automatically dump water out; rather, they are manually operated with a hose connected to the end to direct the flow of water to a proper disposal route or to a tanker truck. Blow-offs are installed below the ground surface, with access provided within a sidewalk or street by a manhole, meter box, or valve pot cover.

Inline valves would be installed periodically along the alignment to allow portions of the pipelines to be isolated from the water distribution system for maintenance or repair. Inline valves would also be placed at the connection points between the new pipelines and the existing water distribution system. A bypass valve would be installed at each inline valve location. Bypass valves are required because the water pressure on a closed 24-inch diameter inline valve is too great to manually open when one side of the valve is depressurized. The bypass valve would be a smaller valve that can be manually opened to allow water to fill into the empty side of the pipe equalizing water pressure on both sides of the larger inline valve. Inline and bypass valves would be buried with the pipeline. The only aboveground feature would be a valve pot cover, which would cover the valve operating stem.

Where a pipeline would be installed outside of a street in a landscaped area such as Towata Park, the pipeline location would be indicated with flat fiberglass marker posts approximately 4 feet tall and 4 inches wide (Figure 2.6-1).

2.6.3 Alternate Alignment Options

This Draft EIR analyzes two alternate transmission pipeline open trench construction options and one alternate location for a distribution pipeline replacement. The locations of these alternate alignment options are shown in Figures 2.1-2 and 2.1-5 and are described below:

- **Crossing #1 Alternate Trench Option.** Instead of using 2nd Street, the open trench construction and pipeline installation would occur along 3rd Street for one block, then along Oak Street for one block, and then would continue along the proposed alignment.
- **Crossing #1 Alternate Pipeline Replacement Option.** Instead of replacing the existing pipeline on 2nd Street between Madison Street and Oak Street, the pipeline on 3rd Street between Madison Street and Oak Street would be replaced.
- **Crossing #3 Alternate Trench Option.** Instead of using Clement Avenue and a portion of Everett Street, open trench construction would occur on Broadway and then along Eagle Avenue until Everett Street, where pipeline installation would continue along the proposed alignment.

2.7 PROJECT CONSTRUCTION

2.7.1 Construction Activities

Construction of the pipelines would be performed using conventional open trench construction methods; however, both HDD and trenchless (jack and bore) construction would be used to install pipelines at underwater, major roadway, and railroad crossings. Construction activities would also involve connecting the new water pipelines to existing EBMUD water transmission pipelines, abandoning an existing pipeline along Crossing #1, replacing a small-diameter distribution pipeline along Crossing #1 and Crossing #3, and abandoning seven existing underwater pipeline crossings (See Figures 2.1-1 through 2.1-5). Following construction, the project area would be restored to pre-construction conditions.

2.7.1.1 Transmission Pipeline Open Trench Construction

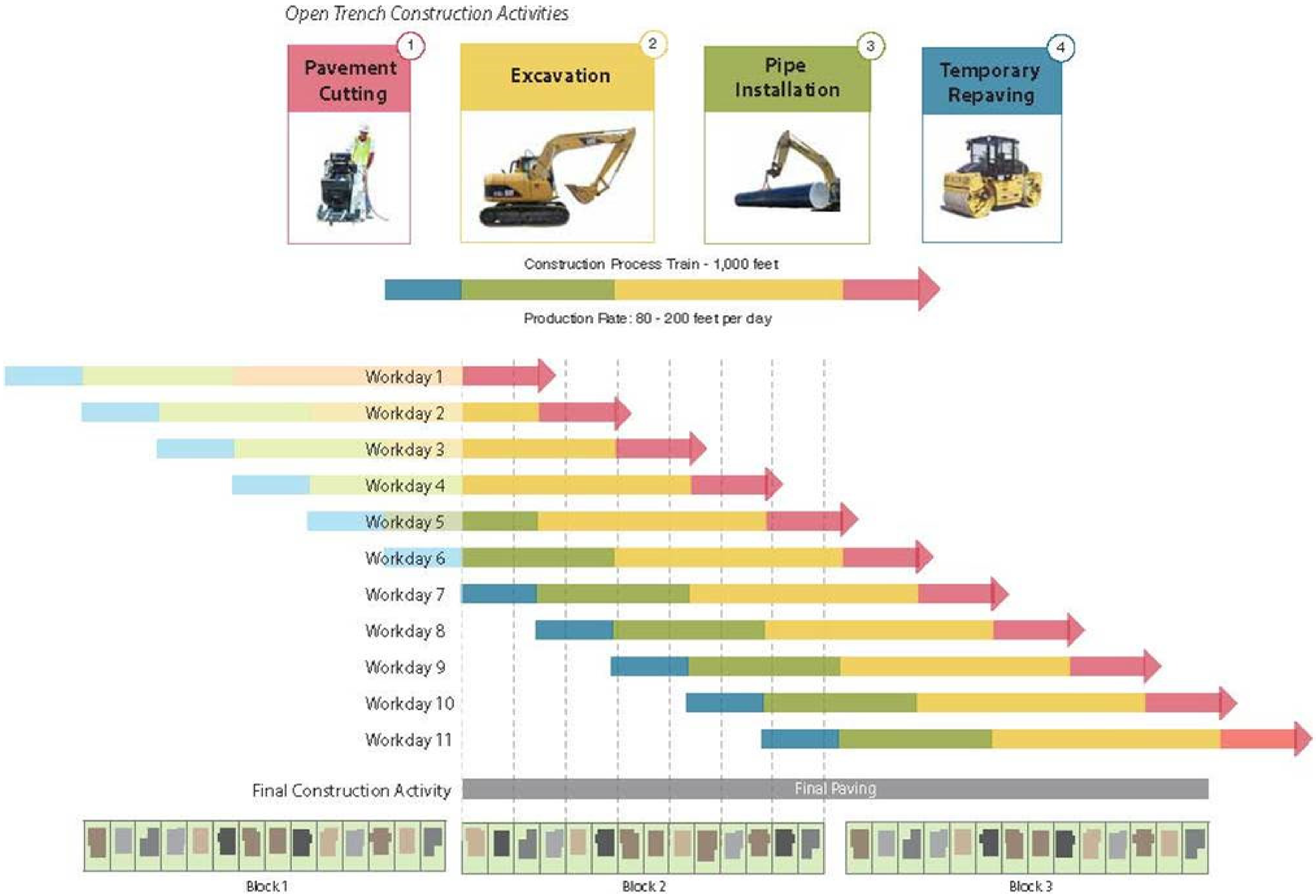
Description of Process

Open trench construction consists of the following activities:

- Utility location/potholing
- Saw-cutting the pavement
- Excavating a trench
- Removing and stockpiling soils
- Installing the pipeline
- Backfilling the trench and applying temporary paving
- Pressure testing and disinfecting the pipeline
- Repaving

Figure 2.7-1 provides a schematic representation of how open trench construction would progress along the pipeline alignments.

Figure 2.7-1 Typical Progression of Open Trench Construction



Construction Corridor

A minimum construction corridor width of 25 feet would be needed to accommodate pipeline storage and to allow trucks and equipment access along the trench. Other construction activities, such as the installation of pipeline connections, could require larger excavations. Open trench construction in public roadways would usually necessitate the closure of at least one travel lane, depending on roadway width and the size of the pipeline and trench. Full roadway closure would be required in some reaches, as described in Section 3.13: Transportation and Traffic. Most excavated soil would be hauled off site, and new materials would be imported for backfilling the excavations. Some excavated soil might be used as backfill around the pipeline instead of being hauled offsite, when the existing soil characteristics are acceptable. The excavated soil might be mixed with cement to improve soil characteristics for trench backfilling around the pipeline.

Construction Details

Pipeline trenches would be a maximum of 8 feet deep and 4 feet wide. Pipeline staging would be located on roadways adjacent to the pipeline alignment. Prior to installation, sections of the pipeline would be laid out along the alignment. The pipeline would then be lowered into the trench and the sections welded together. The trench would be backfilled and sections of the pipeline would be pressure tested and disinfected via chlorination before repaving. Table C-12 in Appendix C: Construction Details provides additional information about the pipeline length and construction duration.

Equipment

Typical construction equipment associated with trench installation of pipelines includes: pavement saws, jack hammers, excavators, backhoes, front-end loaders, dump trucks, flatbed delivery trucks, dewatering pumps, soil-cement mixing machines, paving equipment (asphalt and/or concrete trucks, vibratory compactors, pavers, rollers) and water trucks.

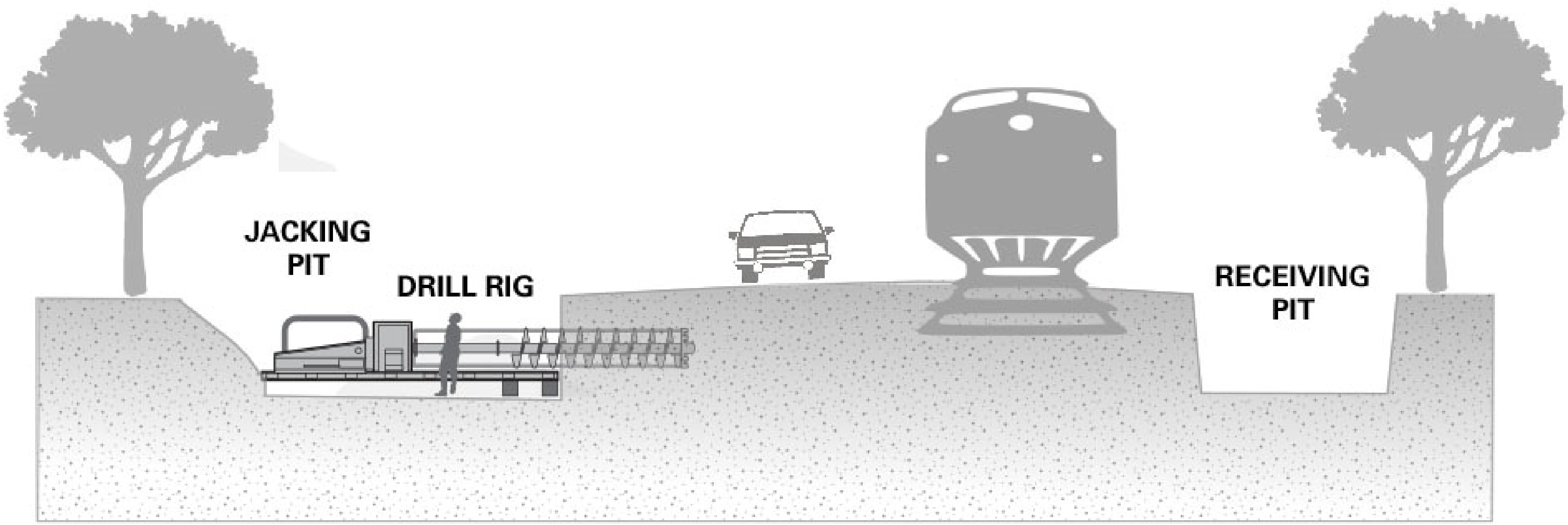
2.7.1.2 Transmission Pipeline Jack and Bore

Description of Process

The jack and bore method (also known as horizontal auger boring) would be used twice during project implementation: at Crossing #1 to install pipeline beneath a segment of railroad track on Oak Street, and at Crossing #2 to install pipeline beneath Otis Drive so that Otis Drive could remain open during construction. The jack and bore method would consist of the following activities and is illustrated in Figure 2.7-2:

- Excavating a temporary jacking and receiving pit
- Constructing a temporary jacking platform in the jacking pit
- Drilling or jacking a casing through the earth under the road or railroad to be avoided
- Installing the new pipeline in the casing
- Connecting the new pipeline-to-pipeline segments on either end
- Backfilling the jacking and receiving pit and temporary paving
- Pressure testing and disinfecting the pipeline
- Repaving

Figure 2.7-2 Typical Jack and Bore Construction Method



Construction Details
Jack and bore work would have a pit footprint of approximately 500 square feet, and the pit would be approximately 10 to 15 feet deep on either side of the jack and bore operation. Vibratory or impact-driven sheet piles would be used to ensure the stability of the pit walls. Soil removed from the pits would either be reused or loaded directly into dump trucks and hauled away for disposal. If existing soil is not adequate for backfilling, new backfill material would be imported. Table 2.7-1 provides a summary of jack and bore locations for the proposed project.

Table 2.7-1 Jack and Bore Construction Details

Crossing	City	Pit Locations	Approximate Length
Crossing #1	Oakland	Oak Street – North of Embarcadero West, just north of the railroad crossing Oak Street – South of Embarcadero West, just south of the railroad crossing	150 feet
Crossing #2	Alameda	Peach Street – South of Otis Drive (this road divides Towata Park in half) Peach Street – North of Otis Drive, on a part of Peach Street that has been closed to vehicle access	300 feet

Pipeline staging would be located on roadways adjacent to the pipeline alignment. The jack and bore method is similar to the open trench construction method: after backfilling, the pipeline would be flushed, pressure tested, and disinfected via chlorination.

Equipment
Typical construction equipment associated with the jack and bore method includes: horizontal boring machine or auger, hydraulic jack, excavators, dump trucks, flatbed delivery trucks, backhoes, front-end loaders, and dewatering pumps.

2.7.1.3 Geotechnical Investigation

Description of Process
A geologic review and geotechnical investigation would be conducted for the HDD crossings and jack and bore locations. Exploratory borings would be made at the HDD entry and insertion pit locations and along the underwater alignment as well as at each jack and bore pit. The subsurface soil investigation would originate on the land and/or water surface and would consist of the following steps:

- Utility location/potholing
- Mobilize land based and barge- or ship-mounted geotechnical drilling equipment
- Drill exploratory soil borings at the following locations:
  - At HDD entry and insertion pits for all crossings
  - At underwater alignments
  - A jack and bore pits
- Collect soil samples for classification and laboratory analysis
- Abandon exploratory borings (backfill land-based borings only)

Investigation

The geotechnical investigation would evaluate subsurface conditions related to the potential for geological and seismic hazards, including ground shaking, liquefaction, lateral spreading, settlement, seismic slope instabilities, expansive soils, and corrosion in addition to studying the regional seismicity and site-specific geologic conditions. The investigation would also include a static and pseudo-static analysis of the potential for seismic-induced lateral spreading and landslides at shorelines near the proposed project area.

Construction Details

The drilling operations would involve a limited number of workers and equipment, and would be relatively quiet. There would be minor amounts of truck traffic during mobilization and demobilization.

Equipment

Typical construction equipment associated with the geotechnical investigation would include geotechnical, track-mounted and barge-mounted drilling rigs. Drilling rigs would require some small equipment such as drilling fluid pumps.

2.7.1.4 Transmission Pipeline Horizontal Directional Drilling

Description of Process

HDD would be used to install the three underwater pipelines under the Oakland Inner Harbor, Tidal Canal, and the San Leandro Bay Channel. HDD is a process that originates on the surface and typically consists of the following steps:

- Ramming a steel conductor casing approximately 200 feet long into the ground on both sides of the drilling operation to support the pipeline until the pipeline reaches deeper and more stable soil and to prevent hydraulic fracturing (“frac-out”) at the surface
- Drilling a pilot hole from the entry pit across the water to the insertion pit; drilling could potentially occur at both the entry pit and the insertion pit
- Enlarging the pilot hole through a reaming process
- Laying down, fusing together, and pressure testing the pipeline
- Pulling the pipeline into the insertion pit, through the enlarged pilot hole, and to the receiving pit
- Injecting grout between the pipeline and casing
- Injecting jet-grouted columns (see Figure 2.7-3) to provide additional support to the casing, between the entry pit and the shoreline
- Backfilling the HDD pit and temporary paving
- Disinfecting the pipeline
- Repaving

Construction Details

The pipelines would have entry and insertion angles of about 15 degrees and would reach depths of approximately 50 to 100 feet under the water surface. Figures 2.7-4, 2.7-5, and 2.7-6 show profiles of the HDD construction method for Crossings #1, #2, and #3. The entry and insertion pits would be set back more than 200 feet from the shore to allow installation of the longer conductor casings and any associated ground improvement work. The entry and insertion pits would be approximately 10 feet by 20 feet and 5 feet deep. Staging would occur around both the entry and insertion pits. The total staging area around the entry and insertion pits would be approximately 2,000 to 2,500 square feet.

Table 2.7-2 summarizes the length of HDD and the location and size of the entry and insertion pit work areas for the three underwater pipeline crossings. The entry pit side would function as the primary work site.

The HDPE pipeline would be fused during the pilot hole drilling and reaming processes. The construction crews would need to lay down the pipeline on city streets (pipeline laydown) in order to assemble, fuse, and pressure test the pipeline (see Figures 2.7-7, 2.7-8, and 2.7-9). The pipeline laydown would be protected from traffic through the use of K-rails, as shown in these figures. Temporary closures of one to two vehicle traffic lanes are anticipated to occur during staging activities for Crossings #1, #2, and #3, as described further in Section 3.13: Traffic and Transportation. The pipeline laydown for Crossing #2 would be located on the sidewalk west of the Bay Trail and Bay Farm Island Bicycle Path (bicycle path) along Island Drive. At Crossing #2, the sidewalk would be closed for 2 weeks during pipeline laydown, and both the sidewalk and bicycle path along this portion of Island Drive would be closed for 48-hours during the weekend when the pipeline is pulled through.

Table 2.7-2 HDD Construction Details for Crossings #1, #2, and #3

Crossing	HDD Length (feet)	Entry Pit Location	Insertion Pit Location
Crossing #1	1,800	Oakland Adjacent to the parking spaces next to Estuary Park–located approximately 500 feet south of the intersection of Embarcadero West and Fallon Street, along EBMUDs historic property rights per Port of Oakland Resolution 8628.	Alameda Telecare Corporation parking lot–located in the middle of Telecare Corporation parking lot, approximately 250 feet north of the intersection of Marina Village Parkway and Tynan Avenue
Crossing #2	1,400	Alameda Towata Park–located within Towata Park, east of the portion of Peach Street that divides Towata Park	North Bay Farm Island Veterans Court–located approximately 275 feet north of the intersection of Veterans Court and Island Drive
Crossing #3	1,400	Oakland Derby Avenue–located on Derby Avenue, between Ford Street and Glascock Street, approximately 50 feet north of the intersection of Derby Avenue and Glascock Street	Alameda Broadway–located on Broadway, between Blanding Avenue and Clement Avenue, approximately 160 feet south of the intersection of Broadway and Blanding Avenue

Figure 2.7-3 Jet Grouting Support

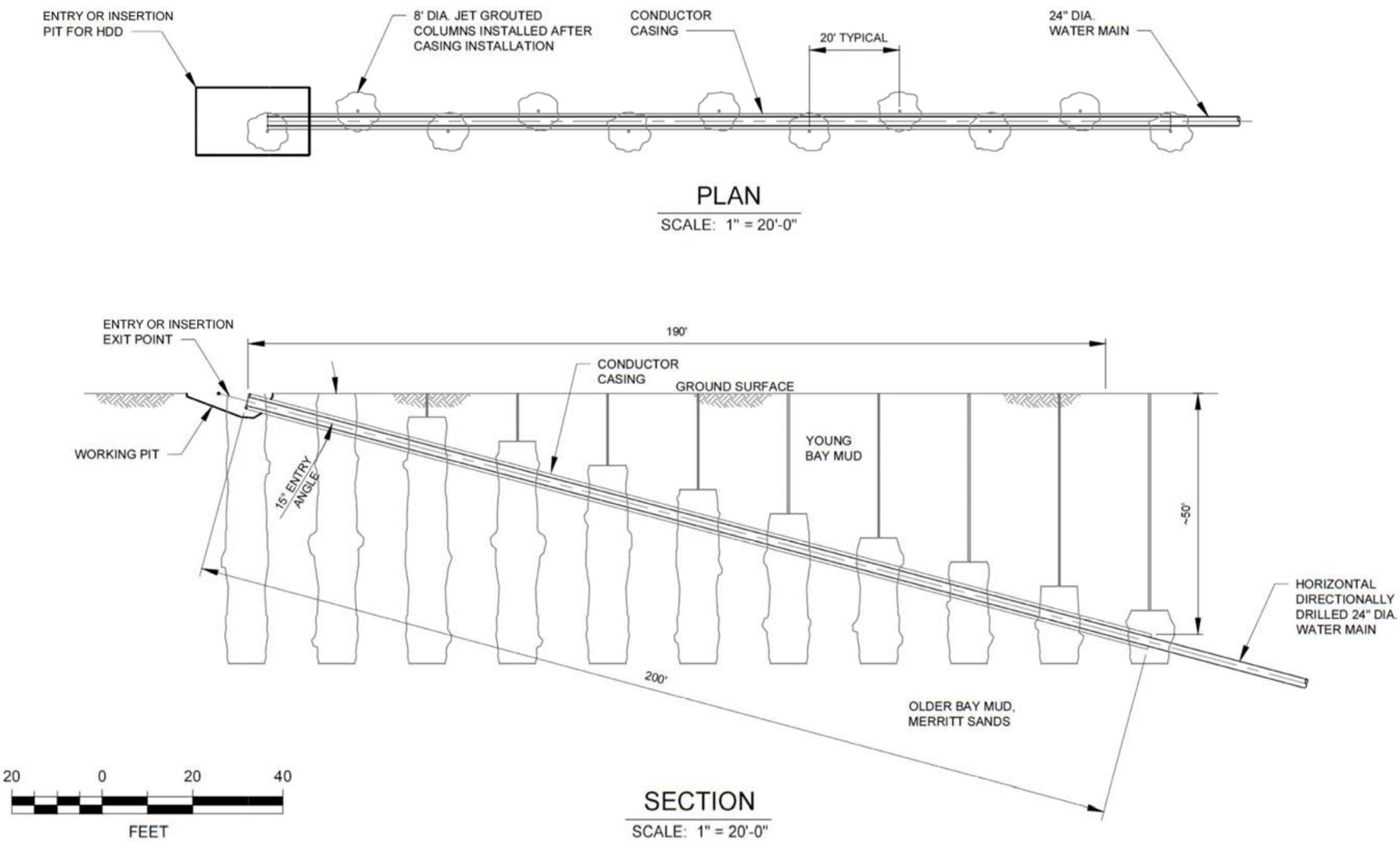


Figure 2.7-4 Typical HDD Construction Method (Crossing #1)

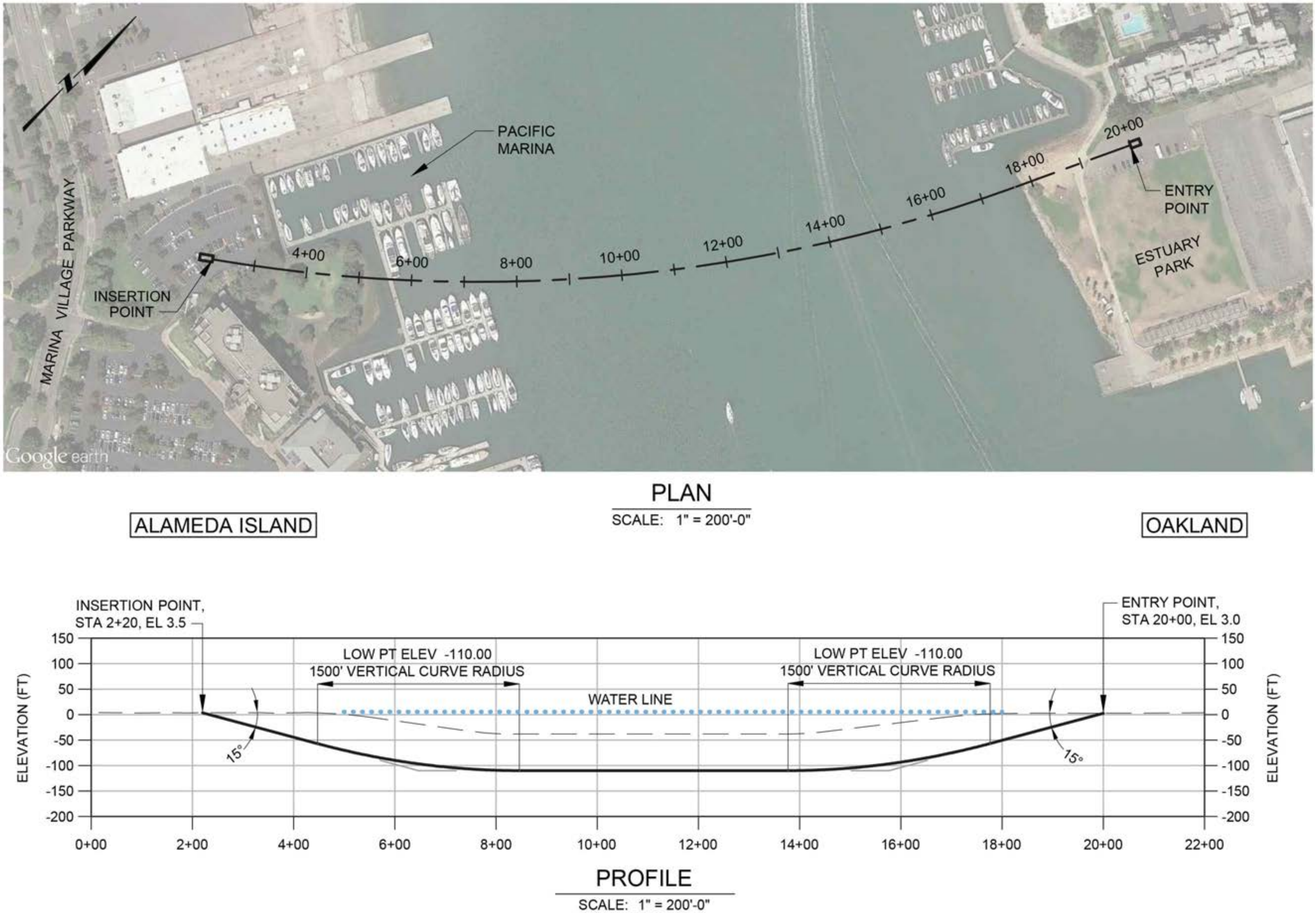
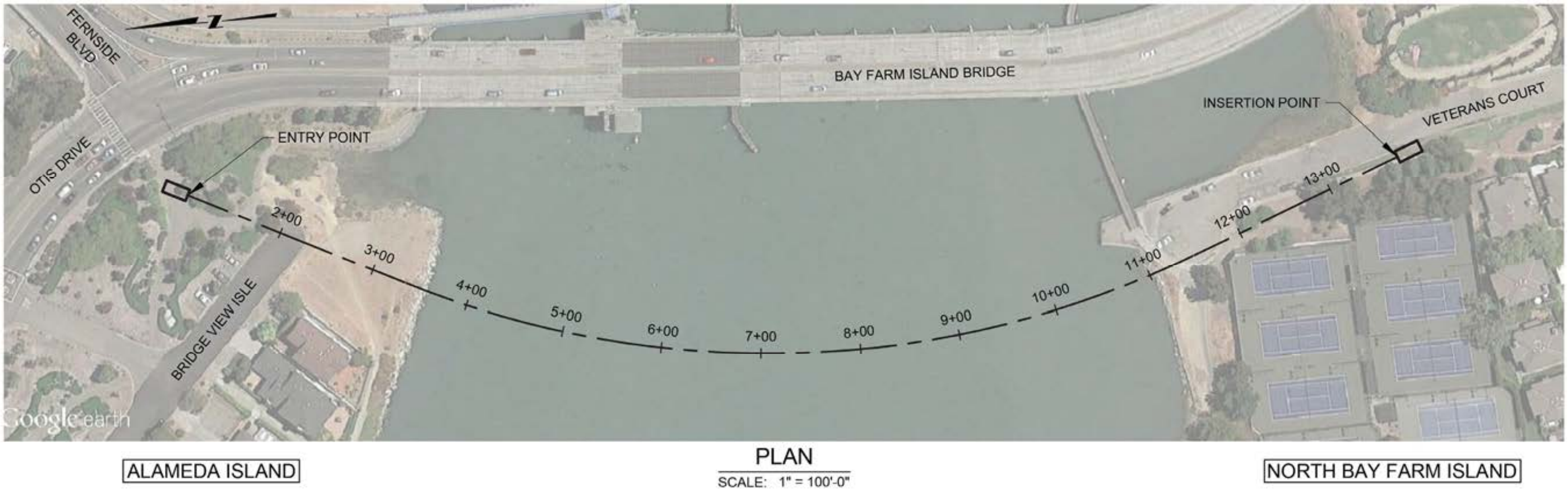


Figure 2.7-5 Typical HDD Construction Method (Crossing #2)



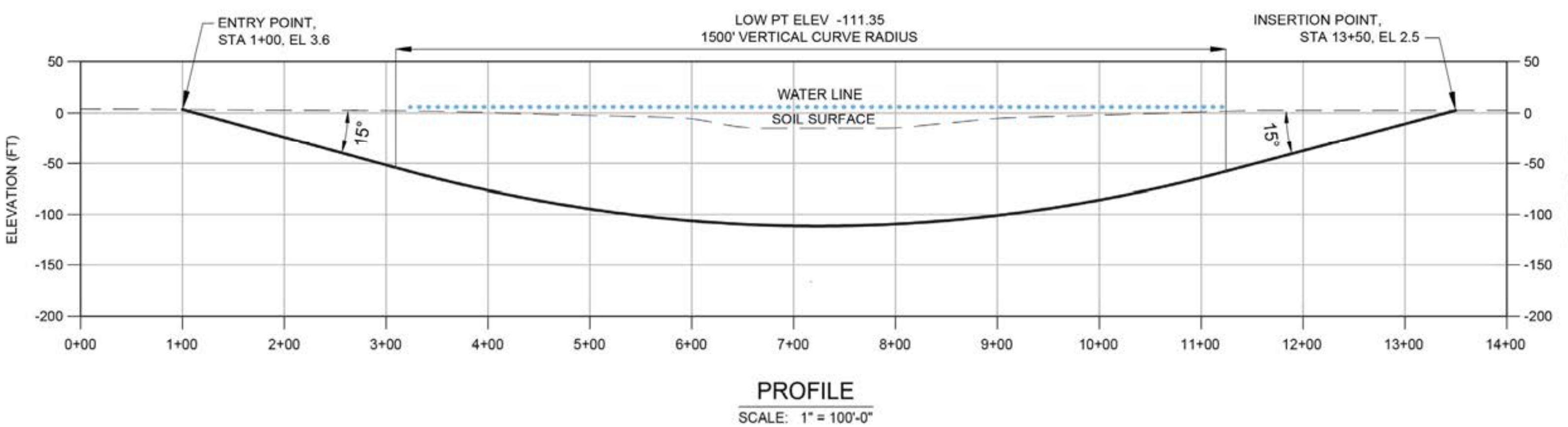


Figure 2.7-6 Typical HDD Construction Method (Crossing #3)

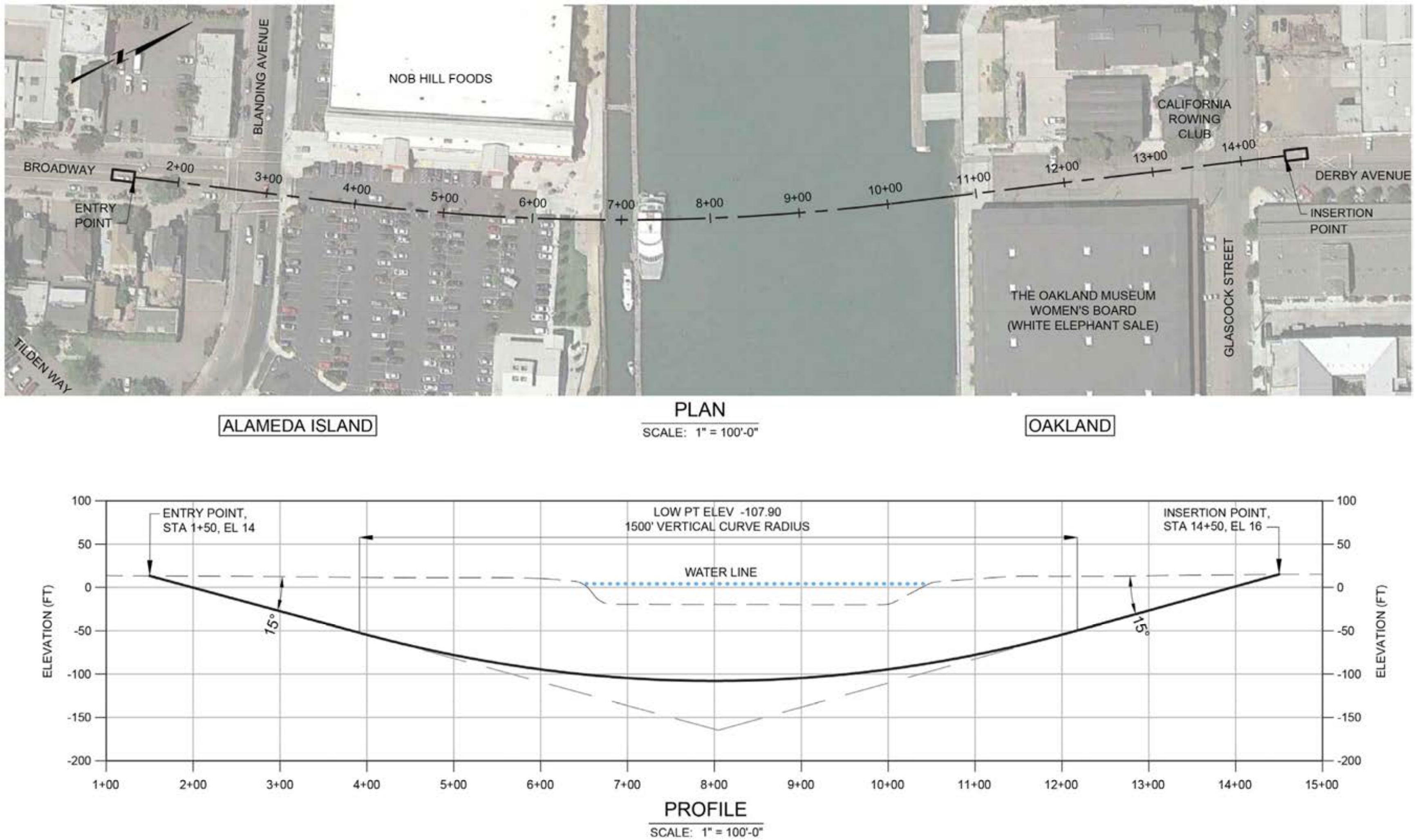
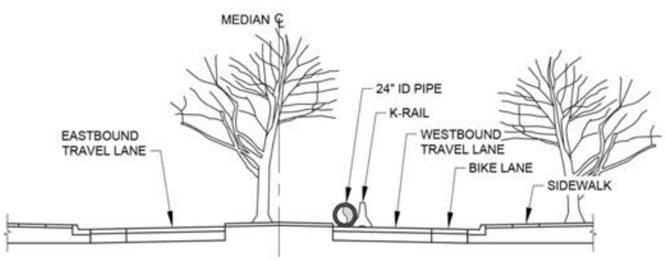


Figure 2.7-7 Pipeline Laydown (Crossing #1)

ALAMEDA ISLAND

PLAN
SCALE: 1" = 150'-0"



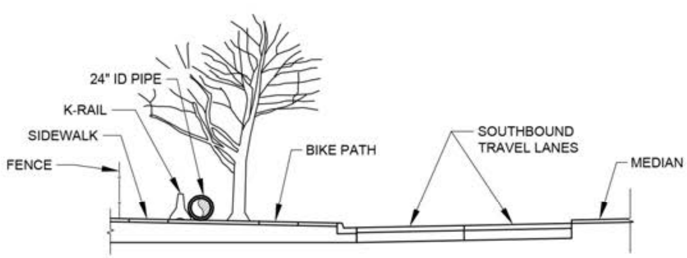
SECTION A-A
SCALE: 1" = 10'-0"

(STREET LEVEL GOOGLE EARTH PHOTOGRAPH)
SECTION A-A
NO SCALE

Figure 2.7-8 Pipeline Laydown (Crossing #2)

NORTH BAY FARM ISLAND

PLAN
SCALE: 1" = 150'-0"



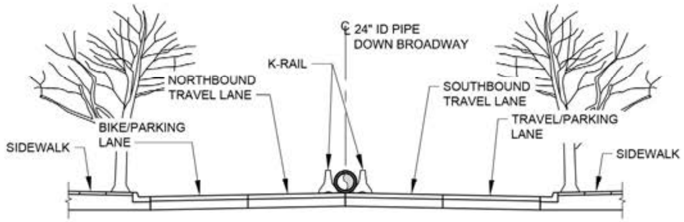
SECTION A-A
SCALE: 1" = 10'-0"

(STREET LEVEL GOOGLE EARTH PHOTOGRAPH)
SECTION A-A
NO SCALE

Figure 2.7-9 Pipeline Laydown (Crossing #3)

ALAMEDA ISLAND

PLAN
SCALE: 1" = 150'-0"



SECTION A-A
SCALE: 1" = 10'-0"

(STREET LEVEL GOOGLE EARTH PHOTOGRAPH)
SECTION A-A
NO SCALE

Equipment

HDD would require the following major pieces of equipment: HDD rig with control cab for the HDD operator(s) (potentially one for each side), slurry separation plants (one for each side), small pick-cranes (one for each side), pipeline rollers, slurry and grout pumps (one for each side), welders (at insertion pit), soil-cement mixing machines (one for each side), jet grouting rigs (one for each side), excavators (one for each side), and tractors/loaders/backhoes (one for each side).

2.7.1.5 Connections

Description of Process

The proposed project would connect the new water pipelines to existing EBMUD water transmission pipelines. The work to connect the new pipelines to existing pipelines would require the excavation of a trench or pit at each connection location. Temporary shoring would be required to ensure the stability of the excavation, which may include the use of vibratory sheet piles. The proposed tie-ins would be located within street rights-of-way (ROW) and sited to minimize disruptions to traffic and homeowner access. Construction of the connections would generally be completed within a 12-hour period.

Two techniques would be used to connect the new pipelines to the existing pipelines: "hot tapping" or constructing a new tee. Hot tapping would be used when connecting to steel pipelines that are 12 inches in diameter and smaller. A new tee would be constructed when connecting to pipelines larger than 12 inches in diameter and when connecting to any cast-iron pipeline, regardless of size. For connections that require a new tee, construction could require a full 24-hour period, and night work might be necessary.

Hot Tap Technique

To complete a hot tap, a saddle and pressure valve is first fitted and grouted to the outside of the pipeline. A hot tap machine is then fitted to the open valve. The hot tap machine contains a saw that is used to cut an opening in the pipeline while pressure is maintained by the hot tap machine. Once the hole is made, the valve is closed and the hot tap machine is removed, at which point the new pipeline is fitted to the valve. The hot tap technique does not require any shutdown of water service.

Installation of a New Tee

Some connections would be made by installing a new tee; the installation would require the construction crews to shut down the existing pipeline by closing isolation valves and then dewatering the pipeline. Water from the dewatering process would be discharged to the storm drain through a drain inlet or sewer through a manhole consistent with Alameda or Oakland permit requirements and statewide requirements as described in Section 2.7.1.11: Dewatering. A section of the pipeline would then be cut out and a new tee installed in place from the outside. No work would need to be performed from within the pipeline. During the installation of a new tee, there may be a temporary shutdown of water service for customers fed by the existing pipeline for up to 12 hours. Affected customers would be notified in advance.

Construction Details
The connections would be made in the open trench construction corridor and would have similar dimensions as open trench construction, previously described.

Equipment
Typical construction equipment associated with connections includes: excavators, generator sets for night lighting, tractors/loaders/backhoes, dewatering pumps, and a hot tap machine.

2.7.1.6 In-Street Pipeline Abandonment

Description of Process
Pipeline abandonment would require three construction pits in 5th Street to move service connections and fire hydrants and to install two endcaps, one at 5th Street and another at Oak Street. The abandoned pipeline would be filled with cellular concrete between the two endcaps, and an existing valve near the intersection of Madison Street and 5th Street would be abandoned in place after opening the valve.

Construction Details
Approximately 800 feet of an existing 20-inch cast-iron pipeline, constructed in 1916 and located in 5th Street between Oak Street and Jackson Street for Crossing #1 in the city of Oakland, would be abandoned (see Figure 2.1-2). The estimated time to complete pipeline abandonment is approximately 5 days.

Equipment
The equipment needed to accomplish pipeline abandonment includes: concrete/industrial saws, jack hammers, excavators, tractors/loaders/backhoes, dewatering pumps, welders, grouting pumps, cement and mortar mixers (grouting), pavers, paving equipment, rollers, dump trucks, forklifts, and flatbed delivery trucks.

2.7.1.7 Underwater Pipeline Crossings Abandonment

Description of Process
The seven existing underwater pipeline crossings would be abandoned. The Alice-Webster pipeline abandonment is located near Crossing #1; the Bay Farm 1 and Bay Farm 2 pipeline abandonments are located near Crossing #2; and the Blanding Street, Park Street, Derby Avenue, and High Street pipeline abandonments are located near Crossing #3.

Abandonment includes filling onshore sections of pipelines with cellular concrete and abandoning submarine sections of pipelines in place. Bumped heads or blind flanges would be constructed at the demarcation between the onshore and submarine sections and at the end of the onshore sections to be abandoned. To install the bumped heads or blind flanges, a pit would be excavated down to the pipeline. The bumped head at the two abandonment locations at Crossing #2 would be installed in existing vaults and would not require pit excavation (see Figures 2.1-3 and 2.1-4). Additional pits may be necessary to remove valves, hydrants, move service laterals, and at low points along the onshore pipeline alignment to facilitate concrete pumping; the location of these additional pits would be determined during detailed design.

Construction Details
The excavated pits have an area of about 100 square feet with a width and length of 10 feet. The pits would have a depth of 4 to 10 feet. The approximate location of the pipeline abandonments is shown in Figures 2.1-2 to 2.1-5.

Equipment
Underwater pipeline crossings abandonment would require the same equipment used for in-street pipeline abandonment, as described in Section 2.7.1.6. Vibratory pile driving may be used to install sheet pile walls for the abandonment pits.

2.7.1.8 Distribution Pipeline Replacement

Description of Process
The proposed project would include replacing existing small-diameter distribution pipelines at two locations along Crossing #1 and Crossing #3. Open trench construction methods (see Section 2.7.1.1) would be used to install the new pipeline and the existing pipeline would be abandoned in place. Pipeline replacement would occur during open trench construction activities, before the new transmission pipeline is installed.

Construction Details
The following pipelines would be replaced:

- **Crossing #1.** On 2nd Street (see Figure 2.1-2), approximately 400 feet of existing 10-inch cast-iron pipeline constructed in 1908 would be replaced with a 12-inch steel pipeline.
- **Crossing #3.** On Everett Street (see Figure 2.1-5), approximately 750 feet of existing 4-inch cast-iron pipeline constructed in 1895 would be replaced with a 6-inch steel pipeline.

Equipment
Distribution pipeline replacement would require the same equipment used for open trench construction, as described in Section 2.7.1.1.

2.7.1.9 Staging and Materials Storage
Staging areas would be located adjacent to or in the vicinity of the pipeline alignment corridors, including sidewalks, wherever feasible. At any given time, sidewalk staging would occur on only one side of the road and pedestrians would be able to use the sidewalk on the opposite side of the road that is not being used for staging. The construction crews would not stage on sidewalks when only one side of the roadway has a sidewalk. A minimum construction corridor width of 25 feet would be needed to accommodate pipeline storage and to allow trucks and equipment access along the trench.

2.7.1.10 Excavated Soils Handling, Testing, and Disposal
Open trench construction, HDD, jack and bore, and excavation activities related to pipeline abandonment and pipeline replacement would generate excavated soil. The excavated soil would be reused for backfill when feasible. If the excavated soils are found to be inadequate for

backfill, new backfill material would be imported. Table 2.7-3 provides a summary of the excavated soil that would be generated by the proposed project. All excavated soil would be disposed of in accordance with applicable laws.

Table 2.7-3 Estimated Excavated Soil to be Generated

	Excavated Soil (cubic yards)[1]			
Crossing	HDD	Open Trench Construction	Underwater Pipeline Crossings Abandonment	Total (cubic yards)
Crossing #1	800	12,600	140	13,500
Crossing #2	600	5,100	180	5,900
Crossing #3	600	4,500	320	5,400
Total	**2,000**	**22,200**	**640**	**24,800**

Note:

[1] Refer to pages C-10, C-12, and C-14 in Appendix C for the construction details used to calculate the numbers in this table.

2.7.1.11 Dewatering

Dewatering would be necessary if groundwater is encountered during excavation, during hydrostatic testing of the new pipelines, during disinfection of the new pipelines, and when connecting to the existing pipeline. Table 2.7-4 provides a summary of the dewatering volume that would be necessary for construction of Crossings #1, #2, and #3.

Table 2.7-4 Dewatering Volumes for the Proposed Project

	Dewatering Volumes from Construction (gallons)[1]		
Crossing	Open Trench Construction (Disinfection and Testing)	Connections	Total (gallons)
Crossing #1	824,800	96,000	920,800
Crossing #2	310,000	44,500	354,500
Crossing #3	351,000	106,400	517,400
Total Dewatering Volume for All Activities at the Three Crossings			**1,792,700**

Note:

[1] Refer to pages C-12 and C-16 in Appendix C for the construction details used to calculate the numbers in this table.

All water discharged from construction activities would be managed in compliance with the permit conditions of the respective cities and with statewide National Pollutant Discharge Elimination System (NPDES) permit requirements. The construction crews would be required to comply with EBMUD's Standard Construction Specification 01 35 44, which requires the preparation of a Water Control and Disposal Plan to ensure compliance with regulations of the Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), Alameda County Flood Control District (ACFCD), and any other regulatory agency that has jurisdiction in the project area. All flushing water (used to disinfect the pipelines before installation) would be dechlorinated prior to discharging it to any storm drain.

2.7.1.12 Vegetation Removal

The HDD entry pit for Crossing #2 would be located in Towata Park. The 1.58-acre Towata Park consists of a landscaped area with ornamental shrubs and trees. To accommodate the entry pit and the HDD machinery at Crossing #2, construction crews may need to trim trees and remove vegetation, including trees. Ornamental trees and shrubs would be removed from the HDD pit location and where jet grouting would occur. Trees removed would include five pineapple guava trees (*Feijoa sellowiana*), two Chinese pistache (*Pistachia chinensis*), and the following ornamental shrubs: *Cotoneaster parneyi, Leptospermum scoparium, Myoporum parvifolium, Phormium tenax,* and *Westringia brevifolia*. Additional ornamental trees and shrubs would be trimmed that would be affected by machinery within the staging area for HDD. These trees and shrubs include four pine trees (one *Pinus radiata* and three *P. canarensis*), four pineapple guava trees (*Feijoa sellowiana*), 11 Chinese pistache (*Pistachia chinensis*), one oak tree (*Quercus chrysolepis*), and the following shrubs: *Cotoneaster parneyi, Leptospermum scoparium, Myoporum parvifolium, Westringia brevifolia, Pyracantha crenatoserrata,* and a large hedge of *Escallonia x fradessii.* Many of these trees are in failing health or their growth is stunted due to their close proximity to the San Leandro Bay Channel where they are exposed to higher salinity levels in the soil.

Other landscape trees may also be trimmed or removed along Crossing #1, Crossing #2, and Crossing #3. Jet grouting for Crossing #1 in the city of Alameda would be located near ornamental trees and shrubs. Jet grouting could potentially affect the roots of two eucalyptus trees (*Eucalyptus viminalis*) and one white alder tree (*Alnus rhombifolia*). In addition, jet grouting could affect *Nerium oleander* shrubs. Pipeline laydown for Crossing #2 on North Bay Farm Island may require the trimming of trees located along the sidewalk and bike path of the western side of Island Drive. Pipeline laydown could potentially affect the sweetgum (*Liquidambar* sp.) and London planetree (*Platanus x acerifolia*) trees located along the sidewalk and bike path. Open trench construction along the alternate route option of Eagle Avenue for Crossing #3 (see Section 2.6.3: Alternate Alignment Options) would require trimming or removal of the following ornamental trees: one Italian cypress (*Cupressus sempervirens*), one red-leaf photinia (*Photinia fraseri*), and one scarlet oak (*Quercus coccinea*).

2.7.1.13 Water Needs

Water would be required during construction for dust control, hydrostatic testing, and disinfection of the pipelines. Water would also be used to control dust during open trench construction within roadways. For cut and fill activities, such as HDD, open trench construction, and pipeline abandonment, it takes at least 30 gallons of water to control dust from each cubic yard of material to be moved (Maricopa County Air Quality Department 2005). Under the proposed project, 27,520 cubic yards of soil would be excavated (see Table 2.7-3). Therefore, based on the above calculation, it is estimated that up to 826,000 gallons of water would be required for dust control for the total duration of the construction of the proposed project.

2.7.2 Construction Schedule and Personnel

2.7.2.1 Schedule

Pre-Construction Geotechnical Investigation

The pre-construction geotechnical borings for Crossing #1 would take place during detailed design in approximately 2017, in advance of construction. The timing for geotechnical borings for Crossings #2 and #3 is not yet known.

Construction

The construction of Crossing #1, the Alice-Webster Crossing, is the highest priority because it replaces the oldest and most vulnerable underwater pipeline crossing. Crossing #1 is scheduled for construction in 2018–2019.

Crossings #2 and #3 would replace underwater pipeline crossings constructed in the 1980s; these two underwater pipeline crossings are, therefore, a lower priority than the underwater crossings for Crossing #1. Construction of Crossings #2 and #3 would be scheduled at a future date (i.e., after 2020 but before the existing pipelines reach the end of their useful life). Crossings #2 and #3 would not be constructed simultaneously.

2.7.2.2 Duration

Table 2.7-5 shows the duration of different construction activities for Crossings #1, #2, and #3. The time needed to construct the three underwater pipeline crossings is based on whether or not the HDD, open trench construction, and pipeline abandonment work would occur simultaneously (e.g., construction for Crossing #1 would last 13 months if HDD, open trench construction, and pipeline abandonment work occurred simultaneously, or 22 months if work occurred at different times). Table 2.7-5 presents the best-case scenario and Table 2.7-6 presents the worst-case scenario. Under the best-case scenario, the project would be completed as fast as possible by performing construction activities simultaneously; under the worst-case scenario, construction activities would not occur simultaneously. The duration of actual project construction could last for any length of time between these two scenarios and would depend on several factors, including any limitations on construction activities to reduce environmental impacts as well as routine construction delays, such as inclement weather and unforeseen site conditions.

2.7.2.3 Work Hours and Number of Personnel

Construction hours would typically be from 7 a.m. to 7 p.m.; however, longer construction hours (up to 24 hours per day) might be required when the proposed pipelines are connected to existing pipelines as well as to minimize service disruptions for customers. Forty-eight-hour construction periods for one weekend would also be necessary for each HDD pull through. Additional nighttime construction work could occur at traffic intersections when required by encroachment permit conditions to minimize traffic impacts. If required, it is expected that nighttime intersection work would only occur at arterial and freeway connector streets such as High Street, Tilden Way, 5th Street, 6th Street, 7th Street, and 8th Street. Table 2.7-7 lists the number of workers that would be required during construction.

Table 2.7-5 Summary of Duration of Construction (Best-Case Scenario)

Activity	Duration (number of months)		
	Crossing #1	Crossing #2	Crossing #3
HDD			
Surface casings and jet grouting, HDD setup, pilot hole drilling, and multiple reaming passes (including placement of the pipeline), pipeline tie-in work and demobilization	6	6	6
Open Trench Construction, Jack and Bore, and Other Activities on Roads			
Open trench construction/ jack and bore/ pipeline replacement/ pipeline abandonment; Mobilization (Oakland and Alameda); locate and mark utilities for Oakland and Alameda; pipeline pressure test (Oakland and Alameda); disinfect pipeline (includes Oakland and Alameda); repave; underwater pipeline crossings abandonment	13	9	9
Pipeline Abandonments			
Install bumped heads, fill onshore sections of pipelines, repaving	1	1	2
Total Construction Time (HDD, open trench, and pipeline abandonment work occur at the same time)	**13**	**9**	**9**

Table 2.7-6 Summary of Duration of Construction (Worst-Case Scenario)

Activity	Duration (number of months)		
	Crossing #1	Crossing #2	Crossing #3
HDD			
Surface casings and jet grouting, HDD setup, pilot hole drilling, and multiple reaming passes (including placement of the pipeline), pipeline tie-in work and demobilization	8	8	8
Open Trench Construction, Jack and Bore, and Other Activities on Roads			
Open trench construction/ jack and bore/ pipeline replacement/ pipeline abandonment; mobilization (Oakland and Alameda); locate and mark utilities for Oakland and Alameda; pipeline pressure test (Oakland and Alameda); disinfect pipeline (Oakland and Alameda); repave; underwater pipeline crossings abandonment	13	9	9
Pipeline Abandonments			
Install bumped heads, fill on-shore sections of pipelines, repaving	1	1	2
Total Construction Time (HDD, open trench, and pipeline abandonment work constructed in succession)	**22**	**18**	**19**

Table 2.7-7 Maximum Number of Construction Workers

Worker Classifications								
Foreman	Workers[1]	Heavy Equipment Operator[2]	Truck Driver	Flagger	Superintendent	EBMUD Inspector	City Inspector	Total
Open Trench Construction								
1	7	3	3	2	1	1	1	**19**
HDD								
2	11	4	0	4	2	1	1	**25**
Pipeline Abandonment								
0	4	1	1	2	1	1	1	**11**

Notes:

[1] The classification includes the following: surveyor, plumber, welder, driller, rod helper, drill positioner, mud engineer.

[2] The classification also includes drillers and crane operators.

2.7.3 EBMUD Practices and Procedures

EBMUD maintains two Standard Construction Specification documents specifically related to environmental conditions and an Environmental Compliance Manual that would become part of the construction contract. Standard Construction Specification 01 35 24 describes the Project Safety Requirements. Standard Construction Specification 01 35 44 is the Environmental Requirement specification. Conditions identified in the Environmental Requirement specification are implemented on all projects. Engineering Standard Practice 512.1 Water Main and Services Design Criteria and Engineering Standard Practice 550.1 Seismic Design Requirements dictate basic requirements for water pipelines and design standards for pipelines to withstand seismic hazards. The Environmental Compliance Manual includes best management practices (BMPs) that would be implemented for the proposed project including a trench spoils BMP program and discharge dechlorination BMPs. Appendix D includes Standard Construction Specification 01 35 24, Standard Construction Specification 01 35 44, Engineering Standard Practice 512.1 Water Main and Services Design Criteria, Engineering Standard Practice 550.1 Seismic Design Requirements, and the Environmental Compliance Manual.

2.8 OPERATION AND MAINTENANCE

The proposed project would require routine operation and maintenance after construction.

2.8.1 Flushing

EBMUD would conduct periodic pipeline flushing to remove particles, rust, or old water that has lost its chlorine residual. In the event of a pipeline break that presents the possibility of contamination, EBMUD would consider flushing the pipeline with chlorinated water to remove any biological contamination and/or particles that may have entered the pipeline during the break. Transmission pipelines, such as those identified for the proposed project, generally carry a high flow of water that prevents sediment buildup, removes rust, and keeps the water fresh. As a result, transmission pipelines would typically be flushed only when there is a reported water quality problem or following a pipeline break. Flushed water would be disposed of as previously described, and in accordance with local municipal permits for water discharge.

2.8.2 Anode Replacement

Either HDPE or steel pipeline would be installed in the open trench portions of the project alignment. Welded steel pipelines are often protected from corrosion by a cathodic protection system. The anodes used in a cathodic protection system require replacement about once every 25 years. Anode replacement would involve using a drill rig or backhoe to make a hole for the anode, placing the anode underground, connecting wires to the cathodic protection system, and backfilling the hole. HDPE pipeline would not require cathodic protection.

2.8.3 Leak Detection

EBMUD would conduct routine leak detection on its pipelines. Several different methods would be used, including the deployment of internal pipeline probes and external listening devices. These methods could be performed while the pipeline is in service and would be employed by small crews driving pickup trucks or vans.

2.8.4 Right-of-Way Maintenance

EBMUD would conduct routine inspections and maintenance to identify and remove vegetation from areas above water pipelines. For pipelines installed in roadways, the valve pots would be adjusted for height whenever the road was repaved or otherwise reconstructed so that the valve pots would not sit too low or too high.

2.8.5 Valve Preventative Maintenance

Valves would be installed along the pipelines to allow EBMUD to isolate a reach of pipeline for maintenance activities or repairs. The maintenance program for these valves would consist of locating, cleaning, and exercising the valves attached to distribution mains. Maintenance activities would be conducted every two years, and any broken valves would be repaired or replaced.

2.9 PERMANENT RIGHTS-OF-WAY AND TEMPORARY EASEMENTS

The pipelines would primarily be located beneath existing roads in public ROWs in Alameda and Oakland; however, EBMUD would need to obtain additional permanent easements and ROWs in order to construct the proposed project, including the following:

- New ROW would be required from the City of Oakland and City of Alameda for the underwater portions of all three underwater pipeline crossings
- An approximate 500-foot-long pipeline easement would be required from the Telecare Corporation in the Telecare Corporation parcel for Crossing #1 in the city of Alameda

- An approximate 200-foot-long pipeline easement would be required in Towata Park from the City of Alameda for Crossing #2
- A pipeline easement would be required from a private party for a parcel at 3328 Bridgeview Isle in Alameda

In addition to the new easements listed above, EBMUD will use historic property rights (Oakland Port Resolution 8628) to install 800-feet of pipeline along Fallon Street near Estuary Park for Crossing #1. These historic property rights would be recorded as a permanent easement in coordination with the City and Port of Oakland.

Temporary easements would also be needed during construction, including easements for:

- HDD work (insertion pit) within the Telecare Corporation parking lot from the Telecare Corporation for Crossing #1
- HDD work (entry pit) within Estuary Park from the City of Oakland for Crossing #1
- HDD work (entry pit) within Towata Park from the City of Alameda for Crossing #2

2.10 PERMITS AND APPROVALS

Table 2.10-1 provides a summary of the approvals and permits that EBMUD would be required to obtain prior to construction.

Table 2.10-1 Agency-Required Approvals and Permits

Agency/ Stakeholder	Type of Jurisdiction	Type of Approval
City of Oakland	Local	Encroachment permit for construction and soil borings in city streets and parks; creek protection permit Approval for underwater soil borings Approval for use of city sewer line or storm drains for dewatering activities Encroachment permit for work in Estuary Park
City of Alameda	Local	Encroachment permit for construction and soil borings within city streets and parks. Approval for underwater soil borings Approval for use of city sewer line or storm drains for dewatering activities Encroachment permit for work in Towata Park
Bay Conservation and Development Commission (BCDC)	Local	Administrative permit for pre-construction geotechnical borings and for construction activities near San Francisco Bay Trail segments
Bay Area Air Quality Management District (BAAQMD)	Local	Approval for emissions generated from construction of the proposed project

Agency/ Stakeholder	Type of Jurisdiction	Type of Approval
California Department of Transportation (Caltrans)	State	Encroachment permits for construction within streets that are designated state highways and a transportation permit for the movement of oversized or excessive-load vehicles on state roadways
RWQCB	State and Federal	National Pollutant Discharge Elimination System Construction General Permit and Waste Discharge Requirements for dewatering and work within the bed and banks of waters of the U.S. and state
Southern Pacific Lines	Private Company	Approval from Southern Pacific Railways for work beneath the railroad
CDFW	State	California Endangered Species Act Section 2081 Incidental Take Permit or Consistency Determination under Section 2080.1 for in water geotechnical borings
California Department of Toxic Substances Control (DTSC)	State	Hazardous materials and hazardous waste disposal in California
US Army Corps of Engineers (USACE)	Federal	Permit under Clean Water Act Section 404 and Rivers and Harbors Act Section 10 for in water geotechnical borings
National Marine Fisheries Service (NMFS)	Federal	Consultation or technical assistance under Endangered Species Act Section 7 regarding USACE permit for geotechnical borings Potential Incidental Harassment Authorization under Marine Mammal Protection Act for in water geotechnical borings
US Fish and Wildlife Service (USFWS)	Federal	Consultation or technical assistance under Endangered Species Act Section 7 regarding USACE permit for geotechnical borings
US Coast Guard	Federal	Establish Vessel Traffic Safety Zone for in water geotechnical borings Issuance of appropriate Notice to Mariners

2.11 REFERENCES

EBMUD (East Bay Municipal Utility District). 2011. Urban Water Management Plan 2010. June 2011.

______. 2014. Alameda–North Bay Farm Island Crossings Master Plan. November 2014.

Maricopa County Air Quality Department. 2005. Guidance for Application for Dust Control Permit. June 2005.

3 ENVIRONMENTAL ANALYSIS

3.1 INTRODUCTION TO ENVIRONMENTAL ANALYSIS

This chapter includes descriptions of the existing environmental setting in the proposed project area and the analyses of the environmental impacts that would occur from construction of the proposed project. Following construction, the project areas would be restored to pre-construction conditions. Operation and maintenance activities would be the same as for existing activities for nearby and similar EBMUD infrastructure. Operations and maintenance activities are not considered in the project environmental analysis.

3.1.1 Organization of Chapter 3

Chapter 3 is organized by resource topic, as follows:

3.2 Aesthetics
3.3 Air Quality
3.4 Biological Resources
3.5 Cultural Resources
3.6 Energy Use
3.7 Geology, Soils, and Seismicity
3.8 Greenhouse Gases
3.9 Hazards and Hazardous Materials
3.10 Hydrology and Water Quality
3.11 Noise
3.12 Recreation
3.13 Transportation and Traffic

3.1.2 Format of Environmental Resource Topic Sections

The resource topic sections in Chapter 3 are organized as follows:

3.1.2.1 Definitions

The Aesthetics, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Noise, and Transportation and Traffic sections include definitions of the technical terms that are used in the respective section.

3.1.2.2 Data Collection

The Data Collection sections identify the sources and methods used to prepare the environmental setting and to define the baseline of the resource being analyzed.

3.1.2.3 Environmental Setting

The Environmental Setting sections describe the existing physical environment within the proposed project area and within the vicinity of the proposed project area, and provide the baseline for each resource topic.

3.1.2.4 Applicable Regulations, Plans, and Standards

The Applicable Regulations, Plans, and Standards sections describe the pertinent federal, state, and local laws, regulations, plans, standards, and policies that would pertain to the proposed project.

For some resource topics, EBMUD has established Practices and Procedures such as Standard Construction Specifications and BMPs in their Environmental Compliance Manual. For the purposes of the Draft EIR analyses, although these practices and procedures are considered part of the proposed project, the environmental impacts of the proposed project are assessed before application of the practices and procedures as well as after their application. If impacts remain potentially significant after application of the practices and procedures, mitigation measures are also defined.

3.1.2.5 Significance Criteria

The environmental impacts for each of the resource topics are identified and classified as either no impact, less than significant impact, less than significant with mitigation, or significant and unavoidable. Section 15382 of the CEQA Guidelines defines a “significant effect on the environment” as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project.”

Each resource topic in the Draft EIR includes a definition of the significance criteria used to perform the analysis. This Draft EIR uses the significance criteria identified in Appendix G of the CEQA Guidelines. The CEQA significance criteria are supplemented with thresholds of significance identified by federal, state, or local agencies, including the City of Oakland and the City of Alameda. A significant impact meets the criteria for significance developed for its resource topic. Impacts that do not meet the significance criteria are considered less than significant or are considered to have no impact, if there is no measurable physical change in the environment.

3.1.2.6 Approach to Impact Analysis

The Approach to Impact Analysis section describes the general approach to analyzing a given environmental topic. For more technical resources topics, this section also includes the methodology used to quantify impacts.

3.1.2.7 Proposed Project Impacts and Mitigation Measures

Project impacts that are related to the specific environmental resource topic are addressed in each subsection. The impacts associated with the proposed project are generally short-term and temporary construction impacts.

Operational activities following project construction would be the same as existing activities for nearby and similar EBMUD infrastructure. Following construction, project areas would be restored to pre-construction conditions, as stated in Section 2.7.1. Operational activities would continue to include occasional inspection and maintenance. Because long-term operation and maintenance would not result in a net increase in maintenance activities, no impacts would be associated with the maintenance or operations of the proposed project. Therefore, long-term operation and maintenance impacts are not discussed further.

CEQA Guidelines Section 15126.4(a)(1) states that, "an EIR shall describe feasible measures which could minimize significant adverse impacts . . ." CEQA Guidelines Section 15126.4(a)(3) also states that, "mitigation measures are not required for effects which are not found to be significant." This Draft EIR identifies mitigation measures for all of the significant impacts identified. This Draft EIR also identifies the residual effect after mitigation is implemented. The proposed mitigation measures would reduce most impacts to a level that is less than significant, except for noise and traffic impacts, which would be significant and unavoidable, even with mitigation.

Mitigation measures would be incorporated into contract specifications to be implemented by contractors (or EBMUD), and monitored by EBMUD. The Mitigation Monitoring and Reporting Plan (MMRP) prepared for the proposed project identifies the responsible parties through each phase, from design and construction.

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3.2 AESTHETICS

This section presents the environmental setting and impact analysis for visual resources that could be affected by the proposed project. Background information, known resources, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here.

3.2.1 Definitions for Visual Resources

Aesthetics refers to the nature and appreciation of beauty in both form and appearance as perceived through the visual sense only. Aesthetic resources, commonly referred to as visual resources, are the visible natural and built landscape features that surround a project site. Aesthetic resources include the visual character and quality of an area, consisting of both the landscape features and the social environment from which it is viewed. The landscape features may be natural (e.g., mountain views) or manmade (e.g., a city's skyline). Aesthetic resources include, but are not limited to:

- Federal, state, and local designated scenic resources
- Places of cultural importance, such as traditional cultural properties
- Designated federal, state, and local historic properties
- Areas of high visual quality (e.g., scenic vistas, scenic hiking trails, scenic rivers, and scenic highways)
- Recreation areas characterized by high numbers of users with sensitivity to visual quality (such as parks and preserves)
- Landscape features, including, but not limited to, canyons and gorges, valleys, and mountains
- Significant trees and rock outcroppings
- Natural lightscapes (such as dark night skies)

The primary existing visual condition factors considered in the aesthetics section are defined below and include:

- Visual quality
- Viewer types and volumes of use
- Viewer exposure
- Visual sensitivity

3.2.1.1 Visual Quality

Visual quality is defined as the overall visual impression or attractiveness of an area as determined by the particular landscape characteristics, including landforms, rock forms, water features, and vegetation patterns. The attributes of variety, vividness, coherence, uniqueness, harmony and pattern contribute to the overall visual quality of an area. For the purposes of this Draft EIR, visual quality is defined according to three levels:

- **Indistinctive, or industrial.** Generally lacking in natural or cultural visual resource amenities typical of the region

- **Representative.** Visual resources typical or characteristic of the region's natural and/or cultural visual amenities
- **Distinctive.** Visual resources that are unique or exemplary of the region's natural or cultural scenic amenities

3.2.1.2 Viewer Types and Volumes of Use

Viewer types and volumes of use pertain to the types and amounts of utilization that various land uses receive. Land uses that derive value from the quality of their settings are considered potentially sensitive to changes in visual setting conditions. Land uses that may be sensitive to change in visual conditions include designated parks, recreation, and natural areas.

3.2.1.3 Viewer Exposure

Viewer exposure addresses the variables that affect viewing conditions from potentially sensitive areas. Viewer exposure considers the following factors:

- Landscape visibility (i.e., the ability to see the landscape)
- Viewing distance (i.e., the proximity of viewers to the project)
- Viewing angle—whether the project would be viewed from above (superior), below (inferior) or from a level (normal) line of sight
- Extent of visibility—whether the line of sight is open and panoramic to the project area or restricted by terrain, vegetation and/or structures
- Duration of view

3.2.1.4 Visual Sensitivity

Visual sensitivity is a composite measurement of the overall susceptibility of an area or viewer group to adverse visual or aesthetic impacts, given the combined factors of landscape visual quality, viewer types and volumes of use, viewer exposure, and special planning designations such as scenic routes. Visual sensitivity is reflected according to high, moderate and low visual sensitivity ranges.

3.2.2 Data Collection

Aesthetic resources along the proposed pipeline alignments were identified from:

- Field observations and photographs collected on June 11, 2015
- Project data provided by EBMUD
- Google Maps
- City General Plans (City of Alameda 1991, City of Oakland 1998)
- Land use cover maps

3.2.3 Environmental Setting

3.2.3.1 Regional Setting

The proposed project is primarily located along urbanized areas in the cities of Alameda and Oakland. Alameda is flat and heavily developed with residential, commercial, institutional, and industrial uses. The Oakland waterfront is flat and also developed with residential, commercial, and industrial uses. Several parks are located along the waterfronts of both cities. Prominent regional landscape features include the Oakland Hills to the east and the San Francisco Bay and peninsula to the west.

3.2.3.2 Proposed Project Area Setting

Overview
The overall visual quality, viewer types and volumes of use, viewer exposure, and visual sensitivity for all crossing locations is relatively homogenous due to the nature of the urban environment. The visual resources across the proposed project area can be divided by crossing, which includes any associated pipeline abandonments, for the purposes of the analysis.

Visual Resources
Crossing #1 and Abandonments
The visual features of the pipeline alignment within Alameda Island are common to commercial areas within urban environments, with one- to two-story commercial buildings, associated parking lots, and trees facing the roadways. Some multi-family residential buildings line the eastern side of Marina Village Parkway. The visual features of Marina Village Parkway are shown in Figure 3.2-1. The proposed pipeline laydown area would be located amongst commercial and industrial buildings. The boats in the marina are visible to the northeast from a section of Marina Village Parkway. Street lamps and numerous parking lots are located along the proposed pipeline alignment and laydown areas. Trees and landscaped areas line the roadways and center meridians are also often landscaped. The pipeline abandonment pit would be located in a marina parking lot adjacent to boat docks and commercial buildings (see Figure 3.2-1). A waterfront walkway with trees is located around the parking lot.

The visual features of the pipeline alignment within Oakland is urban with residential, commercial, and industrial buildings interspersed. The pipeline abandonment parallel to I-880 would be in the vicinity of the pipeline alignment. Multi-family buildings ranging from two to four stories and single-family homes intermixed with commercial buildings are located on Madison Street to the north of I-880. Industrial uses are located on Madison Street in the vicinity of the 5th Street intersection. Mixed-use buildings ranging in size up to five stories intermixed with commercial buildings are located on Madison Street in the vicinity of the 4th Street intersection, as shown in Figure 3.2-2. Street lamps and utility poles line the roadways. The Oakland Hills are just visible to the northeast. Railroad tracks cross Oak Street/Embarcadero West. Multi-family homes, commercial buildings, and parking lots lined by landscaping are located close to Estuary Park along Embarcadero West. The visual features of Estuary Park are flat, grassy, open areas and the waterfront has boats docked in the marina to the west, as shown in Figure 3.2-2. The San Francisco Bay Trail is located along the shoreline of Estuary Park. The Oakland Hills are visible from Estuary Park. The waterfront pipeline abandonment pit would be located along the San Francisco Bay Trail, adjacent to multi-family buildings and a boat dock. The waterfront is landscaped with trees and grass.

The visual features from the shoreline of Alameda Island or the city of Oakland across the Oakland Inner Harbor is of a tidal waterway with periodic passage of vessels ranging from racing shells, US coast guard vessels, tug boats hauling dredges, sailing boats, and yachts.

Figure 3.2-1 Marina Village Parkway and Telecare Corporation Parking Lot

Marina Village Parkway Facing Southwest (Alameda)

Telecare Corporation Parking Lot Facing North (Alameda)

Figure 3.2-2 Madison/4th Street Intersection and Estuary Park

Madison/4th Street Intersection in the City of Oakland


Estuary Park in the City of Oakland

The visual quality across most of Crossing #1 is indistinctive and industrial. Estuary Park and the San Francisco Bay Trail are representative of similar types of built environmental resources affording views of the San Francisco Bay and associated water features (e.g., the Tidal Canal and marina).

Viewer types include motorists, pedestrians, boaters, and recreationalists. Viewer volumes of use is relatively high due to the urban setting, where many people use the streets and parks. Viewer exposure is limited, however, as most foreground views are confined to the area immediately in front of the viewer with distant views obscured by buildings and reduced by the relatively flat topography. Viewer sensitivity would be considered low across most of the pipeline alignment based on the low visual quality of the urban environment, with the exception being the portion of the proposed project within Estuary Park and in proximity to the San Francisco Bay Trail, where sensitivity would be low to moderate.

Crossing #2 and Abandonments

The visual features surrounding the pipeline alignment and laydown area within North Bay Farm Island are typical of an urban environment. The pipeline abandonment pits would be in the vicinity of the HDD insertion pit. A wide landscaped meridian with trees and mulch lies along the center of Island Drive. Grass and mature trees line a sidewalk and a bicycle path along the west side of Island Drive. The laydown area would be located along Island Drive on the sidewalk adjacent to Earhart Elementary school and multi-family homes to the west as shown in Figure 3.2-3. The Chuck Corica Golf Complex and an event center are located to the east of the pipeline laydown area on the opposite side of Island Drive. The US flag within Veterans Memorial Park and marshland is located immediately east of Veterans Court and the HDD entry point as shown in Figure 3.2-3. The Harbor Bay Club and multi-family residences are located to the west of the HDD entry pit.

The visual features of the pipeline alignment on Alameda Island are also typical of an urban environment with one- to two-story single-family homes along the majority of the pipeline alignment. The pipeline abandonment pits are in the vicinity of the HDD entry pit. There are several multi-family dwellings interspersed among the single-family homes. Street lamps and trees line the roadways. Picnic tables are located in and a trail traverses Towata Park, as shown in Figure 3.2-4.

The visual features from the shoreline of Alameda Island or North Bay Farm Island across the San Leandro Bay Channel are of a tidal waterway with periodic passage of recreational sailing boats and yachts. The visual quality across most of Crossing #2 is indistinctive. The area within Towata Park that affords views across the San Leandro Bay Channel offers limited visual quality as does the area along Veteran's Court adjacent to a marshland.

Viewer types include motorists, pedestrians, and recreationalists. Viewer volumes are high; however, exposure is low, similar to Crossing #1. Viewer sensitivity would be considered low across most of the pipeline alignment, with the exception being the portion of the proposed project within Towata Park and near the marshland to the east of Veteran's Court on North Bay Farm Island where sensitivity is low to moderate.

Figure 3.2-3 Veterans Court and Island Drive

Marshland, Veterans Memorial Park, and Veterans Court on North Bay Farm Island

Island Drive on North Bay Farm Island

Figure 3.2-4 Towata Park

Towata Park on Alameda Island

Crossing #3 Derby Avenue Crossing and Abandonments

The visual features of the pipeline alignment within Alameda Island are typical of an urban environment with one- to two-story residential buildings along Everett Street, Eagle Avenue, and Broadway, as shown in Figure 3.2-5. The residences include both single- and multi-family homes. Several commercial and industrial buildings, including auto shops, are located along Clement Avenue and Lincoln Avenue. Trees are interspersed along Everett Street in front of residential homes. Trees and landscaping line Broadway with greater density. Several pipeline abandonment pits are located mostly along the waterfront adjacent to industrial and commercial buildings.

The visual features of the pipeline alignment within the city of Oakland are typical of an urban environment with one-story commercial and industrial facilities and some one- to two-story residential buildings located on Ford Street, as shown in Figure 3.2-5. Trees are interspersed along the roadways throughout the pipeline alignment. Several pipeline abandonment pits are located along the waterfront adjacent to industrial and commercial buildings.

The visible features from the shoreline of Alameda Island or the city of Oakland across the Tidal Canal is of a tidal waterway with periodic passage of vessels ranging from racing shells, tug boats hauling dredges, sailing boats, and yachts.

Figure 3.2-5 Ford Street at Derby Avenue and Broadway near Clement Avenue

Ford Street at Derby Avenue Facing East (Oakland)

Broadway near Clement Avenue Facing Northeast (Alameda)

The visual quality across most of Crossing #3 is indistinctive and industrial. Viewer types include motorists and pedestrians. Viewer volume of use is high; however, exposure is low, similar to Crossings #1 and #2. Viewer sensitivity would be considered low across all of the pipeline alignment based on the low visual quality of the urban environment.

Light and Glare
The glass on building windows lining much of the proposed pipeline alignments are potential sources of existing glare. Lighting from street lights, cars, and security lighting provide night lighting along the proposed pipeline alignments.

3.2.4 Applicable Regulations, Plans, and Standards

3.2.4.1 Federal Regulations
No federal regulations related to aesthetics apply to the proposed project.

3.2.4.2 State Regulations
No state regulations related to aesthetics apply the proposed project.

3.2.4.3 Local Regulations

Overview
Pursuant to California Government Code § 53091, EBMUD, as a local agency and utility district serving a broad regional area, is not subject to building and land use zoning ordinances (e.g., 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 local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

At the local level, aesthetic quality is addressed through implementation of General Plan policies, which provide guidelines for preserving and enhancing the visual character and scenic resources of an area. Applicable local policies regarding aesthetics are identified below:

City of Alameda General Plan
The City of Alameda General Plan (1990-2010) establishes goals and objectives to provide guidance in the growth of the City. The following policies related to aesthetics were identified in the City of Alameda General Plan:

Chapter 3 City Design Element
Guiding Policies: Edges, Vistas, Focal Points
Policy 3.2a Maximize views of water and access to shorelines.

Chapter 6 Parks and Recreation, Shoreline Access, Schools and Cultural Facilities Element
Guiding Policies: Shoreline Access and Development
Policy 6.2a Maximize visual and physical access to the shoreline and to open water.

City of Alameda Master Street Tree Plan

The City of Alameda has a Master Street Tree Plan that was established to address the goals of urban forestry, preserve trees, cultivate attractive and functional streetscapes and increase public safety. One of the goals of the plan is to discourage the unnecessary removal of existing healthy trees in the design, construction, or reconstruction of street projects, and other property development.

City of Oakland General Plan

The City of Oakland General Plan (1998-2015) establishes goals and objectives to provide guidance in the growth of the City. The following policies related to aesthetics were identified in the City of Oakland General Plan:

Oakland Estuary Policy Plan

Land Use Objectives

Objective LU-3	Expand opportunities and enhance the attractiveness of the Estuary as a place to live.

Oakland Protected Tree Ordinance

The City of Oakland requires a Tree Removal Permit before removing any protected tree. A permit is also required if work might damage or destroy a protected tree. A protected tree is defined as a Coast Live Oak with a diameter of four inches or larger, measured at four-and-a-half feet above the ground, or any other species nine inches in diameter or larger, except Eucalyptus and Monterey pine trees.

EBMUD Practices and Procedures

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44 (Environmental Requirements) includes practices and procedures for protecting aesthetic resources (see Appendix D).

3.2.5 Proposed Project Impacts and Mitigation Measures

3.2.5.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on aesthetics if it would:

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

Based on the Initial Study analysis, no scenic vistas or scenic resources within a state scenic highway are found within the proposed project area; therefore, the proposed project would have no impact on visual or scenic resources. Criteria 1 and 2 would not apply to the proposed project and are not discussed further.

3.2.5.2 Approach to Analysis

Impacts to aesthetics were based on an assessment of the visual changes that could result from implementation of the proposed project.

3.2.5.3 Impacts and Mitigation Measures

Table 3.2-1 provides a summary of the significance of the proposed project's impacts to aesthetics before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.2-1 Summary of Potential Impacts to Aesthetics

Impact	Significance Prior to Mitigation	Significance with Mitigation
Impact Aesthetics-1: Potential to substantially degrade the existing visual character or quality of the site and its surroundings (Criteria 3)	Potentially Significant	Less than Significant MM Aesthetics-1
Impact Aesthetics-2: Potential to introduce new sources of substantial light or glare which could adversely affect day or nighttime views in the area (Criteria 4)	Potentially Significant	Less than Significant MM Aesthetics-2

Impact Aesthetics-1: Potential to substantially degrade the existing visual character or quality of the site and its surroundings (Criteria 3). (*Less than Significant with Mitigation)*

Pre-Construction Geotechnical Investigation

The pre-construction geotechnical investigation borings on land at the HDD pit locations would require vehicles, a drill rig, and haul trucks to transport spoils to appropriate waste disposal areas. Equipment required for the in-channel borings would include a barge or drill ship with a drill rig, and haul trucks similar to the land borings. Geotechnical boring activity would be visible within Estuary Park and Towata Park for 1 day. The in-channel boring equipment would be visible from shoreline locations in the city of Oakland, Alameda Island, and North Bay Farm Island. The in-channel borings would occur over a relatively short duration of about 6 days for each crossing (daytime work only). The overall visual sensitivity in the proposed project areas is low and low to moderate in Estuary Park and Towata Park. The visual sensitivity of viewers of the Oakland Inner Harbor and San Leandro Bay Channel from the shoreline is low to moderate. The truck and drill rig would not represent a substantial visual change as compared to the existing vehicle traffic in the vicinity of the HDD pit locations. The addition of one barge or drill ship for a short duration would not result in a substantial visual change as compared to the existing boat traffic in the Oakland Inner Harbor and San Leandro Bay Channel. The impact to the visual character of the Oakland Inner Harbor and San Leandro Bay Channel and land boring locations, particularly at Estuary Park and Towata Park, would be less than significant.

Construction

Construction activities associated with the proposed project would involve earthwork and the use of heavy equipment for pipeline installation and re-paving. Earthwork could periodically create dust that could have temporary potentially significant visual impacts. In accordance with the Environmental Requirements of EBMUD's Standard Construction Specification 01 35 44, construction activities would be required to comply with EBMUD's standard best practices for dust control, which include preparation of a Dust Control and Monitoring Plan and implementation of dust control measures (e.g., application of water on dust-generating construction and exposed soils, and restricted construction vehicle speeds), which would minimize visual impacts from dust to less than significant.

Visual impacts resulting from construction dust would also be reduced through implementation of Mitigation Measure Air-1 (see Section 3.3: Air Quality), which requires construction site soil moisture to be controlled, haul trucks to be covered, wet power sweepers used to clean streets, and exposed surfaces to be treated, covered, or paved to the extent possible in order to comply with BAAQMD requirements.

The proposed pipelines would be installed primarily within roadways in the cities of Oakland and Alameda but also within Estuary Park and Towata Park. The majority of the construction would be completed using open trench pipeline installation. Construction materials, equipment, and vehicles, similar to that shown in Figure 3.2-6, would be highly visible within the construction area. The closed roadways, construction equipment and vehicles, spoil piles, and pipelines would be visible from public roadways and within the public parks. Construction activity along the pipeline alignments would be highly noticeable for short periods of time; generally, about 2 weeks per section along each pipeline alignment. The HDD pit activity would be visible from local roadways and within Estuary Park and Towata Park for a period of time, between two and five months. Pipeline abandonment pit activity would be visible from local roadways for 10 working days at each pit location. Construction would be temporarily visible only in the immediate vicinity of the areas where it is occurring. The roads, parking lots, and other hardscape areas would be restored to their pre-construction conditions after construction is complete. Given that the overall visual sensitivity in the proposed project areas is low and low to moderate in Estuary Park and Towata Park (near the shorelines), and the visual change would be temporary and therefore considered low, visual impacts from construction would be less than significant.

Construction of the proposed project would require the removal and trimming of trees in the city of Alameda, within Towata Park, and potentially for street trees within road medians, such as Marina Village Parkway at Crossing #1 in the city of Alameda. The removal and trimming of trees could cause a potentially significant visual impact. The removal and trimming of trees within Towata Park could substantially degrade the visual character of the park and would be noticeable to the people that use the park. The removal of trees along road medians and adjacent sidewalks and bicycle paths, such as along Island Drive, could substantially degrade the visual character of the roadway because there are not many trees in the urbanized cities of

Figure 3.2-6 Typical Construction Equipment

Equipment Associated with HDD

Pipeline and pulling equipment

Source: Underground Solutions 2014

Oakland and Alameda and the removal of street trees would be noticeable. Both impacts are considered potentially significant. Mitigation Measure Aesthetics-1 requires EBMUD to replace any trees or vegetation that are removed as a result of proposed project construction. Impacts would be less than significant after implementation of Mitigation Measure Aesthetics-1 because the trees would be replaced.

Mitigation Measures: Aesthetics-1

Mitigation Measure Aesthetics-1. Tree Replacement.

EBMUD shall replant trees or landscaping vegetation that are removed as a result of construction activities, consistent with the following guidelines:

1. If any mature native tree (i.e., trees that are 6 inches in diameter at breast height [dbh] or ten inches aggregate dbh for multi-trunk trees) is removed, replanting shall be with the same species at a 1:1 ratio. To allow for access to the pipeline, replanted trees shall not be located within 20 feet of the pipeline.
2. All non-native protected trees that are removed shall be replaced at a 1:1 ratio with a non-invasive or native tree species.
3. All disturbed plant, bush, and ground cover landscaping shall be restored to pre-project conditions, using similar plants and materials.

Significance after Mitigation: Less than Significant.

Impact Aesthetics-2: Potential to introduce new sources of substantial light or glare which could adversely affect day or nighttime views in the area (Criteria 4). (*Less than Significant with Mitigation)*

Pre-Construction Geotechnical Investigation

The pre-construction geotechnical investigation borings would not introduce new sources of substantial light or glare as boring activities would not require lighting or the use of reflective materials to drill the individual borings. Borings would be drilled during daytime hours only; therefore, the geotechnical investigation would not result in nighttime lighting impacts.

Construction

Construction of the proposed pipelines and pipeline abandonments would typically occur between 7 a.m. and 7 p.m. during the weekdays. Nighttime construction may occur for open trench construction at intersections with arterial roads, as required by encroachment permit conditions. Longer construction hours, potentially up to 24-hour days, may be required for portions of the HDD construction when the proposed pipelines are connected to existing pipelines to minimize duration of customer water service disruption. Pull through of each HDD pipeline would require a 48-hour construction period over the course of one weekend. Should construction need to occur at night, lighting would be used to illuminate the construction area. The construction lighting may be visible to adjacent residences and along public roadways. Although the use of construction lighting at night would be temporary, the impact from night lighting on nighttime views could be potentially significant. Mitigation Measure Aesthetics-2 requires the shielding of night lighting. Impacts to nighttime views would be less than significant after implementation of Mitigation Measure Aesthetics-2 because night lighting would be directed downward or oriented such that the light source is not directed toward residential areas or into streets.

Mitigation Measures: Aesthetics-2.

Mitigation Measure Aesthetics-2. Shield Night Lighting.

Stationary lighting used during nighttime construction (if required) shall be shielded and directed downward or oriented such that the light source is not directed toward residential areas or into streets where glare could impact motorists or pedestrians.

Significance after Mitigation: Less than Significant.

3.2.6 References

City of Alameda. 1991. City of Alameda General Plan 1990-2010. Accessed September 17, 2015. http://alamedaca.gov/community-development/planning/general-plan. 1991.

City of Oakland. 1998. General Plan 1998-2015. Accessed September 22, 2015. http://www2.oaklandnet.com/Government/o/PBN/OurServices/GeneralPlan/DOWD008821. 1998.

3.3 AIR QUALITY

This section presents the environmental setting and impact analysis for air quality that could be affected by the proposed project and project alternatives. Background information, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here. Appendix E includes a copy of the Air Quality and Greenhouse Gas Emissions Assessment and Technical Memo prepared for the proposed project.

3.3.1 Data Collection

The following sources were consulted to collect data for the setting and analysis presented in this section:

- California Air Resources Board's (CARB) 2013 Area Designations for State Ambient Air Quality Standards (CARB 2013)
- United States Environmental Protection Agency (USEPA) Green Book: Current Nonattainment Counties for All Criteria Pollutants (USEPA 2015)
- Air Quality and Greenhouse Gas Emissions Report and Technical Memo (Appendix E) (Illingworth & Rodkin 2016a, 2016b)

3.3.2 Environmental Setting

3.3.2.1 Climate and Meteorology

Climate and meteorology are important considerations for air quality. Local dispersion and regional transport of air pollutants directly relate to prevailing meteorology. Diurnal, seasonal, and regional air pollution patterns are controlled by a variety of meteorological factors. Wind directions and speeds, and vertical temperature structure (inversions) are the primary determinants of transport and dispersion effects.

Along Alameda County's western coast, temperatures are moderated by the San Francisco Bay, which can act as a heat source during cold weather, or cool the air by evaporation during warm weather. It is generally sunnier farther inland from the coast, although partly cloudy skies are common throughout the summer. Average summer temperatures are mild overnight and moderate during the day. Winter temperatures are cool overnight and mild during the day. Higher temperatures are more common inland. Wind speeds vary throughout the county, with the strongest gusts along the western coast, often aided by dominant westerly winds and a San Francisco Bay-breeze effect. Rainfall totals average between 14 and 23 inches per year, with the highest totals in the northern end of the county and atop the Oakland-Berkeley hills (Illingworth & Rodkin 2016a).

3.3.2.1 Air Basins

Air basins are geopolitical regional areas designated by the state of California for the purpose of air quality management and air pollution control. The proposed project area is located in the western portion of Alameda County within the San Francisco Bay Area Air Basin (Air Basin).

The Air Basin is located along the northern coast of California and covers roughly 5,340 square miles, encompassing several counties including all of Alameda County.

3.3.2.2 Existing Air Quality Conditions

Air Pollutants
The USEPA set National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants. The six criteria pollutants are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter[1] (PM), and lead (Pb). CARB, a department of the California Environmental Protection Agency (CalEPA), has established the California Ambient Air Quality Standards (CAAQS). The CAAQS and NAAQS are shown in Table 3.3-1. The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to set standards that would avoid health-related effects. Federal and state standards differ in some cases. California standards are generally more stringent than federal standards, which is particularly true for ozone and respirable particulate matter (PM_{10}).

Air Quality Attainment Status
Table 3.3-2 presents a summary of the air quality attainment designations by the USEPA and CARB for the Air Basin. An attainment area is a geographic area identified to have air quality as good as or better than the ambient air quality standards. Areas with air quality that is worse than adopted air quality standards are designated as "nonattainment" areas for the relevant air pollutants. Nonattainment areas are sometimes further classified by degree (i.e., marginal, moderate, serious, severe, and extreme) or status (i.e., nonattainment-transitional). Once a nonattainment area meets the standards and additional re-designation requirements in the Clean Air Act (CAA), the area is designated as a maintenance area. Unclassified areas are those with insufficient air quality monitoring data to support a designation of attainment or nonattainment, but are generally presumed to comply with the ambient air quality standard.

The Air Basin meets all ambient air quality standards with the exception of ozone, PM_{10}, and $PM_{2.5}$. Ozone and $PM_{2.5}$ are the major regional air pollutants of concern in the Air Basin. Ozone is primarily a problem in the summer, and fine particle pollution is a problem in the winter.

High ozone levels are caused by the cumulative emissions of precursor pollutants including reactive organic gases (ROG) and nitrogen oxides (NO_x) that react under certain meteorological conditions. High ozone levels aggravate respiratory and cardiovascular diseases, reduce lung function, and increase coughing and chest discomfort. Controlling the emissions of precursor

[1] Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM_{10}) and fine particulate matter where particles have a diameter of 2.5 micrometers or less ($PM_{2.5}$).

Table 3.3-1 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards[a]	
			Primary[b,c]	Secondary[b,d]
O_3	8-hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	—
	1-hour	0.09 ppm (180 µg/m^3)	—[e]	Same as primary
CO	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
NO_2	Annual	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary
	1-hour	0.18 ppm (339 µg/m^3)	0.100 ppm[f] (188 µg/m^3)	—
SO_2	Annual	—	—[g]	—
	24-hour	0.04 ppm (105 µg/m^3)	—[g]	—
	3-hour	—	—	0.5 ppm (1300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	0.075 ppm[g] (196 µg/m^3)	—
PM_{10}	Annual	20 µg/m^3	—	Same as primary
	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
$PM_{2.5}$	Annual	12 µg/m^3	12 µg/m^3	—
	24-hour	—	35 µg/m^3	—
Pb	Calendar quarter	—	1.5 µg/m^3	Same as primary
	30-day average	1.5 µg/m^3	—	—

Notes:

ppm = parts per million

µg/m^3 = micrograms per cubic meter

mg/m^3 = milligrams per cubic meter

[a] Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

[b] Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.

[c] Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the USEPA.

[d] Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[e] The national 1-hour ozone standard was revoked by USEPA on June 15, 2005. A new 8-hour standard was established in May 2008.

[f] The form of the 1-hour NO_2 standard is the 3-year average of the 98th percentile of the daily maximum 1-hour average concentration.

[g] On June 2, 2010 the USEPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of the 1-hour daily maximum. The USEPA also revoked both the existing 24-hour and annual average SO_2 standards.

Table 3.3-2 San Francisco Bay Area Air Basin Air Quality Attainment Designations

Pollutant	Federal Designation	State Designation
O_3	Marginal nonattainment	Nonattainment
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Pb	Attainment	Attainment
PM_{10}	Unclassified	Nonattainment
$PM_{2.5}$	Moderate nonattainment	Nonattainment
Sulfates	No federal standard	Attainment
Hydrogen Sulfide (H_2S)	No federal standard	Unclassified
Visibility Reducing Particles	No federal standard	Unclassified

Sources: CARB 2013, USEPA 2015

pollutants is the focus of BAAQMD's attempts to reduce ozone levels. The highest ozone levels in the San Francisco Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. In Alameda County west of the East Bay hills, ozone rarely exceeds health standards because the area is adjacent to the San Francisco Bay, which tends to keep temperatures well below prime levels for ozone formation (Illingworth & Rodkin 2016a).

Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children. Fine particle pollution is an issue in the San Francisco Bay region due to cool winter nights with light winds, wood smoke, and occasional pollution transport from the Livermore Valley to the east (Illingworth & Rodkin 2016a). The highest concentrations of particulates occur during winter, particularly at night due to cool temperatures, low wind speeds, low inversion layers, and high humidity (ABAG 2013).

Existing and probable future air quality in the proposed project area can best be inferred from examining ambient air quality measurements taken by BAAQMD at its monitoring station closest to the proposed project area, which is the Oakland West monitoring station located approximately 1.5 miles away from the closest project component (Crossing #1 open trench construction). The ambient air quality measurements for several pollutants are listed from the data collected at the next closest station, the Oakland East monitoring station, located approximately 3.5 miles away from the nearest project component (Crossing #2 HDD), when data was not available for the Oakland West station. Table 3.3-3 presents local ambient air quality monitoring data for 2010 through 2014, and compares measured pollutant concentrations with the most stringent applicable state and federal ambient air quality standards.

Table 3.3-3 Summary of Ambient Air Quality Data from Nearby Monitoring Stations

Pollutant	Most Stringent Applicable Standard	Number of Days where Exceeded and Maximum Concentration Measured				
		2010	2011	2012	2013	2014
O_3						
Number of days 1-hour standard exceeded	0.09 ppm[a]	1*	0	0	0	0
Maximum 1-hour (ppm)		**0.097***	0.057	0.061	0.071	0.074
Number of days 8-hour standard exceeded	0.07 ppm[a]	0*	0	0	0	0
Maximum 8-hour (ppm)		0.058*	0.048	0.048	0.059	0.059
NO_2						
Number of days 1-hour standard exceeded		0	0	0	0	0
Maximum 1-hour (ppm)	0.18 ppm[a]	0.0686	0.062	0.053	0.064	0.056
CO						
Number of days 1-hour standard exceeded	20 ppm[a]	0	0	0	0	0
Maximum 1-hour (ppm)		2.7	3.5	2.8	3.8	3.0
Number of days 8-hour standard exceeded	9 ppm[a]	0	0	0	0	0
Maximum 8-hour (ppm)		1.7	2.7	2.4	3.2	2.6
SO_2						
Number of days 1-hour standard exceeded	0.25 ppm[a]	0*	0	0	0	0
Maximum 1-hour (ppm)		0.011*	0.0193	0.0681	0.0498	0.0165
Number of days 24-hour standard exceeded	0.04 ppm[a]	0*	0	0	0	0
Maximum 24-hour (ppm)		0.0037*	0.0038	0.008	0.0071	0.0033
PM_{10}						
Maximum 24-hour (µg/m3)	50 µg/m³ [a,c]	—	—	—	—	—
Estimated Days 24-hour standard exceeded		—	—	—	—	—
$PM_{2.5}$						
Maximum 24-hour (µg/m³)	35 µg/m³ [b]	25.2*	**49.3***	33.6*	**42.7**	**38.8**
Number of days 24-hour standard exceeded		0*	3*	0*	2	1
Annual average (µg/m³)	12 µg/m³ [a]	7.8*	10.1*	**35.7***	**12.8**	9.5

Notes:
Bold values are in excess of applicable standard
- indicates that no data is available
*Data from East Oakland monitoring station
ppm = parts per million
µg/m³ = micrograms per cubic meter
[a] State standard, not to be exceeded
[b] Federal standard, not to be exceeded
[c] PM_{10} is only sampled every sixth to twelfth day

Source: BAAQMD 2010 to 2014

3.3.2.3 Toxic Air Contaminants

Toxic air contaminants (TACs) are a broad class of compounds known to have the potential to cause morbidity or mortality (i.e., have carcinogenic qualities) and include, but are not limited to, the criteria air pollutants listed above. TACs are commonly found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal levels (Illingworth & Rodkin 2016a).

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the San Francisco Bay Area average). According to CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles, which makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the gaseous components of diesel exhaust, such as benzene, formaldehyde, and 1,3-butadiene, are suspected or known to cause cancer in humans. The particulate portion of diesel exhaust is mainly comprised of aggregates of spherical carbon particles coated with inorganic and organic substances. The inorganic fraction primarily consists of small solid carbon. The organic fraction consists of soluble organic compounds such as aldehydes, alkanes, and alkenes, and high-molecular weight polycyclic aromatic hydrocarbon (PAH) and PAH-derivatives. Many of the PAH and PAH-derivatives have been found to be potent mutagens and carcinogens. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by CARB, and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants programs (Illingworth & Rodkin 2016a).

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of diesel particulate matter (DPM). Several of the regulatory programs affect medium and heavy duty diesel trucks that represent the bulk of DPM emissions from California highways, and include the solid waste collection vehicle rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations (Illingworth & Rodkin 2016a).

3.3.2.4 Odors

Land uses around the proposed project are primarily residential and commercial (i.e., business space and retail). There are no stationary odor-producing land uses (e.g., landfills, refineries, confined animal feeding operations) in the proposed project vicinity.

3.3.2.5 Sensitive Receptors

Some groups of people are more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution and are classified as sensitive receptors: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. Locations that may contain a high concentration of sensitive receptors include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The closest sensitive receptors to proposed project construction activities are residents, child-care centers, and elementary schools located on streets adjacent to where construction would occur. For the purposes of the air quality and greenhouse gas emissions analyses (see Section 3.8: Greenhouse Gases), all residential locations in the vicinity of proposed project construction activities are assumed to include infants, children, and adults. Table 3.3-4 summarizes the sensitive receptors located within the vicinity of the proposed project.

Table 3.3-4 Sensitive Receptors within the Vicinity of the Proposed Project

Crossing	Sensitive Receptor	Distance from Crossing
Crossing #1	Sugar and Spice Center for Children	Approximately 400 feet
	Residences	Range between 10 and 500 feet
Crossing #2	Earhart Elementary School	Adjacent to HDD pipeline laydown area next to Island Drive
	Small Size Big Mind Preschool	Adjacent to HDD entry pit
	Residences	Range between 10 and 500 feet
Crossing #3	Edison Elementary School	Approximately 500 feet from the HDD pipeline laydown area
	Residences	Range between 10 and 500 feet

3.3.3 Applicable Regulations, Plans, and Standards

3.3.3.1 Federal Regulations

The USEPA is responsible for enforcing the federal CAA and the 1990 amendments. The NAAQS, as previously discussed, were established by the federal CAA of 1970 and amended in 1977 and 1990. The ambient air quality standards are prescribed levels of pollutants that represent safe levels that avoid specific adverse health effects associated with each pollutant. Table 3.3-1 presents the NAAQS for the criteria air pollutants at different averaging periods.

As part of its enforcement responsibilities, the USEPA requires each state with nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations, and identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs.

3.3.3.2 State Regulations

California Ambient Air Quality Standards

CARB oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the 1989 amendments to the California Clean Air Act (CCAA), responding to the federal CAA requirements, and regulating emissions from motor vehicles and consumer products within the state. CARB has established emission standards for vehicles sold in California and for various types of equipment available commercially. CARB also sets fuel specifications to further reduce vehicular emissions and develops airborne toxic control measures to reduce TACs identified under CARB regulations.

CARB is also responsible for establishing and reviewing state standards, compiling the California SIP, securing approval of the SIP from the USEPA, conducting research and planning, and identifying TACs. CARB regulates mobile sources of emissions in California, such as construction equipment, trucks, and automobiles, and oversees the activities of California's air quality management districts, which are organized at the county or regional level.

Pursuant to the CCAA, CARB is responsible for setting CAAQS under California Health and Safety Code Section 39606. The CAAQS, listed in Table 3.3-1 and previously discussed, are intended to protect public health, safety, and welfare.

On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation

In 2008, CARB approved the On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation to reduce emissions of DPM and NO_x from existing on-road heavy-duty diesel-fueled vehicles. The regulation requires affected vehicles to meet specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023. The requirements are phased in over the compliance period and depend on the model year of the vehicle.

3.3.3.3 Local Regulations

Overview

Pursuant to California Government Code §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 local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

Bay Area Air Quality Management District Regulations

BAAQMD is the regional agency responsible for air quality regulations within the Air Basin. BAAQMD regulates air quality through its planning and review activities. BAAQMD has permit authority over most types of stationary emission sources, can require stationary sources to obtain permits, and can 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.

Because the region is designated nonattainment for both the 1- and 8-hour state ozone standards, and emissions of ozone precursors in the Air Basin contribute to air quality problems in neighboring air basins, state law requires the 2010 Clean Air Plan (CAP) to include all feasible measures to reduce emissions of ozone precursors and to reduce the transport of ozone precursors to neighboring air basins. The CAP addresses four categories of pollutants: ozone and ozone precursors (ROG and NO_x); particulate matter (primarily $PM_{2.5}$); air toxics; and greenhouse gases (GHGs). The CAP contains 55 control strategies.

In response to Senate Bill 656, BAAQMD completed the Particulate Matter Implementation Schedule in November 2005. The implementation schedule evaluates the applicability of 103 PM control measures identified by CARB. BAAQMD implements a number of regulations and programs to reduce PM emissions, such as controlling dust from earthmoving and construction/ demolition operations, limiting emissions from various combustion sources such as cement kilns and furnaces, and reducing PM emissions from composting and chipping activities. In addition to limiting stationary sources, BAAQMD implements a variety of mobile source incentive programs to encourage fleet operators and the public to purchase low-emission vehicles, re-power old polluting heavy-duty diesel engines, and install aftermarket emission control devices to reduce particulates and NO_x emissions.

BAAQMD CEQA guidance and significance thresholds are discussed under Section 3.3.4: Proposed Project Impact and Mitigation Measures.

City of Alameda General Plan

The City of Alameda General Plan (1990–2010) provides guidance and policies regarding air quality. Those pertaining to air quality are provided below (City of Alameda 1990).

Guiding Policies: Climate and Air Quality

Policy 5.5.a	Strive to meet all Federal and State standards for ambient air quality.
Policy 5.5.b	Support continued monitoring efforts by the Bay Area Air Quality Management District.

City of Oakland General Plan

The City of Oakland General Plan Open Space, Conservation, and Recreation Element, adopted in 1994 provides objectives, policies, and actions for air resources (City of Oakland 1996).

Objective CO-12	To improve air quality in Oakland and the surrounding Bay Region.
Policy CO-12.6	Control of dust emissions. Require construction, demolition and grading practices which minimize dust emissions
Action CO-12.6.1	Grading Ordinance Review. Review the grading ordinance on a regular basis to ensure that it includes sufficient provisions for minimizing airborne dust.

EBMUD Practices and Procedures

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44 (Environmental Requirements) includes practices and procedures for minimizing air quality impacts including dust control and monitoring and emission controls. EBMUD's Standard Construction Specification 01 35 44 requires preparation and implementation of a Dust Control Plan "detailing the means and methods for controlling and monitoring dust generated by demolition and other work on the site for EBMUD's acceptance prior to any work at the jobsite." The Plan shall also include practices and procedures for the control of paint overspray generated during the painting of exterior surfaces. The Plan shall detail the equipment and methods used to monitor compliance with the Plan. The handling and disposal of water used in compliance with the Dust Control Plan shall be addressed in the Water Control and Disposal Plan. EBMUD's Standard Construction Specification 01 35 44 also identifies several practices and procedures to minimize dust generation during construction including, but not limited to, watering construction areas, covering hauling trucks, sweeping access roads, and hydroseeding. The practices and procedures require monitoring of dust generation and emissions control including, but not limited to, use of line power instead of diesel (where feasible) using equipment that meets emissions standards, and limiting idling.

3.3.4 Proposed Project Impacts and Mitigation Measures

3.3.4.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on air quality if it would:

1. Conflict with or obstruct implementation of the applicable air quality plan;
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
4. Expose sensitive receptors to substantial pollutant concentrations; or
5. Create objectionable odors affecting a substantial number of people.

Bay Area Air Quality Management District Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA that were designed to establish the level at which BAAQMD air pollution emissions would cause significant environmental impacts under CEQA. The thresholds were posted on BAAQMD's website and included in the 2011 CEQA Air Quality Guidelines (updated May 2011).

As a result of years of litigation and pending action on remand by the court of appeal, use of BAAQMD's 2011 guidelines are not required or formally recommended by BAAQMD at this time. However, EBMUD has chosen to apply those thresholds to determine the air quality impacts of the proposed project. EBMUD considers the 2011 BAAQMD significance thresholds adequate to provide a conservative evaluation of the potential air quality impacts emitted by a project. The 2011 BAAQMD significance thresholds used in the air quality and GHG emissions analysis are summarized in Table 3.3-5.

Table 3.3-5 Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Annual Average Emissions (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	> 10.0 per one million		
Chronic or Acute Hazard Index	> 1.0		
Incremental annual average $PM_{2.5}$	> 0.3 µg/m³		
Health Risks and Hazards for Sensitive Receptors (Cumulative from all sources within 1,000-foot zone of influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	> 100 per one million		
Chronic Hazard Index	>10.0		
Annual Average $PM_{2.5}$	> 0.8 µg/m³		
GHG Emissions			
GHG Annual Emissions	Compliance with a Qualified GHG Reduction Strategy or 1,100 metric tons or 4.6 metric tons per capita		

Source: BAAQMD 2011

3.3.4.2 Approach to Analysis

Criteria Air Pollutants

Pre-construction (i.e., geotechnical investigation borings) and construction emissions from the proposed project were modeled using project-specific information. Construction schedule, proposed equipment for use, hauling volumes, and anticipated workers (Appendix C) were entered into California Emissions Estimator Model Version 2013.2.2 (CalEEMod), as recommended by BAAQMD. CalEEMod was used to calculate the project's emissions for both on-site and off-site construction activities. Emissions from on-site activities include construction equipment emissions, while off-site activities include worker, vendor, and haul truck traffic to and from the site. For each project activity (i.e., demolition-open trench construction, grading/excavation-open trench construction, HDD/drilling, jack and bore drilling, pipeline abandonment, and paving-open trench construction), construction equipment usage was provided by specifying the type, quantity, days of use on site, and average hours of use per day and was input to CalEEMod.

CalEEMod predicts emissions from estimated worker and hauling trips. Worker trips include autos and light-duty trucks. CalEEMod was used to model truck-hauling trips based on the amount of material to be imported or exported for open trench construction and HDD/drilling phases. Project quantities of materials and personnel used for the model are shown in Tables 2.7-3 and 2.7-7 (Chapter 2: Project Description).

Community Risk Assessment

To determine community risk impacts from construction of the proposed project, a screening level health risk assessment was conducted using the USEPA American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) air quality dispersion model. The AERMOD dispersion model was used to predict DPM and $PM_{2.5}$ concentrations at residential and sensitive receptor locations near the project construction areas. Additional information on the assumptions used in the model are provided in Appendix E.

The AERMOD modeling utilized area sources to represent the HDD entry pit areas, HDD pipeline laydown areas, jack and bore pit areas, abandonment pit areas, and pipeline open trench construction areas. For the HDD pipeline laydown areas and pipeline open trench construction areas, the line source option in AERMOD was used, which uses a series of consecutive area sources to represent emissions that are distributed along a line, such as a roadway, or the pipeline laydown and open trench construction areas. Construction emissions were modeled as occurring daily between 7 a.m. and 7 p.m., when the majority of the construction activity involving equipment usage would occur.

The modeling used a 5-year data set (2009 to 2013) of hourly meteorological data from the Oakland Airport that was prepared for use in AERMOD by CARB. The airport is approximately 2 to 5 miles south-southeast from the proposed project area and is a good approximation of the conditions at the project locations. Annual DPM and $PM_{2.5}$ concentrations from construction activities during the 2018 - 2019 period were calculated for Crossing #1 and for the 2021–2022 period for Crossings #2 and #3 using the model. DPM and $PM_{2.5}$ concentrations were calculated at residential receptors near the proposed project work areas. Concentrations were also calculated at Sugar and Spice Center for Children near Crossing #1, the Earhart Elementary School and Small Size Big Mind Preschool near Crossing #2, and the Edison Elementary School near Crossing #3. Appendix E shows the modeled construction areas for Crossings #1, #2, and #3 and the sensitive receptor locations used in the air quality dispersion modeling analysis where potential health impacts were evaluated.

Modeling of the potential community health risks from construction activities centered at the HDD/drilling work and HDD pipeline laydown locations, as drilling and laydown activities generate the greatest emissions and are concentrated in relatively small areas. Other smaller emission sources (e.g., jack and bore drilling, abandonment pits, and open trench construction work) that are located within about 1,000 feet from the location of the HDD sites were included in the evaluation.

Health risks from open trench construction activities were assessed for approximately 20 percent of the proposed open trench construction (which includes all open trench construction within 1,000 feet of the HDD sites). Construction equipment and vehicles for open trench construction work would remain in a particular area for a short duration (approximately a week) while completing each segment, limiting nearby receptor's exposure to diesel exhaust and $PM_{2.5}$; therefore, the health risk from open trench construction activities would be minimal, supported by the fact that the open trench construction portions within 1,000 feet of the HDD sites contributed only 2 to 3 percent of the total concentration of DPM and $PM_{2.5}$, and were significantly below thresholds.

3.3.4.3 Impacts and Mitigation Measures

Table 3.3-6 provides a summary of the significance of the proposed project's impacts to air quality before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.3-6 Summary of Potential Impacts to Air Quality

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact Air-1: Potential to conflict with or obstruct implementation of the applicable regional air quality plan (Clean Air Plan) (Criteria 1)	Less than Significant	---
Impact Air-2: Potential to violate an air quality standard and contribute substantially to an existing or projected air quality violation (Criteria 2)	Less than Significant	---
Impact Air-3: Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (Criteria 3)	Potentially Significant	Less than Significant MM Air-1
Impact Air-4: Potential to expose sensitive receptors to substantial pollutant concentrations (Criteria 4)	Potentially Significant	Less than Significant MM Air-1 MM Air-2
Impact Air-5: Potential to create objectionable odors affecting a substantial number of people (Criteria 5)	Less than Significant	---

Impact Air-1: Potential to conflict with or obstruct implementation of the applicable regional air quality plan (Clean Air Plan) (Criteria 1). (*Less than Significant*)

The most recent clean air plan is the Bay Area 2010 CAP that was adopted by BAAQMD in September 2010. The development of the CAP relied on projections of population and employment forecasts made by the Association of Bay Area Governments to inform the control strategies for attaining federal and state air quality standards. The Association of Bay Area Governments' projections were based on land use projections made by local jurisdictions (e.g., the General Plan process of cities and counties within the region). Conflicts with the air quality plan would arise if the proposed project's activities caused those projections to be exceeded by creating a substantial increase in employment or population. Transportation is a major contributor to $PM_{2.5}$, PM_{10}, and O_3 for which the Air Basin is in nonattainment. Substantial population or employment increases could affect transportation control strategies that are crucial for achieving attainment. Because the proposed project does not propose activities that would change population or employment levels within the Air Basin, the proposed project would not conflict or obstruct implementation of the applicable air quality plan. The emissions generated by the proposed project, as detailed in Table 3.3-8, do not exceed significance thresholds. Emissions from the proposed project would not conflict with the latest CAP efforts since the emissions would be below BAAQMD criteria air pollutant and GHG thresholds, as shown in Table 3.8-4 (Section 3.8: Greenhouse Gases), and construction would be temporary. Emissions from the proposed project would not exceed any of the significance thresholds; thus, the project sponsor is not required to incorporate project-specific control measures listed in the latest CAP. The proposed project's impact to the CAP would be less than significant.

Mitigation Measures: None Required.

Impact Air-2: Potential to violate an air quality standard and contribute substantially to an existing or projected air quality violation (Criteria 2). (*Less than Significant)*

As analyzed under Impact Air-3, the proposed project would generate pre-construction and construction emissions below the significance thresholds adopted by BAAQMD for ozone and particulate matter emissions. Therefore, construction of the proposed project would not contribute substantially to existing or projected violations of those standards.

CO emissions from construction traffic could result in localized pollutant impacts. Congested intersections with a large volume of traffic have the greatest potential to cause high, localized concentrations of CO. BAAQMD air pollutant monitoring data indicate that CO levels have been at healthy levels (i.e., below state and federal standards) in the San Francisco Bay Area since the early 1990s (as identified in the CAP). As a result, the region has been designated as attainment for the CO standard. The highest measured level of CO over any 8-hour averaging period in the San Francisco Bay Area during recent years is less than 3.0 ppm[2], compared to the ambient air quality standard of 9.0 ppm. The proposed project would generate a relatively small amount of new construction traffic. BAAQMD screening guidance indicates that the proposed project's impact would be less than significant with respect to CO levels if project traffic projections indicate traffic levels would not increase at any affected intersection to more than

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[2] BAAQMD 2014. Bay Area Emissions Inventory Summary Report: Criteria Air Pollutants Base Year 2011. May 2014.

44,000 vehicles per hour.[3] Because cumulative traffic volumes at all intersections affected by the proposed project would have less than 44,000 vehicles per hour, the proposed project's impact would be less than significant with respect to CO.

Mitigation Measures: None Required.

Impact Air-3: Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (Criteria 3). (*Less than Significant with Mitigation)*

The San Francisco Bay Area is designated as a nonattainment area for $PM_{2.5}$ under both the federal CAA and the CCAA. The San Francisco Bay Area is designated as nonattainment for PM_{10} under the CCAA, but not the CAA, and has attained both state and federal ambient air quality standards for CO. BAAQMD has established thresholds of significance for air pollutants and their precursors to attain and maintain ambient air quality standards. Thresholds are established for ozone precursor pollutants (ROG and NO_x), PM_{10}, and $PM_{2.5}$.

Pre-Construction Geotechnical Investigation

Pre-construction geotechnical investigation borings for Crossing #1 would take place during the design, in approximately 2017, in advance of construction. Drilling operations for Crossings #2 and #3 are not yet known at this time. As described further in Section 2.7.1.3 of the Project Description, borings for all three crossings would be conducted on land and in the channel. The emissions that would be generated by the pre-construction geotechnical investigation borings are provided in Table 3.3-7. For the purposes of this analysis, the borings required for the jack and bore proposed by Mitigation Measure Traffic-4 have been included in the Crossing #3 emissions estimated below. The emissions generated by the geotechnical investigation borings would be minimal and substantially below BAAQMD significance thresholds. Impacts from criteria air pollutant emissions would be less than significant. EBMUD's Standard Construction Specification 01 35 44 includes several practices and procedures for emissions reductions. The impact from generation of criteria air pollutants would remain less than significant.

Construction

Construction of Crossing #1 is anticipated to begin in 2018 and last between 13 and 22 months. Construction of Crossings #2 and #3 would not occur until after 2020. Construction of Crossing #2 would last between 9 and 18 months, and Crossing #3 would last between 9 and 19 months. Because the exact timeframe for construction of Crossing #2 or #3 is not known, both

[3] For a land-use project type, the BAAQMD CEQA Air Quality Guidelines state that a proposed project would result in a less-than-significant impact to localized carbon monoxide concentrations if the project would not increase traffic at affected intersections to more than 44,000 vehicles per hour.

Table 3.3-7 Pre-Construction Geotechnical Investigation Borings Emissions

Crossing	Pollutant	Average Daily Emissions (pounds per day)	Threshold (pounds per day)	Exceeds Threshold
Crossing #1	ROG	0.009	54	No
	NO_x	0.13	54	No
	PM_{10} Exhaust	0.004	82	No
	$PM_{2.5}$ Exhaust	0.004	54	No
Crossing #2	ROG	0.009	54	No
	NOx	0.13	54	No
	PM_{10} Exhaust	0.004	82	No
	$PM2_{.5}$ Exhaust	0.004	54	No
Crossing #3	ROG	0.009	54	No
	NOx	0.13	54	No
	PM_{10} Exhaust	0.004	82	No
	$PM_{2.5}$ Exhaust	0.004	54	No

Source: Reyff 2016

were conservatively modeled with construction start dates of 2021.[4] Crossings #2 and #3 would not be constructed at the same time, but modeling them as simultaneous construction is a more conservative approach given the uncertainty of their timing. CalEEMod estimates the total construction emissions in tons. Average daily emissions were computed by dividing the total construction emissions by the number of construction days.[5] For purposes of the criteria pollutant analysis and averaging, construction of Crossing #1 is expected to begin in early 2018 and last for 13 months as the shortest construction timeframe conservatively estimates the highest average daily emissions. For purposes of the air quality analysis, construction of Crossing #2 and Crossing #3 was conservatively assumed to last for 9 months each. Table 3.3-8 shows average daily construction emissions of ROG, NO_x, PM_{10} exhaust, and $PM_{2.5}$ exhaust during construction of each pipeline alignment. The emissions generated by the proposed project are all below BAAQMD significance thresholds.

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4 Using a start date of 2021 results in a more conservative analysis because construction equipment emissions are expected to decline in future years. As a result, by choosing a 2021 start date for construction that would in no event begin until after 2020, EBMUD ensured that air quality impacts associated with constructing Crossings 2 and 3 would not be underestimated.

5 Assumes an average of 22 construction days per month.

Table 3.3-8 Construction Emissions

Crossing	Pollutant	Total Emissions (tons)	Average Daily Emissions (pounds per day)	Threshold (pounds per day)	Exceeds Threshold
Crossing #1	ROG	0.66	5	54	No
	NOx	5.30	37	54	No
	PM_{10} Exhaust	0.26	2	82	No
	$PM_{2.5}$ Exhaust	0.27	2	54	No
Crossing #2	ROG	0.39	4	54	No
	NOx	3.35	34	54	No
	PM_{10} Exhaust	0.15	2	82	No
	$PM2_{.5}$ Exhaust	0.16	2	54	No
Crossing #3	ROG	0.41	4	54	No
	NOx	3.46	35	54	No
	PM_{10} Exhaust	0.16	2	82	No
	$PM_{2.5}$ Exhaust	0.16	2	54	No

Source: Illingworth & Rodkin 2016a

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site could deposit dust or mud on local streets, which could be an additional source of airborne dust after it dries. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

BAAQMD CEQA Air Quality Guidelines requires control of fugitive dust through best management practices (BMPs) in order to consider impacts from fugitive dust emissions less than significant. Although fugitive dust emissions are below the BAAQMD threshold, the impact would be potentially significant because BAAQMD requires BMPs for impacts to be considered less than significant. EBMUD's Standard Construction Specification 01 35 44 includes several practices and procedures for dust control; however, not all BAAQMD required BMPs are included. Therefore, impacts would still be potentially significant even with application of Standard Construction Specification 01 35 44. Mitigation Measure Air-1 would require implementation of additional BAAQMD recommended BMPs, including watering exposed surfaces, minimizing idling time, minimizing vehicle speeds, and other practices, which would meet BAAQMD CEQA Air Quality Guideline requirements for fugitive dust emissions and reduce impacts to less than significant. Therefore, the impact from construction dust emissions would be less than significant after implementation of Mitigation Measure Air-1.

Mitigation Measures: Air-1

Mitigation Measure Air-1. Best Management Practices.

The construction crew shall implement the following Best Management Practices that are required of all construction projects:

1. When moisture content is low enough to create dust, all exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible and feasible. Building pads shall be laid as soon as possible and feasible, as well, after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. A publicly visible sign with the telephone number and email address to contact EBMUD regarding dust complaints will be posted at the site. If dust exceeds specified limits, EBMUD shall respond and take corrective action within 48 hours.

Significance after Mitigation: Less than Significant.

Impact Air-4: Potential to expose sensitive receptors to substantial pollutant concentrations (Criteria 4). (*Less than Significant with Mitigation)*

Pre-Construction Geotechnical Investigation

Pre-construction geotechnical investigation borings would use drill rigs, barge or drill ships, and trucks for hauling and workers. The use of this equipment would be limited to less than a week and a limited number of hours per day for each crossing. Due to the short term use of the equipment and minimal number of equipment, the generated diesel exhaust emissions associated with geotechnical borings would be minimal. The impact to sensitive receptors would be less than significant. EBMUD would also implement Standard Construction Specification 01 35 44 that includes several practices and procedures for emissions reduction. The impact would remain less than significant.

Construction

Diesel Particulate Matter and $PM_{2.5}$ Emissions Modeling

Project construction would use diesel-powered equipment such as excavators, dozers, loaders, backhoes, and cranes. Operation of such equipment would generate diesel exhaust emissions. Diesel exhaust is a complex mixture of gases and fine particles and includes over 40 substances that are listed by the USEPA as hazardous air pollutants and by the CARB as TACs, which were previously described in detail.

Table 3.3-4 summarizes the sensitive receptors within the vicinity of the proposed project. A community risk assessment of the project construction activities was conducted because the project's construction-related diesel exhaust emissions could potentially exceed BAAQMD's risk and hazard significance thresholds at the sensitive receptor locations. The methods used to conduct the community risk assessment followed the guidelines of BAAQMD, as previously discussed. BAAQMD also requires that $PM_{2.5}$ be modeled and evaluated because of its potential to cause chronic health impacts. There are two types of $PM_{2.5}$ considered: particulate matter from fugitive dust (fugitive $PM_{2.5}$) and DPM. Construction period DPM and fugitive $PM_{2.5}$ emissions shown in Table 3.3-9 were calculated based on the assumption of drilling at the entry side only for all underwater pipeline crossings. Table 3.3-9 summarizes the DPM and $PM_{2.5}$ emissions, respectively, for construction activities at each pipeline alignment. The emissions were then used in the dispersion modeling of DPM and $PM_{2.5}$ concentrations at residences and sensitive receptors to determine the health risks to the community. The unmitigated health risks to the community from construction of the proposed project are described below and summarized in Table 3.3-10.

Table 3.3-9 Construction Period Diesel Particulate Matter and Fugitive $PM_{2.5}$ Emissions (tons)

Scenario	HDD Entry Pit Work Area	HDD Insertion Pit Work Area	HDD Pipeline Laydown Area	Pipeline Open Trench Construction	Jack and Bore Drilling Areas	Pipeline Abandon Pit Areas
Diesel Particulate Matter						
Crossing #1	0.0840	0.0786	0.0141	0.0192	0.0076	—
Crossing #2	0.0579	0.0539	0.0066	0.0038	0.0051	0.0108
Crossing #3	0.0568	0.0529	0.0082	0.0108	—	0.0054
Fugitive $PM_{2.5}$						
Crossing #1	0.0005	0.0005	0.0003	0.0004	0.0000	—
Crossing #2	0.0004	0.0004	0.0002	0.0001	0.0000	0.0000
Crossing #3	0.0005	0.0005	0.0003	0.0003	—	0.0000

Source: Illingworth & Rodkin 2016a

Table 3.3-10 Maximum Community Risks from Project Construction Activities

Location and Exposure Type		Cancer Risk: Entry Side Cancer Risk (per million)	Cancer Risk: Annual $PM_{2.5}$ (µg/m³)	Non-Cancer Risk: Hazard Index
Crossing #1				
Maximum Residential	Child	**16.1**	0.19	< 0.1
	Adult	0.8	0.19	< 0.1
Maximum Preschool Child		0.1	< 0.01	< 0.1
BAAQMD Significance Threshold		10	0.3	1.0
Exceeds Threshold?		**Yes**	No	No
Crossing #2				
Maximum Residential	Child	7.7	0.09	< 0.1
	Adult	0.4	0.09	< 0.1
Maximum School Child		0.2	< 0.01	< 0.1
Maximum Preschool Child		0.6	0.02	< 0.1
BAAQMD Significance Threshold		10	0.3	1.0
Exceeds Threshold?		No	No	No
Crossing #3				
Maximum Residential	Child	**64.7**	**0.74**	0.1
	Adult	3.4	**0.74**	0.1
Maximum School Child		0.1	< 0.01	< 0.1
BAAQMD Significance Threshold		10	0.3	1.0
Exceeds Threshold?		**Yes**	**Yes**	No

Note:
Bold numbers exceed the BAAQMD significance threshold.

Source: Illingworth & Rodkin 2016a

EBMUD also considered the possibility of HDD drilling from both sides of each crossing. Dividing the drilling between the entry and insertion sides would generate reduced DPM emissions compared to drilling on only one side, as analyzed further in the Air Quality and Greenhouse Gas Emissions Technical Memo in Appendix E. Fugitive $PM_{2.5}$ concentrations would not be substantially affected by dividing the drilling. Estimating DPM and fugitive $PM_{2.5}$ emissions based on drilling from only one side of each crossing results in the most conservative estimation of emissions; therefore, the following community health risk assessment assumes that drilling would occur only from the entry side.

Cancer Risks

The maximum modeled DPM and $PM_{2.5}$ concentrations occurred at the same receptor location for each of the proposed pipeline alignments. Increased cancer risks were calculated using the estimated DPM concentrations discussed in the previous section and BAAQMD-recommended risk assessment methods for both a child exposure (3rd trimester through 2 years of age) and adult exposure.[6] The cancer risk calculations were based on applying BAAQMD-recommended age sensitivity factors to the DPM exposures. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer-causing TACs. BAAQMD-recommended exposure parameters were used for the cancer risk calculations.[7] Adult and child exposures were assumed to occur at all residences during the entire construction period and child exposures were assumed to occur at the preschools and elementary schools near the construction sites. The maximum residential cancer risks at Crossings #1, #2, and #3 are shown in Table 3.3-10.

The BAAQMD significance threshold for an increase in cancer risk from a project is a cancer risk of greater than 10 in 1 million. For $PM_{2.5}$, BAAQMD significance threshold is an annual concentration of greater than 0.3 $\mu g/m^3$. The maximum residential cancer risk for a child from emissions generated during construction of Crossings #1 and #3 exceeds the BAAQMD significance threshold for the maximum cancer risk. Annual $PM_{2.5}$ exposures for residential sensitive receptors near Crossing #3 also exceed the BAAQMD significance thresholds. Therefore, impacts would be considered potentially significant. Although emission concentrations could be reduced by drilling from both sides of each crossing, the cancer risk from emissions would remain potentially significant at Crossings #1 and #3.

EBMUD's Standard Construction Specification 01 35 44 includes several practices and procedures for emissions reductions. The impact would remain potentially significant and additional measures would be needed to minimize impacts to levels that are less than significant. As required by Mitigation Measure Air-1, fugitive dust would be controlled through the use of BAAQMD's Recommended BMPs for construction. Implementation of Mitigation Measure Air-2 would reduce on-site diesel exhaust emissions for all crossings. The cancer risks for Crossings #1 and #3 were modeled with implementation of the Standard Construction Specification 01 35 44 and Mitigation Measures Air-1 and Air-2, as shown in Table 3.3-11. The cancer risk and annual $PM_{2.5}$ concentrations were reduced to below BAAQMD significance thresholds. As discussed above, splitting the drilling between the two sides would result in lower maximum cancer risk and annual $PM_{2.5}$ than drilling from the entry side alone. Therefore, the calculated values shown in Table 3.3-11 represent the greatest possible cancer risk and annual $PM_{2.5}$ to the community from construction activities after implementation of recommended mitigation measures. The impact with respect to community risk caused by proposed construction activities would be less than significant with implementation of Mitigation Measures Air-1 and Air-2.

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[6] Bay Area Air Quality Management District (BAAQMD), 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards*. May.

[7] Bay Area Air Quality Management District (BAAQMD), 2010. *Air Toxics NSR Program Health Risk Screening Analysis Guidelines*. January.

Table 3.3-11 Maximum Community Risks from Project Construction Activities after Implementation of Mitigation

Location and Exposure Type		Max. Cancer Risk (per million)	Max. Annual $PM_{2.5}$ ($\mu g/m^3$)[1]
Crossing #1			
Maximum Residential	Child	0.7	0.01
BAAQMD Significance Threshold		10	0.3
Exceeds Threshold?		No	No
Crossing #3			
Maximum Residential	Child	3.9	0.06
	Adult	0.2	0.06
BAAQMD Significance Threshold		10	0.3
Exceeds Threshold?		No	No

Source: Illingworth & Rodkin 2016a

Non-Cancer Risks

Potential non-cancer health effects due to chronic exposure to diesel exhaust were evaluated. Non-cancer health hazards from TAC exposure are expressed in terms of a Hazard Index, which is the ratio of the TAC concentration to a reference exposure level. The chronic inhalation reference exposure level for DPM is an annual average concentration of 5 $\mu g/m^3$. California's Office of Environmental Health and Hazards has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. For the proposed project, TAC concentrations below the reference exposure level of 5 $\mu g/m^3$ are not expected to cause adverse, non-cancer health impacts, even for sensitive individuals. BAAQMD significance criterion for non-cancer health is a Hazard Index greater than 1.0. Table 3.3-10 above, identifies the estimated non-cancer risk from construction of each crossing. The non-cancer health impacts do not exceed the BAAQMD significance threshold. Impacts for non-cancer risks would be less than significant.

Mitigation Measures: Air-1 and Air-2

Mitigation Measure: Air-2. Selection of equipment during demolition, grading and open trench construction phases to minimize emissions.

1. All diesel-powered off-road equipment larger than 50 horsepower and operating during construction for more than two days continuously shall, at a minimum, meet USEPA particulate matter emissions standards for Tier 4 engines or equivalent.
2. The number of hours that equipment operates shall be minimized.

Note that other measures may be used to minimize construction period DPM emissions to reduce the predicted cancer risk below the thresholds. Such measures may be the use of alternative powered equipment (e.g., liquefied petroleum gas-powered lifts), alternative fuels (e.g., biofuels), added exhaust devices, or a combination of measures, provided that the measures are approved by the lead agency and demonstrated to reduce community risk impacts to less than significant.

Significance after Mitigation: Less than Significant.

Impact Air-5: Potential to create objectionable odors affecting a substantial number of people (Criteria 5). (*Less than Significant)*

Construction of the proposed pipelines would generate some site-specific odors from diesel exhaust emissions. Residential uses are located as close as 10 feet away from construction work areas. The threshold distances for diesel exhaust emission perception were an average of 29 feet for an idling bus and 36 feet for an accelerating bus; presented distances are conservative due to advances in diesel engines and emission reduction technology since 1970 (Colucci 1970). Buses with diesel engines would create comparable odors to construction equipment. The concentration of several vehicles in one area 10 to 25 feet from a residence could result in minimally perceptible odors. Odors would be temporary because construction of a segment of the underground pipelines would only remain in one area for approximately a week and only a few homes in the vicinity would perceive the odors. Odors from pipeline abandonment activities would be temporary as construction would last for approximately 5 days at any one location. Activities at the HDD pits could occur for approximately a month. However, the closest residence is located approximately 180 feet from the HDD pit. As indicated above, diesel exhaust odors would dissipate prior to reaching the residence. At any one time during construction, a substantial number of people would not be affected due to the movement of construction along the pipeline alignments as open trenching is completed. The residences that have the potential to perceive odors would only be affected temporarily as odors would only be perceptible during construction. Impacts would be less than significant.

Mitigation Measures: None Required.

3.3.5 References

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3.4 BIOLOGICAL RESOURCES

This section presents the environmental setting and impact analysis for biological resources that could be affected by the proposed project. Background information, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here. Appendix F includes a copy of the Preliminary Biological Resources Assessment prepared by EBMUD for the proposed project.

3.4.1 Definitions

3.4.1.1 Special-Status Species

Species are considered to be special-status if they meet any of the following criteria:

- Plant and wildlife species listed as endangered, threatened, or candidates for listing under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA)
- Species formally designated by USFWS as Species of Concern or by CDFW as Species of Special Concern
- Species protected by the federal Migratory Bird Treaty Act (MBTA) (16 US Code [USC] Sections 703-711), the federal Marine Mammal Protection Act (MMPA) (16 USC Sections 1361-1423), and the California Fish and Game Code
- Species such as candidate species that may be considered rare or endangered pursuant to Section 15380(b) of the CEQA Guidelines, including vascular plants listed as rare or endangered or as List 1 or 2 by the California Native Plant Society (CNPS)

3.4.1.2 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 as discussed below in Section 3.4.4.

3.4.2 Data Collection

3.4.2.1 Literature and Database Review

The following sources were reviewed to determine the special-status plant and wildlife species that may occur or have been documented to occur in the vicinity of the proposed project area:

- CDFW California Natural Diversity Database (CNDDB) records, accessed July 2015, and focused on a 5-mile radius around the entire proposed project area (CDFW 2015a)
- CDFW Special Vascular Plants, Bryophytes, and Lichens List, accessed July 2015 (CDFW 2015c)
- CDFW Special Animals List, dated July 2015 (CDFW 2015b)
- USFWS IPaC Trust Resource Report, accessed August 2015
- Conservation Biology Institute's Data Basin (CBI 2016)

3.4.2.2 Surveys

Staff from the Natural Resources Department at EBMUD conducted site assessments of the proposed project on August 10, 2015 and September 30, 2015. EBMUD staff surveyed on foot the proposed project areas, including the pipeline alignment and pipeline abandonment areas. The surveys identified (1) plant communities and habitats, (2) suitable habitat for special-status plants or wildlife, and (3) sensitive biological communities and special-status species. EBMUD staff also conducted a field survey in December 2015 to investigate Alameda Island mole activity because the Alameda Island mole is a California species of concern and is known to occur on Alameda Island. EBMUD staff reviewed the exposed soils located near Crossing #2 and the Bay Farm 1 and Bay Farm 2 pipeline abandonment pit areas for any mole activity. EBMUD staff also conducted a rare plant survey using meandering transects at Crossings #1 and #2 on April 14, 2016. The rare plant survey was not conducted at Crossing #3 because there is no habitat that could support special-status plant species at Crossing #3.

EBMUD staff assessed the project area to determine whether any wetlands and waters potentially subject to jurisdiction by USACE, RWQCB, or CDFW were present. The wetland assessment was based primarily on the presence of wetland plant indicators and any observed indicators of wetland hydrology or wetland soils. The preliminary waters assessment was based primarily on hydrologic indicators.

The potential for the special-status species identified in the literature and database review to occur within the proposed project areas was then evaluated according to the following criteria:

- **No Potential.** Habitat on and adjacent to the proposed project area is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
- **Low Potential.** Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the proposed project area is unsuitable or of very poor quality. The species has low potential to be found on the site.
- **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 proposed project area is unsuitable. The species has a moderate probability of being found on the site.
- **High Potential.** All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the proposed project area is highly suitable. The species has a high probability of being found on the site.
- **Present.** Species are observed on the proposed project area or have been recorded (i.e., CNDDB or other reports) on the proposed project area recently.

The results of the surveys are provided in Appendix F and are summarized in Section 3.4.3.

3.4.3 Environmental Setting

3.4.3.1 Sensitive Biological Communities

Special status biological communities include communities and habitats that fulfill special functions or have special values, such as wetlands, streams, riparian habitat, and sensitive natural plant communities. No sensitive biological communities were identified within the proposed project area during the surveys. The closest sensitive biological communities to the proposed project area are northern coastal salt marsh habitat and eelgrass habitat, which are located near Crossing #2. The work area for Crossing #2, which entails areas that vehicles and equipment could use, is located approximately 10 feet from northern coastal salt marsh. Pit construction for the Bay Farm 1 and Bay Farm 2 pipeline abandonments is located approximately 90 feet from northern coastal salt marsh habitat. In-channel pre-construction geotechnical borings may be located in or immediately adjacent to eelgrass habitat.

3.4.3.2 Jurisdictional Waters

The only jurisdictional waters in the proposed project area consist of the three water bodies that surround Alameda Island, including the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel.

3.4.3.3 Wildlife Corridors

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. Wildlife movement activities usually fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas, or individuals extending range distributions), (2) seasonal migration, and (3) movements related to home range activities (e.g., foraging for food or water, defending territories, searching for mates, breeding areas, or cover). The proposed project area does not function as an important regional wildlife corridor due to its high degree of urbanization. The closest regional wildlife corridors are the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel, which allow for the movement of fish and other aquatic species.

3.4.3.4 Special-Status Plants

A total of 32 special-status plants that may occur in the project area were identified by the literature and database review. None of the 32 special-status species were observed during the rare plant survey. The potential for rare plants to occur at the proposed project location is extremely low; most of the special-status plants have not been seen in the proposed project area in nearly 100 years.

No sensitive plants are expected to occur within the proposed project area because soils or habitat features indicative of special-status plant species do not exist and/or were not observed. The proposed project area consists of paved parking lots, landscaping, and ruderal (i.e., growing where the natural vegetation cover has been disturbed by humans) habitat. Small patches of ruderal vegetation occur on the Oakland side of Crossing #1, near Estuary Park and at the Alameda side of the High Street pipeline abandonment, near Crossing #3. At proposed project areas where land meets water, riprap protects the shoreline from erosion due to heavy boat traffic. The proposed project areas lack unique substrates (e.g., alkaline or serpentine soils), or micro-habitats (e.g., volcanic rock outcrops, vernal pools, wetlands, etc.). No special-status plant species are, therefore, expected to occur within the proposed project area.

Table 1 in Appendix F shows the list of all the special-status species that were evaluated.

3.4.3.5 Special-Status Fish and Wildlife

A total of 35 special-status wildlife species that may occur in the project area were identified by the literature and database review. Of the 35 special-status wildlife species identified, 15 special-status wildlife species were identified as having some potential to occur within the proposed project area. Table 1 in Appendix F shows the list of all the special-status wildlife species that were evaluated. Table 3.4-1 provides a summary of the special-status species with some potential to occur within the proposed project area.

3.4.4 Applicable Regulations, Plans, and Standards

3.4.4.1 Federal Regulations

Endangered Species Act

The federal Endangered Species Act (ESA) provides protection for plants and animals listed by the USFWS and the NMFS as threatened or endangered. Section 9 of the ESA (16 USC Section 1538) prohibits the take, possession, sale, or transport of any ESA-listed species. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, capture, collect, or attempt to engage in any such conduct" (16 USC Sections 1532(19)). Take may also include significant modification or degradation of a listed species' habitat that actually kills or injures the species. For plants, the statute governs removing, possessing, maliciously damaging, or destroying any listed plant in areas subject to federal jurisdiction, and removing, cutting, digging up, damaging, or destroying any listed plant on non-federal land in knowing violation of state law or in any violation of state criminal trespass law (16 USC Section 1538(a)(2)).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) provides protection for migratory birds. Activities such as hunting, pursuing, capturing, killing, selling, and shipping migratory birds, unless expressly authorized in the regulations, or by permit, are prohibited. Protection extends to all migratory birds, parts, nests, and eggs. The full list of species protected under the Act is found in 50 Code of Federal Regulation (CFR) 10.13.

Clean Water Act

The intent of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 CFR 1251). The regulations implementing the CWA protect waters of the US including streams and wetlands (33 CFR 328.3). Waters of the US are classified as Wetlands, Navigable Water, or Other Waters and include marine waters, tidal areas, stream channels, and associated wetlands. Under federal regulations, wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support

Table 3.4-1 Special-status Species Potential to Occur in the Proposed Project Area

Common Name	Scientific Name	Status[1]	Suitable Habitat Notes	Potential to Occur
Invertebrates				
Monarch butterfly - California overwintering population	*Danaus plexippus pop. 1*	SA	Monarch butterflies are known to overwinter in eucalyptus trees located within the Chuck Corica Golf Complex, which is across the street from where construction would occur for the North Bay Farm Island side of Crossing #2. In addition to eucalyptus trees, monarch butterflies utilize trees native to California (Griffiths and Villablanca 2015).	**Moderate Potential (Crossing #2).** Known to overwinter near the North Bay Farm Island side of Crossing #2, at the Chuck Corica Golf Complex. However, trees within the proposed project area are likely too small to be utilized by monarchs in comparison to the larger eucalyptus trees at the golf course.
Fish				
Longfin smelt	*Spirinchus thaleichthys*	FC, ST, SSC	Found in California's bay, estuary, and nearshore coastal environments, including the San Francisco Bay. The San Francisco Estuary and the Sacramento-San Joaquin Delta support the largest longfin smelt population in California (CDFG 2009).	**Moderate Potential (All Crossings).** Species is known to occur in the San Francisco Bay.
North American green – Southern Distinct Population Segment (DPS)	*Acipenser medirostris*	FT	The Southern DPS North American green sturgeon ranges from Mexico to at least Alaska in marine waters, and is observed in bays and estuaries up and down the west coast of North America and forage in estuaries and bays ranging from San Francisco Bay to British Columbia (NOAA 2015a).	**Moderate Potential (All Crossings).** Species is known to occur in the San Francisco Bay.
Steelhead - Central California Coast DPS	*Oncorhynchus mykiss*	FT	The Central California Coast DPS steelhead comprises winter-run steelhead populations from the Russian River inclusive (Sonoma County), in stream tributaries to the San Francisco/San Pablo Bay system, and stretches south to Aptos Creek (Santa Cruz County), inclusive (NOAA 2011).	**Moderate Potential (All Crossings).** Species is known to occur in the San Francisco Bay.
Birds				
Alameda song sparrow	*Melospiza melodia pusillula*	SSC	The Alameda song sparrow is endemic to California and is restricted to tidal salt marshes on the fringes of south San Francisco Bay (Shuford and Gardali 2008).	**Moderate Potential (All Crossings).** May forage in portions of the proposed project area.

Common Name	Scientific Name	Status[1]	Suitable Habitat Notes	Potential to Occur
California black rail	*Laterallus jamaicensis coturniculus*	ST, FP	Yearlong resident of saline, brackish, and fresh emergent wetlands in the San Francisco Bay area. Occurs most commonly in tidal emergent wetlands dominated by pickleweed, or in brackish marshes supporting bulrushes in association with pickleweed. In freshwater, usually found in bulrushes, cattails, and saltgrass (Harvey 1999a).	**Low Potential (All Crossings).** Quality habitat components (tidal emergent wetlands) for this species are not present in the proposed project area.
California clapper rail	*Rallus longirostris obsoletus*	FE, SE, FP	Locally common year long in coastal wetlands and brackish areas around San Francisco. Requires emergent wetlands and tidal sloughs. Occasionally uses ecotone between wetland and adjacent upland vegetation (Harvey 1999b).	**Low Potential (All Crossings).** Quality habitat components (coastal wetlands, tidal sloughs) for this species are not present in the proposed project area.
California least tern	*Sterna antillarum browni*	FE, SE, FP	Breeding colonies are located in the San Francisco Bay in abandoned salt ponds and along estuarine shores. Prefers undisturbed nest sites on open, sandy, or gravelly shores near shallow-water feeding areas in estuaries. Feeds primarily in shallow estuaries or lagoons where small fish are abundant and considerable feeding also takes place near shore in the open ocean, especially where lagoons are nearby, or at mouths of bays (Harvey 2005).	**Low Potential (All Crossings).** Quality habitat components (salt ponds, estuarine shores) for this species are not present in the proposed project area.
Double-crested cormorant	*Phalacrocorax auritus*	WL	A yearlong resident along the entire coast of California and on inland lakes, in fresh, salt, and estuarine waters. Requires undisturbed nest-sites beside water, on islands or mainland. Uses wide rock ledges on cliffs, rugged slopes, and live or dead trees, especially tall ones (Granholm 1990).	**Moderate Potential (All Crossings).** May occur in portions of the proposed project area while foraging.

Common Name	Scientific Name	Status[1]	Suitable Habitat Notes	Potential to Occur
Mammals				
Alameda Island mole	*Scapanus latimanus parvus*	SSC	It is known to occur within Alameda Island. Little is known about this species. The Alameda Island mole is a subspecies of the broad-footed mole (*Scapanus latimanus*). The broad-footed mole prefers moist, friable soils, avoids flooded soils, and is most common in moist meadows and near streams (Harris 2000a).	**Low Potential (All Crossings).** Quality habitat components for this species are not present. Exposed soils occur near Crossing #2; however, no mole activity was identified during the field survey in December 2015.
Big free-tailed bat	*Nyctinomops macrotis*	SSC	Rare in California. A probable vagrant was collected in Alameda County, but the record is suspect. Prefer rugged, rocky terrain and roosts in buildings, caves, crevices in high cliffs, rock outcrops, and occasionally roosts in holes in trees (Harris 2002).	**Low Potential (All Crossings).** May occur as a transient.
California sea lion	*Zalophus californianus*	MMPA	California sea lions reside in the Eastern North Pacific Ocean in shallow coastal and estuarine waters. Sandy beaches are preferred for haul out sites. In California, they haul out on marina docks as well as jetties and buoys (NOAA 2015b). They are known to occur in the San Francisco Bay and have been observed in Oakland Inner Harbor (US Department of Navy 1997).	**Moderate Potential (All Crossings).** Species is known to occur in the San Francisco Bay.
Harbor porpoise	*Phocoena*	MMPA	Harbor porpoises inhabit northern temperate and subarctic coastal and offshore waters. They are commonly found in bays, estuaries, harbors, and fjords less than 650 ft (200 m) deep (NOAA 2015c). In San Francisco Bay, most observations of this species are near the Golden Gate Bridge, with some observations near Angel Island and Alcatraz (Keener 2011).	**Moderate Potential (All Crossings).** Species is known to occur in the San Francisco Bay.

Common Name	Scientific Name	Status[1]	Suitable Habitat Notes	Potential to Occur
Hoary bat	*Lasiurus cinereus*	SA	Habitats suitable for bearing young include all woodlands and forests with medium- to large-size trees and dense foliage. Generally, roosts in dense foliage of medium- to large-size trees. Preferred sites are hidden from above, with few branches below, and have ground cover of low reflectivity. Females and young tend to roost at higher sites in trees. Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding (Harris 1990a).	**Moderate Potential (All Crossings).** This species may forage in the area and has the potential to roost in medium-to large-size trees within and near the proposed project.
Pacific harbor seal	*Phoca vitulina*	MMPA	Harbor seals live in temperate coastal habitats and use rocks, reefs, beach, and drifting glacial ice as haul out and pupping sites (NOAA 2015d). They are known to occur in the San Francisco Bay and have been observed in Oakland Inner Harbor (US Department of Navy 1997). Pacific harbor seals are also known to utilize the Alameda Breakwater as a haulout site and forage in the vicinity of the breakwater (USFWS 1998).	**Moderate Potential (All Crossings).** Species is known to occur in the San Francisco Bay.
Pallid bat	*Antrozous pallidus*	SSC	Suitable habitat includes grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. Most common in open, dry habitats with rocky areas for roosting. Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Day roosts are in caves, crevices, mines, and occasionally in hollow trees or buildings (Harris 1990b).	**Low Potential (All Crossings).** There is some potential for this species to roost under the bridges near the proposed project; however, this species is not known to occur within the area.
Salt-marsh harvest mouse	*Reithrodontomys raviventris*	FE, SE, FP	Pickleweed saline emergent wetlands of San Francisco Bay and tributaries. Salt-tolerant vegetation is essential (Brylski 1990).	**Low Potential (Crossing #2).** Quality habitat components (pickleweed saline emergent wetlands) for this species are not present.

Common Name	Scientific Name	Status[1]	Suitable Habitat Notes	Potential to Occur
Silver-haired bat	*Lasionycteris noctivagans*	SA	The distribution of the silver-haired bat includes coastal and montane forests from the Oregon border south along the coast to San Francisco Bay, and along the Sierra Nevada and Great Basin region to Inyo County. Roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark. Primarily a forest dweller, feeding over streams, ponds, and open brushy areas (Harris 2005).	**Low Potential (All Crossings).** May occur as a transient.
Townsend's big-eared bat	*Corynorhinus townsendii*	SC, SSC	Found in all but subalpine and alpine habitats and is most abundant in mesic habitats. Requires caves, mines, tunnels, buildings, or other human-made structures for roosting (Harris 2000b).	**Moderate Potential (All Crossings).** There is some potential for this species to roost under the bridges near the proposed project.

[1] Status:

FE = Federally listed as endangered

FT = Federally listed as threatened

FC = Candidate species for federal listing

MMPA = Marine Mammal Protection Act

SE = State-listed as endangered

SE = State-listed as threatened

SC = Candidate species for state listing

CFP = California Department of Fish and Wildlife Fully Protected Species

SSC = California Department of Fish and Wildlife Species of Special Concern

WL = California Department of Fish and Wildlife Watch List

SA = California Department of Fish and Wildlife Special Animal a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3(b)).

Projects that cause the discharge of dredged or fill materials in waters of the US require permitting by the USACE.

Rivers and Harbors Act

The Rivers and Harbors Act addresses effects to navigable waters and regulates "excavation, fill, or alterations or modifications to the course, location, condition, or capacity of any port, …harbor, canal, lake, …or enclosure within the limits of any breakwater, or of the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers" (33 USC Section 403). Under Section 10 of the Rivers and Harbors Act, the USACE has the authority to regulate the navigable capacity of any of the waters of the US.

Magnuson-Stevens Fishery Conservation and Management Act.

The Magnuson-Stevens Act of 1976 (as amended in 1996 and reauthorized in 2006) applies to fisheries resources and fishing activities in federal waters, which extend to 200 miles offshore (16 USC Sections 1801-1884). The Act is intended to facilitate conservation and management of US fisheries, development of domestic fisheries, and phasing out of foreign fishing activities. Sections 305(b)(2) to (4) of the Magnuson-Stevens Act outline a process for NMFS to comment on activities proposed by federal action agencies that may adversely impact areas designated as Essential Fish Habitat (EFH). Specifically, federal action agencies are required to consult with NMFS on any action authorized, funded, or undertaken that may adversely impact EFH. This consultation process is typically integrated into environmental review procedures in accordance with the NEPA, ESA, or the Fish and Wildlife Coordination Act to provide the greatest level of efficiency. NMFS must provide the federal action agency with EFH consultation recommendations for any action that would adversely affect EFH. These recommendations are advisory in nature.

EFH is defined as those waters, aquatic areas, and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH Consultation Guidelines (NMFS 2004) include in their definition of EFH: (1) "Aquatic areas" and their associated physical, chemical, and biological properties are areas that are used by fish and may include aquatic areas historically used by fish, where appropriate; (2) "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; (3) "Necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and (4) "Spawning, breeding, feeding, or growth to maturity" covers a species' full lifecycle. EFH is present in the San Leandro Bay Channel, which is in the vicinity of Crossing #2.

Marine Mammal Protection Act

Under the Marine Mammal Protection Act (MMPA) of 1972 (as amended in 2007), it is unlawful to take or import marine mammals and marine mammal products (16 USC Section 1371). The MMPA defines "take" as to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 USC Section 1362[13]). The MMPA defines harassment as "any act of pursuit, torment or annoyance, which has the potential to either: (i) injure a marine mammal or marine mammal stock in the wild, or (ii) disturb a marine mammal or marine mammal stock by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." Levels of harassment are further defined: "Level A harassment" means harassment that has the potential to injure, and "Level B harassment" means harassment that has the potential to disturb a marine mammal or marine mammal stock in the wild (16 USC Section 1362[18]).

Under Section 101(a)(5)(D) of the Act, an Incidental Harassment Authorization (IHA) Permit may be issued for activities other than commercial fishing that may impact small numbers of marine mammals. An IHA covers activities that extend for periods of no more than one year and that will have a negligible impact on the impacted species. If the potential for serious injury and/or mortalities exists, and there are no measures that could be taken to prevent this form of "take" from occurring, a Letter of Authorization (LOA) must be obtained. NMFS reviews reports for "strategic stocks" of marine mammals annually. A strategic stock is a marine mammal stock: "for which the level of direct human-caused mortality exceeds the potential biological removal level; which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the federal ESA within the foreseeable future; or which is listed as threatened or endangered under the federal ESA, or is designated as depleted under the MMPA."

3.4.4.2 State Regulations

California Endangered Species Act
CESA provides legal protection for plant and wildlife species listed as threatened or endangered. CESA prohibits the take of endangered and threatened species. Under CESA, take is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" (California Fish and Game Code Section 86). CDFW administers CESA and authorizes take through the issuance of incidental take permits, Section 2080.1 consistency determinations (for species that are also listed under the federal Endangered Species Act), or NCCPs.

Native Plant Protection Act
The Native Plant Protection Act of 1977 prohibits importing of rare and endangered plants into California, taking of rare and endangered plants, and selling of rare and endangered plants. CDFW may permit the take of state-listed rare plants using the same procedures and under the same conditions as incidental take permits, voluntary local programs, NCCPs, safe harbor agreements, and scientific/educational/management permits (14 CCR Section 786.9(d)). Removal of rare plants by publicly or privately owned public utilities may occur in compliance with certain provisions of the Native Plant Protection Act (California Fish and Game Code Section 1913).

California Fish and Game Code
Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or

any regulation made pursuant thereto. Section 3503.3 of the California Fish and Game Code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs.

The California Fish and Game Code also designates certain species as Fully Protected, which provides a greater level of protection than is afforded by the CESA, since it means the designated species cannot be taken at any time.

Porter-Cologne Water Quality Control Act and Clean Water Act Section 401

SWRCB administers the Porter-Cologne Water Quality Control Act and Section 401 of the CWA, typically through its RWQCBs. The Porter-Cologne Water Quality Control Act, Water Code Section 13260, requires that, "any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the state" file a report of discharge with the RWQCB. Waters of the State are defined in the Porter-Cologne Act (Water Code Section 13050[e]) as "any surface water or groundwater, including saline waters, within the boundaries of the state."

Sensitive Natural Communities

Sensitive natural communities are identified as such by CDFW's Natural Heritage Division and include those that are naturally rare and those whose extent has been greatly diminished through changes in land use. The CNDDB tracks 135 such natural communities in the same way that it tracks occurrences of special-status species: information is maintained on each site's location, extent, habitat quality, level of disturbance, and current protection measures. While there is no statewide law that requires protection of all special-status natural communities, CEQA requires consideration of a project's potential impacts on biological resources of statewide or regional significance.

California Marine Invasive Species Program

The California State Lands Commission's Marine Invasive Species Program is intended to prevent the release of nonindigenous species from commercial vessels into California waters. The program began in 1999 with the passage of California's Ballast Water Management for Control of Nonindigenous Species Act. In 2003, the Marine Invasive Species Act (MISA) was passed, reauthorizing and expanding the 1999 Act. Subsequent amendments to MISA and additional legislation has further expanded the scope of the program to include research, management and policy development related to vessel fouling and ballast water treatment technologies.

3.4.4.3 Local Regulations

Overview

Pursuant to California Government Code §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 practical.

City of Alameda General Plan

The Open Space and Conservation Element of the City of Alameda General Plan (1991) establishes policies to preserve and properly manage natural resources by preventing waste, destruction, or neglect of natural resources. Listed below are the pertinent City of Alameda General Plan policies:

Policy 5.1.a	Preserve and enhance all wetlands and water-related habitat.
Policy 5.1.j	Use the City of Alameda Street Tree Management Plan as the guiding reference when considering action that would affect the trees contained in the urban forest. After presenting a thorough inventory of the location, composition, condition, and maintenance needs of City-maintained trees, the Street Tree Management Plan presents recommendations for planting and tree maintenance.
Policy 5.2.a	Protect and preserve Bay waters and vegetation as nurseries and spawning grounds for fish and other aquatic species, both as part of habitat preservation and to encourage continued use of the Bay for commercial fishing production.

The Open Space and Conservation Element of the City of Alameda General Plan includes implementing policies for the preservation of natural resources. Listed below are the pertinent implementing policies:

Policy 5.1.p	Require that proposed projects adjacent to, surrounding, or containing wetlands be subject to a site-specific analysis, which will determine the appropriate size and configuration of the buffer zone. The size and configuration of the buffer zone should be based on the characteristics and importance of the wetlands and the proposed project. The purpose of the buffer zone will be to ensure the long-term viability of the wetlands area, which may include provisions for off-site needs such as upland nesting habitat.
Policy 5.1.bb	Require a biological assessment of any proposed project site where species or the habitat of species defined as sensitive or special status by the [CDFW] or the U.S. Fish and Wildlife Service might be present.

City of Alameda Trees and Shrubbery Ordinance

The City of Alameda Municipal Code Chapter 23-3 establishes that no tree or shrub located upon any public street or place shall be removed, trimmed, pruned or cut without written permission from the Public Works Director to do so.

City of Oakland General Plan

The Open Space, Conservation, and Recreation Element of the City of Oakland General Plan (1996) provides goals, objectives, polices, and actions to protect the natural resources in the City of Oakland. The Open Space element identifies goals, policies, and actions related to resource conservation areas and wildland parks, urban parks, trail improvement, and creek conservation. The Conservation Element identifies the goal to preserve and prudently use natural resources to sustain life, support urban activities, protect public health and safety, and provide a source of beauty and enjoyment.

City of Oakland Protected Trees Ordinance

The City of Oakland Municipal Code Title 12, Chapter 12.36 establishes permit requirements for the removal or damage of protected trees. Protected trees are defined as the following:

- California or Coast Live Oak (*Quercus agrifolia*) measuring 4-inches in dbh or larger
- Other trees measuring 9-inches dbh or larger, except eucalyptus and individual Monterey pine (*Pinus radiata*) trees
- Monterey pine trees are protected when on City property and in development-related situations where more than five Monterey pine trees per acre are proposed to be removed

The City of Oakland Municipal Code Title 12, Chapter 12.36.060 includes conditions for approval, including conditions for replacement plantings. The City's ordinance requires replacing removed protected trees at a 1:1 ratio with trees of a 24-inch box size. Protected trees could also be replaced with trees that are 15 gallons in size, when appropriate. Chapter 12.36.060 B2 of the City of Oakland Municipal Code provides a list of species that should be used for replacement trees.

City of Oakland Street Trees and Shrubs Ordinance

The City of Oakland Municipal Code Title 12, Chapter 12.32.060 makes it "unlawful for any person to make any tree or shrub improvement, or to destroy, deface or mutilate any tree or shrub in and along any public street, or to attach or place any rope, wire, sign, poster, handbill or other thing to or on any tree growing in any public street, or any guard or protection of such tree, or to cause or permit any wire charged with electricity to come in contact with any such tree, without having first obtained a written permit" from the City of Oakland Director of Parks and Recreation.

EBMUD Practices and Procedures

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification Section 01 35 44 (Environmental Requirements) includes several measures to protect water quality and to minimize polluted runoff that could otherwise impact biological resources.

3.4.5 Proposed Project Impacts and Mitigation Measures

3.4.5.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on biological resources if it would:

1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS;
2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS;
3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
6. Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP.

Based on the Initial Study analysis, there are no adopted HCP, NCCP, or other local, regional, or state habitat conservation plans within the proposed project area. As a result, Criteria 6 would not apply to the proposed project and is not discussed further.

3.4.5.2 Approach to Analysis

Impacts were analyzed by determining if any biological resources identified as potentially occurring within the proposed project area would be directly or indirectly affected by construction of the proposed project. Direct impacts to biological resources include any activities that would injure or kill a special-status species, any activities that would significantly disturb a special-status species, and any activities that would directly disturb habitat. Indirect impacts include the consequences of any activity that could result in an impact to a biological resource, such as a spill that would affect the quality of habitat.

3.4.5.3 Impacts and Mitigation Measures

Table 3.4-2 provides a summary of the significance of the proposed project's impacts to biological resources before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.4-2 Summary of Potential Impacts to Biological Resources

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (Criteria 1)	Potentially Significant	Less than Significant MM Biology-1 MM Biology-2 MM Biology-3 MM Biology-4 MM Biology-5 MM Biology-6 MM Biology-7 MM Biology-8 MM Hydro-1
Impact Bio-2: Potential to have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations or by CDFW or USFWS (Criteria 2)	Potentially Significant	Less than Significant MM Biology-8 MM Biology-9 MM Biology-10
Impact Bio-3: Potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means (Criteria 3)	Potentially Significant	Less than Significant MM Biology-8 MM Hydro-1
Impact Bio-4: Potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or could impede the use of native wildlife nursery sites (Criteria 4)	Potentially Significant	Less than Significant MM Hydro-1
Impact Bio-5: Potential to conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Criteria 5)	Less than Significant	---

Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (Criteria 1). (*Less than Significant with Mitigation)*

Direct Impacts

Overview

Direct impacts to special-status species could occur from construction activities that would cause injury or mortality to the species or result in the destruction of sensitive habitat used by special-status species, including any impacts to nesting and roosting as a result of construction noise.

Special-Status Plants

There are no special-status plant species expected to occur within the proposed project area due to the disturbed nature of the urban environment where the proposed project is located (see Section 3.4.3.4); therefore, no direct impacts to special-status plants would occur.

Special-Status Invertebrates
The monarch butterfly is the only special-status invertebrate species that may potentially occur within the vicinity of Crossing #2. Monarch butterflies are known at the Chuck Corica Golf Complex, which has eucalyptus trees that can be used by the species for their winter roost.

Pre-Construction Geotechnical Investigation. Monarch butterflies would not be directly impacted by the pre-construction geotechnical investigation, as no tree or vegetation removal would result from investigation activities.

Construction. The eucalyptus trees at the Chuck Corica Golf Complex are located near the HDD pits and pipeline abandonment pits associated with Crossing #2. The HDD pit on the North Bay Farm Island side of Crossing #2 is located approximately 650 feet from some eucalyptus trees, and one of the pits for the Bay Farm 1 pipeline abandonment is located approximately 200 feet from eucalyptus trees. The closest area where tree removal and vegetation effects would occur is near the two pipeline abandonment pits. A potentially significant impact could occur if overwintering monarch butterflies use trees or vegetation located near the two pipeline abandonment pits. Monarch butterflies could be injured or killed from falling trees and their roosting behavior could be interrupted. Mitigation Measure Biology-1 requires EBMUD to conduct a late fall/early winter monarch butterfly survey if construction were to occur in the overwintering period. If monarch butterflies are found, tree removal would be deferred until the overwintering monarch butterflies are no longer using the site, and therefore, potential impacts to monarch butterfly would be less than significant after implementation of Mitigation Measure Biology-1.

Special-Status Fish
Pre-Construction Geotechnical Investigation. Three special-status fish species (longfin smelt, Southern DPS green sturgeon, and Central California Coast DPS steelhead) could be temporarily affected by water-borne noise and vibration, sediment displacement, mobilization of contaminants, or possible collisions with equipment during pre-construction geotechnical borings in the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. These fish species have a moderate potential to occur in these water bodies. Turbidity in marine waters may affect special-status fish during various life stages by affecting respiration (clogging gills); reducing visibility and the ability to forage or avoid predators; and altering movement patterns (due to avoidance of turbid waters).

The active drilling surface and any fluids (i.e., bentonite) that may be used for the pre-construction geotechnical borings would be contained within steel casing. The casing would prevent sediment displacement and the mobilization of contaminants within the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel during each boring. Any in-water sediment movement that may result from the placement and removal of the steel casing would be ephemeral in nature and minimal. Special-status fish species are anticipated to avoid potential plumes and forage in the unaffected areas surrounding the pre-construction geotechnical boring site. No significant long-term impacts to special-status fish species are anticipated due to the rapid recovery expected at the in-channel pre-construction geotechnical boring locations, the limited number of borings (two to three per crossing), and the very small area affected; however, short-term potentially significant impacts to special-status fish species could occur during in-channel pre-construction geotechnical borings. Mitigation Measure Biology-2 would reduce impacts to special-status fish species to less than significant by requiring in-channel pre-construction geotechnical borings to be completed outside of the seasonal window when special-status fish species could be migrating through the proposed project area. Potential impacts to special-status fish species would be less than significant after implementation of Mitigation Measure Biology-2.

Noise impacts to special-status fish from the in-channel pre-construction geotechnical borings are not anticipated to be high enough to cause injury or death (Reyff pers. comm. 2016). The areas proposed for in-channel activities are heavily used by boat traffic. The additional noise from the in-channel activities would not likely be higher than background noise. Tugboats and small vessels would be sources of noise comparable to those caused by the proposed project. Therefore, in-water noise impacts to special-status fish would be less than significant.

Construction. Construction of the proposed project would not directly impact the three special-status fish species (longfin smelt, Southern DPS green sturgeon, and Central California Coast DPS steelhead) as no construction activities would directly occur within the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. HDD pipelines would be drilled underneath the water bodies. Although no construction would be conducted within the water bodies, there is still a low potential for the water bodies to be negatively affected from a frac-out. A frac-out occurs when pressure created by drilling equipment forces drilling fluids up from the borehole, with the fluids potentially escaping to the surface water bodies. Impact Hydro-5 in Section 3.10: Hydrology and Water Quality describes the potential significant impacts to the Oakland Inner Harbor, Tidal Canal, and the San Leandro Bay Channel from a frac-out. Mitigation Measure Hydro-1 would reduce impacts to special-status fish species to less than significant by requiring the preparation and implementation of a Frac-Out Contingency Plan.

Fish have the potential to be negatively affected if onshore vibration or sound waves from construction are large enough to travel into and through the water. Jet grouting would occur in proximity to the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel; however, the sound/vibration from jet-grouting would not be transmitted into the water. Jet grouting would be located a minimum of 50 feet from water and because noise dissipates quickly, the noise would not be transmitted into the water (ICF Jones & Stokes and Illingworth & Rodkin, Inc. 2012). In order to abandon existing underwater pipeline crossings in the area, vibratory pile driving may be used to install sheet pile walls for the pits. Pile driving has the potential cause impacts to fish species from noise and vibration. The construction activities would have a significant impact to special-status fish species if pile driving is conducted close to the water. Mitigation Measure Biology-3 requires that no impact or pile driving occur within 200 feet of water. Generally, vibratory pile driving is considered to fall below the threshold for impacts to fish species; therefore, a distance of 200 feet would be sufficient to ensure that special-status fish species are protected from any noise and vibration impacts (ICF Jones & Stokes and Illingworth

& Rodkin, Inc. 2012). Potential impacts to special-status fish species would be less than significant after implementation of Mitigation Measure Biology-3, by restricting pile driving near the shoreline.

Special-Status Birds

Pre-Construction Geotechnical Investigation. Special-status bird species would not be directly impacted by the pre-construction geotechnical investigation as no tree or vegetation removal would result from investigation activities.

Construction. Nesting birds have the potential to be affected during construction if a nesting bird were to be injured or killed or if the bird's eggs or nest were to be destroyed during tree removal, pruning, or vegetation removal.

Two special-status bird species (Alameda song sparrow and double-crested cormorant) have a moderate potential to occur within the proposed project area at all three crossings, but only as foraging adults. Construction of the proposed project would involve tree removal, tree pruning, and vegetation removal. The removal and pruning activities could impact bird species if the bird's eggs or nest were destroyed, which would be a significant impact because nesting birds are protected under the MBTA and California Fish and Game Code Sections 3503 and 3503.5. Mitigation Measure Biology-3 requires that EBMUD minimize impacts to all nesting birds by conducting tree removal outside of the nesting bird season, to the extent feasible. If construction activities are scheduled to begin during the nesting season, Mitigation Measure Biology-4 requires EBMUD to conduct pre-construction surveys for nesting birds and implement no-disturbance buffers if active nests are found. Mitigation Measure Biology-4 ensures that nesting birds are kept safe from injury and mortality and that nests and eggs are protected. Therefore, potential impacts to nesting bird species would be less than significant after implementation of Mitigation Measure Biology-4.

Three special-status bird species (California black rail, California clapper rail, and California least tern) have a low potential to occur within the proposed project area. Potential impacts to the three bird species would be less than significant because the three species would most likely not occur within the proposed project area due to the lack of suitable habitat at individual work sites. Although the impact is less than significant even without mitigation, the three species would be afforded further protection through the implementation of Mitigation Measure Biology-4.

Special-Status Mammals

Pre-Construction Geotechnical Investigation. Land based special-status mammals such as bats or the salt marsh harvest mouse would not be directly impacted by the pre-construction geotechnical investigation as no tree or vegetation removal would result from investigation activities; however, marine mammals could be impacted by in-channel pre-construction geotechnical investigation activities. Three marine mammals (harbor seal, harbor porpoise, and California sea lion) have a moderate potential to occur within the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel, as they occur throughout the San Francisco Bay.

Marine mammals could be temporarily affected by water-borne noise and vibration, sediment displacement, mobilization of contaminants, or possible collisions with equipment during pre-construction geotechnical borings. The active drilling surface and any fluids (i.e., bentonite) that may be used for the pre-construction geotechnical borings would be contained within steel casing. The casing would prevent sediment displacement and the mobilization of contaminants within the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel during each boring. Any in-water sediment movement that may result from the placement and removal of the steel casing would be ephemeral in nature and minimal. Pre-construction geotechnical borings also could produce underwater noise that has the potential to harass marine mammals; however, the additional noise would not likely be greater than that produced by commercial shipping vessels in the Oakland Inner Harbor and Tidal Canal. While marine mammals are highly mobile and would likely avoid areas of noise and disturbance from the pre-construction geotechnical borings, there remains the potential for a significant impact to individual marine mammals. Mitigation Measures Biology-5 and Biology-6 would reduce impacts to special-status marine mammals to less than significant by requiring consultation with the NMFS pursuant to the Marine Mammal Protection Act and implementation of a Marine Mammal Monitoring Plan to avoid noise disturbances to passing marine mammals. Impacts to special-status marine mammals would be less than significant after implementation of Mitigation Measures Biology-5 and Biology-6.

Construction. Two special-status bat species (hoary bat and Townsend's big-eared bat) have a moderate potential to occur within the proposed project area. The two species could potentially roost in the trees within Towata Park and under the bridges located within the vicinity of the proposed project, including the following:

- Otis Drive bridge near Crossing #2 and the Bay Farm 1 and Bay Farm 2 pipeline abandonments near Crossing #2
- High Street bridge, which is where pipeline abandonment would occur near Crossing #3
- Fruitvale Avenue bridge, which is 850 feet east of Crossing #3 and the Derby Avenue pipeline abandonment, which is near Crossing #3
- Park Street bridge, which is adjacent to the Park Street pipeline abandonment near Crossing #3

There is potential for hoary bat and Townsend's big-eared bat to be affected during construction, if individuals of the two species were to be injured or killed during tree removal, tree limb removal, or construction near bridges. The impact to either of the two species would be potentially significant. Mitigation Measure Biology-7 requires pre-construction bat surveys and implementation of disturbance-free buffer zones if any roosting special-status bats are found during the pre-construction surveys. Potential impacts to hoary bat and Townsend's big-eared bat would be less than significant after implementation of Mitigation Measure Biology-7 because a pre-construction survey would be conducted and measures would be required to identify and protect active maternity roosts or day roosts.

Three special-status bat species (big free-tailed bat, pallid bat, and silver-haired bat) have a low potential to occur within the proposed project area. Impacts to these three special-status bat species would be less than significant because the three species would most likely not occur within the proposed project area. Although the impact is less than significant even without mitigation, the three species would also be afforded protection through the implementation of Mitigation Measure Biology-7.

Impacts to the salt-marsh harvest mouse would be less than significant because the mouse has a low potential to occur within the proposed project area within the Alameda Island side of Crossing #2. Northern coastal salt marsh is located adjacent to Towata Park, where HDD would occur; however, construction of the proposed project would not directly disturb any northern coastal salt marsh. Furthermore, Towata Park is a landscaped area, which does not provide suitable habitat for salt-marsh harvest mouse. The potential for salt-marsh harvest mouse to occur in the proposed project site is low; therefore, potential impacts to salt-marsh harvest mouse would be less than significant.

Impacts to the Alameda Island mole would be less than significant because the species has a low potential to occur within the proposed project area. Although there is some exposed soil located near Crossing #2, no individual moles or evidence of mole activity were identified during the December 2015 survey.

No direct impacts to marine mammals would result from project construction.

Indirect Impacts

Indirect impacts to special-status species include any construction activities that would tangentially affect special-status species, including any activities that would damage the quality of the habitat used by special-status species.

Special-Status Plants

No indirect impacts to special-status plants would occur because no special-status plants are located within the proposed project area.

Special-Status Invertebrates

Pre-construction and construction activities would not indirectly impact the trees or vegetation used by the overwintering monarch butterfly. No indirect impacts would occur.

Special-Status Fish

Pre-Construction Geotechnical Investigation. Investigation activities would not indirectly impact special-status fish species.

Construction. There is some potential for three-special status fish species (longfin smelt, Southern DPS green sturgeon, and Central California Coast DPS steelhead) to be indirectly impacted by HDD, jet grouting, and pipeline abandonments that would occur within the vicinity of the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. Construction of the proposed project would potentially affect the water quality of the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel from the following: stormwater discharges during construction; the conveyance of contaminants via stormwater runoff due to improper use, storage, or disposal of fuels, lubricants, and other chemicals used in construction; discharge of groundwater; and discharge of treated water used for flushing. As described in Impact Hydro-1 in Section 3.10: Hydrology and Water Quality, compliance with existing programs and regulations and EBMUD Standard Construction Specification 01 35 44, which requires a Water Control and Disposal Plan, would reduce any impacts related to water quality standards or waste discharge requirements to less than significant. Potential indirect impacts to special-status fish species would be less than significant.

Special-Status Birds
Pre-Construction Geotechnical Investigation. Investigation activities would not impact special-status bird species as no trees or vegetation would be removed.

Construction. Construction of the proposed project would not indirectly impact the Alameda song sparrow or California least tern because none of the construction activities would indirectly impact the habitat used by these species.

Construction of the proposed project could potentially have indirect impacts on foraging habitat for the double-crested cormorant. The double crested cormorant forage on fish within the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. Fish habitat within these waterways would be potentially affected during construction by stormwater discharges; the conveyance of contaminants via stormwater runoff due to improper use, storage, or disposal of fuels, lubricants, and other chemicals used in construction; discharge of groundwater; and discharge of treated water used for flushing. As described in Impact Hydro-1 in Section 3.10: Hydrology and Water Quality, compliance with existing programs and regulations and EBMUD Standard Construction Specification 01 35 44, which requires a Water Control and Disposal Plan would reduce any impacts related to water quality standards or waste discharge requirements to less than significant. Because impacts to fish habitat would be less than significant, indirect impacts to foraging habitat for double-crested cormorant would also be less than significant.

There is some potential for proposed project construction to indirectly impact California black rail and California clapper rail habitat (i.e., northern coastal salt marsh). A potentially significant impact to northern coastal salt marsh would occur if construction activities were to accidentally cross into the marsh, or if a significant amount of hazardous materials spilled and drained into salt marsh habitat. EBMUD would implement Standard Construction Specification 01 35 44, which requires preparation and implementation of a Waste Control and Disposal Plan and a Water Control and Disposal Plan. The law also requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). Impacts to northern coastal salt marsh would remain potentially significant even after implementation of EBMUD's Standard Construction Specification 01 35 44 and the SWPPP because EBMUD's Standard Construction Specification 01 35 44 and the SWPPP do not specifically require protection for the northern coastal salt marsh at Crossing #2. To ensure that the northern coastal salt marsh is protected, EBMUD would implement Mitigation Measure Biology-8, which requires silt and exclusion fencing be installed at the edges of work areas near the northern coastal salt marsh habitat. Because Mitigation Measure Biology-8 would ensure that northern coastal salt marsh is protected during construction, potential indirect impacts to northern coastal salt marsh would be less than significant after implementation of Mitigation Measure Biology-8.

Special-Status Mammals

Pre-Construction Geotechnical Investigation. Investigation activities would not indirectly impact special-status mammal species.

Construction. There is some potential for construction of the proposed project to indirectly impact northern coastal salt marsh and therefore there is some potential for construction to indirectly impact the salt-marsh harvest mouse, which uses the salt marsh habitat. The potential indirect impacts to northern coastal salt marsh are described previously in the discussion of indirect impacts to special-status birds. Indirect impacts to northern coastal salt marsh would be potentially significant. EBMUD would implement Standard Construction Specification 01 35 44 and the SWPPP; however, impacts would remain potentially significant because the Standard Construction Specification 01 35 44 and the SWPPP do not specifically require protection for the northern coastal salt marsh at Crossing #2. Implementation of Mitigation Measure Biology-8, which requires silt and exclusion fencing, would reduce the impact to less than significant.

Construction of the proposed project would not indirectly impact the Alameda Island mole, big free-tailed bat, hoary bat, pallid bat, silver-haired bat, or Townsend's big-eared bat because none of the construction activities would indirectly impact the habitat used by those species. No indirect impacts would occur.

Mitigation Measures: Biology-1, Biology-2, Biology-3, Biology-4, Biology-5, Biology-6, Biology-7, Biology-8, Hydro-1 (see Section 3.10: Hydrology and Water Quality)

Mitigation Measure Biology-1. Conduct a Pre-Construction Monarch Butterfly Survey.

Prior to tree removal at HDD sites for Crossing #2 and pipeline abandonments near Crossing #2, during the monarch butterfly overwintering period from October 1 through March 1, a qualified biologist shall conduct a late fall/early winter butterfly survey within all potential habitats within 200 feet of the proposed project area. If the results of the survey do not identify any potential overwintering of the monarch butterfly on-site, no further mitigation shall be required. If overwintering monarch butterflies are determined to use the site, tree removal shall be deferred until a qualified biologist has determined that overwintering monarch butterflies are no longer using the site, or, per the direction of CDFW.

Mitigation Measure Biology-2. Seasonal In-Channel Work Window.

In-channel pre-construction geotechnical borings shall be conducted between June 1 and November 30 to avoid impacts to special-status fish species. If work must occur between

June 1 and November 30, EBMUD shall implement additional minimization measures, such as buffer zones and monitoring for herring spawn, in consultation with NMFS, USFWS, and CDFW.

Mitigation Measure Biology-3. Pile Driving.

No impact or vibratory pile driving shall occur within 200-feet of the Oakland Inner Harbor, Tidal Canal, or San Leandro Bay Channel.

Mitigation Measure Biology-4. Pre-Construction Special-Status Bird Survey.

A pre-construction survey shall be performed prior to construction activities that would require vegetation or tree removal during the nesting season. The following measures shall be implemented:

1. If construction activities (i.e., ground clearing and grading, including removal of trees or shrubs) are scheduled to occur during the nonbreeding season (September 1 through January 31), no measures are required.
2. If construction activities are scheduled to occur during the nesting season (February 1 through August 31), the following measures shall be implemented to avoid potential adverse effects on special-status birds: A qualified wildlife biologist shall conduct pre-construction surveys of all potential nesting habitat within 500 feet of construction activities. If active nests are found during pre-construction surveys, a no- disturbance buffer shall be created (acceptable in size to the CDFW) around active raptor nests and nests of other special-status birds during the breeding season, or until it is determined that all young have fledged. Typical buffers include 500 feet for raptors, 250 feet for other nesting birds, and 50 feet for passerines. The size of the buffer zones may be further modified in coordination with the CDFW. Nests initiated during construction are presumed to be unaffected, and no buffer would be necessary.
3. Trees shall be removed outside of the nesting season to the extent feasible.

Mitigation Measure Biology-5. Marine Mammal Harassment Consultation.

EBMUD shall consult with the National Marine Fisheries Service (NMFS) to determine whether an Incidental Harassment Authorization (IHA) or Letter of Authorization (LOA) for marine mammals is necessary prior to initiation of in-channel pre-construction geotechnical borings. All IHA or LOA conditions and requirements shall be adhered to by EBMUD and its contractors.

Mitigation Measure Biology-6. Marine Mammal Monitoring Plan.

EBMUD and its contractors shall prepare and implement a Marine Mammal Monitoring Plan. The Marine Mammal Monitoring Plan shall include the following elements:

1. Establishment of an appropriate buffer zone around the work area, generally 400 feet or as defined in consultation with NMFS, that would

require work be slowed or otherwise modified if a marine mammal approaches the established buffer zone.

2. A qualified biologist shall be on board the geotechnical drilling vessel during construction.
3. The qualified biologist shall monitor marine mammal presence and behavior in the vicinity of the vessel and the surface above drilling operations. The qualified biologist shall have the authority to stop work until the marine mammal has left the buffer zone.

Mitigation Measure Biology-7. Pre-Construction Bat Surveys.

A pre-construction survey shall be performed within 2 weeks prior to tree removal in the Telecare corporation parking lot and in Towata Park, and prior to construction near Otis Drive bridge, High Street bridge, Fruitvale Avenue bridge, and Park Street bridge. Areas within 200 feet of the construction work limits shall be surveyed. The biologist shall conduct a search for suitable entry points, roost cavities or crevices, and, survey for evidence of day roosts, and maternity roosts. The following measures shall be implemented:

1. If no roosting is observed, no additional mitigation is required.
2. If roosting surveys are inconclusive, indicate potential occupation by a special-status bat species, and/or identify a large day roosting population or maternity roost by any bat species within 200 feet of an active construction work area, a qualified biologist shall conduct focused day- and night-emergence surveys.
3. If active maternity roosts or day roosts are found in areas that would be removed or modified as part of project construction, activities shall commence before maternity colonies form (before March 1) or after young are flying (after July 31). Disturbance-free buffer zones (determined by a qualified biologist in coordination with CDFW) shall be observed during the maternity roost season (March 1 through July 31) for any active maternity colony identified during the surveys to protect maternity roosts.
4. If a non-breeding bat roost is found in a structure scheduled for modification or removal, the individual(s) shall be safely evicted, under the direction of a qualified biologist (as determined in consultation with CDFW) in such a way that ensures individuals are not injured.

Mitigation Measure Biology-8. Protection of Northern Coastal Salt Marsh.

Silt and exclusion fencing shall be installed at the edges of work areas, where the work areas are near salt marsh habitat, to delineate the areas and ensure that work does not occur in sensitive habitats or wetland areas, such as at the Alameda Island side of Crossing #2, Bay Farm 1 pipeline abandonment, and Bay Farm 2 pipeline abandonment locations.

Significance after Mitigation: Less than Significant.

Impact Bio-2: Potential to have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations or by CDFW or USFWS (Criteria 2). (*Less than Significant with Mitigation)*

Direct Impact

Pre-Construction Geotechnical Investigation

Eelgrass habitat is present in the San Leandro Bay Channel in the vicinity of Crossing #2 (CBI 2016). Locations of eelgrass in the San Leandro Bay Channel represent Habitat Areas of Potential Concern (HAPCs) under the Magnuson-Stevens Act and are EFH. Minor habitat modifications within the eelgrass HAPCs may occur from the in-channel pre-construction geotechnical borings that would occur in the vicinity of the Crossing #2 HDD alignment. Impacts would be potentially significant. Mitigation Measure Biology-9 would reduce this impact to less than significant by requiring eelgrass surveys and avoidance of potential habitat. Potential impacts to eelgrass HAPC would be less than significant after implementation of Mitigation Measures Biology-9.

Construction

The proposed project is located within an urban environment; there are no sensitive natural communities, including riparian habitat, that would be impacted by construction within the proposed project area. Construction activities would, therefore, not have any direct impacts on sensitive natural communities. No impact would occur.

Indirect Impacts

Pre-Construction Geotechnical Investigation

Vessels, barges, or any other floating equipment used in support of the in-channel pre-construction geotechnical borings that does not originate in the San Francisco Bay could introduce marine invasive species into the project area, which would be considered a potentially significant impact. Mitigation Measure Biology-10 would reduce this impact to less than significant by requiring that vessels and equipment originate from the San Francisco Bay or that an Invasive Marine Species Control Plan be developed and implemented. Potential impacts to sensitive marine communities resulting from invasive species introduction would be less than significant after implementation of Mitigation Measures Biology-10.

Construction

Construction activities at Crossing #2, including HDD and pipeline abandonment, could cause indirect impacts to the northern coastal salt marsh that is adjacent to the Alameda Island side of Crossing #2. A significant impact to northern coastal salt marsh could occur if construction activities were to accidentally cross into northern coastal salt marsh or if a significant amount of hazardous materials spilled and drained to the northern coastal salt marsh habitat. The potential indirect impacts to northern coastal salt marsh are described in the Impact Bio-1 discussion of indirect impacts to special-status birds. Indirect impacts to northern coastal salt marsh would be potentially significant. EBMUD would implement Standard Construction Specification 01 35 44 and the SWPPP; however, impacts would remain potentially significant because the Standard Construction Specification 01 35 44 and the SWPPP do not specifically require protection for the northern coastal salt marsh at Crossing #2. Implementation of Mitigation Measure Biology-8, which requires silt and exclusion fencing, would reduce the impact to less than significant.

Mitigation Measure: Biology-8, Biology-9, Biology-10

Mitigation Measure Biology-9. Eelgrass Surveys and Avoidance.

A survey for eelgrass shall be conducted by a qualified biologist prior to pre-construction geotechnical drilling at Crossing #2, as described in the California Eelgrass Mitigation Policy and Implementing Guidelines (NOAA Fisheries 2014). If eelgrass is observed within the pre-construction geotechnical investigation work area, an alternative work area outside of eelgrass shall be chosen. The eelgrass survey shall be conducted during the growing season between April to October. The pre-construction geotechnical investigation shall commence within 60 days of completion of the eelgrass survey or anytime between November and March if the survey was completed in October.

Mitigation Measure Biology-10. Control of Invasive Marine Species.

In order to prevent introduction and spread of invasive marine species, EBMUD shall utilize a geotechnical contractor that can provide vessels that originate and operate in the San Francisco Bay. If the vessels to be used for pre-construction geotechnical borings have been operating outside the San Francisco Bay, then EBMUD shall develop an Invasive Marine Species Control Plan in order to effectively limit the introduction and spread of invasive marine species. The plan shall require that vessels or in-channel equipment originating or recently operating outside the San Francisco Bay prior to project use follow existing compliance measures established by the California State Lands Commission as part of the Marine Invasive Species Program relating to hull fouling and ballast water control. The plan shall also require that vessels and in-channel equipment originating or operating outside of San Francisco Bay be examined and any invasive species handled and disposed of according to the developed plan prior to vessel or equipment use on the project.

Significance after Mitigation: Less than Significant.

Impact Bio-3: Potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means (Criteria 3). ***(Less than Significant with Mitigation)***

Direct Impacts

Pre-Construction Geotechnical Investigation

The pre-construction geotechnical investigation would require in-channel pre-construction geotechnical borings in the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel in the vicinity of each of the three proposed HDD alignments. In-channel work would occur within federally protected, jurisdictional waters; however, borings would not be taken within federally protected wetlands. No impact would occur.

Construction
There are no federally protected wetlands or jurisdictional wetlands located within the proposed project construction areas; therefore, the construction activities (e.g. fill, dredging, hydrological interruption) would not directly impact federally protected wetlands or jurisdictional wetlands. No impact would occur.

Indirect Impacts
Pre-Construction Geotechnical Investigation
The northern coastal salt marsh habitat located near Crossing #2 and within the San Leandro Bay Channel is considered a federally protected, jurisdictional wetland. The in-channel pre-construction geotechnical borings would occur within the vicinity of the salt marsh habitat. The in-channel borings would generate a slurry waste that is a combination of soil, water, and bentonite. The slurry waste would be stored within drums. An accidental release of the slurry waste in water could potentially impact adjacent northern coastal salt marsh habitat. As described in Impact Hazards-1, the accidental release of slurry waste would be less than significant because EBMUD would implement a SWPPP, implement a Spill Prevention and Response Plan as required by EBMUD Standard Construction Specification 01 35 44, and adhere to the existing CUPA regulation. Therefore, potential indirect impacts to federally protected wetlands from the pre-construction geotechnical investigation would be less than significant.

Construction
Federally protected, jurisdictional waters are located within the vicinity of the proposed project. The Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel that surround the city of Alameda are considered federally protected, jurisdictional waters. The northern coastal salt marsh habitat located near Crossing #2 and within the San Leandro Bay Channel is considered a federally protected, jurisdictional wetland. HDD and pipeline abandonment would occur within the vicinity of the jurisdictional waters and wetlands surrounding the city of Alameda.

As described in Impact Bio-1, construction of the proposed project could affect the water quality of the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. As described in Impact Hydro-1 in Section 3.10: Hydrology and Water Quality, EBMUD would comply with the Standard Construction Specification 01 35 44 that includes preparation and implementation of plans to reduce impacts to surrounding waterways. Impacts would remain potentially significant, however, because of the potential for a frac-out. As discussed in Impact Hydro-5, Mitigation Measure Hydro-1 would reduce impacts to less than significant by requiring the preparation and implementation of a Frac-Out Contingency Plan. Potential impacts to federally protected wetlands would be less than significant after implementation of Mitigation Measure Hydro-1.

Construction activities at Crossing #2, including HDD and pipeline abandonment, could cause indirect impacts to the northern coastal salt marsh that is adjacent to the Alameda Island side of

Crossing #2. A significant impact to northern coastal salt marsh could occur if construction activities were to accidentally cross into northern coastal salt marsh or if a significant amount of hazardous materials spilled and drained to the northern coastal salt marsh habitat. The potential indirect impacts to northern coastal salt marsh are described, in the Impact Bio-1 discussion of indirect impacts to special-status birds. Indirect impacts to northern coastal salt marsh would be potentially significant. EBMUD would implement Standard Construction Specification 01 35 44 and the SWPPP; however, impacts would remain potentially significant because the Standard Construction Specification 01 35 44 and the SWPPP do not specifically require protection for the northern coastal salt marsh at Crossing #2. Implementation of Mitigation Measure Biology-8, that requires silt and exclusion fencing, would reduce the impact to less than significant.

Mitigation Measures: Biology-8, Hydro-1 (see Section 3.10: Hydrology and Water Quality)

Significance after Mitigation: Less than significant.

Impact Bio-4: Potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or could impede the use of native wildlife nursery sites (Criteria 4). (*Less than Significant with Mitigation*)

The Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel are considered regional wildlife corridors that allow for the movement of fish and other aquatic species including marine mammals.

Pre-Construction Geotechnical Investigation

In-channel pre-construction geotechnical borings would not significantly impact the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. The water quality of the wildlife corridor would not be significantly affected because, as described in Impact Bio-1, the drilling surface and drilling fluids (i.e., bentonite) would be contained within steel casing, the casing would prevent sediment displacement, and any in-water sediment movement would be ephemeral and minimal. The temporary placement of a drill within the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel would not significantly affect the movement of aquatic wildlife because they would be able to swim around the drill. Impacts to wildlife corridors would be less than significant because the water quality of the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel would not be significantly affected and because the movement of aquatic wildlife would not be significantly altered.

Construction

As described in Impact Bio-1, construction of the proposed project could affect the water quality of the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. EBMUD would comply with the Standard Construction Specification 01 35 44 that includes preparation and implementation of plans to reduce impacts to surrounding waterways. Impacts would remain potentially significant because of the potential for a frac-out. As discussed in Impact Hydro-5, Mitigation Measure Hydro-1 would reduce impacts to less than significant by requiring the preparation and implementation of a Frac-Out Contingency Plan. Potential impacts to the movement of native resident or migratory fish or wildlife species would be less than significant after implementation of Mitigation Measure Hydro-1.

Mitigation Measure: Hydro-1 (see Section 3.10: Hydrology and Water Quality)

Significance after Mitigation: Less than Significant.

Impact Bio-5: The proposed project could conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Criteria 5). (*Less than Significant*)

Construction of the proposed project could require the removal of several landscaped trees located in Towata Park, along sidewalks, and in the Telecare Corporation parking lot. The City of Alameda Trees and Shrubbery Ordinance requires that a permit be obtained prior to the removal of any trees. The protections for native and non-native trees may not be feasible for median trees and other landscaping trees in the urban environment. EBMUD is not subject to the permitting requirements of the City for tree removal; however, EBMUD would replant trees when they are removed. Because removed trees would be replaced, impacts to trees would be less than significant. Although less than significant even without mitigation, impacts to trees would be further reduced with the implementation of Mitigation Measures Aesthetics-1 that requires tree replacement. Tree removal is addressed further in Section 3.2: Aesthetics.

Construction of the proposed project would not require the removal of any protected trees in Oakland. The proposed project would not conflict with the City of Oakland tree ordinance. No impact would occur.

Mitigation Measure: None Required.

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3.5 CULTURAL RESOURCES

This section presents the environmental setting and impact analysis for cultural resources that could be affected by the proposed project. Background information, known resources, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here. Appendix G includes copies of communications with the California Native American Heritage Commission (NAHC) and Native American tribes that could be affected by or have concerns about the proposed project.

3.5.1 Definition of Archaeological and Historical Resources

Cultural resources in the State of California are recognized as non-renewable resources that require management to ensure their benefit to present and future Californians. CEQA requires analysis of a project's effect on historical and archaeological resources. CEQA Guidelines Section 15064.5 defines the term "historical resource" as any of the following:

1. A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (CRHR).
2. A resource included in a local register of historical resources or identified as significant in a historical resources survey shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3. Any object, building, structure, site area, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a cultural resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR, including the following:
    a. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
    b. Is associated with the lives of persons important in our past;
    c. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
    d. Has yielded, or may be likely to yield, information important in prehistory or history.

The term "unique archaeological resource" has the following meaning under Public Resources Code (PRC) §21083.2(g):

> An archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
>
> 1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information,
> 2. Has a special and particular quality such as being the oldest of its type or the best available example of its type, or
> 3. Is directly associated with a scientifically recognized important prehistoric or historical event or person (PRC §21083.2[g]).

"Tribal cultural resources" are a new group of cultural resources that have the following meaning under PRC §21074(a):

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
   a. Included or determined to be eligible for inclusion in the CRHR.
   b. Included in a local register of historical resources as defined in PRC §5020.1(k).
2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC §5024.1(c). In applying the criteria set forth in PRC §5024.1(c), the lead agency shall consider the significance of the resource to a California Native American tribe.

A cultural landscape that meets the criteria of PRC §21074(a) is also a tribal cultural resource if the landscape is geographically defined in terms of the size and scope. A historical resource as described in PRC §21084.1, a unique archaeological resources as defined in PRC §21083.2, or a non-unique archaeological resource as defined in PRC §21083.2 may also be a tribal cultural resource if it meets the criteria of PRC §21074(a).

The California Historical Resources Inventory (HRI) is maintained by the California Office of Historic Preservation. The HRI is a database of cultural resource information, including sites listed or eligible for listing on the CRHR. The HRI includes only information on historical resources that have been identified and evaluated through one of the programs that the Office of Historic Preservation administers under the National Historic Preservation Act (NHPA) or the PRC. The HRI includes data on:

- Resources evaluated in local government historical resource surveys partially funded through Certified Local Government grants or in surveys which local governments have submitted for inclusion in the statewide inventory;
- Resources evaluated and determinations of eligibility made in compliance with Section 106 of the NHPA;
- Resources evaluated for federal tax credit certifications; and

- Resources considered for listing in the National Register of Historic Places (NRHP) and CRHR, or as California State Landmarks or Points of Historical Interest.

3.5.2 Data Collection

3.5.2.1 Literature and Database Review

The purpose of conducting cultural resources literature and database reviews is to better understand previously discovered resources in or near the proposed project area. Information from the reviews can give some indication of the likelihood, type, and distribution of cultural resources that could be encountered during implementation of the proposed project.

A prehistoric and historic site record and literature search for the proposed project pipeline alignments and pipeline abandonments, and an industry standard 0.25-mile radius around each was completed at the California Historical Resources Information System (CHRIS), Northwest Information Center (NWIC), Sonoma State University, Rohnert Park (CHRIS/NWIC File No. 14-1748 by Hagel). Reference material from the Bancroft Library at the University of California in Berkeley, California, and material on file at Basin Research Associates in San Leandro, California, was reviewed. The NAHC was contacted for a search of the Sacred Lands Inventory for the proposed project area.

Twenty-two reports were found on file with the CHRIS/NWIC that covered areas that cross or are adjacent to the proposed project area and that include archaeological reviews. Several of the reports cover areas adjacent to two or more of the proposed pipeline alignments. The reports are identified and summarized by proposed project area below:

- **Crossing #1.** Fourteen reports were identified that consist primarily of a proposed development project (Alameda Marina Village) and mostly linear infrastructure alignments including projects involving transportation, fiber optics, cellular telephone equipment, the turning basin/estuary, and the Tidal Canal.
- **Crossing #2.** Two reports were identified that include City of Alameda linear infrastructure alignments.
- **Crossing #3.** Ten reports were identified that involve fiber optics, the Inner Harbor/Tidal Canal, a review of historic bridges, the evaluation of the High Street Bridge and linear infrastructure alignments.

An architectural inventory was not undertaken for the proposed project, as the work would be confined to previously disturbed areas including public ROW, city parks, private property, and underwater pipeline crossings with no direct or indirect impacts to adjacent structures (see Section 3.5.7: Proposed Project Impacts and Mitigation Measures).

3.5.2.2 Surveys

An archaeological field inventory/review was not conducted for the proposed project, as it is located within urban areas of the cities of Alameda and Oakland with little opportunity to inspect exposed native soil. The proposed project area is primarily covered with hardscape and introduced landscaping in a few areas. An architectural field review was also not undertaken since the proposed project would not directly or indirectly impact adjacent buildings.

3.5.3 Environmental Setting

3.5.3.1 Regional Setting

Prehistoric Context
In northern California, cultural resources, which are defined as traces of human occupation and activity, extend back in time for at least 9,000 to 11,500 years with Native American occupation and use of central California extending over the last 5,000 to 8,000 years and possibly longer. The proposed project region appears to have been located in a favorable environment along the periphery of San Francisco Bay, in an area with a variety of ecological niches available for resource exploitation, including the San Francisco Bay margin, marshlands, riparian, and inland resources. Habitation sites in the proposed project region appear to have been selected for accessibility, protection from seasonal flooding, and the availability of both food and tool resources (Basin 2015).

Archaeological information for the San Francisco Bay Area suggests a slow, steady increase in the prehistoric population with an increasing focus on permanent settlements with large populations in later periods. The change from a hunter-collector lifestyle to an increased sedentary lifestyle is due both to more efficient resource procurement as well as to a focus on staple food exploitation, the increased ability to store food at village locations, and the development of increasingly complex social and political systems, including long-distance trade networks (Basin 2015).

Prehistoric site types recorded in the region consist of shell mounds, lithic scatters, quarries, habitation sites (including burials), bedrock mortars or other milling feature sites, petroglyph sites, and isolated burial locations. A number of prehistoric sites in the proposed project region have been recorded. However, none of the "Shell Mound" and/or Nelson sites are located in or adjacent to the proposed project components. The majority of the prehistoric archaeological sites in the proposed project region have been discovered as the result of Euro-American settlement and development (Basin 2015).

Ethnographic Overview
The aboriginal inhabitants of the San Francisco Bay Area region belonged to a group known as the Costanoan, derived from the Spanish word Costanos ("coast people" or "coastal dwellers"), who occupied the central California coast as far east as the Diablo Range. The proposed project is within the Chochenyo territory of the group (Levy 1978) also known as the Ohlone (Galvan 1967/1968, Bean 1994). In 1770 the estimated 50 Ohlone tribelets consisted of politically autonomous groups of 50 to 500 individuals, with an average population of 200. Tribelet territories, defined by physiographic features, usually had one or more permanent villages surrounded by a number of temporary camps. The camps were used to exploit seasonally available floral and faunal resources (Levy 1978).

Research suggests that the proposed project area would have been occupied by the San Antonio ethnic group and by the Huchiun, Huchium-Southern, or the Wekemnayon tribelet. The nearest reported villages were located in Indian Gulch (later known as Trestle Glen), northeast of Lake Merritt and near High Street and Encinal Avenue (City of Alameda) (Duran 1824 in Bennyhoff 1977, Kroeber 1925, Merlin 1977, Levy 1978, Mosier and Mosier 1986, Milliken 1995, 2006). The presence of numerous Native Americans in the Alameda, Oakland, and Berkeley areas appears to have been so evident that the Spanish named the area in the vicinity of present day Temescal Creek (Oakland) and the Emeryville Shellmound on the edge of San Francisco Bay Encinal del Temescal (i.e., "oak grove by the sweathouse") (Gudde 1998).

The traditional Native American lifeway disappeared by 1810 due to the introduction of new diseases, a declining birth rate, the cataclysmic impact of the mission system and the later secularization of the missions by the Mexican government.

Historic Overview

Hispanic Period

The Oakland portion of the proposed project (i.e., Crossing #1 and Crossing #3) and most of the main Alameda Island portion of the proposed project are within the former Rancho San Antonio. The North Bay Farm Island (part of Crossing #2) was within ungranted lands (Basin 2015).

The Rancho San Antonio was granted to Sergeant Luis Maria Peralta, a member of the 1776 Anza expedition, on August 3, 1820, by Governor Pablo Vincente de Sola, the last Spanish governor of Alta California. The grant was revoked and then re-granted in the following years. Peralta died in 1842 resulting in subdivision of the rancho into approximately four equal parts for his four sons. Antonio Maria secured the present-day East Oakland and the Encinal de San Antonio (City of Alameda) on June 25, 1874. None of the Hispanic Period dwellings or other structures are located in or adjacent to the proposed project components (Basin 2015).

American Period

Alameda County. Alameda County was named after Alameda Creek, the former boundary between Contra Costa and Santa Clara Counties. The county was created from portions of Santa Clara and Contra Costa Counties on March 25, 1853. Oakland and Alameda are two major cities on the east shore of San Francisco Bay (Basin 2015).

In the mid-19th century, the majority of the rancho and pueblo lands and some of the ungranted land in California were subdivided as the result of population growth, the American takeover, and the confirmation of property titles. The initial population boom in the proposed project area was associated with the Gold Rush (1848), followed later by the construction of the transcontinental railroad (1869) with Oakland as its western terminus, and various local railroads (Basin 2015).

Oakland. In 1850, the firm of Mhoon [Moon], Carpentier & Adams built a small house at the foot of present-day Broadway within Rancho San Antonio owned by Vicente Peralta. They were joined by other squatters, survived an attempt at removal, and later negotiated a 160-acre "lease". The Town of Oakland was incorporated in 1852, became a city in 1854, and established a post office March 2, 1855. The city of Oakland was designated the Alameda County seat on March 29, 1873 (Basin 2015).

The city and its environs quickly grew with the railroads, becoming a major rail terminal in the late 1860s and 1870s with the city grid firmly established by the late 1880s. In 1868, the Central Pacific Railroad constructed the Oakland Long Wharf at Oakland Point, the site of the contemporary Port of Oakland. The city developed rapidly during the later American Period and into the Contemporary Period (ca. 1876–1940s) and continues to the present. Oakland is a major port and industrial center noted particularly for machinery manufacture, chemical production, and food processing, with the growth dependent on its varied transportation networks of railroads, highways and shipping. The Port of Oakland is the fifth busiest in the United States and is a major gateway to the Pacific Rim (Basin 2015).

Alameda. Alameda's geographical setting and historical development are similar to Oakland's. Both communities originated during the Gold Rush, yet the two cities are quite different. Alameda, a fraction of the size of Oakland, is a low-rise city with few buildings over three stories. Primarily residential, it is characterized by neighborhoods of detached houses intermixed with apartment buildings and commercial districts (Basin 2015). Despite the apartment buildings that replaced hundreds of houses in areas with high-density zoning, Alameda is a remarkably well-preserved residential city from the late 19th and early 20th centuries. While there are fine examples of types and styles from the 1850s to the 1960s, local architecture achieved its amplest expression between the 1870s and 1940s, in a stylistic sequence from Italianate, Stick, and Queen Anne to Colonial Revival, Craftsman, and Period Revival. Alameda houses tend to be small, on constricted lots (Basin 2015).

Alameda began as a farming community serving San Francisco. Early settlement was centered in the east end of the peninsula, along High Street. The San Francisco & Alameda Railroad began service in the summer of 1864 from the Alameda Wharf along Pacific to Second Avenue continuing along Railroad Avenue (now Lincoln Avenue) eastward, crossing the proposed project area between Everett Street and Broadway. With the establishment of consolidated rail and ferry service, the peninsula underwent rapid development as a commuter suburb. The San Francisco & Alameda Railroad was absorbed by the Central Pacific Railroad in 1869. The Central Pacific Railroad was reorganized as the Southern Pacific Company in 1885. The Southern Pacific Company discontinued ferry service at the Alameda Pier between Alameda and San Francisco in 1939 and terminated local train service in 1941 (Basin 2015).

3.5.3.2 Local Environmental Setting

Settlement and Development Patterns

City of Oakland

Crossing #1. The majority of the proposed project pipeline alignment within the city of Oakland is south of Interstate 880 (I-880) and generally adjacent to the NRHP-listed Oakland Waterfront Warehouse District, although small sections of Crossing #1 and the Alice-Webster pipeline abandonment are within a small extension of the main District bounded by 5th Street on the north, Madison Street on the east, 4th Street on the south and Jackson Street on the west, as shown in Figure 2.1-2. The District, an industrial area that includes a group of 30 buildings and one structure, generally includes one- to three-story warehouses, most in the style of early 20th Century utilitarian and some with Beaux Arts Derivative and Art Deco elements. The period of significance spans from 1900 to 1974. The area is currently undergoing redevelopment with new residential high-density medium-rise housing and existing buildings being converted to residential housing, interspersed with ongoing commercial and industrial activities (Basin 2015).[1]

The area north of I-880 passes through a section of residential housing, primarily consisting of Victorian homes converted to multi-family use and new high-density condos and apartments interspersed with commercial and governmental buildings. The area north of I-880 is also undergoing redevelopment (Basin 2015).

Crossing #3. The area around Crossing #3 and the Blanding Street, Park Street, Derby Avenue, and High Street pipeline abandonments is a mixed area of low warehouses and industrial and manufacturing uses. There are some scattered single-family Victorians with many of the buildings undergoing redevelopment for live-work spaces, commercial offices, in-fill residential and mixed-uses. In particular, the area supports a burgeoning artistic colony. The area buildings appear to date from the early 1900s to the 1940s (Basin 2015).

The Blanding Street, Park Street, Derby Avenue, and High Street pipeline abandonments are located in industrial areas in the city of Oakland. The Blanding Street pipeline abandonment passes through the Redy Mix Concrete facility and then continues to the intersection of Oak Street and Blanding Avenue. The Park Street pipeline abandonment follows the alignment of the Park Street Bridge in an industrial/commercial area with adjacent new residential and live-work condo development on the Oakland bank along the Tidal Canal. The Derby Avenue pipeline abandonment passes under the Tidal Canal from Derby Avenue in Oakland to the bank of the canal at the foot of Broadway in Alameda (Basin 2015).

Pipeline Abandonments. The pipeline abandonments within the city of Oakland are in primarily industrial areas.

City of Alameda

Crossing #1. The area north of Ralph M. Appezzato Memorial Parkway and Eagle Avenue was originally marshland that was filled between the 1870s and 1920s with dredged material from harbor shipping channels and basins. Portions of the site were occupied by shipyards (United

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1 The building bounded by the pipeline alignments is currently used as office and warehouse for Cost Plus World Market International Headquarters. It was formerly used by S&W Fine Foods. The concrete Modern Warehouse was constructed in 1937 with an addition in 1946. It is listed as a contributing building to the Historic District.

Engineering Works, 1900–1916; Bethlehem Shipyard, 1916–1948). The Bethlehem Shipyard site was redeveloped in the 1980s as Marina Village, a mixed-use development with a mall, office buildings, townhouses, and marina, including several shipyard structures adapted to commercial use (Basin 2015).

The pipeline alignment along Marina Village Parkway, Challenger Drive, and Atlantic Avenue, as shown in Figure 2.1-2, runs through the center of the Bethlehem Shipyard site and Marina Village. One shipyard structure, now offices, was listed on the NRHP in the 1980s. Sherman Street south of Eagle Avenue has several blocks of 19th-century houses. The pipeline alignment passes through two blocks between Buena Vista Avenue and Lincoln Avenue that are at the center of the "Bay Station Heritage Area," a neighborhood of more than thirty Queen Anne houses designed and built in the 1890s by the local firm of Marcuse & Remmel, and designated a Heritage Area in 1980s by the City of Alameda's Historical Advisory Board. The Bay Station Heritage Area is recognized by the Alameda City Council as an area of local heritage significant to the city's history and is designated in the City of Alameda's Historic Preservation Element and the City of Alameda's General Plan (Basin 2015). The area has not been evaluated as a district for eligibility on the CRHR or NRHP.

Crossing #2. The pipeline alignment in the vicinity of Crossing #2 extends through the center of development in Gold Rush Alameda, as shown in Figure 2.1-3. The 1853 plat of the town included the southeast section of the peninsula east of Versailles Avenue and south of Encinal Avenue. By 1860, the town had several hundred residents. Peach Street was the access road to the first North Bay Farm Island Bridge, erected in 1854, which connected with an earth-fill roadway across North Bay Farm Island marshland to upland farms. Little remains of the area's 19th-century origins. San Jose Avenue and Peach Street are lined with single-family houses, mostly dating from the early-to-mid 20th century—primarily bungalows and postwar tract houses, with a scattering of 19th-century structures. The pipeline alignment parallels the North Bay Farm Island Bridge, built in 1951-1953, and enters the east edge of the contemporary Harbor Bay Isle bay-fill development west of Island Drive. The municipal golf course east of Island Drive was built in the 1920s on filled marshland. There are no designated local landmarks or NRHP properties in the vicinity of Crossing #2 of the pipeline alignment (Basin 2015).

Crossing #3. The pipeline alignment in the area of Crossing #3 extends from the Oakland waterfront across the tidal canal portion of the harbor to the Alameda waterfront and south into historic residential neighborhoods, as shown in Figure 2.1-5. Broadway, located 0.25 mile east of Park Street, is a Gold Rush-era street laid out in 1854 with 1-acre lots—the westernmost plat associated with the pioneer town of Alameda to the east. Northwest of Tilden Way, formerly a railroad ROW, the pipeline alignment passes through several tracts platted soon after the start of rail service in the vicinity of Park Street, including the Alameda Station Homestead and the Jenks and Mead Homestead. The waterfront area was industrialized in the early 20th century, following the opening of the tidal canal; since the 1970s, the waterfront area has been incrementally redeveloped with commercial properties (Basin 2015).

The pipeline alignment along Broadway passes through varied settings. North of Tilden Way, there are remnants of 19th century residential development, including an intact row of Queen Anne houses between Clement Avenue and Blanding Avenue, and several small industrial properties. North of Blanding Avenue, the area has been redeveloped with a modern mall. South of Tilden Way, most 19th century houses on Broadway have been replaced with bungalow tracts and postwar apartment buildings, and nothing remains from the Gold Rush era. The current architectural character of the street south to Santa Clara Avenue is rooted in the early 20th century, notably with extensive rows of bungalows. The pipeline alignment along Clement Avenue, Eagle Avenue, Everett Street, and Lincoln Avenue presents a varied mix of old houses and newer industrial and commercial infill. Extant houses include rare Italianates dating back to the 1860s, along with other 19th and early 20th century styles and types. There are no designated local landmarks or NRHP-listed properties along the pipeline alignment, although the Park Street Historic Commercial District with a period of significance from 1875 to 1949 is immediately west of the pipeline termination on Lincoln Avenue. It is characterized by 64 contributing buildings, generally consisting of small retail establishments and a few monumental institutional buildings, including the Old Alameda Federal Post Office (1912), the Wells Fargo Bank (1888), the Old Masonic Temple (1891), and others (Basin 2015).

Pipeline Abandonments. The pipeline abandonments within the city of Alameda are in commercial and residential areas.

3.5.3.1 Prehistoric/Archaeological Resources

Records Search Results

No prehistoric/archaeological sites have been recorded or reported in or directly adjacent to any of the proposed pipeline alignments. However, five archaeological resource sites have been recorded within 0.25 mile of Crossing #1 and Crossing #3, as summarized in Table 3.5-1. Most resources are shell-based evidence of human settlement and habitation.

Table 3.5-1 Archaeological Sites within 0.25 Mile of the Proposed Project Pipeline Alignments from Records Search Results

Site Number	General Description of Resource	Project Component
P-01-000091	Nelson Mound. Badly destroyed site on Alameda Island.	Crossing #1
P-01-010692	A scatter of eroded shell in the city of Oakland.	Crossing #1
P-01-010693	A scatter of mussel and clam shell in the city of Oakland that could possibly be evidence of an archaeological site or a redeposited midden.	Crossing #1
P-01-010796	A Native American burial with associated mortar in the city of Oakland.	Crossing #1
P-01-000074 CA-ALA-54	Archaeological resource on Alameda Island.	Crossing #3

Archaeological Sensitivity Analysis

Prehistoric use of the Oakland area was heavily influenced by the presence of various seasonal creeks, sloughs, the San Francisco Bay marshlands, the Oakland Hills, and marshes near the shoreline and on higher elevations near the shoreline. The majority of the prehistoric shellmounds and associated sites in the East Bay are situated at the boundary between the salt marsh and alluvial plain ecozones. A regional area-specific predictive model to identify locations with a high potential for containing buried archaeological sites based on the presence of certain surface landforms and sediments, as well as the existing archaeological record, has not been developed for the proposed project area (Basin 2015). However, a review of the available archaeological data collected since the 1970s and the physical locations of the underwater pipeline crossings and proposed pipeline abandonment locations suggests a low to low-moderate sensitivity for prehistoric archaeological resources near the San Francisco Bay Margin/Oakland Estuary. The presence of five recorded or probable prehistoric resource sites within 0.25 mile of Crossings #1 and #3 suggests a potential low-moderate sensitivity, although Crossings #1 and #3 in the city of Oakland and the southern periphery of the Main Alameda Island and/or North Bay Farm Island portion of Crossing #2 are former marshy bay lands that have been filled for current development. In addition, the Tidal Canal is an engineered channel that was completed in 1920, turning the Alameda peninsula into an island, and therefore is heavily disturbed. The available information strongly suggests a low sensitivity for the discovery of significant subsurface historic resources within the proposed pipeline alignments and pipeline abandonment areas due to past disturbance and historic filling (Basin 2015).

3.5.3.2 Historic Resources

Records Search Results

The records search did not include a historic architectural field survey outside of the public ROWs because there are no changes proposed to structures outside of the ROW. It is expected that some of the homes and buildings adjacent to the proposed pipeline alignment and pipeline abandonment areas are listed in the California Register of Historic Places (CRHP) or are eligible for listing. Some portions of the pipeline alignments pass through historic districts and landmarks, as described in the next section.

Non-architectural historical resources were included in the records search. No resources were identified within the proposed pipeline alignments. One historic resource was identified within 0.25 mile. Site P-01-010733 includes 14 historic-era features comprised of small privy pits/trash scatters. The site is located in the city of Alameda; however, it is not adjacent to any of the proposed project's components.

Historic Districts and Landmarks

A portion of the proposed project is within the Rancho San Antonio, a California State Landmark (Hoover et al. 1966, CAL/OHP 1990), as previously described. As a State Historical Landmark, it is automatically on the CRHP (Basin 2015).

A small extension of a NRHP-listed historic district, the Oakland Waterfront Warehouse District, includes approximately one block of Crossing #1 in the city of Oakland and pipeline abandonment 1. Crossing #3 on Lincoln Avenue, in the city of Alameda, is adjacent to the northeast boundary of the Park Street Historic Commercial District. No other NRHP- or CRHR-listed, determined eligible, or pending properties have been identified within the proposed project pipeline alignments (Basin 2015).

3.5.4 Native American Resources and Consultation

3.5.4.1 Native American Resources

The NAHC was contacted for a search of the Sacred Lands Inventory. The NAHC record search "failed to indicate the presence of Native American cultural resources in the immediate project area." No prehistoric, combined prehistoric/historic or Native American ethnographic resources, settlements and/or use areas, including Native American trails, have been identified within or adjacent to the proposed project (Basin 2015).

3.5.4.2 Native American Consultation

Letters soliciting information were sent to the ten Native American individuals/groups registered by the NAHC, as listed in Table 3.5-2. Records of communication with Native Americans are included in Appendix G.

Table 3.5-2 Native American Individuals or Groups Contacted

Individual/Tribe	Location
Individual	Patterson
Individual	Linden
Individual	Seaside
Amah Mutsun Tribal Band of Mission San Juan Bautista	Woodside
Amah Mutsun Tribal Band of Mission San Juan Bautista	Woodside
Coastanoan Rumsen Carmel Tribe	Pomona
Indian Canyon Mutsun Band of Costanoan	Hollister
Muwekma Ohlone Indian Tribe of the San Francisco Bay Area	Milpitas
The Ohlone Indian Tribe	Mission San Jose
Trina Marine Ruano Family	Lathrop

Basin Research Associates contacted the Native American individuals/groups by telephone on October 9, 2015 (Basin 2015).

Detailed messages were left with Native American tribe representatives; no calls were returned prior to publication of this EIR. Recommendations received included that the construction crew receive cultural sensitivity training, the archaeologists should have experience with Northern and Central California archaeology, and qualified and trained Native American monitors should be used. Additional recommendations were that all excavation within the city of Alameda should be monitored during any ground disturbance and that a Native American monitor who can prove a genealogical relationship to the East Bay be used for monitoring (Basin 2015).

3.5.5 Paleontology

Paleontological resources are the fossilized remains of plants and animals, including vertebrates (animals with backbones), invertebrates (e.g., starfish, clams, ammonites, and marine coral), and fossils of microscopic plants and animals (microfossils). The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found. Fossil discoveries not only provide a historical record of past plant and animal life but can assist geologists in dating rock formations. Fossil discoveries can expand our understanding of the time periods and the geographic range of existing and extinct flora and fauna.

The proposed project area within the cities of Alameda and Oakland is underlain primarily by alluvial deposits, dune sand, and artificial fill from the historic, Holocene, and Pleistocene Periods. The underwater pipeline crossings are underlain by Bay Mud (Young Bay Mud and Old Bay Mud), as detailed in Section 3.7: Geology, Soils, and Seismicity.

Pleistocene-age (1.8 million to 10,000 years ago) alluvial fan and fluvial deposits have been known to yield fresh water mollusks and extinct late Pleistocene vertebrate fossils. Bay Mud is comprised of silty clay that is rich in organic materials and is known to be soft and compressible. Poorly engineered fill was placed over the Bay Mud in many locations. Dune sand is a loose, well-sorted, fine- to medium-grained sand. The historic (in the last 200 years) or Holocene-age (last 10,000 years) geologic units are unlikely to preserve the remains of organisms due to the lack of time and burial needed for the organisms to be fossilized. In addition, artificial fills are manmade, and have been mixed and reworked from native geologic materials; therefore, they are not fossil-yielding (City of Alameda 2014). There is a low to moderate potential to encounter paleontological resources in the proposed project area.

3.5.6 Applicable Regulations, Plans, and Standards

3.5.6.1 Federal Regulations

A federal agency is not approving, implementing, or funding the proposed project or any element of it; therefore, NHPA Section 106 would not apply to the proposed project. California PRC §5024.1 established the CRHR, which includes properties that are listed, or have been formally determined to be eligible for listing in the NRHP. Therefore, all properties listed or eligible for listing in the NRHP are included in the NRHP and CRHR analysis.

3.5.6.2 State Regulations

California Register of Historic Resources

PRC §5024.1 is a listing of those properties that are to be protected from substantial adverse change, and it includes properties that are listed, or have been formally determined to be eligible for listing in the NRHP, State Historical Landmarks, and eligible Points of Historical Interest.

Related Public Resources Code Sections

Public Resources Code §21084.1

PRC §21084.1 stipulates that any resource listed in, or eligible for listing in the CRHR, is presumed to be historically or culturally significant and is considered a historical resource. Resources listed in a local historic register or deemed significant in a historical resource survey (as provided under PRC §5024.1g), are presumed historically or culturally significant unless the preponderance of evidence demonstrates they are not. A resource that is not listed in, or determined to be eligible for listing in the PRC, not included in a local register or historic resources, or not deemed significant in a historical resource survey may nonetheless be historically significant (PRC §21084.1). The provision is intended to give the CEQA Lead Agency discretion to determine that a resource of historic significance exists where none had been identified before and to apply the requirements of PRC §21084.1 to properties that have not previously been formally recognized as historic.

CEQA equates a substantial adverse change in the significance of a historical resource with a significant effect on the environment (PRC §21084.1) and defines substantial adverse change as physical demolition, destruction, relocation, or alteration of the resource or its surroundings such that the significance of an historical resource would be materially impaired (PRC §5020.1, CEQA Guidelines Section 15064.5(b)(1)).

Public Resources Code §21083.2

Where a project may adversely affect a unique archaeological resource, PRC §21083.2 requires the CEQA Lead Agency to address the issue in the EIR prepared for the project. When an archaeological resource is listed in, or is eligible to be listed in the CRHR, PRC §21084.1 requires that any substantial adverse effect to that resource be considered a significant environmental effect. Either of these benchmarks may indicate that a project may have a potential adverse effect on archaeological resources.

Assembly Bill 52

Governor Brown signed Assembly Bill (AB) 52 (Chapter 532, Statutes of 2014) which went into effect July 1, 2015. AB 52 established a formal consultation process for California Native American tribes as part of CEQA. The law requires a lead agency to consult with a tribe that requests consultation and is traditionally and culturally affiliated with the geographic area in which the proposed project would be located. To be notified of such proposed projects, tribes must first request notification from the lead agency. When a tribe has requested notice, the lead agency is required to contact the tribe within 14 days of determining that a project in the geographic area traditionally and culturally affiliated with the tribe will be undertaken. Tribes that wish to be engaged in consultation must respond to the lead agency within 30 days. Consultation may include discussion of issues such as the appropriate level of environmental review for the proposed project, the significance of the proposed project's potential impacts to tribal cultural resources, and the availability of mitigation measures or project alternatives that could lessen effects of the project, if any, on tribal cultural resources.

California Health and Safety Code

Section 7050.5(b) of the California Health and Safety Code requires that in the event of discovery of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the county coroner has been notified. The coroner must investigate the remains, and if he or she determines that the remains are Native American, the coroner must call the NAHC within 24 hours. The Commission must then immediately notify those persons it believes to be most likely descended from the decedent.

California Native American Graves Protection and Repatriation Act

The California Native American Graves Protection and Repatriation Act of 2001 (CANAGPRA) state repatriation policy for Native American Remains (Health and Safety Code §8010 *et seq.*). The Act is designed to achieve the following:

- Ensures that a consistent state policy is followed with respect to handling of all California Indian human remains and cultural items, and that the state's repatriation policy is applied consistently with the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC §3001 *et seq.*);
- Facilitates implementation of the provisions of NAGPRA with respect to publicly funded agencies and museums in California and encourages voluntary disclosure and return of remains and cultural items by agencies and museums;
- Provides a mechanism whereby lineal descendants and culturally affiliated California Indian tribes that file repatriation claims for human remains and cultural items under NAGPRA or CANAGPRA, with California state agencies and museums, may request assistance from the commission in ensuring that state agencies and museums are responding to those claims in a timely manner and in facilitating the resolution of disputes regarding those claims; and
- Provides a mechanism whereby California tribes that are not federally recognized may file claims with agencies and museums for repatriation of human remains and cultural items.

Other California Laws and Regulations

Other state-level requirements for cultural resources management appear in PRC Chapter 1.7, §5097.5: "Archaeological, Paleontological, and Historical Sites," and Chapter 1.75 beginning at §5097.9: "Native American Historical, Cultural, and Sacred Sites" for lands owned by the state or a state agency.

3.5.6.3 Local Regulations

Overview

Pursuant to California Government Code §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 local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

City of Alameda General Plan

The City of Alameda General Plan (1990–2010) provides guidance and policies regarding historic and archaeological resources. Those pertaining to archaeological resources are provided below.

Guiding Policy: Historic and Archaeologic Resources

Policy 5.6.a	Protect historic sites and archaeologic resources for their aesthetic, scientific, educational, and cultural values.

Historic preservation programs, such as the measures proposed within the 1980 Historic Preservation Element, have been successful in preserving the small-town character of many California communities.

Implementing Policies: Historic and Archaeologic Resources

Policy 5.6.b	Working in conjunction with the California Archaeological Inventory, review proposed development projects to determine whether the site contains known prehistoric or historic cultural resources and/or to determine the potential for discovery of additional cultural resources.
Policy 5.6.c	Require that areas found to contain significant historic or prehistoric archaeological artifacts be examined by a qualified consulting archaeologist or historian for appropriate protection and preservation.

CEQA requires evaluation of any archaeological resource on the site of a development project. Unique resources, as defined by state law, should be protected, either by physical measures or by locating development away from the site. A preferred preservation method involves covering a site with earth fill for potential future, leisurely excavation; immediate excavation by qualified archaeologists should be undertaken only if such protection is infeasible.

City of Oakland General Plan

The City of Oakland General Plan (1998-2015) Historic Preservation Element adopted in 1994, provides goals for historic preservation. The City is a Certified Local Government with a local historic preservation office.

Goal 2 of the City of Oakland Historic Preservation Goals is applicable to archaeological resources along with Objective 4 Archeological Resources, Policy 4.1 Archeological Resources in the Oakland General Plan Historic Preservation Element, and Action 4.1.2.

Goal 2	To preserve, protect, enhance, perpetuate, use, and prevent the unnecessary destruction or impairment of properties or physical features of special character or special historic, cultural, educational, architectural or aesthetic interest or value.

Such properties or physical features include buildings, building components, structures, objects, districts, sites, natural features related to human presence, and activities taking place on or within such properties or physical features.

Objective 4 Archeological Resources
To develop databases identifying existing and potential archeological sites and adopt procedures for protecting significant archaeological resources.

Policy 4.1 Archeological Resources
To project significant archaeological resources, the City will take special measures for discretionary projects involving ground disturbances located in archeologically sensitive areas. These procedures will include:

(a) Mapping areas possessing high prehistoric or historic archeological potential.

(b) Archival studies for new development or other activities involving ground disturbance within areas of high archeological potential.

(c) Determination of whether the ground disturbance activity could damage archeological materials.

(d) Surface reconnaissance by archeologist.

(e) Subsequent actions. If the results of the surface reconnaissance were positive, several options would be available. One option would be to have an archeologist observe the project excavation with authority to stop work for the conduct of further investigations if archeological materials appear. Another option would be to perform limited archeological excavations prior to construction to determine more conclusively whether archeological materials are present.

Action 4.1.2 Archeological Protection Criteria and Procedures
Establish criteria and interdepartmental referral procedures for determining when discretionary City approval of ground-disturbing activities located in archeologically sensitive areas should be subject to special condition to safe ground potential archeological resources.

3.5.7 Proposed Project Impacts and Mitigation Measures

3.5.7.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project would be considered to have a significant impact on cultural resources if it would:

3. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;

4. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;
5. Disturb any human remains, including those interred outside of formal cemeteries;
6. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
7. Cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in PRC Section 21074.

3.5.7.2 Approach to Analysis

Basin Research Associates prepared a Cultural Resources Technical Report that contains information from documents and survey reports for the proposed project area. The information was used to identify and define potential impacts on cultural resources that may be affected by implementation of the proposed project. Impacts are based on an Area of Potential Effects (APE) that was established to identify where direct or indirect impacts may occur. The horizontal APE of the proposed project site consists of a minimum corridor width of 25 feet within the public ROW and construction easement widths of up to 40 feet depending on the locations of existing and proposed project-related utilities. The vertical APE would extend to a depth of 8 feet, the maximum depth at which open trench construction could occur and up to 100 feet under the water surface, the maximum depth at which HDD could occur. The APE also included construction staging and laydown areas.

3.5.7.3 Impacts and Mitigation Measures

Impact Summary

Table 3.5-3 provides a summary of the significance of the proposed project's impacts to cultural resources before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.5-3 Summary of Potential Impact to Cultural Resources

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact Cultural-1: Potential to cause a substantial adverse change in the significance of a historical resource (Criteria 1)	Potentially Significant	Less than Significant MM Cultural-1 MM Cultural-2 MM Noise-2
Impact Cultural-2: Potential to cause a substantial adverse change in the significance of an archaeological resource (Criteria 2)	Potentially Significant	Less than Significant MM Cultural-2
Impact Cultural-3: Potential to disturb human remains, including those interred outside of formal cemeteries (Criteria 3)	Potentially Significant	Less than Significant MM Cultural-3
Impact Cultural-4: Potential to directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature (Criteria 4)	Potentially Significant	Less than Significant MM Cultural-4

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact Cultural-5: Potential to cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resource Code Section 21074 (Criteria 5)	Potentially Significant	Less than Significant MM Cultural-2

Impact Cultural-1: Potential to cause a substantial adverse change in the significance of a historical resource (Criteria 1). (*Less than Significant with Mitigation)*

Pre-Construction Geotechnical Investigation

Pre-construction geotechnical investigation borings would occur at the HDD entry and insertion pits, along the underwater alignments for all three crossings, and in jack and bore pits. Geotechnical investigations would require the drilling of borings up to 2 inches in diameter and up to 125 feet deep. Many of the boring locations would be in the water or away from areas with historic uses. Historic resources are unlikely to be encountered within borings. There is a higher likelihood for encountering historical resources in the jack and bore locations as these are within neighborhoods with historic structures. Even if historic artifacts are encountered, these artifacts have a low potential to be impacted by such a small disturbance. The boring would not remove or displace enough material to impact a potential historic resource; therefore, the impact from pre-construction geotechnical investigation borings would be less than significant.

Construction

Impacts on cultural resources could result if ground-disturbing activities cause damage, destruction, or alteration of historic structures or buildings. Ground-disturbing activities include proposed project-related excavation, grading, open trench construction, vegetation clearing, operation of heavy equipment, and other surface and subsurface disturbance. Proposed project ground-disturbing activities would include:

- Open trench construction for the proposed pipelines
- Jack and bore drilling for Crossings #1, #2, and #3
- Excavation for the pipeline abandonments
- HDD for the underwater pipeline crossings

There are no CRHR-eligible historical resources identified within the proposed pipeline alignments or pipeline abandonment areas. The seven pipelines proposed for abandonment are not considered significant or unique resources in regard to design, components, installation methods, or purpose (Basin 2015). The pipelines and associated components proposed for abandonment are not considered historical resources. Crossing #3 in the city of Oakland would cross under an existing railroad ROW that has not been evaluated for its significance; however, the jack and bore method would be used to cross under the railroad and would entirely avoid impacts to the railroad and railroad ROW.

The proposed pipeline alignments (Crossings #1, #2, and #3) and pipeline abandonments are located within some historic districts and adjacent to known or potential historic buildings and structures. The proposed Crossing #1 pipeline alignment would be constructed adjacent to the

Oakland Waterfront Warehouse District. Crossing #3 within the city of Alameda terminates at the northeast corner of the NRHP-listed Park Street Commercial District on Lincoln Avenue. Crossings #1 and #3 are within the Rancho San Antonio California State Landmark. The proposed pipeline alignments cross through several residential and commercial areas within the cities of Oakland and Alameda that may include individually significant potential historic resources and/or contributing and non-contributing buildings and structures that could comprise a potential historic district. The proposed pipelines would be installed entirely underground within disturbed areas, and would not require any construction that could directly impact buildings or structures adjacent to the alignment. The construction, consequently, would not have any direct impacts on the Rancho San Antonio California State Landmark, Historic District, or other known or potentially historic structures and buildings. The proposed project would not affect the historic values for which the Landmark is listed: exploration and settlement and representing the Hispanic Era (Basin 2015). Areas that are subject to open trench construction or drilled during construction would be resurfaced and returned to pre-construction conditions wherever possible. The direct construction impact to known historical resources would be less than significant.

Indirect impacts to historic buildings and structures from vibration caused by construction of the proposed project are not anticipated. Were construction-generated vibration to cause structural damage or significant cosmetic damage to the exterior of potentially historic buildings, such as cracking of exterior plaster, cracking of masonry foundations, or cracking of windows, then the historical significance of a building could be altered, which would be a potentially significant impact. The vibration level that could cause such damage is estimated to be 0.4 inches per second (in/sec) peak particle velocity (PPV) or greater for continuous sources and 0.5 in/sec PPV for single-source vibrations, based on several references (e.g., Hendricks 2002, British Standards Institute 1993, Sedovic 1984, Whifflin and Leonard 1971). All vibration levels would be kept below 0.4 in/sec PPV for continuous sources and would be kept below 0.5 in/sec PPV for single-source vibrations with implementation of Mitigation Measure Noise-2. The impact to historic structures would be less than significant after mitigation. See Section 3.11: Noise for the discussion of vibration levels and significance criteria.

Although there is no potential impact to known historic resources, there is a potential to encounter previously undiscovered buried historical resources (such as trash deposits or other buried historical features) during construction activities. Damage to a previously undiscovered historical resource during ground-disturbing activities could result in a potentially significant impact to the resource were it eligible for listing in the CRHR. Mitigation Measure Cultural-1 would require that EBMUD hire a professional archaeologist who would conduct cultural resources sensitivity training. Mitigation Measure Cultural-2 would require (1) stopping work in the event of a cultural resource discovery, and (2) reviewing and evaluating the resource by a professional archaeologist. Work would not resume until the resource is evaluated and either protected or the data from the resource is recovered in accordance with the Secretary of the Interior's standards. The impact to previously undiscovered buried historical resources from construction of the proposed project would be less than significant after implementation of Mitigation Measures Cultural-1 and Cultural-2.

Mitigation Measures: Cultural-1, Cultural-2, Noise-2 (see Section 3.11: Noise)

Mitigation Measure Cultural-1. Cultural Resources Sensitivity Training.

A professional archaeologist shall provide sensitivity training to supervisory staff, prior to initiation of site preparation and/or construction, to alert construction workers to the possibility of exposing significant historic and/or prehistoric archaeological resources within the proposed project area. The training shall include any prehistoric or historic objects that could be exposed, the need to stop excavation at the discovery and within 100 feet of the discovery, and the procedures to follow regarding discovery protection and notification. An "Alert Sheet" shall be posted in staging areas, such as in construction trailers, to alert personnel to the procedures and protocols to follow for the discovery of a potentially significant historic and/or prehistoric archaeological resources.[2]

Mitigation Measure Cultural-2. Cultural Resources Inadvertent Discoveries.

In the event that a historical or cultural resource is identified during pre-construction geotechnical investigation borings or during excavation for construction, all work within 100 feet of the resource shall be halted until a professional archaeologist, retained by EBMUD, can review, identify, and evaluate the resource for its significance. Should the archaeologist determine that a cultural resource has the potential to be a tribal cultural resource, then a Native American monitor shall be retained by EBMUD to monitor work in the area where the tribal cultural resource was discovered.

If the historical resource can be preserved in place and no further impacts would occur, the resource shall be documented on California State Department of Parks and Recreation cultural resource record forms and no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, the professional archaeologist shall evaluate the resource and determine whether it is: (1) eligible for the

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[2] Significant prehistoric cultural resources may include:

a. Human bone, either isolated or intact burials.
b. Habitation, occupation or ceremonial structures as interpreted from rock rings/features, distinct ground depressions, differences in compaction (e.g., house floors).
c. Artifacts including chipped stone objects such as projectile points and bifaces; groundstone artifacts such as manos, metates, mortars, pestles, grinding stones, pitted hammerstones; and, shell and bone artifacts including ornaments and beads.
d. Various features and samples including hearths (fire-cracked rock; baked and vitrified clay), artifact caches, faunal and shellfish remains (which permit dietary reconstruction), distinctive changes in soil stratigraphy indicative of prehistoric activities.
e. Isolated prehistoric artifacts (Basin 2015).

CRHR (and thus a historical resource for purposes of CEQA), and/or (2) a unique archaeological resource as defined by CEQA.

If the resource is determined to be neither a unique archaeological nor an historical resource, work may commence in the area. If the resource meets the criteria for either an historical or unique archaeological resource, or both, work shall remain halted, and the professional archaeologist shall consult with EBMUD regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA Guidelines Section 15064.5(b). Methods to be considered shall include preservation in place or evaluation, collection, recordation, and analysis of any significant cultural materials in accordance with a Cultural Resources Work Plan (known as data recovery) prepared by the professional archaeologist. The methods and results of evaluation or data recovery work at an archaeological find shall be documented in a professional level technical report to be filed with CHRIS. Work may commence upon completion of treatment, as approved by EBMUD.

A *Monitoring Closure Report* shall be filed by EBMUD at the conclusion of ground-disturbing construction if archaeological and Native American monitoring of excavation was undertaken.

Significance after Mitigation: Less than Significant.

Impact Cultural-2: Potential to cause a substantial adverse change in the significance of an archaeological resource (Criteria 2). (*Less than Significant with Mitigation)*

No known CRHR-eligible archaeological resources are located within the proposed pipeline alignments or pipeline abandonment areas. Although there is no potential to impact known archaeological resources, there is a potential to encounter previously undiscovered archaeological resources during construction activities. The geotechnical borings would disturb a very small area (geotechnical borings are 2-inches wide). Due to the small area that would be impacted, the potential to cause a substantial adverse change in the significance of a previously undiscovered archeological resource from pre-construction geotechnical investigation would be low and the impact would be less than significant. The construction activities could, however, result in the inadvertent exposure of buried prehistoric archaeological materials that could be eligible for inclusion on the CRHR and/or meet the definition of a unique archeological resource as defined in PRC §21083.2, resulting in a potentially significant impact. Mitigation Measure Cultural-2 requires the review, identification, evaluation and treatment of any significant archaeological find by a professional archaeologist at the time of discovery. The impact to previously undiscovered archaeological resources from the pre-construction geotechnical investigation and construction of the proposed project would be less than significant after implementation of Mitigation Measure Cultural-2.

Mitigation Measure: Cultural-2

Significance after Mitigation: Less than Significant.

Impact Cultural-3: Potential to disturb human remains, including those interred outside of formal cemeteries (Criteria 3). (*Less than Significant with Mitigation)*

Previously undiscovered Native American human remains would not be significantly impacted by pre-construction geotechnical investigations. The geotechnical borings would disturb a very small area (geotechnical borings are 2-inches wide). Due to the small area that would be impacted, the potential to disturb human remains from pre-construction geotechnical investigation would be low and the impact would be less than significant. Previously undiscovered Native American human remains could, however, be exposed during ground-disturbing construction activities such as open trench construction and drilling. Construction would occur within existing disturbed areas such as roadways and paved parking lots as well as landscaped city parks. The entire proposed project area is highly disturbed. There is a low potential to uncover previously undisturbed human remains; however, it is possible. A Native American burial was listed in the records search within 0.25 mile of the proposed pipeline alignment and pipeline abandonments. Mitigation Measure Cultural-3 requires that the treatment of human remains and/or associated or unassociated funerary objects during any soil-disturbing activity must comply with applicable state law. The construction impact to previously undiscovered human remains would be reduced to less than significant after implementation of Mitigation Measure Cultural-3.

Mitigation Measure: Cultural-3

Mitigation Measure Cultural-3. Human Remains Inadvertent Discoveries.

a. The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity within the proposed project area shall comply with applicable state laws. Treatment shall include halting all work within 100 feet of the discovery and immediate notification of the Alameda County Medical Examiner and the City of Alameda and/or the City of Oakland and EBMUD.

b. In the event of the coroner's determination that the human remains are Native American, notification of the Native American Heritage Commission is required, who shall appoint a Most Likely Descendant (MLD) (PRC §5097.98).

c. EBMUD, the professional archeologist, the landowner and MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5[d]). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. If the MLD and the other parties do not agree on the disposition of the remains, the reburial method will follow PRC §5097.98(b) which states that:

> . . . the landowner or his or her authorized representative shall reinter the human remains and items associated with Native

American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance.

Significance after Mitigation: Less than Significant.

Impact Cultural-4: Potential to directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature (Criteria 4). (*Less than Significant with Mitigation)*

Pre-construction geotechnical investigation borings would occur at the HDD entry and insertion pits, along the underwater alignments for all three crossings, and in jack and bore pits. Geotechnical investigations would require the drilling of borings up to 2 inches in diameter and up to 125 feet deep. There are no unique geologic features in the vicinity of the boring locations. The boring depths would access layers of alluvial deposits that have the low to moderate potential to contain fossils as described previously. Due to the small area that would be impacted, the potential to directly or indirectly destroy a unique paleontological resource, site, or unique geologic feature from pre-construction geotechnical investigation would be low and the impact would be less than significant.

As indicated above, portions of the proposed pipeline alignments are underlain by alluvial deposits that have a potential to contain fossils such as fresh water mollusks and extinct late Pleistocene vertebrate fossils. There are no unique geologic features within the proposed pipeline alignments. Construction of the proposed project would require ground-disturbing work during open trench construction and drilling within existing roadways. The area is highly disturbed due to construction of the existing roadways, urban development, and filling. There is a low to moderate potential to uncover previously undiscovered paleontological resources during ground-disturbing work along portions of the pipeline alignments due to the geologic units underlying the area, as described in detail under Section 3.5.5 above. Construction activities could potentially unearth a unique paleontological resource. There would be a potentially significant impact should the unique resource be damaged or destroyed during construction. Mitigation Measure Cultural-4 would reduce the potential construction impacts to unique paleontological resources by requiring evaluation by a qualified paleontologist of any paleontological resources uncovered during construction. Impacts to unique paleontological resources would be less than significant after implementation of Mitigation Measure Cultural-4.

Mitigation Measures: Cultural-4

Mitigation Measure Cultural-4. Paleontological Resources.

a. A professional paleontologist shall provide sensitivity training to supervisory staff to alert construction workers to the possibility of exposing significant paleontological resources within the proposed project area. The training shall be conducted as defined by the Society of Vertebrate Paleontology's Conformable Impact Mitigation Guidelines Committee (1995), to recognize fossil materials in the event that any are uncovered during construction.

b. An "Alert Sheet" shall be posted in staging areas, such as in construction trailers, to alert personnel to the procedures and protocols to follow for the discovery of unique paleontological resources.
c. In the event that a paleontological resource is uncovered during project construction, all ground-disturbing work within 100 feet shall be halted. A qualified paleontologist shall inspect the discovery and determine whether further investigation is required.
d. If the discovery can be avoided and no further impacts will occur, no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, a qualified paleontologist shall evaluate the resource and determine whether it is "unique" under CEQA, Appendix G, part V.
e. If the resource is determined not to be unique, work may commence in the area. If the resource is determined to be a unique paleontological resource, work shall remain halted, and the paleontologist shall consult with EBMUD staff regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA.
f. Other methods may be used but must ensure that the fossils are recovered, prepared, identified, catalogued, and analyzed according to current professional standards under the direction of a qualified paleontologist. All recovered fossils shall be curated at an accredited and permanent scientific institution according to Society of Vertebrate Paleontology standard guidelines. Work may commence upon completion of treatment.

Significance after Mitigation: Less than Significant.

Impact Cultural-5: Potential to cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resource Code Section 21074 (Criteria 5) (*Less than Significant with Mitigation*)

The proposed project would not impact any known archaeological resources that are eligible for listing in the NRHP or the CRHP. Construction would occur entirely within disturbed areas in the cities of Oakland and Alameda, either in road ROWs or on private property in a parking lot. Although not required, and as previously stated, ten tribes were contacted during preparation of the Draft EIR. The main concern of the tribes was to use qualified and trained Native American monitors during construction. No additional information was provided that would indicate that tribal cultural resources are located within and could be impacted by the proposed project; however, there is the potential for unknown tribal cultural resources to be uncovered during construction. Therefore, the impact would be potentially significant. Mitigation Measure Cultural-2 requires a professional archaeologist to determine whether an artifact is a tribal cultural resource and if so, a Native American monitor would monitor construction in the location where the tribal cultural resource was found. The impact on tribal cultural resources would be reduced to less than significant after implementation of Mitigation Measure Cultural-2. As indicated in Impact Cultural-1 and Cultural-2, impacts to cultural resources from pre-construction geotechnical investigation would be less than significant due to the small area that would be impacted by the geotechnical borings.

Mitigation Measure: Cultural-2

Significance after Mitigation: Less than Significant.

3.5.8 References

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3.6 ENERGY USE

This section presents the environmental setting and impact analysis for energy resources that could be affected by the proposed project. Background information applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here.

3.6.1 Data Collection

The amount of electricity, natural gas, and petroleum used and generated in California and imported from outside of the state was determined by reviewing information prepared by the California Energy Commission (CEC), which is the state's primary energy policy and planning agency (CEC 2008, CEC 2013, CEC 2015, CEC 2016).

3.6.2 Environmental Setting

3.6.2.1 Electricity

The production of electricity requires the consumption or conversion of energy resources, including water, wind, oil, gas, coal, solar, geothermal, and nuclear. Table 3.6-1 summarizes the sources for the electricity used in California in 2014. Most of the energy consumed in California in 2014 (64.5 percent) was generated from nonrenewable sources (coal, large hydroelectric, natural gas, and nuclear). Approximately 20.1 percent of the energy consumed in California in 2014 was generated from renewable resources, including biomass, geothermal, small hydroelectric, solar, and wind (CEC 2015).

Of the electricity consumed in California in 2014, 67 percent was generated in California. The other 33 percent of the electricity was imported from the northwest (12.6 percent) and the southwest (20.4 percent) (CEC 2015).

Pacific Gas & Electric (PG&E) is the local electricity and natural gas supplier in the cities of Oakland and Alameda. PG&E serves approximately 16 million people in a 70,000-square-mile service area in Northern California, including residential, commercial, and industrial users (PG&E 2016a). PG&E produces electricity from PG&E-owned generators, purchases electricity from independent generators in California and out-of-state generators, and distributes electricity to its customers. The electricity comes from a combination of renewable and nonrenewable resources, with power derived from fossil fuels, nuclear sources, and hydroelectric sources (PG&E 2016b).

EBMUD's hydropower, solar, and biogas generation facilities power many of EBMUD's operations. In an average year, EBMUD produces more renewable energy from hydropower than it consumes, making it a net energy generator (EBMUD 2012). When sufficient water flows are available, EBMUD sells hydropower to electric power providers. EBMUD's wastewater treatment plant is also a net producer of renewable energy, selling energy back to the electric grid (EBMUD 2012).

Table 3.6-1 California Total Electricity System Power in 2014

Fuel Type	California Power Mix (Gigawatt/ hour)[1]	Percent California Power Mix (Gigawatt/ hour)
Nonrenewable Sources of Electricity		
Coal	18,888	6.4
Large Hydro	16,350	5.5
Natural Gas	132,087	44.5
Nuclear	25,220	8.5
Oil	46	0.0
Other	16	0.0
Subtotal	*192,607*	*64.5*
Renewable Sources of Electricity		
Biomass	7,507	2.5
Geothermal	13,030	4.4
Small Hydro	2,787	0.9
Solar	12,566	4.2
Wind	23,913	8.1
Subtotal	*59,803*	*20.1*
Unspecified Sources of Power		
Unspecified Sources of Power	44,433	15.0
Grand Total		
All Fuel Types	**296,843**	**100.0**[2]

Notes:

1 The total California Power Mix includes both energy generated in-state and imported electricity.

2 Note that the percentages do not add up exactly to 100% due to rounding.

Source: CEC 2015

3.6.2.2 Natural Gas

Table 3.6-2 shows the total amount of natural gas used in California in 2014. Most of the natural gas used in California is imported from outside of the state (southwest, Rocky Mountains, and Canada) with a small amount (12 percent) produced within the state. Natural gas is used in the residential, commercial, and industrial sectors to generate electricity or for heating and cooling buildings and heating or cooling water. Most of the natural gas in California is used to generate electric power and for commercial and residential users. Only a small amount of natural gas is used for industrial purposes and natural gas vehicles. Table 3.6-3 summarizes the amount of natural gas consumed for different uses.

Table 3.6-2 California Natural Gas Supply in 2014

Region of Production	California Natural Gas Supply (Million cubic feet/ day)	Percentage of California Natural Gas Supply
California	791	12
Canada	1,173	18
Southwest	2,217	34
Rocky Mountains	2,324	36
Total	**6,505**	**100**

Source: California Gas and Electric Utilities 2015

Table 3.6-3 Natural Gas Consumption in California by End Use

End Use	Natural Gas Consumption in 2014 (Billion cubic feet/ year)	Percentage of Natural Gas Consumption in 2014
Residential	397	17.5
Commercial	238	10.5
Industrial	789	34.8
Natural Gas Vehicle	17	0.7
Electric Power	824	36.4
Total Natural Gas Demand	**2,265**	**100**

Source: EIA 2016b

3.6.2.3 Petroleum

The petroleum used in California originates both within and outside of the state. Table 3.6-4 summarizes the sources for crude oil received in California in 2014. Most of the crude oil that California receives originates from foreign sources; however, California does produce a substantial amount of the crude oil consumed within the state. California's oil fields represent the 4th-largest petroleum producing area in the US, behind federal off-shore production, Texas, and Alaska. The crude oil consumed by California is transported to refineries through a network of oil pipelines and oil tankers that transport oil overseas. Crude oil is refined in California at one of the 21 refineries located in the San Francisco Bay Area, the Los Angeles area, and the Central Valley (CEC 2008).

Most petroleum, or crude oil, produced in California is used in on-road motor vehicles and is refined within California to meet state-specific formulations required by CARB. The major categories of petroleum fuels are gasoline and diesel for passenger vehicles, transit, rail vehicles, and construction equipment; and fuel oil for industry and electrical power generation. Other liquid petroleum fuels include kerosene, jet fuel, and residual fuel oil for marine vessels.

Table 3.6-4 Crude Oil Received in California in 2014

Source of Crude Oil	Volume (Barrels)	Percentage
California	240,108,000	38
Alaska	67,359,000	11
Foreign sources	328,222,000	52
Total	**635,688,000**	**100[1]**

[1] Note that the percentages do not add up exactly to 100 percent due to rounding.

Source: CEC 2016

3.6.2.4 EBMUD Actions

EBMUD's 2014 Climate Change and Monitoring Response Plan describe the various actions that EBMUD has conducted to address climate change, including the following actions to generate and use renewable energy (EBMUD 2014a):

- Production of renewable energy from several sources including hydropower, photovoltaic, and biogas cogeneration at EBMUD's main wastewater treatment plant
- Installation of 776 kilowatts of new photovoltaic cells at five EBMUD facilities
- Maintenance of a 57 vehicle hybrid-electric sedan fleet
- Maintenance of two plug-in electric hybrid vehicles

3.6.3 Applicable Regulations, Plans, and Standards

3.6.3.1 Federal Regulations

Energy Policy and Conservation Act

The Energy Policy Act of 1975 was established in response to the oil crisis of 1973, which increased oil prices due to a shortage of reserves. The Energy Policy Act requires that all vehicles sold in the US meet certain fuel economy goals. The Energy Policy Act of 1975 established the corporate average fuel economy (CAFE) standard with the purpose of reducing energy consumption by increasing the dual economy of cars and light trucks. CAFE requires cars and light trucks to have a minimum fuel economy (i.e., miles per gallon). CAFE standards have steadily increased year after year (NHTSA 2016). Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not subject to CAFE standards. The Energy Policy Act indirectly applies to the proposed project due to its effects on vehicle fuel efficiencies for the vehicles to be used during construction.

3.6.3.2 State Regulations

Senate Bill 350

Governor Jerry Brown signed Senate Bill 350 into law in October 2015. Senate Bill 350 establishes a requirement for California to reduce the use of petroleum in cars by 50 percent by the year 2030, to generate half of its electricity from renewable resources by the year 2030, and to increase energy efficiency by 50 percent at new and existing buildings by the year 2030.

State of California Energy Action Plan

The California Public Utilities Commission (CPUC) and CEC adopted the Energy Action Plan I in 2003 and the Energy Action Plan II in 2005 and published a status update for the 2005 plan in 2008 (CPUC and CEC 2003, 2005, 2008). The agencies' goals in adopting the Energy Action Plans are to "ensure that adequate, reliable, and reasonably-priced electrical power and natural gas supplies, including prudent reserves, are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers." The plans identify that the agencies' goals will be achieved in part by (1) optimizing energy conservation and resource efficiency, (2) building new generation, (3) upgrading and expanding the electricity transmission and distribution infrastructure and reducing the time to bring facilities on-line, and (4) promoting customer- and utility-owned distributed generation. The plan also establishes a "loading order", prioritizing preferred resources for managing both supply and demand.

The top four action areas called out in the Energy Action Plan include (1) energy efficiency, (2) demand response, (3) renewable energy sources, and (4) electricity adequacy, reliability, and infrastructure. Other major action areas identified in the 2008 Energy Action Plan Update include: electricity market structure; natural gas supply, demand and infrastructure; transportation fuels supply, demand and infrastructure; research, development, and demonstration; and climate change. Energy efficiency includes programs that require buildings and appliances to be constructed in a manner that uses less energy, that provide incentives for purchasing energy efficient equipment, and that provide information and education to encourage people to save energy. Demand response is a rate-based strategy that varies electricity prices throughout the day to encourage lower consumption during peak hours of use, when demand is high and reserves are low. Renewable energy sources include electricity generation using wind, solar, small hydroelectric, geothermal, and biomass technologies. Distributed generation is electricity that is produced by the customer or utility very near the point of use, reducing the demand on the transmission and distribution system. Distributed generation may include fuel cells, rooftop solar systems, or cogeneration systems that simultaneously produce both electricity and heat or steam for on-site use. However, investments in conventional power plants and transmission and distribution infrastructure will still be needed.

By prioritizing load management strategies, the Energy Action Plan seeks to implement the lowest-cost and lowest-impact measures first, followed by less cost-effective and less environmentally beneficial or neutral measures, in order to reduce and meet growing energy demand in the state. Of the four action areas, all but new renewable energy generation would also reduce the demand for transmission and distribution system capacity.

State of California Integrated Energy Policy Report

Senate Bill 1389 was passed into law in 2002 and requires the CEC to prepare, adopt, and transmit an Integrated Energy Policy Report every two years. The Integrated Energy Policy Report "assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety" (CEC 2013).

The 2013 Integrated Energy Policy Report addresses the following energy issues: "future demand for electricity, natural gas, and transportation fuels; energy efficiency in California's existing buildings; publicly owned utilities' progress toward achieving 10-year energy efficiency targets; the definition of zero-net-energy and its inclusion in state building standards; challenges to increased use of geothermal heat pump/ground loop technologies and procurement of biomethane; using demand response to meet California's energy needs and integrate renewable technologies; bioenergy development; California's electricity infrastructure needs given potential retirement of power plants and the closure of the San Onofre Nuclear Generating Station; new generation costs for utility-scale renewable and fossil-fueled generation; the need for investments in new or upgraded transmission infrastructure; utility progress in implementing past recommendations related to nuclear power plants; natural gas market trends; the Alternative and Renewable Fuel and Vehicle Technology Program; potential vulnerability of California's energy supply and demand infrastructure to the effects of climate change; and potential electricity system needs in 2030" (CEC 2013).

3.6.3.3 Local Regulations

EBMUD Sustainability Policy
EBMUD adopted a sustainability policy in 2008 that focuses on using resources (economic, environmental, and human) in a responsible manner that meets the needs of today without compromising the ability of future generations to meet the needs of tomorrow. The sustainability policy uses a holistic view and minimizes waste; conserves energy and natural resources; promotes long-term economic viability; supports safety and well-being for employees, communities, and customers; and is beneficial to society (EBMUD 2015).

EBMUD Strategic Plan
EBMUD's Strategic Plan outlines the goals, strategies, objectives, and key performance indicators that are used by EBMUD to carry out the mission of managing natural resources, providing reliable, high quality water and wastewater services at fair and reasonable rates for the people of the East Bay, and by preserving and protecting the environment for future generations. The long term water supply goal in the Strategic Plan includes a strategy to address climate change. Strategy 4 of the long term water supply goal notes that EBMUD shall:

> Maintain an updated Climate Change Monitoring and Response Plan to inform [EBMUD's] planning efforts for future water supply, water quality and infrastructure and support sound water and wastewater infrastructure investment decisions (EBMUD 2014b).

EBMUD Climate Change Monitoring and Response Plan
The purpose of the Climate Change Monitoring and Response Plan is to help EBMUD understand the potential climate change threats, prepare adaptation strategies, and guide mitigation of GHG emissions, which contribute to climate change (EBMUD 2014a). The Climate

Change Monitoring and Response Plan established objectives for EBMUD, including encouraging and promoting cost-effective use and generation of renewable energy within their water and wastewater operations.

3.6.4 Proposed Project Impacts and Mitigation Measures

3.6.4.1 Significance Criteria

Appendix F of the CEQA Guidelines provides guidance for assessing energy impacts of projects. The appendix provides three goals:

1. Decreasing overall per capita energy consumption
2. Decreasing reliance on natural gas and oil
3. Increasing reliance on renewable energy sources

Consistent with Appendix F, environmental impacts analyzed that are associated with energy use include:

1. The proposed project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the proposed project;
2. The effects of the proposed project on local and regional energy supplies and on requirements for additional capacity;
3. The effects of the proposed project on peak and base period demands for electricity and other forms of energy;
4. The degree to which the proposed project complies with existing energy standards;
5. The effects of the proposed project on energy resources; and
6. The proposed project's transportation energy use requirements and its overall use of efficient transportation alternatives.

3.6.4.2 Approach to Analysis

A qualitative assessment of the energy used for construction of the proposed project was performed based on duration and type of construction activities.

3.6.4.3 Impacts and Mitigation Measures

Table 3.6-5 Summary of Potential Impact to Energy Resources

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact Energy Use-1: Potential to result in a significant consumption of energy (Criteria 1 and 5)	Less than Significant	---
Impact Energy Use-2: Potential to result in a significant impact on local and regional energy supplies or on requirements for additional capacity (Criteria 2 and 5)	Less than Significant	---

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact Energy Use-3: Potential to result in a significant impact on peak and base period demands for electricity and other forms of energy (Criteria 3)	Less than Significant	---
Impact Energy Use-4: Potential to conflict with existing energy standards (Criteria 4)	Less than Significant	---
Impact Energy Use-5: Potential to result in a significant impact related to transportation energy use or use of efficient transportation alternatives (Criteria 6)	Less than Significant	---

Impact Energy Use-1: Potential to result in a significant consumption of energy (Criteria 1 and 5). (*Less than Significant)*

The machinery and vehicles that would be used for geotechnical investigation, open trench construction, jack and bore, HDD, and pipeline abandonments would require the use of energy, including gas, diesel, and motor oil. Energy used for the construction of the proposed project would account for the greatest use of energy for the proposed project; however, the energy used during construction would be temporary and would cease after construction is completed. Proposed project construction would last 13 to 22 months for Crossing #1, 9 to 18 months for Crossing #2, and 9 to 19 months for Crossing #3. In addition to direct construction-related energy consumption, indirect energy use would be required to make the materials and components used in construction. Indirect energy use includes energy used for extraction of raw materials, manufacturing, and transportation associated with manufacturing.

Fuel use would be consistent with typical construction and manufacturing practices and would not require excessive or wasteful use of energy. Construction activities would not reduce or interrupt existing fuel or electricity delivery systems due to insufficient supply. Some construction activities would minimize the amount of energy used. For example, EBMUD proposes to use excavated material as backfill where feasible, thereby minimizing fuel consumption associated with construction haul trucks and solid waste disposal. Because construction and manufacturing practices would not require an excessive or wasteful use of energy, energy consumption from construction activities would be less than significant.

While less than significant even without mitigation, Mitigation Measure Air Quality-1 in Section 3.3 would further reduce the impact by ensuring that energy is not wastefully used. Mitigation Measure Air Quality-1 requires EBMUD to implement BMPs during construction, including practices to prevent the wasteful use of energy, such as minimizing idling time and requiring that vehicles be maintained and properly tuned.

Mitigation Measure: None Required.

Impact Energy Use-2: Potential to result in a significant impact on local and regional energy supplies or on requirements for additional capacity (Criteria 2 and 5). (*Less than Significant)*

Fuel consumption associated with the use of construction vehicles and equipment would account for the greatest use of energy on-site during construction. The energy used during construction would be temporary and would cease after construction has been completed. The energy used during construction of the proposed project would not represent a substantial portion of the available local and regional energy supplies. Due to the temporary nature of the energy use and due to the proposed project's unsubstantial use of the local and regional energy supplies, impacts would be less than significant.

Mitigation Measure: None Required.

Impact Energy Use-3: Potential to result in a significant impact on peak and base period demands for electricity and other forms of energy (Criteria 3). (*Less than Significant)*

Impacts to electricity demands would occur if significant amounts of electricity were required for construction or operation of the proposed project such that PG&E would be required to increase their available supply or production capacity. Construction of the proposed project would mostly occur from 7 a.m. to 7 p.m. with some work required at night and on the weekend. The proposed project would use energy during construction but usage would not be substantial due to the size of the proposed project. Impacts would be less than significant.

Mitigation Measure: None Required.

Impact Energy Use-4: Potential to conflict with existing energy standards (Criteria 4). (*Less than Significant)*

The proposed project would comply with the federal standards for vehicle fuel efficiency because all vehicles and machinery that are sold within the US are required to meet those standards. If the proposed project were to use energy resources in a wasteful manner, it would conflict with state energy standards.

Proposed project construction would be short-term and would not result in the permanent increased use of non-renewable energy resources. The energy used during construction would be necessary for implementation of the proposed project. Due to the temporary nature of the proposed project and due to the fact that construction of the proposed project would only use the amount of energy required for construction, construction would not conflict with energy standards. Impacts would be less than significant.

While less than significant even without mitigation, Mitigation Measure Air Quality-1 in Section 3.3 would further ensure that EBMUD does not use fuel in a wasteful manner by requiring EBMUD to implement BMPs during construction, including practices to prevent the wasteful use of energy, such as minimizing idling time and requiring that vehicles be maintained and properly tuned.

Mitigation Measure: None Required.

Impact Energy Use-5: Potential to result in a significant impact related to transportation energy use or use of efficient transportation alternatives (Criteria 6). (*Less than Significant)*

Construction of the proposed project would require the use of vehicles and machinery, including a vessel or barge, to move workers and materials to and from the proposed project area. As discussed in Impact Energy Use-1 the energy used for transportation during construction would be minimal, would cease after construction, and would therefore be less than significant.

The less than significant impact from energy use by construction vehicles and machinery would be further reduced by implementation of Mitigation Measure Air Quality-1 in Section 3.3, which requires EBMUD to implement BMPs for construction, including practices to prevent the wasteful use of energy such as minimizing idling time and requiring that vehicles be maintained and properly tuned.

The proposed project would require the closure of some roadways and would therefore increase the amount of local area traffic. The detours that would be required during the closure of roadways would result in increased idling and therefore increased energy consumption. The impact from increased idling times would be less than significant because increased idling times would only occur during short-term closure of roadways (48 hours to 2 weeks) and would cease after construction has been completed for the proposed project. EBMUD would implement traffic control measures to improve traffic, thereby minimizing idling time and therefore, also minimizing energy use (see Impact Traffic-1 in Section 3.13).

The proposed project would result in impacts to bus stops and routes along Crossing #1 (AC transit bus lines 31 and 88), Crossing #2 (AC transit bus lines 21, OX, 631, 687), and Crossing #3 (AC transit bus lines O, W, and 51A) (see Impact Traffic-1 in Section 3.13). Buses transport many people and offer an alternative to using a personal vehicle, thereby reducing the amount of fuel used for personal vehicles. The proposed project would affect the travel time of bus routes that use roadways that would be affected by construction activities. The travel time of bus routes would be affected throughout the duration of construction (see Impact Traffic-1 in Section 3.13: Transportation and Traffic). The impacts to bus stops, the travel time of buses, and associated with restricted routes are short-term and would be less than significant. While less than significant even without mitigation, EBMUD would implement Mitigation Measure Traffic-5 to minimize the impacts to the two bus routes (see Impact Traffic-1 in Section 3.13).

Mitigation Measure: None Required.

3.6.5 References

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3.7 GEOLOGY, SOILS, AND SEISMICITY

This section presents the environmental setting and impact analysis for geological resources that could be affected by the proposed project. Background information, known resources, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here. Appendix H includes a copy of the Geotechnical Assessment for the proposed project.

3.7.1 Data Collection

This geology, soils, and seismicity analysis addresses the potential for the proposed project to result in impacts related to fault rupture, ground shaking, seismic-related ground failure, landslides, soil erosion and loss of topsoil, unstable geologic units or soils, and expansive, collapsible, or corrosive soils. Geologic conditions were evaluated by reviewing the following data sources:

- California Geologic Society (CGS) geology maps (CGS 2010)
- California Division of Mines and Geology (CDMG) geology maps (CDMG 1991)
- US Geological Survey (USGS) geology maps and information regarding seismic hazards and geology of San Francisco Bay Area (USGS 1996, USGS 2000, USGS 2002, USGS 2004, USGS 2007, USGS 2008a, USGS 2008b, USGS 2010, USGS 2014a, USGS 2014b, USGS 2014c)
- National Resources Conservation Service (NRCS) soils maps (NRCS 2014)
- City General Plans (City of Alameda 1991, City of Oakland 1998)
- Reports provided by EBMUD (EBMUD 2014, EBMUD 2016)
- USGS topographic maps and geology maps (ESRI 2014)

3.7.2 Environmental Setting

3.7.2.1 Physiography and Topography

Regional

California is divided into twelve geomorphic provinces that are topographic-geologic groupings of convenience based primarily on landforms and geologic history (EBMUD 2016). The proposed project area is located within the Coast Ranges Geomorphic Province. The Coast Ranges Geomorphic Province extends along much of the California coast from the northern state boundary down to San Luis Obispo and encompasses inland areas to the edge of the Central Valley. The Pacific Ocean lies to the west of the Coast Ranges. The Coast Ranges Geomorphic Province consists of a series of north-west-trending mountain ranges and valleys subparallel to the San Andrea Fault. The mountain ranges within the Coast Ranges Geomorphic Province generally range in elevation from 2,000 feet above mean sea level (amsl) to 4,000 feet amsl, occasionally reaching up to 6,000 feet amsl. The San Andreas Fault extends for more than 600 miles along the Coast Ranges Geomorphic Province (CGS 2002).

The Coast Ranges Geomorphic Province is generally divided in two sub-provinces, north and south of the San Francisco Bay. The proposed project area is located in the South Coast Range sub-province. The major geographic features in the South Coast Range sub-province include: the Diablo Range, Santa Cruz Mountains, San Francisco Peninsula, and the San Francisco Bay. Significant physiographic features include the San Francisco Bay and the broad alluvial fans (or flatlands) that were formed between the mountain ranges and the San Francisco Bay.

Local

The proposed project area is within the center of the Coast Ranges Geomorphic Province situated on the alluvial plains of the San Francisco Bay and several of the channels around Alameda. The proposed pipeline open trench construction and staging areas are within urbanized and heavily disturbed areas including existing city streets, one business park parking lot, Estuary Park, and Towata Park. Elevations at the proposed construction staging areas and open trench construction areas are flat and do not exceed 10 feet amsl (USGS 1996). The proposed underwater pipeline crossings would occur under the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel.

3.7.2.1 Geologic Setting and Units

Geologic Time

Over time different layers of rock accumulate due to seismic and erosional events as well as deposition. Geologic time is used to define the ages of rock layers. Geologic time is broken down into Eons, Eras, Periods, Epochs, and Ages. The four primary eras in Geologic time are the Precambrian (4.6 billion years to 541 million years before present), Paleozoic (541 to 252 million years before present), Mesozoic (252 to 66 million years before present), and Cenozoic (66 million years before present to present). The Cenozoic era includes the Paleogene, Neogene[1], and Quaternary Periods. The Quaternary Period is the most recent and includes two Epochs, the Pleistocene (2.58 million to 11,700 years before present) and Holocene (11,700 years before present to present) Epochs (Cohen 2014).

Regional Geology

Underlying the Coast Ranges Geomorphic Province is thick Mesozoic and Cenozoic sedimentary strata. Nine lithographic assemblages[2] are located within Alameda County. The deposition of the geologic material within each assemblage often correlates to the local fault lines. Cenozoic strata rest atop two deformed Mesozoic rock complexes. One of the Mesozoic

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1 The Paleogene and Neogene periods were previously the Tertiary period.

2 Assemblages are defined as large, fault-bounded blocks that contain a unique stratigraphic sequence, such as by containing different rock units or by different stratigraphic relationships among similar rock units (USGS 1996).

complexes is comprised of Coast Range ophiolite and overlying Great Valley sequence. The other Mesozoic complex is the Franciscan complex (USGS 1996).

Local Geology
The proposed pipeline alignments are located in areas underlain by artificial fill, marine sand deposits, alluvium, and terrace deposits from the Cenozoic Era (CDMG 1991, CGS 2010). The artificial fill varies in thickness from 0 to 36 feet with an average thickness of 10 feet. The fan deposit thickness ranges from 0 to 47 feet and overlaps with Pleistocene alluvial fan deposits with a thickness of 15 feet. Groundwater is shallow with an approximate depth of 10 feet. The alluvial plain includes sediments eroded from the Oakland Hills over the last 2 million years and generally consists of unconsolidated mixtures of gravel, sand, clay, and silt typically deposited by streams. The specific units present include artificial fills, Young Holocene-age, Holocene to Latest Pleistocene-age, and Latest Pleistocene-age alluvial deposits (USGS 2012). The geologic units underlying the proposed staging and open trench construction areas for each of the three pipelines are shown in Figure 3.7-1 and detailed below:

- **Crossing #1.** Alameda Island and the city of Oakland along the Oakland Inner Harbor are underlain by Historic artificial fill (af). Further inland on Alameda Island is Holocene and Pleistocene dune sand (Qds) (USGS 2000).
- **Crossing #2.** Alameda Island and North Bay Farm Island on either side of the San Leandro Bay Channel is Historic artificial fill (af). Further inland on Alameda Island is Holocene and Pleistocene dune sand (Qds) (USGS 2000).
- **Crossing #3.** The northeastern portion of Alameda Island along the Tidal Canal is Holocene and Pleistocene dune sand (Qds) and the city of Oakland along the Tidal Canal near Union Point Park is Holocene alluvial fan and fluvial deposits (Qhaf) (USGS 2000).

The geologic units underlying the proposed pipeline alignments are listed in Table 3.7-1.

3.7.2.2 Soil Types

San Francisco Bay History
Artificial fill was placed along the margins of the San Francisco Bay over estuarine deposits (Bay mud) and Holocene fluvial deposits, including along the waterfronts of the cities of Alameda and Oakland. Artificial fill was placed in a variety of ways including hydraulic pumping of materials typically dredged from the San Francisco Bay. Artificial fill can be comprised of different materials including tidal marsh sediments, sand and silt from the San Francisco Bay, or waste debris, rubble, quarry rock, or soil. Some of the different material as well as the underlying Bay mud are unconsolidated and granular. Unconsolidated material is susceptible to liquefaction. Design and review of artificial fill was not required prior to 1965. Fill in the San Francisco Bay after 1965 has been engineered to increase liquefaction resistance to settlement, lateral spread, and sand boils (Fugro Consultants, Inc. 2013).

Table 3.7-1 Geologic Units in the Proposed Project Area

Pipeline Crossing	Geologic Unit
Crossing #1	Historic artificial fill (af) Holocene and Pleistocene dune sand (Qds)
Crossing #2	Historic artificial fill (af) Holocene and Pleistocene dune sand (Qds)
Crossing #3	Holocene and Pleistocene dune sand (Qds) Holocene alluvial fan and fluvial deposits (Qhaf)

Source: USGS 2000

Figure 3.7-1 Geologic Units in the Proposed Project Area

Source: USGS 2006

Proposed Project Area Soils

The NRCS has mapped soils in the proposed project area. The soils underlying the proposed staging and open trench construction areas for each of the three pipelines are shown in Figure 3.7-2 and detailed below:

- **Crossing #1.** The soil of Alameda Island and the city of Oakland along the Oakland Inner Harbor is underlain by urban land (inferred to mean artificial fill). Further inland on Alameda Island is xerorthents (clayey) and urban land (Baywood complex) (NRCS 2014).
- **Crossing #2.** The soil of Alameda Island and North Bay Farm Island on either side of the San Leandro Bay Channel is xeropsamments (fill). Further inland on Alameda Island is urban land (Baywood complex) (NRCS 2014).
- **Crossing #3.** The soil of Alameda Island and the city of Oakland along the Tidal Canal is urban land (inferred to mean artificial fill). Further inland on Alameda Island is urban land (Baywood complex) (NRCS 2014).

The soil beneath the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel where the proposed pipelines would cross is comprised of a top layer of Young Bay Mud, which is soft, unconsolidated silty clay saturated with water, and underlain by Old Bay Mud, which is more compacted silty clay (EBMUD 2014).

The soils underlying the entirety of the proposed pipeline alignments are listed in Table 3.7-2. The liquefaction potential along the proposed pipeline alignments, particularly due to the presence of fill soils, is described in detail under Section 3.7.2.3. The urban land soil (Baywood complex) is excessively drained with very low runoff. The xerorthents (clayey) soil has medium runoff (NRCS 2014).

Table 3.7-2 Soils in the Proposed Project Area

Pipeline Crossing	Soil Types	
Crossing #1	• Urban land (artificial fill) • Xerorthents (clayey) • Urban land (Baywood complex)	• Young Bay Mud • Old Bay Mud
Crossing #2	• Xeropsamments (fill) • Urban land (Baywood complex)	• Young Bay Mud • Old Bay Mud
Crossing #3	• Urban land (artificial fill) • Urban land (Baywood complex)	• Young Bay Mud • Old Bay Mud

Source: NRCS 2014

Figure 3.7-2 Soils in the Proposed Project Area

Source: NRCS 2014

3.7.2.3 Geologic Hazards

Fault Rupture

Several faults are located in the proposed project vicinity, as shown in Figure 3.7-3. Fault traces shown on Figure 3.7-3 are color coded to indicate the geologic Period during which the last displacement has occurred. The primary active faults near the proposed project area are shown in Table 3.7-3. The South Hayward Fault is the closest fault line and is approximately 3 miles to the northeast of the proposed pipeline alignments.

Surface rupture occurs when movement on a fault deep within the earth breaks through to the surface. Surface ruptures associated with the 1906 San Francisco earthquake extended for more than 260 miles, with displacements of up to 21 feet. However, not all earthquakes result in surface rupture. The Loma Prieta earthquake of 1989 caused major damage in the San Francisco Bay Area, but the fault movement did not break through to the ground surface.

Fault rupture almost always follows preexisting faults, which are zones of relative weakness in the earth's crust. Rupture may occur suddenly during an earthquake or slowly in the form of fault creep. Sudden displacements are more damaging to structures because they can displace structures and are accompanied by shaking. Fault creep is the slow rupture of the earth's crust. In highly developed areas of Contra Costa and Alameda Counties, the Hayward Fault exhibits fault creep, which offsets and deforms curbs, streets, buildings, and other structures that lie on the fault trace. There are no known active or potentially active fault traces that intersect any of the proposed pipeline alignments.

Seismic Shaking

The intensity of the seismic shaking, or strong ground motion, during an earthquake affecting the proposed project area would depend on the distance to the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the area. Earthquakes occurring on faults closest to the proposed project area would have the potential to generate the largest ground motions.

The Hayward Fault is projected to experience a major earthquake every 140 years or so based on averages between historic major earthquakes on that fault. The last major earthquake was in

Table 3.7-3 Active Faults in the Proposed Project Area

Fault	Distance from Proposed Project Area (miles)	30-Year Probability of at least a Magnitude 6.7 [1] (percent)
South Hayward	2.9 - 3.7	31[2]
Northern San Andreas	14.1 - 14.9	21
Calaveras	11.9 - 12.9	7

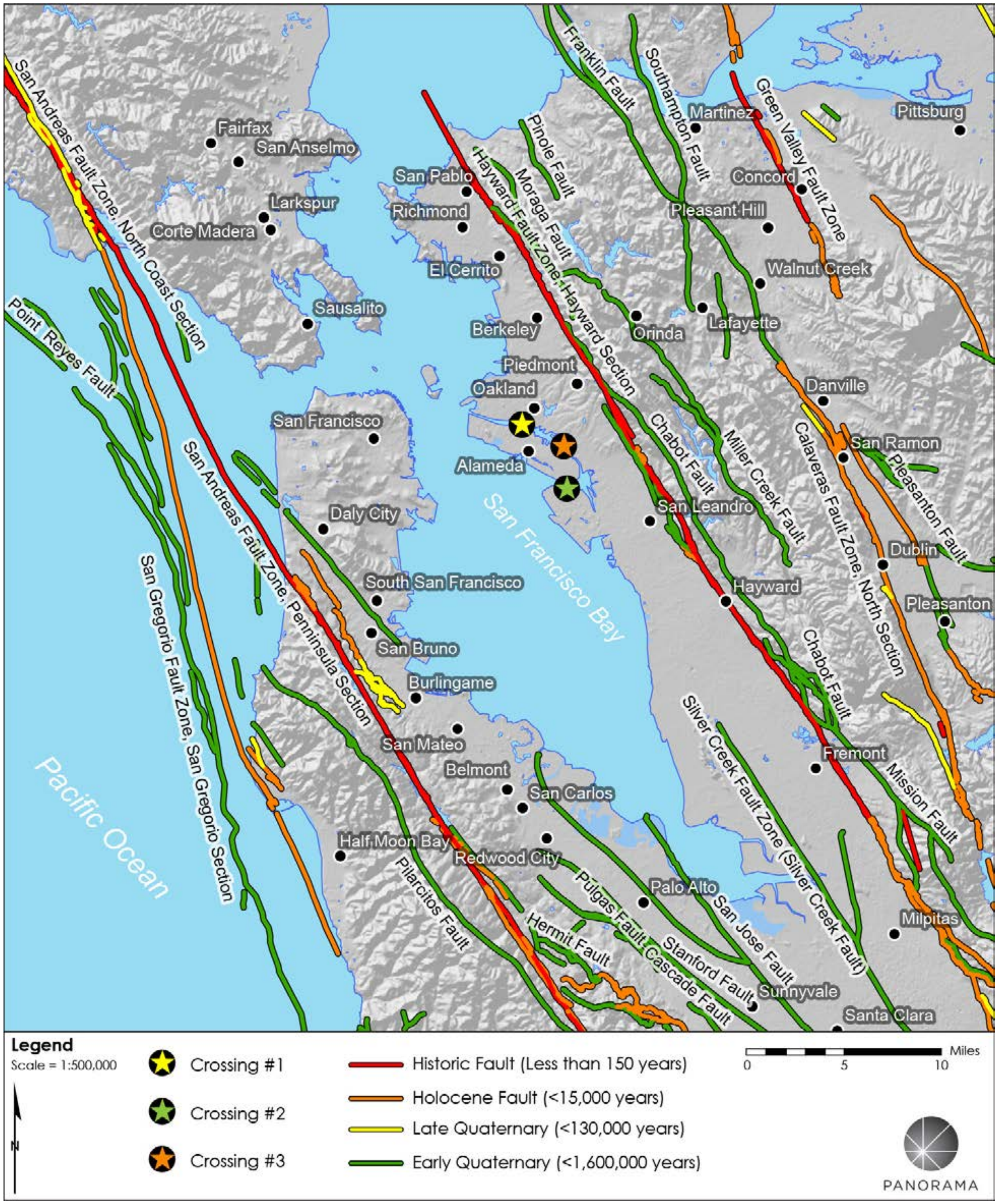
Notes:

1 The probability shown is the mean.

2 The probability is for the entirety of the Hayward-Rogers Creek Fault.

Source: USGS 2010, USGS 2008a

Figure 3.7-3 Faults in the Proposed Project Area



Source: USGS, CGS 2010

1868, indicating the next one could occur in the near future. The next major earthquake is anticipated to be a magnitude 6.9 or greater based on historical data (USGS 2008b). An earthquake of magnitude 6.9 could result in considerable damage to structures, partial collapse of buildings, and buildings shifted off foundations (USGS 2014b). The other faults with a high potential to affect the proposed project area are the San Andreas and Calaveras faults. Both the San Andreas and Calaveras faults are capable of generating large (greater than magnitude 7) earthquakes.

Liquefaction

Liquefaction occurs when water-saturated sand and silt takes on the characteristics of a liquid, most often during the intense shaking that accompanies an earthquake. The susceptibility of a soil to liquefaction is a function of the depth, density, and water content of the granular sediments and the magnitude of earthquakes likely to affect the area. Saturated, unconsolidated silts, sands, silty sands, and gravels within 50 feet of the ground surface are most susceptible to liquefaction. Liquefaction-related phenomena include vertical settlement from densification, lateral spreading, ground oscillation, flow failures, loss of bearing strength, subsidence, and buoyancy effects.

The USGS classifies liquefaction susceptibility according to five categories that describe the likely proportion of all liquefaction occurrences that could take place in each category, the abundance or frequency of liquefaction occurrence within the category, the strength of shaking required to produce liquefaction, and the geologic units included (USGS 2006). The classifications include:

- **Very High.** The USGS estimates that about 40 to 50 percent of future liquefaction effects would occur within geologic units assigned the *Very High* category. Only modest ground shaking (peak ground acceleration of about 0.1 g [acceleration due to Earth's gravity]) would be required to cause liquefaction. Geologic map units that fall within the *Very High* category include the latest Holocene and historical stream channel deposits, as well as artificial fills over bay and other estuarine mud.
- **High.** The USGS estimates that about 20 to 30 percent of future liquefaction effects would occur within geologic units assigned the *High* category. Relatively modest ground shaking (peak ground acceleration of about 0.1 to 0.2 g) would be required to cause liquefaction. Geologic map units within the *High* category include the latest Holocene and historical alluvium, natural levees, and stream terraces.
- **Moderate.** The USGS estimates that about 20 to 30 percent of future liquefaction effects would occur within geologic units assigned the *Moderate* category. Somewhat stronger ground shaking (peak ground acceleration greater than about 0.1 to 0.2 g) would be required to cause liquefaction. Geologic map units within the *Moderate* category include the latest Pleistocene and Holocene Bay and other estuarine mud, alluvial fan and levee deposits, and stream terrace deposits.
- **Low.** The USGS estimates that about 2 percent of future liquefaction effects would occur within geologic units assigned the *Low* category. Stronger ground shaking (peak ground acceleration of about 0.5 g) would be required to cause liquefaction.

Geologic map units within the *Low* category include basin deposits, various late Pleistocene deposits, and Pleistocene marine terrace deposits.

- **Very Low.** The USGS estimates that about 2 percent of future liquefaction effects would occur within geologic units assigned the *Very Low* category. Stronger ground shaking (peak ground acceleration greater than about 0.6 g) would be required to cause liquefaction. Geologic map units within the *Very Low* category include Pleistocene deposits, pre-Quaternary deposits, and bedrock.

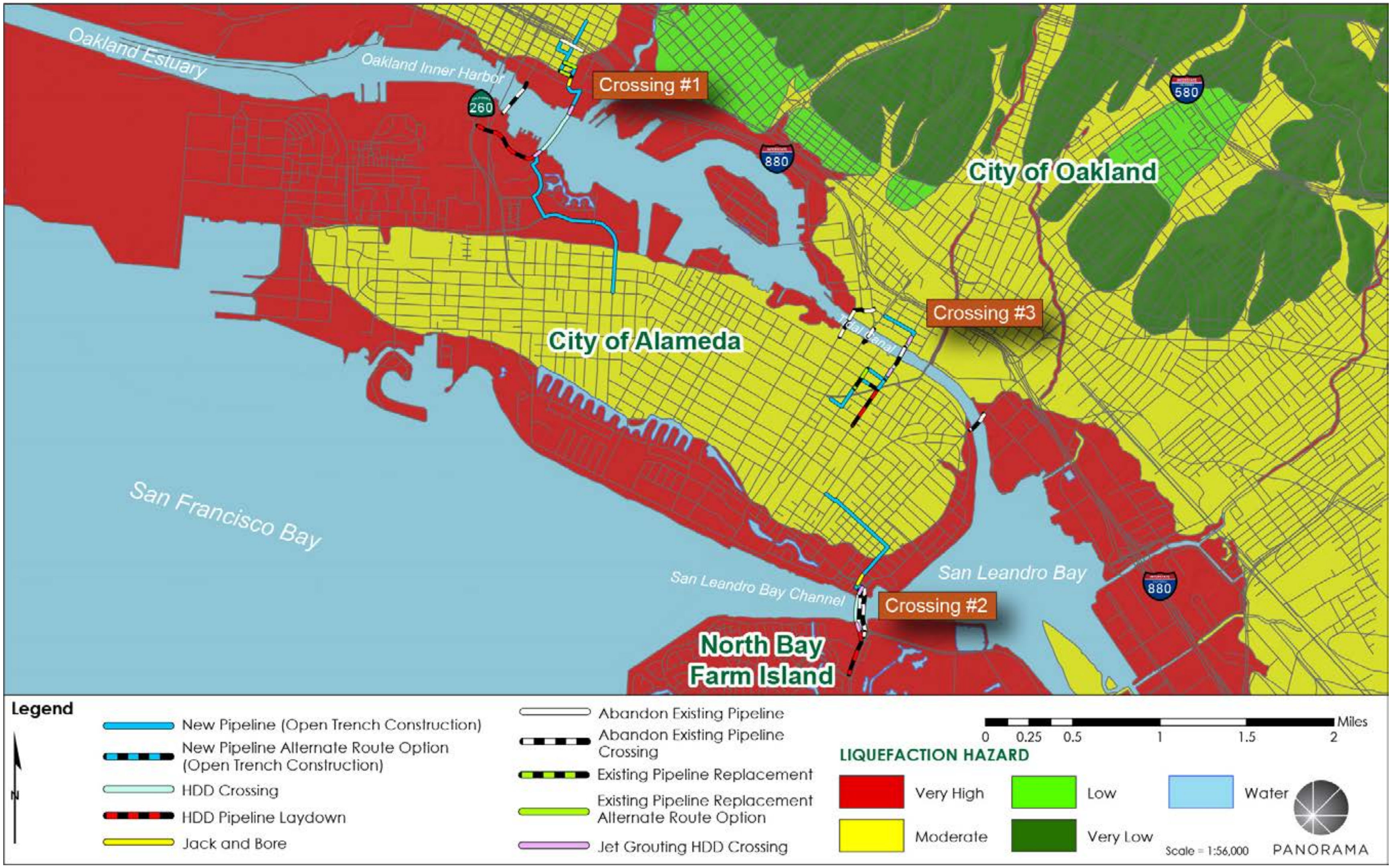
The portions of the proposed project area with susceptibility to liquefaction are those areas with artificial fill where there was once submerged San Francisco Bay or other water body floor (USGS 2014c). The margins of the San Francisco Bay have artificial fill, including Alameda and Oakland. Figure 3.7-4 shows the three proposed pipeline crossings in relation to liquefaction hazard. The liquefaction risk for each crossing is detailed below:

- **Crossing #1.** Alameda Island and the city of Oakland along the Oakland Inner Harbor have a very high liquefaction risk. Further inland on Alameda Island the risk is moderate (Holtzer 2010). Young Bay Mud lining the harbor bed has a high risk of liquefaction. Old Bay Mud lying beneath Young Bay Mud has a minimal risk of liquefaction (EBMUD 2014).
- **Crossing #2.** Alameda Island and North Bay Farm Island on either side of the San Leandro Bay Channel have a very high liquefaction risk. Further inland on Alameda Island the risk is moderate (Holtzer 2010). Young Bay Mud lining the channel bed has a high risk of liquefaction. Old Bay Mud lying beneath Young Bay Mud has a minimal risk of liquefaction (EBMUD 2014).
- **Crossing #3.** The northeastern portion of Alameda Island and the city of Oakland along the Tidal Canal have a moderate liquefaction risk (Holtzer 2010). Young Bay Mud lining the canal bed has a high risk of liquefaction. Old Bay Mud lying beneath Young Bay Mud has a minimal risk of liquefaction (EBMUD 2014).

Lateral Spreading

Pore pressure build-up or liquefaction from an earthquake that results in finite, lateral displacement of gently sloping ground is referred to as lateral spreading. Of the liquefaction hazards, lateral spreading generally causes the most damage. Lateral spreading involves large blocks of intact, non-liquefied soil moving downslope on a liquefied substrate of large aerial extent (EBMUD 2016). Lateral spreading can occur on mild slopes as gentle as 0.3 to 5 percent in areas underlain by loose sands and a shallow water table (Rauch 1997). Lateral spreading can extend several hundred feet from a slope, and displacements in the range of tens of feet can occur if soil conditions are especially favorable for liquefaction and earthquake shaking is of sufficient duration. Lateral spreading was responsible for most of the pipeline failures in San Francisco during the 1989 Loma Prieta earthquake. The saturated sandy soils along sloped channel sides (i.e., near the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel surrounding Alameda Island) where the pipeline alignments are proposed, pose a potential for lateral spread.

Figure 3.7-4 Liquefaction Hazards in the Proposed Project Area



Source: Holtzer 2010

Landslide

The downward and outward movement of materials on a slope is referred to as a landslide. Landslides can be instigated in numerous ways, including by earthquakes due to liquefaction or lateral spreading (USGS 2004). The potential for landslides along the proposed pipeline alignments is low, as the proposed project area is relatively flat. However, there is risk of seismic-induced landslides underwater along sloped shorelines. The proposed project area near sloped channel sides (near the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel surrounding Alameda Island) could be subject to lateral spreading and landslides due to the presence of loose sands and soft saturated clays (EBMUD 2016).

Slope Failure (Static Landslides)

Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience soil slumps, rapid debris flows, and deep-seated rotational slides. Slope stability can depend on several complex variables, including the geology, structure, topography, slope geometry, and amount of groundwater present, as well as external processes such as climate and human activity. The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope.

Landslides can occur on slopes of 15 percent or less, but the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslides typically occur within slide-prone geologic units that contain excessive amounts of water or are located on steep slopes, or where planes of weakness are parallel to the slope angle. The potential for static landslides along the proposed pipeline alignments is very low as the proposed project area is mostly flat (EBMUD 2016).

Settlement and Heaving

As mentioned above, lateral spreading can result in vertical displacement in soils referred to as settlement and heaving. Settlement is a result of compaction of the soils due to loss of water or air space, which can occur at any location, whereas heaving is the upward lift of soil, which typically occurs at the toe of a slide (Rauch 1997). The sandy and fill soils in the areas of the proposed pipeline alignments have the potential to experience settlement and heaving.

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid rearrangement, compaction, and settling of subsurface materials (particularly loose, non-compacted, and variable sandy sediments). Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill or Bay mud.

During an earthquake, underground utilities can fail as a result of differential settlement, as it can cause the uneven movement of pipelines, resulting in substantial damage to pipelines, including cracks and breakage.

Expansive Soils

Expansive soils generally contain fine-grained clays that have the ability to absorb water during the wet season, which expands the soil's volume. During the dry season the soil loses the water and contracts, resulting in cyclical "shrink-swell" behavior. The repeated expansion and contraction of expansive soils can result in damage to structures (USGS 2014a). The soils underlying the proposed pipeline alignments are primarily artificial fill or urban land, which contain coarse-grained materials. A small portion of soil underlying the Crossing #1 pipeline alignment has a larger percentage of clay (xerorthents). Additionally, the Young Bay Mud that underlies the artificial fill could potentially exhibit shrink-swell behavior (EBMUD 2016).

Corrosive Soils

Corrosive soils are commonly related to several key parameters, including soil resistivity (the ability to conduct electricity), the presence of chlorides and sulfates, oxygen content, and pH. Typically, the most corrosive soils are those with the lowest pH (acidic) and highest concentration of chlorides and sulfates. Depending on the degree of corrosivity of subsurface soils, building materials such as concrete, reinforcing steel in concrete structures, and bare metal structures exposed to the corrosive soils can deteriorate, eventually leading to failures. There is potential for shallow subsurface soils in the vicinity of the proposed pipeline alignments to be classified as corrosive to severely corrosive to metals, and moderately deleterious to concrete. Corrosive conditions are typically most evident in Young Bay Mud which exhibits high sulfate and chloride and low pH (EBMUD 2016).

3.7.3 Applicable Regulations, Plans, and Standards

3.7.3.1 Federal Regulations

There are no federal laws or regulations pertaining to geology, soils, and seismicity that are applicable to the proposed project.

3.7.3.2 State Regulations

The Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (A-P Act) was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with the A-P Act, the state geologist established regulatory zones, called "earthquake fault zones," around the surface traces of active faults and published maps showing the earthquake fault zones. Within the fault zones, buildings for human occupancy cannot be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200 to 500 feet on either side of the mapped fault trace because many active faults are complex and consist of more than one branch that may experience ground surface rupture.

CCR Title 14, Section 3601(e) defines buildings intended for human occupancy as those that would be inhabited for more than 2,000 hours per year. The proposed project area does not cross the Alquist-Priolo Earthquake Fault Zone or the Hayward Fault and does not include any buildings that meet the CCR Title 14 criterion for human occupancy. Therefore, the A-P Act does not apply to the proposed project.

Seismic Hazard Mapping Act

The Seismic Hazard Mapping (SHM) Act was passed in 1990 following the 1989 Loma Prieta earthquake to reduce the potential impacts of earthquakes on public health and safety and to minimize property damage caused by earthquakes related to ground deformation. The SHM Act directs the California Department of Conservation (CDC) to identify and map areas prone to the earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. For structures intended for human occupancy, the SHM Act requires site-specific geotechnical investigations to identify potential seismic hazards and to formulate mitigation measures before permitting most developments designed for human occupancy within the Zones of Required Investigation. The proposed project would not involve the construction of any structures for human occupancy; therefore, the SHM Act does not apply to the proposed project.

California Building Code

The California Building Code (CBC) was adopted by the California Building Standards Commission on January 1, 2014, and is based on the 2012 International Building Code with the addition of more extensive structural seismic provisions. The CBC is included in Title 24 of the CCR, California Building Standards Code, and is a compilation of three types of building standards from three different origins:

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

Seismic sources and the procedures used to calculate seismic forces on structures are defined in Section 1613 of the CBC. The CBC requires that all structures and permanently attached nonstructural components be designed and built to resist the effects of earthquakes. The CBC also addresses grading and other geotechnical issues, building specifications, and non-building structures.

3.7.3.3 Local Regulations and Policies

Overview

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 for projects involving facilities for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

City of Alameda General Plan

The City of Alameda General Plan (1990–2010) establishes goals and objectives to provide guidance for the growth of the city. The following pertinent policy was identified in the City of Alameda General Plan:

Chapter 8 Health and Safety Element

Guiding Policies: Seismic, Geologic, and Soils Hazards

Policy 8.1.e	Design underground utilities to minimize the effect of differential ground displacements.

City of Oakland General Plan

The City of Oakland General Plan (1998–2015) establishes goals and objectives to provide guidance for the growth of the city. The following pertinent policy and action were identified in the City of Oakland General Plan:

Safety Element

Policy Statements Related to Geologic Hazards

Policy GE-4	Work to reduce potential damage from earthquakes to "lifeline" utility and transportation systems.
Action GE-4.2	As knowledge about the mitigation of geologic hazards increases, encourage public and private utility providers to develop additional measures to further strengthen utility systems against damage from earthquakes, and review and comment on proposed mitigation measures.

EBMUD Practices and Procedures

EBMUD Standard Practices

EBMUD uses two primary Engineering Standard Practices for the design of water pipelines in its distribution system to address geologic hazards. Engineering Standard Practice 512.1 Water Main and Services Design Criteria, establishes basic criteria for the design of water pipelines and establishes minimum requirements for pipeline construction materials. Engineering Standard Practice 550.1 Seismic Design Requirements addresses seismic design of the pipelines to withstand seismic hazards including fault rupture, ground shaking, liquefaction-related phenomena, landslides, seiches, and tsunamis and requires that EBMUD establish project-specific seismic design criteria for pipelines with a diameter of greater than 12-inches, such as the water mains that would be installed under the proposed project.

Practices and procedures to avoid seismic hazards include selecting appropriate routing to avoid seismic hazards, use of appropriate materials to withstand seismic hazards, and providing flexibility at locations where the pipeline crosses from one soil condition to another. Engineering Standard Practice 550.1 also requires use of steel pipe with restrained joints or the equivalent to address fault rupture, liquefaction, and landslide hazards. Isolation valves may also be required on either side of the seismic hazard zone.

Engineering Standard Practice 550.1 is based on *Guidelines for the Seismic Design of Oil and Gas Pipeline Systems* prepared by the American Society of Civil Engineers Committee on Gas and

Liquid Fuel Lifelines (1984). In addition to the practices and procedures listed above, EBMUD follows the recommendations of the American Water Works Association for the design and installation of steel pipe, including design for the appropriate wall thickness, external loadings, pipeline supports, pipe joints, fittings and appurtenances, corrosion control, and protective coatings and linings (EBMUD 2001, EBMUD 2006).

EBMUD Standard Construction Specifications
EBMUD's Standard Construction Specification 01 35 44 (Environmental Requirements), includes provisions for preventing soil erosion and for the protection of water quality. Regarding site activities, the specifications require the construction crew to:

- Prevent the discharge of debris, soil, silt, sand, asphalt, rubbish, paint, oil or petroleum products, cement, concrete, or washings thereof, and any other organic or earthen materials to a surface water or storm drain system. The discharge materials may also not be stored where they can be washed outside of the construction limits by rainfall or runoff. When construction is completed, the discharge materials must be disposed of in accordance with the Construction and Demolition Waste Disposal Plan.
- Dispose excess material in locations approved by EBMUD consistent with all applicable legal requirements and disposal facility permits.
- Divert or otherwise control surface water and waters flowing from existing projects, structures, or surrounding areas from coming onto work areas. The methods of diversions or control must be adequate to ensure the safety of stored materials and personnel in the work area. At the completion of work, ditches, dikes, and other ground alterations made by the construction crew must be removed and ground conditions must be returned to their former condition.
- Maintain construction sites to ensure that drainage from the site will minimize erosion of stockpiled or stored materials and the adjacent native soil material.

3.7.4 Proposed Project Impacts and Mitigation Measures

3.7.4.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on geology, soils, and seismicity if it would:

1. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
   a. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault
   b. Strong seismic ground shaking
   c. Seismic-related ground failure, including liquefaction
   d. Landslides;

2. Result in substantial soil erosion or the loss of topsoil;
3. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the proposed project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
4. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), or a corrosive soil creating substantial risks to life or property; or
5. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

As identified in the Initial Study (Appendix B), the proposed project does not include the development of a wastewater disposal system; therefore, Criteria 5 would not apply to the proposed project and is not discussed further in the analysis.

3.7.4.2 Approach to Analysis

The impact analysis considers whether implementation of the proposed project would result in significant impacts to geology, soils, and seismicity using the significance criteria listed above and based on published geologic and seismic information related to the geology, soils, and seismicity of or in the proposed project area. The potential direct and indirect effects of the proposed project's construction are addressed below.

3.7.4.3 Impacts and Mitigation Measures

Table 3.7-4 provides a summary of the significance of the proposed project's impacts to geology, soils, and seismicity before and after implementation of mitigation measures.

Table 3.7-4 Summary of Potential Impact to Geology, Soils, and Seismicity

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact Geology Soils-1: Potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; or landslides (Criteria 1)	Potentially Significant	Less than Significant MM Geology-1
Impact Geology Soils-2: Potential to result in substantial soil erosion or the loss of topsoil (Criteria 2)	Less than Significant	--
Impact Geology Soils-3: Potential to be located on a geologic unit or soil that is unstable or that would become unstable as a result of the proposed project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse (Criteria 3)	Potentially Significant	Less than Significant MM Geology-1 Noise-2
Impact Geology Soils-4: Potential to be located on expansive or corrosive soils that would create substantial risks to life or property (Criteria 4)	Potentially Significant	Less than Significant MM Geology-1

Impact Geology Soils-1: Potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure (liquefaction); or landslides (Criteria 1). (*Less than Significant with Mitigation)*

Fault Rupture

The proposed project is located in a region with several active and potentially active fault zones that have a history of strong earthquakes. The potential for fault rupture to occur is greatest in the immediate vicinity of a fault trace. The active fault closest to the proposed project area is the South Hayward Fault, which is approximately 3.7 miles northeast of the proposed pipeline alignments. However, none of proposed pipeline alignments cross the active fault trace; therefore, there would be no impact related to surface fault rupture.

Seismic Ground Shaking and Liquefaction

The probability of a magnitude 6.7 or greater earthquake is moderate for the nearby faults, as shown in Table 3.7-3. In the unlikely event of an earthquake, construction workers could be exposed to hazards from strong seismic ground shaking. Building damage or collapse due to potential severe ground shaking and liquefaction could occur in the vicinity of pipeline construction and staging areas; however, there are no collapsible structures located within proposed construction zones or construction staging areas, nor are any intended as part of the proposed project.

The potential for a significant seismic event to occur in the vicinity of the pipeline alignments and crossings is high over the lifetime of the proposed project. Artificial fill and Young Bay Mud have a very high liquefaction potential. To minimize the risk of liquefaction along the underwater pipeline crossing portions (underneath the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel), the HDD process (see Section 2.7.1.3) would be used to install each underwater pipeline crossing approximately 50-100 feet deep within Old Bay Mud and underneath the Young Bay Mud, which would put the underwater pipeline crossings below the liquefaction zone. Impacts related to liquefaction, differential settlement, and other seismically-induced ground failures for the shallow portions of the HDD and for the jack and bore portions of the proposed project would be potentially significant. The proposed project includes project design features such as the use of a casing to support the pipeline in weaker soils and jet grouting to stabilize and provide support for the pipeline segments located within Young Bay Mud zones at the HDD entry and insertion pits. The casing and grouting design features would minimize the risk of seismic shaking and liquefaction damage; however, potentially significant impacts could remain due to site-specific conditions. EBMUD would conduct a geotechnical investigation at the HDD entry and insertion pit locations and along the underwater alignments, which would include evaluation of site-specific subsurface conditions related to the potential for geological and seismic hazards, including ground shaking and liquefaction. Mitigation Measure Geology-1, which requires implementation of engineering design recommendations developed from the geotechnical investigation, would reduce potentially significant seismic shaking and liquefaction impacts to less than significant.

The potential for liquefaction along the remaining open trench construction portions of the proposed pipelines ranges from moderate to very high, as previously described. Liquefaction and associated hazards may apply stresses to trenched areas of the proposed pipeline, which could lead to failure due to cracks or breaks in the line, resulting in a potentially significant impact. As described in Section 3.7.3.3, EBMUD has Engineering Standard Practices that are employed to reduce earthquake-related damage. Engineering Standard Practices would be implemented as part of the proposed project and include use of special joints (i.e., butt welds or double welded joints), use of stronger or more flexible pipelines, use of special backfill or casing to support and/or allow pipeline motion, as well as many other practices to reduce the risk of seismic damage (EBMUD 2001, EBMUD 2006). Underground pipelines would be less susceptible to damage from strong ground shaking as they would be imbedded in structural fill and constructed in accordance with seismic design standards (EBMUD 2016). Therefore, implementation of EBMUD Standard Engineering Practices would ensure that seismic ground shaking and liquefaction impacts after construction of the proposed pipelines would be less than significant.

Landslides

Landslides are unlikely to occur as there is minimal elevation change along the proposed pipeline alignments. Proposed project construction would be of a short duration (less than two years), and would not substantially increase the risks of exposure over typical risks of exposure throughout the region. Earthquake safety training pursuant to Occupational Safety and Health Administration (OSHA) regulations would minimize potential for impacts to workers. However, there is risk of a potentially significant seismic-induced landslide underwater along sloped shorelines during and after construction of the proposed pipelines. EBMUD would conduct a geotechnical investigation at the HDD entry and insertion pit locations and along the underwater alignments. The investigation would evaluate subsurface conditions to understand geological and seismic hazards, including ground shaking, liquefaction, lateral spreading, settlement, and landslides based on site-specific geological conditions. Implementation of Mitigation Measure Geology-1, which requires implementation of engineering design recommendations developed from the site-specific geotechnical investigation, would reduce potentially significant impacts resulting from seismic-induced landslides to less than significant.

Mitigation Measures: Geology-1

Mitigation Measure Geology-1. Incorporation of Geotechnical Investigation into Construction and Design Requirements.

EBMUD shall incorporate the recommendations and results from the geotechnical investigation into construction and design of the pipeline, shoring systems, and dewatering methods to comply with current seismic standards and to withstand geologic and seismic hazards. Recommendations shall also be incorporated into the proposed project specifications for implementation during construction and shall be verified during construction by a qualified geotechnical engineer who shall monitor construction activities.

Significance after Mitigation: Less than Significant.

Impact Geology Soils-2: Potential to result in substantial soil erosion or the loss of topsoil (Criteria 2). (*Less than Significant)*

Construction of the proposed pipelines would require open trench construction, HDD, and jack and bore construction. Pipeline construction would often be within roadways but portions of pipeline would traverse parks, open spaces, or other unpaved areas. The spoils generated from construction would be temporarily stockpiled adjacent to the pipeline alignments for reuse in trenches or would be hauled off-site. All disturbed surfaces, including pavement, would be restored following pipeline installation. Although the soils within the proposed project area are not significantly erosive, erosion could occur around the open trenches and pits, and stockpiled spoils. The impact from erosion of soil and loss of topsoil would be potentially significant. To avoid erosion impacts from uncovered soil, the construction crew would be required to adhere to EBMUD's Standard Construction Specification 01 35 44 (see Section 3.7.3.3 above). EBMUD's Standard Construction Specification 01 35 44 includes the requirement for implementing erosion control measures such as diversion of surface waters, minimization of removal and disturbance of natural vegetation, and prevention of erosion and loss of soil (1.1 B.1 through 1.1 B.12). Compliance with EBMUD's Standard Construction Specification 01 35 44 would ensure that impacts related to soil erosion and loss of topsoil during construction would be less than significant.

Mitigation Measures: None Required.

Impact Geology Soils-3: Potential to be located on a geologic unit or soil that is unstable or that would become unstable as a result of the proposed project, and potentially could result in onsite or offsite landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse (Criteria 3). (*Less than Significant with Mitigation)*

Landslides

As indicated in Impact Geology Soils-1, the potential for landslides along the proposed pipeline alignments is unlikely as the proposed project area is relatively flat. However, there is risk of a potential for seismic-induced landslide underwater along sloped shorelines that could damage the pipeline which would be a potentially significant impact. EBMUD would conduct a geotechnical investigation at the HDD entry and insertion pit locations and along the underwater alignments as well as at the jacking receiving pits for each jack and bore location. Geotechnical borings would be analyzed for risk of soil instability. Implementation of Mitigation Measure Geology-1, which requires implementation of engineering design recommendations developed from the site-specific geotechnical investigation, would reduce potentially significant impacts resulting from seismic-induced landslides to less than significant because the risk of an underlying landslide would be identified and the pipelines would be designed accordingly to mitigate this risk.

Lateral Spreading and Liquefaction

As indicated in Impact Geology Soils-1 there is substantial risk of liquefaction along portions of the proposed pipeline alignments, and the potential for lateral spreading exists within the saturated sandy soils near sloped channel sides (i.e., near the Oakland Inner Harbor, Tidal

Canal, and San Leandro Bay Channel surrounding Alameda Island) where the pipeline alignments are proposed. Impacts related to liquefaction and lateral spreading for the shallow portions of the HDD and for the jack and bore portions of the proposed project would be potentially significant. The proposed project includes project design features including the use of a casing to support the pipeline in weaker soils and jet grouting to stabilize and provide support for the pipeline segments located within Young Bay Mud at the HDD entry and insertion pits. The casing and grouting design features would minimize the risk of liquefaction damage; however, potentially significant impacts could remain due to site-specific conditions. EBMUD would conduct a geotechnical investigation at the HDD entry and insertion pit locations and along the underwater alignments as well as at the jacking receiving pits for each jack and bore location. Geotechnical borings would be analyzed for risk of soil instability. Mitigation Measure Geology-1, which requires implementation of engineering design recommendations developed from the site-specific geotechnical investigation, would reduce potentially significant liquefaction and lateral spreading impacts during construction to less than significant.

Liquefaction also may apply stresses to trenched areas of the proposed pipeline, which could lead to failure due to cracks or breaks in the line, resulting in potentially significant impacts. EBMUD has Engineering Standard Practices that would be implemented as part of the proposed project, including use of special joints (i.e., butt welds or double welded joints), stronger or more flexible pipelines, and special backfill or casing to support and/or allow pipeline motion (EBMUD 2001, EBMUD 2006). The pipelines also would be less susceptible to liquefaction damage associated with strong ground shaking as they would be imbedded in structural fill and constructed in accordance with seismic design standards (EBMUD 2016). Therefore, implementation of EBMUD Standard Engineering Practices would ensure that liquefaction impacts after construction of the proposed pipelines would be less than significant.

Operation of continuous vibratory equipment (such as a compaction roller) could induce liquefaction and/or differential settlement in sandy soils, depending on the type, magnitude, and duration of vibration. The differential settlement could cause damage to nearby structures. The USGS has provided information regarding the liquefaction susceptibility of soils, indicating that vibration on the order of 0.1 g to 0.2 g peak ground acceleration could cause liquefaction in areas with a moderate to very high susceptibility to liquefaction. Much of the project area is located in areas with very high liquefaction potential. A 0.1 g and 0.2 g peak ground acceleration equates to PPV of 0.2 and 0.4 in/sec, respectively. Because the proposed project would be constructed in previously disturbed areas and in areas subject to years of vibration from heavy vehicular traffic and previous construction, and considering the range of soils encountered throughout the project, 0.3 in/sec is considered a reasonable continuous vibration limit, below which liquefaction-induced differential settlement at nearby structures is not likely to occur. As discussed in Impact Noise-2 in Section 3.11: Noise, the use of vibratory roller compactors could potentially exceed the continuous vibration limit of 0.3 in/sec near structures, which would be a potentially significant impact. Mitigation Measure Noise-2 requires that EBMUD limit vibration at the nearest buildings or structures to 0.3 in/sec for continuous source vibrations. Implementation of Mitigation Measure Noise-2 would prevent vibration-induced liquefaction that could cause damaging differential settlement, and the impact would be less than significant.

Subsidence and Soil Collapse
As further discussed in Section 3.10: Hydrology and Water Quality, groundwater may be encountered during open trench construction operations and would therefore require dewatering. Dewatering of sandy soils for temporary excavations could cause ground subsidence (i.e., settlement) and damage to nearby structures and underground utilities. Unsupported excavations into soft or loose soils can cause settlement and soil collapse in/near foundations, roadways and other infrastructure near the proposed pipeline alignments (EBMUD 2016). The proposed project could result in settlement from dewatering, which would be a potentially significant impact. EBMUD would conduct a geotechnical investigation at the HDD entry and insertion pit locations and along the underwater alignments as well as at the jacking receiving pits for each jack and bore location. Geotechnical borings would be analyzed for risk of soil instability. Mitigation Measure Geology-1 would be implemented to reduce the potential for settlement. Mitigation Measure Geology-1 requires implementation of engineering design recommendations developed from the site-specific geotechnical investigation; the geotechnical investigation would be completed and recommendations incorporated into the shoring design for open trench construction. The impact from risk of subsidence and soil collapse from dewatering would be less than significant after implementation of Mitigation Measure Geology-1.

Mitigation Measures: Geology-1, Noise-2 (see Section 3.11: Noise)

Significance after Mitigation: Less than Significant.

Impact Geology Soils-4: Potential to be located on expansive or corrosive soils that would create substantial risks to life or property (Criteria 4). (*Less than Significant with Mitigation)*

Expansive Soils
Pipeline Crossing #1 crosses a section of soil within the city of Alameda with higher clay content (xerorthents) than the other soils along Crossings #2 and #3, as shown in Figure 3.7-2. Many of the areas with artificial fill are underlain by Bay mud, which may have expansive qualities that affect all of the proposed pipeline alignments. The shrink and swell of the expansive soil may apply stresses to the pipelines, which could lead to failure due to cracks or breaks in the line, resulting in a potentially significant impact.

Compliance with seismic design standards would minimize the effects of expansive soils. The proposed project incorporates design features including the use of a casing to support the pipeline in weaker soils and jet grouting to stabilize and provide support for the pipeline segments located within Young Bay Mud at the HDD entry and insertion pits. Underground pipelines would be less susceptible to damage from expansive soils as they would be imbedded in structural fill and therefore more tolerant of expansive soil effects (EBMUD 2016). The casing and grouting design features would minimize the effects of expansive soils; however, potentially significant impacts could remain due to site-specific conditions. EBMUD would conduct a geotechnical investigation at the HDD entry and insertion pit locations and along the underwater alignments as well as at the jacking receiving pits for each jack and bore location. The investigation would evaluate subsurface conditions related to the potential for geological and seismic hazards, including the presence and extent of expansive soils. Mitigation Measure Geology-1, which requires implementation of engineering design recommendations developed from the site-specific geotechnical investigation, would reduce potentially significant expansive soil impacts to less than significant.

The impact of expansive soils on the underwater pipeline crossing portions of the proposed project would be less than significant because the submarine portions would be 50 to 100 feet deep in Old Bay Mud where soil expansion is generally not a concern.

Abandonment of existing crossings would involve only minor modifications to existing infrastructure, which would not affect the existing infrastructure's response to expansive soils. Therefore, there would be no impact associated with abandonment activities.

Corrosive Soils

Corrosive soils can weaken a pipeline if the pipeline is not properly designed. As discussed in Section 3.7.2.3: Geologic Hazards, the shallow soils along the proposed pipeline alignments may be classified as corrosive to severely corrosive to metals, and moderately deleterious to concrete. A cathodic protection system would be used to protect the proposed pipelines from corrosion resulting from corrosive soils, as discussed in the Project Description. The effects of corrosive soils would be further reduced by construction in accordance with EBMUD Engineering Standard Practices and industry standards. EBMUD's Engineering Standard Practice 512.1 (see Section 3.7.3.3), would reduce the risk of corrosion through methods such as control of dissimilar metals, proper handling of materials, and use of insulating joints. EBMUD would also follow the recommendations of the 2004 American Water Works Association M11 Manual for the design and installation of steel pipe, including design for corrosion control. Design features may include epoxy coating of reinforcing steel, use of Type 5 Portland cement in structural concrete, or soil treatment to neutralize pH in the soil or reduce excessive chloride and sulfate concentrations in the soil (EBMUD 2016). Therefore, impacts to the proposed project resulting from corrosive soils would be less than significant.

Mitigation Measures: Geology-1

Significance after Mitigation: Less than Significant.

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3.8 GREENHOUSE GASES

This section presents the environmental setting and impact analysis for greenhouse gases and climate change that could occur as a result of the proposed project. Background information, known resources, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here. Appendix E includes a copy of the Air Quality and Greenhouse Gas Emissions Assessment and Technical Memo prepared for the proposed project.

3.8.1 Data Collection

GHGs were evaluated by reviewing the following data sources:

- CARB's First Update to the Climate Change Scoping Plan: Building on the framework Pursuant to AB 32, The California Global Warming Solutions Act of 2006 (CARB 2014b)
- Air Quality and Greenhouse Gas Emissions Report (Illingworth & Rodkin 2016)

3.8.2 Environmental Setting

3.8.2.1 Greenhouse Gases and Climate Change

Gases that trap heat in the atmosphere (i.e., GHGs) regulate the earth's temperature. The greenhouse gas effect is responsible for maintaining a habitable climate. The most common GHGs are CO_2 and water vapor; other important GHGs include methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). GHGs are released into the earth's atmosphere through a variety of natural processes and human activities.

Sources of GHGs are generally as follows:

- Fuel Combustion: CO_2 and N_2O
- Agricultural Operations: N_2O from crop fertilization; CH_4 from off-gassing from livestock and landfill operations
- Refrigeration and Cooling: HFCs
- Industry Processes: PFCs and SF_6

Each GHG has its own potency and effect upon the earth's energy balance, expressed in terms of a global warming potential (GWP), with CO_2 being assigned a value of 1 and SF_6 being several orders of magnitude stronger with a GWP of 23,900. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of equivalent CO_2 (CO_2e).

An expanding body of scientific research supports the theory that global warming is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California could be adversely affected by the global warming trend. Increased precipitation and sea level rise could increase coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include: more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

According to CARB, total gross California GHG emissions in 2013[1] were 459.3 million metric tons of carbon dioxide equivalent ($MMTCO_2e$). Table 3.8-1 shows the Statewide GHG emissions estimated by CARB for the years 1990 and 2013.

The population of California has grown by 8.47 million (29.96 million in 1990 to 38.43 million in 2013) between 1990 and 2013 (U.S. Census Bureau 1999, U.S. Census Bureau 2013). The gross domestic product (GDP) for California has grown by $1.4 billion ($0.8 billion in 1990 to $2.2 billion in 2013) between 1990 and 2013 (Department of Finance 2015). Despite the population growth of 28 percent and the increase in GDP of 186 percent from 1990 to 2013, GHG emissions have only increased by 6 percent. The low rate of GHG emission generation as compared to the significantly higher rate of population growth and GDP is likely attributed to energy efficiency and conservation efforts (CARB 2014a).

Table 3.8-1 California Greenhouse Gas Inventory

Source Category	1990 ($MMTCO_2e$)	2013 ($MMTCO_2e$)
Total Energy	*386.41*	*382.4*
Energy Industries	157.33	140.80
Manufacturing Industries and Construction	24.24	19.93
Transport	150.02	168.20
Other Sectors	48.19	45.25
Non-Specified	1.38	—
Fugitive Emissions from Fuels	5.25	8.21
Industrial Processes and Product Use	*18.34*	*31.8*
Agriculture, Forestry and Other Land Use	*19.11*	*33.8*
Waste	*9.42*	*11.3*
Gross California Emissions	**433.29**	**459.3**

Sources: CARB 2007, CARB 2015

[1] The most recent year for which GHG emissions are available.

3.8.3 Applicable Regulations, Plans, and Standards

3.8.3.1 Federal Regulations

Final Rule on Mandatory Reporting of Greenhouse Gases

In 2009, the USEPA established the Final Rule on Mandatory Reporting of Greenhouse Gases, which requires reporting of GHG emissions from large sources and suppliers in the US. In general, the rule is referred to as 40 CFR Part 98. 40 CFR Part 98 is intended to collect accurate and timely emissions data to inform future policy decisions. Facilities that emit 25,000 metric tons of CO_2e ($MTCO_2e$) or more per year are required to submit annual reports to the USEPA.

Clean Air Act

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- **Endangerment Finding.** The current and projected concentrations of the six key well-mixed GHGs – CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 – in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding.** The combined emissions of well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

The findings do not themselves impose any requirements on industry or other entities.

Light-Duty Vehicle Standards

In collaboration with the National Highway Traffic Safety Administration (NHTSA), the USEPA finalized the program to reduce GHG emissions and improve fuel economy for light-duty vehicles (model years [MY] 2012–2016) in May 2010. The program was extended in 2012 to set more stringent standards for MY 2017–2025 light-duty vehicles. The revised standards are projected to reduce GHGs by approximately 2 billion metric tons and save 4 billion barrels of oil over the lifetime of MY 2017–2025 vehicles (USEPA 2012). Standards include fuel economy targets and improvements in vehicle technologies, including improved vehicle aerodynamics, reduced vehicle weight, lower tire rolling resistance, and expanded production of electric and hybrid vehicles.

Heavy-Duty Truck and Bus Standards

In August 2011, the USEPA and the NHTSA announced the first-ever program to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses. The final combined standards of the program will reduce CO_2 emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of MY 2014 to 2018 heavy-duty vehicles (USEPA 2011). The heavy-duty sector addressed in the USEPA and NHTSA rules (including the largest pickup trucks and vans, semi-trucks, and all types and sizes of work trucks and buses in between) accounts for nearly 6 percent of total GHG emissions in the US and 20 percent of transportation emissions. The program includes standards for fuel consumption and emissions for combination tractors and vocational vehicles, N_2O and CH_4 emissions standards applicable to all heavy-duty engines, pick-ups, and vans, and standards for leakage of HFC refrigerants from air conditioning systems.

3.8.3.2 State Regulations

Executive Order S-3-05
Executive Order S-3-05, signed in June 2005 by Governor Arnold Schwarzenegger, states that California is vulnerable to the impacts of climate change and that increased temperatures could reduce the Sierra snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To address those concerns, the Executive Order established the state's first GHG emissions targets:

- Reduce GHG emissions to 2000 levels by 2010;
- Reduce GHG emissions to 1990 levels by 2020; and
- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

Executive Order S-3-05 requires biannual reports on progress made toward meeting the targets and the global warming impact on California.

Global Warming Solutions Act of 2006 (Assembly Bill 32)
In September 2006, the State legislature passed, and Governor Schwarzenegger signed, AB 32 (Chapter 488, Statutes of 2006), the Global Warming Solutions Act of 2006, which set the 2020 GHG emissions reduction goal into law. It directed CARB to begin developing discrete early actions to reduce GHG emissions while also preparing the Climate Change Scoping Plan (Scoping Plan), which outlines a framework of practices that would eventually be adopted and implemented to reach AB 32 goals (CARB 2014b). CARB approved the Scoping Plan in 2008 and updated it in May 2014. Regulations are being phased in over time. Adopted regulations include the 33 percent Renewable Portfolio Standard, the Cap-and-Trade Program, and the Low Carbon Fuel Standard. Relevant recommended actions of the updated Scoping Plan are generally related to transportation/goods movement and gases with a high GWP.

Reporting of GHG emissions by major sources is required by AB 32. In 2007, CARB established the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions. Revisions to the GHG reporting regulation were approved by the California Office of Administrative Law, which became effective on January 1, 2012. Facilities that emit 10,000 $MTCO_2e$ or more of GHG emissions per year are required to submit annual reports to CARB.

Executive Order B-30-15
In April 2015, Governor Brown signed Executive Order B-30-15, establishing a new interim statewide GHG emission reduction target of 40 percent below 1990 levels by 2030. The interim reduction target was established in order to ensure California meets its goal of reducing GHG emissions to 80 percent below 1990 levels by 2050. Executive Order B-30-15 requires state agencies to consider climate change in their planning and investment decisions, giving priority to actions that reduce GHG emissions.

Senate Bill 97

SB 97 was passed by the State legislature and approved by Governor Schwarzenegger in August 2007. SB 97 acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. The California Natural Resources Agency adopted amendments to the CEQA Guidelines to address the analysis and mitigation of GHG emissions. The amendments to the CEQA Guidelines implementing SB 97 became effective on March 18, 2010.

Assembly Bill 1826

Governor Brown signed AB 1826 (Chapter 727, Statutes of 2014) in October 2014. AB 1826 requires businesses to recycle their organic waste on and after April 1, 2016, depending on the amount of waste they generate per week. The law also requires local jurisdictions across California to implement organic waste recycling programs to divert organic waste generated by businesses, including multifamily residential buildings that consist of five or more units. AB 1826 was enacted to reduce the disposal of organic waste in landfills in efforts to reduce GHG emissions from landfills, which is a part of the Scoping Plan.

3.8.3.3 Local Regulations

Overview

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 for projects involving facilities for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

Bay Area Air Quality Management District CEQA Guidelines

See Section 3.3: Air Quality for a discussion of the BAAQMD CEQA Guidelines, which includes the guidelines for GHG thresholds.

City of Alameda Local Action Plan for Climate Protection

The City of Alameda has prepared a Local Action Plan to reduce GHG emissions generated by the community. The City of Alameda's goal is to reduce GHG emissions by at least 25 percent below 2005 emission levels by the year 2020. The Local Action Plan provides five critical initiatives to reduce GHGs:

1. Adopt "Zero Waste Strategy" Programs and Ordinances.
2. Develop a multi-faceted community outreach program to increase public awareness and participation in greenhouse gas reductions.
3. Amend the Alameda Municipal Code to include sustainable design and green building standards for all new, substantially expanded, and remodeled buildings.
4. Encourage the Alameda Public Utilities Board to require that Alameda Power & Telecom maintain and expand its source mix to 100 percent carbon-free energy.
5. Develop and fund alternative transportation strategies in the City's budget.

City of Oakland Energy and Climate Action Plan

The City of Oakland has prepared an Energy and Climate Action Plan to reduce citywide GHG emissions. The City of Oakland has approved a goal of 36 percent reduction of 2005 emission levels in GHG emissions by 2020. A variety of priority actions are identified within the OCAP to achieve emissions reductions in the transportation, residential, and commercial sector.

PA 20	Refine Implementation of the Construction and Demolition (C&D) Recycling Ordinance.
Action MW-2	Refine implementation of Oakland's C&D Debris Waste Reduction & Recycling Ordinance (OMC 15.34) to capture greater amounts of materials for reuse, recycling and composting.

EBMUD 2014 Climate Change Monitoring and Response Plan

In 2008, EBMUD adopted a climate change objective in EBMUD's Strategic Plan focusing on using resources (economic, environmental, and human) in a responsible manner that meets current needs without compromising the ability to meet future needs. In response to the climate change objective, EBMUD prepared the EBMUD 2014 Climate Change Monitoring and Response Plan. EBMUD also prepared an Action Plan that provides guidance to inform EBMUD of decisions regarding water supply, water quality, and infrastructure planning. EBMUD's goal is to reduce GHG emissions 50 percent by 2040 (as compared to baseline GHG emissions in year 2000). In 2013, GHG emissions generated by EBMUD were 31,244 $MTCO_2e$ which was 31 percent below 2000 GHG emission levels. EBMUD tracks GHG emissions per the California Climate Action Registry protocols (EBMUD 2014).

EBMUD Practices and Procedures

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44 requires that the construction crews implement practices and procedures to reduce greenhouse gas emissions from fuel combustion including:

- Maintaining on-road and off-road vehicle tire pressures to manufacturer specifications; checked and re-inflated at regular intervals
- Maintaining construction equipment engines to manufacturer's specifications
- Recycling demolition debris for reuse to the extent feasible (excluding wood treated with preservatives)

3.8.4 Proposed Project Impacts and Mitigation Measures

3.8.4.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on GHG emissions if it would:

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

2. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

BAAQMD is the regional agency tasked with managing air quality. At the state level, CARB (a part of the California Environmental Protection Agency) oversees regional air district activities and regulates air quality at the state level. BAAQMD has published CEQA Air Quality Guidelines that are used in this assessment (BAAQMD 2011).

3.8.4.2 Approach to Analysis

An Air Quality and Greenhouse Gas Emissions Assessment was prepared for the proposed project (Appendix E). Proposed project information was entered into CalEEMod, as recommended by BAAQMD, to generate GHG emissions data. The emissions data was used to identify and define potential impacts on GHG emissions that may be affected by implementation of the proposed project.

3.8.4.3 Impacts and Mitigation Measures

Table 3.8-2 provides a summary of the significance of the proposed project's GHG emission impacts before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.8-2 Summary of Potential Impacts to Greenhouse Gases

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact GHG-1: Potential to generate annual GHG emissions, either directly or indirectly, that may have a significant impact on the environment (Criteria 1)	Less than Significant	---
Impact GHG-2: Potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions (Criteria 2)	Less than Significant	---

Impact GHG-1: Potential to generate annual GHG emissions, either directly or indirectly, that may have a significant impact on the environment (Criteria 1). (*Less than Significant)*

Pre-Construction Geotechnical Investigation

Pre-construction geotechnical investigation borings would be conducted in 2017 prior to construction of Crossing #1. Drilling operations for Crossings #2 and #3 are not yet known at this time. The boring activities would be conducted in less than a week. As described further in Section 2.7.1.3 of the Project Description, borings for all three crossings would be conducted on land and in the channel. The GHG emissions generated during the borings are shown in Table 3.8-3.

The GHG emissions generated during borings would be minimal. The impact from pre-construction geotechnical boring emissions would be less than significant. EBMUD would also implement Standard Construction Specification 01 35 44, which requires certain practices and procedures that would further reduce GHG emissions. The impact would remain less than significant.

Table 3.8-3 GHG Emissions Generated from Geotechnical Investigation Borings

Location/Year	GHG Emissions ($MTCO_2e$)
Crossing #1	
2017	4.5
Crossing #2	
2020	4.5
Crossing #3	
2020	4.5

Source: Reyff 2016

Construction

Construction of the proposed project would occur over the short-term and generate emissions primarily from equipment exhaust and worker and vehicle hauling trips. Construction of Crossing #1 is anticipated to begin in 2018 and last between 13 and 22 months. Construction of Crossings #2 and #3 would not occur until after 2020. Construction of Crossing #2 would last between 9 and 18 months, and Crossing #3 would last between 9 and 19 months. Because the exact timeframe for construction of Crossing #2 or #3 is not known, both were conservatively modeled with construction start dates of 2021, since exhaust emissions associated with construction equipment are anticipated to be reduced as time goes on in association with more efficient technology. Crossing #2 and #3 would not be constructed at the same time, but both were modeled simultaneously to provide a conservative GHG emissions estimate.

A breakdown of GHG emissions per year and totals for each crossing are provided in Table 3.8-4. GHG emissions are generated from on-site operation of construction equipment, hauling truck trips, and worker trips.

Table 3.8-4 GHG Emissions Generated by the Proposed Project ($MTCO_2e$)

Year	Crossing #1	Crossing #2	Crossing #3	Total GHG Emissions
2018	285	–	–	285
2019	471	–	–	471
2021	–	279	250	529
2022	–	312	365	**677**

Note:
Bold indicates greatest emissions in any one year.

Source: Illingworth & Rodkin 2016

The maximum GHG emissions associated with construction were computed to be 677 $MTCO_2e$[2] per year, generated by all construction activities occurring in one year as shown in Table 3.8-4. Neither the cities of Alameda or Oakland, EBMUD, nor BAAQMD have an adopted threshold of significance for construction-related GHG emissions, though BAAQMD recommends quantifying emissions and disclosing that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of BMPs to reduce GHG emissions during construction, where feasible and applicable. For reference, the operational-related threshold is 1,100 $MTCO_2e$ per year. A conservative, maximum annual construction emission of 677 $MTCO_2e$ from the proposed project would be less than the operational-related threshold. Consequently, the impact from construction emissions generated by the proposed project during construction would be less than significant. EBMUD also would implement Standard Construction Specification 01 35 44, which requires certain practices and procedures that would further reduce GHG emissions. The impact would remain less than significant.

Mitigation Measures: None Required.

Impact GHG-2: Potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions (Criteria 2). (*Less than Significant)*

CARB Climate Change Scoping Plan

Construction of the proposed project would result in GHG emissions that are covered by the Scoping Plan. Conformity with relevant actions in the Scoping Plan is summarized in Table 3.8-5.

The consistency analysis conducted for the proposed project and Scoping Plan determines that there is no conflict with the Scoping Plan. The impact would be less than significant.

Bay Area 2010 CAP

As discussed in Section 3.3.4: Air Quality, Impact Air-1, the proposed project would not conflict with the 2010 CAP because emissions would be below the BAAQMD significance threshold. The impact would be less than significant.

Local Plans

The City of Alameda Local Action Plan and City of Oakland Energy and Climate Action Plan identify actions for the cities to implement including community outreach, transportation strategies, and updating the municipal code or preparing city ordinances to achieve city-wide GHG reduction goals. These actions identified in the cities' plans are outside the purview of the proposed project. There would be no impact.

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2 The maximum GHG emissions would occur in 2022, should Crossings #2 and #3 be constructed at the same time.

Table 3.8-5 Proposed Project Conformity with Scoping Plan Actions

Action	Expected Completion Date	Proposed Project Consistency Analysis
Propose "Phase 2" heavy-duty truck GHG standards (CARB)	2016	Phase 2 on-road heavy-duty vehicle GHG standards are not scheduled to take effect until 2018. EBMUD would comply with the "Phase 2" heavy-duty truck GHG standards for any construction that occurs within and beyond the year 2018. The proposed project would not conflict with the Scoping Plan action.
Continue diesel controls that will reduce black carbon emissions by 95 percent from the late 1960s to 2020 (CARB)	2020	The proposed project would use diesel-burning vehicles and equipment, which produce black carbon emissions. The Scoping Plan notes that regulating diesel particulate retrofits and turnover of legacy fleets would reduce black carbon emissions. The proposed project would comply with all diesel controls including Advisory 377 limiting idling. The proposed project would not conflict with the Scoping Plan action.
Reduce emissions of smog-forming pollutants by about 90 percent below 2010 levels by 2032 to meet the NAAQS for O_3 (CARB)	2032	The proposed project would use diesel-burning vehicles and equipment, which produce emissions that would contribute to smog formation. The proposed project is consistent with the 2010 CAP, which was, in part, drafted to outline how the O_3 CAAQS will be met. The CAAQS for O_3 are more stringent than the NAAQS; therefore, consistency with the 2010 CAP would ensure emissions would meet the NAAQS for O_3. The proposed project would not conflict with the Scoping Plan action.

EBMUD Action Plan

The EBMUD Action Plan requires certain practices and procedures to help EBMUD achieve the GHG reduction goal. These practices and procedures identified in the Action Plan are outside the purview of the proposed project. There would be no impact.

Mitigation Measures: None Required.

3.8.5 References

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3.9 HAZARDS AND HAZARDOUS MATERIALS

This section presents the environmental setting and impact analysis for hazards and hazardous materials. Background information, known hazards, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here.

3.9.1 Definitions

As used in this section, the term "hazardous material" is defined as any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.[1] As used in this section, the term "hazardous waste" generally refers to a hazardous material that has been used for its original purpose and is about to be discarded or recycled. In California, a hazardous waste is defined as a waste, or combination of wastes, that due to its quantity, concentration, or physical, chemical, or infectious characteristics may either:

- Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
- Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.[2]

The criteria for identifying hazardous wastes are discussed further under Section 3.9.4: Applicable Regulations, Plans, and Standards.

3.9.2 Data Collection

Existing conditions in the proposed project vicinity were determined based on review of environmental records, regulatory reports, and other documents. Environmental records of hazardous materials release sites in Alameda County were acquired from the State Water Resources Control Board (SWRCB) GeoTracker database and the DTSC EnviroStor database. Records of school sites in Alameda County were acquired from federal records maintained by the National Center for Education Statistics. Site information from each environmental and school record was imported into a geographic information system (GIS) program to spatially analyze sites within 0.25 mile of the proposed project area.

1 Abbreviated from California Health and Safety Code Section 25501.

2 Abbreviated from California Health & Safety Code Section 25141.

3.9.3 Environmental Setting

3.9.3.1 Potential Subsurface Contamination

Over the span of more than 100 years, the waterfront properties created from imported fill materials (Graymer et al. 2006) along the Oakland Estuary in the cities of Oakland and Alameda have been intensely developed for industrial and commercial land uses (City of Oakland 1999). The chemical quality of the fill materials is unknown and may contain construction debris and wastes originating from offsite sources. The long history of industrial and commercial land uses has also resulted in releases of hazardous materials that have affected subsurface soils and groundwater in many areas. Potentially undocumented releases of hazardous materials may have occurred. Documented and undocumented releases of hazardous materials and existing fill materials may have affected soil and groundwater quality in the proposed project vicinity.

3.9.3.2 Known Subsurface Contamination

Based on preliminary review of the SWRCB GeoTracker database and DTSC EnviroStor database, 155 hazardous materials release sites (open and closed) were identified within 0.25 mile of the proposed project area. Hazardous materials release sites were identified from the following SWRCB and DTSC cleanup programs: Leaking Underground Storage Tank (LUST) Cleanup Sites, Cleanup Program Sites, Evaluation, Military Evaluation, Military Privatized Site, Military Underground Storage Tank (UST) Site, State Response, and Voluntary Cleanup. The majority of the release sites (112 sites) have been closed because residual contamination (if any) does not pose an unacceptable health risk to the current site users. Residual contamination, however, could pose an unacceptable health or environmental risk under future development scenarios, such as grading, excavation, and/or dewatering.

There are 43 hazardous materials release sites identified as under active regulatory oversight for ongoing investigation and cleanup activities. The primary contaminants of concern in soil and groundwater at many of the active hazardous materials release sites are petroleum hydrocarbons and chlorinated solvents. Site information about the hazardous materials releases identified within 0.25 mile of the proposed project area is summarized in Table 3.9-1 and site locations are shown in Figure 3.9-1.

Table 3.9-1 Hazardous Materials Release Sites within 0.25-mile of the Proposed Project Area

Site Name[1]	Address	Case Type	Status
Crossing #1 and Alice Webster Pipeline Abandonment			
Alameda Navy Supply Center (NSC) Annex	2155 Mariner Square Loop, Alameda	Voluntary Cleanup	Active
Chevron #21-1663 / Mariner Boat Yard	2415 Mariner Square Drive, Alameda	LUST Cleanup Site	Open - Site Assessment
Stewart Court Property	762 Stewart Court, Alameda	Cleanup Program Site	Open - Site Assessment
Marina Village Cleaners	817 Marina Village Parkway, Alameda	Cleanup Program Site	Open - Assessment & Interim Remedial Action

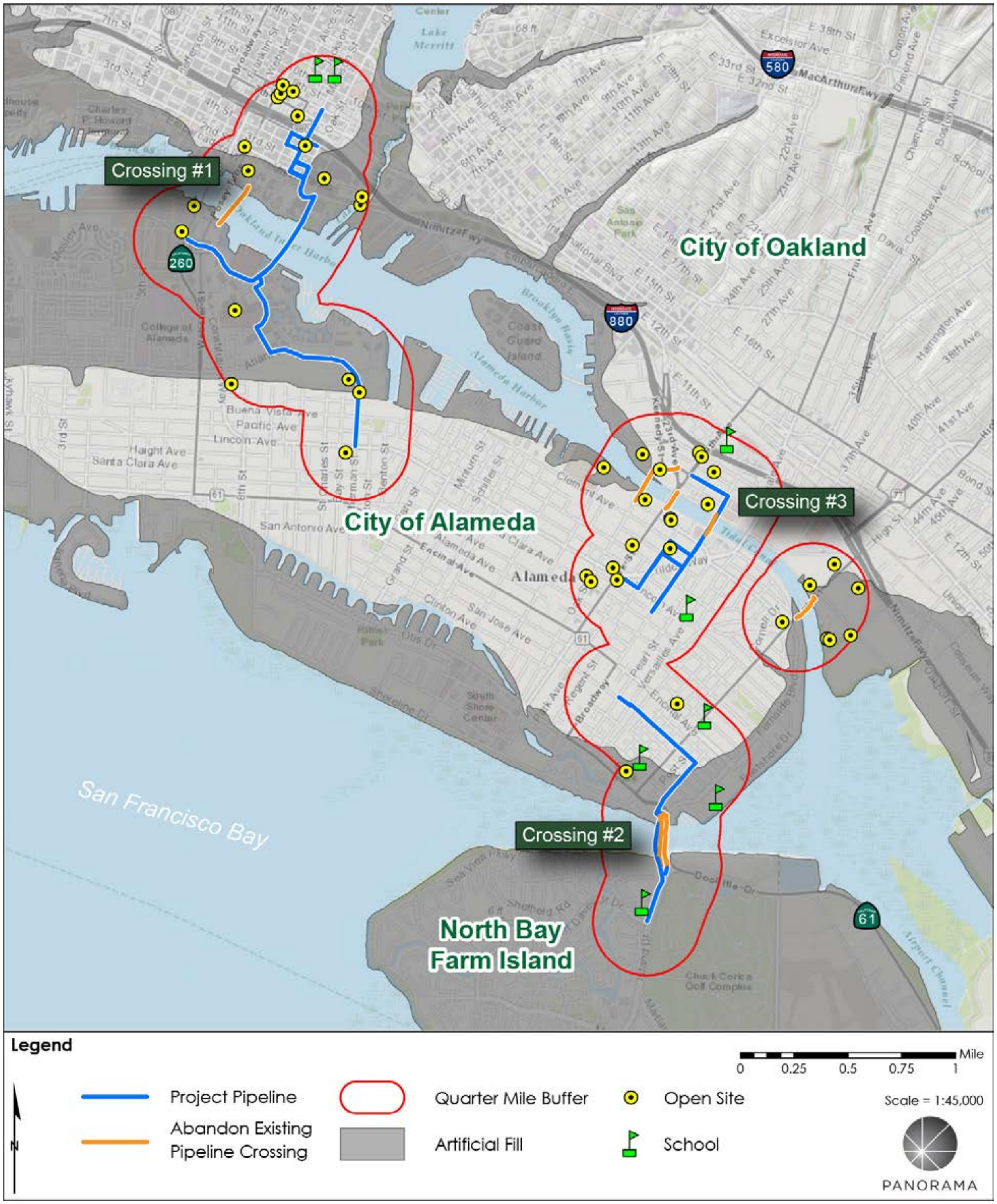
Site Name[1]	Address	Case Type	Status
The Colony / The Olson Company	311 2nd Street, Oakland	Cleanup Program Site	Open - Site Assessment
Jack London Square Parcel F2	Embarcadero West, Oakland	Cleanup Program Site	Open - Remediation
Oakland Auto Parts	706 Harrison Street, Oakland	LUST Cleanup Site	Open - Remediation
Chan's Service Station / Shell	726 Harrison Street, Oakland	LUST Cleanup Site	Open - Remediation
Unocal #0752	800 Harrison Street, Oakland	LUST Cleanup Site	Open - Remediation
Lim Property Gas Station	250 8th Street, Oakland	LUST Cleanup Site	Open - Remediation
Seabreeze Yacht Center	280 6th Street, Oakland	Cleanup Program Site	Open - Remediation
Lakeside Non-Ferrous Metals Corp	412 Madison Street, Oakland	Evaluation	Inactive - Needs Evaluation
Macy's Movers (Toxic)	200 Victory Court, Oakland	Cleanup Program Site	Open - Site Assessment
Elegant Cleaners	1208 Lincoln Avenue, Alameda	Cleanup Program Site	Open - Assessment & Interim Remedial Action
Jean Sweeney Open Space Park	1925 Sherman Street, Alameda	Cleanup Program Site	Open - Site Assessment
Jean Sweeney Open Space Park	1925 Sherman Street, Alameda	Voluntary Cleanup	Active
Port of Oakland / Pacific Dry Dock Yard 2	321 Embarcadero, Oakland	LUST Cleanup Site	Open - Assessment & Interim Remedial Action
Vukasin/Southern Pacific	250 Fallon Street, Oakland	Cleanup Program Site	Open - Inactive
Crossing #2 and Bay Farm-1 and Bay Farm-2 Pipeline Abandonments			
Krusi Park	UNKNOWN Otis Drive, Alameda	Cleanup Program Site	Open - Inactive
Private Residence	Private Residence, Alameda	Cleanup Program Site	Open - Assessment & Interim Remedial Action
Crossing #3 and Blanding Street, Park Street, and Derby Street Pipeline Abandonments			
Alameda Naval Air Station - City of Alameda	2263 Santa Clara Avenue, Alameda	Military Privatized Site	Open - Site Assessment
Bill Chun Service Station	2301 Santa Clara Avenue, Alameda	LUST Cleanup Site	Open - Remediation
Former J. H. Baxter Facility, Alameda	2201 Clement Avenue, Alameda	State Response	Active
Alameda Auto Enhancers	2327 Lincoln Avenue, Alameda	Cleanup Program Site	Open - Inactive

Site Name[1]	Address	Case Type	Status
Bell Cleaners / Wittenau Property	1534 Park Street, Alameda	Cleanup Program Site	Open - Site Assessment
Xtra Oil	1701 Park Street, Alameda	LUST Cleanup Site	Open - Assessment & Interim Remedial Action
Conagra Inc	2201 7th Street E, Oakland	LUST Cleanup Site	Open - Site Assessment
Park Street Landing	2301-2337 Blanding Street, Alameda	Cleanup Program Site	Open - Site Assessment
Rhodes & Jamieson Batch Plant	333 Kennedy Street, Oakland	LUST Cleanup Site	Open - Site Assessment
Walt Living Trust	1814 Everett Street, Alameda	LUST Cleanup Site	Open - Site Assessment
Allied Engineering Corporation	2421 Blanding Avenue, Alameda	LUST Cleanup Site	Open - Site Assessment
Allied Engineering & Production Corp	2421 Blanding Avenue, Alameda	Cleanup Program Site	Open - Site Assessment
Hans And Gunter Roofing Company	2834 E 7th Street, Oakland	LUST Cleanup Site	Open - Site Assessment
EBMUD	UNKNOWN 7th Street & 29th Ave, Oakland	LUST Cleanup Site	Open - Site Assessment
Signature Properties	303 & 315 Derby Avenue, Oakland	Cleanup Program Site	Open - Site Assessment
Esposito Plating Corporation	2904-2908 Chapman Street, Oakland	Voluntary Cleanup	Inactive - Action Required
High Street Pipeline Abandonment			
Private Residence	Private Residence, Alameda	LUST Cleanup Site	Open - Assessment & Interim Remedial Action
Arco/Unocal	401/411 High Street, Oakland	Cleanup Program Site	Open - Remediation
Abf Freight Maintenance Shop	4575 Tidewater Avenue, Oakland	Cleanup Program Site	Open - Site Assessment
ABF Freight Systems	4575 Tidewater Ave, Oakland	LUST Cleanup Site	Open - Assessment & Interim Remedial Action
Howard Street Lot	569 High Street, Oakland	Cleanup Program Site	Open - Site Assessment
Tidewater Business Park	4703 - 4723 Tidewater, Oakland	Cleanup Program Site	Open - Site Assessment
El Monte RV Center (Toxics)	4341 Howard Street, Oakland	Cleanup Program Site	Open - Site Assessment

Note:

1 Sites name and address information are derived directly from the SWRCB (2015) and DTSC (2015) databases.

Figure 3.9-1 Hazardous Materials Release Sites and Schools within 0.25 mile of the Proposed Project



3.9.3.3 Potential for Naturally-Occurring Asbestos

Geologic mapping from the USGS does not show any areas of rock likely to contain naturally-occurring asbestos (ultramafic rock) in the proposed project vicinity (Van Gosen and Clinkenbeard 2011).

3.9.3.4 High-Priority Subsurface Utilities

High-priority subsurface utilities include high-pressure natural gas pipelines with normal operating pressures greater than 60 pounds per square inch, petroleum pipelines, pressurized sewage pipelines, conductors or cables that have a potential to ground of 60,000 volts or more, or hazardous materials pipelines that are potentially hazardous to employees or the public, if damaged[3]. The locations of high-priority subsurface utilities in the vicinity of the proposed project area are currently unknown, but would be identified prior to excavation (see Section 3.9.4.2).

3.9.3.5 Schools

Based on a review of federal records for public and private schools with grades ranging from pre-kindergarten to 12, there are eight schools located within 0.25 mile of the proposed project area (National Center for Education Statistics 2015). Information about the schools is summarized in Table 3.9-2 and shown on Figure 3.9-1.

Table 3.9-2 Schools within 0.25-Mile of the Proposed Project Area

School Name	Lowest Grade	Highest Grade	Street Address	City
American Indian Public Charter School II	KG	8	171 12th Street	Oakland
Lazear Charter Academy	KG	8	824 29th Avenue	Oakland
Lincoln Elementary	KG	5	225 11th Street	Oakland
Amelia Earhart Elementary	KG	5	400 Packet Landing Road	Alameda
Edison Elementary	KG	5	2700 Buena Vista Avenue	Alameda
Frank Otis Elementary	KG	5	3010 Fillmore Street	Alameda
Lincoln Middle	6	8	1250 Fernside Boulevard	Alameda
St Philip Neri School	KG	8	1335 High Street	Alameda
Note: KG = kindergarten				

Source: Google 2015

[3] California Code of Regulations, Title 8, Section 1541.

3.9.3.6 Airports

No private airstrips are mapped within 2 miles of the proposed project area (FAA 2015). The nearest public-use airport to the proposed project area is the Oakland International Airport, which is located approximately 0.9 mile southeast of Crossing #2. The Alameda County Airport Land Use Commission has adopted an Airport Land Use Compatibility Plan for the Oakland International Airport that includes height restrictions for structures (including construction equipment) near the airport based on the Federal Aviation Regulations (FAR) Part 77. The FAR Part 77 height restrictions extend over Crossing #2 and the High Street pipeline abandonment; the FAR Part 77 height restrictions do not apply to the rest of the proposed project area (ESA 2012).

3.9.3.7 Wildland Fires

California Department of Forestry and Fire Protection (CAL FIRE) has mapped Very High Fire Hazard Severity Zones in Alameda County to assist responsible local agencies with identifying measures to reduce the potential for losses of life, property, and resources from wildland fire. CAL FIRE has determined that there are no Very High Fire Hazard Severity Zones in the proposed project vicinity (CAL FIRE 2008).

3.9.3.8 Marine Navigation Hazards

The water bodies surrounding Alameda Island are used by various types of vessels including government vessels, passenger ferry ships, and private boats. The US Coast Guard uses the Oakland Inner Harbor and Tidal Canal, which are located near Crossings #1 and #3, respectively. USACE uses ships for maintenance dredging within the Oakland Inner Harbor and Tidal Canal, which are located near Crossings #1 and #3, respectively (URS 2015). Private boats are used throughout all the waterbodies surrounding Alameda Island.

3.9.4 Applicable Regulations, Plans, and Standards

The proper management of hazardous materials is a common concern for all communities. Beginning in the 1970s, governments at the federal, state, and local levels became increasingly concerned about the effects of hazardous materials on human health and the environment. Numerous laws and regulations were developed to investigate and mitigate the effects of hazardous materials. As a result, the storage, use, generation, transport, and disposal of hazardous materials are highly regulated by federal, state, and local agencies. The agencies and information about the laws, regulations, policies, and programs they administer are summarized below.

3.9.4.1 Federal Regulations

Hazardous Waste Management

The USEPA is the lead agency responsible for enforcing federal laws and regulations governing hazardous materials that affect public health or the environment. In 1976, the Resource Conservation and Recovery Act (RCRA) was enacted to provide a general framework for the USEPA to regulate hazardous waste from the time it is generated until its ultimate disposal. Under the RCRA, a waste may be considered hazardous if it exhibits certain hazardous characteristics (ignitability, corrosivity, reactivity, or toxicity) or if it is included on a specific list of wastes that the USEPA has determined are hazardous. In accordance with the RCRA, any generator, transporter, or facility that treats, stores or disposes of hazardous waste is required to ensure that the waste is properly managed from "cradle to grave" by complying with the federal waste manifest system and other regulations regarding hazardous waste identification, classification, generation, management and disposal.[4]

Hazardous Materials Transportation

In 1990 and 1994, the federal Hazardous Materials Transportation Act was amended to improve the protection of life, property, and the environment from the inherent risks of transporting hazardous materials in all major modes of commerce. The US Department of Transportation (US DOT) developed hazardous materials regulations, which govern the classification, packaging, communication, transportation, and handling of hazardous materials, as well as employee training and incident reporting.[5] The transportation of hazardous materials is subject to both RCRA and US DOT regulations.

Worker Health and Safety

OSHA is the federal agency responsible for enforcement and implementation of federal laws and regulations pertaining to worker health and safety. Under OSHA jurisdiction, the Hazardous Waste Operations and Emergency Response regulations require training and medical supervision for workers at hazardous waste sites.[6]

Airport Land-Use Compatibility

The Federal Aviation Administration (FAA) has established land-use regulations in the vicinity of public-use airports to protect the safety and compatibility of aircraft operations. The FAR Part 77, Objects Affecting Navigable Airspace, sets forth standards and review requirements for protecting navigable airspace near airports by restricting the height of potential structures and minimizing other potential hazards (e.g., reflective surfaces, flashing lights, and electronic interference) to aircraft approaching or departing an airport. FAR Part 77 includes criteria that define sloped imaginary surfaces extending several miles from the airport runways that are used to identify structures that could potentially obstruct air navigation.

The FAA requires notification of proposed construction or alteration projects that would penetrate the imaginary surfaces defined by FAR Part 77 or projects that would stand 200 feet high or more at least 30 days prior to beginning construction (FAA Form 7460-1). Following notification of proposed construction or alteration, the FAA may conduct an aeronautical study

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[4] Code of Federal Regulations, Title 40 – Protection of Environment, Parts 260-273.

[5] Code of Federal Regulation, Title 49 – Transportation, Parts 171-180.

[6] Code of Federal Regulations, Title 29 – Labor, Section 1910.120 – Hazardous Waste Operations and Emergency Response.

to determine if proposed structures and construction equipment would create an airspace hazard. The FAA commonly requires proposed structures and construction equipment affecting navigable airspace to be marked and/or lighted for increased visibility.

Inland Navigation Rules Act of 1980

In 1980 the US enacted the Inland Navigation Rules Act of 1980. Rule 9 of the Inland Navigation Rules Act includes requirements for vessels proceeding along a narrow channel. The project area falls under Rule 9. Rule 9 includes the following requirements:

- A vessel of less than 20 meters in length or a sailing vessel shall not impede the passage of a vessel which can safely navigate only within a narrow channel or fairway
- A vessel shall not cross a narrow channel or fairway if such crossing impedes the passage of a vessel which can safely navigate only within such channel or fairway
- A vessel nearing a bend or an area of a narrow channel or fairway where other vessels may be obscured by an intervening obstruction shall navigate with particular alertness and caution and shall sound the appropriate signal
- Any vessel shall, if the circumstances of the case admit, avoid anchoring in a narrow channel

San Francisco Bay Regulated Navigation Area

The US Coast Guard established Regulated Navigation Areas (RNAs) in 1995 and 33 CFR 165.1181 established the San Francisco Bay RNAs. Vessel traffic is regulated within the San Francisco Bay RNAs by the Vessel Traffic Service (VTS), which continuously monitors the San Francisco Bay. The San Francisco RNA is divided into smaller RNAs, including the Oakland Harbor RNA. 33 CFR 165.1181(e)(5) established that a power-driven vessel of 1,600 or more gross tons or a tug with a tow of 1,600 or more gross tons shall not enter the Oakland Harbor RNA when another power-driven vessel of 1,600 or more gross tons, or a tug with a tow of 1,600 or more gross tons, is navigating therein, if such entry would result in meeting, crossing, or overtaking the other vessel. 33 CFR 165.1181(d)(3) requires that the master, pilot or person directing the movement of a vessel within the San Francisco Bay RNAs comply with Rule 9 of the Inland Navigation Rules Act of 1980.

The VTS establishes regulations for anchorages within the San Francisco Bay RNA. Established anchorages are defined in 33 CFR 110.224. Any vessel anchoring outside of established anchorages should notify VTS immediately. Anchoring offshore is strictly forbidden. Exceptions may be made for vessel engine casualties or severe weather preventing transit into port on a case-by-case basis—notification to the VTS is required prior to anchoring offshore. A vessel anchoring outside an established anchorage area should be positioned outside the vessel traffic lanes or ship channel insofar as practicable. If necessary to anchor within a traffic lane or channel, the vessel should be positioned as near the edge of the lane or channel as practicable.

3.9.4.2 State Regulations

Hazardous Waste Management
In California, the DTSC administers the RCRA program, as well as additional State-specific requirements for managing hazardous waste in accordance with the California Hazardous Waste Control Law.[7] The State criteria for identifying hazardous waste based on characteristics of toxicity, flammability, reactivity, and corrosiveness are described in Title 22 of the California Code of Regulations, Sections 66261.10-66261.24, and are broader than the RCRA hazardous waste criteria; therefore, hazardous wastes in California can be identified as either RCRA hazardous waste or non-RCRA hazardous waste.

Hazardous Materials Release Sites
In California, the USEPA has granted most enforcement authority of federal hazardous materials regulations to CalEPA. Under the authority of CalEPA, the SWRCB and DTSC are responsible for overseeing the remediation of contaminated soil and groundwater sites. The provisions of Government Code 65962.5 (also known as the Cortese List) require the SWRCB, DTSC, the California Department of Health Services, and the California Department of Resources Recycling and Recovery to submit information pertaining to sites associated with solid waste disposal, hazardous waste disposal, and/or hazardous materials releases to CalEPA.

Hazardous Materials Transportation
The California Highway Patrol, Caltrans, and DTSC are responsible for enforcing federal and State regulations pertaining to the transportation of hazardous materials. If a discharge or spill of hazardous materials occurs during transportation, the transporter is required to take appropriate immediate action to protect human health and the environment (e.g., notify local authorities and contain the spill), and is responsible for the discharge cleanup.[8]

Worker Health and Safety
State worker health and safety regulations related to construction activities are enforced by the California Division of Occupational Safety and Health (CAL OSHA). Regulations include requirements for protective clothing, training, and limits on exposure to hazardous materials. Specific worker safety measures for excavation hazards (e.g., falling or cave-in of the excavation wall) are described in in California Code of Regulations Title 8 of the California Code of Regulations, Section 1541.

Subsurface Utility Notification Requirements
In accordance with Title 8 of the California Code of Regulations, Section 1541, the approximate location of subsurface utilities (e.g., sewer, telephone, fuel, electric, and water lines) must be

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7 California Health and Safety Code Section 25100 et seq.

8 California Code of Regulations, Title 22 – Social Security, Section 66260.10 et seq.

identified prior to excavation work. The California Government Code, Section 4216 et seq., requires owners and operators of underground utilities to participate in a Regional Notification Center. Excavators must notify the appropriate Regional Notification Center at least 2 business days prior to excavation to allow utility owners/operators adequate time to mark the location of their subsurface utilities, provide information, and/or give clearance prior to digging. Underground Services Alert of Northern California (USA North) is the Regional Notification Center for all proposed excavation activities in the proposed project vicinity.

When excavation is proposed within 10 feet of a high-priority subsurface utility, the excavator must coordinate an on-site meeting with the owner/operator of the utility to determine the action or activities required to verify the location of such installations. An excavator discovering or causing damages to a high-priority subsurface utility must immediately notify the utility owner/operator and the appropriate emergency response personnel.

3.9.4.3 Local Regulations

Overview
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 for projects involving facilities for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

City of Alameda General Plan
The City of Alameda General Plan includes policies governing hazards and hazardous materials within the Health and Safety Element (see Policies 8.4a through 8.4.l and 8.6a through 8.6e). The policies state the City of Alameda's intent to minimize the potential risks to human and environmental health from natural and man-made disasters and hazardous materials releases.

City of Alameda
The City of Alameda Fire Department provides emergency response services for major emergencies in the city of Alameda, such as earthquakes, hazardous materials emergencies, flooding, and wildfires. Emergency response and evacuation procedures in the city of Alameda are implemented in accordance with the City's Comprehensive Emergency Management Plan.

City of Oakland General Plan
The City of Oakland General Plan includes policies and actions governing hazards and hazardous materials within the Safety Element (see Policies PS-1, FI-3, HM-1, HM-2, and HM-3). The policies state the City of Oakland's intent to minimize the potential risks to human and environmental health from natural and man-made disasters, wildland fires, and hazardous materials releases.

City of Oakland

The Oakland Emergency Management Services Division, under the Oakland Fire Department, provides emergency management planning, response, recovery, and mitigation services for natural, technological, and man-made emergencies and disasters affecting the city of Oakland. The Emergency Management Services Division coordinates the activities of all the City's agencies relating to planning, preparation, and implementation of the City's Emergency Plan.

EBMUD Practices and Procedures

EBMUD Standard Construction Specifications

EBMUD Standard Construction Specifications set forth the contract requirements for environmental compliance to which construction crews must adhere. Construction Specifications applicable to hazards and hazardous materials include the following:

- Standard Construction Specification 01 35 44 (Environmental Requirements)
- Standard Construction Specification 01 35 24 (Project Safety Requirements)

The Standard Construction Specifications stipulate that the construction crew shall be responsible for maintaining compliance with applicable federal, State, and local requirements. The requirements include preparation of plans that outline procedures to be followed to ensure the safe and lawful handling of hazardous materials, implementation of plans, and documentation of compliance. EBMUD reviews submittals for conformance with the requirements of the contract documents and specified laws and regulations. Specific planning documents and procedures related to hazards and hazardous materials that are required by EBMUD for construction are described below:

- **Stormwater Pollution Prevention Plan**. Prior to construction, the proposed project's contractor must prepare a SWPPP during construction for coverage under the Construction General Permit in accordance with the requirements of the SWRCB. The SWPPP must include measures to prevent the discharge of contaminated stormwater runoff from the construction site.
- **Water Control and Disposal Plan**. Prior to construction, the project contractor must prepare a Water Control and Disposal Plan approved by EBMUD that describes measures for containing, handling, and disposing of groundwater, runoff water, construction water or any other liquids that come into contact with the interior surface of a pipeline. The plan must include a sampling and analytical program for the characterization of any wastewater, as needed, prior to disposal.
- **Construction and Demolition Waste Disposal Plan.** Prior to construction, the project contractor must prepare a Construction and Demolition Waste Disposal Plan approved by the EBMUD that describes measures for removing, handling, transporting, and disposing of any waste material (except liquid wastes addressed in the Water Control and Disposal Plan). The plan must include a sampling and analytical program for characterizing any waste material, as needed, prior to reuse, recycling or disposal. The plan must also identify the disposal method for soil and the approved disposal site, and include written documentation that the disposal site will accept the waste. Materials and wastes may only be recycled, reused,

reclaimed, or disposed of at locations approved by EBMUD. Prior to disposition of wastes, the contractor must submit copies of waste profile forms and correspondence between the contractor and the disposal facility to EBMUD. Prior to disposal of hazardous wastes, the contractor must submit copies of the waste manifests to EBMUD and provide documentation that the waste hauler is regulated by the state to transport hazardous wastes.

- **Spill Prevention and Response Plan.** Prior to construction, the project contractor must prepare a Spill Prevention and Response Plan approved by EBMUD that describes methods for preventing and controlling the accidental release of hazardous materials used during proposed project construction. In the event of an accidental release, the plan shall include phone numbers for notifying appropriate regulatory agencies and EBMUD, spill-related worker and public health and safety issues, and spill control and cleanup procedures.
- **Project Safety and Health Plan.** Prior to construction, the project contractor must prepare a Project Safety and Health Plan approved by EBMUD that addresses anticipated hazards related to hazardous materials, confined spaces, fall protection, open trench construction or excavations in accordance with CAL OSHA regulations. It must designate a Project Health and Safety Representative and a qualified person to take air samples and measurements of known or suspected hazardous materials. All personnel who will likely be exposed to hazardous substances must have appropriate training. The plan shall include an Emergency Action Plan in the event of an accident that requires notifying any responsive agencies.
- **Excavation Safety Plan.** Prior to project excavation, the project contractor must prepare an Excavation Safety Plan, approved by EBMUD, which describes measures for worker protection and control of ground movement. The plan must include drawings and details of system(s) to be used, the area in which each type of system will be used, de-watering, means of access and egress, storage of materials, and equipment restrictions.
- **Electrical Safety Plan.** If pipeline work is proposed adjacent to electrical transmission lines, the project contractor must prepare an Electrical Safety Plan describing measures to protect workers from hazardous voltages on pipelines and appurtenances as a result of electromagnetic induction from the electrical transmission lines. The plan must be approved by EBMUD prior to construction.

EBMUD Environmental Compliance Manual

EBMUD's Environmental Compliance Manual requires the implementation of planning documents and procedures. Specific planning documents and procedures that are required by EBMUD for construction are described below:

- **Trench Spoils Best Management Practices Program.** The Trench Spoils Best Management Practices program consists of a set of procedures to be followed prior to and during planned and unplanned trenching work by the Distribution Maintenance and Construction Division, Pipeline Construction and Equipment

Division, and/or other departments to ensure that worker exposure to contaminants of concern is minimized and that trench spoils are disposed of properly. The program involves site investigations for all planned jobs, collection and analysis of soil, slurry and groundwater samples when required, and, depending on the results of the investigation, advance soil, slurry and groundwater disposal arrangements.

- **Site Assessment.** Under Water Resources Control Board, Chapter 16 Underground Storage Tank Regulations (Title 23), a site assessment is necessary and required when it appears that there has been a release from an underground storage tank into the soil. The purpose of a site assessment is to determine the extent of the contamination and if remediation is necessary. There are elements to a site assessment that require the oversight of either a professional engineer, registered geologist, or registered environmental assessor. In general, companies that have such licensed and registered professionals should be hired to conduct the entire site assessment.

3.9.5 Proposed Project Impacts and Mitigation Measures

3.9.5.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on hazards and hazardous materials if it would:

1. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
2. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school;
4. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;
5. For a project located within an area covered by an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area;
6. For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area;
7. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
8. Expose people or structures to a significant risk of loss, injury, or death involving wildfires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

An additional significance criteria was added to address potential hazards associated with using a vessel (barge) in the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. Based on Appendix G of the CEQA Guidelines and professional judgement, the proposed project could result in a significant hazards impact from a vessel if it would:

9. Substantially increase boating hazards due to changes in vessel traffic.

Based on the Initial Study analysis, the proposed project would have no impact on the navigable airspace of private airstrips because there are no private airstrips located within 2 miles of the proposed project area. The Initial Study analysis also found that the proposed project would not expose people or structures to a potential wildfire because the proposed project is located completely in an urban/suburban area and would not include work in wildlands. The Initial Study also identified that the project is not located on any Cortese List sites; therefore, there is no potential for the project to release contaminants from Cortese List sites. Criteria 4, 6, and 8 would not apply to the proposed project and are not discussed further.

3.9.5.2 Approach to Analysis

As previously described under Section 3.9.4: Applicable Regulations, Plans, and Standards, common project-related hazards, including the management of hazardous materials, are subject to numerous laws and regulations, as well as standards established in EBMUD's Standard Construction Specifications. In most cases, compliance with existing laws, regulations, and standards are sufficient to minimize risks to human health and the environment from hazards and hazardous materials. The analysis identifies areas where impacts related to hazards and hazardous materials during project construction would be subject to applicable laws, regulations, and standards.

To assess the potential for the proposed project to create a significant hazard to the public or environment related to subsurface hazardous materials, the findings of the preliminary regulatory database search and other potential sources of subsurface contamination discussed under Section 3.9.3: Environmental Setting, are considered. The analysis also addresses the potential for the proposed project to release hazardous materials during construction and interfere with an adopted Emergency Response Plan or Emergency Evacuation Plan. Mitigation measures are identified, as necessary, to reduce potentially significant impacts to less than significant.

3.9.5.3 Impacts and Mitigation Measures

Table 3.9-3 provides a summary of potential hazards and hazardous materials impacts before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.9-3 Summary of Potential Hazards and Hazardous Material Impacts

Impact	Significance Prior to Mitigation	Significance After Mitigation
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials (Criteria 1)	Significant	Less than Significant MM Hazards-1 MM Hazards-2 MM Hazards-3 MM Hazards-4 MM Hazards-5
Impact Hazards-2: Potential to create a significant hazard to human health and/or the environment through the routine transport, use, or disposal of hazardous materials (Criteria 2)	Significant	Less than Significant MM Hazards-3 MM Hazards-4 MM Hazards-5
Impact Hazards-3: Potential to create a significant hazard to children at nearby schools from the emissions and handling of hazardous or acutely hazardous materials (Criteria 3)	Significant	Less than Significant MM Air-2
Impact Hazards-4: Potential to create a significant aviation hazard to nearby public-use airports (Criteria 5)	Less than Significant	—
Impact Hazards-5: Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (Criteria 7)	Significant	Less than Significant MM Traffic-6
Impact Hazards-6: Potential to substantially increase boating hazards due to changes in vessel traffic (Criteria 9)	Significant	Less than Significant MM Hazards-6

Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials (Criteria 1). (*Less than Significant with Mitigation*)

Accidental Rupture of High-Priory Subsurface Utilities

As discussed in Section 3.9.3.4, high-priority subsurface utilities could be located in the proposed project area. High-priority utilities could be inadvertently damaged during excavation for construction (open trench construction and pit construction for pipeline abandonment), during jet grouting, and during drilling for in-channel geotechnical borings. The rupture of a high-pressure gas pipeline could result in a release of flammable liquids or gases. Contact with buried electrical utilities could cause electrocution or shock. Such damage to utilities could fatally injure construction workers, damage equipment, and initiate fires.

Construction workers are required to adhere to CAL OSHA health and safety requirements for open trench construction excavations. Consistent with California Government Code 4216.2, the construction crew is required to contact USA North at least 2 working days prior to initiation of ground-disturbing activities. USA North would notify the utility providers in the vicinity of the planned excavations to mark the location of underground utilities and coordinate with the contractor (as necessary) to avoid damages. In addition, EBMUD's Standard Construction Specification 01 35 24 requires EBMUD to prepare and implement an Excavation Safety Plan and Electrical Safety Plan that includes specifications to protect the health of workers. Although the requirement to contact USA North at least 2 working days prior to initiation of ground-disturbing activities would provide notification to utility owners of planned excavations, it may not provide sufficient time for utility owners to locate and mark the subsurface utilities due the length of the proposed pipeline alignments. EBMUD and its contractors may need more time to develop and incorporate appropriate design changes, if needed, to avoid damage to subsurface utilities.

EBMUD's Standard Construction Specification 01 35 24 requires EBMUD to prepare and implement an Excavation Safety Plan and Electrical Safety Plan that includes specifications to protect the health of workers. However, the Excavation Safety Plan and Electrical Safety Plan do not include the location of subsurface utilities that could cause an impact if ruptured or the location of subsurface utilities that could potentially shock workers with hazardous voltages. Because the USA notification may not provide sufficient time and the Excavation Safety Plan and Electrical Safety Plans do not include all subsurface utilities, excavation for proposed project construction activities near high-priority subsurface utilities could result in a potentially significant impact. Mitigation Measure Hazards-1 requires EBMUD to identify buried utilities prior to any excavation activities, including utilities located under the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. Mitigation Measure Hazards-2 requires that EBMUD include the location of subsurface utilities in their Excavation Safety Plan and Electrical Safety Plan. Implementation of Mitigation Measures Hazards-1 and Hazards-2 would reduce potentially-significant impacts to less than significant.

Accidental Hazardous Materials Releases during Construction

The accidental release of hazardous materials during proposed project construction activities could pose a significant threat to human health or the environment. Fuels, lubricants, paints, solvents, and bentonite would be used during construction of the proposed project, including during open trench construction, HDD, jack and bore construction, pipeline abandonments, and geotechnical borings. The use of hazardous materials would be subject to existing hazardous materials regulations and Certified Unified Program Agencies' (CUPA) programs. Adherence to the standards would also reduce the potential for an accidental release. A SWPPP must be prepared and implemented during proposed project construction for coverage under the Construction General Permit in accordance with the requirements of the SWRCB. Preparation of a SWPPP is also required under the EBMUD's Standard Construction Specifications. As detailed in Section 3.10: Hydrology and Water Quality, the SWPPP requires implementation of BMPs for hazardous materials storage and containment of releases to prevent runoff into existing stormwater collection systems or waterways. Since compliance with these existing regulations and programs is mandatory, proposed project construction activities are not expected to result in an accidental hazardous materials release that would pose a significant hazard to the public or the environment. Therefore, impacts related to accidental hazardous materials releases would be less than significant. In accordance with the EBMUD Standard Construction

Specification 01 35 44, the proposed project contractor is required to implement a Spill Prevention and Response Plan to prevent and control (if necessary) accidental releases of hazardous materials used during proposed project construction. Impacts would be less than significant.

Disturbance of Subsurface Hazardous Materials

Potential and/or known sources of subsurface contamination in the proposed project vicinity include current and former industrial and commercial properties, known hazardous materials release sites reported within 0.25 mile of the proposed project area, and existing fill materials. The chemical quality of soil and groundwater that may be encountered during project-related excavation has not been assessed. Excavated soils would either be reused or loaded directly into dump trucks for offsite disposal.

If geotechnical properties of excavated soils are inadequate for backfilling, then new backfill material would be imported. The DTSC has approved the reuse of contaminated spoils as backfill during underground utility installation, provided that the following general conditions apply:

- The contamination is caused by a third party
- Appropriate health and safety procedures are implemented to protect workers
- The property owner and applicable regulatory agencies are notified
- The soil is excavated, stored nearby, and immediately placed back into the excavation (DTSC 1993)

The channel beds of the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel could potentially have contaminated soils. The geotechnical borings would require excavation and would generate a slurry waste that is a combination of soil, water, and bentonite. The slurry waste would be stored in drums prior to disposal.

The proper management and disposal (if necessary) of contaminated soil and/or groundwater is required to ensure the protection of workers and the environment. The disturbance of contaminated soil and/or groundwater (if any) during proposed project excavation activities for construction activities could, therefore, pose a significant hazard to construction workers and/or the environment. The EBMUD Environmental Compliance Manual includes a Trench Spoils Best Management Practices program that describes procedures to ensure that worker exposure to contaminants of concern is minimized and that trench spoils are disposed of properly. The program involves a site assessment and investigations to collect and analyze soil and groundwater samples to determine if health and safety precautions are required and to determine disposal methods for both trench spoils and/or groundwater. The location of site investigations is determined based on the findings of the site assessment, which includes an environmental records database review and a review of the extent of current and/or former industrial zones. EBMUD's Standard Construction Specification 01 35 24 requires that a Project Safety and Health Plan be prepared that includes measures to protect workers from exposure to contaminants that could potentially be released during construction. EBMUD's Standard Construction Specification 01 35 44 requires that a Water Control and Disposal Plan be prepared that would restrict maximum contaminant concentrations and discharge volumes and that a Construction and Demolition Waste Disposal Plan be prepared to address the disposal of non-hazardous wastes. Impacts could still be potentially significant, even with implementation of the plans because the locations of contamination need to be better understood prior to preparing and implementing the plans.

EBMUD would implement Mitigation Measure Hazards-3 (Site Assessment), Mitigation Measure Hazards-4 (Site Investigation) and Mitigation Measure Hazards-5 (Project Safety and Health Plan). Impacts would be less than significant after implementation of Mitigation Measures Hazards-3, Hazards-4, and Hazards-5.

Mitigation Measures: Hazards-1, Hazards-2, Hazards-3, Hazards-4, Hazards-5

Mitigation Measure Hazards-1. Identifying Buried Utilities.

While any excavation is open, EBMUD shall protect, support, or remove underground utilities as necessary to safeguard employees.

EBMUD shall notify local fire departments whenever damage to a gas utility results in a leak or suspected leak, or whenever damage to any utility results in a threat to public safety. EBMUD shall also contact utility owners if any damage occurs as a result of the project and coordinate repair with approval of the owner.

EBMUD shall request as-built documents, drawings, and maps from all utilities within the proposed project vicinity; shall conduct a site visit; contact city, county, and utility owners in writing to inform them of the proposed project; and shall locate utilities including utilities under the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel by subsurface geophysical methods, potholing, test holes, or other excavation methods as determined by the site conditions.

Mitigation Measure Hazards-2. Excavation and Electrical Safety Plans.

The construction crew shall prepare and implement a project-specific Excavation Safety Plan and Electrical Safety Plan. The plans shall include the location of buried utilities identified in the proposed project vicinity, as described under Mitigation Measure Hazards-1. The Excavation Safety Plan shall include safety measures to protect the health of workers and the structural integrity of the buried utilities at the site. The Electrical Safety Plan shall include measures to protect workers from hazardous voltages on pipelines and appurtenances as a result of electromagnetic induction from nearby electrical transmission lines.

Mitigation Measure Hazards-3. Site Assessment.

EBMUD shall perform a Site Assessment to identify potential soil and groundwater contamination that could be encountered during excavation for proposed project construction activities. The Site Assessment shall be performed in accordance with ASTM International's Standard Practice Method E1527-13, Standard Practice for

Environmental Site Assessments: Phase I Environmental Assessment Process, which shall augment the existing Site Assessment procedures described in the Environmental Compliance Manual. The Site Assessment shall identify areas of concern where soil and/or groundwater contamination could be encountered during proposed project construction activities. The Site Assessment shall be prepared and evaluated by a licensed professional.

Mitigation Measure Hazards-4. Site Investigation.

EBMUD shall perform a Site Investigation to evaluate the chemical quality of soils and/or groundwater in the areas of concern identified during the Site Assessment (see Mitigation Measure Hazards-3). Based on the analytical results, the Site Investigation shall include an evaluation of potential health risks to construction workers and shall pre-characterize groundwater for disposal. In areas where soil will not be reused as excavation backfill, soil shall also be pre-characterized for disposal. The Site Investigation shall be prepared and evaluated by a licensed professional.

Mitigation Measure Hazards-5. Project Safety and Health Plan.

The construction crew shall prepare and implement a Project Safety and Health Plan. The plan shall incorporate the findings of the Site Assessment and Site Investigation (see Mitigation Measures Hazards-3 and Hazards-4) and describe appropriate monitoring measures, establishment of exclusions zones, and personal protective equipment for workers (as needed) who may encounter hazardous materials in soil and/or groundwater to ensure that workers and the public are protected.

Significance after Mitigation: Less than Significant.

Impact Hazards-2: Potential to create a significant hazard to the human health and/or the environment through the routine transport, use, or disposal of hazardous materials (Criteria 2). (*Less than Significant with Mitigation*)

Construction activities are expected to involve the routine transport, use, and disposal of hazardous materials, including but not limited to motor fuels, paints, oils, grease, and the slurry waste from geotechnical borings. Waste from geotechnical borings would be stored in drums and would be a combination of bentonite, water, and soil. The routine transport, use, and disposal of hazardous materials listed above could pose a significant threat to human health or the environment if not properly managed. Relatively small amounts of the listed materials, which are not considered acutely hazardous, would be transported, used, and disposed of during construction. Workers handling hazardous materials are required to adhere to OSHA and CAL OSHA health and safety requirements. Hazardous materials must be transported to and from the proposed project area in accordance with RCRA and US DOT regulations, managed in accordance with the Alameda County Department of Environmental Health's CUPA programs, and disposed of in accordance with RCRA and the CCR at a facility that is permitted to accept the waste. Since compliance with existing regulations and programs are mandatory, proposed project construction activities are not expected to create a potentially significant hazard to the public or the environment. Therefore, impacts related to the routine transport, use, or disposal of hazardous materials during proposed project construction would be less than significant.

Construction of the proposed project would potentially require the disposal of soil that has been contaminated from potential and/or known sources of subsurface contamination in the proposed project vicinity, which could potentially result in a significant impact. Impact Hazards-1 provides a full analysis of impacts associated with the disposal of contaminated soils. Impacts would be significant even after implementation of BMPs in the Environmental Compliance Manual, the Project Safety and Health Plan (EBMUD's Standard Construction Specification 01 35 24), and Water Control and Disposal Plan (EBMUD's Standard Construction Specification 01 35 44) because locations of contamination need to be better understood prior to preparing and implementing the plans. EBMUD would implement Mitigation Measure Hazards-3 (Site Assessment), Mitigation Measure Hazards-4 (Site Investigation) and Mitigation Measure Hazards-5 (Project Safety and Health Plan). Impacts would be less than significant after implementation of Mitigation Measure Hazards-3, Hazards-4, and Hazards-5.

Mitigation Measures: Hazards-3, Hazards-4, Hazards-5

Significance after Mitigation: Less than Significant.

Impact Hazards-3: Potential to create a significant hazard to children at nearby schools from the emissions and handling of hazardous or acutely hazardous materials. (Criteria 3). (*Less than Significant with Mitigation*)

Eight schools are located within 0.25 mile of the proposed project area (Table 3.9-3). The only plausible exposure pathway of concern for children at nearby schools is the inhalation of air contaminants, such as particulate matter, during construction.

Sources of hazardous emissions during proposed project construction would include diesel particulate matter from vehicle exhaust. As discussed under Section 3.3: Air Quality, impacts from particulate matter (both from diesel and dust) would be potentially significant. Implementation of Mitigation Measure Air-2 includes restrictions on the type of equipment that can be used and the number of hours that equipment can operate to minimize diesel particulate matter emissions. The emission of diesel particulate matter would be less than significant after implementation of Mitigation Measure Air-2.

Sources of hazardous emissions during proposed project construction would include particulate matter from dust emissions. As discussed under Impact Hazards-1, proposed project construction activities could disturb contaminated soils and generate dust that could pose a health risk to construction workers; however, construction activities for the proposed pipelines would not be expected to generate substantial amounts of dust and diesel emissions that could pose a risk to nearby school sites. Table 3.3-10 in Section 3.3: Air Quality provides the worst case risk to preschool and school children. The particulate matter emissions would not exceed thresholds and the impact would be less than significant. While the impact would be less than significant, dust emissions would be even further reduced through the implementation of

Mitigation Measure Air-1, which requires the implementation of BMPs to reduce dust emissions.

As discussed under Impacts Hazards-1 and Hazards-2, above, hazardous materials used during construction would be managed in accordance with applicable regulations and CUPA programs. Therefore, the impact on nearby schools from emissions and handling of hazardous or acutely hazardous materials during proposed project construction would be less than significant.

Mitigation Measures: Air-2 (See Section 3.3: Air Quality)

Significance after Mitigation: Less than Significant.

Impact Hazards-4: Potential to create a significant aviation hazard to nearby public-use airports (Criteria 5). (*Less than Significant)*

Development near airports can pose a potential hazard to people and property on the ground and can also create obstructions and other hazards to flights. The Oakland International Airport is located about 0.9 mile southeast of Crossing #2 (the nearest project segment to the airport). According to the Airport Land Use Compatibility Plan, the FAR Part 77 height restrictions for the Oakland International Airport range from about 200 to 300 feet above ground surface at Crossing #2 and the High Street pipeline abandonment. Since project equipment would not exceed height restrictions, the proposed project would not be expected to obstruct navigable airspace associated with the Oakland International Airport. The impact from the proposed project related to aviation hazards at public-use airports would, therefore be less than significant.

Mitigation Measures: None Required.

Impact Hazards-5: Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (Criteria 7). (*Less than Significant with Mitigation*)

The Cities of Oakland and Alameda have adopted Emergency Management Plans that provide a general framework for local agencies to implement emergency response and evacuation procedures. As discussed in Impact Traffic-3, the full and partial closure of roadways during construction of the proposed project could result in a potentially significant impact to emergency access. EBMUD would implement Mitigation Measure Traffic-6, which requires (1) notification of and coordination with emergency response services as well as notification of businesses, commercial offices, and residents located within 300 feet of construction areas prior to road closures; (2) the use of easily removed, temporary barricades; and (3) the removal of barricades and closure of open trenches at the end of the day. The implementation of Mitigation Measure Traffic-6 would ensure that the proposed project does not impair the implementation of the adopted Emergency Management Plans and the impact would therefore be less than significant after implementation of Mitigation Measure Traffic-6.

Mitigation Measures: Traffic-6

Significance after Mitigation: Less than Significant.

Impact Hazards-6: Potential to substantially increase boating hazards due to changes in vessel traffic (Criteria 9). (*Less than Significant with Mitigation*)

Private vessels, US Coast Guard vessels, and USACE vessels use the Oakland Inner Harbor. The US Coast Guard vessels and USACE vessels would not use the San Leandro Bay Channel; only private vessels would use the San Leandro Bay Channel (US Harbors 2016). EBMUD would use a barge in the Oakland Inner Harbor and San Leandro Bay Channel to conduct the geotechnical borings. The Oakland Inner Harbor and San Leandro Bay Channel is located within the Oakland Harbor RNA and EBMUD would, therefore, be required to follow Rule 9 of the Inland Navigation Rules Act, which mandates that vessels not impede the passage of other vessels. EBMUD would also be required to comply with the regulations established by the VTS to avoid traffic hazards. EBMUD would be required to contact the VTS prior to anchoring outside of any established anchorages. Although EBMUD would be required to follow regulations to minimize vessel hazards, the impact could remain potentially significant if the US Coast Guard requires a vessel safety zone. Mitigation Measure Hazards-6 requires EBMUD to notify the US Coast Guard about work that would occur on the vessel and EBMUD would establish a vessel safety zone if required by the US Coast Guard. Coordination with the US Coast Guard would ensure that vessel hazards are avoided and the impact would therefore be less than significant after the implementation of Mitigation Measure Hazards-6.

Mitigation Measures: Hazards-6.

Mitigation Measure Hazards-6. Notify the US Coast Guard.

EBMUD shall notify the US Coast Guard and VTS of when, where, and the type of work that would be conducted within the Oakland Inner Harbor and San Leandro Bay Channel 90 days prior to any vessel work being conducted. As a part of the notification process, the US Coast Guard may require the establishment of a vessel safety zone. If required by the US Coast Guard, EBMUD shall establish a vessel safety zone, which may be delineated by fixed limits, such as buoys.

Significance after Mitigation: Less than Significant.

3.9.6 References

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3.10 HYDROLOGY AND WATER QUALITY

This section presents the environmental setting and impact analysis for hydrological and water resources that could be affected by the proposed project. Background information, known resources, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here.

3.10.1 Data Collection

The following hydrologic sources were reviewed to understand the existing conditions in the proposed project area:

- A reconnaissance survey of the proposed project area conducted on June 11, 2015
- Review of project background information provided by EBMUD
- Watershed maps prepared by Alameda County Flood Control and Water Conservation District (Alameda County Flood Control and Water Conservation District 2015)

3.10.2 Environmental Setting

3.10.2.1 Watersheds

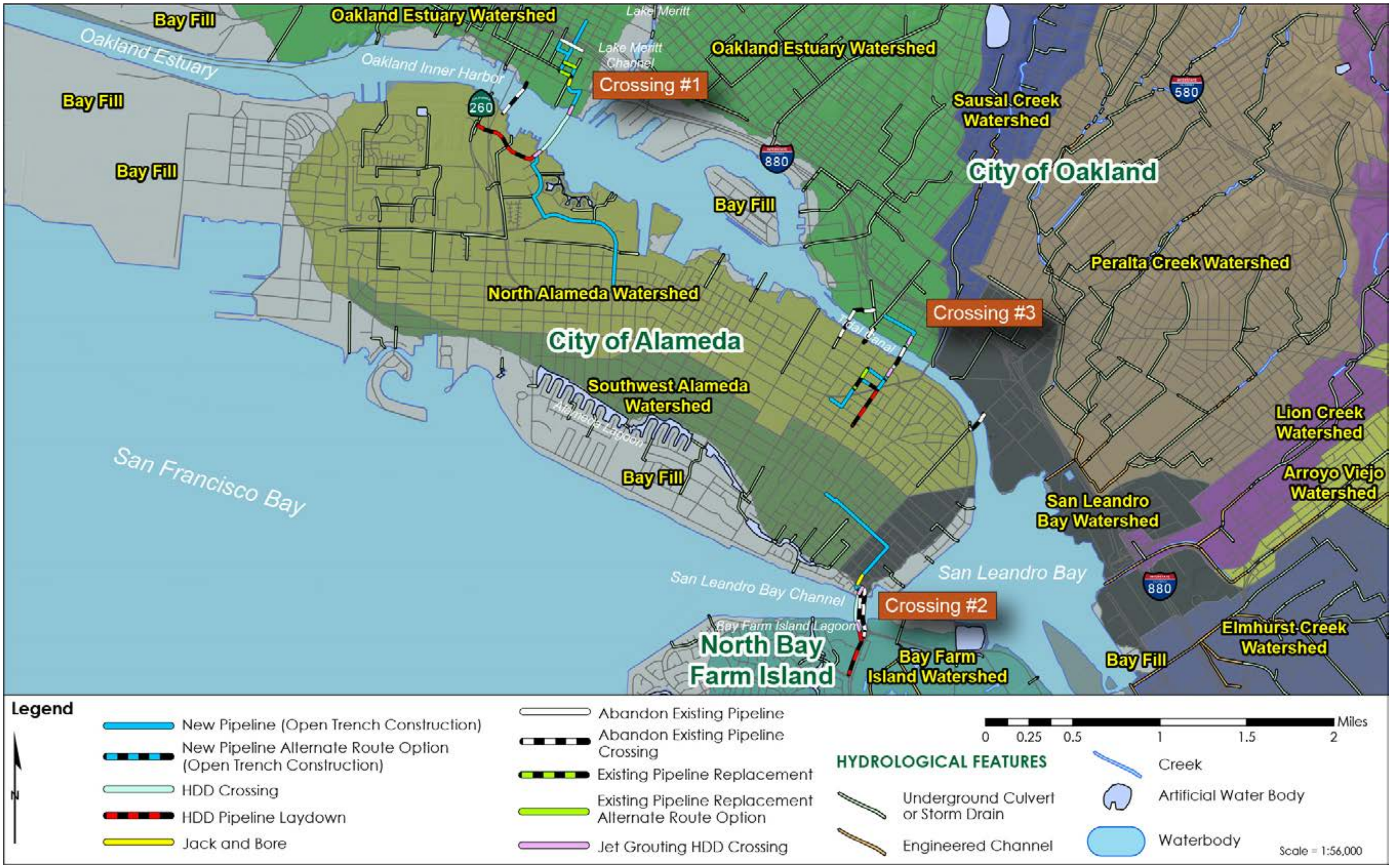
Overview

The proposed project, including the pipeline abandonments, traverse several watersheds in Alameda County that drain into the Oakland Estuary, San Leandro Bay, and San Francisco Bay. Most of the creeks in the proposed project area watersheds have been lined or culverted as a result of urban development that commenced in the mid-1800s (Tiller et al. 2000). Based on the review of watershed maps prepared by the Alameda County Flood Control and Water Conservation District and the reconnaissance of the project site performed in June 2015, the proposed project alignments would not cross any existing creeks (Alameda County Flood Control and Water Conservation District 2015). Figure 3.10-1 depicts the locations of project alignments (including proposed new pipeline segments and pipeline abandonments) in relation to watersheds, drainage features, and receiving bodies of water. Figure 3.10-1 shows the watersheds each crossing is located within.

Crossing #1 Watersheds

Crossing #1 is approximately 2.3 miles long and would cross from Oakland to Alameda under the Oakland Inner Harbor, which is located in the central portion of the Oakland Estuary. The Alice-Webster pipeline abandonment is located northwest of proposed Crossing #1. The northern portion of Crossing #1 is located in the Oakland Estuary Watershed, which drains a large area of dense urban uses in central Oakland into the Oakland Estuary (Figure 3.10-1). The southern portion of Crossing #1 is located within the North Alameda Watershed, which drains the majority of Alameda Island into the Oakland Estuary, San Leandro Bay, and San Francisco Bay (Alameda County Flood Control and Water Conservation District 2015).

Figure 3.10-1 Hydrological Features



Crossing #2 Watersheds

Crossing #2 is approximately 1 mile long and would cross from Alameda Island to North Bay Farm Island under the San Leandro Bay Channel. The San Leandro Bay Channel is located between San Leandro Bay to the east and the San Francisco Bay to the west. The Bay Farm 1 and Bay Farm 2 pipeline abandonments are located immediately east of proposed Crossing #2. The northern portion of Crossing #2 is located in the San Leandro Bay Watershed, and the northwest end of proposed Crossing #2 extends into the Southwest Alameda Watershed (Figure 3.10-1). The San Leandro Bay Watershed drains the southeast end of Alameda Island into San Leandro Bay, and near-shore (largely industrial) areas of Oakland into the Tidal Canal and San Leandro Bay. The Tidal Canal is a narrow strait of the Oakland Estuary that connects the Oakland Inner Harbor to the northwest to San Leandro Bay to the southeast. The Southwest Alameda Watershed drains the southwest portion of Alameda Island either into the San Francisco Bay, or into the Alameda Lagoon, which discharges to the San Francisco Bay. The portion of the Southwest Alameda Watershed containing the northwest end of proposed Crossing #2 drains into the Alameda Lagoon. The southern portion of Crossing #2 is located in the Bay Farm Island Watershed, which drains the northern portion of North Bay Farm Island into San Leandro Bay and the San Francisco Bay. Much of the northwest portion of North Bay Farm Island drains into the Bay Farm Island Lagoon, which discharges to the San Francisco Bay (Alameda County Flood Control and Water Conservation District 2015).

Crossing #3 Watersheds

Crossing #3 is approximately 1 mile long and would connect from Oakland to Alameda under the Tidal Canal. Blanding Street and Park Street pipeline abandonments are located northwest of proposed Crossing #3; the Derby Avenue pipeline abandonment is located adjacent to proposed Crossing #3; and the High Street pipeline abandonment is located southeast of proposed Crossing #3. The northern portions of Crossing #3 are located in the Oakland Estuary Watershed, except for the northern portion of the High Street underwater pipeline crossing, which is located in San Leandro Bay Watershed (Figure 3.10-1). The southern portions of Crossing #3 are located in the North Alameda Watershed.

3.10.2.2 Water Bodies

Surface water bodies that receive drainage from the watersheds discussed above include the Oakland Estuary, which is considered part of the Central San Francisco Bay and includes the Oakland Inner Harbor and Tidal Canal; San Leandro Bay, which is considered part of the Lower San Francisco Bay; the Alameda and Bay Farm Island Lagoons; and the Central and Lower San Francisco Bay. The mouth of the Lake Merritt Channel, which connects Lake Merritt to the Oakland Estuary, is located immediately east of the northern portion of Crossing #1 across Estuary Park; however, runoff from the area of the northern portion of Crossing #1 does not discharge directly into the Lake Merritt Channel.

The existing and potential beneficial uses of the water bodies listed in the San Francisco Bay Regional Water Quality Control Board's (SFRWQCB's) Basin Plan are presented below (SFRWQCB 2015a):

- **Central San Francisco Bay.** Industrial service/process water supply, commercial and sport fishing, shellfish harvesting, estuarine habitat, fish migration, preservation of rare and endangered species, fish spawning, wildlife habitat, contact and non-contact recreational uses, and navigation.
- **Lower San Francisco Bay.** Industrial water supply, commercial and sport fishing, shellfish harvesting, estuarine habitat, fish migration, preservation of rare and endangered species, fish spawning, wildlife habitat, contact and non-contact recreational uses, and navigation.
- **Oakland Inner Harbor.** Estuarine habitat, wildlife habitat, contact and non-contact recreational uses, and navigation.
- **Lake Merritt Channel**. Commercial and sport fishing, estuarine habitat, wildlife habitat, and contact and non-contact recreational uses.

3.10.2.3 Water Quality

The Federal Clean Water Act (discussed below in Section 3.10.3.1) requires state governments to identify a list of impaired water bodies, defined as those water bodies that do not meet water quality standards. The SWRCB has listed specific locations within the Oakland Inner Harbor (Fruitvale Site and Pacific Dry Dock Part 1), the Central San Francisco Bay (which includes the Oakland Estuary), the Lower San Francisco Bay, and San Leandro Bay as impaired water bodies. The Fruitvale Site of the Oakland Inner Harbor is actually located in the Tidal Canal, and the proposed Crossing #3 passes under the northwest portion of the Fruitvale Site. All of the water bodies are impacted with pollutants including pesticides, heavy metals, dioxins, and furans. Various additional pollutants have impacted the identified water bodies, including polychlorinated biphenyls (PCBs) in all except San Leandro Bay (SWRCB 2015).

3.10.2.4 Flood Hazards

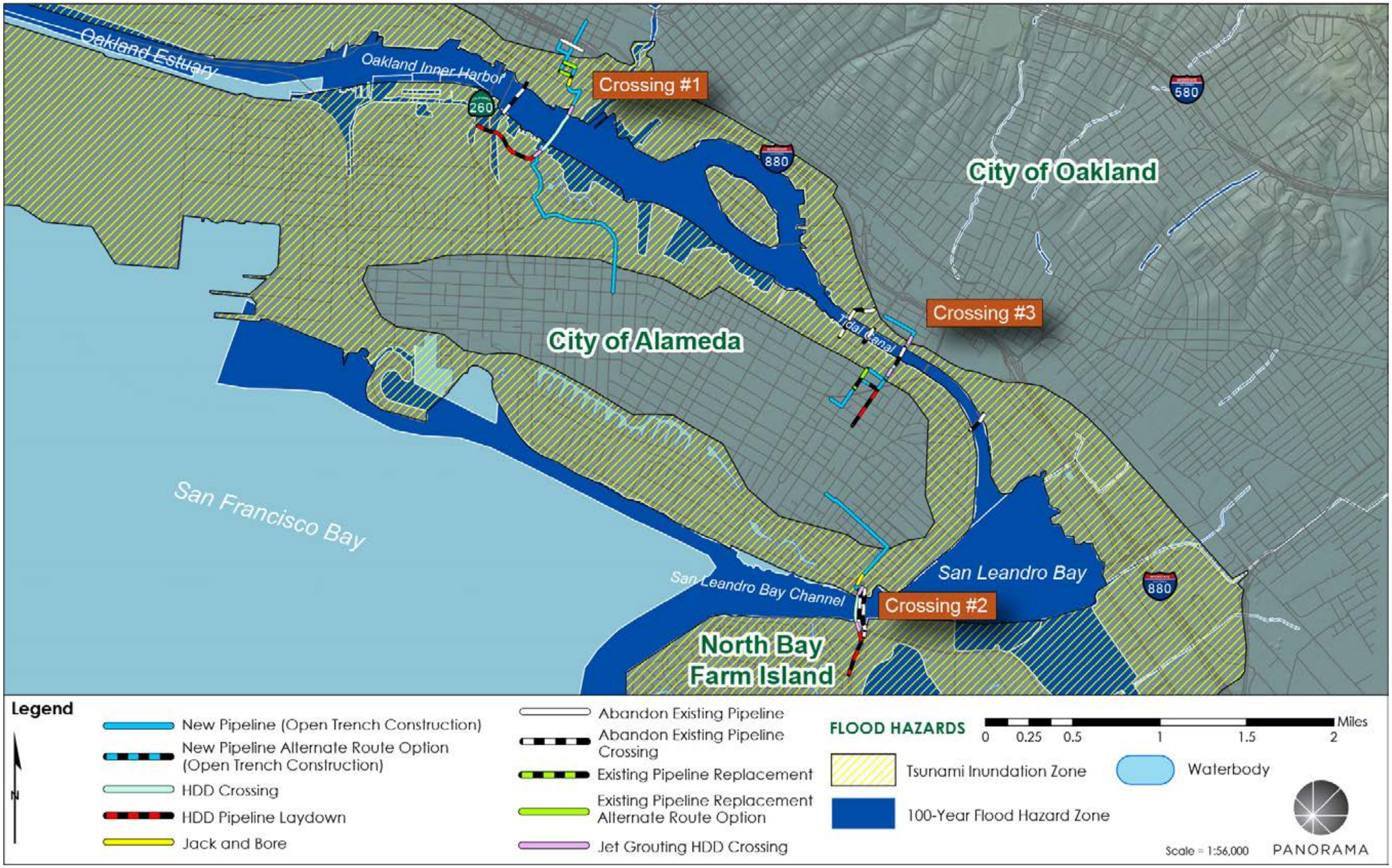
Flooding

Flooding in the San Francisco Bay region is primarily restricted to areas along the San Francisco Bay margins and along individual streams. The following areas of proposed construction activities are located within mapped 100-year flood hazard zones (see Figure 3.10-2) (FEMA 2015):

- The water bodies between Oakland and Alameda Island, and between Alameda Island and North Bay Farm Island.
- The proposed pit construction location for the southern end of the Alice-Webster pipeline abandonment.
- The western portion of the proposed HDD pipeline laydown area for Crossing #1.

Flooding hazards in the proposed project vicinity are anticipated to be exacerbated by global climate change. Modeling of a 150-centimeter (approximately 5-foot) rise in sea levels, which could occur by the year 2100, indicates that additional proposed project areas along the Oakland and Alameda shorelines could be subject to flooding hazards in the future (Knowles 2010).

Figure 3.10-2 Flood Hazard Zones



Dam Failure

The northern portion of proposed Crossing #3 and the northern ends of the Blanding Street, Park Street, and Derby Avenue pipeline abandonments are located within the mapped dam failure inundation area for the Central Reservoir (City of Oakland 2004). The Central Reservoir is owned by EBMUD and is operated in accordance with the EBMUD Dam Safety Program, carried out in cooperation with the State Department of Dam Safety. No other proposed construction areas in Oakland are located within the mapped dam failure inundation area, and there are no reservoirs/dams located in the city of Alameda.

Tsunami

Tsunamis are long period water waves caused by underwater seismic events, volcanic eruptions, or undersea landslides. Tsunamis affecting the San Francisco Bay region would originate west of the San Francisco Bay, in the Pacific Ocean. Tsunamis entering the San Francisco Bay through the relatively narrow Golden Gate would tend to dissipate as the energy of the wave spreads out as the San Francisco Bay becomes wider and shallower. Areas that are highly susceptible to tsunami inundation tend to be low-lying coastal areas, such as tidal flats, marshlands, and former bay margins that have been artificially filled. The predicted maximum credible tsunami amplitude in the Richmond area (approximately 9 miles northwest of the nearest proposed project area) is estimated to be approximately 5 feet (Borrero et al. 2006). A tsunami wave would have to travel approximately 3 miles through the relatively narrow Oakland Estuary in order to reach the area of proposed Crossing #1, and the San Francisco Bay widens and becomes shallower in the area south of Alameda Island; therefore, the energy of a tsunami wave would be significantly dissipated by the time it reached proposed construction areas. All areas of proposed construction activities are located within potential tsunami inundation areas except for the northern ends of the three proposed new crossing segments and the southern end of proposed Crossing #1 (Figure 3.10-2) (CalEMA 2009).

Seiche

A seiche is caused by oscillation of the surface of an enclosed body of water, such as San Francisco Bay, as a result of an earthquake or large wind event. Seiches can result in long-period waves that cause run-up or overtopping of adjacent landmasses, similar to tsunami run-up (URS 2008). Seiches are not considered a hazard in the San Francisco Bay (Borrero et al. 2006).

3.10.2.5 Groundwater

The proposed project area is located within the Santa Clara Valley groundwater basin, East Bay Plain groundwater sub-basin (East Bay Plain). Existing beneficial uses of this groundwater basin include municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply. The SFRWQCB considers all groundwater suitable or potentially suitable for municipal or domestic water supply unless it meets one or more of the following criteria (SFRWQCB 2015a):

- The total dissolved solids exceed 3,000 milligrams per liter (5,000 microSiemens per centimeter, for electrical conductivity), and it is not reasonably expected by the SFRWQCB that the groundwater could supply a public water system;

- There is contamination, either by natural processes or by human activity, that cannot be reasonably treated for domestic use;
- There is not sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day; or
- The aquifer is regulated as a geothermal energy-producing source.

The beneficial or potential beneficial uses identified in the SFRWQCB's Basin Plan described above are not exhaustive. The SFRWQCB acknowledges the possibility that other beneficial uses exist or have the potential to exist.

3.10.2.6 Drinking Water Supply

Most of the water for EBMUD comes from the Mokelumne River watershed in the Sierra Nevada Mountains. Water is collected in the Pardee Reservoir and conveyed to EBMUD's service area via three large aqueducts that extend for more than 90 miles. During dry years, EBMUD draws water from the Sacramento River near the town of Freeport according to the joint agreement between EBMUD and the Sacramento County Water Agency. EBMUD's water supply system consists of a network of reservoirs, aqueducts (pipelines), WTPs, pumping plants, and other distribution facilities that convey water to customers in the EBMUD service area. EBMUD's Orinda WTP has the largest capacity and serves all or most of Alameda Island, with other WTPs balancing out the service area.

3.10.3 Applicable Regulations, Plans, and Standards

3.10.3.1 Federal Regulations

Clean Water Act

The CWA of 1972 and subsequent amendments, under the enforcement authority of the USEPA, were enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA gave the USEPA the authority to implement pollution control programs, such as setting wastewater standards for industry. It also set water quality standards for surface waters and established the NPDES program to protect water quality.

Clean Water Act Section 303(d) List of Impaired Water Bodies and TMDLs

In accordance with Section 303(d) of the CWA, states must present the USEPA with a list of "impaired water bodies," defined as those water bodies that do not meet water quality standards. The CWA requires the development of total maximum daily loads (TMDLs) or other actions to improve water quality of impaired water bodies. Implementation of the impaired water bodies program in the proposed project area is conducted by the RWQCB and is discussed under Section 3.10.3.2: State Regulations.

Clean Water Act Section 401

Section 401 of the CWA requires compliance with state water quality standards for actions within state waters. Compliance with the water quality standards required under Section 401 is a condition for issuance of a Section 404 permit. Under Section 401 of the CWA, every applicant for a federal permit or license for any activity that may result in a discharge to a water body must obtain a State Water Quality Certification that the proposed activity will comply with state water quality standards.

Clean Water Act Section 402

Under Section 402 of the CWA, discharge of pollutants to navigable waters is prohibited unless the discharge is in compliance with an NPDES permit. Implementation and enforcement of the NPDES program is conducted through the SWRCB and the nine RWQCBs. The local RWQCB (i.e., SFRWQCB) has set standard conditions for each permittee in the San Francisco Bay Area, which includes effluent limitation and monitoring programs. The proposed project would be subject to NPDES permits described under Section 3.10.3.2: State Regulations.

Clean Water Act Section 404

Under Section 404 of the CWA, a permit must be obtained from the USACE for work within waters of the US, including wetlands. USACE reviews applications for permits in accordance with Section 404 guidelines, which have been established by USACE and USEPA, and typically limits and requires mitigation for impacts to waters of the US before it will issue a permit. Construction activities for the proposed project include horizontal drilling beneath the Oakland Inner Harbor, Tidal Channel, and the San Leandro Bay Channel but the proposed project would not alter these water bodies. A Section 404 permit would be required for the proposed project for the exploratory geotechnical borings within the Oakland Inner Harbor and the San Leandro Bay Channel.

3.10.3.2 State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code [CWC]) provides for the protection of the quality of all waters of the State of California for use and enjoyment by the people of California. The act also establishes provisions for a statewide program for the control of water quality, recognizing that waters of the state are increasingly influenced by interbasin water development projects and other statewide considerations, and that factors such as precipitation, topography, population, recreation, agriculture, industry, and economic development vary regionally within the state. The statewide program for water quality control is therefore administered on a local level with statewide oversight. Within the program framework, the act authorizes the SWRCB and RWQCBs to oversee the coordination and control of water quality within California.

Stormwater Programs

The SWRCB administers a number of stormwater programs to regulate the discharge of pollutants to surface waters from various sources, including municipal stormwater discharges. Municipal stormwater discharges are regulated by the Municipal Stormwater Program under the NPDES in accordance with the federal CWA.

Under the Municipal Stormwater Program, the SWRCB has issued two types of NPDES permits authorizing the discharge of stormwater from municipalities. Phase I permits were issued to medium and large municipalities serving between 100,000 and 250,000 people and

250,000 people or more, respectively. A Phase II permit was issued as a general permit to small municipalities serving less than 100,000 people. In the San Francisco Bay Area, the existing Phase I permit was issued to a group of co-permittees consisting of contiguous municipalities covering a geographic area. The Cities of Oakland and Alameda are co-permittees of Alameda County, which facilitates NPDES compliance through the Clean Water Program. Municipal stormwater discharges in Alameda County, including the proposed project area, are authorized under the SFRWQCB's Municipal Regional Stormwater NPDES Permit (MRP), Order No. R2-2009-0074, NPDES Permit No. CAS612008, adopted on October 14, 2009 and amended periodically thereafter. The current MRP is contained in Order R2-2015-0049.

Projects disturbing more than 1 acre of land during construction are required to comply with the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbing Activities, Order No. 2009-0009-DWQ, as amended by Order No. 2012-0006-DWQ, NPDES No. CAS000002 (Construction General Permit). To obtain coverage under the Construction General Permit, the project applicant must provide, via electronic submittal, a Notice of Intent, a SWPPP, and other documents required by Attachment B of the Construction General Permit. Activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as grubbing or excavation. Construction General Permit activities are regulated at the local level by the SFRWQCB.

The Construction General Permit uses a risk-based permitting approach and mandates certain requirements based on the project risk level (i.e., Level 1, Level 2, or Level 3). The project risk level is based on the risk of sediment discharge and the receiving water risk. The sediment discharge risk depends on the project location and timing (i.e., wet season versus dry season activities). The receiving water risk depends on whether the project would discharge to a sediment-sensitive receiving water. A sediment-sensitive water body is one that appears on the most recent 303(d) list for water bodies impaired for sediment; has a USEPA-approved TMDL implementation plan for sediment; or has the beneficial uses of cold freshwater habitat, fish migration, and fish spawning. The Central San Francisco Bay (including the Oakland Estuary/Inner Harbor/Tidal Canal) and Lower San Francisco Bay (including San Leandro Bay) may be considered sediment-sensitive water bodies due to beneficial uses for fish migration and fish spawning (SFRWQCB 2011), and/or because they appear on the most recent 303(d) list for water bodies impaired for sediment (SWRCB 2015).

Linear Underground/Overhead Projects (LUPs) are categorized as Type 1, Type 2, or Type 3 based on threat to water quality, and the Construction General Permit mandates certain requirements based on the LUP type. The LUP types are defined as follows:

- Type 1 LUPs are those that include 70 percent or more construction on a paved surface; or include greater than 30 percent of the construction activities within the non-paved shoulders or land immediately adjacent to paved surfaces, or where construction occurs on unpaved improved roads, and where there is a low sediment risk and low or medium receiving water risk, or a medium sediment risk and low receiving water risk.

- Type 2 LUPs are those with a high sediment risk and low receiving water risk, medium sediment risk and medium receiving water risk, or low sediment risk and high receiving water risk.
- Type 3 LUPs are those with a high sediment risk and medium or high receiving water risk or medium sediment risk and high receiving water risk.

The determination of the project risk level and LUP type would be made by the project applicant when the Notice of Intent is filed (and more details of the timing of the construction activity are known).

The performance standard in the Construction General Permit is that dischargers shall minimize or prevent pollutants in stormwater discharges and authorized non-stormwater discharges through the use of controls, structures, and BMPs that achieve Best Available Technology for treatment of toxic and non-conventional pollutants and Best Conventional Technology for treatment of conventional pollutants. A SWPPP must be prepared by a Qualified SWPPP Developer that meets the certification requirements in the Construction General Permit. The purpose of the SWPPP is (1) to help identify the sources of sediment and other pollutants that could affect the quality of stormwater discharges, and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges resulting from construction activity. Operation of BMPs must be overseen by a Qualified SWPPP Practitioner that meets the requirements outlined in the permit.

The SWPPP must also include a construction site monitoring program. The monitoring program includes, depending on the project risk level, visual observations of site discharges, water quality monitoring of site discharges (e.g., pH, turbidity, and non-visible pollutants, if applicable), and receiving water monitoring (e.g., pH, turbidity, suspended sediment concentration, and bioassessment, if applicable).

3.10.3.3 Local Regulations

Overview

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 for projects involving facilities for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

To facilitate coordination, local requirements related to stormwater management, drainage, and watercourse protection are described below. EBMUD has consulted and held meetings with the local jurisdictions, and would continue to consult with local entities on issues related to the protection of water quality during the project planning process.

San Francisco Bay Water Quality Control Plan

The San Francisco Bay waters are under the jurisdiction of the SFRWQCB, which established regulatory standards and objectives for water quality in the San Francisco Bay in the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The Basin Plan identifies existing and potential beneficial uses for surface waters (described above in Section 3.10.2.2) and provides numerical and narrative water quality objectives designed to protect those uses. The preparation and adoption of water quality control plans is required by CWC §13240 and supported by the federal CWA.

Because beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plan is a regulatory reference for meeting the state and federal requirements for water quality control. Adoption or revision of surface water standards is subject to the approval of the USEPA.

Total Maximum Daily Loads

As described above under Section 303(d) of the CWA, states must present the USEPA with a list of "impaired water bodies," defined as those water bodies that do not meet water quality standards. As discussed under Water Quality in Section 3.10.2.3 above, the SWRCB has listed locations in the Oakland Inner Harbor (Fruitvale Site and Pacific Dry Dock Part 1), the Central San Francisco Bay (which includes the Oakland Estuary), the Lower San Francisco Bay, and San Leandro Bay as impaired water bodies, and all of the water bodies are impacted with pollutants including pesticides, heavy metals, dioxins, and furans. Various additional pollutants have impacted the water bodies, including PCBs in all except San Leandro Bay.

TMDLs define how much of a pollutant a water body can tolerate and still meet water quality standards. TMDLs account for all the sources of a pollutant, including: discharges from wastewater treatment facilities; runoff from homes, agriculture, and streets or highways; "toxic hot spots;" and deposits from the air. In addition to accounting for past and current activities, TMDLs may consider projected growth that could increase pollutant levels. The SFRWQCB is developing more than 30 TMDL projects to address more than 160 listings for water bodies impaired by specific pollutants. TMDLs have been approved by the USEPA and officially incorporated into the Basin Plan for pesticide-related toxicity in urban creeks, as well as PCBs and mercury in the San Francisco Bay (SFRWQCB 2015b).

Alameda County

The Alameda County Code of Ordinances, Chapter 13.08 Stormwater Management and Discharge Control, includes provisions to reduce or eliminate the pollution of receiving waters, including creeks and the San Francisco Bay, and to protect and enhance the water quality in county water bodies, including watercourses, wetlands, creeks, and flood control facilities, in a manner pursuant to and consistent with the Federal CWA, the State Porter/Cologne Act, and the county NPDES permit, by:

- Reducing and eliminating illegal or illicit non-storm discharges to the waters of the US, the county storm drain system, the creeks, and the Bay from construction activities, county maintenance operations, industrial and commercial activities, new

development, redevelopment, and other activities, through inspection, monitoring, and complaint response;
- Controlling the discharge to the county storm drain system, the creeks, and the bay from spills, dumping or disposal of materials other than stormwater or other legal discharges;
- Reducing pollutants in stormwater discharges to the maximum extent practicable;
- Regulating the design and construction of permanent post-development stormwater quality measures and controls, including the application of site design, source control, stormwater treatment, and hydromodification management, through the provisions of this chapter and of other county ordinances, rules, regulations, and procedures;
- Inspecting, monitoring, and regulating pollution prevention measures during construction; and
- Establishing legal authority to perform all reviewing, inspection, surveillance, and monitoring activities necessary to ensure compliance with this chapter.

The Alameda County Code of Ordinances, Chapter 13.12 Water Course Protection, includes provisions to safeguard and preserve watercourses, protect lives and property, prevent damage due to flooding, protect drainage facilities, control erosion and sedimentation, restrict discharge of polluted materials and enhance recreational and beneficial uses of watercourses.

Alameda Countywide Clean Water Program
The Alameda Countywide Clean Water Program is the entity within Alameda County that assists local municipalities in complying with SFRWQCB's MRP. It comprises Alameda County, 14 incorporated cities (including Oakland and Alameda), the Alameda County Flood Control and Water Conservation District, and the Zone 7 Water Agency. The Alameda Countywide Clean Water Program educates the public on how to keep businesses and homes from contributing to stormwater pollution, and also coordinates its activities with other pollution prevention programs, such as wastewater treatment plants, hazardous waste disposal, and water recycling.

City of Alameda
The Alameda Code of Ordinances, Chapter 18, Article III Storm Water Management and Discharge Control, includes provisions to protect and enhance the water quality of watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Clean Water Act, to ensure the future health, safety, and general welfare of City of Alameda citizens by:

- Eliminating non-storm water discharges to the municipal separate storm sewer.
- Controlling the discharge to municipal separate storm sewers from spills, dumping or disposal of materials other than storm water.
- Reducing pollutants in storm water discharges to the maximum extent practicable.

The following policies pertaining to hydrology and water quality are from the City of Alameda Open Space and Conservation Element (City of Alameda 1990):

Policy 5.1.r	Continue to participate in the Alameda County Non-Point Source Task Force.
Policy 5.1.s	Participate in the Non-Point Source Control Program (NPSC).
Policy 5.1.t	Consider adopting City standards in addition to those adopted by the County, to deal with non-point source water pollution problems such as sheet flow storm runoff and sedimentation affecting sensitive water habitats.
Policy 5.1.x	Prevent migration of runoff off-site or into wetlands areas and water related habitat by requiring that proposed projects include design features ensuring detention of sediment and contaminants.

The following policies pertaining to flooding are from the City of Alameda General Plan Health and Safety Element (City of Alameda 1990):

Policy 8.3.f	Use all possible means of reducing the potential for flood damage in Alameda. These may include the requirement of flood-proofing, flood forecast and warning or evacuation programs, and stringent groundwater management programs to prevent subsidence.
Policy 8.3.g	Require the maintenance of easements along those drainage ways necessary for adequate drainage of normal or increased surface runoff due to storms.
Policy 8.3.h	Require new drainage facilities to be designed to minimize the effects of settlement.
Policy 8.3.i	Reduce the effects of surface runoff by the use of extensive landscaping, minimizing impervious surface and drainage easements.
Policy 8.3.j	Require shoreline owners to maintain perimeter dikes to applicable standards.
Policy 8.3.k	Leave adequate setbacks along waterfront areas for the expansion of seawalls and levees.

City of Oakland

The Oakland Code of Ordinances, Chapter 13.16 Creek Protection, Storm Water Management and Discharge Control, includes provisions to protect and enhance the water quality of watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the federal CWA, to ensure the future health, safety, and general welfare of city citizens by:

- Eliminating non-stormwater discharges to the municipal separate storm sewer

- Controlling the discharge to municipal separate storm sewers from spills, dumping or disposal of materials other than stormwater
- Reducing pollutants in stormwater discharges to the maximum extent practicable
- Safeguarding and preserving creeks and riparian corridors in a natural state
- Preserving and enhancing creekside vegetation and wildlife
- Preventing activities that would contribute significantly to flooding, erosion or sedimentation, or that would destroy riparian areas or would inhibit their restoration
- Enhancing recreational and beneficial uses of creeks
- Controlling erosion and sedimentation
- Protecting drainage facilities
- Protecting the public health and safety, and public and private property

The following policies pertaining to hydrology and water quality are from the City of Oakland General Plan Safety Element (City of Oakland 2004):

Policy FL-1 Enforce and update local ordinances, and comply with regional orders, that would reduce the risk of storm-induced flooding.

Policy FL-2 Continue or strengthen city programs that seek to minimize the storm-induced flooding hazard.

Policy FL-3 Seek the cooperation and assistance of other government agencies in managing the risk of storm-induced flooding.

Policy FL-4 Minimize further the relatively low risks from non-storm-related forms of flooding.

The Open Space, Conservation and Recreation Element of the City of Oakland General Plan includes the following policies related to hydrology and water quality (City of Oakland 1996):

Policy CO-5.2 Improvements to Groundwater Quality. Support efforts to improve groundwater quality, including the use of non-toxic herbicides and fertilizers, the enforcement of anti-litter laws, the clean-up of sites contaminated by toxics, and on-going monitoring by the Alameda County Flood Control and Water Conservation District.

Policy CO-5.3 Control of Urban Runoff. Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Program, to: (a) reduce water pollution associated with storm runoff; (b) reduce water pollution associated with hazardous spills, runoff from hazardous materials areas, improper disposal of household hazardous materials, illicit dumping, and marina “live-aboards;” and (c) improve water quality in Lake Merritt to enhance the lakes aesthetic, recreational and ecological functions.

EBMUD Practices and Procedures

Potable Water Discharges

EBMUD complies with the NPDES permit issued by the SFRWQCB for planned, unplanned, and emergency discharges from the potable water transmission, storage, and distribution system. For planned discharges, EBMUD must submit a site-specific Discharge Plan to the SFRWQCB at least 1 week in advance of the discharge with copies to interested parties such as flood control agencies and downstream jurisdictions. The Discharge Plan must include the proposed project name and reason for the discharge; a description of the discharge; a map showing the discharge location(s) and receiving water(s); the estimated time, duration, volume, and flowrate of the discharge; and a monitoring plan for the chlorine residual, pH, and turbidity of the discharge. The maximum monitoring schedule for residual chlorine is every 15 minutes for the first 2 hours and daily thereafter. Once the Discharge Plan is approved, the SFRWQCB will issue a non-action letter specifying approval of the discharge.

For unplanned discharges, BMP's must be implemented to alleviate the discharge as soon as practicable. Certain discharges must be reported to the California Emergency Management Agency and SFRWQCB within 24 hours, followed by a written report within 5 days. EBMUD must also submit an annual report to the SFRWQCB summarizing the date, address, estimated flow rate, and BMPs implemented for each unplanned discharge.

EBMUD employs Source Control BMPs whenever practical to reduce pollutants at their source rather than applying Treatment Control BMPs. Typical source controls include: isolating a system for several days and/or reducing or eliminating chemical dosages to allow the chlorine residual and pH levels to naturally comply with regulatory limits; transferring the contents via a truck to a wastewater treatment plant; and minimizing the flow rate and/or volume to reduce potential sedimentation and erosion effects. Typical treatment BMPs include dechlorinating the discharge with sodium sulfite tablets or liquid calcium thiosulfate.

For discharges of superchlorinated water such as that which is used for pipeline disinfection (typically with chlorine concentrations of 100 to 300 milligrams per liter [mg/L]), the EBMUD Environmental Compliance Manual requires: placement of BMPs at all affected storm drains, even if there are no planned discharges; photo documentation of all BMP installations; documented calculation of the amount of dechlorination agent necessary to dechlorinate the planned discharge; measurement and recording of the amount of dechlorination agent used; provision of creek maps to all dechlorination vans to ensure awareness of sensitive creeks; and documentation of the amount of water discharged to the sanitary sewer under a permit or trucked off-site. All superchlorinated discharges, whether dechlorinated or not, must be discharged in one of several ways: discharge to a sanitary sewer or interceptor in compliance with a permit; to the EBMUD wastewater treatment plant; or other approved disposal methods such as dust control at a construction site with no discharge to storm drain. Superchlorinated water transported off-site for disposal must be dechlorinated prior to transport, and dechlorination may also be required for discharge to a sanitary sewer system. Under normal conditions, discharge to a storm drain or creek is not permitted, but emergency discharges of superchlorinated water may be dechlorinated and discharged to the storm sewer system.

EBMUD Standard Construction Specifications

Standard Construction Specification 01 35 44 includes provisions for the protection of water quality. Regarding site activities, the Specification requires:

- Prevent the discharge of debris, soil, silt, sand, asphalt, rubbish, paint, oil or petroleum products, cement, concrete, or washings thereof, and any other organic or earthen materials to a surface water or storm drain system. The discharged materials may also not be stored where they can be washed outside of the construction limits by rainfall or runoff. When construction is completed, the discharged materials must be disposed of in accordance with the Construction and Demolition Waste Disposal Plan.
- Prevent creation of a nuisance pollution as defined in the CWC, and may not cause a violation of water quality standards for receiving waters adopted by the Reginal Water Board or SWRCB, as required by the CWA.
- Clean up spills immediately, and notify EBMUD in the event of a spill.
- Equip stationary equipment such as motors, pumps, and generators with drip pans.
- Divert or otherwise control surface water and waters flowing from existing projects, structures, or surrounding areas from coming onto work areas. The methods of diversions or control must be adequate to ensure the safety of stored materials and personnel in the work area. At the completion of work, ditches, dikes, and other ground alterations must be removed and ground conditions must be returned to their former condition.
- Maintain construction sites to ensure that drainage from the site will minimize erosion of stockpiled or stored materials and the adjacent native soil material.
- Conduct dust control measures in a manner to prevent runoff from the site.
- Handle, store, apply, and dispose of any chemical and hazardous material in accordance with federal, state, and local laws and regulations.

Regarding compliance with the Stormwater Construction General Permit, permit registration documents must be prepared, including the SWPPP, subject to review and approval by EBMUD. All permit requirements must be complied with, including implementation of effective stormwater/non-stormwater management, conducting inspections and monitoring requirements of the permit, and ensuring permit coverage termination at the completion of construction by preparing a Notice of Termination.

In addition to implementing stormwater management requirements, Section 1.3 B of EBMUD's Standard Construction Specification 01 35 44 requires EBMUD to prepare a detailed Water Control and Disposal Plan describing project compliance, as well as the requirements of the SFRWQCB, CDFW, the county flood control district, and any other regulatory agency having jurisdiction. The plan must also describe: measures for containment, handling, and disposal of groundwater (if encountered); runoff of water used for dust control; tank heel water; wash water; sawcut slurry; test water; and construction water or other liquid that has been in contact with any interior surfaces of EBMUD facilities. A sampling and analytical program for characterizations of any wastewater prior to disposal must be included, as needed. Permits must be obtained from any agency having jurisdiction over the discharge or disposal of liquid and must provide EBMUD with documentation of authorization for the discharge or disposal.

EBMUD's Standard Construction Specification 01 35 44 also requires the preparation of a Spill Prevention and Response Plan detailing the means and methods for preventing and controlling a spill of hazardous materials used on the job site. The Spill Prevention and Response Plan must include a list of the hazardous materials used or generated on the construction site and methods that will be used to prevent spills, monitor hazardous substances, and provide immediate response to spills. Spill response measures must address notification of EBMUD and appropriate agencies, and must address issues related to spill-related workers as well as public health and safety, spill control, and spill cleanup.

3.10.4 Proposed Project Impacts and Mitigation Measures

3.10.4.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on hydrology and water quality if it would:

1. Violate any water quality standards or waste discharge requirements; or
2. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
4. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
5. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
6. Otherwise substantially degrade water quality;
7. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
8. Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
9. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
10. Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow.

Based on the Initial Study analysis, the proposed project does not include the construction of housing; therefore, there would be no impact associated with placing housing within a 100-year flood hazard area. The Initial Study analysis found that the proposed project would not be impacted by seiches, tsunamis, or mudflows because the proposed project would be an underground feature after it is built. Criteria 7 and 10 would not apply to the proposed project and are not discussed further.

Portions of the proposed project are located within 100-year flood hazard areas (see Figure 3.10-2) as previously described in the Environmental Setting; however, the proposed project would not include any aboveground buildings or other structures in flood zone areas that would have the potential to impede or redirect flood flows. Therefore, the proposed project would not impact flood flows. Criteria 8 is not discussed further in this section.

3.10.4.2 Approach to Analysis

As described under Section 3.10.3: Applicable Regulations, Plans, and Standards, nearly all routine or predictable discharges to a surface water body are regulated by a permit under the federal CWA. Permits require standard BMPs, define permissible discharge volumes, and set standards for maximum contaminant concentrations in discharges with the goal of protecting water quality. In most cases, compliance with existing laws, regulations, and standards is sufficient to minimize risks to water quality resources. The impact analysis focuses on releases and where adverse effects related to hydrology and water quality, not already addressed through permitting or other regulatory programs, could occur. The significance of the effects is compared to established CEQA criteria. Mitigation measures are identified, as necessary, to reduce potentially significant impacts to less than significant.

3.10.4.3 Impacts and Mitigation Measures

Table 3.10-1 provides a summary of the significance of the proposed project's impacts to hydrology and water quality before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.10-1 Summary of Potential Impact to Hydrology and Water Quality

Impact	Significance Prior to Mitigation	Significance After Mitigation
Impact Hydro-1: Potential to violate water quality standards or waste discharge requirements (Criteria 1)	Less than Significant	---
Impact Hydro-2: Potential to substantially deplete groundwater supplies or interfere substantially with groundwater recharge to cause a net deficit in aquifer volume or a lowering of the local groundwater table level (Criteria 2)	Less than Significant	---
Impact Hydro-3: Potential to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site (Criteria 3 and 4)	Less than Significant	---

Impact	Significance Prior to Mitigation	Significance After Mitigation
Impact Hydro-4: Potential to create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff (Criteria 5)	Less than Significant	---
Impact Hydro-5: Potential to substantially degrade water quality during construction due to releases of drilling lubricants during horizontal directional drilling (Criteria 6)	Potentially Significant	Less than Significant MM Hydro-1
Impact Hydro-6: Potential to 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 (Criteria 9)	Less than Significant	—

Impact Hydro-1: Potential to violate water quality standards or waste discharge requirements (Criteria 1). ***(Less than Significant)***

Overview

The five types of potential discharges associated with construction of the proposed project that could potentially violate water quality standards or waste discharge requirements are: stormwater discharges; discharge of dewatered groundwater; discharge of hydrostatic testing; release of treated water; and the accidental release of slurry waste (combination of soil, water, and bentonite) from geotechnical investigation drilling and HDD operations. Each discharge, and the applicable regulations, plans, and standards that address the potential impacts of discharges, are described below.

Stormwater

Open trench construction and construction staging areas would require the removal of existing pavement and vegetation, exposing soils to the elements. Soils may be entrained in stormwater runoff, potentially affecting water quality in receiving waters. Improper use, storage, or disposal of fuels, lubricants, and other chemicals used in construction could also result in the conveyance of contaminants to the receiving waters via stormwater runoff.

As the proposed project is greater than one acre in area, all elements of the Construction General Permit would apply. Implementation of the Construction General Permit would serve to reduce potential impacts from stormwater discharges to less than significant. The Construction General Permit requirements are strengthened and made more specific by EBMUD's Standard Construction Specification 01 35 44. EBMUD requires qualified professionals, as described in the permit, to prepare and certify all permit-required documents/submittals, to implement effective stormwater/non-stormwater management practices, and to conduct inspections and monitoring as required by the permit. Requirements include preparing a SWPPP that describes measures that would be implemented to prevent the discharge of contaminated stormwater runoff from the jobsite. The SWPPP must be reviewed and approved by EBMUD prior to construction. Contaminants specifically required to be addressed include, but are not limited to: soil, sediment, concrete residue, pH less than 6.5 or greater than 8.5, and chlorine residual. EBMUD also requires that the SFRWQCB's existing MRP C.6 construction stormwater inspection requirements, implemented by Alameda County Public Works, are obtained and complied with. Therefore, construction impacts would be less than significant with implementation of Standard Contract Specification 01 35 44.

Groundwater

Groundwater would likely be encountered during open trench construction. In accordance with EBMUD Health and Safety Requirements Required Safety Practices 1100, groundwater must be removed from trenches for worker safety purposes. All water discharged would be managed and discharged in storm drains or sewer lines, in compliance with the SFRWQCB's existing MRP. The permit requirements include restrictions on discharges that could pose a risk to surface water quality. The proposed project would still have a potentially significant impact on water quality and waste discharge because groundwater could be contaminated and not properly managed. EBMUD's Standard Construction Specification 01 35 44would require that the preparation of a Water Control and Disposal Plan that complies with all requirements and regulations of the SFRWQCB, CDFW, County Flood Control Districts, and any other regulatory agency having jurisdiction. The Water Control and Disposal Plan would be required to include the sampling and analytical program for characterization of any wastewater, as needed, prior to disposal. The plan must also describe: measures for containment, handling, and disposal of groundwater (if encountered); runoff of water used for dust control; tank heel water; wash water; sawcut slurry; test water; and construction water or other liquid that has been in contact with any interior surfaces of EBMUD facilities. With implementation of the Water Control and Disposal Plan per EBMUD's Standard Construction Specification 01 35 44, impacts would be less than significant.

Treated Water

Treated water would be used for hydrostatic testing of the pipelines and to flush the pipelines in order to disinfect the pipelines after installation but before the pipeline is placed in-service. Once any identified leaks are repaired, highly chlorinated water would be added at one end of the pipeline. The superchlorinated test water, with chlorine levels of approximately 100 to 300 mg/L, would be flushed through the pipelines and discharged. In all, 2 to 3 pipeline volumes of water would be discharged during the dewatering process, assuming that no testing needed to be redone. Dewatering volume estimates by pipeline are shown in Table 2.7-4. In accordance with EBMUD's Environmental Compliance Manual, the superchlorinated water produced during testing and disinfection activities would be discharged to: a sanitary sewer or interceptor in compliance with a NPDES Permit obtained from the SFRWQCB for this action; to the EBMUD wastewater treatment plant; or via another approved disposal method. If transported off-site for disposal, the water would be dechlorinated prior to transport, and dechlorination would also be required for discharge to a sanitary sewer system. The water would not be normally discharged to a storm drain and there are no creeks in the proposed project areas. Emergency discharges of superchlorinated water may be dechlorinated and then discharged to the storm sewer system. Discharge to the storm drain system would ultimately result in discharge to a surface water, and the Basin Plan prohibits the discharge of chlorine or other substances that are toxic to aquatic organisms into reservoirs, creeks, or other waters of the state. Impacts could still be potentially significant if discharged water is not properly characterized, managed, and disposed of. EBMUDs Section 01 35 44 Environmental Requirement would require the preparation of a Water Control and Disposal Plan that complies with all requirements and regulations of the CRWQCB, CDFW, County Flood Control Districts, and any other regulatory agency having jurisdiction. Impacts would be less than significant with implementation of the Water Control and Disposal Plan.

Slurry Waste from Pre-Construction Geotechnical Investigation Borings and HDD Operations

The geotechnical investigation borings and the HDD operations would generate a slurry waste that is a combination of soil, water, and bentonite. The slurry waste would be stored within drums. An accidental release of the slurry waste on land and in water could potentially violate water quality standards. As described in Impact Hazards-1, the accidental release of slurry waste would be less than significant because EBMUD would implement a SWPPP, a Spill Prevention and Response Plan as required by EBMUD Standard Construction Specification 01 35 44, and would adhere to the existing CUPA regulation.

Exploratory geotechnical investigation borings would be conducted on land near the HDD pits and the jack and boring pits. Exploratory geotechnical investigation borings would be conducted within the Oakland Inner Harbor and the San Leandro Bay Channel along the underwater alignments. Slurry would be used during HDD operations at the insertion and entry pits.

Mitigation Measures: None Required.

Impact Hydro-2: Potential to substantially deplete groundwater supplies or interfere substantially with groundwater recharge to cause a net deficit in aquifer volume or a lowering of the local groundwater table level (Criteria 2). ***(Less than Significant)***

Although groundwater dewatering may be required during construction, dewatering would be limited in volume and duration and local groundwater elevations would be expected to soon return to pre-construction conditions. The proposed project does not include an increase in the area of impervious surfaces that could potentially interfere with the recharge of groundwater through the infiltration of precipitation. Therefore, the impact to groundwater supplies or recharge during construction would be less than significant.

Mitigation Measures: None Required.

Impact Hydro-3: Potential to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site (Criteria 3 and 4). ***(Less than Significant)***

Pre-Construction Geotechnical Investigation

The proposed project would require geotechnical investigation borings along the underwater alignments. The drilling of the geotechnical investigation borings could potentially cause some sedimentation within the Oakland Inner Harbor, the San Leandro Bay Channel, and the Inner Harbor. A total of about 9 geotechnical borings would be needed and each geotechnical boring would have a diameter of 5-inches and a depth of about 70 to 100 feet for Crossing #2. The volume of sediment to be drilled would be approximately 98 cubic feet. Drilling along the underwater crossings would be conducted with casing which minimizes sedimentation. The amount of sedimentation that would be generated from the geotechnical borings would be minimal and the sedimentation impact would be less than significant. Implementation of Mitigation Measure Hydro-1 requires turbidity curtains be used during drilling to minimize sedimentation which would further minimize this impact.

Construction

The proposed project would be constructed largely within existing street ROWs, which would be repaired after construction. The proposed project would not create new significant areas of impervious surfaces that could increase stormwater runoff during construction. There are no streams or creeks crossing any of the new pipeline alignments. In those locations where the proposed new pipelines cross a waterway (i.e., the Oakland Inner Harbor, Tidal Canal, San Leandro Bay Channel), the pipelines would be installed using HDD (all underground) and no alterations to the surface waterways would occur. Therefore, the proposed project would not change existing drainage patterns that would result in substantial erosion or siltation on- or off-site or substantially increase the surface runoff in a manner that would result in flooding on- or off-site.

As detailed under Impact Hydro-1, compliance with the Construction General Permit would reduce potential impacts related to the temporary disturbance of soils during construction and the discharge of sediment into stormwater runoff to less than significant. Additional protections are provided in EBMUD's Standard Construction Specification 01 35 44 which states that no "debris, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities" is permitted to enter storm drains or surface waters or be stored in areas where it is subject to being washed away by stormwater. Construction sites must be maintained to ensure that drainage from the sites would minimize erosion of stockpiled or stored materials and the adjacent native soil material.

No erosion or siltation would be anticipated following construction after streets and construction areas are returned to their pre-construction conditions. The majority of proposed pipeline alignments are covered by hardscape. There are no natural stream courses crossing the proposed pipeline alignments. Compliance with permit requirements would ensure that sediments do not mobilize in stormwater, which could pollute the surrounding waters. Impacts would be less than significant.

Mitigation Measures: None Required.

Impact Hydro-4: Potential to create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff (Criteria 5). ***(Less than Significant)***

The proposed project would be primarily constructed within existing street rights-of-ways, with some construction in private parking lots, which would be repaired after construction. There would be no new significant areas of impervious surfaces that could increase stormwater runoff. The discussion under Impact Hydro-1, above, describes how implementing existing stormwater permit requirements would prevent the proposed project from contributing polluted runoff during construction. Therefore, the proposed project would not create a new source of stormwater runoff that could exceed the capacity of the existing storm drain system or provide an additional source of polluted runoff.

While EBMUD may discharge test water to the stormwater drainage system as the result of hydrostatic testing and pipeline flushing and maintenance, the discharge of test waters would occur in compliance with permit conditions (NPDES and under the conditions of a SWPPP) that limit the rate of discharge and specify water quality limits for the discharged water. Impacts to water quality could still be potentially significant if discharges are not properly managed. Preparation of a Water Control and Disposal Plan, as required by Standard Construction Specification 01 35 44, would restrict maximum contaminant concentrations and discharge volumes and ensure less than significant impacts. Impacts related to increased runoff water or polluted runoff would be less than significant.

Mitigation Measures: None Required.

Impact Hydro-5: Potential to substantially degrade water quality during construction due to releases of drilling fluids during horizontal directional drilling (Criteria 6). (*Less than Significant with Mitigation*)

Construction of the proposed project would require HDD beneath the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel. Drilling operations for the entry pits would be set back more than 200 feet from the shorelines and would not disturb the bed and banks of any waterways. The proposed project includes a number of measures to minimize the potential for frac-outs. A steel conductor casing about 200 feet long would be rammed into the ground at entry and insertion points, with jet-grouted columns inserted to support the casing. The casing would prevent frac-outs along the portion of the drilling alignment when the borehole is nearest the surface and passes through less stable fill and Young Bay Mud.

During HDD there is a potential for pressures created by drilling equipment to force drilling fluids up from the borehole, with the fluids potentially escaping to the surface water bodies.

Escape of fluid is referred to as a frac-out and is most likely to occur near the entry and insertion points of the horizontal drilling, where there is the least distance between the borehole and the bottom of the surface water bodies. Drilling fluids consist primarily of bentonite (a type of clay) and water, and are considered non-toxic. But when discharged to a surface water body, the fine-grained bentonite particles can smother benthic invertebrates, aquatic plants, and fish and their eggs. Regardless of the preventative measures incorporated into the proposed project, a frac-out has the potential to occur during any stage of the drilling operations. A frac-out could substantially degrade water quality during construction, which would be considered a potentially significant impact.

Mitigation Measure Hydro-1 requires EBMUD to prepare and implement a Frac-Out Contingency Plan that requires monitoring and coordination with applicable regulatory agencies. Careful monitoring during drilling can minimize the potential for frac-outs to occur. When decreased pressure is noted, indicating a potential frac-out, stopping drilling for a few hours and allowing the bentonite slurry to harden often effectively seals the frac-out and drilling can continue. But if the frac-out does not seal itself, additional measures could be required to contain and clean up the released drilling fluids. If a frac-out were to occur, affecting the channel bottom of the Oakland Inner Harbor, Tidal Canal, or San Leandro Bay Channel, then consultation with NMFS would also be required to demonstrate that impacts were mitigated. Impacts would be less than significant after implementation of Mitigation Measure Hydro-1.

Mitigation Measures: Hydro-1

Mitigation Measure Hydro-1. Frac-Out Contingency Plan.

A Frac-Out Contingency Plan shall be prepared by a qualified California-licensed professional geologist or engineer to address the potential for drilling fluids to be released during horizontal directional drilling operations. The plan shall include the following:

1. A monitor shall be on site during drilling operations to look for observable inadvertent release, frac-out conditions or lowered pressure readings on drilling equipment that may indicate a potential frac-out.
2. If the construction crew and/or drilling-machine operator suspect that there is a frac-out (i.e., notices a loss of circulation of drilling fluid) or drilling fluid is observed at the surface, all work shall stop, including the recycling of drilling fluid. The location and extent of the frac-out shall be determined. The construction crew shall implement measures to stop the frac-out, such as reducing the drilling pressure or thickening the drilling fluid (e.g., by using less water).
3. If the drilling fluid does not surface, no other actions shall be needed.
4. If the drilling fluid surfaces, EBMUD shall notify the regulatory agencies (NMFS, USACE, BCDC, CDFW, SFRWQCB) and if so directed, the affected area shall be surrounded with a barrier (e.g., silt fence) to prevent

further dissemination of the fluid. If there is a visible plume in the waterway, a sediment boom or curtain shall be installed around the plume to attempt to capture the released drilling fluid. The drilling fluid shall then be removed using the minimum amount of equipment needed to remove it (e.g., manually or by suction hose using a vacuum truck) in order to minimize impacts to the surface area where the frac-out occurred.

5. Upon implementation of the response measures described above, and once the frac-out is contained, drilling may resume.
6. EBMUD shall ensure that the frac-out plan also includes notification procedures to applicable regulatory agencies for reporting frac-outs. EBMUD shall consult with the regulatory agencies to implement the most appropriate measures to protect water quality in the event of a frac-out. EBMUD shall provide a copy of the plan to the USACE, RWQCB, NMFS, BCDC and CDFW prior to construction.

Significance after Mitigation: Less than Significant.

Impact Hydro-6: Potential to 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 (Criteria 9). ***(Less than Significant)***

As described above in Section 3.10.24, portions of the proposed project area are located within the mapped inundation area for the Central Reservoir, which is actively maintained by EBMUD. There is a very low likelihood of a dam failure during the construction phase of the proposed project. The risk of dam failure during the proposed project's construction would not represent a significant risk to people and structures.

Mitigation Measure: None Required.

3.10.5 References

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3.11 NOISE

This section presents the environmental setting and impact analysis for noise. Background information, known resources, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here. Appendix I includes a copy of the Noise and Vibration Technical Report prepared for the proposed project.

3.11.1 Definitions

3.11.1.1 Noise

Noise is defined as unwanted sound. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Most of the sounds that we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a weighting that reflects the facts that human hearing is less sensitive at low frequencies and extremely high frequencies, than in the frequency mid-range. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment and in industry are shown in Table 3.11-1 for different types of noise. A 10 dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented in this section are expressed in terms of dBA unless otherwise indicated.

To describe the time-varying character of environmental noise, the statistical noise descriptors, L_{01}, L_{10}, L_{50}, and L_{90}, are commonly used. They are the A-weighted noise levels equaled or exceeded during 1%, 10%, 50%, and 90% of a specified time period. A single number descriptor called the L_{eq} is also widely used. The L_{eq} is the average A-weighted noise level during a specified period of time and will be the primary descriptor used in the analysis. L_{max} and L_{min} will also be used, which represent the maximum and minimum A-weighted noise level during the measurement period.

3.11 NOISE

Table 3.11-1 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	**70 dBA**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**60 dBA**	
		Large business office
Quiet urban daytime	**50 dBA**	Dishwasher in next room
Quiet urban nighttime	**40 dBA**	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: ICF Jones & Stokes 2009

Vibration
Vibration caused by construction activities can be interpreted as energy transmitted in waves through the ground. Vibration attenuates as a function of the distance between the source and receptor. Vibration emanating from a single location (a "point source") attenuates at a rate of approximately 50 percent for each doubling of distance from the source (termed the "inverse square law") which tends to underestimate attenuation and, therefore, provides a "worst-case" estimate of vibration at the receptor.

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. Peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is used to assess the potential for damage to buildings and structures, and annoyance, and is expressed in inches per second (in/sec).

Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration.

3.11.2 Data Collection

The existing noise environment in the proposed project area was characterized with 9 short-term (10-minute duration), and 6 long-term (49-hour duration) noise measurements conducted between September 23 and September 25, 2015. Further information about the methodology is provided in Appendix I. Long-term noise measurements were taken in the vicinity of the HDD pipeline entry and insertion points, and where construction would occur in residential areas during the day and night. Short-term noise measurements were taken during the day for all other areas where only daytime construction is expected to occur.

3.11.3 Environmental Setting

3.11.3.1 Noise Sources and Sensitive Receptors

The existing noise environment for Crossings #1, #2, and #3 is typical of urban residential neighborhoods and commercial areas.

Existing Noise Levels
Table 3.11-2 summarizes the long-term and short-term measurement results. The locations of the measurements are shown in Figures 3.11-1 through 3.11-3. Areas where long-term measurements were taken are shown with an LT label and areas where short-term measurements were taken are shown with an ST label. The hourly results of the long-term noise measurements are described in the Noise and Vibration Technical Report (Appendix I).

Table 3.11-2 Summary of Noise Measurements Results

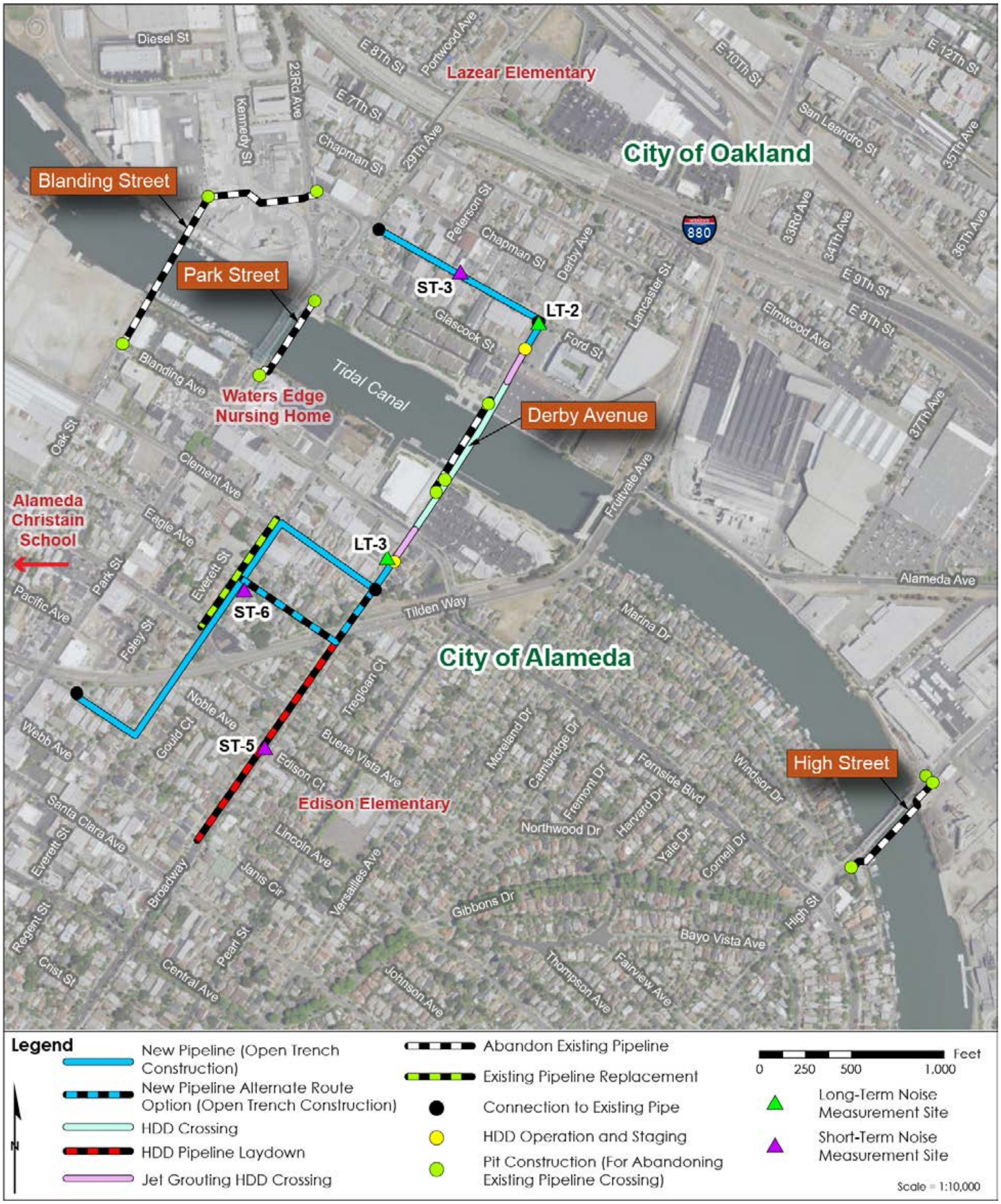
Measurement Sites (Date/Time) LT = Long-Term ST = Short-Term	Daytime & Nighttime Average Noise Levels (dBA)		
	Time of Day	L_{max}	L_{eq}
Crossing #1			
LT-1 (entry pit): Tree at apartment setback north of Estuary Park 1:00 p.m. (9/23/15) - 2:00 p.m. (9/25/15)	Daytime	76	55
	Nighttime	69	54
LT-6 (insertion pit): Tree at adjacent to park and parking in Office area 1:00 p.m. (9/23/15) - 2:00 p.m. (9/25/15)	Daytime	72	54
	Nighttime	69	52
ST-1: Corner of Madison and 7th Streets 10:40 a.m. -10:50 a.m. (9/25/15)	Daytime	81	71
ST-2: Corner of 4th and Madison Streets 11:00 a.m. -11:10 a.m. (9/25/15)	Daytime	76	63
ST-4: Little John Park across from 1715 Sherman Street 11:40 a.m. -11:50 a.m. (9/25/15)	Daytime	76	60
Crossing #2			
LT-4: (entry pit): Light standard in front of 3132 Bridgeview Isle 1:00 p.m. (9/23/15) - 2:00 p.m. (9/25/15)	Daytime	74	59
	Nighttime	67	53
LT-5: (insertion pit): Tree 75 ft. north of Veterans Court centerline 1:00 p.m. (9/23/15) - 2:00 p.m. (9/25/15)	Daytime	72	56
	Nighttime	67	53
ST-7: Corner of Peach & Fillmore Streets 12:40 p.m. - 12:50 p.m. (9/25/15)	Daytime	58	48
ST-8: Corner of San Jose Ave. & Fountain Street 1:00 p.m. - 1:10 p.m. (9/25/15)	Daytime	58	48
ST-9: Island Drive next to Earhart School 1:20 p.m.-1:30 p.m. (9/25/15)	Daytime	75	63
Crossing #3			
LT-2 (entry pit): Light standard at NW corner of Derby Avenue and Glascock Street 1:00 p.m. (9/23/15) - 2:00 p.m. (9/25/15)	Daytime	81	59
	Nighttime	77	56
LT-3 (insertion pit): Light standard in front of 1913 Broadway 1:00 p.m. (9/23/15) - 2:00 p.m. (9/25/15)	Daytime	84	64
	Nighttime	79	56
ST-3: In front of 2912 Ford Street 11:20 a.m. - 11:30 a.m. (9/25/15)	Daytime	69	55
ST-5: Broadway at Noble Avenue 12:00 p.m. - 12:10 p.m. (9/25/15)	Daytime	74	62
ST-6: Corner of Everett St. & Eagle Avenue 12:20 p.m. - 12:30 p.m. (9/25/15)	Daytime	77	56

Source: Illingworth & Rodkin 2016

Figure 3.11-1 Noise Survey Locations and Sensitive Receptors (Crossing #1)

Figure 3.11-2 Noise Survey Locations and Sensitive Receptors (Crossing #2)

Figure 3.11-3 Noise Survey Locations and Sensitive Receptors (Crossing #3)



Sensitive Noise Receptors

Human response to noise varies considerably from one individual to another. The effects of noise can include interference with sleep, concentration, and communication; physiological and psychological stress; and hearing loss. Given these noise effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hospitals, and nursing homes are considered to be the most sensitive to noise. Table 3.11-3 identifies sensitive receptors located adjacent to or near the proposed project pipeline alignments and Figures 3.11-1 through 3.11-3 show the locations of the schools that are considered sensitive receptors.

Table 3.11-3 Sensitive Receptors Near the Proposed Project

Facility	Location	Distance from Alignment
Crossing #1 (Oakland)		
Residential Uses	Interspersed over Entire Alignment	As close as 10 feet from pipeline open trench construction and excavations, jack and bore, and HDD drilling, but usually 40 feet or more
Laney College	900 Fallon Street	> 500 feet from all construction activities
Lazear Elementary School	1025 2nd Avenue	> 500 feet from all construction activities
Crossing #1 (Alameda)		
Residential Uses	Sherman Street	As close as 10 feet but usually 40-50 feet from pipeline open trench construction
Crossing #2 (Alameda)		
Small Size Big Mind Preschool	3300 Bridgeview Isle	200 feet from jack and bore, and HDD drilling
Otis Elementary School	3010 Fillmore Street	> 500 feet from all construction activities
Lincoln Middle School	1250 Fernside Boulevard	> 500 feet from all construction activities
Residential Uses	Entire Alignment	As close as 10 feet but usually 40 feet from pipeline open trench construction and excavations, and jack and bore; 150 feet from HDD drilling
Crossing #2 (North Bay Farm Island)		
Residential Uses	Veterans Court and Island Drive	40 feet from HDD drilling and HDPE pipeline laydown
Earhart Elementary School	400 Packet Landing Road	40 feet from HDPE pipeline laydown
Crossing #3 (Oakland)		
Residential Uses	Derby Avenue and Ford Street	As close as 10 feet but usually 40 feet from pipeline open trench construction and excavations, and HDD drilling

Facility	Location	Distance from Alignment
Crossing #3 (Alameda)		
Edison Elementary School	2700 Buena Vista Avenue	> 500 feet from all construction activities
Alameda Christian School	2226 Pacific Avenue	> 500 feet from all construction activities
Waters Edge Nursing Home	2401 Blanding Avenue	> 500 feet from all construction activities
Residential Uses	Interspersed over Entire Alignment	As close as 10 feet but usually 40 feet from pipeline open trench construction and excavations, HDD drilling, and HDPE pipeline laydown, and abandonment pits

3.11.4 Applicable Regulations, Plans, and Standards

3.11.4.1 Federal and State Regulations

No federal or state standards related to noise are applicable to the proposed project. The Federal Noise Control Act of 1972 divides powers between federal, state, and local governments, in which the primary federal responsibility is for noise source emission control. State and local governments are responsible for controlling the use of noise sources and determining the levels of noise to be permitted in their environments (42 USC, Chapter 65: Noise Control).

3.11.4.2 Local Regulations

Overview

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 noise ordinances) for projects involving facilities for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

At the local level, noise is addressed through the implementation of General Plan policies, including noise and land use compatibility guidelines, and through enforcement of noise ordinances. General Plan policies provide guidelines for determining whether a noise environment is appropriate for a proposed or planned land use. Local noise ordinances regulate such sources as mechanical equipment and amplified sounds, as well as prescribe hours of heavy equipment operation.

City of Alameda General Plan

The City of Alameda General Plan establishes policies related to noise. The following policies are pertinent to the proposed project:

Guiding Policy 8.7a	Minimize vehicular and stationary noise sources, and noise emanating from temporary activities.

Guiding Policy 8.7c	Recognize that residential, school, hospital, church, or public library properties in commercial areas and commercial development in 130 industrial areas will be subject to noise levels associated with noisier permitted uses.

Chapter 5 of the Municipal Code, Community Noise, sets noise level standards for receiving land uses and requires noise sources to submit a noise reduction plan where the standards are violated.

Implementing Policy 8.7g	Minimize the impact of aircraft, railroad, and truck noise by requiring that noise levels caused by single events be controlled to 50 dB in bedrooms and 55 dB in living areas within the 60 dB contour.
Implementing Policy 8.7g	In making a determination of impact under the California Environmental Quality Act (CEQA), consider the following impacts to be "significant": An increase in noise exposure of 4 or more dB if the resulting noise level would exceed that described as normally acceptable for the affected land use, as indicated in Table 8-1. Any increase of 6 dB or more, due to the potential for adverse community response.

City of Oakland General Plan

The Noise Element for the City of Oakland General Plan provides policies to ensure that there is compatibility between a land use and a range of ambient noise levels. The following policies are pertinent to the proposed project:

Policy 1	Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.
Policy 2	Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.
Policy 3	Reduce the community's exposure to noise by minimizing the noise levels that are received by Oakland residents and others in the City. (Policy 3 addresses the reception of noise whereas Policy 2 addresses the generation of noise.)

Project construction would occur in two cities: Oakland and Alameda. Table 3.11-4 summarizes the pertinent construction noise ordinance time and noise limits for each city.

Table 3.11-4 Summary of Noise Ordinance Time and Noise Limits

Jurisdiction	Construction Time Limits: Weekdays	Construction Time Limits: Weekends	Construction Noise Limits
City of Oakland[a]	7 a.m. – 7 p.m. (daytime)	9 a.m. – 8 p.m. (daytime)	*Residential Zones* Short term (<10 days): 80 dBA on weekdays and 65 dBA on weekends and legal holidays Long-term (>10 days): 65 dBA on weekdays and 55 dBA on weekends and legal holidays *Commercial Zones* Short term (<10 days): 85 dBA on weekdays and 70 dBA on weekends and legal holidays Long-term (>10 days): 70 dBA on weekdays and 60 dBA on weekends and legal holidays
City of Oakland[a]	7 p.m. – 7 a.m. (nighttime)	8 p.m. – 9 a.m. (nighttime)	*Residential Zones* 45 dBA for more than 20 minutes in a 1 hour period 50 dBA for more than 10 minutes in a 1 hour period 55 dBA for more than 5 minutes in a 1 hour period 60 dBA for more than 1 minute in a 1 hour period 65 dBA maximum level *Commercial Zones* 65 dBA for more than 20 minutes in a 1 hour period 70 dBA for more than 10 minutes in a 1 hour period 75 dBA for more than 5 minutes in a 1 hour period 80 dBA for more than 1 minute in a 1 hour period 85 dBA maximum level
City of Alameda[b]	7 a.m. – 7 p.m.	8 a.m. – 5 p.m. Saturday	None Specified during the time limits noted
City of Alameda[b]	10 p.m. – 7 a.m.	10 p.m. – 7 a.m.	Noise due to construction activities occurring outside of the allowed time limits are restricted by the noise limits contained Section 4-10.4b of the Alameda Municipal Code, which are as follows: *Residential Zones* 50 dBA for more than 30 minutes in a 1 hour period 55 dBA for more than 15 minutes in a 1 hour period 60 dBA for more than 5 minutes in a 1 hour period 65 dBA for more than 1 minute in a 1 hour period 70 dBA maximum level *Commercial Zones* 60 dBA for more than 30 minutes in a 1 hour period 65 dBA for more than 15 minutes in a 1 hour period 70 dBA for more than 5 minutes in a 1 hour period 75 dBA for more than 1 minute in a 1 hour period 80 dBA maximum level

Notes:

[a] Time limits and noise levels for construction activity specified in Section 17.120.050 of the Oakland Planning Code.

[b] Time limits for construction activity specified in Section 4-10.7e of the Alameda Municipal Code. Construction that occurs within the time limits listed is not subject to noise limits contained in Tables I and II of Section 4-10.4b of the Alameda Municipal Code.

Source: City of Oakland 1997 and City of Alameda 2015

EBMUD Practices and Procedures

EBMUD Standard Construction Specifications

EBMUD's Standard Construction Specification 01 35 44 identifies several measures for controlling noise and vibration and requires preparation and implementation of both a noise control monitoring plan and a vibration control monitoring plan. Noise generation should comply with noise level rules, regulations, and ordinances to the extent feasible. Noise reduction measures are also specified, including muffling equipment, selecting quieter equipment, using noise barriers, etc.

When a project needs to reduce noise generation, the specification identifies that impact equipment (e.g., jack hammers, pavement breakers, and rock drills) and hydraulically or electric-powered equipment should be used wherever feasible to avoid noise associated with compressed-air exhaust from pneumatically-powered tools. Where use of pneumatically-powered tools is unavoidable, an exhaust muffler on the compressed-air exhaust should be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves should be used, where feasible, which could achieve a reduction of 5 dB. Quieter procedures, such as drilling rather than impact equipment, would be used whenever feasible. Construction crews are also required to limit the noisiest phases of construction to 10 work days at a time, where feasible, and to notify neighbors/occupants within 300 feet of proposed project construction about the estimated duration of the activity at least 30 days in advance of the extreme noise-generating activities.

3.11.5 Proposed Project Impact and Mitigation Measures

3.11.5.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on noise if it would:

1. Expose persons to or generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies; or
2. Expose persons to or generate excessive groundborne vibration or groundborne noise levels; or
3. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
4. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or
5. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or
6. For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

Based on the Initial Study analysis, the proposed project would include the installation of new underground water pipelines, which would not generate any new source of ambient noise. In addition, the Initial Study analysis found that because the proposed project is located in an urban environment with consistent urban noise, the proposed project would not expose people residing or working near the airport to excessive noise levels. Criteria 3, 5 and 6 would therefore not apply to the proposed project and are not discussed further.

Thresholds of Significance

City of Alameda and City of Oakland Ordinances

The noise ordinances established by the City of Alameda and the City of Oakland are presented in Table 3.11-4. Any construction activity of the proposed project that exceeds the thresholds identified in the City of Alameda and City of Oakland noise ordinances would be considered a significant impact.

Ambient Noise Levels

A significant increase in ambient noise levels is defined as increased noise levels that cause speech interference and sleep disturbance. Daytime activities would cause speech interference and nighttime activities would cause sleep disturbance. The Noise and Vibration Technical Report identified the speech interference threshold as 70 dBA and the sleep disturbance threshold as 60 dBA (see Appendix I). The speech interference threshold and the sleep disturbance threshold are defined by two factors: the increase in noise and the duration of the increase in noise. A significant impact would occur if construction of the proposed project exceeds the following thresholds:

- Noise exceeds 70 dBA speech interference threshold and 10-day duration near residential areas
- Noise exceeds 70 dBA speech interference threshold for more than 1 day by schools
- Noise exceeds 60 dBA sleep disturbance threshold at residential uses for any duration near residences

Vibration

A considerable amount of research has been done to correlate vibrations from single events such as dynamite blasts with architectural and structural damage; however, "safe" levels for continuous vibrations generated by construction equipment are not well defined (Hendricks 2004). No commonly accepted standard for construction vibration has been established.

Most construction vibration references identify the threshold at which minor cosmetic damage can occur, defined generally as causing the formation of hairline fractures in interior plaster or surfaces and/or the dusting of existing fractures. Other thresholds identify the level at which more significant cosmetic damage occurs, or at which structural damage occurs. The single-event source impact (e.g., impact pile driving) thresholds are higher than continuous source standards (e.g., vibratory equipment). Continuous source thresholds are typically about half of the threshold for single-event sources before causing the same damage. The thresholds also vary by building type, with lower thresholds applying to older homes (most commonly pre-1950) when homes were constructed with non-engineered wood and plaster as well as unreinforced masonry.

To assess the cosmetic damage potential from ground vibration induced by construction equipment, Caltrans (2013) synthesized the various vibration references to develop construction vibration threshold criteria, as shown in Table 3.11-5. Per Table 3.11-5, EBMUD has selected the "Older Residential Structure" category as the CEQA significance threshold for minor cosmetic damage to property. The limits for minor cosmetic damage would be 0.3 in/sec PPV for continuous sources and 0.5 in/sec PPV single-event sources. The "Older Residential Structure" category was selected as the threshold because most of the houses within the vicinity of the proposed project would either be classified as modern industrial/commercial buildings, new residential structures, or older residential structures. Therefore, a CEQA threshold of 0.3 in/sec PPV would protect the vast majority of structures and property along each of the proposed crossing pipeline alignments from minor cosmetic damage from vibration.

Historic buildings are likely located adjacent to the project (see Section 3.5 Cultural Resources for a discussion of historical resources and regulatory requirements pertaining thereto). Damage from vibration can impact the historical significance of a building. The threshold at which vibration can impact the historical significance of a building is greater than the threshold at which vibration can cause minor cosmetic damage to a historic building. Major cosmetic damage would need to occur such as visible cracking and deterioration of exterior plaster or masonry or the breaking of glass in order for the project to have a potentially significant impact on the historical significance of a building. Minor cosmetic damage, as identified as occurring for "Historic and Some Old Buildings" in Table 3.11-5, would not be considered a significant impact to the historical significance of a building. For the historic buildings anticipated in the project areas, major cosmetic damage is not anticipated at levels below 0.4 in/sec PPV (Hendricks 2004). The threshold for potential impacts to the historical significance of buildings would, therefore, be at 0.4 in/sec PPV for buildings greater than 50 years old.

Table 3.11-5 Vibration Thresholds for Minor Cosmetic Damage Potential

Category	Continuous Source PPV (in/sec)	Single-Event Source PPV (in/sec)
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments[1]	0.08	0.12
Fragile Buildings[1]	0.1	0.2
Historic and Some Old Buildings[2]	0.25	0.5
Older Residential Structures[3]	0.3	0.5
New Residential Structures	0.5	1.0
Modern Industrial/Commercial Buildings	0.5	2.0

Notes:

[1] There are no extremely fragile historic buildings, ruins, ancient monuments, or fragile buildings within the vicinity of the proposed project; therefore, this category is not relevant to the proposed project.

[2] Few if any structures that are susceptible to minor cosmetic damage from vibration at levels lower than 0.3 in/sec PPV are anticipated along the pipeline alignments.

[3] This threshold was chosen as the CEQA significance threshold for the proposed project because it would be protective of the vast majority of structures along the pipeline alignment.

Source: Caltrans 2013

3.11.5.2 Approach to Analysis

The noise that would be generated by construction of the proposed project was identified by calculating what the noise levels would be for the equipment used during construction of the proposed project. Because HDD operations may require drilling at both the entry and insertion pit locations, the noise that would be generated from HDD was analyzed conservatively by calculating the noise that would be generated if drilling occurred at both locations. A L_{eq} level was calculated and adjusted for distance and usage for each piece of equipment. The L_{eq} levels for the equipment were compared to the City of Oakland and City of Alameda thresholds and the speech interference and sleep disturbance thresholds. Vibration impacts were identified by finding the minimum distance away from existing structures a piece of equipment could be used (i.e., the threshold distance), such that the vibration would not exceed the established thresholds. The threshold distance was then compared to the distance from the location of a construction activity to a building and a significance determination was made.

3.11.5.3 Impacts and Mitigation Measures

Table 3.11-6 provides a summary of the significance of the proposed project's impacts to noise and vibration before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.11-6 Summary of Potential Noise Impacts

Impact	Significance Prior to Mitigation	Significance After Mitigation
Impact Noise-1: Potential to expose persons to or generate noise levels in excess of standards established in the local General Plan or noise ordinance or applicable standards of other agencies, and could result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the proposed project (Criteria 1 and 4)	Potentially Significant	Significant and Unavoidable MM Noise-1
Impact Noise-2: Potential to expose persons to or generate excessive groundborne vibration or groundborne noise levels (Criteria 2)	Potentially Significant	Less than Significant MM Noise-2

Impact Noise-1: Potential to expose persons to or generate noise levels in excess of standards established in the local General Plan or noise ordinance or applicable standards of other agencies, and potential to result in a substantial temporary or periodic increase in ambient noise levels in the proposed project vicinity above levels existing without the proposed project (Criteria 1 and 4). (*Significant and Unavoidable)*

City of Oakland (Daytime Construction)

A significant impact would result if the following occurs:

- Pre-construction geotechnical investigation or construction of the proposed project conflicts with the construction time limits established by the City of Oakland Noise Ordinance; or

- Pre-construction geotechnical investigation or construction of the proposed project exposes persons to noise levels in excess to the standards established by the Oakland Noise Ordinance; or
- Pre-construction geotechnical investigation or construction of the proposed project exceeds the speech interference threshold

Construction of the proposed project would mostly occur between 7:00 a.m. – 7:00 p.m., with some work occurring on the weekends and at night, later than 7:00 p.m. The construction work that would occur on the weekends and at night is discussed under nighttime construction.

Table 6 in Appendix I summarizes the estimated increases in noise levels during daytime construction activities. Certain activities at Crossing #1 and Crossing #3 would result in noise level increases that are considered less than significant. The following activities that would occur at Crossing #1 would not exceed the City of Oakland Noise Ordinance or the speech interference threshold and are considered less than significant:

- Use of dump trucks, pavers, and rollers for jack and bore construction at Oak Street would increase noise levels to 63–65 dBA
- Use of a vibratory sheet pile driver for jack and bore construction at Oak Street would increase noise levels to 79 dBA and would have a duration of less than 10 days
- Use of excavators, tractors/loaders/backhoes, cement and mortar mixers, pavers, and rollers for abandonment of the Alice-Webster pipeline would increase noise levels to 76–79 dBA and would have a duration of less than 10 days
- Equipment used for the pre-construction geotechnical investigation borings, both on land and in-channel would increase noise levels to 60–76 dBA and would have a duration of less than 10 days

The following activities that would occur at Crossing #3 would not exceed the City of Oakland Noise Ordinance or the speech interference threshold and are considered less than significant:

- Use of concrete/industrial saws, jackhammers, excavators, tractors/ loaders/ backhoes, cement and mortar mixers, pavers, and rollers for the abandonment of the Park Street Bridge, Blanding Street, and Derby Avenue pipelines would increase noise levels to 67–80 dBA and would have a duration of less than 10 days
- Use of excavators, tractors/ loaders/ backhoes, cement and mortar mixers, pavers, and rollers for the abandonment of the High Street Bridge pipeline would increase noise levels to 73–77 dBA and would have a duration of less than 10 days
- Equipment used for the pre-construction geotechnical investigation borings, both on land and in-channel, would increase noise levels to 67–74 dBA and would have a duration of less than 10 days

The significant noise impacts from construction of the proposed project, which would occur in the city of Oakland are summarized in Table 3.11-7; this table contains detail regarding equipment details and estimated noise levels before and after the application of mitigation measures. Several

Table 3.11-7 Significant Daytime Noise Impacts in the City of Oakland[1]

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Speech Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM	
Crossing #1										
Open Trench Construction and Pipeline Abandonment	Concrete/ Industrial Saws	90	96	91	<10 days	Yes	Yes	No	--	10 feet (residential receptors north of Estuary Park and on 2nd, 4th, Oak and Madison Streets)
	Jackhammer	89	96	91	<10 days	Yes	Yes	No	--	
	Tractors/Loaders/ Backhoes	80	89	84	<10 days	Yes	Yes	No	--	
Open Trench Construction, Pipeline Connections, Abandonment, and Replacement	Vibratory Sheet Pile Driver	95	102	97	<10 days	Yes	Yes	No	--	
	Excavator	81	91	86	<10 days	Yes	Yes	No	--	
	Hot Tapping Machine	78	89	84	<10 days	Yes	Yes	No	--	
	Tapping Machine Motor/Generator	81	92	87	<10 days	Yes	Yes	No	--	
	Tractors/Loaders/ Backhoes	79	89	84	<10 days	Yes	Yes	No	--	
	Dewatering Pumps	78	92	87	<10 days	Yes	Yes	No	--	

1 The noise analysis assumes that only one piece of equipment would operate at a time at a given location. That is, multiple pieces of equipment would not operate concurrently. For example, concrete saws are usually used in lieu of jackhammers and not at the same time as jackhammers. Tractors, loaders, or backhoes usually operate one at a time to remove debris that was previously jackhammered or cut. One operation is usually performed at a time (e.g., removing pavement, then excavating, then placing sheet piles) and not concurrently, particularly in urban areas where construction space is limited.

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Speech Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM	
	Various Trucks (dump, flatbed, water)	74	84	79	<10 days	Yes	No	No	--	
Repaving	Cement and Mortar Mixers	83	89	84	<10 days	Yes	Yes	No	--	
	Paver	77	88	83	<10 days	Yes	Yes	No	--	
	Paving Equipment	76	86	81	<10 days	Yes	Yes	No	--	
	Roller	80	87	82	<10 days	Yes	Yes	No	--	
	Tractors/Loaders/ Backhoes	79	89	84	<10 days	Yes	Yes	No	--	
Jack and Bore Construction under Railroad at Oak Street	Bore/Drill Rig	84	68	53	>10 days	Yes	No	No	--	150 feet (residential receptors north of Estuary Park)
	Excavator	81	68	53	>10 days	Yes	No	No	--	
	Tractors/Loaders/ Backhoes	79	66	51	>10 days	Yes	No	No	--	
Abandonment of Existing Pipeline between Alice Street and Marina Village	Concrete/ Industrial Saws	90	86	81	<10 days	Yes	Yes	No	--	40 feet (residential receptors on Alice Street)
	Jackhammer	89	85	80	<10 days	Yes	No	No	--	
	Vibratory Sheet Pile Driver	95	90	85	<10 days	Yes	Yes	No	--	
HDD Entry	Excavator	81	74	59	>10 days	Yes	No	Yes	No	65 feet (residential receptors north of Estuary Park)
	Tractors/Loaders/ Backhoes	80	73	58	>10 days	Yes	No	Yes	No	
	Bore/Drill Rig	84	78	63	>10 days	Yes	No	Yes	No	
	Slurry Plant	78	76	61	>10 days	Yes	No	Yes	No	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4] No MM	Exceeds Noise Ordinance[4] With MM[5]	Exceeds Speech Interference Threshold[6] No MM	Exceeds Speech Interference Threshold[6] With MM	Distance from Closest Sensitive Receptor
	Pick-Crane	81	70	55	>10 days	Yes	No	No	--	
	Generator Set	81	75	60	>10 days	Yes	No	Yes	No	
Crossing #3										
Open Trench Construction	Concrete/ Industrial Saws	90	96	91	<10 days	Yes	Yes	No	--	10 feet (residential receptors on Derby Avenue & Ford Street)
	Tractors/Loaders/ Backhoes	80	89	84	<10 days	Yes	Yes	No	--	
Open Trench Construction and Pipeline Connections	Vibratory Sheet Pile Driver	95	102	97	<10 days	Yes	Yes	No	--	
	Excavator	81	91	86	<10 days	Yes	Yes	No	--	
	Hot Tapping Machine	78	89	84	<10 days	Yes	Yes	No	--	
	Tapping Machine Motor/Generator	81	92	87	<10 days	Yes	Yes	No	--	
	Tractors/Loaders/ Backhoes	80	89	84	<10 days	Yes	Yes	No	--	
	Dewatering Pumps	78	92	87	<10 days	Yes	Yes	No	--	
	Various Trucks (dump, flatbed, water)	74	84	79	<10 days	Yes	No	No	--	
Repaving	Cement and Mortar Mixers	83	89	84	<10 days	Yes	Yes	No	--	
	Paver	77	88	83	<10 days	Yes	Yes	No	--	
	Paving Equipment	76	86	81	<10 days	Yes	Yes	No	--	
	Roller	80	87	82	<10 days	Yes	Yes	No	--	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Speech Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM	
	Tractors/Loaders/ Backhoes	80	89	84	<10 days	Yes	Yes	No	--	
HDD Entry	Excavator	81	79	64	>10 days	Yes	No	Yes	No	40 feet (residential receptors on Derby Avenue)
	Tractors/Loaders/ Backhoes	80	77	62	>10 days	Yes	No	Yes	No	
	Bore/Drill Rig	84	82	67	>10 days	Yes	Yes	Yes	No	
	Slurry Plant	78	80	65	>10 days	Yes	No	Yes	No	
	Pick-Crane	81	75	60	>10 days	Yes	No	Yes	No	
	Generator Set	81	82	67	>10 days	Yes	Yes	Yes	No	
Abandonment of the Existing Pipeline near Blanding Street	Vibratory Sheet Pile Driver	95	85	80	<10 days	Yes	No	No	--	70 feet (residential receptors and commercial retail uses)
Abandonment of the Existing Pipeline near the Park Street Bridge	Concrete/ Industrial Saws	90	97	92	<10 days	Yes	Yes	No	--	10 feet (residential receptors on 29th Avenue)
	Jackhammer	89	96	91	<10 days	Yes	Yes	No	--	
	Excavator	81	91	86	<10 days	Yes	Yes	No	--	
	Vibratory Sheet pile Driver	95	102	97	<10 days	Yes	Yes	No	--	
	Tractors/Loaders/ Backhoes	80	89	84	<10 days	Yes	Yes	No	--	
	Cement and Mortar Mixers	83	89	84	<10 days	Yes	Yes	No	--	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Speech Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM	
	Paver	77	88	83	<10 days	Yes	Yes	No	--	
	Roller	80	87	82	<10 days	Yes	Yes	No	--	
Abandonment of Derby Avenue Pipeline	Vibratory Sheet Pile Driver	95	82	77	<10 days	Yes	No	No	--	100 feet (residential receptors on Derby Avenue)
Abandonment of the Existing Pipeline near the High Street Bridge	Concrete/ Industrial Saws	90	83	78	<10 days	Yes	No	No	--	50 feet (receptors commercial and retail uses)
	Jackhammer	89	82	77	<10 days	Yes	No	No	--	
	Vibratory Sheet Pile Driver	95	88	83	<10 days	Yes	Yes	No	--	

Notes:

1. L_{max} at 50 feet.
2. The L_{eq} level is adjusted for distance and usage.
3. Implementation of Mitigation Measure Noise-1 would reduce noise levels by 5 dBA through the implementation of source control measures and 10 dBA through the implementation of barrier control measures. Noise from open trench construction, pipeline abandonments, and pipeline laydown would be reduced by 5 dBA through the implementation of source control measures. Noise levels from jack and bore construction and HDD would be reduced by 15 dBA through the implementation of source control measures (5 dBA) and barriers (10 dBA).
4. Noise exceeding 80 dBA for less than 10 days and 65 dBA for more than 10 days near residences is considered exceeding the noise ordinance. Noise exceeding 85 dBA for less than 10 days and 70 dBA for more than 10 days near commercial uses is considered exceeding the noise ordinance.
5. The highlighted cells indicate impacts that are significant and unavoidable. The Exceed Speech Interference Threshold column includes the application of mitigation measures.
6. Noise exceeding 70 dBA for more than 10 days is considered exceeding the speech interference threshold.

Source: Illingworth & Rodkin 2016

conditions related to noise monitoring and control, as identified in EBMUD's Standard Construction Specification 01 35 44, could reduce impacts; however, more specificity is needed to identify the types of reduction measures needed, locations where measures are needed, and the feasibility of reduction measures. Impacts could remain potentially significant, even after implementation of EBMUD's Standard Construction Specifications 01 35 44 pertinent to noise control.

Crossing #1
Open trench construction, jack and bore construction, abandonment of the Alice-Webster pipeline, and HDD would require the use of equipment that would exceed the noise limits established in the Oakland Noise Ordinance, resulting in a potentially significant impact. HDD operations at the entry pit would exceed the speech interference threshold, resulting in a potentially significant impact. Mitigation Measure Noise-1 would require construction crews to implement source control measures and barriers to reduce noise impacts for each of the different types of construction activities. The source control measures (5 dBA noise reduction) and noise barriers (10 dBA noise reduction) would reduce noise by a minimum of 15 dBA. Source control measures, including mufflers, have been shown to reduce noise levels by 5 dBA (Eaton 2000). The Federal Highway Administration has identified that effective noise barriers can reduce noise levels by 10 to 15 dBA and that the degree of difficulty to obtain a 10 dBA reduction is "attainable" (Federal Highway Administration 2011).

HDD and Jack and Bore Construction. The noise generated by jack and bore construction and HDD would be reduced by 15 dBA after the implementation of source control measures and noise barriers as specified in Mitigation Measure Noise-1. Noise levels would be below the noise limits established by the City of Oakland Noise Ordinance after implementation of Mitigation Measure Noise-1. Noise levels from HDD operation at the entry pit would also be below the speech interference thresholds after implementation of Mitigation Measure Noise-1. The noise impact from jack and bore construction and HDD along Crossing #1 in the city of Oakland is less than significant after implementation of Mitigation Measure Noise-1.

Open Trench Construction and Abandonment of the Alice-Webster Pipeline. The noise generated by open trench construction and the abandonment of the Alice-Webster pipeline would be reduced by 5 dBA after the implementation of source control measures, as specified in Mitigation Measure Noise-1. Placement of noise barriers during open trench construction is not practical due to the short period of time that construction will take place in front of any one residence; therefore, a reduction in 5 dBA is used in the analysis for open trench work and abandonment of the Alice-Webster pipeline. Noise levels from open trench construction and the abandonment of the Alice-Webster pipeline would still exceed the noise limits established by the Oakland Noise Ordinance. The potential noise impact from open trench construction for Crossing #1 in the city of Oakland is significant and unavoidable, even with implementation of Mitigation Measure Noise-1. The significant and unavoidable noise impact would last no longer than approximately 7 days at any given residence because open trench construction activities would last approximately 7 days in front of any given residence (see Figure 2.7-1).

Crossing #3

Open trench construction, abandonment of the Park Street pipeline, abandonment of the Derby Avenue pipeline, abandonment of the High Street pipeline, and HDD would require the use of equipment that would exceed the noise limits established in the City of Oakland Noise Ordinance, resulting in a significant impact. HDD operations at the entry pit would exceed the speech interference threshold, resulting in a potentially significant impact. Mitigation Measure Noise-1 requires EBMUD to implement source control measures and barriers to reduce noise impacts.

HDD. The noise generated by HDD would be reduced by 15 dBA after the implementation Mitigation Measure Noise-1. Noise levels from HDD operation at the entry pit would be below the speech interference thresholds after implementation of Mitigation Measure Noise-1. However, noise levels would remain above the noise limits established by the City of Oakland Noise Ordinance and impacts would be significant and unavoidable.

Open Trench Construction and Abandonment of Existing Pipelines near the Park Street Bridge, High Street Bridge, Blanding Street, and Derby Avenue. Similar to Crossing #1 the noise levels from open trench construction and the abandonment of existing pipelines near Park Street Bridge, High Street Bridge, Blanding Street and Derby Avenue would be reduced by 5 dBA. The noise levels from abandonment of the existing pipeline near Blanding Street and Derby Avenue would be reduced below the noise limits established by the City of Oakland Noise Ordinance after implementation of Mitigation Measure Noise-1; therefore, the impact would be less than significant after mitigation.

The noise levels from open trench construction and the abandonment of existing pipelines near Park Street Bridge and High Street Bridge would still exceed the noise limits established by the City of Oakland Noise Ordinance after the implementation of Mitigation Measure Noise-1. Impacts from open trench construction and the abandonments of existing pipelines near Park Street Bridge and High Street Bridge would be significant and unavoidable along Crossing #3, even with implementation of Mitigation Measure Noise-1. The significant and unavoidable noise impact would last approximately 7 days in front of any given residence.

City of Alameda (Daytime Construction)

A significant impact would occur if the proposed project exposed people to noise levels in excess of the standards established by the Alameda Municipal Code. Construction of the proposed project would mostly occur between 7:00 a.m. – 7:00 p.m., with some work occurring on the weekdays and at night, later than 7:00 p.m. The construction work that would occur on the weekends and at night is discussed under nighttime construction.

The Alameda Municipal Code limits construction hours from 7:00 a.m. – 7:00 p.m. on weekdays and does not include noise limits for construction occurring during these time periods. The construction activities that EBMUD would conduct during the day would not conflict with the limits established in the Alameda Municipal Code; however, daytime construction in Alameda could exceed speech interference thresholds.

Table 6 in Appendix I summarizes the estimated increases in noise levels during daytime construction activities. Certain activities at all three crossings would result in noise level increases that are considered less than significant. The following activities that would occur at Crossing #1 would not exceed the speech interference threshold because they have a duration of less than 10 days and are considered less than significant:

- Open trench construction (84–102 dBA)
- Abandonment of the Alice-Webster pipeline (71–86 dBA)
- Pipeline laydown and assembly (74–82 dBA)
- Pre-construction geotechnical investigation borings, both on land and in-channel (67–76 dBA)

The following activities that would occur at Crossing #2 would not exceed the speech interference threshold because they have a duration of less than 10 days and are considered less than significant:

- Open trench construction (84–102 dBA)
- Abandonment of the Bay Farm 1 and Bay Farm 2 pipelines (71–86 dBA)
- Pre-construction geotechnical investigation borings, both on land and in-channel (60–83 dBA)
- HDD at the entry pit for Crossing #2 would have a duration of more than 10 days but the noise levels for HDD would be between 63 dBA and 70 dBA; the noise levels would not exceed the speech interference threshold and the impact is considered less than significant.

The following activities that would occur at Crossing #3 would not exceed the speech interference threshold because they have a duration of less than 10 days and are considered less than significant:

- Open trench construction (84–102 dBA)
- Pipeline laydown and assembly (76–84 dBA)
- Abandonment of the Park Street Bridge, Blanding Street, Derby Avenue, and High Street pipelines (75–102 dBA)
- Pre-construction geotechnical investigation borings, both on land and in-channel (67–93 dBA)

Table 3.11-8 identifies the activities that substantially increase the ambient noise levels in the city of Alameda; this table contains detail regarding equipment assumptions and estimated noise levels before and after the application of mitigation measures. Several conditions related to noise monitoring and control, as identified in EBMUD's Standard Construction Specification 01 35 44, could reduce impacts; however, more specificity is needed in identifying the types of reduction needed, locations, and feasibility of reduction measures. Impacts for several activities along each pipeline alignment could remain potentially significant, even after implementation of the required specifications. Mitigation Measure Noise-1 requires EBMUD to use source control measures and noise barriers around the HDD work areas. Implementation of Mitigation

Table 3.11-8 Significant Daytime Noise Impacts in the City of Alameda[2]

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Speech Interference Threshold[4]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	
Crossing #1								
HDD Insertion Pit	Excavator	81	74	59	>10 days	Yes	No	70 feet (Marina Village office/ commercial uses)
	Tractors/Loaders/Backhoes	80	72	57	>10 days	Yes	No	
	Bore/Drill Rig	84	77	62	>10 days	Yes	No	
	Slurry Plant	78	75	60	>10 days	Yes	No	
	Generator Set	81	75	60	>10 days	Yes	No	
Crossing #2								
Jack and Bore Construction under Otis Street	Vibratory Sheet Pile Driver	95	92	77	>10 days	Yes	Yes	30 feet (residential receptors at end of Peach Street)
	Bore/Drill Rig	84	82	67	>10 days	Yes	No	
	Excavator	81	81	66	>10 days	Yes	No	
	Tractors/Loaders/Backhoes	80	80	65	>10 days	Yes	No	
	Dump Truck	76	77	62	>10 days	Yes	No	
	Paver	77	79	64	>10 days	Yes	No	
	Roller	80	78	63	>10 days	Yes	No	

[2] The noise analysis assumes that only one piece of equipment would operate at a time at a given location. That is, multiple pieces of equipment would not operate concurrently. For example, concrete saws are usually used in lieu of jackhammers and not at the same time as jackhammers. Tractors, loaders, or backhoes usually operate one at a time to remove debris that was previously jackhammered or cut. One operation is usually performed at a time (e.g., removing pavement, then excavating, then placing sheet piles) and not concurrently, particularly in urban areas where construction space is limited.

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Speech Interference Threshold[4]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	
HDD Insertion Pit	Excavator	81	79	64	>10 days	Yes	No	40 feet (residential receptors on Centre Court)
	Tractors/Loaders/Backhoes	80	78	63	>10 days	Yes	No	
	Bore/Drill Rig	84	82	67	>10 days	Yes	No	
	Slurry Plant	78	80	65	>10 days	Yes	No	
	Pick-Crane	81	75	60	>10 days	Yes	No	
	Generator Set	81	80	65	>10 days	Yes	No	
Pipeline Laydown and Assembly	Pumps	81	80	65	< 10 days	Yes	No[6]	40 feet (Earhart Elementary School buildings)
	Welders	74	72	57	<10 days	Yes	No[6]	
	Cement and Mortar Mixers (Grouting)	83	77	62	<10 days	Yes	No[6]	
	Flatbed Truck	74	72	57	<10 days	Yes	No[6]	
	Pick-Crane	81	74	59	<10 days	Yes	No[6]	
Crossing #3								
HDD Insertion Pit	Excavator	81	79	64	>10 days	Yes	No	40 feet (residential receptors on Broadway)
	Tractors/Loaders/Backhoes	79	77	62	>10 days	Yes	No	
	Bore/Drill Rig	84	82	67	>10 days	Yes	No	
	Slurry Plant	78	80	65	>10 days	Yes	No	
	Pick-Crane	81	74	59	>10 days	Yes	No	
	Generator Set	81	80	65	>10 days	Yes	No	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Speech Interference Threshold[4]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	
Jack and Bore Construction under Tilden Way at Everett Street[7]	Vibratory Sheet Pile Driver	95	102	87	>10 days	Yes	Yes	10 feet (residential receptors on Everett Street)
	Bore/Drill Rig	84	92	77	>10 days	Yes	Yes	
	Excavator	81	91	76	>10 days	Yes	Yes	
	Tractors/Loaders/Backhoes	80	90	75	>10 days	Yes	Yes	
	Dump Truck	76	87	72	>10 days	Yes	Yes	
	Paver	77	89	74	>10 days	Yes	Yes	
	Roller	80	88	73	>10 days	Yes	Yes	

Notes:

1 L_{max} at 50 feet

2 The L_{eq} level is adjusted for distance and usage

3 Noise levels from jack and bore construction and HDD would be reduced by 15 dBA through the implementation of source control measures (5 dBA) and barriers (10 dBA).

4 Noise exceeding 70 dBA for more than 10 days is considered exceeding the speech interference threshold, except near schools as described below.

5 The highlighted cell indicates an impact that is significant and unavoidable. The Exceeds Speech Interference Threshold with Mitigation Measure column includes the application of mitigation measures.

6 Noise exceeding 70 dBA for more than 1 day near a school, is considered exceeding the speech interference threshold. Pipeline laydown and assembly adjacent to Earhart Elementary School would exceed the 70 dBA limit. The incorporation of Mitigation Measure Noise-1 would reduce the impact from pipeline laydown to less than significant through the implementation of administrative measures to schedule the operation of heavy equipment (including pumps, generators with no noise enclosures, tractors, loaders, backhoes, cement trucks) when the classroom windows facing or perpendicular to construction activities are closed and students are indoors; windows reduce outdoor noise by an average of 15 dBA.

7 Jack and bore construction is required under Tilden Way at Everett Street by Mitigation Measure Traffic-4 (see Impact Traffic-1 in Section 3.13: Transportation and Traffic).

Source: Illingworth & Rodkin 2016

Measure Noise-1 reduces impacts to less than significant in some cases, but in other scenarios noise impacts from construction would remain significant and unavoidable, as summarized below.

Crossing #1
HDD operations at the insertion pit within the Telecare Corporation parking lot would generate noise that would exceed the speech interference threshold of 70 dBA for a duration of 10 or more days. The closest sensitive receptors are 70 feet away, within the Telecare Corporation buildings. The increased noise impact to the sensitive receptors is considered significant. Implementation of Mitigation Measure Noise-1 would reduce the noise levels of all equipment below the significance threshold of 70 dBA. Impacts would be less than significant with implementation of Mitigation Measure Noise-1.

Crossing #2
The following three activities would generate noise that would exceed the speech interference threshold and would be considered significant impacts (1) jack and bore construction under Otis Street, (2) HDD operations at the insertion pit on Veterans Court, and (3) HDD pipe laydown and assembly on North Bay Farm Island.

Jack and Bore Construction. Jack and bore construction under Otis Street would expose sensitive residential receptors that are within 30 feet of the work area to noises greater than 70 dBA for a duration of 10 or more days. Even after implementation of Mitigation Measure Noise-1 the noise levels from jack and bore construction would exceed the 70 dBA speech interference threshold; therefore, impacts from jack and bore construction at Crossing #2 would be significant and unavoidable during sheet pile driving which would take about 2 days**.**

HDD Construction. Similar to jack and bore construction, work at the HDD insertion pit would expose sensitive residential receptors within 40 feet of the work area to noises greater than 70 dBA for a duration of 10 or more days. Noise impacts from HDD would be less than significant after implementation of Mitigation Measure Noise-1.

HDD Pipeline Laydown and Assembly. Pipeline laydown and assembly for Crossing #2 would last between 1 and 10 days, and would generate noise levels greater than 70 dBA. The closest sensitive receptors to the proposed work areas are residences and Earhart Elementary School, 40 feet from the work area. The impacts to residences would not exceed the speech interference threshold because pipeline laydown would last less than 10 days. The noise impacts to residences would therefore be less than significant. However, any activity that exceeds the speech interference threshold of 70 dBA for more than 1 day and is within the vicinity of a school is considered a significant impact; therefore, the increase in noise from pipeline laydown and assembly activities is considered significant. Mitigation Measure Noise-1 requires EBMUD to coordinate with Earhart Elementary School and schedule the operation of heavy equipment (including pumps, generators with no noise enclosures, tractors, loaders, backhoes, cement trucks) when the classroom windows facing or perpendicular to construction activities are closed and students are indoors. Windows reduce outdoor noise by an average of 15 dBA.

Potentially significant noise impacts would be reduced below the 70 dBA speech interference threshold. Impacts from pipeline laydown and assembly would be less than significant after implementation of Mitigation Measure Noise-1.

Crossing #3

HDD operations at the insertion pit on Broadway would generate noise that would exceed the speech interference threshold of 70 dBA for a duration of 10 or more days. The closest sensitive receptors are residences on Broadway, 40 feet away. The increased noise impact to those sensitive receptors is considered significant. The noise levels from HDD would be less than significant after implementation of Mitigation Measure Noise-1.

As described in Impact Traffic-1 in Section 3.13: Transportation and Traffic, Mitigation Measure Traffic-4 requires jack and bore construction under Tilden Way at Everett Street to minimize traffic impacts at roadways near Crossing #3. Jack and bore construction would expose sensitive residential receptors that are within 10 feet of the work area to noises greater than 70 dBA for a duration of 10 or more days. Even after implementation of Mitigation Measure Noise-1, the noise levels from jack and bore construction would exceed the 70 dBA speech interference threshold; therefore, impacts from jack and bore construction at Crossing #3 would be significant and unavoidable.

Cities of Oakland and Alameda (Nighttime Construction)

Construction of the proposed project would require construction during the nighttime for two activities, pipeline connections and the pull through of the pipeline during HDD. In addition, open trench construction and pipeline abandonment construction at intersections may potentially occur during nighttime if nighttime construction is required in the encroachment permits that would be prepared by the City of Oakland and Alameda. The locations of nighttime construction are shown in Figures 3.11-4 through 3.11-6. A significant impact would occur if noise levels during construction exceed the noise limits established in the City of Oakland Noise Ordinance or the Alameda Municipal Code. Noise levels exceeding 45 dBA near residences and 65 dBA near commercial uses in the city of Oakland would be considered a significant impact. Noise levels exceeding 50 dBA near residences and 60 dBA near commercial uses in the city of Alameda would be considered a significant impact. In addition, a significant impact would occur if the construction noise levels exceed the sleep disturbance threshold of 60 dBA for any duration near residences. Several conditions related to noise monitoring and control, as identified in Standard Construction Specification 01 35 44, could reduce impacts; however, more specificity is needed in identifying the types of reduction needed, locations, and feasibility of reduction measures. Noise impacts for several activities would remain potentially significant and mitigation is required to reduce impacts to less than significant levels.

Pipeline Connection and HDD Pull through of Pipeline

Table 3.11-9 summarizes the significant noise impact that would occur in the cities of Oakland and Alameda during the night. The pipeline connections and the pull through construction activities would exceed the limits established by the City of Oakland Noise Ordinance and the Alameda Municipal Code. The pipeline connections and the pull through construction activities

Figure 3.11-4 Locations of Nighttime Construction, Crossing #1

Figure 3.11-5 Locations of Nighttime Construction, Crossing #2

Figure 3.11-6 Locations of Nighttime Construction, Crossing #3

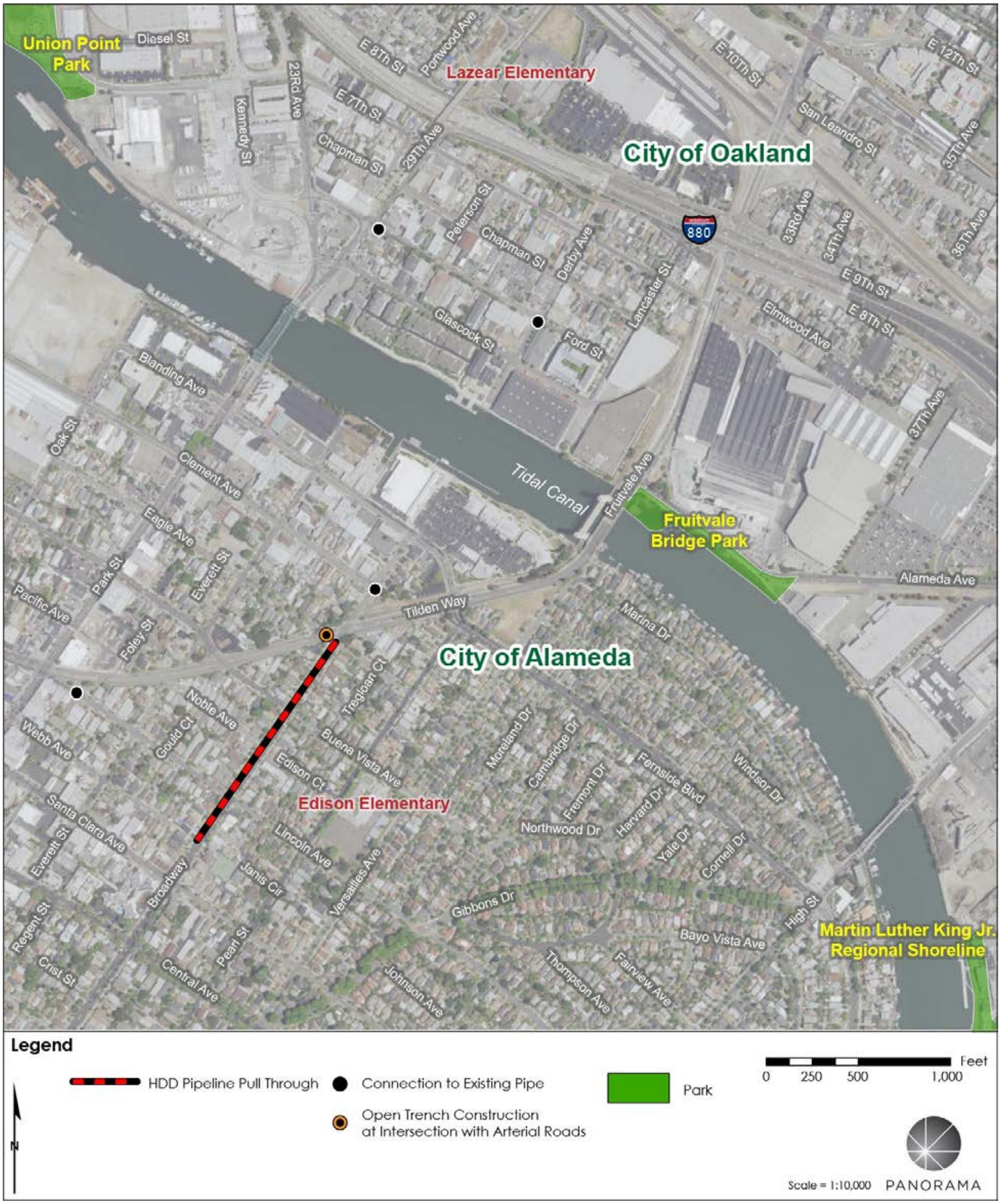


Table 3.11-9 Significant Nighttime Noise Impacts in the Cities of Oakland and Alameda

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Sleep Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM[5]	
Crossing #1 (Oakland)										
Pipeline Connections	Hot Tapping Machine	78	89	74	<10 days	Yes	Yes	Yes	Yes	10 feet (residential receptors north of Estuary Park & on 5th, Jackson and Madison Streets)
	Tapping Machine Motor/Generator	81	92	77	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	89	74	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	92	77	<10 days	Yes	Yes	Yes	Yes	
	Various Trucks (dump, flatbed, water)	74	84	69	<10 days	Yes	Yes	Yes	Yes	
HDD Pull through (Entry Pit)	Various Trucks (dump, flatbed, water)	74	69	54	<10 days	Yes	Yes	Yes	No	65 feet (residential receptors north of Estuary Park)
	Drill Rig	84	78	63	<10 days	Yes	Yes	Yes	Yes	
	Pick-Crane	81	70	55	<10 days	Yes	Yes	Yes	No	
Open Trench Construction	Concrete/Industrial Saws	90	92	87	<10 days	Yes	Yes	Yes	Yes	15 feet (residential receptors at the intersections of Madison Street and 6th Street / 7th Street/8th Street)
	Tractors/Loaders/ Backhoes	80	85	80	<10 days	Yes	Yes	Yes	Yes	
	Excavator	81	87	82	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	85	80	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	88	83	<10 days	Yes	Yes	Yes	Yes	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Sleep Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM[5]	
	Various Trucks (dump, flatbed, water)	74	80	75	<10 days	Yes	Yes	Yes	Yes	
Repaving	Cement and Mortar Mixers	83	85	80	<10 days	Yes	Yes	Yes	Yes	
	Paver	77	84	79	<10 days	Yes	Yes	Yes	Yes	
	Paving Equipment	76	82	77	<10 days	Yes	Yes	Yes	Yes	
	Roller	80	83	78	<10 days	Yes	Yes	Yes	Yes	
	Tractors/ Loaders/ Backhoes	79	85	80	<10 days	Yes	Yes	Yes	Yes	
Abandonment of the Existing Pipeline on 5th Street	Concrete/Industrial Saws	90	75	70	<10 days	Yes	Yes	Yes	Yes	130 feet (residential receptors west of the intersection of 5th Street and Jackson Street)
	Jackhammer	89	74	69	<10 days	Yes	Yes	Yes	Yes	
	Excavator	81	69	64	<10 days	Yes	Yes	Yes	Yes	
	Vibratory Sheet Pile Driver	95	80	75	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	80	67	62	<10 days	Yes	Yes	Yes	Yes	
	Cement and Mortar Mixers	83	67	62	<10 days	Yes	Yes	Yes	Yes	
	Paver	77	66	61	<10 days	Yes	Yes	Yes	Yes	
	Roller	80	65	60	<10 days	Yes	Yes	Yes	Yes	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Sleep Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM[5]	
Crossing #1 (Alameda)										
Pipeline Connections	Hot Tapping Machine	78	89	74	<10 days	Yes	Yes	Yes	Yes	10 feet (residential receptors on Sherman Street and Lincoln Avenue)
	Tapping Machine Motor/Generator	81	92	77	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	89	74	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	92	77	<10 days	Yes	Yes	Yes	Yes	
	Various Trucks (dump, flatbed, water)	74	84	69	<10 days	Yes	Yes	Yes	Yes	
HDD Pull through (Insertion Pit)	Various Trucks (dump, flatbed, water)	74	69	54	<10 days	Yes	Yes	Yes	No	70 feet (commercial uses at Marina Village)
	Bore/Drill Rig	84	77	62	<10 days	Yes	Yes	Yes	Yes	
	Pick-Crane	81	70	55	<10 days	Yes	Yes	Yes	No	
Crossing #2 (Alameda)										
Pipeline Connections	Hot Tapping Machine	78	89	74	<10 days	Yes	Yes	Yes	Yes	10 feet (residential receptors on Peach Street and San Jose Avenue)
	Tapping Machine Motor/Generator	81	92	77	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	89	74	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	92	77	<10 days	Yes	Yes	Yes	Yes	
	Various Trucks (dump, flatbed, water)	74	84	69	<10 days	Yes	Yes	Yes	Yes	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4] No MM	Exceeds Noise Ordinance[4] With MM[5]	Exceeds Sleep Interference Threshold[6] No MM	Exceeds Sleep Interference Threshold[6] With MM[5]	Distance from Closest Sensitive Receptor
HDD Pull through (Entry Pit)	Various Trucks (dump, flatbed, water)	74	61	46	<10 days	Yes	No	Yes	No	150 feet (residential Receptors on Bridgeview Isle)
	Bore/Drill Rig	84	70	55	<10 days	Yes	Yes	Yes	No	
	Pick-Crane	81	63	48	<10 days	Yes	No	Yes	No	
Open Trench Construction	Concrete/Industrial Saws	90	88	83	<10 days	Yes	Yes	Yes	Yes	25 feet (residential receptors at the intersections of High Street and San Jose Avenue)
	Tractors/Loaders/ Backhoes	80	81	76	<10 days	Yes	Yes	Yes	Yes	
	Excavator	81	83	78	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	81	76	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	84	79	<10 days	Yes	Yes	Yes	Yes	
	Various Trucks (dump, flatbed, water)	74	76	71	<10 days	Yes	Yes	Yes	Yes	
Repaving	Cement and Mortar Mixers	83	81	76	<10 days	Yes	Yes	Yes	Yes	
	Paver	77	80	75	<10 days	Yes	Yes	Yes	Yes	
	Paving Equipment	76	78	73	<10 days	Yes	Yes	Yes	Yes	
	Roller	80	79	74	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	81	76	<10 days	Yes	Yes	Yes	Yes	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Sleep Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM[5]	
Crossing #2 (North Bay Farm Island)										
Pipeline Connections	Hot Tapping Machine	78	77	62	<10 days	Yes	Yes	Yes	Yes	40 feet (Centre Ct. Residences & Earhart Elementary School)
	Tapping Machine Motor/Generator	81	80	65	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	77	62	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	80	65	<10 days	Yes	Yes	Yes	Yes	
	Various Trucks (dump, flatbed, water)	74	74	59	<10 days	Yes	Yes	Yes	No	
HDD Pull through (insertion Pit)	Various Trucks (dump, flatbed, water)	74	74	59	<10 days	Yes	Yes	Yes	No	40 feet (residential receptors on Centre Ct.)
	Bore/Drill Rig	84	82	67	<10 days	Yes	Yes	Yes	Yes	
	Pick-Crane	81	75	60	<10 days	Yes	Yes	Yes	Yes	
Crossing #3 (Oakland)										
Pipeline Connections	Hot Tapping Machine	78	89	74	<10 days	Yes	Yes	Yes	Yes	10 feet (residential receptors on Derby Avenue and Ford Street)
	Tapping Machine Motor/Generator	81	92	77	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	89	74	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	92	77	<10 days	Yes	Yes	Yes	Yes	
	Various Trucks (dump, flatbed, water)	74	84	69	<10 days	Yes	Yes	Yes	Yes	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Sleep Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM[5]	
HDD Pull through (Entry Pit)	Various Trucks (dump, flatbed, water)	74	74	59	<10 days	Yes	Yes	Yes	No	40 feet (residential receptors on Derby Avenue)
	Bore/Drill Rig	84	82	67	<10 days	Yes	Yes	Yes	Yes	
	Pick-Crane	81	75	60	<10 days	Yes	Yes	Yes	Yes	
Crossing #3 (Alameda)										
Pipeline Connections	Hot Tapping Machine	78	89	74	<10 days	Yes	Yes	Yes	Yes	10 feet (residential receptors on Everett Street, Clement, Eagle and Lincoln Avenues)
	Tapping Machine Motor/Generator	81	92	77	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	89	74	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	92	77	<10 days	Yes	Yes	Yes	Yes	
	Various Trucks (dump, flatbed, water)	74	84	69	<10 days	Yes	Yes	Yes	Yes	
HDD Pull through (Insertion Pit)	Various Trucks (dump, flatbed, water)	74	74	59	<10 days	Yes	Yes	Yes	Yes	40 feet (residential receptors on Broadway)
	Bore/Drill Rig	84	82	67	<10 days	Yes	Yes	Yes	Yes	
	Pick-Crane	81	75	60	<10 days	Yes	Yes	Yes	Yes	
Open Trench Construction (Alternate Trench Option)	Concrete/Industrial Saws	90	90	85	<10 days	Yes	Yes	Yes	Yes	20 feet (residential receptors at the intersection of Tilden Way and Eagle Avenue/ Broadway)
	Tractors/Loaders/ Backhoes	80	83	78	<10 days	Yes	Yes	Yes	Yes	
	Excavator	81	85	80	<10 days	Yes	Yes	Yes	Yes	

Activity	Principal Noise Sources	Reference Noise Level[1]	Adjusted L_{eq} Level[2]	L_{eq} Level with Mitigation[3]	Duration	Exceeds Noise Ordinance[4]		Exceeds Sleep Interference Threshold[6]		Distance from Closest Sensitive Receptor
						No MM	With MM[5]	No MM	With MM[5]	
	Tractors/Loaders/ Backhoes	79	83	78	<10 days	Yes	Yes	Yes	Yes	
	Dewatering Pumps	78	86	81	<10 days	Yes	Yes	Yes	Yes	
	Various Trucks (dump, flatbed, water)	74	78	73	<10 days	Yes	Yes	Yes	Yes	
Repaving (Alternate Trench Option)	Cement and Mortar Mixers	83	83	78	<10 days	Yes	Yes	Yes	Yes	
	Paver	77	82	77	<10 days	Yes	Yes	Yes	Yes	
	Paving Equipment	76	80	75	<10 days	Yes	Yes	Yes	Yes	
	Roller	80	81	76	<10 days	Yes	Yes	Yes	Yes	
	Tractors/Loaders/ Backhoes	79	83	78	<10 days	Yes	Yes	Yes	Yes	

Notes:

1 L_{max} at 50 feet.

2 The L_{eq} level is adjusted for distance and usage.

3 Noise levels from jack and bore, pipeline abandonments, and HDD would be reduced by 15 dBA through the implementation of source control measures (5 dBA) and barriers (10 dBA).

4 Noise levels exceeding 45 dBA near residences and 65 dBA near commercial uses in the city of Oakland would be considered a significant impact and noise levels exceeding 50 dBA near residences and 60 dBA near commercial uses in the city of Alameda would be considered a significant impact

5 The highlighted cells indicate impacts that are significant and unavoidable. The Exceeds Noise Ordinance with Mitigation Measure column includes the application of mitigation measures.

6 Noise exceeding 60 dBA for any duration near residences is considered exceeding the sleep disturbance threshold.

Source: Illingworth & Rodkin 2016

would also exceed the sleep interference threshold, resulting in a significant impact. Mitigation Measure Noise-1 would reduce noise by a minimum of 15 dBA. Even after implementation of Mitigation Measure Noise-1, noise levels from pipeline connections and pull through construction activities would exceed the City of Oakland and Alameda Municipal Code noise limits and the sleep interference threshold. Mitigation Measure Noise-1 also requires EBMUD to designate a contact person to respond to and resolve noise complaints during construction. EBMUD would notify residents within 400 feet of potential nighttime project construction at least 10 days in advance and notified resident may request alternative lodging for the night(s) of the potential nighttime construction from EBMUD. Even with implementation of Mitigation Measure Noise-1, residences could still be exposed to a significant noise impact during the night and the impact is considered significant and unavoidable. Significant noise impacts related to pull through construction would be expected to last no longer than two nights at a single location. Significant noise impacts related to pipeline connections would not occur for more than a single night and only in unusual circumstances, such as if the existing pipeline material was severely corroded, which would make a new connection difficult. This condition would only be known once the pipe has been dug up.

Open Trench Construction and Pipeline Abandonment Construction

The cities of Oakland and Alameda may require nighttime construction at the intersections with High Street (Crossing #2), Tilden Way and Broadway (Crossing #3), 5th Street (Crossing #1), 6th Street (Crossing #1), 7th Street (Crossing #1), and 8th Street (Crossing #1) to avoid traffic impacts. Potential nighttime construction areas are shown in Figures 3.11-4 through 3.11-6.

Table 3.11-9 summarizes the potential noise impacts from conducting open trench construction during the night which may occur at 5th Street and Madison Street; 5th Street and Jackson Street; 6th Street and Madison Street; 7th Street and Madison Street; 8th Street and Madison Street; High Street and San Jose Avenue; and Tilden Way at Eagle Avenue/ Broadway. Table 3.11-9 also summarizes the potential noise impacts from conducting pipeline abandonment construction at night which may occur at 5th Street and Madison Street; 5th Street and Jackson Street; and 5th Street and Oak Street. As shown in Table 3.11-9 the nighttime open trench construction and pipeline abandonment construction would exceed the limits established by the City of Oakland Noise Ordinance, the Alameda Municipal Code, and the sleep interference threshold, resulting in a significant impact. Implementation of Mitigation Measure Noise-1 would reduce noise levels by 5 dBA after source control measures are implemented. Noise barriers during open trench construction and pipeline abandonments are not practical due to the short period of time that construction would take place in front of any one residence; therefore, a reduction in 5 dBA is used in the analysis presented here. The noise impact from open trench construction is significant and unavoidable, even with implementation of Mitigation Measure Noise-1.

Mitigation Measures: Noise-1.

Mitigation Measure Noise-1. Noise Control.

EBMUD shall implement the noise control measures described below:

Time Limits

1. All construction activities shall be limited to the daytime weekday hours (7:00 a.m. – 7:00 p.m.) to the extent feasible. The HDD pullback operations, the pipeline connection work, and work in arterial intersections may extend or take place beyond these hours.
2. All haul and delivery truck operations shall be prohibited during the evening and nighttime hours (7:00 p.m. – 8:00 a.m.) to the extent feasible.
3. Equipment and vehicular activities (e.g., concrete saws, jackhammers, tractors, loaders, backhoes, excavators, pavers, rollers, and all other equipment identified in Tables 3.11-7 to 3.11-9) identified as generating noise levels in excess of an L_{eq} of 65 dBA in the vicinity of residential uses or an L_{eq} of 80 dBA in the vicinity commercial uses shall be limited to weekday hours between 8 a.m. – 7 p.m., and Saturdays between 8 a.m. – 5 p.m. to the extent feasible.

Noise Level Reduction

EBMUD shall implement a combination of the following source control measures such that noise is reduced by a minimum of 5 dBA:

1. Best available noise-control techniques (including but not limited to mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) shall be used for all equipment and trucks to reduce construction noise impacts.
2. If impact equipment such as jack hammers, pavement breakers, and rock drills are proposed to be used during construction, hydraulically- or electric-powered equipment shall be used wherever feasible to avoid the noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically-powered tools is unavoidable, the construction crews shall place exhaust mufflers on the compressed-air exhaust and external jackets on the tools themselves where feasible.
3. If vibratory sheet piles are used for construction, pre-drill pile holes for shoring systems to eliminate or reduce noise and vibration from vibratory pile driving.
4. Stationary noise sources (e.g., pumps, compressors) shall be located as far from sensitive receptors as possible and practicable, and within the specified construction time limits. If they must be located near receptors, adequate muffling (with enclosures) shall be used. Enclosure openings or venting shall face away from sensitive receptors. A registered engineer qualified in noise control analysis and design shall design the enclosures.

5. If pipe-cutting equipment must be operated at pipeline tie-ins outside the hours of 8 a.m. – 7 p.m., temporary noise barriers or noise enclosures shall be used to minimize disturbance when construction occurs adjacent to residential uses. Operation of trucks and noisier types of heavy equipment shall be minimized to the extent feasible.

EBMUD shall implement the following noise barrier measure, such that noise is reduced by 10 dBA:

6. Noise barriers (e.g., sound walls, sound curtains, etc.) shall be provided at the perimeter of HDD entry and insertion work areas and jack and bore construction sites.

Administrative Controls

7. Residents located within one block of the project construction shall be notified at least 7 days in advance of extreme noise-generating activities, about the estimated duration of the activity and to update them prior to noise producing phases, such as open trench construction, pipeline connections, pipeline abandonment, HDD, or jack and bore construction.
8. Where pipeline construction zones are within 100 feet of school classrooms or childcare facilities (e.g., Earhart Elementary), construction crews shall coordinate with the school and schedule the operation of heavy equipment (including pumps, generators with no noise enclosures, tractors, loaders, backhoes, cement trucks) when the classroom windows facing or perpendicular to construction activities are closed, and students are indoors.
9. An EBMUD contact person shall be designated as a project liaison for responding to noise complaints during construction. The liaison's name and phone number shall be posted at construction areas and included in all advance notifications. The contact shall take steps to resolve complaints, which could include measuring noise levels, if necessary. The coordinator shall be available during normal business hours (8 a.m. – 5 p.m.) and shall work with residents and business owners and the construction crews to determine the noise problem and resolve conflicts.
10. Provide alternative lodging for residents, if requested, that are adversely affected by nighttime construction; this measure would only be used if nighttime construction occurs. EBMUD shall make a concerted attempt to notify residents located within one block of potential nighttime project construction at least 10 days in advance. Notified residents may request alternative lodging for the night(s) of the potential nighttime construction from EBMUD; alternative lodging shall consist of a standard room at a hotel located within 6 miles of the affected residence or as close as feasible. Alternative lodging shall be provided and approved by EBMUD the day before the known nighttime construction would occur, or sooner, based

upon the types of construction activities that may occur during the nighttime hours (7:00 p.m. – 7:00 a.m.).

11. Noise monitoring will be conducted during HDD, jack and bore construction, and during the first 500 feet of open trench construction.

Significance after Mitigation: Significant and Unavoidable.

Impact Noise-2: Potential to expose persons to or generate excessive groundborne vibration or groundborne noise levels (Criteria 2). (*Less than Significant with Mitigation)*

Open trench construction, jack and bore construction, HDD, and pipeline abandonments for the proposed project would require the use of equipment that would generate groundborne vibration. A significant impact from vibration could occur if it causes:

- Cosmetic damage or any structural damage to surrounding buildings and structures – the vibration threshold is 0.3 in/sec PPV for continuous vibration and 0.5 in/sec PPV for single-source vibration
- Damage that could alter the historical significance of a building – the vibration threshold is 0.4 in/sec PPV for continuous vibration and 0.5 in/sec PPV for single-source vibration
- Damage to other underground utilities – the vibration threshold is 4.0 in/sec PPV
- A significant nuisance or annoyance – no threshold, duration dependent

Cause Minor Cosmetic Damage

The activities that could cause significant vibration impacts to property related to minor cosmetic damage are summarized in Table 3.11-10 and Table 3.11-11. The primary activities that could cause a significant impact include:

- Clam shovel drops within 14 feet of any buildings
- Impact pile driving for jack and bore construction within 32 feet of any buildings
- Vibratory compaction rollers within 13 feet of older residential structures

Mitigation Measure Noise-2 requires that EBMUD limit vibration at the nearest buildings or structures to 0.3 in/sec for continuous source vibrations and 0.5 in/sec PPV for any single-source vibrations. Pavement cutting shall be used instead of clam shovel drops within 15 feet of buildings, and vibratory pile driving shall be used instead of impact pile driving within 35 feet of structures to avoid impacts. EBMUD would monitor for vibration levels and would modify the construction methods to ensure that levels are below the stated limits. Mitigation Measure Noise-2 would also minimize the impact to any buildings that might be sensitive to vibration below the 0.3 in/sec PPV threshold by requiring EBMUD notify property owners within 15 feet of continuous vibration-generating activities and perform pre-construction and post-construction surveys of homes/buildings or other structures along the alignment, at an owner's request. If cosmetic damage is found after construction and deemed to be the result of project vibration, EBMUD would compensate the property owner or otherwise repair the damage. Impacts associated with cosmetic damage to buildings as a result of vibration would be less than significant after implementation of Mitigation Measure Noise-2.

Table 3.11-10 Significant Single-Source Vibration Impacts

Construction Activity	Principle Vibration Sources	Maximum Distance from Source to 0.5 in/sec PPV	Distance from Closest Building (feet)
Crossing #1			
Open Trench Construction	Clam Shovel Drop	14	10
Jack and Bore Construction under Railroad at Oak Street	Impact Pile Driver	32	30
Abandonment of Existing Pipeline on 5th Street	Impact Pile Driver	32	20
Crossing #2			
Open Trench Construction	Clam Shovel Drop	14	10
Jack and Bore Construction under Otis Street	Impact Pile Driver	32	30
Crossing #3			
Open Trench Construction	Clam Shovel Drop	14	10
Abandonment of the Existing Pipeline between 23rd Avenue and Blanding Street	Impact Pile Driver (Upper Range)	32	25-70
Abandonment of the Existing Pipeline near the Park Street Bridge	Impact Pile Driver (Upper Range)	32	10
	Clam Shovel Drop	14	

Source: Illingworth & Rodkin 2016

Table 3.11-11 Significant Continuous Vibration Impacts

Construction Activity	Principle Vibration Sources	Maximum Distance from Source to 0.3 in/sec PPV	Distance from Closest Building (feet)
Crossing #1			
Open Trench Construction	Vibratory Roller/Compactor	13	10
Crossing #2			
Open Trench Construction	Vibratory Roller/Compactor	13	10
Crossing #3			
Open Trench Construction	Vibratory Roller/Compactor	13	10
Abandonment of the Existing Pipeline near the Park Street Bridge	Vibratory Roller/Compactor	13	10

Source: Illingworth & Rodkin 2016

Alter Historical Significance of Structures

The historical significance of buildings adjacent to the project construction areas were not evaluated as part of this EIR; however, potentially historic buildings are likely to be found in certain areas of the project, such as along Sherman Street in Alameda along Crossing #1. Impacts to potentially historic buildings would occur if significant cosmetic damage, such as cracking of windows, plaster, or unreinforced masonry were to occur as a result of construction vibration or if structural damage were to occur. The level at which impacts to the historical significance of a structure could occur is estimated to be at a continuous vibration level of 0.4 in/sec PPV based on various references that identify structural or architectural damage occurring at the 0.4 in/sec level or higher (e.g., Hendricks 2002, British Standards Institute 1993, Sedovic 1984, Whifflin and Leonard 1971). None of the project activities would result in continuous vibration at 0.4 in/sec PPV or greater at the nearest receptor; therefore, no impacts to the historical significance of a building would occur from continuous vibratory construction sources. Single-source vibration at 0.5 in/sec PPV could impact the historical significance of structures. Mitigation Measure Noise-2 would reduce potentially significant impacts to less than significant by requiring that the use of clam shovel drops be avoided in areas where the thresholds could be exceeded and requiring the use of vibratory pile driving instead of impact pile driving. Potential impacts to the historical significance of structures along the proposed crossing pipeline alignments would be less than significant after implementation of Mitigation Measure Noise-2.

Damage Underground Utilities

Damage to underground utilities in the same roadway as the proposed project construction could occur if vibration were greater than 4.0 in/sec PPV. Vibration at 4.0 in/sec would not occur for any activities, even at close distances, therefore, impacts to other underground utilities would not occur.

Cause Nuisance

Nuisance or annoyance can occur at 0.1 in/sec PPV; however, potential impacts would be less than significant since the nuisance noise would be temporary and would only occur during daytime hours in residential areas.

Mitigation Measures: Noise-2.

Mitigation Measure Noise-2. Vibration. Vibration limits are specified as follows:

For Cosmetic Damage to Property	
Any Buildings or Structures	0.3 in/sec PPV (continuous vibration) 0.5 in/sec PPV (single-source vibration
For Impacts to Historical Significance	
Potentially historic buildings or structures and/or buildings/structures older than 50 years	0.4 in/sec PPV (continuous source vibration) 0.5 in/sec PPV (single-source vibration)
For Damage to Utilities	
Adjacent utilities	4.0 in/sec PPV (continuous source)

EBMUD shall implement the following:

1. Vibration monitoring shall be conducted for the first 500 feet of pipeline construction for each side of the crossings to confirm vibration levels do not exceed vibration thresholds at the nearest receptors. If vibration levels exceed the limits of this mitigation measure, then construction practices shall be modified (i.e., use smaller types of construction equipment, operate the equipment in a manner to reduce vibration, or use alternate construction methods), and monitoring shall continue for an additional 200 feet or until construction practices meet the required vibration levels. The monitoring in this mitigation measure shall be repeated if the construction methods change in a manner that would increase vibration levels, or when structures are closer to the limits of construction than previous vibration monitoring has confirmed is below the vibration thresholds.
2. Smaller vibratory compactors and/or non-compacting materials (i.e., some types of gravel) will be used to minimize vibration levels during repaving activities where needed to meet vibration limits. Clam shovel drops and heavy trucks and loaders shall not be used within 15 feet of unreinforced masonry or non-engineered timber and/or plaster buildings, and alternative methods shall be used such as saw cutting and use of smaller equipment that causes less vibration.
3. Sheet piles shall be installed with vibratory drivers instead of impact drivers where feasible. Impact sheet pile installation shall be prohibited within 35 feet of the closest structures. Vibration monitoring shall be conducted within 100 feet of any buildings where impact sheet pile installation occurs, and within 35 feet of any building where vibratory sheet pile installation occurs to ensure that the above applicable performance standard is not exceeded. If vibration levels exceed the applicable threshold, the construction crews will use alternative construction methods.
4. With permission and at the request of homeowners, EBMUD shall conduct a preconstruction survey of homes and other sensitive structures within 15 feet of continuous vibration-generating activities (vibratory roller/compactor) for potential effects due to vibration-generating activities. EBMUD shall respond to any claims by inspecting the affected property promptly. 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 proposed project is determined to have caused the damage, EBMUD shall coordinate with the owner to have the damage repaired to pre-existing conditions.

Significance after Mitigation: Less than Significant

3.11.6 References

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3.12 RECREATION

This section presents the environmental setting and impact analysis for recreational resources that could be affected by the proposed project. Background information, known resources, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here.

3.12.1 Data Collection

Recreational areas are defined as any public or quasi-public site or facility that is used for recreational activities, including, but not limited to:

- National, state, county, city or private parks (e.g., dog parks)
- Bicycle paths
- Trails
- Open space preserves
- Cultural centers
- Museums
- Campgrounds
- Areas of leisure

This section does not address private recreational areas such as golf courses and amusement parks because CEQA does not require addressing impacts to these facilities. For the purposes of analyzing impacts in this section, recreational facilities located within 1,000 feet of the proposed project pipeline alignments are identified and analyzed. The 1,000-foot buffer around the proposed project accounts for the area of potential indirect effects on recreational access and value.

Information about recreational facilities that would serve individuals within the proposed project area was obtained from information prepared by the City of Alameda and City of Oakland (City of Alameda 2015, City of Oakland 2015).

3.12.2 Environmental Setting

Residents of the city of Alameda and the city of Oakland are served by both regional and local community recreational facilities. A summary of the regional and local recreational facilities are described below.

3.12.2.1 Regional Recreational Facilities

Residents of the city of Alameda and the city of Oakland use regional parks managed by the East Bay Regional Parks District (EBRPD). A total of 65 recreational facilities are managed by the EBRPD, including some State of California parks that are managed under a cooperative agreement with the State of California (EBRPD 2015). The recreational facilities managed by the EBRPD consist of open space areas, including beaches. Residents of the city of Alameda and the city of Oakland use the San Francisco Bay Trail, which is a recreational corridor planned by the

Association of Bay Area Governments (ABAG), to encircle San Francisco and San Pablo Bays with a 500-mile network of bicycling and hiking trails. Portions of the San Francisco Bay Trail are located within the city of Alameda and the city of Oakland.

3.12.2.2 Local Recreational Facilities

The City of Alameda Recreation and Parks Department manages a total of 35 recreational facilities (City of Alameda 2015). The 35 recreational facilities have the typical amenities found in local parks, including picnic benches, open spaces, recreation centers, sport fields, courts, dog-friendly areas, and swimming pools.

The City of Oakland Department of Parks and Recreation manages a total of 126 recreational facilities (City of Oakland 2015). The parks within the city of Oakland have typical amenities found in local parks. In addition to local parks, the City of Oakland Department of Parks and Recreation also manages bigger parks with open space, such as Joaquin Miller Park, which includes woodland trails.

3.12.2.3 Recreational Facilities within the Vicinity of the Proposed Project

A total of 13 recreational facilities are located within 1,000 feet of the proposed project area. One portion of the San Francisco Bay Trail is within the vicinity of each crossing. Each portion of the San Francisco Bay Trail is referred to as a discreet recreational facility. Table 3.12-1 provides the names, descriptions of the facilities, amenities in the parks, and the management agency for each facility. Figures 3.12-1, 3.12-2, and 3.12-3 show the locations of the recreational facilities.

Table 3.12-1 Recreational Facilities within 1,000 feet of the Proposed Project Area

Name of Recreational Facility	Location	Managing Agency	Facilities	Location in Relation to Proposed Project
Crossing #1				
Madison Park	Oakland	City of Oakland Department of Parks and Recreation	• Benches • Play area • Open fields	Approximately 50 feet northeast of the alignment
Harrison Square, also known as Chinese Garden Park	Oakland	City of Oakland Department of Parks and Recreation	• Park building	Approximately 400 feet west of the alignment
Estuary Park	Oakland	City of Oakland Department of Parks and Recreation	• Large play field • Benches	Adjacent to the location where HDD construction would occur
Shoreline Park	Alameda	City of Alameda Recreation and Parks Department	• Picnic areas • Play areas	Approximately 500 feet east of the alignment

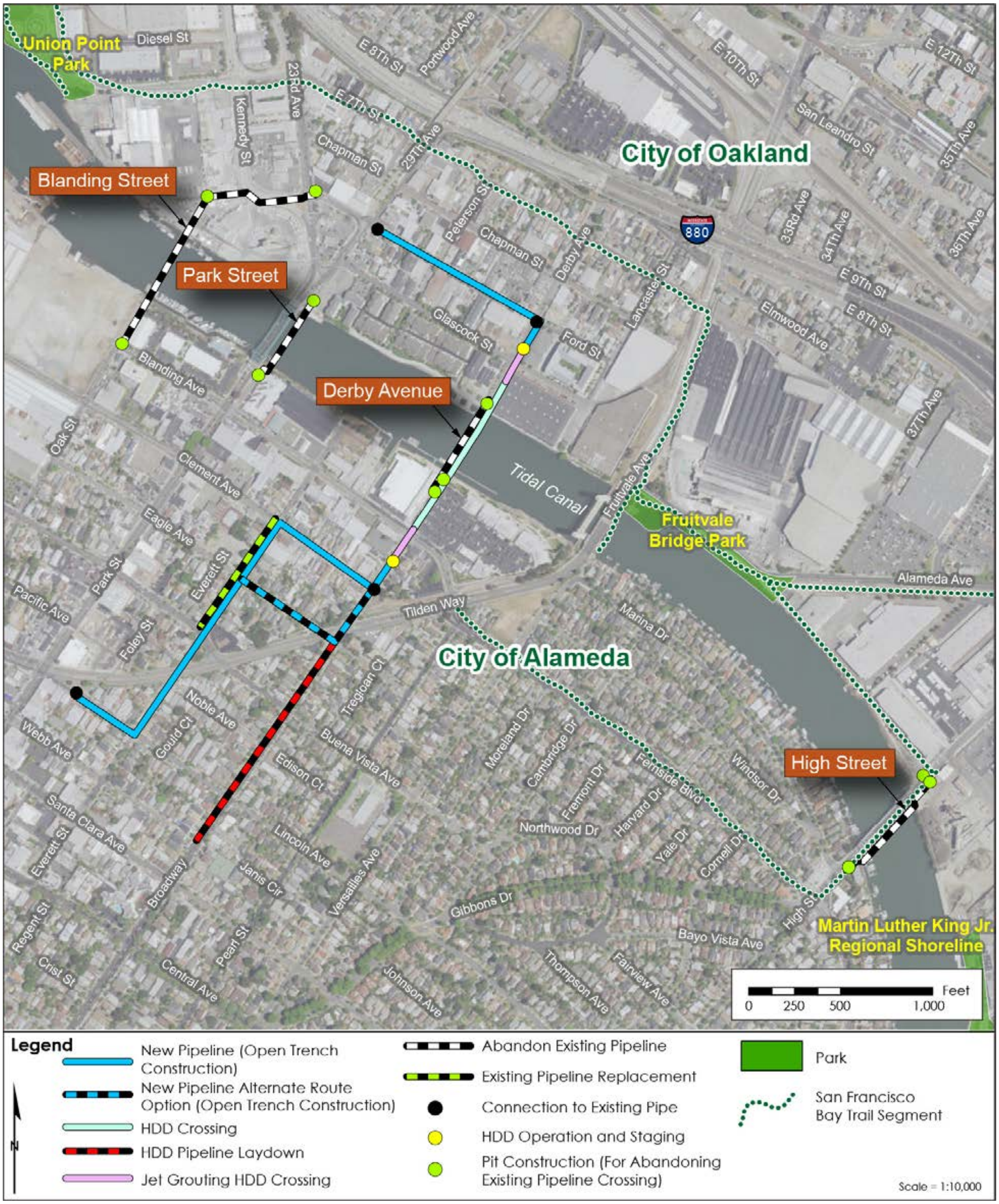
Name of Recreational Facility	Location	Managing Agency	Facilities	Location in Relation to Proposed Project
Littlejohn Park	Alameda	City of Alameda Recreation and Parks Department	• Picnic areas • Play lot • Baseball/ softball fields • Soccer field • Basketball half court	Adjacent to the alignment on Sherman Street
San Francisco Bay Trail	Alameda	ABAG	• Trail	On the Oakland side, the Trail is located on Embarcadero West roadway near the HDD entry pit, and approximately 100 feet from the Alice-Webster pipeline abandonment pit. On the Alameda side, the trail is located on the Atlantic Avenue and Sherman Street Roadways and work on Marina Village Parkway is adjacent to a portion of the trail.
Crossing #2				
Krusi Park	Alameda	City of Alameda Recreation and Parks Department	• Picnic areas • Game tables • Play lot • Tiny tot lot • Baseball/ softball fields • Tennis courts • Shuffleboard	Approximately 630 feet west of the alignment
Towata Park	Alameda	City of Alameda Recreation and Parks Department	• Picnic tables • Water fountain • Small, shady lawn	The HDD pit is located within Towata Park. The Bay Farm 1 and Bay Farm 2 pipeline abandonments are located on Bridgeview Isle, adjacent to Towata Park.
San Francisco Bay Trail	Alameda	ABAG	• Trail	Adjacent to Towata Park where the HDD entry pit is located. Approximately 250 feet from the pits for the Bay Farm 1 and Bay Farm 2 pipeline abandonments.

Name of Recreational Facility	Location	Managing Agency	Facilities	Location in Relation to Proposed Project
Veterans Memorial Park	Alameda (North Bay Farm Island)	City of Alameda Recreation and Parks Department	• Benches	The HDD pit is located on Veterans Court, adjacent to Veterans Memorial Park. One pit for the Bay Farm 1 pipeline abandonment is located in a landscaped area adjacent to Veterans Memorial Park. Two pits for the Bay Farm 2 pipeline abandonment is located on Veterans Court, adjacent to Veterans Memorial Park.
Martin Luther King Jr. Regional Shoreline Park	Alameda (North Bay Farm Island)	EBRPD	• Picnic areas • Birdwatching • Hiking • Bicycling • Fishing • Boat launching	Approximately 300 feet west of the alignment and pits for Bay Farm 1 and Bay Farm 2 pipeline abandonments
Crossing #3				
Fruitvale Bridge Park	Oakland	City of Oakland Department of Parks and Recreation	• Walkways near water	Approximately 900 feet east of Crossing #3 and the Derby Avenue pipeline abandonment.
San Francisco Bay Trail	Oakland and Alameda	ABAG	• Trail	The pits for the High Street pipeline abandonment are located on the San Francisco Bay Trail. Approximately 900 feet east of Crossing #3 on the Oakland side and the Derby Avenue pipeline abandonment. Approximately 400 feet east of Crossing #3 on the Alameda side.

Figure 3.12-1 Recreational Facilities within 1,000 feet of Crossing #1

Figure 3.12-2 Recreational Facilities within 1,000 feet of Crossing #2

Figure 3.12-3 Recreational Facilities within 1,000 feet of Crossing #3



3.12.3 Applicable Regulations, Plans, and Standards

3.12.3.1 Federal Regulations

No federal laws or regulations pertaining to recreation are applicable to the proposed project.

3.12.3.2 State Regulations

No state laws or regulations pertaining to recreation are applicable to the proposed project.

3.12.3.3 Local Regulations

Overview

Pursuant to California Government Code §53091, EBMUD, as a local agency and utility district serving a broad regional area, is not subject to building and land use zoning ordinances for projects involving facilities for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning and to consider local environmental protection policies for guidance.

San Francisco Bay Conservation and Development Commission

BCDC is the nation's first coastal management agency and was created by the 1965 McAteer-Petris Act. Among its activities, BCDC established and implemented a Bay Plan to encourage commercial and recreational uses while protecting environmentally-sensitive areas. BCDC's jurisdiction generally extends to all areas of the San Francisco Bay that are subject to tidal action, including sloughs and marshlands, to a 100-foot shoreline band surrounding the San Francisco Bay, to saltponds and managed wetlands as defined in the McAteer-Petris Act, and certain designated waterways. The McAteer-Petris Act requires that permits are obtained to fill, to extract materials, and to make substantial changes in use of land, water or existing structures in the San Francisco Bay. In determining whether to issue permits, the BCDC looks to policies set forth in the McAteer-Petris Act and in the San Francisco Bay Plan. In general, the McAteer-Petris Act and San Francisco Bay Plan's policies authorize fill or excavation of wetlands only for water-dependent projects where no feasible upland alternatives exist, and only if wetlands impacts are mitigated. The BCDC issues four types of permits: major permits, administrative permits, emergency permits, and region-wide permits. The proposed project would likely be subject to an administrative permit.

City of Alameda General Plan

The City of Alameda General Plan provides guidance for development within the city of Alameda and policies to maintain recreational resources. The City of Alameda General Plan identifies that parks are especially valued in Alameda because the existing park acreage is small relative to the population and the opportunities for expansion of the park system are few. The City of Alameda General Plan includes the following policies that are relevant to the proposed project:

Policy 6.1.a	Expand Alameda's park system
Policy 6.2.a	Maximize visual and physical access to the shoreline and to open water.

Policy 6.2.b Regulate development on City-owned shoreline property to maximize public use opportunities.

Policy 6.2.h Require shoreline access where appropriate as a condition of development approval regardless of whether development occurs within the area of BCDC regulation.

Policy 6.2.i Require off-site access as a mitigation when public access on-site is infeasible.

City of Alameda Municipal Code

Chapter 23 of the City of Alameda Municipal Code includes regulations for recreational areas in the city of Alameda:

Chapter 23-3.2 **Necessity for Permit to Plant, Trim, or Cut.** No tree or shrub shall be planted or set out upon any public street or place in the City, and no tree or shrub located upon any public street or place shall be removed, trimmed, pruned or cut without written permission the Public Works Director to do so. When such permission is granted for the [planting] of trees or shrubs it may prescribe the number, kind and distance apart thereof, and when for the removal, trimming, pruning or cutting thereof may prescribe the number of trees or shrubs to be affected thereby and the manner and the performance of the work. Such permission shall be operative only when exercised subject to such regulations as the Public Works Director may adopt under the previous subsection.

Chapter 23-8.3 **Encroachments on Public Property Prohibited/Declaration of Nuisance.** Encroachments constructed, placed, maintained or otherwise located on public property without an encroachment permit shall be deemed illegal and are hereby declared to be a public nuisance and may be abated in conformance with the provisions of this section.

City of Oakland General Plan

The Open Space, Conservation, and Recreation Element of the City of Oakland General Plan (1996) provides goals, objectives, polices, and actions to protect and improve recreational facilities. The City of Oakland General Plan includes the following policies that are relevant to the proposed project:

Policy REC-1.2 **No Net Loss of Open Space.** Unless overriding consideration exists, allow no net loss of open space within Oakland's urban park system. In other words, the area covered by park buildings or other recreational facilities in the future should be offset in the long-run by acquisition or improvement of an equivalent or larger area of open space. Replacement open space should be of comparable value to the space lost and should generally serve an area identified on Figure 18 (Park Deficient Areas) as having un-met needs.

Policy REC-2.1 **Park Conversion to Other Uses.** Protect parks from conversion to other uses, except for minor boundary changes, which would improve their value or usefulness. In any case, as prescribed by Policy REC-1.2, replace whatever land and facilities are given up with land and facilities of at least equal value and capacity.

City of Oakland Municipal Code

Chapter 12.64 of the City of Oakland Municipal Code includes regulations for recreational areas in the city of Oakland:

Chapter 12.64.090 **Injuring trees and other properties.** It is unlawful for any person to trespass upon the grass of any public park in the city or to pick flowers from the same, or to cut, break or in anywise injure, damage or deface the trees, shrubs, turf, buildings, fences, benches, fountains, statuary or any fixtures connected therewith, or to foul any fountains or springs within said park.

3.12.4 Proposed Project Impacts and Mitigation Measures

3.12.4.1 Significance Criteria

For the purposes of this Draft EIR and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact to recreation if it would:

1. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
2. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

In addition, the proposed project would result in a significant impact on recreational resources if it would:

3. Substantially degrade recreational experiences.

Based on the Initial Study analysis, the proposed project would not include or require the construction or expansion of recreational facilities, and would therefore not result in the substantial physical deterioration of a recreational facility. Criteria 2 would not apply to the proposed project and is not discussed further in this document.

3.12.4.2 Approach to Analysis

Impacts to recreational facilities were analyzed by determining whether any recreational facilities identified in Table 3.12-1 would be substantially directly or indirectly impacted by construction and operation and maintenance of the proposed project. Direct impacts include any vegetation or tree removal activities, excavation activities, or any other activities that would tangibly damage or limit use of or the experience in a recreational facility. Indirect impacts include dust emissions, noise, and visual impacts that would occur as a result of construction or operation and maintenance and that could affect users of recreational facilities. To identify the significance of an impact, the local and regional context was taken into account, including the size and usage of the affected recreational facilities, and the number and location of recreational facilities available within the local and regional vicinity.

3.12.4.3 Impacts and Mitigation Measures

Table 3.12-2 provides a summary of the significance of the proposed project's recreation impacts before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.12-2 Summary of Potential Recreation Impacts

Impact	Significance Prior to Mitigation	Significance after Mitigation
Impact Recreation-1: Potential to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility could occur or be accelerated (Criteria 1)	Less than Significant	---
Impact Recreation-2: Potential to substantially degrade recreational experiences (Criteria 3)	Potentially Significant	Less than Significant MM Recreation-1 MM Recreation-2 MM Aesthetics-1 MM Traffic-5

Impact Recreation-1: Potential to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility could occur or be accelerated (Criteria 1). (*Less than Significant)*

Direct Impacts

Three recreational facilities are located within the proposed project area. The HDD entry pit for Crossing #1 would be located within the Estuary Park parking lot. Open trench construction and a geotechnical investigation boring would also be located within the access roadway to the parking lot. The HDD entry pit and a geotechnical investigation boring for Crossing #2 would be located within Towata Park and portions of Crossings #1, #2, #3, and the High Street pipeline abandonment would be located within portions of the San Francisco Bay Trail.

Construction of the proposed project at or near Estuary Park, Towata Park, and along portions of the San Francisco Bay Trail would not result in increased use of these recreational facilities; therefore, physical deterioration resulting from increased use would not occur, and there would be no direct impacts to recreational facilities associated with the proposed project.

Indirect Impacts

Construction of Crossings #1, #2, and #3 and the seven pipeline abandonments would indirectly impact all 13 recreational facilities located within 1,000 feet of the proposed project (see Table 3.12-1). Indirect impacts could include dust emissions, noise, and temporary visual impacts. While the 13 recreational facilities could be impacted indirectly by dust, noise, and temporary visual impacts; construction would not affect access to most of the recreational facilities. Only five recreational facilities (Estuary Park, Towata Park and the three portions of the San Francisco Bay Trail) would require temporary closure of a part of the facility. The other eight recreational facilities would remain open. Most of Estuary Park and the San Francisco Bay Trail would also remain open.

While residents within the city of Oakland and the city of Alameda would still be able to use eight of the 13 recreational facilities within the vicinity of the proposed project during construction, indirect construction impacts could cause some users of the affected recreation facilities to use other facilities, thereby temporarily increasing the use of other recreational facilities. There would still be 29 local parks within the city of Alameda and 122 local parks within the city of Oakland that residents could use instead of the recreational facilities indirectly impacted by the proposed project. Residents affected by indirect impacts to the 13 recreational facilities could also use the 64 regional parks managed by the EBRPD. Because there is sufficient capacity to accommodate the park users inconvenienced by the indirect impacts from the proposed project, indirect impacts would not substantially increase the use of existing neighborhood and regional parks or other recreational facilities and the proposed project would, therefore, not cause substantial deterioration of other recreational facilities. The impact would be less than significant.

Mitigation Measure: None Required.

Impact Recreation-2: The proposed project could substantially degrade recreational experiences (Criteria 3). (*Less than Significant with Mitigation)*

Direct Impacts

Pre-Construction Geotechnical Investigation

Machinery and equipment would be used to conduct the geotechnical investigation boring within the access roadway and parking lot to Estuary Park. Sediment could potentially be released within Estuary or Towata Parks. However, the amount of sediment that could be released would be minimal. The boring activities at each location would not last longer than 1 day. Additionally, Estuary and Towata Parks would remain open during boring. The direct impacts to recreational users of Estuary and Towata Parks during geotechnical investigations would be less than significant.

Construction

Direct impacts to recreational facilities from construction of Crossing #1, #2, #3, and the seven pipeline abandonments would occur at Estuary Park during construction of Crossing #1, Towata Park during construction of Crossing #2, and at portions of the San Francisco Bay Trail during open trench construction on roadways for Crossing #1 in the city of Alameda (Atlantic Avenue) and the city of Oakland (Embarcadero West).

The proposed project would directly impact Estuary Park during construction of Crossing #1. The entry pit for HDD and open trench construction would be located within a paved access roadway and parking lot in Estuary Park and the pipeline would be installed within EBMUD's historic property rights along Fallon Street and in the parking lot per Port of Oakland Resolution 8628. The HDD pit would be excavated using machinery and equipment within the access roadway and parking lot. Sediment could potentially be released within the park from drilling operations. The HDD pit and associated staging would occupy up to 2,500 square feet or 0.06 acre, which represents a very small portion of the 7.7-acre Estuary Park. Similarly, machinery and equipment would be used during open trench construction within the access roadway and parking lot, though on a substantially reduced scale and timeframe compared to HDD.

Active recreational use of the field areas and shoreline within Estuary Park would not be directly impacted by project construction because the fields and the shoreline would remain open during all construction activities. Although access along Fallon Street would be restricted during a short, 1- to 5-day, period during open trench construction, access to Estuary Park recreational facilities would remain accessible via the alternate Jack London Aquatic Park entrance. Pedestrian and vehicular access along Fallon Street would remain open during HDD construction activities. The reduced accessibility to Estuary Park and potential for direct impacts to park features from construction activities would be a potentially significant impact to recreationalists.

Mitigation Measures Recreation-1, Recreation-2, and Aesthetics-1 would be implemented to address the potentially significant impacts from project construction to the recreational experience. Mitigation Measure Recreation-1 requires that EBMUD coordinate with the City of Oakland Department of Parks and Recreation. Mitigation Measure Recreation-2 requires that EBMUD restore impacted portions of Estuary Park, including the paved roadway and impacted amenities, to their pre-construction conditions. Mitigation Measure Aesthetics-1 requires revegetation and tree replacement. The impact to recreationalists in Estuary Park would be less than significant after implementation of Mitigation Measures Recreation-1, Recreation-2, and Aesthetics-1.

The proposed project would directly impact Towata Park during construction of Crossing #2. The entry pit for HDD would be located within Towata Park, which would entail the excavation of the HDD pit, the use of machinery and equipment within the park, and the potential release of sediment from drilling. To accommodate the machinery and equipment needed for HDD, some vegetation removal, tree trimming and/or tree removal would be required. A substantial portion of Towata Park would require temporary closure during construction and the quality of the park would be affected by vegetation removal and excavation of the HDD pit. As such, the impact to recreationalists in Towata Park from HDD and open trench construction would be potentially significant. Mitigation Measures Recreation-1, Recreation-2, and Aesthetics-1 would be implemented to address the impact of temporary closure and disturbances in Towata Park. Mitigation Measure Recreation-1 requires that EBMUD coordinate with the City of Alameda Department of Recreation and Parks to protect the public during construction within Towata Park through temporary closure of portions of the park and to inform the public of the temporary closure. Mitigation Measure Recreation-2 would be implemented to address the impact associated with excavation by requiring EBMUD repair Towata Park to its pre-construction conditions. Mitigation Measure Aesthetics-1 requires revegetation and tree replacement. The impact to recreationalists at Towata Park would be less than significant after implementation of Mitigation Measures Recreation-1, Recreation-2, and Aesthetics-1.

Open trench construction would require the closure of roadways that form part of the San Francisco Bay Trail and are used by pedestrians and bicyclists. Sherman Street would be fully closed to bicyclists. Embarcadero West and Atlantic Avenue would be partially closed but access for bicyclists would be maintained. The recreational experience of bicyclists could be impacted by the temporary and full closure of portions of the San Francisco Bay Trail. The impact is considered potentially significant. Mitigation Measure Traffic-5 from Section 3.13: Transportation and Traffic requires EBMUD to implement measures to manage bicycle traffic in places where the roadway is partially and/or fully closed, including: using "share the road" signs for partially closed roadways; obtaining to the extent possible, a temporary permit that allows bicyclists to use sidewalks; and providing detours. Potential impacts to recreational experience at the San Francisco Bay Trail would be less than significant after implementation of Mitigation Measure Traffic-5.

Indirect Impacts

As discussed in Impact Recreation-1, parks located within the vicinity of the proposed project would be indirectly affected during construction from dust, noise, and visual impacts. Table 3.12-1 summarizes the recreational facilities within 1,000 feet of the proposed project. Six of the recreational facilities (Estuary Park, Littlejohn Park, Veterans Memorial Park, Towata Park, and two portions of the San Francisco Bay Trail near Crossing #1 and Crossing #2) in Table 3.12-1 would be indirectly affected from construction, in particular because they are located directly adjacent to roads where construction would occur. The other seven parks in Table 3.12-1 would also be impacted by construction, but impacts would be less than those on the parks located adjacent to roads where construction would occur. Access to all parks, except Towata Park, would be maintained during construction; however, the recreational experience of using these parks would be temporarily degraded by dust, noise, and visual impacts.

EBMUD would address the dust impact by implementing dust control monitoring and emission controls according to the Dust Control Plan required under EBMUD's Standard Construction Specification 01 35 44. Compliance with EBMUD's Standard Construction Specification 01 35 44 would ensure that indirect impacts to recreationalists during construction would be less than significant.

The only potential substantial noise impacts to recreational facilities would occur at the recreational facilities located adjacent to where construction would occur. Noise dissipates quickly and would not substantially affect recreational facilities that are not located adjacent to construction activities. Noise would be the loudest in areas that are closer to the construction activities. While construction noise would deter some recreational users from using the affected recreational facility, some recreational users could also choose to use a location in the park that is away from construction where noise would not be as loud. Construction near the recreational facilities adjacent to the proposed project would be conducted during the day on weekdays, thereby avoiding impacts on the weekends, which are the busiest times for recreational facilities.

The temporary visual impacts associated with construction is not expected to substantially deter users of recreational facilities. Impact Aesthetics-1 in Section 3.2: Aesthetics, describes that temporary visual impacts would be less than significant because views of construction equipment and machinery would be similar in visual quality to the overall visual quality in the proposed project areas, which is low and low to moderate, and the visual change would be temporary.

The indirect dust, noise, and visual impacts to the parks within the vicinity of the proposed project would not substantially deter recreational use of those affected facilities. Recreational users that choose not to use those affected parks have the option to use the other 29 local parks within the city of Alameda, the 122 local parks within the city of Oakland, or the 64 regional recreational facilities managed by the EBRPD. The proposed project would not substantially degrade recreational experience because indirect dust, noise, and visual impacts would be less than significant and because recreational users can use other local and regional parks within the vicinity of the proposed project.

Mitigation Measure: Recreation-1, Recreation-2, Aesthetics-1 (see Section 3.2: Aesthetics), Traffic-5 (see Section 3.13: Transportation and Traffic)

Mitigation Measure Recreation-1. Coordination with Cities.

EBMUD shall coordinate with the City of Oakland Department of Parks and Recreation and the City of Alameda Department of Recreation and Parks regarding temporary park closures prior to construction within Estuary Park and Towata Park. EBMUD shall implement park closure methods after consultation with each City, and shall notify the members of the public of temporary park closures via the methods provided by the City of Oakland Department of Parks and Recreation and the City of Alameda Department of Recreation and Parks.

Mitigation Measure Recreation-2. Park Restoration.

Construction activities shall be located to avoid trees to the extent feasible. After completion of construction activities, public parks shall be restored to pre-project conditions in coordination with the City of Oakland or the City of Alameda. Park restoration shall include replacement of any other park amenities (park benches, sidewalks, signage, etc.) that were removed or impacted during construction.

Significance after Mitigation: Less than Significant.

3.12.5 References

City of Alameda. 2015. Parks and Facilities. http://alamedaca.gov/recreation/parks-facilities. Accessed on September 18, 2015.

City of Oakland. 2015. Park Listings. http://www2.oaklandnet.com/Government/o/opr/s/Parks/index.htm. Accessed on September 18, 2015.

East Bay Regional Park District. 2015. Home Page. http://www.ebparks.org/. Accessed on September 18, 2015.

3.13 TRANSPORTATION AND TRAFFIC

This section presents the environmental setting and impact analysis for transportation and traffic that could be affected by the proposed project. Background information, known resources, applicable regulations, environmental impacts, and mitigation measures to reduce or avoid significant effects are presented here. Appendix J includes a copy of the Transportation and Traffic Technical Report prepared for the proposed project.

3.13.1 Definitions

3.13.1.1 Level of Service

Intersection Level of Service (LOS) is used to rank traffic operation on various types of facilities, based on traffic volumes and roadway capacity, using a series of letter designations ranging from A to F. LOS measures the operational effectiveness of a roadway or intersection. LOS A represents relatively free-flow conditions with little delay at intersections and LOS F represents a significantly congested condition where traffic flows can exceed design capacities resulting in long vehicle delays.

Table 3.13-1 provides definitions of the LOS used in this analysis, as defined in the Highway Capacity Manual (HCM) (Transportation Research Council 2000 and 2010).

3.13.1.2 Average Daily Traffic

Average daily traffic (ADT) is a term that describes the average number of vehicles or volume of traffic on a road. ADT has been estimated for the project area based on the standard capacity for each roadway type. The capacities have been determined from historical peak hour capacities of similar roadways in many different communities and are, therefore, generalizations. Daily capacities are adjusted based on unique or non-standard road conditions. To adjust the capacities, a peak hour intersection analysis was performed to determine the peak hour volumes on the road. The peak hour volume was then translated to a daily volume in order to assign a daily capacity estimate.

3.13.1.3 Peak Hour Traffic

Peak hour traffic is the hour in which the four highest traffic volume 15-minute periods (consecutive) fall during the typical two-hour commute period. There is an AM and a PM peak hour traffic. The AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) commute periods are generally considered the peak flow of traffic during the weekday periods. Depending on the specific region, these periods can fluctuate by as much as an hour or more depending on a variety of factors, including commute distances, freeway operations, and local incidents. The City of Oakland has indicated that peak periods can fluctuate in the Chinatown areas due to retail business hours and demographics; however, it is very likely that during established AM and PM peak commute periods the peak flows of traffic will occur (Wlassowsky, personal communication, August 18, 2015). Recent transportation studies conducted in the proposed project vicinity have also used the same time periods to conduct traffic analyses (Urban Planning Partners, Inc. 2015).

Table 3.13-1 Level of Service

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle (seconds)		
				Signalized	Un-signalized	All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	< 10.0	< 10.0	< 10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and < 20.0	>10.0 and < 15.0	>10.0 and < 15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at level C. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	>20.0 and < 35.0	>15.0 and < 25.0	>15.0 and < 25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and < 55.0	>25.0 and < 35.0	>25.0 and < 35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and < 80.0	>35.0 and < 50.0	>35.0 and < 50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	> 80.0	> 50.0	> 50.0

Source: Transportation Research Council 2000

The peak hour of traffic flow is determined from the AM and PM peak commute period counts. From these peak hour volumes, intersection LOSs are calculated to understand the intersections' operation. As previously indicated, operational conditions are assigned a letter grade from LOS A to LOS F.

3.13.1.4 Bicycle Route Classes

Bicycle route classes are defined by the location of the bicycle route. The California Manual on Uniform Traffic Control Devices defines bicycle facilities according to the following three categories (State of California 2014):

- **Class I.** A dedicated off-road bicycle and/or pedestrian path (typically multi-use path). Provides for bicycle travel on a paved ROW completely separated from any street or highway. The minimum travel width for two-way travel is 8 feet and 5 feet for a one-way path. If adjacent to the highway or arterial with no physical barrier there should be a 5-foot buffer area.
- **Class II.** A dedicated bike lane on a street and/or highway (not a sidewalk). Bicycle lanes are typically 4- to 5-feet wide and provide for directional one-way travel on one or both sides of the roadway. Requires signing and pavement markings with a 6-inch solid white stripe separating the bicycle lane from adjacent traffic flow.
- **Class III.** Dedicated bike routes that provide shared use with pedestrian or motor vehicle traffic and are identified by signing. Typically, bike routes are used to connect with other Class II or Class I bike facilities where ROW acquisition or physical linkage is not possible. Ideally, Class III bike routes should only be used on low volume streets (for safety purposes) with speed limits of 35 miles per hour (mph) or less.

3.13.2 Data Collection

Prior to collecting traffic data for the proposed project, both Planning and Public Works staff were contacted at the Cities of Oakland and Alameda to introduce them to the project and to seek early input on transportation planning for project construction. Caltrans was also consulted for information on baseline conditions. Existing traffic data was obtained from the City of Oakland and the City of Alameda; however, the existing traffic data from the City of Oakland and City of Alameda did not include data for the roads that would be affected by the proposed project. Therefore, new traffic data was collected for the proposed project. Current construction activities associated with the 23rd Street and 29th Street Overcrossing Project in Oakland precluded the collection of new traffic count data for that area. Previously collected data was reviewed from City database websites, as well as in recent transportation studies conducted in the vicinity of the proposed project. The traffic data used to define the existing baseline was derived completely from the literature review conducted for this project and the traffic count data collected for this project.

Peak period intersection and daily traffic count data collection was conducted over a 3-week period in October 2015. Traffic counts were taken in typical weekday travel conditions during the mid-week (Tuesday, Wednesday, or Thursday) when schools were in session. New traffic data was collected for intersection turning movement counts, pedestrians, and bicycle traffic during the AM peak period and PM peak periods. Daily traffic counts were typically conducted for a 24- to 48-hour period. Traffic counts at intersections were conducted by one to two people, dependent on the overall flow of traffic and the traffic volumes during the peak period. The traffic counts were then summarized (along with intersection geometric and phasing data). Machine counts were also conducted for 24-hour data collection on selected roadways. The street and intersection locations where new traffic data was collected is shown in the Transportation and Traffic Technical Report (Omni-Means 2016), included in Appendix J to this EIR.

The bicycle and pedestrian facilities within the proposed project vicinity were determined during a field review of the proposed project area. The public transit facilities located within the proposed project area were determined by reviewing bus and rail lines within the cities of Oakland and Alameda.

3.13.3 Environmental Setting

3.13.3.1 Transportation System

Regional Access

Regional access to the project area is provided by interstate freeways and state highway routes that travel through Oakland and Alameda and connect to the local roadway network. These regional facilities are described below.

Interstate 880

I-880 extends in a northwest-southeast direction in the proposed project vicinity, connecting to State Route 17/Interstate 280 (I-280) in the South Bay and Interstate 80 (I-80) just east of the San Francisco Bay Bridge. I-880 is an eight lane facility and currently carries an ADT (annual) of 225,000 near Oak Street and Madison Street (Caltrans 2014). Vehicle ramps are located at Jackson Street and Oak Street in the proposed project vicinity. I-880 would provide access to the Crossing #1 construction areas.

State Route 61

State Route 61 (SR-61) starts south of the proposed project area from Davis Street in San Leandro and extends northwest via Doolittle Drive through Bay Farm Island. Crossing over to Alameda, SR-61 continues northwest via Otis Drive, Broadway, Encinal Avenue, and Central Avenue until extending north via Webster Street and the Webster-Posey Tube. In Alameda, SR-61 generally has three to four travel lanes and has an ADT (annual) of 11,300 daily vehicles between Broadway and Encinal Avenue in the proposed project area (Caltrans 2014). SR-61 would provide regional access to the Crossings #2 and #3 construction areas.

Local Access

The proposed project area is served, generally, by a grid network of streets that are classified as arterial, collector, and local roadways in the cities of Oakland and Alameda. Table 3.13-2 describes roadways within the proposed project area. For each crossing, the access roadway segment's physical characteristics have been described related to number of lanes, roadway width, the presence of bicycle lanes and on-street parking, transit routes, and ADT. The highlighted cells in Table 3.13-2 indicate the routes that would likely be used as detours during the proposed project's construction.

3.13.3.2 Levels of Service

The LOS for the roadways located within the proposed project area and for likely detours was calculated from the traffic data collected. The intersections that were analyzed were chosen based on consultation with the Cities of Oakland and Alameda.

The LOS for each studied intersection was determined using the Synchro-Simtraffic software, consistent with HCM 2000 and HCM 2010 methodologies. The Synchro-Simtraffic software yields the vehicle delay, in seconds, based on the data that was collected. The vehicle delay is used to determine the current LOS at each intersection. Table 3.13-3 identifies the baseline LOS and the current vehicle delay for AM and PM peak hours for intersections in the proposed project area and along potential detour routes.

3.13.3.3 Routes of Regional Significance

The Alameda County Transportation Commission (ACTC) through its Congestion Management Plan (CMP) establishes Routes of Regional Significance (RORS) throughout the County. RORS are typically freeways and/or major arterial links that provide regional and sub-regional access between and within cities in the County. The ACTC requires local jurisdictions to analyze proposed change in land use (General Plan Amendments and/or projects generating over 100 net new one-way peak hour vehicle trips) on the transportation network.

CMP RORS are designated as Tier 1 type or Tier 2 type facilities. Tier 1 facilities are primarily interstate freeways, state freeways, state highways, or city arterials/roadways. In the proposed project area Tier 1 CMP RORS include the following:

- State Route 260 (Posey/Webster Tubes) from Alameda to I-880
- 23rd/29th Avenues from Alameda to I-880
- I-880 from I-980 to Hegenberger Road
- Doolittle Drive from Oakland to Fernside Boulevard
- Otis Drive from Fernside Boulevard to Broadway
- Broadway from Otis Drive to Encinal Avenue
- Encinal Avenue from Broadway to Sherman Street
- Central Avenue from Sherman Street to Webster Street
- Webster Street from Central Avenue to Posey/Webster Tubes
- Posey/Webster Tubes from Webster Street to Oakland
- Atlantic Avenue from Webster Street to Poggi Street
- Atlantic Avenue from Poggi Street to Main Street
- Park Street from Oakland to Central Avenue
- Park Street from Central Avenue to Encinal Avenue

Table 3.13-2 Roadways in the Proposed Project Area

Roadway/ Segment	No. of Lanes	One Way or Two Way	Road Width (feet)	Bike-Lanes? (Y/N)	On-Street-Parking (Y/N)?	Public-Transit Lines (Y/N)	Traffic Volumes VPD[1]
Crossing #1: Oakland							
Madison Street/ 8th Street – 2nd Street	2 to 3	One Way (8th to 4th) Two Way (4th to 2nd)	44 to 52[2]	No	Yes, both sides	Yes, AC Transit Bus (Routes 11, 26, 62, 88)	6,980
2nd Street/ Madison Street - Oak Street	2	Two Way	44	Yes Sharrows[3] both sides	Yes, both sides	No	100
Oak Street/ 2nd Street – Embarcadero West	4	Two Way	58	Yes Sharrows[3] both sides	Yes, both sides	No	2,350
Jackson Street/ 8th Street – 4th Street	2	Two Way	42	No	Yes, both sides	Yes, AC Transit Bus (Routes 11, 26, 62, 88, O, W)	2,800
4th Street/ Jackson Street – Madison Street	2	Two Way	40	No	Yes, both sides	No	4,500
5th Street/ Jackson Street – Oak Street	3	One Way	44	No	Yes, south side only	No	4,570
Crossing #1: Alameda							
Marina Village Pkwy/ Mariner Square Loop - Challenger Drive	2 to 4	Two Way	45 to 80	Yes Class II both sides	No	Yes, AC Transit Bus (Route 31)	3,000
Challenger Drive/ Marina Village Parkway - Atlantic Avenue	2	Two Way	47 to 65	Yes Class II both sides	No	Yes, AC Transit Bus (Route 31)	6,250

Roadway/ Segment	No. of Lanes	One Way or Two Way	Road Width (feet)	Bike-Lanes? (Y/N)	On-Street-Parking (Y/N)?	Public-Transit Lines (Y/N)	Traffic Volumes VPD[1]
Atlantic Avenue/ Challenger Drive - Sherman Street	2	Two Way	46	Yes Class II both sides	No	Yes, AC Transit Bus (Route 31)	9,300
Sherman Street/ Atlantic Avenue - Lincoln Avenue	2	Two Way	36	No	Yes, both sides	No	10,116
Mitchell Avenue/ Mariner Square Loop – 5th Avenue	2	Two Way	44	Yes Class II	No	No	1,800
Crossing #2: Alameda (Only)							
Island Drive/ Stewart Davey Jr. – Veterans Court	4	Two Way	120	Yes Class I west side	No	Yes, AC Transit Bus (Routes 21, OX, 631, and 687)	26,200
Veterans Court/ Island Drive - north	2	Two Way	34	Yes Class I west side	Yes both sides	No	100
Bridgeview Isle/ Driftwood Lane - south	2	Two Way	36	Yes Class I north side	Yes both sides	No	250
Peach Street/ Bridgeville Court - San Jose Avenue	2	Two Way	38	No	Yes both sides	No	205
San Jose Avenue/ Peach Street - Pearl Street	2	Two Way	36	No	Yes both sides	No	550
Versailles Avenue/ San Jose Avenue	2	Two Way	40’	No	Yes both sides	No	1,610

Roadway/ Segment	No. of Lanes	One Way or Two Way	Road Width (feet)	Bike-Lanes? (Y/N)	On-Street-Parking (Y/N)?	Public-Transit Lines (Y/N)	Traffic Volumes VPD[1]
Post Street/ Otis Drive - San Jose Avenue	2	Two Way	40	No	Yes both sides	No	215
Fernside Boulevard/ Otis Drive - San Jose Avenue	2 to 3	Two Way	52	Yes Class I&II both sides	No	No	16,000
Crossing #3: Oakland							
Ford Street/ 29th Avenue - Derby Avenue	2	Two Way	3	No	Yes both sides	No	1,050
Derby Avenue/ Ford Street - Tidal Canal	2	Two Way	36	No	Yes both sides	No	320
Chapman Street/ 29th Avenue - Derby Avenue	2	Two Way	36	No	Yes both sides	No	470
Glascock Street/ 29th Avenue - Derby Avenue	2	Two Way	36	No	Yes both sides	No	800
Crossing #3: Alameda							
Broadway/ Blanding Avenue - Webb Avenue	2	Two Way	48	Yes Class II both sides	Yes both sides	Yes, AC Transit Bus (Routes 51A, 851, W)	6.270
Clement Avenue/ Everett Street - Broadway	2	Two Way	48	No	Yes Both sides	No	4,265
Everett Street/ Clement Avenue - Lincoln Avenue	2	Two Way	36	No	Yes Both sides	No	1,000
Lincoln Avenue/ Park Street - Everett Street	2	Two Way	44	No	Yes Both sides	No	300

Roadway/ Segment	No. of Lanes	One Way or Two Way	Road Width (feet)	Bike-Lanes? (Y/N)	On-Street-Parking (Y/N)?	Public-Transit Lines (Y/N)	Traffic Volumes VPD[1]
Eagle Avenue/ Everett Street - Broadway	2	Two Way	36	No	Yes Both sides	No	160
Blanding Avenue/ Park Street - Broadway	2	Two Way	46	No	Yes Both sides (west of Broadway)	Yes. AC Transit Bus (Routes 51A, 851, W)	5,080
Tilden Way/ Buena Vista Avenue – Blanding Avenue	4	Two Way	68	No	No	Yes, AC Transit Bus (Routes 51A, 851, O)	14,720
Santa Clara Avenue/ Broadway - Park Street	2	Two Way	40	No	Yes Both sides	Yes, AC Transit Bus (Routes 51A, 851, O)	4,000
Park Street/ Santa Clara Avenue – Blanding Avenue	4	Two Way	54	No	Yes Both sides	Yes, AC Transit Bus (Routes 20, 21, O, OX)	23,000

Notes:

1 Vehicles per day (VPD)-based daily traffic counts conducted by Baymetrics Traffic Resources in the cities of Oakland/Alameda and/or converted PM Peak Hour intersection approach counts conducted along specific roadway segment, October, 2015.

2 The 52 feet exists between 7th and 8th Streets.

3 Sharrows are pavement markings that indicate a shared use lane between autos and bicycles. They are typically placed in roadways where there is not enough room for bike lanes.

4 Highlighted cells indicate the routes that would likely be used as detours during the proposed project's construction.

Table 3.13-3 LOS for Intersections in the Proposed Projects and Detour Routes

Traffic Count Number	Intersection	Control Type[1]	LOS & Delay in Seconds	
			AM Peak Hour	PM Peak Hour
Crossing #1				
1	Madison Street/ 8th Street	Signal	B 11.9	B 11.9
2	Madison Street/7th Street	Signal	A 5.5	A 8.7
3	Madison Street/6th Street	Signal	A 6.5	A 7.4
4	Madison Street/5th Street	Signal	A 5.8	A 7.5
5	Madison Street/4th Street	TWSC	A 9.9	B 11.0
6	Madison Street/2nd Street	TWSC	A 9.3	B 10.3
7	Oak Street/2nd Street	TWSC	B 13.0	C 23.8
8	Oak Street/Embarcadero West	TWSC	C 17.8	E 41.2
9	Jackson Street/8th Street	Signal	A 9.3	B 13.2
10	Jackson Street/7th Street	Signal	B 13.3	B 12.1
11	Jackson Street/6th Street	Signal	C 28.0	C 21.6
12	Jackson Street/5th Street/I-880 EB Off ramp	Signal	B 13.1	B 18.3
13	Oak Street/5th Street	Signal	A 8.8	B 13.3
14	Mitchell Avenue/5th Street	Signal	B 14.6	B 14.2
15	Marina Village Pkwy/Mariner Square Loop	Signal	B 14.4	B 15.7
16	Marina Village Pkwy/Mariner Square Drive	AWSC	A 8.3	A 9.2
17	Marina Village Pkwy/Extend Stay Drive	TWSC	A 9.3	B 10.3
18	Marina Village Pkwy/1250 Drive	TWSC	B 10.1	B 10.2
19	Marina Village Pkwy/1210 Drive	TWSC	B 10.9	B 11.2
20	Marina Village Pkwy/Tynan Avenue	TWSC	B 10.9	B 10.4
21	Marina Village Pkwy/Independence Drive	TWSC	B 10.3	B 11.0
22	Marina Village Pkwy/Challenger Drive	Signal	C 28.5	C 32.3
23	Atlantic Avenue/Challenger Drive	Signal	B 14.5	B 14.9
24	Atlantic Avenue/Triumph Drive	TWSC	D 28.8	F >55.0
25	Sherman Street/Buena Vista Avenue	Signal	B 18.7	C 26.0
26	Sherman Street/Pacific Avenue	TWSC	B 11.2	B 14.5
27	Sherman Street/Lincoln Avenue	Signal	B 11.4	B 14.1
28	8th Street/Constitution Way/Lincoln Avenue	Signal	C 27.2	C20.9
Crossing #2				
1	Island Drive/Robert Davey Jr. Drive	Signal	B 19.7	B 13.8
2	Island Drive/Veteran's Court	TWSC	B 12.8	C 16.0

Traffic	Intersection	Control Type[1]	LOS & Delay in Seconds	
3	Peach Street/Otis Drive	TWSC	C 16.0	C 19.0
4	San Jose Avenue/Fernside Boulevard	TWSC	C 21.2	C 21.9
5	San Jose Avenue/Peach Street	TWSC	A 8.9	A 9.0
6	San Jose Avenue/Post Street	TWSC	A 9.5	A 9.5
7	San Jose Avenue/High Street	TWSC	C 16.7	B 14.2
8	San Jose Avenue/Mound Street	AWSC	A 7.6	A 7.3
9	San Jose Avenue/Versailles Avenue	AWSC	A 7.6	A 7.4
10	San Jose Avenue/Pearl Street	TWSC	A 9.4	A 9.7
Crossing #3				
1	Chapman Street/29th Street[2]	TWSC	B 10.6	B 11.6
2	Chapman Street/Derby Avenue	TWSC	A 9.3	A 9.3
3	Ford Street/29th Street[2]	TWSC	C 28.2	D 48.1
4	Ford Street/Peterson Street	TWSC	A 9.1	A 9.5
5	Ford Street/Derby Avenue	TWSC	A 9.3	A 9.4
6	Glascock Street/Derby Avenue	TWSC	A 8.5	A 9.3
7	Blanding Avenue/Park Street	Signal	D 46.9	C 30.5
8	Blanding Avenue/Broadway	AWSC	C 18.6	C 21.1
9	Clement Avenue/Everett Street	TWSC	C 18.3	B 14.5
10	Clement Avenue/Broadway	TWSC	C 16.8	C 16.9
11	Eagle Avenue/Everett Street	TWSC	A 9.5	A 9.5
12	Tilden Way/Broadway	Signal	C 20.3	C 22.6
13	Buena Vista Avenue/Everett Street	TWSC	B 14.5	B 13.4
14	Buena Vista Avenue/Broadway	Signal	B 11.6	A 8.8
15	Tilden Way/Park Street/Lincoln Avenue	Signal	B 11.6	B 11.6
16	Everett Street/Lincoln Avenue	TWSC	A 9.3	B 10.5
17	Lincoln Avenue/Broadway	TWSC	C 24.4	D 33.9
18	Santa Clara Avenue/Park Street	Signal	B 12.2	B 11.8

Notes:

[1] Signalized/un-signalized intersection LOS based on HCM 2010 methodology (Synchro-Simtraffic software) which yields a vehicle delay in seconds. TWSC (Two-Way-Stop-Control). AWSC (All-Way-Stop-Control).

[2] Due to on-going construction activities related to the 23rd Street and 29th Street Overcrossing project, accurate AM and PM peak hour volumes at the 29th Street study intersections could not be obtained. Therefore, projected intersection LOS has been taken from the I-880 Operational and Safety Improvement at 29th Avenue and 23rd Avenue Overcrossings IS/EA, 2013.

Tier 2 roadways are primarily city/county arterials of local significance. High Street is designated as a Tier 2 roadway between Otis Drive and I-580. The CMP also designates

Metropolitan Transportation System (MTS) roadways. MTS roadways are major arterials or transit routes that provide critical access to areas within the cities of Oakland and Alameda. Within the proposed project area, MTS roadways include 7th and 8th Streets in Oakland as well as portions of Central Avenue, Constitution Way, Park Street, Otis Drive, Tilden Way (east of Park Street), and Broadway (between Tilden Way and Otis Drive) in the City of Alameda.

3.13.3.4 Alternative Transportation

Bus lines (AC Transit) and railroad crossings (Amtrak and Union Pacific) are located on the same roadways as the proposed project. The AC Transit lines, railroad crossings, bicycle facilities, and pedestrian facilities are described below.

AC Transit

AC Transit provides the primary bus service throughout the cities of Oakland and Alameda, as well as 13 other cities in Alameda County and Contra Costa County. While most of the AC Transit routes are local in nature, AC Transit also provides Transbay, All-Night, and Supplementary routes. Transbay routes serve San Francisco and cities located on the San Francisco Peninsula. Table 3.13-4 summarizes the AC Transit routes located within the proposed project area.

Table 3.13-4 AC Transit Bus Routes in the Project Area

Line	Route Description	Frequency
Crossing #1: Oakland		
11 Local	Dimond District; Oakland to Estates Drive and Inverleith Terrace	Weekday 6:00 a.m. – 8:35 p.m. Headways every 30 minutes Weekend 7:00 a.m. – 8:25 p.m. Headways every 60 minutes
26 Local	Emery Bay Public Market to Lakeshore Avenue and Walla Vista Avenue, Oakland	Weekday 5:50 a.m. – 10:20 p.m. Headways every 20 minutes Weekend 5:44 a.m. – 10:25 p.m. Headways every 30 minutes
62 Local	West Oakland BART to Fruitvale BART	Weekday 6:15 a.m. – 12:50 a.m. Headways every 20 minutes Weekend 6:15 a.m. – 12:50 a.m. Headways every 30 minutes
88 Local	Berkeley BART to Lake Merritt BART	Weekdays 5:15 a.m. – 10:30 p.m. Headways every 20 minutes Weekends 5:20 a.m. – 10:30 p.m. Headways every 30 minutes
O Transbay	Fruitvale BART to Transbay Temporary Terminal, San Francisco	Weekdays 6:00 a.m. – 10:45 p.m. Headways every 10-60 minutes Weekends 6:00 a.m. – 10:40 p.m. Headways every 6 minutes
W Transbay	Broadway, Alameda to Transbay Temporary Terminal, San Francisco	Weekdays 4:00 p.m. – 8:40 p.m. Headways every 20 minutes Weekends 5:45 p.m. – 9:20 p.m. Headways every 20 minutes

Line	Route Description	Frequency
Crossing #1: Alameda		
31 Local	Alameda Point to MacArthur BART via Midway Ave., Lincoln Ave, and Marina Village Parkway	Weekdays 5:50 a.m. – 10:40 p.m. Headways every 30 minutes Weekends 6:45 a.m. – 11:15 p.m. Headways every 30 minutes
Crossing #2: Alameda (Only)		
21 Local	Dimond District, Oakland to Oakland Airport via Fruitvale BART, Park Street, Alameda Towne Center, and Bay Farm Island	Weekdays 6:25 a.m. – 10:05 p.m. Headways every 30 minutes Weekends 7:20 a.m. – 10:10 p.m. Headways every 30 minutes
OX Transbay	Bay Farm Island to Temporary Terminal San Francisco via Island Drive Park & Ride, Encinal Avenue, and Park Street	Weekdays 4:20 p.m. – 8:20 p.m. Headways every 10-20 minutes No Weekend Service
Crossing #3: Alameda (Only)		
20 Local	Dimond District, Oakland, to downtown Oakland via Fruitvale Ave., Fruitvale BART, Park St., Alameda Towne Centre, Shoreline Dr., Grand St., Otis Dr., Westline Dr., Central Ave., and Webster St.	Weekdays 5:00 a.m. – 10:50 p.m. Headways every 30 minutes Weekends 5:00 a.m. – 10:55 p.m. Headways every 30 minutes
21 Local	Dimond District, Oakland to Oakland Airport via Fruitvale BART, Park Street, Alameda Towne Center, and Bay Farm Island	Weekdays 6:25 a.m. – 10:05 p.m. Headways every 30 minutes Weekends 7:20 a.m. – 10:10 p.m. Headways every 30 minutes
51A Local	Rockridge BART station to Fruitvale BART station	Weekdays 5:00 a.m. – 12:35 p.m. Headways every 10 minutes Weekends 5:00 a.m. – 12:30 p.m. Headways every 60 minutes
851 All-Night	Downtown Berkeley to Fruitvale BART via UC Campus South, College Ave., Broadway, downtown Oakland, Webster St., Santa Clara Ave., Broadway, and Fruitvale Ave	Daily 12:14 a.m. – 5:05 a.m. Headways every 60 minutes
OX Transbay	Bay Farm Island to Temporary Terminal San Francisco via Island Drive Park & Ride, Encinal Avenue, and Park Street	Weekdays 4:20 p.m. – 8:20 p.m. Headways every 10-20 minutes No Weekend Service
W AC Transit Transbay	Broadway, Alameda to Transbay Temporary Terminal, San Francisco	Weekdays 4:00 p.m. – 8:40 p.m. Headways every 20 minutes Weekends 5:45 p.m. – 9:20 p.m. Headways every 20 minutes
O AC Transit Transbay	Fruitvale BART to Transbay Temporary Terminal, San Francisco	Weekdays 6:00 a.m. – 10:45 p.m. Headways every 10-60 minutes Weekends 6:00 a.m. – 10:40 p.m. Headways every 6 minutes

Source: AC Transit 2015

Bicycle Facilities
Table 3.13-2 identifies the roadways in the proposed project area with bike lanes, including the bike lane class.

Pedestrian Facilities
Pedestrian facilities include sidewalks, crosswalks, corner ramps, signalized intersections/pedestrian signals, and traffic calming pedestrian-friendly streetscapes. The majority of street segments have raised curb, gutter, and pedestrian sidewalks. Exceptions occur in transitional areas between urban and suburban areas (e.g., Atlantic Avenue to Sherman Street) where pedestrian sidewalks may only be present on one side of the street.

Railroad Crossings
Two railroad crossings are located within the proposed project area. The first railroad crossing (a combination of three sets of tracks) is located at Crossing #1 in the city of Oakland, at the intersection of Embarcadero West and Oak Street. The railroad crossing is used by both Amtrak and Union Pacific. The second railroad crossing is located at Crossing #3 in the city of Oakland, at the intersection of Derby Avenue and Glascock Street. This crossing is only used by Union Pacific. The usage of the two railroad crossings by Amtrak and Union Pacific is described below.

Amtrak
Amtrak provides passenger rail service on a local, state-wide, and regional basis. The Jack London Square Amtrak station is located near Crossing #1 in the city of Oakland, approximately 0.25 mile west of Madison Street. The following three Amtrak lines serve the Jack London Square station and use the rail crossing at the intersection of Embarcadero West and Oak Street:

- **Coast-Starlight.** One train per day in each direction operating between Seattle and Los Angeles
- **San Joaquin InterCity.** Four trains per day in each direction to Bakersfield via Modesto and Fresno
- **The Capital Corridor.** In excess of 20 trains per day operating between San Jose and the Sacramento-Auburn area

Union Pacific
Union Pacific operates freight trains that travel north and south through the proposed project area. Freight traffic travels through the railroad crossing at the intersection of Embarcadero West and Oak Street, at Crossing #1, but due to national security concerns, the amount of rail traffic is kept dynamic. The Con Agra flour plant and Ready Mix Concrete-Cemex concrete plant (adjacent to Kennedy Street and Embarcadero Cove, west of Derby Avenue) are served by rail activity that crosses the intersection of Derby Avenue and Glascock Street at Crossing #3. Rail activity at the intersection of Derby Avenue and Glascock Street is limited to night operations and can average up to two to three trains per week on its busiest schedule.

3.13.4 Applicable Regulations, Plans, and Standards

3.13.4.1 Federal Regulations

The CFR includes the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government. The rules under Title 49 of the CFR address safety considerations for the transport of goods, materials, and substances and govern the transportation of hazardous materials, including types of materials and marking of the transportation vehicles.

3.13.4.2 State Regulations

Caltrans manages interregional transportation, including management and construction of the California highway system. Caltrans is also responsible for permitting and regulation of the use of state roadways.

Caltrans construction management practices require temporary traffic control planning "during time periods when the normal function of a roadway is suspended" (Najadet, personal communication, August 18, 2015). Caltrans requires that permits be obtained for transportation of oversized loads and transportation of certain materials, and for construction-related rail-traffic disturbance.

3.13.4.3 Local Policies

The proposed project would be located in the jurisdictions of the Cities of Oakland and Alameda, which have general plan goals, objectives, and policies for maintaining the operation and maintenance of the transportation network within their jurisdictions (City of Oakland 1990, 1998). The City of Oakland's planning objectives and policies that would apply to the proposed project include the prioritization of transit and pedestrian flows over vehicle flow, the potential for transportation hazards, safety at railroad crossings, and requirements for construction activities which would typically include the amount of daily and peak hour construction trips, truck routes, and operating hours. Any construction activities that could affect sidewalks, parking lanes, and travel lanes should be addressed (City of Oakland 2013). Similarly, the City of Alameda's goals and policies are to provide for safe and efficient movement of people, goods, and services (Objective 4.1.1), implement and maintain a truck route map (Policy 4.1.1), develop criteria for safe passage of transit, pedestrians, and bicyclists through construction sites (Policy 4.1.1m), and maintain truck routing throughout the city wherever possible. The City of Alameda has a construction matrix for roadway classifications and street closure criteria (see Appendix J).

EBMUD and its contractors would obtain encroachment permits from the local jurisdictions and comply with all requirements to prevent or reduce disruption of traffic flow and pedestrian/transit operations in the public ROW.

3.13.5 Proposed Project Impact and Mitigation Measures

3.13.5.1 Significance Criteria

California Environmental Quality Act

For the purposes of this report and consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact to transportation and traffic if it would:

1. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulations system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
2. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
3. 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;
4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
5. Result in inadequate emergency access; or
6. Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Based on the Initial Study analysis, the proposed project would not include any aeronautical equipment and would not include any activities that would interfere with the airspace. The proposed project would therefore not result in any changes to air traffic patterns. Criteria 3 would not apply to the proposed project and is not discussed further in this document.

Construction of the proposed project would not conflict with established Alameda County standards for their congestion management program (LOS standards, Transportation Demand Management) for roads and highways. The proposed project would not trigger an ACTC analysis on the CMP roadway network because it would not generate over 100 peak hour trips, as shown in Section 3.13.5.2. There would be no significant increase in traffic on a long-term basis as a result of the proposed project because the traffic generated by the proposed project is temporary. No impact would occur from conflicting with established Alameda County standards for their congestion management program and Criteria 2 is not discussed further in this document.

City of Oakland
According to the City of Oakland's criteria, a project would have a significant impact if it would result in any of the following:

Capacity Thresholds

- At a signalized intersection that is located outside the Downtown area and does not provide access to Downtown, the project would cause the motor vehicle LOS to degrade to worse than LOS D (i.e., LOS E-F) and cause the total intersection average vehicle delay to increase by 4 or more seconds;
- At a signalized intersection located within the Downtown area or that provides direct access to the Downtown, the project would cause the motor vehicle LOS to degrade to worse than LOS E (i.e., LOS F) and cause the total intersection average vehicle delay to increase by 4 seconds;
- At a signalized intersection outside the Downtown area and that does not provide direct access to Downtown where the motor vehicle level of service is LOS E, the project would cause the total intersection average delay to increase by 4 or more seconds;
- At a signalized intersection outside the Downtown area and that does not provide direct access to Downtown where the motor vehicle level of service is LOS E, the project would cause an increase in the average vehicle delay for any of the critical movements of 6 seconds or more;
- At a signalized intersection for all areas where motor vehicle level of service is LOS F, the project would cause (a) the overall volume-to-capacity (v/c) ratio to increase by 0.03 or more or, (b) the critical movement v/c ratio to increase by 0.05 or more;
- At an un-signalized intersection, the project would add 10 or more vehicles (per hour) to the critical movement and after project completion satisfy the California Manual on Uniform Traffic Control Devices peak hour volume signal warrant (would not apply to temporary condition);
- For a roadway segment of the CMP network, the project would cause (a) the LOS to degrade from LOS E or better to LOS F or, (b) the v/c ratio to increase to 0.03 or more for a roadway segment that would operate at LOS F without the project;
- Cause congestion of regional significance on a roadway segment on the MTS evaluated per the requirements of the Land Use Analysis Program of the CMP; or
- Result in substantially increased travel times for AC Transit Buses. AC Transit bus routes would be considered impacted should proposed construction activities result in a re-routing of bus lines to alternative streets and/or preclude buses from accessing existing bus stops along their normal routes.

Traffic Safety Thresholds

- Directly or indirectly cause or expose roadway users (i.e., motorists, pedestrians, bus riders, bicyclists), to a permanent and substantial transportation hazard due to a new or existing physical design feature or incompatible uses;
- Directly or indirectly result in a permanent substantial decrease in pedestrian safety;

- Directly or indirectly result in a permanent substantial decrease in bicycle safety;
- Directly or indirectly result in a permanent substantial decrease in bus rider safety; or
- Generate substantial multi-modal traffic travelling across at-grade railroad crossings that cause or expose roadway users (i.e., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard.

Other

- Fundamentally conflict with adopted City policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities adopted for the purpose of avoiding or mitigating an environmental effect and actually result in physical change in the environment;
- Result in a substantial, though temporary, adverse effect on the circulation system during construction of the project; or
- 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.

City of Alameda

The City of Alameda uses a multi-modal approach to determine proposed project impacts based on pedestrian, bicycle, transit, and vehicular operating conditions. Thresholds are established based on minimum LOS levels and percentage levels (i.e., vehicle delays increase by more than 10 percent). Upon consultation, the City of Alameda Transportation staff indicated that the primary threshold for establishing proposed project impacts would be vehicular based (LOS/Vehicle Delay) since project impacts would be considered temporary in nature (Patel, personal communication, November 3, 2015). All other temporary project impacts to pedestrians, bicycles, and transit would be addressed in the development of construction management plans required prior to issuance of construction permit(s). According to the City of Alameda's criteria, a project would have a significant impact if it would result in any of the following:

- **Automobile.** Causes an intersection to degrade below LOS D. If an intersection were already at LOS E or worse, an impact would be considered significant if there is a 3 percent or greater increase in the traffic volume. Automobile LOS at intersections would be calculated using the 2010 and 2000 *Highway Capacity Manual*'s methodology for determining the average vehicle delay at an intersection.
- **Pedestrian.** Causes the pedestrian LOS to degrade below LOS B at a signalized intersection. If the intersection were already below LOS B, an impact would be considered significant if the delay for a crosswalk increases by 10 percent. (Pedestrian LOS would be determined using the 2000 *Highway Capacity Manual* methodology for determining the average delay for pedestrians at a signalized intersection.) Pedestrian access would be maintained during all full or partial construction-related roadway closures. Appropriate signage would be installed to warn pedestrians of construction/staging activities and to direct them across intersections to open sidewalk(s).

- **Bicycle.** Causes the bicycle segment LOS to degrade below LOS B. If a street segment were already below LOS B, an impact would be considered significant if the LOS score increases by 10 percent or more in value. If a segment has an existing adjacent Class I facility and has not been recommended for a future bicycle lane, the degradation of the bicycle LOS to E would not be considered a significant impact. (Florida Department of Transportation methodology for street segments will be used for the LOS analysis). Bicycle travel would be maintained during all full or partial construction-related roadway closures. Where bicycle facilities exist, bicyclists would be directed to parallel routes and/or sidewalks (pending authorization with City staff) if no feasible alternative route exists.
- **Transit.** Causes travel speed to degrade by 10 percent or more along a street segment. A segment would be defined as the impacted bus stop location plus the two previous stops and the two subsequent stops (Transit LOS for an arterial segment would be calculated using the 2000 *Highway Capacity Manual*'s methodology for Urban Street [arterial] LOS). AC Transit bus routes would be considered impacted should proposed construction activities result in a re-routing of bus lines to alternative roadways and/or precludes buses from accessing existing bus stops along their normal routes. As discussed with City Transportation staff, temporary construction management plans will address the needs of all transportation modes (including needs of the disabled community) as a requirement of project approval and permitting (Patel, personal communication, November 3, 2015).

3.13.5.2 Approach to Analysis

The transportation and traffic circulation impacts of the proposed project have been analyzed from field observations, peak hour and daily vehicle counts, and estimated trip generation for the horizon year of construction. To analyze impacts, the LOS was identified for intersections at traffic count locations during construction, based on the traffic generated by the proposed project, horizon year conditions, and the traffic that would be moved as a result of road closures and detours.

Traffic Generated by the Proposed Project

The construction activities for Crossings #1, #2, and #3 would generate a maximum of 68 worker and truck vehicle trips per day. Assuming a conservative estimate that 90 percent of the daily trips would occur during the AM and PM peak commute periods, the project would generate approximately 60 peak hour trips. The resulting peak hour trip generation would consist of 30 AM hour trips (30 in, 0 out) and 30 PM hour trips (0 in, 30 out). Based on the general locations of the pipeline alignments, there would not be a consistent pattern of trip assignment; therefore, daily and peak hour proposed project trips were added to all proposed project area roadways and intersections in addition to the background growth projected for the horizon construction year.

Baseline Conditions

Construction of Crossing #1 would occur in 2018/2019 and construction of Crossings #2 and #3 would occur sometime after 2020, although the year 2020 was used for this analysis. Traffic volumes for the baseline years were generated by applying an annual traffic volume growth rate to the existing peak hour intersection and daily volumes found along the construction and identified detour routes. Appendix J includes a discussion about the methodology used to define the annual growth rate. The annual growth rate of 1.4 percent was applied to existing intersection and roadway volumes for Crossing #1 to project the future year 2019 conditions and for Crossing's #2 and #3 to project future year 2020 conditions. The adjusted traffic volumes represent baseline without project conditions at the likely period of proposed project construction.

Road Closures

Impacts to traffic and transportation were analyzed by determining the roadways that would be impacted by the proposed project and would require full or partial closure. Open trench construction would usually require closure of at least one travel lane. The exact placement of each pipeline within the roadway ROW is currently not finalized because the location of utilities is currently unknown and would be determined during a later engineering and design phase. EBMUD staff, therefore, developed conservative criteria to identify where road closures may be necessary. EBMUD determined that a minimum roadway width of 48 feet is necessary to allow for a 25-foot construction zone with 11.5-foot traffic lanes on either side. The 48-foot width could include the temporary closure of bicycle lanes and/or on-street parking. Many streets along the pipeline open trench alignments would not meet the 48-foot minimum width criteria for remaining open (or partially open). For the purposes of this traffic analysis, streets with a width smaller than 48 feet were assumed to be closed during construction hours. Closure is determined on a block-by-block basis. Pipeline alignment roadways with curb-to-curb widths greater than 48 feet may be partially closed allowing one-way traffic flow.

An evaluation was conducted to determine the likely change in traffic operations for both roadway and intersection operations along the proposed pipeline alignment, and likely detour routes during the AM and PM peak hour periods. Since the proposed project would require temporary closures of either lanes or entire street segments; some vehicle traffic would be diverted to alternative routes that would result in increased traffic volumes on those alternative routes. The projected changes in daily traffic for the various construction segments for each proposed pipeline alignment are shown in Table 3.13-5 in association with the likely detour routes that would be expected to capture the detoured traffic volumes. ADT volumes are shown for roadway segments expected for complete closure and partial closure. As indicated for the analysis periods, approximately 80 percent of a roadway's daily traffic volumes occur during the construction period from 7:00 a.m. to 7:00 p.m.; thus, 80 percent of the roadway's daily traffic is expected to be diverted for full roadway closures. For partial closure roadways, 50 percent of the daily volumes were assumed to be diverted to detour routes.

Table 3.13-5 Summary of Roadway Closure and Detoured Volumes and Routes

Anticipated Roadway Segment Closure	Closure Type	Traffic Volume (VPD)[1]	Parking Spaces Displaced (total segment)[2]	Detoured Volumes (VPD)[1,3]	Detour Routes[3]
Crossing #1 (Oakland)					
Madison Street/ 8th Street - 2nd Street	Full Closure	6,980	83	5,580	Jackson Street, Oak Street (south of I-880)
2nd Street/ Madison Street - Oak Street	Full Closure	100	26	80	3rd Street, 4th Street, 5th Street
Jackson Street/ 5th Street - 4th Street	Full Closure	2,800	16	2,240	5th Street, Madison Street, 4th Street
4th Street/ Jackson Street - Madison Street	Full Closure	4,500	30	3,600	5th Street, 3rd Street, 2nd Street
5th Street/ Jackson Street - Oak Street	Partial Closure	4,570	15	2,290	4th Street
Oak Street - Embarcadero West (Partial Closure)/ 2nd Street - Estuary	Partial Closure	2,350	13	1,180	Oak Street, Madison Street, Jackson Street, via 7th or 5th Avenue
Crossing #1 (Alameda)					
Marina Village Parkway (Partial Closure)/ Tynan Avenue – Challenger Drive	Partial Closure	3,000	No Parking	1,500	Mariner Square Loop Road, Atlantic Avenue
Challenger Drive (Partial Closure)/ Marina Village Parkway - Atlantic Avenue	Partial Closure	6,250	No Parking	3,130	Atlantic Avenue, Triumph Drive, Independence Drive, Constitution Way
Sherman Street/ Atlantic Avenue - Lincoln Avenue	Full Closure	10,116	44	8,090	Atlantic Avenue, Lincoln Avenue, Constitution Way
Atlantic Avenue (Partial Closure)/ Challenger Drive - Sherman Street	Partial Closure	9,300	No Parking	4,650	Independence Drive, Triumph Drive, Constitution Way, Lincoln Avenue, Atlantic Avenue (west of Challenger Drive)
Crossing #2					
Peach Street/ Otis Street - San Jose Avenue	Full Closure	205	44	160	Fernside Dr., Post St.

Anticipated Roadway Segment Closure	Closure Type	Traffic Volume (VPD)[1]	Parking Spaces Displaced (total segment)[2]	Detoured Volumes (VPD)[1,3]	Detour Routes[3]
San Jose Avenue/ Peach Street - Pearl Street	Full Closure	550	123	440	Adams Street, Madison Street, Encinal Avenue
Veteran's Court	Full Closure	100	42	80	N/A – local access only
Bridgeview Isle	Full Closure	250	35	0	N/A – local access only
Crossing #3 (Oakland)					
Ford Street/ 29th Street - Derby Avenue	Full Closure	1,050	68	840	Chapman Street, Glascock Street
Derby Avenue/ Ford Street - Tidal Canal	Full Closure	320	43	260	Peterson Street, Lancaster Street
Crossing #3 (Alameda)					
Clement Avenue/ Everett Street - Broadway	Full Closure	4,265	36	3,410	Blanding Avenue, Buena Vista
Everett Street/ Clement Avenue – Lincoln Avenue	Full Closure	1,000	62	800	Park Street, Broadway
Lincoln Avenue/ Park Street - Everett Street	Full Closure	300	32	240	Webb Avenue, Tilden Way
Tilden Way/ Broadway - Park Street	Full Closure	14,720	No Parking	11,780	Blanding Avenue, Park Street, Santa Clara Avenue
Broadway/ Blanding Avenue – Clement Street	Full Closure and Partial Closure	6,270	91	5,020	Blanding Avenue, Buena Vista Avenue

Notes:

1 The traffic volume and the detoured volumes represent the ADT within a 24-hour period.

2 Since proposed project construction would typically proceed on a block-by-block basis, the total number of spaces that would be displaced at any one time would be less than what is shown in this table. The number of parking spaces displaced in this table refers to the total number of parking spaces that would be displaced for the entirety of the proposed project. On average, most roadway segments where construction would occur have 16 on-street parking spaces (or less) on a per block basis.

3 Detoured volumes were calculated using the assumption that an average of 80 percent of traffic would use detours for roads with full closures and 50 percent of traffic would use detours for roads with partial closures. The numbers are approximate and are rounded to the nearest tenth.

4 Figures 3.13-1 to 3.13-5 demonstrate the location of the detour routes.

3.13.5.3 Impacts and Mitigation Measures

Table 3.13-6 provides a summary of the significance of the proposed project's impacts to transportation and traffic before implementation of mitigation measures and after the implementation of mitigation measures.

Table 3.13-6 Summary of Potential Transportation and Traffic Impacts

Impact	Significance Prior to Mitigation	Significance After Mitigation
Impact Traffic-1: Potential to 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 (Criteria 1 and 6)	Potentially Significant	Significant and Unavoidable MM Traffic-1 MM Traffic-2 MM Traffic-3 MM Traffic-4 MM Traffic-5
Impact Traffic-2: Potential to substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (Criteria 4)	Potentially Significant	Less than Significant MM Traffic-1
Impact Traffic-3: Potential to result in inadequate emergency access (Criteria 5)	Potentially Significant	Less than Significant MM Traffic-6

Impact Traffic-1: Potential to 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 (Criteria 1 and 6). (*Significant and unavoidable*[1])

Circulation

Crossing #1 (Oakland)

Open trench construction at Crossing #1 in the city of Oakland would require the full closure of one block of Jackson Street, one block of 4th Street, four blocks of Madison Street, and one block of 2nd Street. The trenching activities at Crossing #1 in the city of Oakland would also require

[1] The significant and unavoidable impact would be temporary and would be limited to Crossing #3. A significant and unavoidable impact to circulation and public transit would occur during the 48-hour closure of Tilden Way at Broadway during HDD pipeline pull through. A significant and unavoidable impact to circulation and public transit could also occur if the alternate trench option (Broadway and Eagle Avenue) is used and the significant and unavoidable impact would be limited to the 2-week period that Tilden Way at Broadway would be closed for open trench construction. The impacts at Crossing #1 and #2 are less than significant with mitigation.

the partial closure of one block of Madison Street, a portion of Oak Street, and a portion of Embarcadero West. The pipeline abandonment activities on 5th Street would require the partial closure of two blocks of 5th Street. Figure 3.13-1 shows a map of those closures and the detour routes that cars would use as a result of the road closures. The detour routes were identified as the most convenient and viable routes based on the one-way traffic flow of selected roadways in the vicinity of the proposed project. The following roads are one-way: Madison Street (between 8th Street and 4th Street), 8th Street, 7th Street, 6th Street, 5th Street, and Oak Street (northbound). The only viable detour route for southbound traffic flow on Madison Street would be Jackson Street due to the one-way roads near Madison Street. Motorists would be diverted at 8th Street west to Jackson Street and then continue south on Jackson Street to 5th Street. At 5th Street, motorists could continue south or east on I-880 to their original destinations. Vehicle traffic originating south of 5th Street would be affected by the full-closure of Madison Street south of 5th Street. Motorists could use multiple detour routes (Jackson Street, Oak Street, 5th Street, 4th Street, and 3rd Street) to travel around construction zones. Motorists would use the same detour routes to circumvent the one-block closures of Jackson Street, 4th Street, and 2nd Street. Figure 3.13-1 depicts all the road closures that would result from all construction activities associated with Crossing #1; however, construction activities would not occur at the same time. Pipeline trenching would occur on a block-by-block basis. On any given day, traffic movement would only be impacted by either the full or partial closure of streets along one or two city blocks.

A significant impact would occur to the circulation system if the LOS were reduced to a level considered significant by the thresholds established by the City of Oakland or the City of Alameda. The existing LOS was calculated by measuring the traffic at various traffic count locations, including intersections in the proposed project location and intersections in the detour routes. The LOS at those traffic count locations was estimated for the scenario where the proposed project is being constructed. The LOS for the roadways during project construction was calculated using a conservative approach, wherein it is assumed that all roads that require closure would be closed at the same time. In reality, trenching would occur block per block and on any given day, just one road block would be closed.

Table 8 in Appendix J includes all the LOS changes due to the proposed project for all the traffic count locations. Table 3.13-7 summarizes the LOS changes that are considered significant and Figure 3.13-1 shows the location of significant LOS changes. The LOS changes at traffic count locations 1-7 would be less than significant (see Table 8 in Appendix J); however, the LOS changes at traffic count locations 8-12 would be potentially significant (see Figure 3.13-1). Table 3.13-7 shows LOS as calculated with the implementation of mitigation measures. EBMUD would implement Mitigation Measures Traffic-1, Traffic-2, and Traffic-3 to minimize impacts. Mitigation Measure Traffic-1 requires EBMUD to prepare and implement a Construction Traffic Management Plan (CTMP) that includes comprehensive traffic control and traffic safety measures that help minimize construction-related traffic congestion at proposed project area intersections. Mitigation Measure Traffic-2 requires EBMUD to maintain a minimum of one southbound lane of traffic on Madison Street, between 8th Street and 5th Street.

Figure 3.13-1 Road Closures and Detours for the Proposed Project (Crossing #1 in the City of Oakland)

Table 3.13-7 Significant LOS Changes at Crossing #1

Traffic Count Location Number[1]	Intersection	Control Type	AM Peak LOS Delay Seconds			PM Peak LOS Delay Seconds		
			Baseline (No Project)	Baseline + Project	Baseline + Project + Mitigation[2]	Baseline (No Project)	Baseline + Project	Baseline + Project + Mitigation
8	Oak Street/ Embarcadero West	TWSC[3]	C 17.8	C 17.6	---[3]	E 41.2	F 57.4	D[4]
9	Jackson Street/ 8th Street	Signal	A 9.3	D 48.9	A 9.3	B 13.2	F 108.2	B 13.2[5]
10	Jackson Street/ 7th Street	Signal	B 13.3	F 205.0	B 13.3	B 12.1	F 259.9	B 12.1[5]
11	Jackson Street/ 6th Street	Signal	C 28.0	F 113.8	C 28.0	C 21.6	E 75.0	C 21.6[5]
12	Jackson Street/ 5th Street/ I-880 EB Off	Signal	B 13.1	F 133.1	B 13.1	B 18.3	F 358.8	B 18.3[5]

Notes:

1 See Appendix J for maps showing the traffic count locations and numbering. Locations are also shown in Figure 3.13-2.

2 TWSC (Two-Way-Stop-Control) refers to an un-signalized intersection.

3 The “Baseline + Project + Mitigation” AM Peak LOS is not included for Traffic Count Number 8 because the proposed project would not result in a significant impact to AM Peak LOS at Traffic Count Number 8.

4 A qualitative assessment was made that the impact at the un-signalized intersection of Oak Street and Embarcadero West would be improved to LOS D with the use of flaggers based on previous studies that have shown that LOS improvement (ESA 2013).

5 The opening of Madison Street between 8th Street and 5th Street, per Mitigation Measure Traffic-2 affects the LOS at Madison Street but not significantly (see Table 8 and 9 in Appendix J) and the LOS along Jackson Street would return to baseline LOS conditions.

The LOS at signalized traffic count locations (9 through 12) would be improved after implementation of Mitigation Measures Traffic-1 and Traffic-2 and the impact at signalized traffic count locations (9 through 12) would be less than significant after implementation of Mitigation Measures Traffic-1 and Traffic-2. In addition, extending the pre-timed signal cycle lengths for affected intersections along Jackson Street could further minimize the impact to LOS. EBMUD would also implement Mitigation Measure Traffic-3, which requires EBMUD to use flag persons at the intersection of Oak Street and Embarcadero West to facilitate traffic flow and improve vehicle progression through this (un-signalized) intersection. Previous transportation studies conducted on the use of flaggers at un-signalized intersections indicate significant improvements in overall intersection operations from LOS F to LOS D or better (ESA 2013). Figure 3.13-2 shows the closures, detours, and LOS after implementation of mitigation. The impact at traffic count location 8 in the city of Oakland would be less than significant after the implementation of Mitigation Measures Traffic-1, Traffic-2, and Traffic-3.

Crossing #1 (Alameda)

Open trench construction at Crossing #1 in the city of Alameda would require the full closure of parts of Sherman Street. Open trench construction and pipeline laydown would also require the partial closure of Marina Village Parkway, Challenger Drive, and Atlantic Avenue. HDD would occur within the Telecare Corporation parking lot and would therefore not require the closure of any roadways. Figure 3.13-3 shows a map of the closures and the detour routes that vehicles could use as a result of the road closures. The detour routes were identified as the most convenient and viable routes. Sherman Street (between Atlantic Avenue and Lincoln Avenue) would be fully closed during pipeline trenching and motorists would be diverted to Atlantic Avenue, Constitution Way, and Lincoln Avenue. Atlantic Avenue, Challenger Drive, and Marina Village Parkway would be partially closed during pipeline trenching and pipeline laydown; likely detour routes for motorists using these roads include Lincoln Avenue, Constitution Way, Atlantic Avenue (west of Challenger Drive), Triumph Drive, Independence Drive, Marina Village Parkway (west of Challenger Drive), Tynan Avenue, Mariner Square Drive, Mariner Square Loop, Willie Stargel Avenue, and Webster Street. There would be no significant changes in LOS for any of the traffic count locations at Crossing #1 in the city of Alameda. Impacts would be less than significant. Table 8 in Appendix J includes all of the LOS changes due to the proposed project for all the traffic count locations.

Crossing #2 (Alameda)

Open trench construction for Crossing #2 would require the full closure of portions of San Jose Avenue, portions of Peach Street, portions of Beachview Isle, and portions of Veterans Court. HDD, including HDD laydown would require the full closure of Veterans Court and the partial closure of Island Drive.

Full Roadway Closures. Figure 3.13-4 shows a map of full closures and the detour routes that cars could use as a result of the road closures. The detour routes were identified as the most convenient and viable routes. Full roadway closures are required where pipeline trenching would occur. The parallel roads to Peach Street including Fernside Boulevard and Post Street

Figure 3.13-2 Road Closures and Detours for the Proposed Project after Mitigation (Crossing #1 in the City of Oakland)

Figure 3.13-3 Road Closures and Detours for the Proposed Project (Crossing #1 in the City of Alameda)

Figure 3.13-4 Road Closures and Detours for the Proposed Project (Crossing #2)

would provide convenient detour routes. For construction activities along San Jose Avenue, likely detour routes would include Adams Street and Madison Street as well as Encinal Avenue. Detour routes would not be required for work on Bridgeview Isle or Veteran's Court. Figure 3.13-4 depicts all the road closures that would result from all construction activities associated with Crossing #2; however, construction activities would not occur at the same time. Pipeline trenching would occur on a block-by-block basis. On any given day, traffic movement would only be impacted by either the full or partial closure of streets along one or two city blocks. There would be no significant changes in LOS for any of the traffic count locations at Crossing #2. Impacts would be less than significant. Table 10 in Appendix J includes all of the LOS changes due to the proposed project for all the traffic count locations.

Partial Roadway Closure. Island Drive on the North Bay Farm Island side of Crossing #2 would be partially closed. One lane (the westernmost lane) of Island Drive would be closed for 48 hours during the HDD pull through and intermittently for 2 weeks during the delivery of the pipeline for pipeline laydown. Drivers would be able to use Island Drive during the temporary closure of the one lane; however, the temporary impact could be potentially significant if the one-lane closure occurs during the peak hour traffic periods. The HDD pull through would occur for a 48-hour period during the weekend, outside of peak traffic hours; therefore, the impact to traffic from the HDD pull through would be less than significant. Mitigation Measure Traffic-1 requires EBMUD to limit the timing for the delivery of materials for construction to non-peak hours of traffic flow (9:00 a.m. to 4:00 p.m.); therefore, the impact from the temporary intermittent closure of one lane of Island Drive for 2 weeks during the delivery of the pipeline for pipeline laydown would be less than significant after implementation of Mitigation Measure Traffic-1.

Crossing #3 (Oakland)

Open trench construction and HDD at Crossing #3 in the city of Oakland would require the full closure of two blocks of Ford Street and two blocks of Derby Avenue. Figure 3.13-5 shows a map of those closures and the detour routes that cars could use as a result of the road closures. The detour routes were identified as the most convenient and viable routes. Convenient detour routes would include Chapman Street, Glascock Street, Peterson Street, and Lancaster Street. There would be no significant changes in LOS for any of the Traffic Count locations at Crossing #3. Impacts would be less than significant. Table 11 in Appendix J includes all the LOS changes due to the proposed project for all the traffic count locations.

Crossing #3 (Alameda)

Open trench construction at Crossing #3 in the city of Alameda would require the full closure of one block of Broadway, one block of Clement Avenue, three blocks of Everett Street, and one block of Lincoln Avenue. In addition, construction of Crossing #3 in the city of Alameda would require work in Tilden Way, once at the intersection of Broadway and Tilden Way for the pull through of the pipeline during HDD and another instance at the intersection of Everett Street and Tilden Way during open trench construction. Figure 3.13-5 shows a map of the closures, the detour routes that cars would use as a result of the road closures, and the location of significant impacts. The primary detour routes when the pipe is pulled across Tilden Way for a 48-hour

Figure 3.13-5 Road Closures and Detours for the Proposed Project (Crossing #3)

period for HDD would include Blanding Avenue, Park Street, and Santa Clara Avenue. For pipeline trenching along Clement Avenue, Everett Street, and Lincoln Avenue, parallel detour routes would include Blanding Avenue, Park Street, Eagle Avenue, Buena Vista Avenue, Webb Avenue, and Santa Clara Avenue. Figure 3.13-5 depicts all the road closures that would result from all construction activities associated with Crossing #3; however, construction activities would not occur at the same time. Pipeline trenching would occur on a block-by-block basis. On any given day, traffic movement would only be impacted by either the full or partial closure of streets along one or two city blocks. The figure also shows the worst-case scenario, which would be during the 48-hour closure pipeline pull through and for closure for open trench construction on Tilden Way. Table 3.13-8 summarizes the LOS changes that are considered significant for Crossing #3 in the city of Alameda.

The LOS changes at traffic count locations 1-6 would be less than significant (see Table 11 in Appendix J); however, the LOS changes at traffic count locations 7-8 would be potentially significant (see Table 3.13-8 and Figure 3.13-5). The significant impacts at traffic count locations 7 and 8 are primarily driven by the two impacts to Tilden Way, at Everett Street, and at Broadway. EBMUD would implement Mitigation Measures Traffic-1, Traffic-3, and Traffic-4 to minimize impacts from Crossing #3 in the city of Alameda. Mitigation Measure Traffic-1 requires EBMUD to prepare and implement a CTMP that includes comprehensive traffic control and traffic safety measures that help minimize construction-related traffic congestion at proposed project area intersections. Mitigation Measure Traffic-3 requires the use of flag persons at the un-signalized intersection of Blanding Avenue and Broadway to facilitate the flow of directional traffic and improve vehicle progression through the intersection, which would improve traffic to a LOS D or better, making impacts less than significant at that

Table 3.13-8 Significant LOS Changes at Crossing #3

			AM Peak LOS Delay Seconds			PM Peak LOS Delay Seconds		
Traffic Count Number	Intersection	Control Type	Baseline (No Project)	Baseline + Project	Baseline + Project + Mitigation	Baseline (No Project)	Baseline + Project	Baseline + Project + Mitigation
7	Blanding Avenue/ Park Street	Signal	D 46.9	F 258.9	**F 258.9**[1]	C 30.5	F 191.5	**F 191.5**[1]
8	Blanding Avenue/ Broadway	AWSC	C 18.6	E 42.6	D+[2]	C 21.1	F 52.7	D+[2]

Notes:

1 Bold indicates a significant and unavoidable impact.

2 A qualitative assessment was made that the impact at the un-signalized intersection of Blanding Ave. and Broadway would be improved to LOS D or better with the use of flaggers based on previous studies that have shown LOS improvement (ESA 2013).

intersection. Mitigation Measure Traffic-4 requires the use of jack and bore construction in place of the open trenching proposed across Tilden Way at Everett Street. Even with implementation of the mitigation measures, EBMUD would still need to close Tilden Way at Broadway for 48 hours during the pipeline pull through for HDD. The impacts would remain significant and unavoidable. It should be noted; however, that the impacts would only be significant and unavoidable during the 48-hours when Tilden Way is closed on Broadway, whereas without mitigation, the closure of Tilden Way would be for much longer in order to perform trenching across Tilden (on the order of a week). Figure 3.13-6 shows the closures, detours, and LOS after implementation of mitigation for Crossing #3. Note that the LOS for signalized intersection 7 does not change after mitigation because Tilden Way would still need to be closed at Broadway for pipeline pull through during that 48-hour period. The figure shows the worst-case scenario, which is during the 48-hour pipeline pull through.

An alternate trench option is available at Crossing #3. Instead of using Clement Avenue and a portion of Everett Street, EBMUD could conduct open trench construction on Broadway across Tilden Way and then along Eagle Avenue until Everett Street, where the pipeline would continue along the proposed alignment. Open trench construction for this alternate trench option would require the full closure of portions of Broadway, Eagle Avenue, and Tilden Way at its intersection with Broadway (see Figure 3.13-7). Tilden Way at Eagle Avenue/Broadway would be closed in the same way that Tilden Way would be closed for the HDD pull through, described above. Therefore, the LOS impacts from the alternate trench option would be the same as the LOS impacts from the HDD pull through, which are summarized in Table 3.13-8. EBMUD would implement Mitigation Measure Traffic-1 and Traffic-3. The traffic impacts from construction of the alternate trench option are significant and would remain significant and unavoidable even after implementation of Mitigation Measures Traffic-1 and Traffic-3. This significant and unavoidable impact would only occur during the 2 weeks that open trench construction would occur along Tilden Way.

Pedestrian

Construction activities would be conducted primarily on roads. EBMUD would potentially use sidewalks for staging. Sidewalk staging would occur on only one side of the road and pedestrians would be able to use the sidewalk on the opposite side of the road that is not being used for staging. Construction crews would not stage on sidewalks when only one side of the roadway has a sidewalk. Impacts would remain significant because construction equipment and vehicles traveling to and from work sites could pose a hazard to pedestrians. Impacts would also remain significant because one pedestrian path could potentially be restricted during pipeline laydown on the North Bay Farm Island side of Crossing #2 and both the pedestrian and bicycle paths could also be restricted during the 48-hour pipeline pull through activity. Mitigation Measure Traffic-5 requires that appropriate signage be used and that pedestrians are directed to detours along other sidewalks during closures. Mitigation Measure Traffic-5 would also require EBMUD to provide a detour for pedestrians during the 48 hours that the HDD pipeline pull through activity would occur. Impacts would be less than significant after implementation of Mitigation Measure Traffic-5.

Figure 3.13-6 Road Closures and Detours for the Proposed Project after Mitigation (Crossing #3 in the City of Alameda)

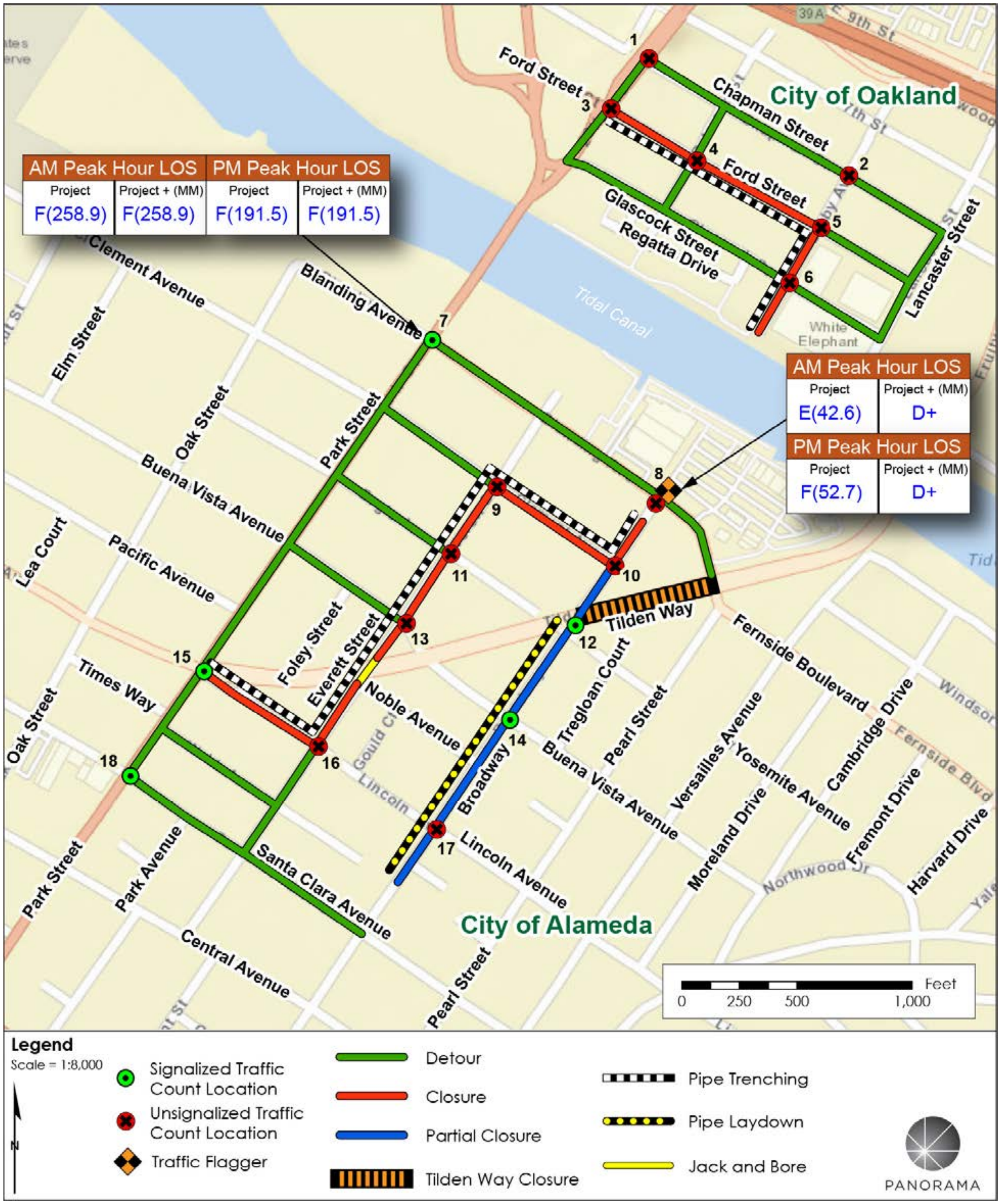


Figure 3.13-7 Road Closures and Detours for the Alternate Route Option for Crossing #3 after Mitigation

Public Transit

Crossing #1

Pipeline construction of Crossing #1 in the city of Oakland would not directly affect transit facilities along 5th Street, 4th Street, and Jackson Street as these roadways are not designated as transit routes. The segment of Madison Street between 8th Street and 7th Street has been recommended for full closure based on the one-way nature of the streets in the area and the need to detour traffic appropriately. AC Transit bus line 88, which travels on Madison Street between 8th Street and 5th Street, would be affected. In addition, the travel time for transit through the construction zone would increase, which would be a potentially significant impact. Mitigation Measure Traffic-2 requires the maintenance of partial traffic flow on Madison Street between 8th Street and 5th Street, and would allow the progression of vehicular traffic and AC Transit buses (AC Transit bus line 88). Mitigation Measure Traffic-5 requires notification of and coordination with AC Transit to re-locate bus stops and/or re-route affected transit services via parallel streets during construction when affected transit service is subject to delays. Mitigation Measure Traffic-2 would ensure that AC Transit bus line 88 could continue to operate on its route on Madison Street during construction and Mitigation Measure Traffic-5 would reduce the impacts from partial closures along Madison Street. Impacts would be less than significant after implementation of Mitigation Measure Traffic-2.

The partial closures of Marina Village Parkway, Challenger Drive, and Atlantic Avenue at Crossing #1 in the city of Alameda would affect AC Transit Line 31. Some of the bus stops along the partially closed segments would not be accessible. Potential impacts to bus routes would be potentially significant. Mitigation Measure Traffic-5 would reduce the impact from partial closures on Marina Village Parkway and Challenger Drive by requiring the re-routing of transit to parallel streets such as Marina Village Shopping Center. AC Transit line 31 could continue to operate on Marina Village Parkway with minor route adjustments. Impacts would be less than significant after mitigation.

Crossing #2

There is one bus stop located on Island Drive on North Bay Farm Island, which serves four different AC Transit Lines (21, OX, 631, and 687).

Pipeline Laydown. Pipeline laydown would occur for 2 weeks on the sidewalk along Island Drive, which could interfere with the public accessing the bus stop. The bicycle path directly adjacent to Island Drive would remain open and accessible to pedestrians as well as bicyclists. Periodic material deliveries would need to cross the bicycle path. These short duration interruptions would pose as minor inconveniences and would not substantially affect access to or the use of public transit. The impact from pipeline laydown adjacent to the bus stop along Island Drive would be less than significant.

HDD Pipeline Pull Through. HDD pipeline pull through would occur for 48 hours on the weekend and the sidewalk adjacent to Island Drive would be fully closed for 48 hours on the weekend. Three of the four AC Transit Lines (OX, 631, 687) do not run on the weekend; therefore, there would be no impact to AC Transit Lines OX, 631, and 687 from the HDD pipeline pull through activity. AC Transit Line 21 does run on the weekend and users of AC Transit Line 21 would not be able to use the bus stop on Island Drive during the 48-hour HDD pipeline pull through, which would result in a significant impact. Mitigation Measure Traffic-5 requires that EBMUD notify the public of the temporary unavailability of the bus stop at Island Drive. Users of AC Transit Line 21 would be able to use the bus stop at the intersection of Robert Davey Jr. Drive and Packet Landing Road, which is 0.25 mile from the Island Drive bus stop. Because the public would be notified of the 48-hour closure of the Island Drive bus stop and because the closest bus stop is 0.25 mile, the impact to public transit from HDD pipeline pull through would be less than significant after implementation of Mitigation Measure Traffic-5.

Crossing #3

There are no public transit lines along the roads that would be affected (Ford Street and Derby Avenue) by the construction of Crossing #3 in the city of Oakland; therefore, there would be no impacts to public transit lines in the city of Oakland for Crossing #3.

There are no public transit lines along Clement Street, Everett Street, and Lincoln Avenue in the city of Alameda. Tilden Way and Broadway, however, are used by AC Transit Routes O, W, and 51A. The following three construction activities would affect Tilden Way and Broadway: (1) open trench construction on Tilden Way at Everett Street, (2) HDD pull through on Broadway, crossing Tilden Way, and (3) HDD pipeline laydown on Broadway. Open trench construction on Broadway across Tilden Way could affect Tilden Way if EBMUD chooses to use this alternate trench option.

Temporary full closures of Tilden Way and temporary partial closure of Broadway would be required, which would result in potentially significant impacts to transit travel times and/or routing. Mitigation Measure Traffic-4 requires the use of jack and bore construction in place of the open trench construction proposed across Tilden Way at Everett Street. Tilden Way would be kept open at Everett Street as a result of Mitigation Measure Traffic-4. Mitigation Measure Traffic-5 requires notification of and coordination with AC Transit to re-locate bus stops and/or re-route affected transit services via parallel streets during construction when affected transit service is subject to delays. Even with implementation of mitigation measures, construction on Tilden Way and Broadway could potentially degrade the travel speed of bus routes that use Broadway and Tilden Way. The full closure of Tilden Way (for 48 hours for the HDD pull through and potentially for 2 weeks for the alternate open trench construction option) could still potentially cause travel speed to degrade by 10 percent or more along a street alignment, even after coordinating with AC transit per Mitigation Measure Traffic-5. The impact to public transit in the city of Alameda for Crossing #3 could potentially be significant and unavoidable. It should be noted; however, that the impact would only be significant and unavoidable during the 48-hours when Tilden Way is closed on Broadway and during the 2-week period of open trench construction if the alternate trench option is selected.

Bicycle Facilities

Crossing #1

Madison Street, 2nd Street, Oak Street, and Embarcadero West all serve bicycle traffic at Crossing #1 in the city of Oakland in some capacity and would be directly affected by open trench construction. Currently, Madison Street is identified as a Class III bike route and has sharrows, which are pavement markings in the southbound vehicle travel lane. Oak Street is a Class II facility (south of I-880) with bike lanes on both sides of the street and sharrows in the northbound direction (north of I-880). 2nd Street is identified as Class III bike route with sharrows in both east-west travel lanes. Finally, Embarcadero West is a Class II facility with bike lanes on both sides of the street. The closure of the 2nd Street segment between Madison Street and Oak Street would have minimal impacts on bicyclists, as there are alternative east-west routes (3rd Street or 4th Street) for bicyclists to bypass the construction zone due to the grid layout of streets in the vicinity. However, the closure of the Madison Street roadway segments would impact bicycle travel and the partial closures of Oak Street and Embarcadero West would require bicyclists to share the roadway with motorists, which would result in a potentially significant impact to bicyclists.

Marina Village Parkway, Challenger Drive, and Atlantic Avenue have Class II bike lanes on both sides of the roadway. Sherman Street has partial Class II bike lanes to Eagle Avenue before they terminate. Partial roadway closures along the Marina Village Parkway, Challenger Drive, and Atlantic Avenue would require one direction of bicycle travel to be closed and full closure of Sherman Street would preclude bicycle travel on the roadway segment under construction, which would result in a potentially significant impact to bicyclists.

Mitigation Measure Traffic-5 would require EBMUD to use "share the road" signs, obtain a permit that allows bicyclists to use sidewalks, and provide detours. Implementation of Mitigation Measure Traffic-5 would improve the safety of bicyclists sharing the roads with motorists and would provide alternative bike routes for closed bike routes; therefore, the impact would be less than significant after implementation of Mitigation Measure Traffic-5.

Crossing #2

There are no bike routes in the city of Alameda along Peach Street or San Jose Avenue in the proposed project area; however, south of Otis Drive and Peach Street, Towata Park provides access to recreational paths and bike facilities. Access to bike facilities would remain open during HDD construction activities at Towata Park; therefore, impacts to bicyclists would be less than significant.

Island Drive, Veteran's Court, and Bridgeview Isle (Towata Park) all provide access to Class I pedestrian/bike facilities linking Bay Farm Island with Alameda via the Bay Farm Island Bicycle/Pedestrian Bridge. Construction activities associated with Crossing #2 on North Bay Farm Island would affect pedestrian/bicycle travel along Island Drive between Robert Davey Jr. Drive and Veteran's Court due to the construction staging (laydown) of the pipeline along the pedestrian and bicycle paths. The sidewalk would be used for pipeline laydown activities for 2 weeks. The bicycle path would temporarily be designated as a multi-use path during the laydown of the pipeline. In addition, both of the pedestrian and bike paths would be fully closed for 48 hours during the HDD pull through activity. Impacts to bicyclists from full closure of the pathways during HDD pull through would be potentially significant. Mitigation Measure Traffic-5 requires EBMUD to provide a detour for bicyclists during the 48 hours that the HDD pipeline pull through activity would occur. Mitigation Measure Traffic-5 ensures that bicyclists have detours during the 48-hour pipeline pull through; therefore, impacts would be less than significant after implementation of Mitigation Measure Traffic-5.

Crossing #3

There are no bike routes at Crossing #3 in the city of Oakland along Ford Street and Derby Avenue where the proposed project would be located; therefore, no impacts to bicyclists would occur.

There are no bike routes located on along Clement Street, Everett Street, and Lincoln Avenue; therefore, no impacts would occur from work in these locations. Tilden Way and Broadway, however, have Class II bike lanes on both sides of the street. HDD pipeline pull through would require temporary full closure of Tilden Way and HDD pipeline laydown would require partial closures of Broadway. Tilden Way has discontinuous sidewalks between Broadway and Park Street; therefore, bicyclists may not be able to access adjacent sidewalks to ride around construction areas. Impacts to bicyclists would be potentially significant. Mitigation Measure Traffic-5 would require EBMUD to provide detours for bicyclists around discontinuous sidewalks along Tilden Way between Broadway and Park Street. Impacts would be less than significant after implementation of Mitigation Measure Traffic-5.

Mitigation Measures: Traffic-1, Traffic-2, Traffic-3, Traffic-4, Traffic-5

Mitigation Measure Traffic-1. Construction Traffic Management Plan.

EBMUD shall develop and implement a project-specific Construction Traffic Management Plan (CTMP). EBMUD shall submit the plan to the Cities of Alameda and Oakland for review and approval at least 30 days prior to construction. The CTMP shall conform to the California Manual on Uniform Traffic Control Devices, and shall include provisions for the following:

1. Implementation of appropriate barriers and/or cones between vehicles and construction areas along partially or fully closed streets.
2. Installation of temporary lane delineation to direct traffic flows through construction areas.
3. Installation of “No Stopping Anytime” and “No Parking Anytime” signs (time and duration) in construction zones 48-hours prior to construction.
4. Use of flaggers and/or signage to guide vehicles through or around construction zones.
5. Use and location of changing message boards and/or appropriate signage indicating preferred detour routes.
6. Timing of material deliveries to use non-peak hours of traffic flow (9:00 a.m. to 4:00 p.m.).

7. Methods for keeping roadways clean.
8. Storage of all equipment and materials in designated work areas in a manner that minimizes traffic obstructions and maximizes sign visibility.
9. Methods and locations for limiting of vehicles to safe speed levels according to posted speed limits, road conditions, and weather conditions
10. Coordination with public transit providers to implement bus detours, bus stop modifications, and to inform public transit providers of potential construction related delays.
11. Methods and locations for routing trucks to avoid minor roads, where possible, to reduce congestion and potential asphalt damage in accordance with EBMUD's specifications and the Cities of Alameda and Oakland permit requirements.
12. Repair of asphalt and other road damage (e.g., curb and gutter damage, rutting in unpaved roads) caused by construction vehicles. Roadway pavement conditions will be documented for all affected roadways before and after project construction. Roads found to have been damaged by construction vehicles will be repaired to the level at which they existed before project construction.
13. Detours for cyclists and pedestrians when bike lanes or sidewalks must be closed.
14. Abiding by any encroachment permit conditions (e.g., Union Pacific Railroad, Caltrans, City of Oakland, City of Alameda), which shall supersede conflicting provisions in the CTMP.
15. Requirement that heavy equipment brought to the construction site shall be transported by truck, where feasible.
16. Notification procedures for adjacent property owners and public safety personnel related to major equipment deliveries, vehicle detours, and lane closures.
17. A process for responding to and tracking complaints pertaining to construction activities, including identification of an EBMUD contact person, designated as a project liaison for responding to traffic complaints. The liaison's name and phone number shall be posted at construction areas and included in all advance notifications. The project liaison shall determine the cause of the complaints and shall take prompt action to correct the problem.

Mitigation Measure Traffic-2. Traffic Control at Crossing #1.

EBMUD shall maintain a minimum of one open lane of southbound traffic flow during construction activities between 8th Street and 5th Street to reduce overall traffic impacts on Jackson Street.

Mitigation Measure Traffic-3. Provide flag persons at un-signalized intersections at Crossing #1 and Crossing #3.

EBMUD shall ensure that the construction contractor deploys flag persons at the following un-signalized intersections to facilitate the flow of directional traffic and improve vehicle progression through the intersection, improving overall operations (to the extent possible):

1. Oak Street and Embarcadero West
2. Blanding Avenue and Broadway

Mitigation Measure Traffic-4. Traffic Control and Maintaining Traffic Flow at Crossing #3.

Pipeline installation across Tilden Way at Everett Street shall use jack and bore construction methods so as to avoid closure of Tilden Way to through traffic.

Mitigation Measure Traffic-5. Minimize Impacts to Pedestrians, Bicyclists, and People Using Public Transit.

The following measures would be implemented to minimize impacts to pedestrians, bicyclists, and public transit:

1. Flaggers shall be used to direct pedestrians and bicyclists using the bicycle lane during construction when material deliveries must cross the bicycle lane.
2. Warning signs shall be posted on sidewalks where construction limits pedestrian access and to identify which side of the street can be safely accessed at intersections prior to construction zones.
3. EBMUD and its contractors shall use "share the road" signs within the construction zones where partial closures would occur; obtain a temporary permit to allow bicyclists to use the sidewalks to bypass the construction zones where allowed by the local jurisdiction; and provide detours for bicyclists around areas with discontinuous sidewalks.
4. EBMUD shall post signs at the affected bus stop on Island Drive and at other bus stops along the route of AC Transit Line 21. The signs will be posted at least 2 weeks in advance of the HDD pipeline pull through activity at Crossing #2 and shall indicate when the bus stop at Island Drive would be unavailable and where the nearest bus stop for AC Transit Line 21 is located.
5. EBMUD shall coordinate with AC Transit to re-locate bus stops and/or re-route affected transit services via parallel streets during construction when affected transit service is subject to delays resulting from partial street closure or inaccessible transit stops due to full street closure.
6. EBMUD shall post signs at affected pedestrian intersections and bike routes at least 2 weeks in advance of construction. These signs shall state

the date range of construction and shall indicate the route of pedestrian and/or bike path detours during construction.

Significance after Mitigation: Significant and Unavoidable[2]

Impact Traffic-2: Potential to substantially increase hazards resulting from a design feature or incompatible uses (Criteria 4). (*Less than Significant with Mitigation)*

The presence of open trenches, construction equipment, construction workers, and vehicles in proximity to flowing traffic would create a potential temporary hazard for both workers and vehicular traffic. Roadways with open trenches would be partially or fully closed, which could result in a hazard for vehicular traffic associated with reduced travel lanes, confusion in identifying detours, and the potential for a vehicle to accidently collide with cones or equipment. The hazardous impact from trenching in roadways would be potentially significant. Mitigation Measure Traffic-1 requires use of barricades with construction mounted signs or combined with electronic changeable signs for road closures. As required, construction cones would be used for marking partial closures. The use of barricades, electronic changeable signs, and construction cones would avoid potential accidents and the traffic hazards impacts would be less than significant after implementation of Mitigation Measure Traffic-1.

Mitigation Measures: Traffic-1

Significance after Mitigation: Less than Significant.

Impact Traffic-3: Potential to result in inadequate emergency access (Criteria 5). (Less than Significant with Mitigation)

Construction of the proposed project would require the full and partial closures of roadways within the city of Oakland and the city of Alameda (see Table 3.13-5). The full and partial closure of roadways in the cities of Oakland and Alameda could result in inadequate emergency access, which could be a significant impact. Mitigation Measure Traffic-6 requires (1) notification of and coordination with emergency response services as well as notification of businesses, commercial offices, and residents located within 300 feet of construction areas prior to road closures; (2) the use of easily removed, temporary barricades; and (3) the removal of barricades and closure of open trenches at the end of the day. Impacts to emergency access would be less than significant after implementation of Mitigation Measure Traffic-6.

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2 The significant and unavoidable impact would be temporary and would be limited to Crossing #3. A significant and unavoidable impact to circulation and public transit would occur during the 48-hour closure of Tilden Way at Broadway during HDD pipeline pull through. A significant and unavoidable impact to circulation and public transit could also occur if the alternate trench option (Broadway and Eagle Avenue) is used and the significant and unavoidable impact would be limited to the 2-week period that Tilden Way at Broadway would be closed for open trench construction. The impacts at Crossing #1 and #2 are less than significant with mitigation.

Mitigation Measures: Traffic-6

Mitigation Measure Traffic-6. Maintain Emergency Access.

1. Emergency responders (i.e., local police, fire, and ambulance services) shall be notified at least seven days in advance of any activities requiring full or partial roadway closures. Emergency access detour routes shall be determined in consultation with emergency responders as part of the notification process. Businesses, commercial offices, and residents located within one block of construction shall be notified at least seven days in advance of activities requiring roadway closures, outlining the proposed project schedule and the duration of construction activities. EBMUD will send notices to the individuals and businesses on the proposed project's mailing list to update them prior to any roadway closures.
2. Temporary barricades and directional cones that can be readily removed shall be used during full or partial roadway closures.
3. Road barricades shall be removed and open trenches shall be covered (plated) at the end of the day on a daily basis to provide access to businesses and residents. A portion of the on-street parking zones may be retained to allow for storage and/or staging of construction equipment.

Significance after Mitigation: Less than Significant.

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4 ALTERNATIVES

4.1 INTRODUCTION

This chapter presents the description and evaluation of alternatives to the proposed project (including the required No Project Alternative), describes the alternatives screening process and alternatives eliminated from consideration, compares the environmental merits of the alternatives, and identifies the environmentally superior alternative.

4.2 APPROACH TO ANALYSIS AND OVERVIEW

4.2.1 CEQA Requirements for Alternatives Analysis

The CEQA Guidelines require EIRs to describe and evaluate a reasonable range of alternatives to a project, or to the location of a project, which would 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, but are not limited to, site suitability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, economic viability, and whether the project 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 impacts.
- **Range of Alternatives.** An EIR need not consider every conceivable alternative, but must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. The "rule of reason" governs the range of alternatives considered in an EIR, 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 feasible project alternatives for examination and discussing them in a manner that fosters meaningful public participation and informed decision making.
- **Evaluation of Alternatives.** EIRs are required to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison

with the proposed 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 can be discussed in less detail than the significant effects of the proposed project.

4.2.2 Approach to Alternatives Analysis

Sources of alternatives considered in this analysis include alternatives identified by EBMUD in the November 2014 Alameda-North Bay Farm Island Crossings Master Plan (Master Plan) and by the EIR preparers based on the environmental impacts described in Chapter 3 of this Draft EIR. Alternatives were developed through consideration of the potential environmental impacts of the project. Public input during the scoping process did not yield any suggestions for alternatives, other than a request by the City of Oakland for an alternative alignment that does not pass through Estuary Park.

Section 4.3 describes the alternatives screening process, Section 4.4 identifies those alternatives carried forward for analysis in this Draft EIR, Section 4.5 presents those alternatives considered but rejected, Section 4.6 provides the comparison of alternatives considered, and Section 4.7 identifies the environmentally superior alternative.

The EBMUD Board of Directors will review and consider the information contained in this Draft EIR prior to its decision to approve, disapprove, or modify the project.

4.3 ALTERNATIVES SCREENING PROCESS

4.3.1 Introduction

EBMUD completed a project development process that is documented in the Master Plan, followed by modifications to the preferred project subsequent to development of the Master Plan. The Master Plan identified the need for three new water transmission crossing areas from the city of Oakland to the city of Alameda based on a detailed hydraulic analysis. The Master Plan considered two construction methods and evaluated several potential pipeline alignments for three crossing areas from a technical and engineering perspective (e.g., geologic hazards, shortest distances for construction, and cost-effective methods of construction) and then recommended a preferred alignment and construction method for each crossing. Prior to and during the Draft EIR scoping period, the three preferred alignments were modified to reduce environmental impacts.

As part of this Draft EIR, a screening analysis for CEQA alternatives was conducted to determine whether any of the Master Plan alternatives that were not selected as the proposed project could reduce potentially significant environmental impacts over those generated by the proposed project. The screening analysis also identified other alternatives that could meet the basic project objectives, were feasible, and could reduce environmental effects. The No Project Alternative was also addressed.

4.3.2 EBMUD Project Development Process

4.3.2.1 Master Plan

The objectives of the proposed project are defined in Section 2.5 of the Project Description of this Draft EIR and are centered on meeting existing and future water demand for the city of Alameda with a high in-service reliability following an earthquake. The Master Plan addresses issues of long-term service to the island, vulnerabilities of the existing crossings, potential impacts due to major seismic events, and recommendations for new crossings and their construction methods. Based on a hydraulic analysis, three primary geographic crossing areas were identified as critical to maintaining an adequate level of service to Alameda:

- A crossing in the vicinity of Posey Tube
- A crossing to North Bay Farm Island from Alameda in the vicinity of Otis Drive
- A crossing in the vicinity of Derby Avenue

Twelve possible alignments were identified in the three geographic areas, based on the need for adequate construction staging, minimizing the length of the underwater pipeline crossings, and being in close proximity to the existing distribution grid and backbone pipelines at both ends of the underwater pipeline crossings.

The twelve alignments were further investigated and analyzed in the Master Plan based on construction accessibility on both sides of the underwater pipeline crossings, the distance of additional open trench construction needed to connect to a reliable transmission main (not just the closest part of the distribution grid), and geology and geotechnical considerations including soil liquefaction susceptibility and construction costs. A description of the twelve crossing alignments is presented in Table 4.3-1.

4.3.2.2 Selection of EBMUD Preferred Construction Method

The appendix to the Master Plan entitled Underwater Pipeline Crossings Feasibility Study (CFS), prepared by Jacobs Associates and G&E Engineering Systems, evaluates different trenchless construction methods for the underwater pipeline crossings with the goal of maximizing survivability and minimizing repair-related water service outages attributable to a major seismic event. The CFS identified microtunneling and HDD as the two most feasible trenchless construction methods for the underwater pipeline crossings based on length of installation, size of pipe, potential conflict of existing utilities and structures, elevations and special site constraints, anticipated subsurface soil and groundwater levels along the alignment, separation clearance at existing utility/water body crossings, accuracy of the installation, available construction staging areas, and construction costs at each of the selected alignments.

The microtunneling approach consists of a jacking shaft from which the microtunneling boring machine and casing are advanced to a receiving shaft for retrieval of the boring machine. The jacking and receiving shafts are constructed using secant piles and have a diameter of 28 and 18 feet, respectively. The shaft depths were selected to place the underwater tunnels below the fill and Young Bay Mud and into the deep stable soils not prone to liquefaction. The microtunnel crossing depths vary from 60 to 85 feet. A microtunnel crossing is a 48-inch steel casing with a 24-inch inside diameter HDPE carrier pipe (30-inch outer diameter). The carrier pipe is grouted inside the steel casing. A description of the HDD approach is presented in Section 2.7.1.3 of the Project Description. Both microtunneling and HDD concepts were developed such that the crossings would be in the deeper, more stable ground conditions and deep enough to avoid conflicts with any future dredging of the channel.

The CFS found that the microtunneling method provided the best reparability and survivability predictions for all three pipeline alignments; however, the HDD method was found to provide sufficient reliability and, overall, HDD is generally more appropriate for the size of pipeline proposed in the project. Generally, microtunneling is appropriate for larger tunneling projects. HDD requires significantly less excavation for the pits/shafts on either side of the crossing. A typical microtunneling shaft would require over 3,000 cubic yards of excavation while HDD requires less than 100 cubic yards. For the project, microtunneling was found to be almost double the cost of HDD,[1] while generally having greater environmental and community impacts. Microtunneling also can take up to one to two months longer than HDD. For these reasons—less cost, less excavation, smaller staging area, shorter construction schedule, appropriateness for the project pipeline size, and generally reduced environmental and community impacts —HDD was selected as the preferred construction method.

4.3.2.3 Selection of EBMUD Proposed Project

EBMUD selected a preferred alignment from all of the alternatives for each of the three geographic areas (the proposed project). The alternatives and the preferred alignments are shown in Figures 4.3-1 through 4.3-3.[2] The three preferred underwater crossings are 1D, 2A, and 3A, all to be constructed using HDD. The preferred alignments were selected based on the following criteria:

- Minimize crossing length
- Minimize the length of open trench construction needed to connect the crossing to an existing transmission pipeline
- Minimize construction in busy roadways
- Minimize construction near residences and businesses
- Minimize disruptions to public recreation areas
- Avoid areas of severe utility congestion
- Minimize environmental and community impacts

Specific reasons for selection of alignments for each of the three crossing areas is explained in the following sections.

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1 This refers to the unit rate cost ($/foot) for just the underwater pipeline crossing sections. Costs for the open trench construction portions of pipelines would generally be the same.

2 The open trench construction alignments for the preferred crossings, 1D, 2A, and 3A have been adjusted from the Master Plan to reflect modifications made to minimize traffic impacts.

Table 4.3-1 Crossing Replacement Alternatives from Master Plan

Alt #	Underwater Pipeline Crossing Method	Description	Underwater Crossing Length (feet)[1]	Length of Open Trench Construction (feet)[2]	Open Trench Excavation (cubic yards)	Trenchless Crossing Excavation (cubic yards)[6]	Total Excavation (cubic yards)	Construction Accessibility (North South)[3]	Open Trench Costs ($M)	Trenchless Costs ($M)	Cost[5] ($M)
Crossing #1: Crossing in the Vicinity of Posey Tube											
1A	Microtunneling[6]	Connect to Constitution Way/Lincoln Avenue in the city of Alameda	1,300	11,500	13,800	4,500	18,300	good to fair	4.9	7.8	$12.7
1B	Microtunneling[6]	Reroute around Mariner Square Drive and connect to Webster at Willie Stargell Avenue in the city of Alameda, connect at 9th and Alice Streets in city of Oakland	1,300	13,800	16,600	4,500	21,100	good to fair	6.0	7.8	$13.8
1C	HDD	Main Street to Union Pacific, west of existing crossing alignment and also west of the Turning Basin	1,900	15,700	18,800	800	1,700	poor to fair	6.7	5.5	$12.3
1D	HDD	Fallon Street to Marina Village Parkway, east of existing crossing alignment	1,800	10,500	12,600	800	13,400	good to fair	4.5	5.3	$9.8
1E	HDD	Washington Street to Mitchell Avenue, west of existing crossing alignment	1,200	14,500	17,400	600	1,900	fair to poor[4]	6.2	3.8	$10.0
Crossing #2: Crossing to North Bay Farm Island from Alameda in the Vicinity of Otis Drive											
2A	HDD	Cross bay only	1,400	4,200	5,100	600	5,700	fair to good	1.8	4.3	$6.1
2A	Microtunneling[6]	Cross bay only	900	4,700	5,700	4,300	9,900	fair to good	2.0	7.8	$9.8
2B	HDD	Broadway to Sea View Parkway West of existing crossing alignment	2,200	5,400	6,500	1,000	7,500	fair to good	2.3	6.3	$8.6
Crossing #3: Crossing in the Vicinity of Derby Avenue											
3A	HDD	Connect to Ford Street and 29th Avenue in Oakland, connect to Lincoln Avenue and Park Street in Alameda	1,400	3,800	4,500	600	5,200	good to good	1.6	4.2	$5.8
3A	Microtunneling	Connect to Ford Street and 29th Avenue in Oakland, connect to Lincoln Avenue and Park Street in Alameda	1,000	4,200	5,000	4,300	9,300	good to fair	1.8	7.8	$9.6
3B	HDD	Connect to Ford Street and 29th Avenue in Oakland, connect to Lincoln Avenue and Park Street in Alameda	1,400	1,600	1,900	600	2,500	poor to poor[4]	0.7	4.3	$4.9
3C	HDD	Connect to Ford Street and 29th Avenue in Oakland, connect to Lincoln Avenue and Park Street in Alameda	1,400	5,000	6,000	600	6,700	poor to fair	2.2	4.3	$6.4
3D	HDD	Connect to Lincoln Avenue and Park Street in Alameda	1,400	7,800	9,400	600	10,000	poor to poor	3.4	4.3	$7.6
3E	HDD	Everett to Peterson Between existing Derby and Park crossings	1,400	2,500	3,000	600	3,700	poor to poor	1.1	4.3	$5.3

Notes:

1 Crossing Length = Distance from shoreline to shoreline. Lengths have been adjusted from data originally presented in the Master Plan due to project refinements since the time of the Master Plan.

2 Length of Open Trench Improvements = Additional distance to connect to a reliable transmission main in the distribution grid. Lengths have been adjusted from data originally presented in the Master Plan due to project refinements since the time of the Master Plan.

3 Construction Accessibility = adequate space for construction laydown and minimal disturbance to nearby residences, businesses, traffic etc., (on either end of the crossing)

4 Construction access changed since the Master Plan was completed because of recent construction and plans for construction in these areas.

5 Costs are in 2014 dollars. Costs for HDD include ground improvements (jet-grouting) and are based on average HDD unit cost of $2,540/LF as calculated from Table 8-9 and Table 8-10 in the Jacobs "Underwater Pipeline Crossings Feasibility Study". Microtunneling costs for Alternative 1A based on Table 8-9 in the Jacobs "Underwater Pipeline Crossings Feasibility Study". Costs also include open trench construction costs of $430/LF based on unit costs used in the Master Plan Appendix C "Alternative Analysis".

6 Microtunneling requires a 300 square foot pit at a depth of 85-feet while HDD requires an 85 square foot pit at a depth of 5-feet and microtunneling can take up to 1-2 months longer than HDD.

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Figure 4.3-1 Master Plan Alternatives Crossing #1

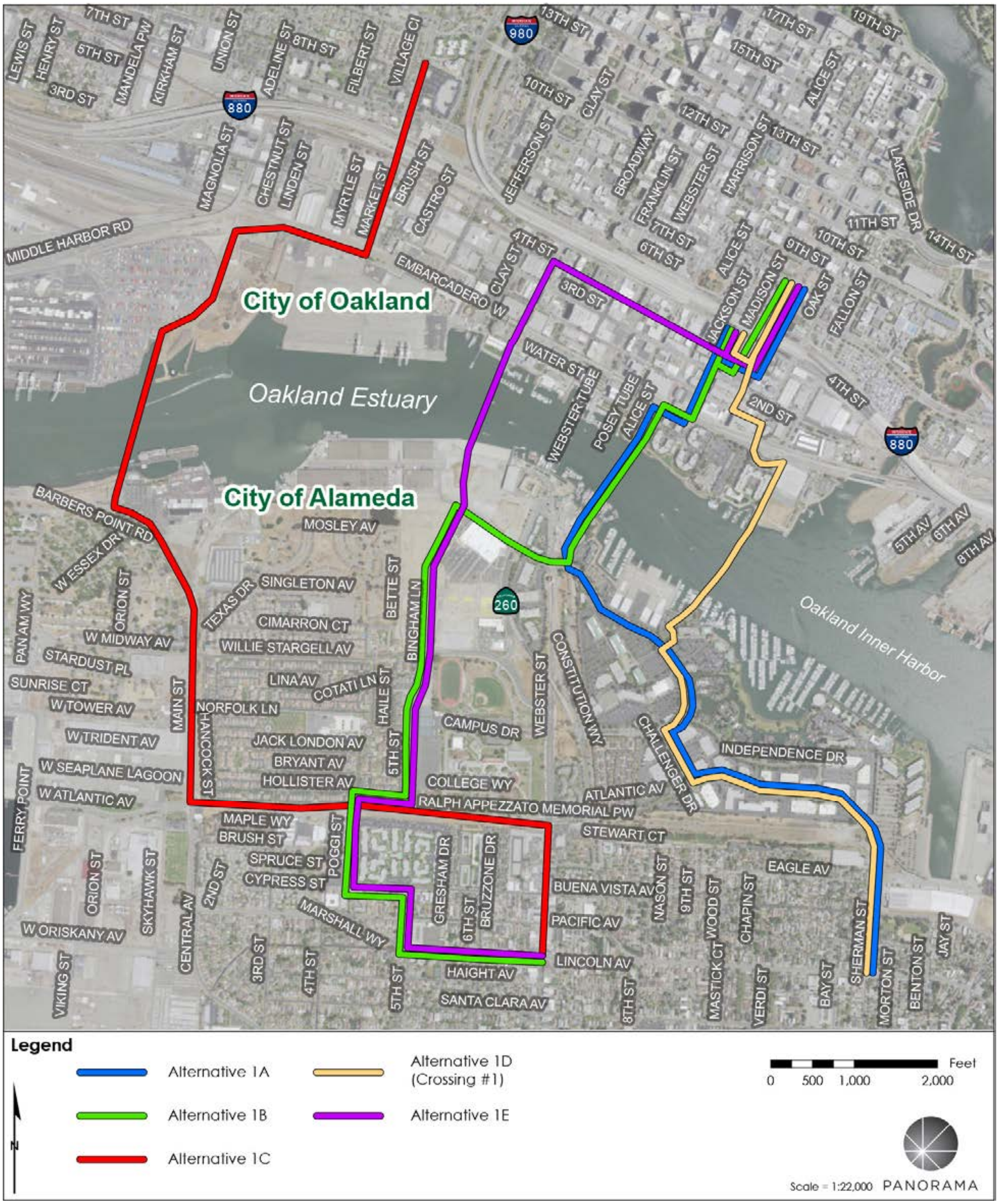
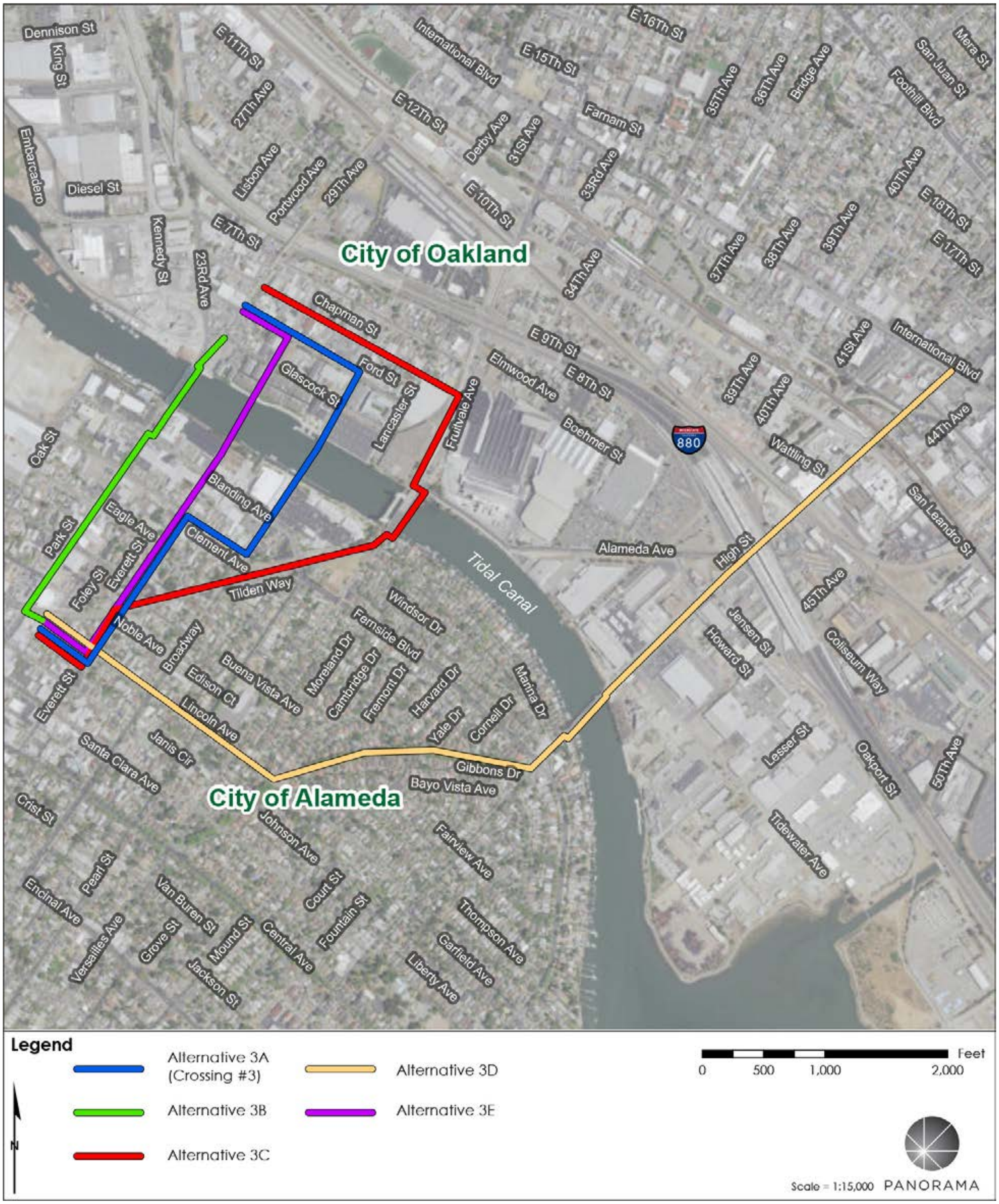


Figure 4.3-2 Master Plan Alternatives Crossing #2

Figure 4.3-3 Master Plan Alternatives Crossing #3



Crossing #1
Crossing 1D was selected over the other Crossing #1 alignments because it has the shortest length of open trench construction and has good construction access on either side of the underwater pipeline crossing. Alternative 1E, 1B and 1A have shorter crossing lengths than 1D; however, Alternative 1E was eliminated because it would require the excavation of 4,000 more feet than Alternative 1D. Alternative 1A and 1B were rejected because they are only possible using microtunneling, which is not the preferred construction method for the reasons described in Section 4.3.2.2. HDD is not an option for 1A or 1B because of severe utility congestion on each end and along the crossing itself. Microtunneling can place the underwater pipeline beneath the utility congestion at a much higher cost, excavation volume, and longer schedule [1-2 months longer], whereas HDD would need to tunnel through the utility congestion, which is not feasible because of potential damage to other utilities. Furthermore, Alternatives 1A and 1B have longer length of total open trench pipeline and more constrained staging areas than 1D. Therefore, Alternative 1D was selected as the preferred alignment because it uses the preferred construction technique, is the most cost effective alternative, and has good construction access on either side of the crossing.

As discussed later in Section 4.6.3, Alterative 1A is evaluated as an EIR alternative. Alternatives 1B, 1C, and 1E are eliminated from further consideration as EIR alternatives, as discussed in Section 4.5.2.1, either because they are infeasible (1C) or do not eliminate or substantially lessen any environmental effects of the proposed project (1B and 1E).

Crossing #2
Crossing 2A, using HDD, was selected as the preferred alignment because it is the most cost effective, has the shortest open trench and underwater crossing lengths, and the best construction staging access. An Alternative for Crossing 2A using microtunneling was considered in the Master Plan; however, as discussed later in Section 4.5.2.1, Alternative 2A (microtunneling) is eliminated from further consideration as an EIR alternative because it does not eliminate or substantially lessen any environmental effects of the proposed project. Alternative 2B is also removed from further consideration as an EIR alternative because it does not eliminate or substantially lessen any environmental effects of the proposed project (see Section 4.5.2.1).

Crossing #3
Crossing 3A was selected over the other Crossing #3 alignments because it has a relatively short crossing length and length of open trench construction. Alternatives 3B and 3E have shorter open trench construction lengths than 3A; however, Alternative 3B would be infeasible, as discussed in Section 4.5.2.1, and Alternative 3E would involve construction on private property, in congested areas, and in areas with little staging access. For Alternative 3E in the city of Oakland, the drilling location would be within narrow private streets near multi-story condominium units. In the city of Alameda, construction would be located in a private steel fabrication yard and within narrow streets with limited access. Alternative 3E would not eliminate or reduce any environmental effects of the proposed project.

Alternative 3A using microtunneling is evaluated as an EIR Alternative. Alternatives 3B, 3C, 3D, and 3E are eliminated from further consideration in this Draft EIR as described in Section 4.5.2.1, either because they are infeasible (3B), or do not eliminate or reduce any environmental effects of the proposed project (3C, 3D, and 3E).

4.3.2.4 Updates since the Master Plan

The three preferred alignments for each crossing selected as the "proposed project" in this Draft EIR were further modified prior to and during the Draft EIR scoping period to reduce environmental impacts, as described in Chapter 2. The underwater pipeline crossing locations were not changed, but the open trench construction pipeline alignments within roadways were adjusted to move the pipeline off of major arterial routes, including Constitution Way, Park Street, and Otis Drive, and onto less busy streets.

4.3.3 Screening of Alternatives

4.3.3.1 Criteria for Screening Alternatives

The evaluation of CEQA alternatives to the proposed project was completed using a screening process that consisted of three steps:

- Step 1: Clarify the description of each alternative to allow comparative evaluation
- Step 2: Evaluate each alternative using CEQA criteria (defined below)
- Step 3: Determine the suitability of each alternative for full analysis in the EIR

Infeasible alternatives and alternatives that clearly offered no substantial reduction in environmental impacts for at least one parameter were removed from further analysis. Following the three-step screening process, the advantages and disadvantages of the remaining alternatives were carefully weighed with respect to CEQA's criteria for consideration of alternatives. CEQA Guidelines Section 15126.6 state that:

> An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible.

In order to comply with CEQA's requirements, each alternative that has been suggested or developed for this project has been evaluated in three ways:

- Does the proposed project alternative meet most basic project objectives?
- Is the alternative feasible?
- Does the alternative avoid or substantially lessen any significant effects of the proposed project?

Basic Project Objectives

The CEQA Guidelines require the consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may "impede to some degree the attainment of project objectives" (Section 15126.6[b]). Therefore, it is not required that each alternative meet all of the objectives.

Feasibility

CEQA Guidelines Section 15364 define feasibility as:

> …capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

The alternatives screening analysis is largely governed by what CEQA terms the "rule of reason," meaning that the analysis should remain focused, not on every possible eventuality, but rather on the alternatives necessary to permit a reasoned choice. Furthermore, of the alternatives identified, the EIR is expected to analyze those alternatives that are feasible, while still meeting most of the project objectives.

According to CEQA Guidelines Section 15126.6(f)(1), factors that may be taken into account when addressing the feasibility of alternatives include site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or other regulatory limitations, jurisdictional boundaries, and proponent's control over alternative sites.

Lessen Environmental Impacts

With the proposed project, most potentially significant impacts would be reduced to less than significant with implementation of mitigation measures. Potentially significant, but mitigable impacts, as well as the significant and unavoidable impacts of the proposed project are summarized in Table 4.3-2. These impacts frame the alternatives considered.

Table 4.3-2 Summary of Potentially Significant Mitigable and Potentially Significant but Unavoidable Impacts of the Proposed Project

Resource	Summary of Impacts
Potentially Significant and Unavoidable Impacts	
Noise	• Generate temporary noise in excess of standards for open trench construction, pipeline connections, and abandonment and replacement along Crossing #1 and for the same activities plus HDD entry at Crossing #3, in the city of Oakland; for jack and bore under Otis Street in the city of Alameda; and for pipeline connections and HDD pull through for nighttime operations in both the cities of Alameda and Oakland.
Traffic	• Cause a significant impact to level of service for Crossing #3 in the city of Alameda for closing of Tilden Way at Broadway during HDD pull through. • Cause a significant impact to public transit for Crossing #3 in the city of Alameda for closures at Tilden Way and Broadway.

Resource	Summary of Impacts
Potentially Significant but Mitigable Impacts	
Aesthetics	• Removal of trees in Towata Park and along medians along Marina Village Parkway in the city of Alameda. • Light and glare impacts from use of lighting for nighttime construction, primarily at the HDD entry and insertion pits.
Air Quality	• Expose sensitive receptors near the HDD entry pits to significant pollutant concentrations increasing cancer risks.
Biological Resources	• Potential impacts on monarch butterfly at the insertion pit and open trench construction locations along North Bay Farm Island for Crossing #2. • Potential impacts to fish and aquatic species during HDD under the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel if a frac-out occurred. • Potential impacts to special status bird species or nesting birds anywhere along the project alignment.
Cultural Resources	• Potential to disturb previous undiscovered historic, archaeological, or paleontological resource or human remains anywhere along the project alignment.
Geology and Soils	• Potential for impacts to pipelines from seismic ground shaking, other seismic hazards, or from expansive or corrosive soils after construction.
Hazards and Hazardous Materials	• Potential impacts from exposure to hazardous spills, existing hazardous soils conditions, and hazardous wastes along the project alignment. • Potential impacts from accidentally damaging buried utilities along the open trench construction areas.
Hydrology and Water Quality	• Sedimentation of waterways during construction. • Impacts to water quality from potential frac-outs. • Sedimentation and water quality impacts from disposal of shallow groundwater during construction.
Noise	• Generate groundborne vibration that could cause cosmetic damage along open trench construction areas in both the city of Oakland and the city of Alameda for all crossings.
Recreation/Public Services	• Impact use of parks including Estuary Park, the San Francisco Bay Trail, and Towata Park during construction.
Transportation and Traffic	• Impact level of service from open trench construction and lane closures along several roadways, to alternative transportation, and to emergency access.

4.3.3.2 Screening of Master Plan Alternatives

As previously stated, the project development process resulted in the identification of twelve alternatives that met project objectives. Three preferred alignments were selected as the "proposed project."

The CEQA alternative screening process for the Master Plan alternatives entailed the following:

1. The initial twelve alignments from the Master Plan (shown in Table 4.3-1 and Figures 4.3-1 to 4.3-3) were re-examined to determine if they were still feasible given changes in the environment or additional information collected since the time of preparation of the Master Plan.
2. The remaining alternatives, after determining feasibility, were evaluated to determine if the alternatives could avoid or reduce any of the potentially significant (both mitigable and unmitigable) impacts identified in this Draft EIR.
3. Alternatives that could substantially lessen a potentially significant impact of the proposed project were carried forward for analysis as a CEQA alternative. Note that where an alternative could avoid a specific impact, such as a traffic impact at Tilden Way and Broadway, but would generate a greater, similar impact somewhere else, (such as closure of Tilden Way at another location) the alternative was eliminated from further evaluation.

Alternatives from the Master Plan that did not meet the screening criteria listed above were rejected. The rejected alternatives are discussed in Section 4.5. For a project of this nature, the selection of alternatives often involves trade-offs, which may lessen some impacts, and worsen others. The trade-offs are discussed further in Section 4.6: Comparison of Alternatives.

Table 4.3-1 shows a summary of all the Master Plan alternatives' revised total lengths, total excavation amounts, and total costs. The magnitude of impacts from the proposed project is based on the length of the pipelines and the amount of material excavated in addition to location.

4.4 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS IN THE EIR

Based on the ability to meet basic project objectives, feasibility, and the potential to significantly lessen at least one potentially significant impact of the proposed project, the following alternatives described in Table 4.4-1 were chosen to be carried forward for analysis in this Draft EIR.

Table 4.4-1 Alternatives Carried Forward for Analysis in the Draft EIR

Type of Alternative	Description
Crossing #1: Crossing in the Vicinity of Posey Tube	
Alignment Alternative and Construction Methods Alternative	**Crossing in the Vicinity of Posey Tube with Microtunneling (Alternative 1A from the Master Plan)** – Alternative 1A is being considered for its potential to reduce construction-related impacts to Estuary Park, since the alternative alignment would not pass through the park, or any new parks. Impacts to Estuary Park from the proposed project are significant but mitigable. The sections of open trench construction under this alternative would be modified from the Master Plan to be similar to the proposed alignment for Crossing #1. Note that the microtunneling alternative would not reduce the only potentially significant unavoidable impacts for this crossing, which are noise impacts related to open trench construction, pipeline connections, and abandonment and replacement near sensitive receptors for day time construction in the city of Oakland.
Crossing #2: Crossing to North Bay Farm Island from Alameda	
None	None
Crossing #3: Crossing in the Vicinity of Derby Avenue	
Construction Method Alternative	**Crossing in the Vicinity of Derby Avenue using Microtunneling (Alternative 3A from the Master Plan, using Microtunneling)** – Alternative 3A is being considered for its potential to reduce or eliminate potentially significant and unmitigable traffic impacts related to the 48-hour closure of Tilden Way at Broadway in the city of Alameda. Alternative 3A would not require the pipeline laydown and pull through that the proposed project would require. Note that Alternative 3A would not reduce potentially significant and unmitigable noise impacts related to open trench construction, pipeline connections, and abandonment and replacement near sensitive receptors for daytime construction in the city of Oakland.

4.5 ALTERNATIVES CONSIDERED BUT REJECTED

4.5.1 Overview

This section describes the alternatives that were considered for analysis in the Draft EIR but were rejected from further analysis because the alternatives did not meet the basic project objectives, were not feasible, and/or would not substantially lessen the significant environmental effects of the proposed project. A description of the alternatives that were rejected and the rationale for rejecting them from further analysis is provided below.

4.5.1 System Alternatives Considered but Rejected

4.5.1.1 Introduction

System alternatives are those alternatives that accomplish the same or similar goals as the proposed project but through overall changes to the system versus individual project elements.

4.5.1.2 Rehabilitation of Existing Underwater Pipeline Crossings

Description of Alternative

Rehabilitation of the existing underwater pipeline crossings would involve "slip-lining" the existing underwater pipeline crossings to improve strength. Slip-lining involves sliding a liner pipeline of slightly smaller diameter into an existing pipeline. Sections of high-strength pipeline such as HDPE, polymer concrete pipeline, and/or fiber-reinforced pipeline are pushed into or pulled through the existing pipeline. The pipeline can either be inserted in segments and joined together or inserted as one long section of pipeline (segmental vs. continuous). Once in place, the annular space is then grouted. In most cases, the liner pipeline is pushed into the existing pipeline via jacking. As a result, a jacking access shaft is required on either side of the underwater pipeline crossing being repaired. The size of the access shaft would be approximately 100 to 300 square feet and approximately 5 to 10 feet deep. As a result of the liner and grouting material inside the existing pipe, the inside diameter would be reduced by four to six inches, yielding a smaller cross-sectional area than the existing pipeline, which reduces the flow capacity of the pipeline.

Objectives and Feasibility

Slip-lining would not meet project objectives and the fundamental purpose of the project. The Master Plan determined that three reliable underwater pipeline crossings with an inner diameter of 24 inches are necessary to maintain the long-term reliable water service to the city of Alameda. Slip-lining the existing underwater pipeline crossings would result in inner-diameters less than 24 inches, reducing the hydraulic capacity. Even if slip-lining were feasible and the reduced hydraulic capacity were acceptable, the overall reliability, particularly in an earthquake, would not be significantly improved. Therefore, slip-lining does not meet the fundamental purpose of the project, which is to improve long-term reliability and redundancy of the water distribution system and maintain high in-service reliability after a seismic event for Alameda Island and North Bay Farm Island.

Slip-lining also may not be feasible where joint deflection (i.e., the bend in the pipeline at the joint) is too large and would not result in the underwater pipeline crossings being located in deeper, more stable ground conditions. Joint deflections in the existing underwater crossings could be large, as much as 15 degrees or more (Jacobs 2014), which is problematic for slip-lining and renders the technique infeasible for the project.

4.5.1.3 On-Island Water Storage

Description of Alternative

On-island water storage would entail the construction of a water storage tank or tanks in the city of Alameda that would provide a permanent source of water to residents and businesses. This alternative would involve purchasing property and constructing one or more elevated tanks on Alameda Island. The tanks would be capable of storing several millions of gallons of water. Inlet and outlet piping and a valve vault would also need to be constructed at the site.

Objectives and Feasibility

The on-island water storage alternative is eliminated from further consideration in the Draft EIR because it would not meet the fundamental purpose of the project, which is to improve long-term reliability and redundancy of the water distribution system and maintain high in-service reliability after a seismic event for Alameda Island and North Bay Farm Island. While on-island water storage would provide a source of water to the city of Alameda, water transmission would still be required to fill the water tank(s). Construction of the proposed project would still be required to ensure that water is transmitted to the city of Alameda.

The on-island water storage alternative is also infeasible because the permanent water storage tanks would have to be large enough to accommodate enough water for all water usage in the city of Alameda. Water storage facilities are sized to provide approximately 1 day of projected maximum day demand, which is not long enough to repair the existing underwater pipeline crossings after an earthquake. Lastly, because of Alameda's flat topography, the storage would have to be elevated almost 200 feet to provide adequate pressure. Constructing a tall water tower of sufficient size would be infeasible considering local seismic hazards and the potential for soil liquefaction.

4.5.2 Master Plan Alignment Alternatives Considered but Rejected

4.5.2.1 Description of Alternatives

A description of the Master Plan alignment alternatives is presented in Table 4.5-1.

4.5.2.2 Objectives, Feasibility, and Ability to Lessen Environmental Impacts

All of the alignment alternatives in the Master Plan meet project objectives. However, several of the routing alternatives identified in the Master Plan were either no longer feasible or did not meet the criteria of substantially lessening environmental impacts over those of the proposed project. Alignment alternatives from the Master Plan and why they were rejected from further analysis in the Draft EIR are presented in Table 4.5-1.

4.5.3 Alternative Underwater Pipeline Crossing Construction Methods Considered but Rejected

4.5.3.1 Overview

Alternative underwater pipeline crossing construction methods look at using the same pipeline alignments, but alternative methods to accomplish construction and installation within those alignments.

4.5.3.2 Microtunneling for Crossing #2

Description of Alternative

The Microtunneling Alternative for Crossing #2 would involve the use of microtunneling instead of HDD for the underwater pipeline crossing. The CFS evaluated the microtunneling methodology for Crossing #2 (see Section 4.3.2.2).

Table 4.5-1 Master Plan Alignment Alternatives Considered but Rejected

Alt #	Description of Alternative	Screening Discussion	Reason for Rejection
Crossing #1: Oakland Inner Harbor Crossing in the Vicinity of Posey Tube			
1B	Existing Alignment Reroute around Mariner Square Drive and connect to Webster Street at Willie Stargell Avenue in the city of Alameda, connect at 9th and Alice Streets in the city of Oakland	**Is it Feasible?** Although EBMUD would be required to obtain ROWs from Caltrans for construction over the Posey and Webster Street tubes, it would be feasible to construct Alternative 1B. **Would it Lessen Environmental Impacts?** Alternative 1B would not substantially lessen any significant environmental impacts of the proposed project. In fact, this alternative could increase the magnitude of traffic and noise impacts because it would require significantly more open trench construction (approximately 3,300 feet) than Crossing #1 for the proposed project. Alternative 1B is located in similar land uses as Crossing #1 for the proposed project, including residential and commercial areas. Approximately the same length of mixed use land uses would be crossed in Oakland, but approximately 2,600 feet more of residential areas would be crossed in Alameda. Impacts for this alternative are moved from one area to another, relative to the proposed project, and they would not be substantially lessened.	Alternative would not substantially lessen any potentially significant impacts.
1C	New Alignment Main Street to Union Pacific, west of existing underwater pipeline crossing alignment and also west of the Turning Basin	**Is it Feasible?** Alternative 1C is not technically feasible. Alternative 1C requires building a new transmission pipeline in the Schnitzer Steel Property, an industrial site on the north side of the Oakland Inner Harbor. EBMUD recently abandoned the pipeline on the Schnitzer Property because maintaining the pipeline in this industrial area is dangerous for workers, access is difficult, and the site is constantly changing (heavy equipment and machinery is frequently moved). Such conditions result in poor pipeline accessibility to operate and maintain the pipeline. Alternative 1C would require an even longer pipeline on the Schnitzer Steel industrial property which would be infeasible because of similar accessibility issues.	Alternative is infeasible.
1E	New Alignment Washington Street to Mitchell Avenue, west of existing underwater pipeline crossing alignment	**Is it Feasible?** Alternative 1E is feasible. **Would it Lessen Environmental Impacts?** Alternative 1E would not substantially lessen any potentially significant impacts of the proposed project. It would avoid impacts to Estuary Park and the San Francisco Bay Trail, which are significant but mitigable impacts of the proposed project; however, this alternative would increase the magnitude of traffic and noise impacts because it would require significantly more open trench construction (approximately 4,000 feet) than Crossing #1 for the proposed	Alternative would not substantially lessen any potentially significant impacts.

Alt #	Description of Alternative	Screening Discussion	Reason for Rejection
		project. It would require at least partial closure of eight blocks (approximately 3,000 feet) of 4th Street in Oakland, which would have greater traffic and noise impacts than the proposed project. 4th Street includes mixed commercial and residential uses, with buildings close to the curb. Alternative 1E is also located in residential and commercial areas that are similar to the areas near Crossing #1. Alternative 1E passes through an additional 3,000 feet of mixed use in Oakland and approximately 2,600 hundred more linear feet of residential land use in Alameda. Other potentially significant or significant unmitigable impacts would be moved to a new location and, therefore, would not be substantially lessened.	
Crossing #2: Crossing to North Bay Farm Island from Alameda			
2B	Broadway to Sea View Parkway West of existing underwater pipeline crossing alignment	**Is it Feasible?** Alternative 2B is considered feasible. **Would it Lessen Environmental Impacts?** Alternative 2B would not substantially lessen the significant impacts of the proposed project. Alternative 2B would avoid potentially significant but mitigable impacts to Towata Park; however, it would still generate potentially significant recreational impacts to the Elsie Roemer Bird Sanctuary, an East Bay Regional Park, due to construction adjacent to the park. This alternative would increase the magnitude of traffic and noise impacts because it would require significantly more open trench construction (approximately 1,200 feet) than Crossing #2 for the proposed project. Alternative 2B is also located in similar land uses as Crossing #1 for the proposed project, including residential and recreational areas. It would pass through approximately 200 less feet of mixed use, including residential areas in Alameda, but approximately 2,700 feet more of residential land uses on North Bay Farm Island. All other potentially significant or significant unmitigable impacts would be moved to a new location, including potential impacts to monarch butterflies, and, therefore, would not be substantially lessened.	Alternative would not substantially lessen any potentially significant impacts.
Crossing #3: Crossing in the Vicinity of Derby Avenue			
3B	Existing Park Street Alignment Connect to Ford Street and 29th Avenue in Oakland, connect to Lincoln Avenue and Park Street in Alameda	**Is it Feasible?** New residential development is being constructed in the city of Oakland that was not proposed when the Master Plan was written. The new development restricts construction access resulting in an insufficient staging area making construction infeasible.	Alternative is infeasible.

Alt #	Description of Alternative	Screening Discussion	Reason for Rejection
3C	Fruitvale Ave Bridge Connect to Ford Street and 29th Avenue in Oakland, connect to Lincoln Avenue and Park Street in Alameda	**Is it Feasible?** Alternative 3C is not feasible. Construction of Alternative 3C requires that the HDD entry pit be located in the city of Oakland, 400 feet from the edge of the tidal canal to accommodate the bending of the pipeline. There are buildings located 400 feet from the tidal canal; therefore, it would be infeasible to conduct HDD.	Alternative is infeasible.
3D	Existing High Street Alignment Connect to Lincoln Avenue and Park Street in Alameda	**Is it Feasible?** Alternative 3D may not be feasible. Construction of Alternative 3D requires that the HDD entry pit be located in the city of Oakland, 400 feet from the edge of the tidal canal, to accommodate the bending of the pipeline. The Cash and Carry Parking Lot is located 400 feet from the tidal canal. In addition, the pipeline would need to extend across the Gallagher and Burk industrial site. It may not be feasible to perform construction, because this activity may interfere with industrial operations. However, feasibility is not currently known, so for the purpose of the alternatives analysis the alternative is also being evaluated for environmental impacts. **Does it Lessen Environmental Impacts?** Alternative 3D would impact different streets than the proposed project and would not reduce any significant impacts of the proposed project but would replace one significant impact with another. The alternative would require the partial or full closure of High Street, Fernside Boulevard, Gibbons Drive, and Lincoln Avenue, which are major arterial roads. Alternative 3D avoids the significant and unavoidable impact from the 48-hour temporary, full closure of Tilden Way; however, Alternative 3D would require the full closure of High Street for 48-hours for the HDD pipeline pull through. High Street carries approximately 11,000 more vehicles than Tilden Way; Tilden Way has an ADT of 14,720 and High Street has and ADT of 26,000 (Alameda County Public Works Agency 2016). Due to the greater amount of traffic along High Street than Tilden Way, it is likely that the full, temporary closure of High Street would result in a significant and unavoidable impact. This alternative would not eliminate a significant and unavoidable traffic impact; rather, it would move the traffic impacts to another location. Alternative 3D would also increase the magnitude of traffic and noise impacts because it would require significantly more open trench construction (approximately 4,000-feet) than Crossing #3 for the proposed project. Alternative 3D in Oakland is located in a commercial/ industrial area, which is different than the mixed-use and residential areas of Crossing #3 and would avoid impacts to sensitive receptors; however, Alternative 3D in the city of Alameda is located	Alternative may not be feasible and would not substantially lessen any potentially significant impacts.

Alt #	Description of Alternative	Screening Discussion	Reason for Rejection
		within a residential area and in close proximity to two schools (Lincoln Avenue is adjacent to Edison Elementary School and High Street is 350 feet from Peek-A-Boo Preschool). The distance of open trench construction for Alternative 3D in the city of Alameda would be approximately 4,900 feet, which is still longer (1,100 feet) than all of Crossing #3. Alternative 3D would have greater air quality, noise, and traffic impacts than Crossing #3.	
3E	Between Existing Park Street Crossing and Derby Crossing Start at Glascock Street and Peters Street in Oakland and Crossing in Everett Street in Alameda	**Is it Feasible?** Alternative 3E is feasible. **Does it Lessen Environmental Impacts?** Alternative 3E is located in similar land uses as Crossing #3 for the proposed project, including residential and commercial areas. Alternative 3E would avoid construction within the vicinity of some residences and commercial areas because this Alternative would require less open trench construction (1,300 feet) than Crossing #3; however, this Alternative would not substantially lessen any significant impacts and would increase traffic impacts. This alternative would require the closure of Tilden Way at Everett Street for 2 weeks during pipeline laydown and for 48-hours during the HDD pipeline pull through. Crossing #3 also requires closure of Tilden Way at Everett Street for open trench construction; however, the impact would be less than significant after implementation of Mitigation Measure Traffic-4, which requires that EBMUD perform jack and bore construction underneath Tilden Way. Crossing #3 also requires the 48-hour closure of Tilden Way at Broadway for the HDD pipeline pull through, which is a significant and unavoidable impact. For Alternative 3E, this impact would be moved to Tilden Way at Everett Street. Overall, Alternative 3E would increase the time that construction would result in a significant and unavoidable traffic impact by 2 weeks. The roads where HDD and staging would occur are narrower than Crossing #3. The HDD equipment in the city of Oakland would be located closer to sensitive receptors than Crossing #3 in Oakland. The closest sensitive receptors to the HDD pit for Crossing #3 in the city of Oakland are residences that are 40 feet from the HDD pit. The closest sensitive receptors to the HDD pit for Alternative 3E in the city of Oakland are residences located on Peterson Street that would be approximately 10 feet away from the HDD pit. Therefore, Alternative 3E would expose sensitive receptors to greater noise and air quality impacts from HDD than Crossing #3.	Alternative would not substantially lessen any potentially significant impacts.

Project Objectives and Feasibility

Microtunneling at Crossing #2 would meet the project objectives and is considered feasible. However, as described in Section 4.3.2.2: Selection of EBMUD Preferred Construction Methods, HDD was selected as the preferred construction method for the size and scope of the project (generally, microtunneling is appropriate for larger tunneling projects). HDD is less costly; requires less excavation, smaller staging areas, and a shorter construction schedule.

Ability to Lessen Environmental Impacts

The primary benefit to microtunneling at Crossing #2 is eliminating the need for pipeline laydown, which is not necessary with microtunneling. The elimination of pipeline laydown would avoid the potentially significant but mitigable traffic, pedestrian, bicyclist, and public transit impacts. Microtunneling at Crossing #2 would not require the intermittent closure of one lane of Island Drive for 2 weeks or the 48-hour closure of one lane of traffic on Island Drive and the multi-use paths used by pedestrians, bicyclists, and bus users accessing the bus stop on Island Drive. However, microtunneling can take 1 to 2 months longer than HDD, needs a larger staging area, and would require excavation and removal of an additional 3,000 cubic yards of soil, which would increase construction related truck trip, noise, air quality, and dust impacts. Microtunneling would, therefore, expose people residing near the construction pits to more traffic, noise, air emissions, and toxic air contaminants for a longer timeframe. Microtunneling for Crossing #2 is eliminated from further consideration because this alternative would be more expensive and could potentially increase environmental impacts.

4.5.3.3 Alternative Pipeline Laydown Locations

Description of Alternative

The Oakland laydown alternative would place pipeline laydown for HDD in the city of Oakland instead of in the city of Alameda. For Crossing #1 the pipeline would be placed on Embarcadero heading east. For Crossing #2 the pipeline laydown would be placed across Towata Park and would either follow Otis Street heading west or Fernside Drive heading north. Crossing #3 would place the laydown along Derby Avenue and it would have to cross a railroad and I-880.

Project Objectives and Feasibility

Relocating the pipeline laydown for HDD would meet project objectives and would be feasible for Crossing #1 and #2, but would be infeasible for Crossing #3 because it would have to cross the railroad and I-880. The Oakland laydown alternative for Crossing #3 was eliminated because it is not feasible.

Ability to Lessen Environmental Impacts

The traffic impacts in Alameda eliminated from placing the pipeline laydown in the city of Oakland for Crossing #1 would be replaced by potentially greater traffic impacts in Oakland because of the need to close Embarcadero West for up to 2 weeks. None of the potentially significant impacts of the proposed project would be substantially lessened.

The traffic impacts eliminated from placing the pipeline laydown on the North Bay Farm Island side for Crossing #2 would be replaced by greater traffic impacts from pipeline laydown on Alameda Island because of the need to close Otis Drive during the pullback operation. None of the potentially significant impacts of the proposed project would be substantially lessened. The alternative was rejected from further consideration in this Draft EIR.

4.5.3.4 Placing the Pipeline on the Bottom of the Channel Bed

Description of Alternative
Placing the crossing on the bottom of the channel bed would not require HDD. The pipelines would be anchored to the bottom of the channel bed.

Project Objectives and Feasibility
The bottom of the channel alternative is eliminated from further consideration because it does not meet the most fundamental and basic project objective to improve long-term reliability and redundancy of the water distribution system and also fails to meet several project objectives. Large ships that use the channels surrounding the city of Alameda could potentially damage the pipelines that would be located on the channel beds. In addition, routine maintenance dredging of the channel entails removing sediment from the channel beds. The maintenance dredging activities could potentially damage the pipelines, as they would be exposed above the channel bed. In the event of an earthquake, this alternative would be susceptible to damage because the underwater pipelines would be placed atop Young Bay Mud, which is a liquefiable soil. This alternative would not meet the objective of avoiding placing the pipeline in areas of geologic hazards.

4.6 COMPARISON OF SELECTED ALTERNATIVES

4.6.1 Overview

This section provides the comparison of the alternatives brought forward for analysis that meet the project's basic objective, are feasible, and substantially lessen at least one potentially significant environmental impact of the proposed project. This section also describes the No Project Alternative, as required under CEQA.

4.6.2 No Project Alternative

The No Project Alternative for this project would entail maintaining the status quo and performing pipeline repairs only after pipelines/crossings fail. The No Project Alternative could also include placing a temporary pipeline in Posey Tube during an emergency.

Under the No Project Alternative, none of the environmental impacts associated with the proposed project would occur. However, the need for the proposed project would not be met and none of the water service needs associated with the project would be satisfied. As discussed in Section 2.4 of Chapter 2: Project Description, the proposed project is needed to correct existing deficiencies in water transmission, meet projected future water demands, improve system reliability, and facilitate replacement of aging infrastructure. If the proposed project were not implemented, EBMUD would not be able to meet the fundamental purpose of the proposed project, which is to improve long-term reliability and redundancy of the water distribution system and maintain high in-service reliability after a seismic event for Alameda Island and North Bay Farm Island.

Consistent with the CEQA Guidelines Section 15126.6(a), the comparison of alternatives and determination of the environmentally superior alternative is based on the ability of the alternative to meet the basic objectives of the proposed project while avoiding or substantially lessening any significant impacts. Under the No Project Alternative, no pipeline segments would be constructed. As a result, the No Project Alternative is considered to be environmentally superior to the "action" alternatives because none of the adverse impacts associated with those alternatives would occur. While it would be the environmentally superior alternative, the No Project Alternative would not meet any of the project objectives. According to CEQA Guidelines Section 15126.6(e)(2), when the No Project Alternative is identified as the environmentally superior alternative, the EIR must identify an environmentally superior alternative among the "build" alternatives. The environmentally superior alternative is identified in Section 4.7.

4.6.3 Vicinity of the Posey Tube Using Microtunneling (Alternative 1A from the Master Plan)

This section provides a comparison of the environmental impacts of Alternative 1A from the Master Plan with the environmental impacts of the proposed project.

4.6.3.1 Description of Alternative

The route for an open trench pipeline in the vicinity of the Posey Tube has been modified from the route described in the Master Plan as shown in Table 4.4-1. Therefore, to be consistent with the changes made to the proposed project; similar changes were made to this alternative. Open trench construction for this alternative, to the extent possible, follows the proposed route for Crossing #1.

For the underwater pipeline crossing in the city of Oakland, the microtunnel pit would be located at the dead-end of Alice Street, one block south of a railroad crossing. The microtunnel pit would be within a public street ROW and located next to an empty lot on the north side, and multi-story housing located on the south side. The trenched pipeline alignment in the city of Oakland would continue further towards Jack London Square along Alice Street, a small portion of Embarcadero West, Jackson Street, 4th Street, and Madison Street.

For the underwater pipeline crossing in the city of Alameda, the microtunnel pit would be located in an existing 10-foot ROW in the Barnhill Marina parking lot, which contains large silos and warehouses. A larger, 20-foot ROW would need to be obtained to ensure long term maintenance of the pipeline. The open trench construction pipeline alignment in the city of Alameda would follow a portion of the same route as described in the proposed project. A small portion of Marina Village Parkway, not proposed for open trench construction for Crossing #1, would also require open trench construction (see Figure 4.3-1).

4.6.3.2 Comparison of Environmental Impacts

The comparison of impacts is shown in Table 4.6-1. Alternative 1A would eliminate the recreation impact from construction within the roadway that forms part of Estuary Park at Crossing #1. Alternative 1A would, however, have environmental impacts associated with aesthetics, noise, air quality, and greenhouse gases due to the increased construction timeframe of 1 to 2 months for Alternative 3A. The greater aesthetics, noise, air quality, and greenhouse gases impacts from Alternative 3A would outweigh the temporary impact to Estuary Park. Crossing #1 of the proposed project would therefore be environmentally superior to Alternative 3A.

4.6.4 Crossing in the Vicinity of Derby Avenue using Microtunneling (Alternative 3A from the Master Plan, using Microtunneling)

This section provides a comparison of the environmental impacts of Alternative 3A from the Master Plan using microtunneling, with the environmental impacts of the proposed project.

4.6.4.1 Description of Alternative

Alternative 3A with the microtunneling alternative would follow the same alignment as the Master Plan Alternative 3A, but microtunneling would be used instead of HDD. Microtunneling for Alternative 3A is described in the CFS. The top of the microtunnel casing would be 65 feet below the channel bed. The microtunneling jacking shaft entry pit would be located on the northeast side of Glascock Street on Derby Avenue in Oakland connecting to a receiving pit in Blanding Avenue on Alameda Island resulting in a drive of about 1,000 feet. The jacking shaft on Derby Avenue would be about 350 feet onshore to be away from the identified contaminated ground on the south side of the Glascock Street, the former site of the Shell Oil Company tanks. The receiving shaft would be placed in Blanding Avenue in an effort to remain within the public ROW.

4.6.4.2 Comparison of Environmental Impacts

The comparison of impacts is shown in Table 4.6-2. Alternative 3A would eliminate the significant and unavoidable traffic impact resulting from a 48-hour closure of Tilden Way at Broadway from Crossing #3 of the proposed project. Alternative 3A would, however, have environmental impacts associated with aesthetics, noise, air quality, and greenhouse gases due to the increased construction timeframe of 1 to 2 months of Alternative 3A. The greater aesthetics, noise, air quality, and greenhouse gases impacts from Alternative 3A would outweigh the very short-term, temporary traffic impact avoided by the alternative; therefore, Crossing #3 of the proposed project would be environmentally superior to Alternative 3A.

Table 4.6-1 Comparison of Alternative 1A from Master Plan to the Proposed Project

Resource	Proposed Alignment	Alternative 1A from Master Plan	No Project Alternative	Discussion of Proposed Project and Alternative 1A from Master Plan
Potential Impacts				
Aesthetics	LSM	LSM+	--	Like the proposed project, Alternative 1A from the Master Plan could result in short-term visual impacts due to construction activities. Alternative 1A would also require some tree removal that would necessitate tree replacement to reduce potentially significant impacts, similar to the proposed project. Impacts from Alternative 1A would be less than significant with application of the same mitigation as prescribed for the proposed project.
Air Quality	LSM	LSM+	--	Microtunneling under Alternative 1A from the Master Plan would require the removal of up to 4,900 more cubic feet of soils, which would increase potential particulate matter emissions as well as require more heavy truck trips that would generate more diesel exhaust emissions. Excavation would be as much as 36 percent higher than for the proposed project and construction would last approximately 1 to 2 months longer. Diesel particulate matter and $PM_{2.5}$ emissions would increase. Criteria pollutant emissions would still be below than thresholds (even with a 36 percent increase in emissions) but due to BAAQMD requirements for reducing fugitive dust emissions, the same mitigation would be required as for the proposed project.
Biological Resources	LSM	LSM=	--	Biological impacts under Alternative 1A from the Master Plan would be similar to the impacts from the proposed project, including potential frac-out impacts and potential impacts to special status bird species nesting along the project alignment. Impacts from Alternative 1A would be less than significant with application of the same mitigation as prescribed for the proposed project.
Cultural Resources	LSM	LSM=	--	Like the proposed alignment, construction of Alternative 1A from the Master Plan could result in vibration levels that have the potential to damage historic structures located along the alignment. Excavation activities also have the potential to disturb archaeological and paleontological resources or human remains, similar to the proposed project. Impacts from Alternative 1A would be less than significant with application of the same mitigation as prescribed for the proposed project.
Energy	--	-- +	--	Alternative 1A would have similar energy impacts as the proposed project; however, more energy would be used to construct the microtunnel than the HDD.

Resource	Proposed Alignment	Alternative 1A from Master Plan	No Project Alternative	Discussion of Proposed Project and Alternative 1A from Master Plan
Geology and Soils	LSM	LSM=	--	Issues related to surface fault rupture, liquefaction, groundshaking, landslides, erosion, unstable geologic units and expansive soils would be similar under the proposed alignment and Alternative 1A from the Master Plan. Impacts from Alternative 1A would be less than significant with application of the same mitigation as prescribed for the proposed project.
Greenhouse Gas Emissions	--	-- +	--	Alternative 1A from the Master Plan requires more excavation, and construction would last approximately 1 to 2 months longer than the proposed project. Construction-related greenhouse gas emissions could increase by 15 percent, which is still less than the BAAQMD threshold of 1,100 $MMTCO_2e$. Impacts would be less than significant.
Hazards and Hazardous Materials	LSM	LSM=	--	Impacts from Alternative 1A from the Master Plan would be similar to those identified for the proposed project, including impacts from exposure of workers to hazardous materials and/or damage to existing utility lines. Impacts from Alternative 1A would be less than significant with application of the same mitigations as prescribed for the proposed project.
Hydrology and Water Quality	LSM	LSM=	--	Impacts from Alternative 1A from the Master Plan would be similar to those identified for the proposed project, including impacts from stormwater runoff, impacts from frac-outs, and impacts from disposal of dewatered groundwater from excavations. Impacts from Alternative 1A would be less than significant with application of the same mitigations as prescribed for the proposed project.
Noise	SU	SU+	--	Impacts from Alternative 1A from the Master Plan would be similar to the noise impacts of the proposed projects. Noise impacts from open trench construction would be significant and unavoidable under both the proposed project and Alternative 1A from the Master Plan. Noise impacts from the microtunneling construction would be greater than for the proposed project as the activities would continue in proximity to housing for 1 to 2 months longer than for HDD under the proposed project. Alternative 1A would apply the same mitigations as prescribed for the proposed project.

Resource	Proposed Alignment	Alternative 1A from Master Plan	No Project Alternative	Discussion of Proposed Project and Alternative 1A from Master Plan
Recreation	LSM	LSM-	--	The pipeline alignment in Alternative 1A from the Master Plan would not pass through Estuary Park. Impacts to Estuary Park from the proposed project would be avoided with Alternative 1A from the Master Plan. Alternative 1A from the Master Plan would be located within a portion of the San Francisco Bay Trail, which may require closure during construction. Alternative 1A would apply the same mitigations as prescribed for the proposed project.
Transportation and Traffic	LSM	LSM=	--	Traffic impacts would generally be the same as for open trench construction of Alternative 1A from the Master Plan as for the proposed project. Impacts from the laydown for pipeline pull through, however, would be avoided as microtunneling does not require pull through. Traffic impacts associated with the trucking-out of up to 36 percent more excavated material, however, would have greater impacts than the proposed project. Impacts from Alternative 1A would be less than significant with application of the same mitigations as prescribed for the proposed project.

Legend:

LSM = Less than Significant with Mitigation

SU = Significant/Unavoidable with Mitigation

-- = Less than Significant or No Impact

+ = Impact would be greater under this alternative than under the proposed project

– = Impact would be less under this alternative than under the proposed project

= = Impacts would be the same (or similar) under this alternative as under the proposed project

Table 4.6-2 Comparison of Alternative 3A from Master Plan to the Proposed Project

Resource	Proposed Alignment	Alternative 3A from Master Plan	No Project Alternative	Discussion of Proposed Project and Alternative 3A from Master Plan
Potential Impacts				
Aesthetics	LSM	LSM=	--	Like the proposed project, Alternative 3A microtunneling could result in short-term visual impacts due to construction activities. Alternative 3A would also require some tree removal that would necessitate tree replacement to reduce potentially significant impacts, similar to the proposed project. Impacts from Alternative 3A microtunneling would be less than significant with application of the same mitigation as prescribed for the proposed project.
Air Quality	LSM	LSM+	--	Microtunneling for Alternative 3A would require the removal of up to 8,300 more cubic feet of soils and construction would last 1 to 2 months longer, which would increase potential particulate matter emissions as well as require more heavy truck trips (i.e., generate more diesel particulate matter and $PM_{2.5}$.) Criteria pollutant emissions would still be below than thresholds, assuming an increased construction timeframe of 1 to 2 months over the proposed project, but due to the requirements of the BAAQMD for reducing fugitive dust emissions, the same mitigation would be required as for the proposed project.
Biological Resources	LSM	LSM=	--	Biological impacts under Alternative 3A microtunneling would be similar to the impacts from the proposed project, including potential frac-out impacts and potential impacts to special status bird species nesting along the project alignment. The same mitigation as for the proposed project would avoid and/or minimize effects.
Cultural Resources	LSM	LSM=	--	Like the proposed alignment, construction of Alternative 3A microtunneling could result in vibration levels that have the potential to damage historic structures located along the alignment. Excavation activities also have the potential to disturb archaeological and paleontological resources or human remains, similar to the proposed project. The same mitigation as for the proposed project would avoid and/or minimize effects.
Energy	--	-- +	--	Alternative 3A microtunneling would have similar less than significant energy impacts as the proposed project; however, more energy would be used to construct the microtunnel than the HDD.

Resource	Proposed Alignment	Alternative 3A from Master Plan	No Project Alternative	Discussion of Proposed Project and Alternative 3A from Master Plan
Geology and Soils	LSM	LSM=	--	Issues related to surface fault rupture, liquefaction, groundshaking, landslides, erosion, unstable geologic units and expansive soils would be similar under the proposed alignment and Alternative 3A microtunneling. The same mitigation as for the proposed project would avoid effects.
Greenhouse Gas Emissions	--	-- +	--	Because Alternative 3A microtunneling requires more excavation, more greenhouse gas emissions would be generated. Construction-related greenhouse gas emissions could result from a 1- to 2-month longer construction timeframe for microtunneling. Emissions would remain below the BAAQMD GHG threshold and the impact would be less than significant.
Hazards and Hazardous Materials	LSM	LSM=	--	Impacts from Alternative 3A microtunneling would be similar to those identified for the proposed project, including impacts from exposure of workers to hazardous materials and/or damage to existing utility lines. The same mitigation as for the proposed project would avoid effects.
Hydrology and Water Quality	LSM	LSM=	--	Impacts from Alternative 3A microtunneling would be similar to those identified for the proposed project, including impacts from stormwater runoff, impacts from frac-outs, and impacts from disposal of dewatered groundwater from excavations. Impacts from Alternative 3A microtunneling would be less than significant with application of the same mitigation as prescribed for the proposed project.
Noise	SU	SU+	--	Impact from Alternative 3A microtunneling would be similar to the noise impacts of the proposed projects. Noise impacts from open trench construction would be significant and unavoidable under both the proposed project and Alternative 3A microtunneling. Noise impacts from the microtunneling construction would be greater than for the proposed project as the activities would continue in proximity to housing for 1 to 2 months longer than for HDD under the proposed project. Alternative 3A microtunneling would apply the same mitigation as prescribed for the proposed project.
Recreation	--	--	--	Neither the proposed alignment nor Alternative 3A microtunneling would impact recreational facilities.

Resource	Proposed Alignment	Alternative 3A from Master Plan	No Project Alternative	Discussion of Proposed Project and Alternative 3A from Master Plan
Transportation and Traffic	LSM/SU	LSM +	--	Traffic impacts would generally be the same as open trench construction for the proposed project. However, significant unavoidable impacts for a 48-hour period from the laydown/pull through along Tilden Way at Broadway and for alternative transportation would be avoided as microtunneling does not require pull through. Traffic impacts associated with the trucking out of 136 percent more excavated material, however, would have greater impacts than the proposed project, but impacts would still be less than significant with mitigation (which could limit the timing of removal of materials, if needed).

Legend:

LSM = Less than Significant with Mitigation

SU = Significant/Unavoidable with Mitigation

-- = Less than Significant or No Impact

+ = Impact would be greater under this alternative than under the proposed project

– = Impact would be less under this alternative than under the proposed project

= = Impacts would be the same (or similar) under this alternative as under the proposed project

4.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The environmentally superior alternative for Crossing #1 is identified as Alternative 1A because this Alternative would eliminate the impact at Estuary Park from the proposed project. Crossing #1 of the proposed project is, however, environmentally superior to Alternative 1A because Alternative 1A would have more environmental impacts associated with aesthetics, noise, air quality, and greenhouse gases due to its longer construction time frame of 1-2 months. There is no environmentally superior alternative for Crossing #2 because no alternative for Crossing #2 was identified that meets the project's basic objective, is feasible, and substantially lessens at least one potentially significant environmental impact of the proposed project. The environmentally superior alternative for Crossing #3 is identified as Alternative 3A because this alternative would eliminate the significant and unavoidable traffic impact resulting from a 48-hour closure of Tilden Way at Broadway from the proposed project. Crossing #3 of the proposed project is, however, environmentally superior to Alternative 3A because this Alternative would have more environmental impacts associated with aesthetics, noise, air quality, and greenhouse gases due to its longer construction time frame of 1 to 2 months.

4.8 REFERENCES

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5 OTHER CEQA CONSIDERATIONS

5.1 CUMULATIVE IMPACTS

Cumulative impacts, as defined in Section 15355 of the CEQA Guidelines, refer to two or more individual effects that, when taken together, are "considerable" or that compound or increase other environmental impacts. A cumulative impact from several projects is the change in the environment that would result from the incremental impact of the project when added to those of other closely related past, present, or reasonably foreseeable future projects. Pertinent guidance for cumulative impact analysis is provided in Section 15130 of the CEQA Guidelines:

- An EIR shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (e.g., the incremental effects of an individual project are considerable when viewed in connection with the effects of past, current, and probable future projects, including those outside the control of the agency, if necessary).
- An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR.
- A project's contribution is less than cumulatively considerable, and thus not significant, if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.
- The discussion of impact severity and likelihood of occurrence need not be as detailed as for effects attributable to the project alone.
- The focus of analysis should be on the cumulative impact to which the identified other projects contribute, rather than on attributes of the other projects that do not contribute to the cumulative impact.

The cumulative impact analysis for each individual resource topic is included in Section 5.1.3.

5.1.1 Approach to Analysis

Two approaches to a cumulative impact analysis are provided in CEQA Guidelines Section 15130(b)(1):

1. The analysis can be based on a list of past, present, and probable future projects producing related or cumulative impacts, or
2. A summary of projections contained in a General Plan or related planning document can be used to determine cumulative impacts.

For the purpose of this Draft EIR, the analysis employs the list-based approach. The following factors were used to determine an appropriate list of projects to be considered in the cumulative analysis:

- **Similar Environmental Impacts.** A relevant project contributes to effects on resources that are also affected by the proposed project. A relevant future project is defined as one that is "reasonably foreseeable," such as a proposed project for which an application has been filed with the approving agency or has approved funding.
- **Geographic Scope and Location.** A relevant project is located within the defined geographic scope for the cumulative effect.
- **Timing and Duration of Implementation.** Effects associated with activities for a relevant project (e.g., short-term construction or demolition, or long-term operations) that would likely coincide in timing with the effects of the proposed project.

5.1.2 Projects with Potentially Related or Cumulative Impacts

Present and reasonably foreseeable future projects that could contribute to the cumulative scenario are listed in Table 5.1-1. Past projects are considered part of the baseline condition that has contributed to existing impacts on the environment as documented in the environmental setting for each resource topic in Chapter 4. It should be noted that the reasonably foreseeable future projects are subject to independent environmental review and consideration by approving agencies. Consequently, it is possible that some of the reasonably foreseeable future projects will not be approved or will be modified prior to approval (e.g., as a result of the CEQA alternatives process). The table indicates the project name and type, a description of the project, and its location and status. Figure 5.1-1 shows the locations of all identified projects in relation to the proposed project. Each project in Table 5.1-1 has an assigned number that is keyed to Figure 5.1-1.

Projects were identified through review of websites and by contacting the surrounding local, state, and federal agencies/companies, including the following:

- City of Alameda
- City of Oakland
- Amtrak
- ACTC
- Bay Area Rapid Transit (BART)
- BCDC
- Port of Oakland
- Union Pacific
- State Lands Commission
- Caltrans
- PG&E
- USACE

Additional EBMUD projects within the vicinity of the proposed project were also identified. Cumulative projects were identified within Alameda Island, North Bay Farm Island, and within a 0.5-mile radius around all proposed project areas located within the city of Oakland. The entirety of Alameda Island and North Bay Farm Island was considered when identifying cumulative projects due to the small size and defined boundaries of those locations and the resulting likelihood that a project located within Alameda Island and North Bay Farm Island could have a cumulative impact. Projects outside of the 0.5-mile radius were also considered if they were determined to be relevant to the geographic scope of a particular environmental resource topic (e.g., air quality, traffic).

Crossing #1 is anticipated to be constructed between 2018 and 2019. Crossings #2 and #3 are anticipated to be constructed after 2020. The projects included in Table 5.1-1 are projects that can reasonably be projected based on available information; therefore, the projects listed in Table 5.1-1 are generally representative of the types of projects with potential for cumulative impacts that could occur further in the future.

5.1.3 Cumulative Impacts and Mitigation Measures

The majority of the cumulative projects are residential and/or commercial development projects (#1-#3, #5-#8, #10, #11, #13, #14b, #15, and #16). The remaining projects fall under the following categories: water infrastructure (#9, #17, #21, and #22), gas infrastructure (#20), fiber optics infrastructure (#4) alternative transportation—BART (#14, #14a, and #18), highway improvements (#12 and #19), and dredging projects (#23 and #24).

5.1.3.1 Aesthetics

Overview

The geographic extent for cumulative aesthetics impacts are any areas along or within public roads and parks in the line-of-sight of the staging, drilling, and open trench construction of the proposed project. Concurrent construction of the proposed project and the cumulative projects located within the line-of-sight of the proposed project has the potential to result in a cumulative visual impact. Cumulative projects listed in Table 5.1-1 that are within line-of-sight of the proposed project and could potentially impact the same visual resources are:

Crossing #1

- Del Monte Master Plan (#5)
- Jack London Square Redevelopment (#13)
- New Operations Control Center – Lake Merritt BART (#14a)
- Transit Oriented Development around Lake Merritt BART (#14b)
- Madison and 4th Project (#15)
- PG&E 24-inch Gas Pipeline Relocation (#20)

Crossing #2

- AT&T Alameda to Bay Farm Island HDPE Conduit Crossing (#4)
- Harbor Bay Residential and Athletic Club Project (#6)[1]

Crossing #3

- PG&E 24-inch Gas Pipeline Relocation (#20)

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1 The Harbor Bay Residential and Athletic Club Project have the potential to be completed prior to the start of project construction.

Figure 5.1-1 Map of Cumulative Projects

Table 5.1-1 Cumulative Projects

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
City of Alameda							
1	2100 Clement Avenue	City of Alameda	Development of 52 new residential units on the corner of Clement Avenue and Willow Street.	Residential Development	0.5 mile west of the Alameda side of Crossing #3	Construction is scheduled to begin in 2016 or 2017; however, the duration of construction is unknown (Thomas, personal communication 2015).	Potential Overlap
2	Alameda Point Project	City of Alameda	Redevelopment and reuse of the 878 acres of land and approximately 1,229 acres of water at the former Naval Air Station Alameda.	Residential/ Commercial Development	1.15 mile west of the Alameda side of Crossing #1	Construction is scheduled to begin in 2017 and would be completed in 2035 (Thomas, personal communication 2015).	Potential Overlap
3	Alameda Point Project (Site A)	City of Alameda	Component of the Alameda Point Project described No. 2. Construction would include the development of a mixed-use neighborhood on a 68-acre parcel with a total of 800 dwelling units, 600,000 square feet of retail, commercial, or hotel space, and 13.35 acres of publicly accessible parks and open space.	Residential/ Commercial Development	1.15 miles west of the Alameda side of Crossing #1	Construction is scheduled to begin in 2017; however, the duration of construction is unknown (Thomas, personal communication, October 29, 2015).	Potential Overlap
4	AT&T Alameda to Bay Farm Island HDPE Conduit Crossing	AT&T	The new placement of 3-4" conduit structure will link Veteran's Court on Bay Farm Island to Bridgeview Isle Road on Alameda Island, utilizing new fiber optics cables and Horizontal Directional Drilling method (Chen, personal	Fiber Optics Infrastructure	Adjacent to underwater portion of Crossing #2 (The conduit crossing is beneath San Leandro Bay Channel, connecting at	Construction was set to begin on May 1, 2016 and complete on June 30, 2016. However, due to easement access issue, below the estuary, construction is	No[1]

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
			communication, 2016).		Veteran's Court on Bay Farm Island, and Towata Park on Alameda Island)	delayed. As of April 27, start date is unknown (Arbelaez-Novak, personal communication 2016). The duration of construction is 2 months.	
5	Del Monte Master Plan	City of Alameda	Development of 414 units of residential lofts, townhomes and flats, and up to 25,000 square feet (sf) of retail space. The Del Monte Warehouse site (1501 Buena Vista Avenue) would be rehabilitated and reconstructed to contain 309 of the housing units and potentially all of the commercial space proposed.	Residential/ Commercial Development	Adjacent to the Alameda side of Crossing #1, near the intersection of Sherman Street and Buena Vista Avenue	Construction is scheduled to begin 2016/2017 and would have a 12-month duration (Thomas, personal communication 2015).	Potential Overlap
6	Harbor Bay Residential and Athletic Club Project	City of Alameda	The proposed development of the Harbor Bay Residential and Harbor Bay Athletic Club would consist of two components. The primary project component includes the construction and operation of 80 new single-family residential units on approximately 8.39 acres of land at 200 Packet Landing Road. The secondary project component includes the relocation of the existing Harbor Bay Athletic Club on 3 vacant parcels totaling approximately 8.95 acres	Residential/ Commercial Development	The residential units' component is adjacent to the North Bay Farm Island side of Crossing #2 The Harbor Bay Athletic Club component is 1.1 miles south of the North Bay Farm Island side of Crossing #2	Construction is scheduled to begin late 2016 or 2017, but the project has not yet been approved by the City of Alameda. (Thomas, personal communication 2015). The duration of construction is unknown.	Potential Overlap

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
			located on the north side of North Loop Road in the Harbor Bay Business Park.				
7	Harbor Bay Hotel	City of Alameda	Construction of a five-story hotel with 105 rooms on a waterfront property in the Harbor Bay Business Park for a total of approximately 62,250 square feet of floor area.	Commercial Development	1.3 miles south of the North Bay Farm Island side of Crossing #2	The project has a duration of 8 months (Thomas, personal communication 2015). Pending permitting, construction may begin as early as August 1, 2016 and complete on April 1, 2017 (Arbelaez-Novak, personal comm. 2016).	No
8	Marina Village Inn Addition	City of Alameda	Construction of a 326-room addition to an existing motel.	Commercial Development	800 feet north of Atlantic Avenue on the Alameda side of Crossing #1 at 1151 Pacific Marina	Permits have not been approved by the BCDC for this new smaller scale parcel. Construction will take 8 months and is scheduled to start in late 2016 (Michaels, personal comm., 2016 and Calpestri, personal comm. 2016).	No
9	Pipeline Replacement Project	EBMUD	The replacement of approximately 2,000 feet of 75-year old, cement, 8-inch pipeline. The pipeline to be replaced is located on Alameda Island on Marina Drive, from the intersection with Versailles Avenue to the intersection with Windsor	Water Infrastructure	1,000 feet east of the HDD pit on the Alameda side of Crossing #3	It is feasible that construction would begin in 2017 but the construction timeframe will not overlap with construction of Crossing #3 (Hope, personal comm. 2016).	No

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
			Drive.				
City of Oakland							
10	325 7th Street Project	City of Oakland	Demolition of existing structures and construction of two tall towers with 380 residential condominium units, 9,110 square feet of retail/office space, and 399 off-street parking spaces.	Residential/ Commercial Development	750 feet west of the Oakland side of Crossing #1	Construction has not begun and no building permits have been issued by the City of Oakland, as of late 2015 (H. Klein, personal comm. October 29, 2015). Construction would last a total of 3.5 years (6 months for demolition, excavation, and hazardous materials remediation if necessary; 6 months for construction of parking podium; 18 months for construction of Building 1; and 12 months for construction of Building 2) (Lamphier-Gregory 2011).	Potential Overlap

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
11	Brooklyn Basin Project (previously known as the Oak to 9th Mixed-Use Development)	City of Oakland	Construction of approximately 3,100 residential dwelling units (a mix of flats, townhomes, and lofts) on 13 development parcels, 200,000 square feet of ground-floor retail/commercial space, and 30 acres of park and open space along the shoreline. Two marinas would be renovated. The existing 9th Avenue Terminal building (165,000 square feet) would be demolished. Estuary Park, Channel Park, South Park, Gateway Park, and Shoreline Park would be expanded and improved.	Residential/ Commercial Development	A portion of the Brooklyn Basin Project (adjacent to Estuary Park) is located adjacent to a road where open trench construction and HDD would occur on the Oakland side of Crossing #1	The project is currently under construction and is scheduled to be completed by 2020 (Zarsion-OHP 1, LLC. 2015, Soo Hoo, personal communication, May 23, 2016).	Potential Overlap
12	I-880 Operational and Safety Improvements at 29th Avenue and 23rd Avenue Overcrossings	Caltrans	The 29th Avenue overcrossing and the two 23rd Avenue overcrossings would be replaced to provide the standard vertical clearances (16 feet, 6 inches) over I-880 and to accommodate 12-foot travel lanes, and 5-foot to 10-foot outside shoulders on northbound I-880. Improvements to the northbound I-880/29th Avenue and the northbound I-880/23rd Avenue interchanges would be made.	Highway Improvements	500 feet north of the Oakland side of Crossing #3	The project is currently under construction and is scheduled to be completed by the summer of 2018 (Caltrans 2015).	No
13	Jack London Square	City of Oakland	Development of mixed-use buildings along the water	Residential/ Commercial	0.3 mile west of the Oakland side of	Construction is scheduled to begin	Potential Overlap

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
	Redevelopment		front including 380,300 gross square feet (gsf) of office, 444,400 gsf of retail and restaurant space, 250-room hotel, 1,700-seat movie theater, and 120 residential units.	Development	Crossing #1	late 2016 and would have a 2-year duration (Webber, personal communication 2015).	
14	Lake Merritt Station Area Plan	City of Oakland	The Lake Merritt Station Area Plan will be a 25-year planning document for the area around the Lake Merritt BART Station, generally bounded by 14th Street to the north, I-880 to the south, Broadway to the west, and 5th Avenue to the east. The Plan will include recommendations for improvements to streets, open space, and new development.	Alternative Transportation – BART	Encompasses a portion of Crossing #1 pipeline alignment	The Lake Merritt Station Area Plan will be implemented between 2015 and 2040 (City of Oakland 2014). Individual projects resulting from the Plan are listed separately in the table, where known.	Potential Overlap
14a	New Operations Control Center	BART	Construct new operations control center, including expansion into and redesign of the plaza.	Alternative Transportation – BART	Adjacent to Crossing #1 in the city of Oakland, at the intersection of Madison Street and 8th Street, which is adjacent to the Lake Merritt Station	Construction for the Operations Control Center is scheduled for 2020 and operational in 2021 (Layton, personal communication 2016; Lindelof, personal communication 2016).	Potential Overlap
14b	Transit-Oriented Development	BART	Proposed project for an area that is zoned for a 275-foot tower with approximately 800 units for housing or offices. Project details will be available once the RFQ is released for a developer later	Residential/ Commercial Development	Adjacent to Crossing #1 in the city of Oakland, at the intersection of Madison Street and 8th Street, which is adjacent	Project timeline is currently unknown (Layton, personal communication 2016).	Potential Overlap

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
			in 2016.		to the Lake Merritt Station		
15	Madison and 4th Project	City of Oakland	Demolition of existing Cost Plus building and construction of 330 apartments and 3,000 square feet of office space.	Residential/ Commercial Development	Adjacent to Crossing #1 in the city of Oakland , along Jackson Street	Construction is scheduled to begin sometime between the summer of 2016 and the end of 2018 and would have a 2-year duration (Pasquali, personal communication 2015).	Potential Overlap
16	Modified T5/6 Project (Addendum #5 to City Center Project)	City of Oakland	Development on Site A (Phase 1), with up to a 262-unit residential building and 6,800 square feet of ground-floor retail space. Site B (Phase 2) will be subject to a Final PUD application at a later date, once the project sponsor has determined the final use, options for Site B include Option 1, a 300-room hotel; Option 2, a second 262-unit residential building; or Option 3 a 205,800 square-foot office building. All three options would include up to 8,000 square feet of ground-floor retail space.	Residential/ Commercial Development	0.5 mile northwest of the Oakland side of Crossing #1	Construction has not begun; the final development plans were issued in July 2015 but no building permits are on file as of late October 2015 (Payne, personal communication, 2015). Construction would last a total of 4 years (2 years for each phase) (ESA 2015).	Potential Overlap
17	New Pipeline Placement Project on Kennedy Street	EBMUD	Construction would involve the placement of a new pipeline in the City of Oakland, on Kennedy Street, between 23rd Avenue and East 7th Street.	Water Infrastructure	Adjacent to Blanding Street pipeline abandonment approximately 500 feet west of the Oakland side of Crossing #3	Construction schedule is unknown but the construction timeframe will not overlap with construction of Crossing #3 (Hope, personal	No

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
						communication 2016).	
18	Oakland Shop Spur Track Project	BART	Addition of a 1,200-foot spur track within BART's Oakland Maintenance Facility to provide temporary storage of a BART construction train to be used for transporting construction materials during non-revenue hours into the BART Transbay Tube (TBT) that will be used for internal seismic retrofit of the TBT to further strengthen the structure for major earthquake events.	Alternative Transportation – BART	3,000 feet east of Madison Street at Crossing #1 in the city of Oakland at 601 E. 8th Street	Construction will commence around August 2016 and is expected to be completed by summer 2017 (Layton, personal communication 2016).	No
19	Oakland Alameda Freeway Access Project	ACTC	The project would improve the spanning between Market St to Oak St and between 5th and 6th St in Oakland and connectivity for bicycle and pedestrian traffic across the I-880 between Chinatown and Jack London neighborhoods. Completion of the project would improve and provide connectivity from Alameda to I-880/I-980 and Oakland destinations such as the downtown area, including Chinatown, Jack London, and West Oakland.	Highway Improvements	Adjacent to Crossing #1 in the city of Oakland, on 5th Street, between Jackson Street and Oak Street	As of April 2016, project is in the Project Approval/Environmental Document phase. Completion of EIR is scheduled for 2018/2019 (Lam, pers. comm. 2016).	Potential Overlap
20	PG&E 24-Inch Gas Pipeline Relocation	CPUC	Construction would involve the replacement of a gas pipeline with a 24-inch gas pipeline.	Gas Infrastructure	On the Oakland side of Crossing #1, the pipeline would be placed on a portion of	Construction is scheduled to begin in January 2017; however, the duration of construction is	Potential Overlap

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
					Embarcadero West, where open trenching construction would occur On the Oakland side of Crossing #3, the pipeline would be located on Chapman Street, which is one block north (250 feet) of Ford Street, where open trench construction would occur.	unknown.	
21	Wastewater Force Main Improvements Project (WW-1)	EBMUD	The first phase of pipeline improvements includes installation of access manholes on each side of the waterway to allow for assessment and maintenance of the pipe interior and anchor structures. Excavation sizes are roughly estimated at 30 by 15 feet and 15-feet deep on the North Bay Farm Island side and 20 feet by 15 feet and 25-feet deep on the Alameda Island side. If the pipeline is found to be in good condition based on the condition assessment collected via the new manholes, EBMUD would either do nothing or improve vulnerable approach areas	Water Infrastructure	400 feet west from the HDD entry pit on the Alameda Island side of Crossing #2 and 500 feet west from the HDD insertion pit on the North Bay Farm Island side of Crossing #2	The construction timeframe will not overlap with construction of Crossing #2 (Hope, personal communication 2016). The first phase of pipeline improvements is access manhole improvements. Future potential improvements based on condition assessment work after manholes are in place have not been included in the Capital Improvement Projects for the 2016-	No

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
			with grout injection. If the pipeline interior is found to be in poor condition, EBMUD would rehabilitate the pipeline by lining and improving vulnerable approach areas or by replacing the pipeline and improving the vulnerable approach areas.			2020 fiscal years. Timing of future improvements will be dependent on future condition assessment findings.	
City of Alameda and City of Oakland							
22	East Bayshore Recycled Water Project (RW-1)	EBMUD	EBMUD plans to expand the distribution system of recycled water into Alameda, Albany and Berkeley. When the project is complete, up to 24 miles of distribution pipelines will be in place and up to 2.5 million gallons per day of recycled water will be available to East Bayshore Recycled Water Project customers. The project would entail the construction of recycled water pipelines to reach customers in Alameda, including the construction of a new pipeline under the Oakland Inner Harbor using HDD and near the location of the Alice Webster Crossing.	Water Infrastructure	0.3 mile west of HDD portion of Crossing #1 Adjacent to the proposed pipeline abandonment of the Alice-Webster underwater pipeline crossing	Construction is scheduled to begin around 2020 or 2021 and would have a 2-year duration (Parsons 2001). Construction will occur after Crossing #1 is constructed (Hope, personal communication 2016).	No
23	Maintenance Dredging of the Federal Navigation Channels in San	USACE	The proposed action is to continue maintenance dredging the federal navigation channels in the San Francisco Bay. Richmond	Dredging	Within the Oakland Inner Harbor and Tidal Canal, adjacent to Crossings #1 and	Annual activity, ongoing from 2015 to 2024	Potential Overlap

No.	Project Name	Lead Agency	Project Components	Type of Project	Proximity to Project Area	Estimated Construction Schedule	Schedule Overlap?
	Francisco Bay		Inner, Oakland Inner and Outer Harbor, and Redwood City will be dredged annually using a mechanical dredge.		#2 where in-channel geotechnical investigation borings would occur.		
24	Oakland Yacht Club Dredging Project	BCDC	Conduct maintenance dredging, approximately 2,000 cubic yards with disposal of material at the SF-11 Alcatraz disposal site.	Dredging	Within the Oakland Inner Harbor, adjacent to Crossing #1, where in-channel geotechnical investigation borings would occur.	The schedule for construction is currently unknown.	Potential Overlap

Note:

[1] Although the construction of the AT&T Alameda to Bay Farm Island HDPE Conduit Crossing Project is delayed, it is reasonable to assume that the construction schedule would not overlap with construction of Crossing #2 because the project was scheduled for construction in 2016, construction would only last 2 months, and Crossing #2 would not begin construction until as early as 2020.

Visual resources are limited in the proposed project area and the visual quality is generally low or low to moderate in the parks near the shorelines in Oakland and Alameda. Impacts from the proposed project are limited to impacts to visual character from construction and impacts from nighttime lighting during construction. These impacts are addressed in the cumulative analysis below.

Potential Visual Character or Quality Impacts

Construction of the proposed project would result in temporary visual changes to the area from the presence of equipment, graded earth, and personnel. Construction of the cumulative projects #4, #5, #6, #13, #14a, #14b, #15, and #20 also could result in similar impacts. The likelihood that construction of the proposed project and the cumulative projects would occur within the same view shed at the same time is minimal because construction of the proposed project would progress along the alignment at a rate of 80 to 200 feet per day. Were construction to occur in the same view shed, some cumulative visual impacts could result from the presence of construction equipment and from general construction activity in conjunction with construction of the proposed project. The number of impacted viewers would likely be minimal due to existing visual obstructions associated with the urban environment. Construction at any given location would not be visible from great distances due to the built features and flat topography of the project area. The visual character and visual sensitivity in the project area is low for most areas and low to moderate in Estuary Park and Towata Park. Even if more than one project were under construction within a given view shed, the potential cumulative aesthetic impacts from construction would be less than significant due to the temporary nature of the construction activities at any given location, the low viewer sensitivity, and the low to moderate visual quality of the area.

Construction of the proposed project would require the removal and trimming of trees within Towata Park in Alameda and potentially along city-maintained road medians in both Alameda and Oakland. The removal and trimming of trees could substantially degrade the visual character of the park and road medians. Several projects proposed for construction in the vicinity of the proposed project may also involve removal or trimming of trees along the same public roadways or parks within the same view shed. All of the development projects would be subject to the local tree ordinances, which would require tree replacement; however, EBMUD projects are exempt from local tree ordinances. If trees were removed in the areas of the four EBMUD cumulative projects (#9, #17, #21, and #22), which are also located near the shoreline in Oakland and Alameda, a significant cumulative impact could result. The proposed project's contribution to a significant aesthetics impact would be considerable. The proposed project includes Mitigation Measure Aesthetics-1 that requires tree replacement similar to projects subject to local tree ordinances and Mitigation Measure Recreation-3, which requires avoidance of tree removals to the extent feasible and restoration of landscaping within Towata Park and Estuary Park following construction in coordination with the local jurisdictions. Since removed trees and vegetation would be restored and/or replaced, the proposed project's contribution to a potentially significant cumulative impact to the visual character of the area would be temporary and less than significant.

Potential Impacts to Day or Nighttime Views from Light or Glare

Construction activities could occur for up to 24-hours a day on portions of the proposed project (e.g., at the HDD locations and where open trench construction occurs at roadway intersections in commercial zones), which would require illumination of construction work areas. Temporary night lighting has the potential to be visible from adjacent residences and public roadways. The cumulative projects that may be constructed in the vicinity of Crossings #1 and #2 may also generate new nighttime lighting, either during construction, or after they are completed (i.e., development projects may have new exterior lights). There are no construction projects proposed in the vicinity of Crossing #3 that have the potential to occur at the same time as Crossing #3.

Nighttime lighting from the proposed project could be potentially significant where located near residences such as near the HDD entry pit in Estuary Park. Other projects could also have nighttime construction lighting; however, nighttime lighting for construction is not expected to compound with lighting from cumulative projects since the lighting for the proposed project and cumulative projects would not be placed in close proximity to each other. The project area, additionally, is already subject to regular nighttime lighting typical of an urban environment; therefore, the proposed project would not contribute considerably to a cumulative significant impact associated with nighttime lighting. Cumulative impacts from nighttime lighting for construction of the proposed project would be less than significant.

The proposed project would not create new sources of glare; therefore, no cumulative impact would result.

5.1.3.2 Air Quality

Overview

Air quality is a regional resource and is neither defined nor limited by jurisdictional boundaries, political boundaries, or project boundaries. The cumulative study area for air quality primarily encompasses activities within the Air Basin, which includes Alameda County, as detailed in Section 3.3: Air Quality. The Air Basin is in nonattainment for $PM_{2.5}$, PM_{10}, and O_3. Cumulative impacts on regional air quality are addressed by the BAAQMD thresholds of significance for construction and operational criteria pollutant emissions. The BAAQMD thresholds represent the levels at which a project's individual emissions of criteria pollutants and precursors would result in a cumulatively considerable contribution to the region's existing nonattainment. If a project's emissions exceed the BAAQMD thresholds, the project would result in a considerable contribution to the cumulatively significant air quality impact. Carbon monoxide hotspots or fugitive dust emissions have the potential to result in localized impacts.

The principal impact of the proposed project on air quality results from potential impacts to regional attainment from criteria air pollutants and potential impacts to sensitive receptors from pollutant concentrations. The cumulative impact analysis focuses on these potentially significant impacts.

Potential Impacts to Regional Attainment from Criteria Air Pollutants

The criteria air pollutant emissions from the proposed project have the potential to overlap with all of the cumulative projects shown in Figure 5.1-1. Criteria air pollutant emissions generated during construction of the proposed project would not exceed BAAQMD threshold, as shown in Table 3.3-7 (Section 3.3: Air Quality); therefore, the proposed project would not contribute considerably to a significant cumulative impact to $PM_{2.5}$, PM_{10}, and O_3 for which the region is in nonattainment. The cumulative impact would be less than significant.

Potential Impacts to Sensitive Receptors from Pollutant Concentrations

The proposed project impacts have the potential to overlap with several projects shown in Figure 5.1-1. BAAQMD has identified 1,000 feet as the zone of influence for analysis of pollutant concentrations on sensitive receptors; therefore, the cumulative projects with the potential to be constructed simultaneously and within 1,000 feet of the HDD construction have the potential to result in a cumulative localized emissions impact (BAAQMD 2010). Cumulative projects listed in Table 5.1-1 that are within 1,000 feet of HDD construction and have the potential to be constructed simultaneously are:

Crossing #1
- Del Monte Master Plan (#5)
- Jack London Square Redevelopment (#13)
- Madison and 4th Project (#15)
- Oakland Alameda Freeway Access Project (#19)
- PG&E 24-inch Gas Pipeline Relocation (#20)

Crossing #2
- Harbor Bay Residential and Athletic Club Project (#6)[2]

Crossing #3
- No Cumulative Projects

CO emissions from cumulative project construction traffic could result in localized pollutant impacts. BAAQMD screening guidance indicates that impacts with respect to CO levels would be significant if cumulative traffic volumes would increase at any affected intersection by more than 44,000 vehicles per hour. The proposed project would generate a relatively small volume of vehicle trips during construction, a maximum of 68 VPD of which 60 trips could be peak hour trips. The 44,000 vehicles per hour threshold far exceeds the trip generation that would be anticipated by cumulative projects. For example, the Madison Street and 4th Street Project is estimated to generate an additional 1,321 VPD once completed; the Jack London Square Redevelopment Project is estimated to generate an additional 24,914 VPD once completed; and the Del Monte Master Plan Project is estimated to generate an additional 3,861 VPD once completed (City of Oakland, 2016, ESA 2003, ESA 2014). The ADT for the Harbor Bay Residential and Athletic Club Project (#6) is not available and the PG&E 24-inch Gas Pipeline Relocation (#20) would not generate any operational traffic. The ADT of the cumulative projects

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2 The Harbor Bay Residential and Athletic Club Project has the potential to be completed prior to the start of project construction.

is presented in VPD; thus, the increase in vehicles per hour would be far below the 44,000 vehicles per hour threshold and the proposed project would not contribute considerably to a pollutant concentration cumulative impact. The cumulative impact from project-generated localized CO emissions would be less than significant.

The BAAQMD's CEQA Guidelines require evaluation of the project's contribution to cumulative TAC exposure of sensitive receptors in the project vicinity by considering all TAC mobile sources within 1,000 feet of the project site. In accordance with the BAAQMD's CEQA Guidelines, cumulative emissions of TACs would be significant if cumulative DPM emissions exceeded BAAQMD's risk and hazard thresholds of 100 excess cancer cases in a million, a Hazard Index (chronic and acute non-cancer risks) of 10, or annual average $PM_{2.5}$ concentrations of 0.8 $\mu g/m^3$.

The proposed HDD construction would generate DPM and fugitive $PM_{2.5}$ concentrations that would exceed the cancer risk on the entry sides for Crossings #1 and #3 and annual $PM_{2.5}$ concentration criteria from Crossing #3. There would be no exceedance from construction of Crossing #2. The cumulative projects proposed for construction in the vicinity of the underwater pipeline crossings would also generate DPM and fugitive $PM_{2.5}$ concentrations, which in combination with the proposed project could exceed the cancer risk and $PM_{2.5}$ concentrations. Cumulative impacts on sensitive receptors from pollutant concentrations generated by construction of Crossings #1 and #2 in combination with other cumulative projects could be potentially significant and the proposed project's contribution could be considerable. There are no projects in the vicinity of Crossing #3 proposed for construction at the same time.

Project-specific impacts to sensitive receptors would only occur during construction of the proposed pipelines. Implementation of Mitigation Measures Air-1, which requires the implementation of BMPs including watering exposed surfaces, minimizing idling time, minimizing vehicle speeds, and other practices and Mitigation Measure Air-2, which requires the selection of equipment during demolition, grading and open trench construction phases to minimize emissions would ensure that construction-generated air pollutants do not result in significant impacts on sensitive receptors. The BMPs required under Mitigation Measure Air-1 such as watering exposed surfaces would ensure that fugitive dust does not migrate away from the proposed project work sites and use of Tier 4 engines in larger construction equipment would minimize DPM reducing the project's contribution to a cumulatively significant impact. The cancer risk and $PM_{2.5}$ concentrations after mitigation from the proposed project would be insubstantial at Crossings #1 and #2, as shown in Table 3.3-11 in Section 3.3: Air Quality. With implementation of Mitigation Measures Air-1 and Air-2, the cumulative impact from the project's contribution to cancer risk and $PM_{2.5}$ concentration on sensitive receptors near Crossings #1 and #2 would not be considerable.

Potential New Sensitive Receptors at Crossing #2

There is a potential for new residential homes (Harbor Bay Residential and Athletic Club Project [#5]) to be built prior to and in close proximity to the proposed Crossing #2 HDD construction. The closest point to HDD construction would be 40 feet from the potential new sensitive receptors. The community risk analysis conducted for Crossing #2 in Section 3.3: Air Quality analyzed the risk from construction, including HDD construction, pipeline abandonment, and open trench construction on nearby sensitive receptors as close as 45 feet. The risk to sensitive receptors was determined to not exceed BAAQMD thresholds for cancer risk or non-cancer risk. The risk to sensitive receptors at 40 feet would be similar to the assessed risk at 45 feet, and also would not exceed BAAQMD thresholds for cancer risk or non-cancer risk. The cumulative impact scenario would be comparable to that described above for Crossing #2; therefore, cumulative impacts from pollutant concentrations on sensitive receptors near Crossing #2 would remain less than significant and the proposed project's contribution would not be cumulatively considerable.

Potential Impacts with the CAP

Emissions generated by transportation are a major contributor to $PM_{2.5}$, PM_{10}, and O_3 for which the Air Basin is in nonattainment. Substantial population or employment increases could affect transportation control strategies that are crucial for achieving attainment. The proposed project would not induce population growth; it would allow EBMUD to better serve existing customers by increasing reliability of the water distribution system. Because the proposed project does not propose activities that would change population or employment levels within the Air Basin, the proposed project would not conflict with or obstruct implementation of the applicable air quality plan. The emissions generated by the proposed project would not conflict with the recent Bay Area 2010 CAP since the emissions would be below BAAQMD criteria air pollutant thresholds, as shown in Table 3.3-7 (Section 3.3: Air Quality), and GHG thresholds, as shown in Table 3.8-4 (Section 3.8: Greenhouse Gases), and construction would be temporary. Emissions generated from the proposed project would not exceed any of the BAAQMD significance thresholds and, thus, the project's contribution to the cumulative impact would be less than significant.

5.1.3.3 Biological Resources

Overview

The geographic extent of the cumulative impacts analysis on biological resources varies depending on the biological resources impacted. The geographic extent for potential cumulative impacts to trees, special-status birds, and special-status bats is the same as the geographic extent for all cumulative projects, which is shown in Figure 5.1-1. The geographic extent for potential cumulative impacts to marine mammals is the water bodies surrounding Alameda Island. The geographic extent for potential cumulative indirect impacts to northern coastal salt marsh habitat is the represented by the geographic extent of cumulative projects within close proximity to the northern coastal salt marsh habitat; this geographic extent is appropriate because only projects within close proximity to northern coastal salt marsh could impact this habitat type. The geographic extent for potential cumulative impacts to special-status fish and potential cumulative indirect impacts to water bodies is 200 feet from the water bodies surrounding Alameda Island; this geographic extent is appropriate because it captures potential noise and vibration impacts to special-status fish and potential indirect impacts to water bodies.

Most of the proposed project area is characterized as urbanized, with little remaining natural vegetation and wildlife habitat. Most of the proposed project would pass through developed areas where project activities would have little to no effect on biological resources. The principal impacts of the proposed project on biological resources would result from potential impacts to trees in Towata Park and along road medians; potential impacts to special-status birds, bats, and the monarch butterfly; potential indirect impacts to special-status fish, and potential indirect impacts to sensitive habitat and the water bodies surrounding the city of Alameda. The cumulative impact analysis focuses on these potentially significant impacts.

Potential Impacts to Trees, Special-Status Birds, and Special-Status Bats

The proposed project includes excavation primarily in roads and hardscaped areas. Some tree removal may occur in medians, at the Telecare parking lot for the Crossing #1 HDD staging, and in Towata Park. Removal of vegetation and trees could impact migratory and/or special status bird species and/or special status bat species, and monarch butterfly along Crossing #1 on the city of Alameda side and along Crossing #2 at North Bay Farm Island. The cumulative projects identified in Table 5.1-1 would occur within developed areas in the city of Oakland and the city of Alameda. Although the cumulative projects are located in developed areas, the projects may also involve the removal of some trees, including trees that could be used by special-status or migratory birds and special-status bats. None of the cumulative projects would occur in areas where the monarch butterfly may be found, which is primarily at or near the Chuck Corica Golf Complex; therefore, cumulative impacts to the monarch butterfly are not anticipated. A cumulative effect to special-status bird or bat species could occur if impacts from other projects resulted in injury or death to the same population of special-status birds or bats as the proposed project. The development projects may require very limited tree removal. The EBMUD cumulative projects would have similar construction impacts to the proposed project, also with limited potential to impact birds and bats. Although unlikely, if multiple projects occurring at the same time resulted in injury or death to special-status birds or bats, impacts could be considered cumulatively significant. The proposed project's contribution to a significant biological resources cumulative impact could be considerable.

Mitigation Measure Aesthetics-1 would be implemented, which requires EBMUD to replace trees that are removed during construction; Mitigation Measure Biology-4, which requires EBMUD to perform pre-construction nesting bird surveys and to implement a no-disturbance buffer around active nests of special-status species; and Mitigation Measure Biology-7, which requires EBMUD to perform pre-construction bat surveys and to implement a disturbance-free buffer zone around active maternity roosts. With implementation of Mitigation Measures Aesthetics-1, Biology-4, and Biology-7, the proposed project would not result in impacts to trees because they would be replaced or to special-status bird or bat populations because they would be protected with disturbance-free zones, if encountered. The proposed project would, therefore, not contribute considerably to a significant cumulative impact.

Potential Impacts to Marine Mammals

A potentially significant cumulative impact to marine mammals could occur if cumulative projects contribute to noise, vibration, sediment, or mortality impacts to marine mammals.

Cumulative projects listed in Table 5.1-1 that are located within the water bodies surrounding Alameda Island include:

Crossing #1
- Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23)
- Oakland Yacht Club Dredging Project (#24)

Crossing #2
- No Cumulative Projects

Crossing #3
- Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23)

In-channel geotechnical borings would require the use of equipment that could generate sound and vibration, sediment plumes, mobilizes contaminants, and potentially collide with marine mammals. Construction for the cumulative projects would also require the use of equipment that could generate sound and vibration, sediment plumes, mobilizes contaminants, and potentially collide with marine mammals. Due to the use of equipment in the waterways around Alameda Island, in-channel geotechnical borings for Crossings #1 and #3 could result in a potentially significant cumulative impact. There are no projects in the vicinity of in-channel borings for Crossing #2 proposed for construction at the same time.

EBMUD would implement Mitigation Measures Biology-5 and Biology-6, which requires consultation with the NMFS pursuant to the Marine Mammal Protection Act and implementation of a Marine Mammal Monitoring Plan to avoid noise disturbances to passing marine mammals. EBMUD would therefore avoid impacts to marine mammals. With implementation of Mitigation Measures Biology-5 and Biology-6, the project's contribution to cumulative impacts from in-channel borings for Crossings #1 and #3 would be minimized. Therefore, the proposed project would not contribute considerably to cumulative impacts to marine mammals.

Potential Indirect Impacts to Northern Coastal Salt Marsh Habitat
The proposed project would have limited potential to indirectly impact northern coastal salt marsh habitat, a sensitive habitat, near Crossing #2. The proposed project is not located within any northern coastal salt marsh habitat; however, it is adjacent to marsh habitat near Crossing #2. Indirect impacts could occur if the project generated polluted run-off or erosion that impacted the habitat.

Two other cumulative projects are located close to Crossing #2 and close to (but not in) northern coastal salt marsh habitat. Work for EBMUD's Wastewater Force Main Improvement Project (#18) would occur on trails near northern coastal salt marsh habitat and the residential component of the Harbor Bay Residential and Athletic Club Project (#5) would occur on a property (200 Packet Landing) overlooking the water. Both cumulative projects would potentially require the use of hazardous materials during construction and would potentially require excavation. A significant cumulative impact could occur if the proposed project and the cumulative projects all indirectly impact the quality of northern coastal salt marsh habitat through the release of hazardous materials from an accidental spill or through the release of sediment to the northern costal salt marsh habitat from excavation. The proposed project's contribution to a significant biological resources cumulative impact could be considerable.

EBMUD's implementation of Standard Construction Specification 01 35 44, preparation and adherence to a SWPPP, and Mitigation Measure Biology-8 for the proposed project would avoid indirect impacts to northern coastal salt marsh habitat. EBMUD's Standard Construction Specification 01 35 44 requires the preparation and implementation of a Waste Control and Disposal Plan and a Water Control and Disposal Plan. The NPDES General Permit requires the preparation and implementation of a SWPPP. Mitigation Measure Biology-5 requires EBMUD to install silt and exclusion fencing around work areas near northern coastal salt marsh habitat. With implementation of EBMUD's Standard Construction Specification 01 35 44, the SWPPP, and Mitigation Measure Biology-8, the proposed project would not generate significant quantities of polluted runoff or eroded soil to enter the northern coastal salt marsh habitat; therefore, the project would not contribute considerably to any cumulative impacts to northern coastal salt marsh habitat.

Potential Impacts to Special-Status Fish

A potentially significant cumulative impact to special-status fish could occur if cumulative projects contribute to noise and vibrations impacts to special-status fish. Cumulative projects listed in Table 5.1-1 that are located within 200 feet of the water bodies surrounding Alameda Island include:

Crossing #1
- AT&T Alameda to Bay Farm Island HDPE Conduit Crossing (#4)
- Del Monte Master Plan (#5)
- Marina Village Inn Addition (#8)
- Brooklyn Basin Project (previously known as the Oak to 9th Mixed-Use Development) (#11)
- Jack London Square Redevelopment (#13)
- PG&E 24-inch Gas Pipeline Relocation (#20)
- East Bayshore Recycled Water Project (#22)
- Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23)
- Oakland Yacht Club Dredging Project (#24)

Crossing #2
- Harbor Bay Residential and Athletic Club Project (#6)[3]
- Harbor Bay Hotel (#7)

Crossing #3
- Pipeline Replacement Project (#9)
- PG&E 24-inch Gas Pipeline Relocation (#20)
- Wastewater Force Main Improvements Project (WW-1) (#21)

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[3] The Harbor Bay Residential and Athletic Club Project have the potential to be completed prior to the start of project construction.

- Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23)

In-channel geotechnical borings and construction of the proposed project would require the use of equipment that could generate sound and vibration in the water bodies around Alameda Island. Construction for the cumulative projects would require the use of equipment that generates sound and vibration. Due to the proposed in-channel borings and proximity of proposed construction activities, as well as the location of the cumulative projects to water bodies used by special-status fish, noise and vibration from equipment could result in a significant cumulative impact.

EBMUD would implement Mitigation Measure Biology-3, which requires vibratory pile driving to be conducted at least 200 feet from water bodies. EBMUD would therefore avoid noise and vibrations impacts to special-status fish. With implementation of Mitigation Measure Biology-3, the proposed project would avoid impacts. Therefore, the proposed project would not contribute considerably to cumulative impacts to special-status fish.

Potential Indirect Impacts to Water Bodies Use by Special-Status Fish
A potentially significant indirect cumulative impact to special-status fish could occur if cumulative projects contribute to pollutant and sediment runoff into water bodies within which special-status fish have the potential to live. Cumulative projects listed in Table 5.1-1 that are located within 200 feet of the water bodies surrounding Alameda Island include:

Crossing #1
- AT&T Alameda to Bay Farm Island HDPE Conduit Crossing (#4)
- Del Monte Master Plan (#5)
- Marina Village Inn Addition (#8)
- Brooklyn Basin Project (previously known as the Oak to 9th Mixed-Use Development) (#11)
- Jack London Square Redevelopment (#13)
- PG&E 24-inch Gas Pipeline Relocation (#20)
- East Bayshore Recycled Water Project (#22)
- Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23)
- Oakland Yacht Club Dredging Project (#24)

Crossing #2
- Harbor Bay Residential and Athletic Club Project (#6)[4]
- Harbor Bay Hotel (#7)

Crossing #3
- Pipeline Replacement Project (#9)
- PG&E 24-inch Gas Pipeline Relocation (#20)

[4] The Harbor Bay Residential and Athletic Club Project have the potential to be completed prior to the start of project construction.

- Wastewater Force Main Improvements Project (WW-1) (#21)
- Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23)

Construction of the proposed project could generate pollutant or sediment runoff into the water bodies around Alameda Island. A potentially significant cumulative impact to water bodies used by special-status fish could occur if the proposed project and cumulative projects contribute significant water quality impacts to waterbodies around Alameda Island. Construction of the proposed project could generate polluted stormwater runoff, off-site erosion, or frac-outs during HDD resulting in indirect impacts to nearby waterbodies. Increases in turbidity would be quickly diluted to near or within background particulate concentrations (USACE 2015). Pollutants, such as fine-grained bentonite clay and petroleum products could impact nearby water bodies.

In addition to the ten cumulative projects within 200 feet of water bodies, there are cumulative projects within 400 feet of water bodies (New Pipeline Placement Project on Kennedy Street (#17)) and within 1,800 feet of water bodies (Alameda Point Project (#2)). The maximum distance from a water body to a cumulative project is 3,600 feet (#16). Construction of the cumulative projects and construction of the proposed project could result in the following significant indirect cumulative impacts to water quality in surrounding water bodies:

- Turbidity plumes
- Construction stormwater discharges
- Contaminated runoff due to improper use, storage, or disposal of fuels, lubricants, and other chemicals used in construction; and
- Discharge of groundwater

As discussed in the Hazards and Hazardous Materials and the Hydrology and Water Quality cumulative impacts analyses, as with the proposed project, new development and construction projects in the area would also be required to control construction and operational stormwater by implementing federal, state, and local requirements. The imposition of such requirements on the proposed project and cumulative projects would ensure that cumulative impacts to hydrology and water quality and hazardous and hazardous materials would be less than significant. Because the cumulative impact to water quality would be less than significant, the impact from cumulative projects to special-status fish habitat would also be less than significant. Therefore, the proposed project would not contribute considerably to cumulative impacts to special-status fish.

5.1.3.4 Cultural Resources

Overview

The geographic extent for cultural resources includes Alameda Island, North Bay Farm Island, and areas within a 0.5-mile radius around all proposed project components located within the City of Oakland, the area where similar cultural resources can be found. The proposed project impacts have the potential to overlap with all of the projects listed in Table 5.1-1. Surrounding areas within the geographic extent are expected to have similar environments, landforms, and hydrology as the proposed project area due to proximity. Similar geography and geology would likely yield archaeological resources and fossils of similar sensitivity and quantity. No known archaeological or paleontological resources are located within the project area. Most of the project area has a low potential for inadvertent discovery of cultural resource materials. Portions of the project area are underlain by alluvial deposits that have a potential to contain fossils such as fresh water mollusks and extinct late Pleistocene vertebrate fossils. The cumulative analysis focuses on potential impacts to archaeological and paleontological resources, as well as human remains, to which the proposed project could have potentially significant impacts.

Potential Impacts to Archaeological Resources, Human Remains, or Paleontological Resources

The proposed project has the potential to damage, during ground-disturbing activities, previously undiscovered archaeological resources that may be eligible for listing in the CRHR or significant paleontological resources. Construction also has a low potential to unearth human remains. All of the cumulative projects also involve ground disturbance and, therefore, have the potential to damage known or previously undiscovered buried archaeological or historical resources, paleontological resources, or human remains. If several unique archaeological or paleontological resources or human burials are all damaged by various construction projects, it could result in the loss of cultural or earth history, which would be considered a cumulatively significant impact. The proposed project's contribution to a significant cultural resources cumulative impact could be considerable.

EBMUD would implement Mitigation Measures Cultural-1, which requires that the construction crew be trained about the procedures and protocols in the event a potentially significant historic and/or prehistoric archaeological resources; Mitigation Measure Cultural-2, which provides the protocol to follow in the event that a historical or cultural resource is identified, including halting work within 100 feet of the cultural resource; Mitigation Measure Cultural-3, which provides the protocol in the event that human remains are found, including halting work within 100 feet of the discovery; and Mitigation Measure Cultural-4, which provides the protocol to follow in the event that paleontological resources are discovered, including halting work within 100 feet of the resource. Implementation of Mitigation Measures Cultural-1, Cultural-2, Cultural-3, and Cultural-4 would ensure that construction of the proposed project does not result in the loss of cultural history by halting work when a cultural resource is encountered and by following the appropriate protocols to preserve the resource. The proposed project would, therefore, not contribute considerably to a significant cumulative impact.

5.1.3.5 Geology and Soils

Impacts on geology and soils are generally localized and do not result in regionally cumulative impacts. The geographical extent for cumulative impacts to geology and soils includes areas in and immediately adjacent to the project area because erosion and soil stability impacts from the proposed project would be confined to immediately adjacent areas. Cumulative projects listed in Table 5.1-1 that are immediately adjacent to the proposed project construction areas and proposed pipeline alignments are:

Crossing #1
- Del Monte Master Plan (#5)
- Jack London Square Redevelopment (#13)
- New Operations Control Center – Lake Merritt BART (#14a)
- Madison and 4th Project (#15)
- Oakland Alameda Freeway Access Project (#19)
- PG&E 24-inch Gas Pipeline Relocation (#20)
- East Bayshore Recycled Water Project (#22)

Crossing #2
- Harbor Bay Residential and Athletic Club Project (#6)[5]
- Wastewater Force Main Improvements Project (#21)

Crossing #3
- New Pipeline Placement Project (#17)

The proposed project area is in a topographically flat area. Soils hazards are most prominent, with much of the proposed project being located in areas of Very High liquefaction potential as well as some corrosivity and erosion potential. The proposed project area, as with all of the Bay Area, is prone to seismic hazards due to proximity to faults. The proposed project does not cross any faults. The proposed project could have impacts from seismic hazards and soil hazards.

The potential for a significant seismic event to occur in the vicinity of the proposed pipeline alignments is high over the lifetime of the project. Many of the potentially cumulative projects listed in Table 5.1-1 could also be subject to these seismic effects, which is a potentially significant cumulative impact because many of the projects would increase the number of people potentially exposed to seismically-induced hazards. However, the proposed project would not contribute considerably to this impact because the project does not include habitable structures or otherwise introduce new people to the project area.

The potential for liquefaction, lateral spread, and presence of expansive soil (Young Bay Mud) may apply stresses to the pipelines that could lead to failure due to cracks or breaks in the line. The identified cumulative projects could also have localized geologic impacts, including impacts from seismic and soil hazards. These impacts are highly localized and given the hardscape and urban environment, the flat topography, the proposed project would not contribute considerably to a cumulative impact as impacts would not readily combine to generate greater impacts.

[5] The Harbor Bay Residential and Athletic Club Project has the potential to be completed prior to the start of project construction.

5.1.3.6 Greenhouse Gases

GHGs are global pollutants and have long atmospheric lifetimes of one year to several thousand years, which permits dispersal of GHGs around the globe. The quantity of GHGs required to ultimately result in climate change is not precisely known. However, a single project is very unlikely to measurably contribute to a noticeable incremental change in the global average temperature, or to the global, local, or microclimate.

5.1.3.7 Hazards and Hazardous Materials

The geographic extent for the analysis of potential cumulative hazards and hazardous materials impacts includes areas where hazardous materials are used for proposed project activities and the immediately surrounding area where spills or upset could have combined impacts.

Cumulative hazard impacts are site specific and depend on past, present, and future industrial uses and existing soil, sediment, and groundwater conditions. The proposed project area is not located within any areas of known hazardous materials sites (Cortese List sites). The chemical quality of soil and groundwater that may be encountered during project-related excavation has not been assessed but due to previous industrial activities in the area and the extent of landfill in the project area, there is some potential to encounter hazardous materials.

The principal impact of the proposed project is associated with the routine transport, use, and disposal of hazardous materials and accidental hazardous materials releases during construction; the accidental release of high-priority subsurface utilities; the disturbance of subsurface hazardous materials; and impacts to sensitive receptors. The cumulative impact analysis focuses on these potentially significant impacts.

Routine Transport, Use, and Disposal of Hazardous Materials and Accidental Hazardous Materials Releases during Construction

Use of hazardous materials for the proposed project would be minimal during construction. The potential for spills is low. Like the proposed project, construction of the cumulative projects would use minor fuels, lubricants, and other hazardous materials associated with the construction process. There would be no significant cumulative impact associated with the routine transport, use, and disposal of hazardous materials because developers and entities responsible for the construction of the cumulative projects and the proposed project would follow the same regulations that EBMUD would follow during construction of the proposed project to prevent release of hazardous materials. These regulations include the Construction General Permit, which requires the preparation of a SWPPP; CUPA programs, which regulate use of hazardous materials; and RCRA regulations, US DOT regulations, and CUPA programs, which regulate the transportation of hazardous materials (see Impact Hazards-1 and Impact Hazards-2 for a description of the regulations).

Accidental Rupture of High-Priory Subsurface Utilities

Excavation during construction of the proposed project has the potential to damage high-priority subsurface utilities, resulting in hazards to construction workers, the public and the environment as discussed in Impact Hazards-2. All of the cumulative projects identified in

Table 5.1-1 could potentially require excavation that could also potentially damage high-priory subsurface utilities. Damage by several projects to the same utility is unlikely, but if it occurred could result in a significant cumulative impact.

EBMUD would implement Mitigation Measure Hazards-1, which requires EBMUD to identify buried utilities prior to any excavation activities and Mitigation Measure Hazards-2, which requires EBMUD to implement the Excavation Safety Plan and Electrical Safety Plan. The Safety Plan includes measures to protect the health of workers from hazardous voltages on pipelines and appurtenances as a result of electromagnetic induction from nearby electrical transmission lines. With implementation of Mitigation Measures Hazards-1 and Hazards-2, the proposed project would likely not impact subsurface utilities and; therefore, the proposed project would not contribute considerably to cumulative impacts.

Disturbance of Subsurface Hazardous Materials

Subsurface hazardous materials may be encountered during excavation of the proposed project and cumulative projects. There are hazardous materials release sites identified as under active regulatory oversight for ongoing investigation and cleanup activities within 0.25 mile of the proposed project. The open hazardous materials release sites would also be in close proximity to the cumulative projects identified in Table 5.1-1. Because excavation would occur for the proposed project and because excavation would most likely occur for all of the cumulative projects, similar subsurface hazardous materials could be released by both the proposed project and construction of the cumulative projects. The cumulative impact from the release of subsurface hazardous materials would be considered significant. The proposed project's contribution to a significant subsurface hazardous materials release cumulative impact could be considerable.

EBMUD would implement practices and procedures from the Environmental Compliance Manual and Standard Construction Specifications in Section 01 35 44 Environmental Requirements (see Impact Hazards-2). EBMUD would also implement Mitigation Measure Hazards-3, which requires EBMUD to conduct a site assessment; Mitigation Measure Hazards-4, which requires EBMUD to conduct a site investigation; and Mitigation Measure Hazards-5, which requires the implementation of a project safety and health plan. Mitigation Measure Hazards-3, Hazards-4, and Hazards-5 would ensure that EBMUD properly identifies and disposes of hazardous materials. The proposed project would not contribute considerably to the cumulative impact resulting from disturbance of subsurface hazardous materials because EBMUD would properly dispose of any hazardous materials that are encountered during construction.

Impacts to Sensitive Receptors

Cumulative projects listed in Table 5.1-1 that are located within 0.25 mile of schools and within 0.25 mile of the proposed project include:

Crossing #1	• 325 7th Street Project (#10) • Lake Merritt Station Area Plan (#14) • Oakland Shop Spur Track Project (#18) • Oakland Alameda Freeway Access Project (#19)
Crossing #2	• Harbor Bay Residential and Athletic Club Project (#6)[6] • Wastewater Force Main Improvements Project (#21)
Crossing #3	• I-880 Operational and Safety Improvements at 29th Avenue and 23rd Avenue Overcrossings (#12) • New Pipeline Placement Project (#17)

Similar to the proposed project, excavation at the cumulative project sites could expose sensitive receptors to potentially contaminated soils, dust, and diesel emissions from machinery. A significant cumulative impact could occur if construction for the cumulative projects occurred at the same time as construction for the proposed project. As discussed previously in the cumulative Air Quality analysis, the cumulative impact from CO would be less than significant and the cumulative impact from cancer risk due to TACs would be less than significant after implementation of Mitigation Measures Air-1 and Air-2 (see Section 5.1.3.2). The cumulative impact from the use of hazardous materials within the vicinity of sensitive receptors would be less than significant because the cumulative projects would adhere to the same safety regulations that the proposed project would adhere to, as discussed above under the cumulative impacts from the routine transport, use, and disposal of hazardous materials and accidental hazardous materials releases during construction.

Boating Hazards

The proposed project would require the use of vessels for the in-channel geotechnical investigation borings. Vessels would be used along each of the underwater crossing alignments. Two cumulative projects would also use vessels within the waterways surrounding Alameda Island. The Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23) would perform dredging in the Oakland Inner Harbor and Tidal Canal but not in the San Leandro Bay Channel. The Oakland Yacht Club Dredging Project (#24) would also involve dredging in the Oakland Inner Harbor but not in the Tidal Canal or San Leandro Bay Channel. Because the cumulative projects would not have boats in the San Leandro Bay Channel, no cumulative boating hazard impact would occur for Crossing #2. Boat traffic would be generated by the Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23),

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[6] The Harbor Bay Residential and Athletic Club Project have the potential to be completed prior to the start of project construction.

the Oakland Yacht Club Dredging Project (#24), and the proposed project. The boat traffic generated by the cumulative projects and the proposed project would not be significant because the use of up to three vessels (assuming one for each project) within the Oakland Inner Harbor and up to two vessels within the Tidal Canal would represent routine traffic. Furthermore, the cumulative boating hazard impact from in-channel borings for Crossings #1 and #3 would be less than significant because the cumulative projects would be required to adhere to the same regulations as the proposed project, which are established by the VTS.

5.1.3.8 Hydrology and Water Quality

Overview
The geographic extent for the analysis of potential cumulative hydrology and water quality impacts consists of the watersheds affected by the proposed project (see Figure 3.10-1). The analysis of potential cumulative impacts on hydrology and water quality considers those cumulative projects listed in Table 5.1-1.

The principal impacts of the proposed project are associated with water quality impacts, impacts to water quality standards, groundwater impacts, impacts associated with the alteration of drainage patterns, impacts associated with increased runoff, and potential flooding impacts from pipeline leaks. The cumulative impact analysis focuses on these potentially significant impacts.

Impacts to Water Quality and Water Quality Standards
The proposed project could impact water quality through the discharge of hydrostatic testing water, the discharge of dewatered groundwater, the discharge of polluted stormwater, the discharge of drilling fluids from HDD (frac-out), and from the in-channel geotechnical investigation borings. Increases in turbidity would be short term and minor. Any potential increases in turbidity concentrations would be quickly diluted to near or within background particulate concentrations (USACE 2015). Except for frac-out, the water quality impacts are typical for construction projects located in the proposed project vicinity and the impacts could also occur from implementation of the cumulative projects. Significant cumulative impacts could occur if several projects impact the surrounding water bodies (e.g., Tidal Canal, Oakland Estuary, San Leandro Bay Channel, etc.). The proposed project's contribution to a significant water quality impact could be considerable.

As discussed in Impact Hydro-1, EBMUD would minimize impacts to water quality from stormwater discharge, discharge of dewatered groundwater, and discharge of hydrostatic testing water by implementing and complying with EBMUD's Standard Construction Specification 01 35 44 requirements and local and state regulations. As discussed in Impact Hydro-5, EBMUD would implement Mitigation Measure Hydro-1 to minimize impacts from the accidental release of drilling fluids during HDD. Mitigation Measure Hydro-1 requires EBMUD to prepare and implement a Frac-Out Contingency Plan, which requires monitoring and coordination with applicable regulatory agencies. Other new developments in the area would also be required to control construction and operational stormwater by implementing federal, state, and local requirements regarding hydrology and water quality, as well as by requirements introduced through CEQA review, where applicable. The imposition of such requirements would ensure that cumulative impacts to hydrology and water quality would be less than significant.

Groundwater Impacts
Construction of the proposed project would potentially require groundwater dewatering. Groundwater dewatering may also be required during excavation activities for construction of the cumulative projects. A significant cumulative impact could occur if enough construction groundwater dewatering from cumulative projects and the proposed project affected the same groundwater resources. The amount of groundwater that would be dewatered from development projects as well as other EBMUD projects is not known, but due to the short duration of construction in each area, the cone of depression would be isolated to the immediate project area and would not affect groundwater resources outside of individual project right-of-ways. Therefore, cumulative groundwater impacts from construction are not anticipated.

Impacts Associated with the Alteration of Drainage Patterns and Increased Runoff
Due to the highly urbanized environment and the lack of streams or natural drainage courses in the area, the proposed project would not alter drainage patterns. Since the other cumulative projects are all in the same urban environment, a significant cumulative impact to drainage patterns is unlikely to occur.

5.1.3.9 Noise

Overview
The geographic extent for potential cumulative noise impacts is within 0.25 mile of the proposed project area, because noise from different sources within approximately 0.25 mile of each other could combine to cumulatively create elevated noise levels that may be a temporary significant impact to receptors at any point between the projects. A cumulative noise impact would only occur if construction for a cumulative project also occurred at the same time as the proposed project. Cumulative projects listed in Table 5.1-1 that are located within 0.25 mile of the project area and that may have potentially overlapping schedule are:

Crossing #1
- Del Monte Master Plan (#5)
- 325 7th Street Project (#10)
- Jack London Square Redevelopment (#13)
- Lake Merritt Station Area Plan (#14)
- Madison and 4th Project (#15)
- Oakland Alameda Freeway Access Project (#19)
- PG&E 24-inch Gas Pipeline Relocation (#20)
- Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23)
- Oakland Yacht Club Dredging Project (#24)

Crossing #2
- Harbor Bay Residential and Athletic Club Project (#6)

Crossing #3
- Maintenance Dredging of the Federal Navigation Channels in

San Francisco Bay (#23)

Noise Impacts
The proposed project is located within an urban environment with typical ambient noise levels. Sensitive receptors include residences and schools near the cumulative projects. Noise impacts from the proposed project would be temporary and limited to the times when construction would occur. A cumulative noise impact could occur if construction activities occurred at the same time as construction of cumulative projects and the noise from both projects compounded to exceed noise standards. The cumulative noise impact analysis is described by crossing.

Crossing #1
Nine cumulative projects are located within 0.25 mile of proposed project that may have potentially overlapping schedule. Any schedule overlap with the proposed project could cause cumulative construction-related noise impacts on residential receptors located near the roads where open trench construction, jack and bore construction, pipeline abandonment, and HDD would occur. The noise impacts are not quantifiable at this time, as the equipment that would be used and the construction methods for cumulative projects are not known. It is assumed that standard construction equipment would be used. If pile driving, jackhammering, or other high noise generating methods are used, the noise from cumulative projects could compound with that generated by the proposed project, resulting in a significant cumulative noise impact.

EBMUD would implement Mitigation Measure Noise-1, which would require the implementation of noise control measures. Mitigation Measure Noise-1 would reduce the impacts of most construction activities to less than significant. The noise impacts from open trench construction on the Oakland side of Crossing #1 would remain significant and unavoidable even after implementation of Mitigation Measure Noise-1. Cumulative noise effects could be significant and the proposed project's contribution to potential cumulative noise increases would be considerable and significant (and unavoidable).

Crossing #2
The Harbor Bay Residential and Athletic Club Project (#5) is scheduled to begin construction in late 2016 or 2017 and is located adjacent to where HDD would occur on North Bay Farm Island. Construction for Crossing #2 is scheduled to begin after 2020. There is the potential that construction for the proposed project and the Harbor Bay Residential and Athletic Club Project (#5) would occur at the same time. Due to the proximity of the two projects to each other, cumulative construction-related noise impacts could occur. The proposed project would generate significant noise impacts in the daytime from HDD and pipeline laydown and assembly. The proposed project would also generate significant noise impacts in the nighttime from pipeline connection activities and HDD pull through. The noise reduction measures in Mitigation Measure Noise-1 would reduce certain impacts to less than significant; however, pipeline connection activities, which have the potential to occur during the night, and HDD pull activities that would occur during the night would generate noise levels that remain significant and unavoidable. Cumulative noise effects could be significant and the proposed project's

contribution to potential cumulative noise increases would be considerable and significant (and unavoidable).

Potential New Sensitive Receptors at Crossing #2

If construction for the Harbor Bay Residential and Athletic Club Project (#6) is completed before construction for Crossing #2 has begun, additional residences could potentially be located near where HDD, pipeline laydown and assembly, pipeline connection activities, and HDD pull through would occur; new residences would be about 40 feet away from these activities. Impacts to future residents would be similar to those analyzed in Section 3.11: Noise (see Table 3.11-9 and Table 3.11-10). Noise impacts would be less than significant with mitigation for daytime activities and significant and unavoidable for nighttime activities. Similar to the Crossing #2 analysis above, cumulative noise effects could be significant and the proposed project's contribution to potential cumulative noise increases would be considerable and significant (and unavoidable).

Crossing #3

The Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay (#23) is the only cumulative project located within 0.25 mile of Crossing #3 that may occur at the same time as constriction of Crossing #3. The noise generated by the in-channel geotechnical investigation borings would not exceed thresholds (Table 9 in Appendix I). The noise impact would be less than significant. The proposed project would not contribute considerably to a cumulative noise impact.

Vibration

All Crossings

Vibration impacts from the proposed project would be temporary and limited to the times when construction would occur. A cumulative vibration impact could occur if construction occurred at the same time as construction of cumulative projects within 35 feet of the proposed project (vibration impacts generally dissipate within 35 feet of the equipment, see Table 3.11-11 in Section 3.11: Noise). It is reasonable to assume that none of the other cumulative projects would occur at the same time as the proposed project and within 35 feet of the proposed project, as it would not be feasible to undertake two projects with heavy equipment in such close proximity. Therefore, cumulative vibration impacts would not occur.

Potential New Sensitive Receptors at Crossing #2

If construction for the Harbor Bay Residential and Athletic Club Project (#6) is completed before construction for Crossing #2 has begun, additional residences could potentially be located near where HDD and abandonment of the two existing underwater pipelines would occur. The new residences would be 40 feet from where HDD and abandonment of the two existing underwater pipelines would occur. The vibration impacts would be similar to those analyzed in Section 3.11: Noise (see Table 3.11-11). The vibration impacts from construction of Crossing #2 would be less than significant with Mitigation Measure Noise-2. Cumulative noise and vibration impacts would be as described above.

5.1.3.10 Recreation

Overview

The geographic extent for cumulative impacts on the demand for and increased use of recreational resources includes the regional recreational facilities located in the geographic extent identified for cumulative projects shown in Figure 5.1-1 and, therefore, includes all cumulative projects. The geographic extent for cumulative impacts to recreational experience encompasses the proposed project pipeline alignments and immediately adjacent areas that could be affected by proposed project construction activities. The vast majority of the recreational resource geographic extent is characterized as an urbanized setting with neighborhood parks and some regional parks within the vicinity. A total of eleven recreational facilities are located within 1,000 feet of the proposed project area, as shown in Table 3.12-1 (Section 3.12: Recreation).

The principal impacts of the proposed project on recreation are associated with changes in the use of recreational resources that would occur during construction of the proposed project, including the potential for physical deterioration of certain parks due to increased use of parks and impacts to recreational experience due to adjacent construction activities. The cumulative impact analysis focuses on these potentially significant impacts.

Physical Deterioration of Parks Due to Increased Use of Parks

The proposed geotechnical boring and construction activities at or near Estuary Park, Towata Park, and along portions of the San Francisco Bay Trail would not result in increased use of these recreational facilities. Proposed project activities would require temporary closure of portions of Estuary Park, Towata Park, and the San Francisco Bay Trail which could result in increased use and potentially deterioration of other nearby parks. Most of the cumulative projects would not be located within a park and would not have direct impacts resulting in the increased use of parks. The only exception is the Brooklyn Basin Project (#11) which includes expansion and improvements to Estuary Park, Channel Park, South Park, Gateway Park, and Shoreline Park. The Brooklyn Basin Project is currently under construction and is anticipated to be completed in 2020 (Soo Hoo, personal communication, May 23, 2016). There could be overlap with the construction schedule for Crossing #1. The park improvements proposed by the Brooklyn Basin Project would necessitate temporary park closures during construction which could increase the use of existing parks, temporarily. Additionally, the cumulative development projects (#1 through #3, #5 through #8, #10, #11, #13, #14b, #15, and #16) would potentially increase the use of existing parks during operation. The eleven cumulative development projects would result in the construction of 6,213 housing units and 681 hotel units. The development of new homes would increase the population and use of parks and could potentially physically deteriorate parks. The temporary and permanent impact to parks would be a significant cumulative impact.

The temporary impacts and closures to portions of Estuary Park and Towata Park from proposed project construction and the temporary closure of portions of the San Francisco Bay Trail may result in temporary increased use of other parks; however, the increased use would be temporary and would be substantially less than the potential increased demand on recreational park resources resulting from the eleven cumulative development projects. Furthermore, some of the cumulative development projects include the creation of additional recreational facilities and parks which would compensate for the increased demand for recreational park resources. The proposed project would not contribute considerably to a cumulative recreation impact. The cumulative impact would be less than significant.

Direct Impacts to Recreational Experience

Most of the cumulative projects would not be located within a park and would not have direct impacts to the recreational experience of park users; the only exception is the Brooklyn Basin Project described above, which would require temporary park closures during park expansion and improvements. The Brooklyn Basin Project would improve Estuary Park with a paved cul-de-sac and additional parking (see Figure 5.1-2). These park improvements would necessitate temporary park closures during construction. The Brooklyn Basin Project (#11) is scheduled to be completed by 2020 and its construction could overlap with the construction schedule for proposed Crossing #1 (to be constructed in 2018–2019). The timing for construction of the proposed improvements within Estuary Park are not certain. Section 3.12: Recreation analyzes the impact of the proposed project on baseline conditions with no improvements to Estuary Park. To provide a conservative cumulative analysis two scenarios are analyzed in detail below, construction of Estuary Park improvements prior to (Scenario 1) and during (Scenario 2) construction of Crossing #1.

Scenario 1

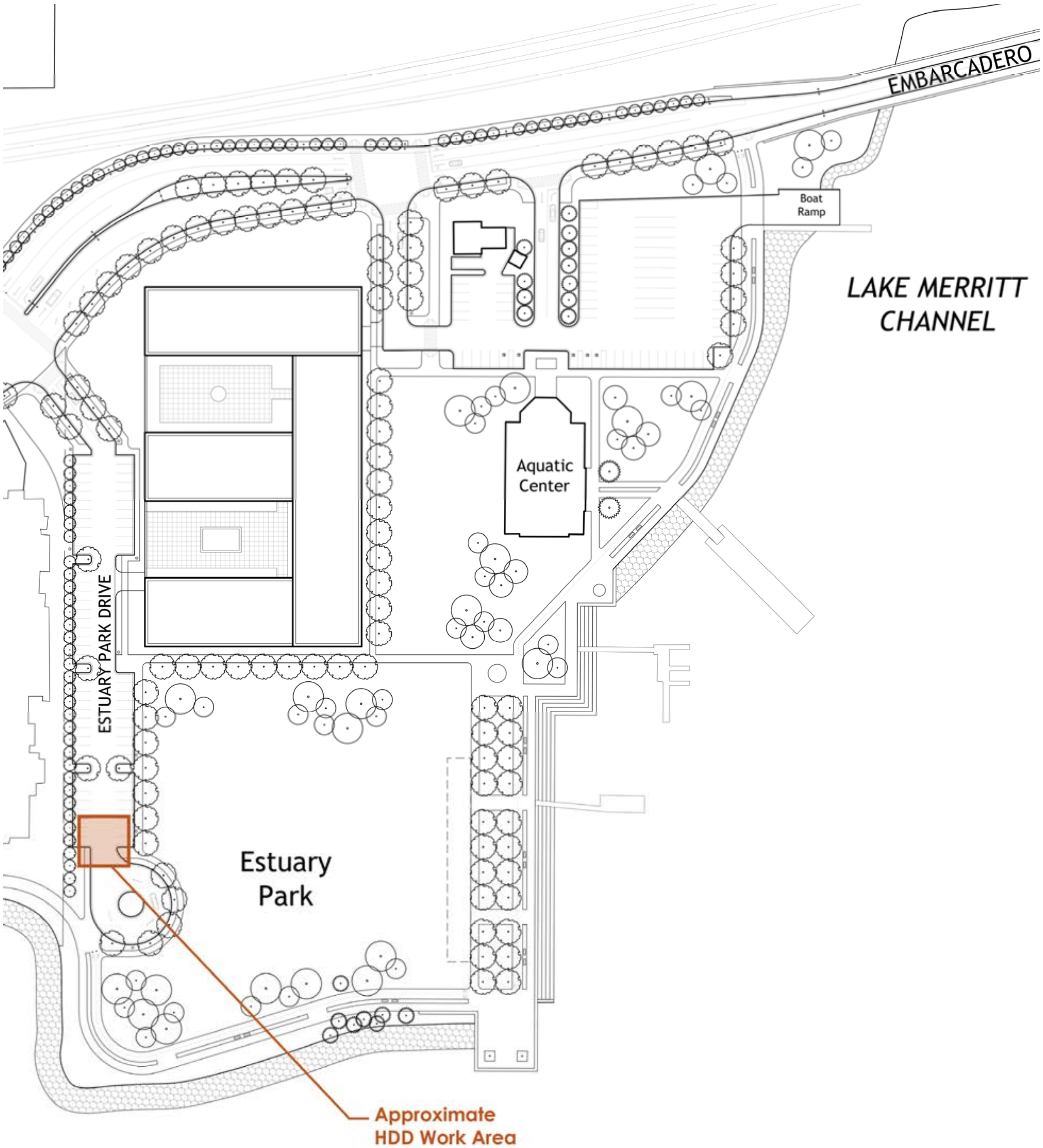
Estuary Park improvements have the potential to be completed before construction of Crossing #1. The temporary HDD activities and associated staging for Crossing #1 would occupy a small portion of Estuary Park, approximately 0.06 acre, as shown in Figure 5.1-2. Although the closure and construction activities would be temporary, the direct impacts from Crossing #1 to the recreational experience at the improved park could be significant.

EBMUD would implement Mitigation Measures Recreation-1, Recreation-2, and Aesthetics-1, which would reduce the impact by ensuring that the park and roadway are restored to the pre-construction condition after construction has been completed. Additionally, people that do not wish to use Estuary Park because of the temporary presence of construction activity could use another nearby park located within the City of Oakland. The proposed project would not contribute considerably to a cumulative direct impact. The cumulative direct impact to recreational experience would be less than significant.

Scenario 2

Construction of the Estuary Park improvements has the potential to occur simultaneously as construction of Crossing #1. The temporary HDD activities and associated staging for Crossing #1 would occupy a small portion of Estuary Park. During construction of the Estuary Park improvements it is anticipated that the park would be temporarily closed to recreational users. The cumulative project could result in a potentially cumulative direct impact to recreational experience. As the park would be closed to recreational users regardless of HDD activities, the

Figure 5.1-2 Crossing #1 HDD Work Area Following Estuary Park Improvements



Note:
The HDD work area is anticipated to require upwards of 2,500 square feet and is represented here as an approximate 50 foot by 50 foot area. The final size, shape, and location of the HDD work area may vary from this conceptual representation.

proposed project would not contribute considerably to a cumulative direct impact. The cumulative direct impact to recreational experience would be less than significant.

Indirect Impacts to Recreational Experience
The New Operation Control Center of the Lake Merritt Station Area Plan is located close to Madison Park (#14a), near the Oakland side of Crossing #1; the Del Monte Master Plan (#5) is located close to Littlejohn Park, near the Alameda side of Crossing #1; and the AT&T Alameda to Bay Farm Island HDPE Conduit Crossing Project (#4) and the Wastewater Force Main Improvement Project (#21) are located close to Towata Park on the Alameda Island side of Crossing #2. The construction schedule for the AT&T Alameda to Bay Farm Island HDPE Conduit Crossing Project and the Wastewater Force Main Improvement Project would not overlap with the construction schedule for Crossing #2. The timeline for construction of the New Operation Control Center (2020–2021) and the Del Monte Master Plan (2016–2018) could potentially overlap with construction of Crossing #1 (2018–2019). If construction of the proposed project were to occur at the same time as the New Operation Control Center and the Del Monte Master Plan, cumulative temporary noise impacts could indirectly impact the recreational experience of park users. However, there are other neighborhood parks and regional parks in the vicinity that could be used by residents, including an additional 158 neighborhood parks in Oakland and Alameda and 65 other regional parks in the vicinity. Therefore, the proposed project would not contribute considerably to a cumulative indirect impact associated with recreational experience during construction. The cumulative indirect impact to the recreational experience would be less than significant.

5.1.3.11 Transportation and Traffic

Overview
The geographic extent for cumulative traffic impacts includes the local and regional roadways and highways that would be used for construction activities and for access by construction workers and vehicles, and temporary detour routes used when roads on the pipeline alignments need to be closed during construction.

A cumulative impact would occur if construction of a cumulative project coincided with construction of the proposed project. Cumulative projects that would potentially be constructed at the same time as the proposed project are:

Crossing #1

- Alameda Point Project (#2)
- Alameda Point Project (Site A) (#3)
- Del Monte Master Plan (#5)
- 325 7th Street Project (#10)
- Jack London Square Redevelopment (#13)
- New Operations Control Center – Lake Merritt BART (#14a)
- Transit Oriented Development around Lake Merritt BART (#14b)
- Madison and 4th Project (#15)
- Modified T5/6 Project (#16)
- Oakland Alameda Freeway Access Project (#19)

	• PG&E 24-Inch Gas Pipeline Relocation (#20)
Crossing #2	• Harbor Bay Residential and Athletic Club Project (#6)[7] • Harbor Bay Hotel (#7)
Crossing #3	• 2100 Clement Avenue (#1)

The principal impacts of the proposed project on transportation and traffic are associated with impacts to LOS; impacts to pedestrian, bicyclists, and public transit; impacts to a congestion management plan, traffic hazard impacts and emergency access impacts. The cumulative impact analysis focuses on these potentially significant impacts.

Impacts to LOS

Impacts to LOS due to the proposed project would be temporary and limited to the times when construction would occur. A cumulative impact to LOS could occur if construction activities occurred at the same time as construction of cumulative projects and the traffic from both projects compounded to significantly affect LOS. The cumulative impact analysis is described by crossing.

Crossing #1 (Oakland)

Open trench construction on Madison Street and Embarcadero West would result in significant impacts to the LOS of detour routes (Jackson Street) and Embarcadero West.

There are five development projects, including 325 7th Street Project (#10), Jack London Square Redevelopment (#13), Transit Oriented Development around Lake Merritt BART (#14b), Madison and 4th Project (#15), and Modified T5/6 Project (#16) that could result in a cumulative impact from increased construction traffic. In addition, there is one alternative transportation–BART cumulative project (New Operations Control Center – Lake Merritt BART [#14a]) that could potentially result in a cumulative impact. The Oakland Alameda Freeway Access Project (#19) and the PG&E 24-Inch Gas Pipeline Relocation (#20) could also potentially result in a cumulative traffic impact. The number of additional vehicles that would be required for the construction of cumulative projects is not quantifiable at this time because it is unknown how many vehicles or equipment could be used by the cumulative projects. It is likely that construction vehicles for cumulative projects would use the detour routes that would be required by the proposed project; therefore, it is likely that traffic from construction of the proposed project and cumulative projects would result in a significant cumulative impact. The proposed project's contribution to the cumulative impact on traffic could be considerable. Implementation of Mitigation Measure Traffic-1 (Construction Traffic Management Plan), Traffic-2 (Traffic Control), and Traffic-3 (flag persons at un-signalized intersections) would return the LOS of roadways affected by the proposed project to baseline conditions (see

[7] The Harbor Bay Residential and Athletic Club Project have the potential to be completed prior to the start of project construction.

Table 3.13-7). The proposed project's contribution to cumulative traffic impacts would not be considerable with implementation of Mitigation Measures Traffic-1, Traffic-2, and Traffic-3; therefore, the project's contribution to a cumulative impact would be less than significant.

Crossing #1 (Alameda)
Open trench construction on the Alameda side of Crossing #1 would require partial and full closure of roadways and use of detours; however, impacts to LOS for roadways affected by construction would be less than significant.

There are three cumulative projects located close to the Alameda side of Crossing #1, the Alameda Point Project (#2), the Alameda Point Project (Site A) (#3), and the Del Monte Master Plan (#4). None of the cumulative projects would directly affect the same roadways that would be affected by the proposed project; however, the Del Monte Master Plan (#4) is located adjacent to Sherman Street where construction would occur for the proposed project. The only cumulative impact that could occur would result from the additional vehicles that would be required during construction of the cumulative projects. Although the number of additional vehicles that would be required for the construction of cumulative projects is not quantifiable at this time, it is likely that construction vehicles for cumulative projects would use some of the detour routes that would be required by the proposed project. There is the potential for a significant cumulative impact on LOS from the additional construction traffic and the proposed project's contribution could be considerable.

The implementation of Mitigation Measure Traffic-3, requires the use of flag persons at un-signalized intersections and would return the LOS of roadways affected by the proposed project to baseline conditions (see Table 3.13-7). The proposed project's contribution to cumulative traffic impacts would not be considerable with implementation of Mitigation Measure Traffic-3; therefore, the cumulative impact would be less than significant.

Crossing #2
Construction of the North Bay Farm Island side of Crossing #2 would not cause any significant impacts to the LOS of any roadways. Construction of the proposed project would require the temporary full closure of Veterans Court for HDD work; however, the impact is not considered significant because Veterans Court is a short road (approximately 0.1 mile) that leads to a dead end. Detours would not be necessary for the temporary full closure of Veterans Court. Although the road would be closed, there would be no traffic impact; therefore, no cumulative impact would occur.

Crossing #3 (Oakland)
There are no cumulative projects located within the vicinity of the Oakland side of Crossing #3 and that would occur at the same time as construction of the proposed project; therefore, no cumulative impacts would occur.

Crossing #3 (Alameda)
HDD pull through at Crossing #3 would require the temporary (48-hour) full closure of Tilden Way at Broadway over the weekend, which would result in significant and unavoidable traffic

(LOS) impacts on the detour routes. Construction of Crossing #3 may also potentially require the closure of Tilden Way at Broadway/Eagle Avenue for open trench construction if the alternate trench alignment option (Broadway to Eagle Avenue) is chosen.

A cumulative impact could occur if traffic impacts from construction of the cumulative project, 2100 Clement Avenue (#1), combined with the traffic impacts of the proposed project. The cumulative project, 2100 Clement Avenue (#1), is a development project located approximately 0.4 mile west of Crossing #3. 2100 Clement Avenue (#1) would likely not impact any roads or require any detours. The only cumulative impact that could occur would result from the additional vehicles that would be required for construction of the cumulative project. It is likely that the cumulative project, 2100 Clement Avenue (#1), would use the detour routes that would be required by the proposed project and which would be significantly affected by proposed project construction activities. Construction of the 2100 Clement Avenue cumulative project would likely be limited to the weekdays. If construction for the 2100 Clement Avenue cumulative project does not occur during the weekend, the cumulative impact from the HDD pull through would be avoided. Because it cannot be determined whether construction of the 2100 Clement Avenue cumulative project would be limited to the weekdays; the cumulative traffic impact from HDD pull through could be significant and the project's contribution would be considerable. If the alternative trench option is used and Tilden Way is closed at Broadway/Eagle Avenue the cumulative traffic impact would be significant and the project's contribution would be considerable.

EBMUD would implement Mitigation Measure Traffic-1 (Construction Traffic Management Plan), Traffic-3 (flag persons at un-signalized intersections), and Traffic-4 (Traffic Control and Maintaining Traffic Flow at Crossing #3); however, the impacts would remain significant and unavoidable because Tilden Way would have to be closed for 48 hours at Broadway for the HDD pipeline pull through. The proposed project's contribution to potential cumulative traffic impacts may also be considerable and significant (and unavoidable).

Impacts to Pedestrian, Bicyclists, and Public Transit
No cumulative projects would directly affect any of the same roadways that would be affected by the proposed project. The only cumulative impact that could occur would result from the additional vehicles that would be required during construction of the cumulative projects on local roadways that would also support proposed project construction. The addition of vehicles from the cumulative projects would not affect the use of sidewalks by pedestrians or the use of bicycle lanes by bicyclists; therefore, there would be no cumulative impacts to sidewalks and bicycle facilities.

The proposed project would require roadways closures that would potentially affect some public transit lines. The cumulative projects would, however, not affect roadways in such a way that they would also affect the routes or availability of bus stops. The only cumulative public transit effect would result from the increased traffic from the cumulative projects.

For Crossing #1 and Crossing #2, Mitigation Measure Traffic-5 requires that EBMUD notify and coordinate with AC Transit to relocate bus stops and/or reroute transit services when public transit would be affected by partial to full street closures resulting from proposed project construction. Because Mitigation Measure Traffic-5 requires coordination with AC Transit and because the cumulative projects would not actually affect the roadways but would only add a certain number of cars to the roadway, it is unlikely that bus lines would be significantly affected by the cumulative projects. There would be no cumulative public transit impact at Crossing #1 or Crossing #2.

For Crossing #3, EBMUD would also implement Mitigation Measure Traffic-4 (jack and bore under Tilden Way on Everett Street) in addition to Mitigation Measure Traffic-5; impacts would remain significant and unavoidable because the HDD pull through on Tilden Way and Broadway in Alameda would require the temporary (48-hour) re-routing of transit service on Broadway (between Blanding Avenue and Tilden Way). No cumulative projects are anticipated to be constructed at the same time as Crossing #3; EBMUD has indicated that the Marina Drive Pipeline Replacement Project (#9) would not be constructed concurrently with the proposed project, and the 2100 Clement Avenue Project (#1) is scheduled to be completed before Crossing #3 is constructed. There would be no cumulative impact to public transit at Crossing #3.

Congestion Management Plan
Construction of the proposed project would not conflict with established Alameda County standards for their congestion management program (LOS standards, traffic demand management) for roads and highways during construction because the proposed project would not be generating over 100 peak hour trips or represent a General Plan Amendment that would typically trigger an ACTC analysis on the CMP roadway network. Therefore, the proposed project would not contribute to a cumulative traffic congestion impact.

Traffic Hazards Impacts
The proposed project would require the presence of open trenches, construction equipment, construction workers, and vehicles in proximity to flowing traffic, which would create a potential temporary hazard for both workers and vehicular traffic. The projects would not create cumulative traffic hazards because none of the cumulative projects would affect the same roadway at the same time. The EBMUD water infrastructure projects (#9, #17, #21, and #22) would not occur at the same time as the proposed project and would, therefore, not impact the same roadways at the same time. The PG&E 24-inch Gas Pipeline Relocation Project (#20) would not occur on the same roadways at the same time as the proposed project because it would not be feasible to conduct open trench construction for both pipelines at the same time.

Construction of the cumulative projects would, however, generate traffic that could exacerbate traffic hazards associated with the proposed project, resulting in a significant cumulative impact. EBMUD would implement Mitigation Measure Traffic-1, which requires use of barricades with construction mounted signs or combined with electronic changeable signs for road closures and use of construction cones for marking partial closures associated with the proposed project. These measures would prevent and reduce traffic hazards associated with the proposed project. The proposed project's contribution to cumulative traffic hazard impacts would not be considerable with implementation of Mitigation Measures Traffic-1.

Emergency Access Impacts

The full and partial closure of roadways during construction of the proposed project could result in impacts to emergency access. The traffic generated during construction of cumulative projects could exacerbate the impact to emergency access through increased delays and detours on proposed project area roadways, resulting in a cumulative impact. EBMUD would implement Mitigation Measure Traffic-6, which requires notification and coordination with emergency response services, the use of easily removed, temporary barricades, and the removal of barricades and closure of open trenches at the end of each work day. These measures would limit the periods when emergency access is impacted and through removal of barricades in an emergency situation. The proposed project's contribution to cumulative emergency access impacts would not be considerable with implementation of Mitigation Measures Traffic-6.

5.2 GROWTH INDUCEMENT

State CEQA Guidelines Section 15126(d) requires that an EIR evaluate the potential growth-inducing impacts of a proposed project. Section 15126.2(d) of the State CEQA Guidelines provides the following guidance for the discussion of potential growth-inducing impacts: "… discuss the ways in which a project could foster economic or population growth, or the construction of additional housing either directly or indirectly, in a surrounding environment." Projects that remove obstacles to population growth also must be considered in this discussion. An example of a project that could "remove obstacles to population growth" is resolving constraints on required public services or utilities. Direct or indirect growth inducement "may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects" (State CEQA Guidelines Section 15126.2(d)). The CEQA Guidelines conclude that "it must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

Local land use plans provide for land use development patterns and growth policies that allow the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service. Typically, the growth-inducing potential of a project or program would be considered significant if it encourages growth or a concentration of population in excess of what is projected in the adopted general plan of the community in which the project is located, or significantly exceeds the population and employment projections made by regional planning agencies.

In accordance with California Government Code Section 65300, land use agencies in EBMUD's service area, such as the City of Alameda, develop and adopt long-term planning documents such as general plans for the physical development within their jurisdiction. These planning documents determine the nature and intensity of land uses to be served by EBMUD. The City of Alameda's General Plan, including components that influence water demand such as the Land Use and Housing Elements, was adopted by the Alameda City Council and amended over time. For example, the City of Alameda's Housing Element was updated in 2014 and identified infill growth within areas of the City of Alameda already designated for development consistent with adopted General Plan policies. Also included in the City of Alameda's General Plan are two area-specific plans, the Alameda Northern Waterfront Project and Alameda Point Project. Demand associated with Alameda's planned growth, as set forth in those approved planning documents, was accounted for in EBMUD's 2040 Demand Study which was used to determine Project sizing and design.

Completed in 2009, the 2040 Demand Study is an extensive and exhaustive study of factors to forecast future water demands to the year 2040 in EBMUD's service area. The 2040 Demand Study divided EBMUD's service area into 11 regions and future water demands were forecasted by region based upon planned land use and development within each region, as identified in the general plans of the land use agencies within each region. Considering the development forecast by the City of Alameda in its General Plan, as part of the 2040 Demand Study, EBMUD determined Alameda's future water demand. The Project is designed to serve demands for the City of Alameda identified in the 2040 Demand Study, and those demands where determined based largely on projected land use changes identified in the City of Alameda's General Plan.

In 2014 EBMUD completed a Mid-Cycle Demand Assessment which updated the 2040 Demand Study projections based on recent changes in development within its service area, including within the City of Alameda, due to General Plan changes and also due to drought and economic conditions since the 2040 Demand Study was originally adopted. The Mid-Cycle Demand Assessment found that the magnitude of demand projections would remain the same but the timing of growth would be delayed. Thus, the original demand estimates developed for the City of Alameda remain valid and are tied to planned development therein.

As explained above, the Project would serve planned land-use changes and redevelopment projects within the City of Alameda as identified in the City of Alameda's General Plan, which informed the water demands identified in the 2040 Demand Study. The project is designed to meet the demand projections of the 2040 Demand Study. Because the 2040 Demand Study's demand projections for the City of Alameda are based on planned development already disclosed and incorporated into the City of Alameda's General Plan and subsequent amendments thereto, implementation of the Project would not support growth beyond planned levels or in areas not planned for development by the City of Alameda. The Project would neither directly nor indirectly support unplanned economic expansion, population growth, or residential construction within the City of Alameda or elsewhere in the EBMUD service area. Therefore, any potential growth-inducing impacts from the Project would be less than significant.

5.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Pursuant to Section 15126.2 (c) of the CEQA Guidelines, an EIR must address significant irreversible environmental changes and irretrievable commitments of resources that would be caused by the proposed project. Changes include uses of non-renewable resources during construction and operation and irreversible damages that may result from project-related accidents.

Implementation of the proposed project would require irreversible commitment of natural resources including construction materials and energy required for construction. Commitment of non-renewable natural resources used in construction would include gravel, petroleum products, steel, and other materials. Commitment of energy resources for construction would include fuel oil, natural gas, and gasoline for heavy machinery.

During construction of the proposed project, potential accidents could occur that could result in significant irreversible changes. As described in Section 3.9: Hazards and Hazardous Materials, impacts would be less than significant because EBMUD would comply with local and state regulations. In addition, EBMUD would implement a Spill Prevention and Response Plan as a part of EBMUD's Standard Construction Specifications. The proposed project would have acceptable response times, and other performance objectives for emergency response that would be available to service the project area in the event of an accident.

Operation of the proposed project would not require the use of energy; therefore, there would not be any significant irreversible environmental changes from operation of the proposed project.

5.4 SIGNIFICANT UNAVOIDABLE IMPACTS

Section 15126.2(b) of the CEQA Guidelines requires that an EIR identify significant environmental effects that cannot be avoided by the proposed project, even with implementation of mitigation measures. The environmental impacts of the proposed project are described in the environmental analysis sections in Chapter 3. Impacts that are significant and cannot be reduced to less than significant through the application of feasible mitigation measures have been characterized as significant and unavoidable impacts. The significant and unavoidable impacts resulting from the proposed project are described below. Complete descriptions of each impact are presented in Chapter 3.

- **Noise.** The proposed project could expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, and could result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the proposed project. The significant and unavoidable impact caused by several activities would result from both construction during the day (Open trench construction, jack and bore, HDD, and pipeline abandonments) and at night (pipeline connections, HDD pull through, and open trench construction at intersections with arterial roadways as required by the encroachment permit). These activities would affect a limited number of locations. Significant daytime noise would occur for fewer than 10 days at all locations except for the HDD entry at Crossing #3, jack and bore at Otis Street for Crossing #2, and jack and bore at Tilden Way for Crossing #3. Significant nighttime noise would occur for fewer than 10 days at all locations and most locations where significant nighttime noise may occur would experience noise for less than 1 day. Noise impacts could also be cumulatively significant and unavoidable at the affected locations.

- **Transportation and Traffic (LOS).** Construction of Crossing #3 would result in a significant impact to LOS standards from HDD pull through activities. HDD pull through activities at Crossing #3 would require the closure of Tilden Way at Broadway for 48 hours. The LOS of detour routes would exceed LOS standards. Impacts would be significant and unavoidable for the 48 hours that Tilden Way at Broadway is closed. An alternate trench option is available at Crossing #3 and if used, would require the closure of Tilden Way at Eagle Avenue/Broadway for 2 weeks for open trench construction. If the alternate trench option is selected, the impact to LOS would be significant and unavoidable for the 2 weeks that Tilden Way at Eagle Avenue/Broadway is closed. Traffic impacts could also be cumulatively significant and unavoidable.
- **Transportation and Traffic (Public Transit).** Construction at Crossing #3 would potentially impact AC transit routes, as a result of construction activities along Broadway and Tilden Way and along Tilden Way and Eagle Avenue/Broadway, if the alternate trench option is chosen. The AC transit routes would require temporary re-routing. Impacts to public transit would be significant and unavoidable for the 48 hours that Tilden Way is closed at Broadway and potentially for 2 weeks if the alternate trench option is chosen and Tilden Way is closed at Eagle Avenue/Broadway.

5.5 REFERENCES

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6 REPORT PREPARATION

6.1 REPORT PREPARERS

This section lists the individuals who either prepared or participated in the preparation of this EIR.

6.1.1 Lead Agency

The Lead Agency for the proposed project is:

East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

Table 6.1-1 identifies the EBMUD personnel that contributed to the preparation of this EIR, including the EBMUD personnel that provided project direction and the personnel that acted in a supporting role for the project.

Table 6.1-1 Lead Agency Team

Contributor	Title
Project Direction	
Xavier J. Irias	Director, of Engineering and Construction Department
Aaron Hope	Project Manager
Bill Maggiore	Senior Civil Engineer
David Rehnstrom	Manager, Water Distribution Planning Division
Support Work Units	
Rachel Jones	Attorney
Chandra Johannesson	Manager of Environmental Compliance
Michael Ambrose	Manager of Regulatory Compliance
Leann Gustafson	Manager of Distribution System Construction/Maintenance
Carlton Chan	Manager of Pipeline Infrastructure Division
Jimi Yoloye	Manager of Construction Division
Marshall Mcleod	Senior Civil Engineer
Javier Prospero	Senior Civil Engineer
Rolando Bueno	Senior Civil Engineer

Contributor	Title
Raffi Moughamian	Associate Civil Engineer
Denise Cicala	Associate Civil Engineer
Yogesh Prashar	Associate Civil Engineer
Bert Mulchaey	Supervising Fisheries &Wildlife Biologist
Michael Carbiener	Fisheries and Wildlife Biologist
Drew Lerer	Environmental Health and Safety
Laura Luong	Community Affairs Representative

6.1.2 Consultants

This EIR was prepared by Panorama Environmental, Inc. located in San Francisco, California, under the direction of EBMUD. Table 6.1-2 identifies staff that contributed to this EIR.

Table 6.1-2 Consultant Team

Contributor	Title	Role/Resource Section
Tania Treis	Project Director	Project Management, Quality Assurance/Quality Control
Jeff Thomas	Project Manager	Project Management, Quality Control
Leo Mena	Deputy Project Manager	Project Description, Alternatives, Biological Resources, Energy Use, Noise, Recreation, Transportation and Traffic
Corey Fong	GIS Specialist, Cartographer	GIS, Graphics
Caitlin Gilleran	Environmental Scientist	Aesthetics, Air Quality and Greenhouse Gases, Cultural Resources, Geology and Soils
Sheila Hoyer	Senior Environmental Scientist	Technical Editing
Kimi Worrell	Environmental Scientist	Technical Editing, Document Production
Dave Jorns	Creative Services Manager	Document Production
Naomi Takahashi	Environmental Scientist	Document Production

Subconsultants also contributed to the preparation of the EIR by preparing technical reports and the EIR sections for Hazards and Hazardous Materials, and Hydrology and Water Quality. Table 6.1-3 identifies subconsultants that contributed to the preparation of the EIR.

Table 6.1-3 Subconsultant Team

Contributor	Firm	Role/Resource Section
Bruce Abelli-Amen Todd Taylor Cem Atabek Patrick Sutton	Baseline Environmental Consulting Emeryville, CA	Hazards and Hazardous Materials, Hydrology and Water Quality

Contributor	Firm	Role/Resource Section
Colin Busby Donna Garaventa Melody Tannam Ian Busby	Basin Research Associates San Leandro, CA	Cultural Resources
Loralie Froman	Eagle Eye Editing Oakland, CA	Technical Editing
Fred Svinth Josh Carman Chris Peters	Illingworth and Rodkin Petaluma, CA	Air Quality, Greenhouse Gases, Noise
Peter Galloway George Nickelson Robert Tuma Craig Newton	Omni Means Ltd. Walnut Creek, CA	Transportation and Traffic

6.2 AGENCIES AND PERSONNEL CONSULTED

Federal, State, and local agencies and tribes were consulted during the preparation of this EIR. The agencies and individuals that were consulted during the preparation of this document are identified below.

6.2.1 Agencies/Entities Consulted

Staff from various agencies as well as from private entities were consulted in the preparation of this EIR. The staff are listed in Table 6.2-1.

Table 6.2-1 Staff Consulted During Preparation of the EIR

Staff	Agency
Catherine Payne	City of Oakland Planning
Darin Ranelletti	City of Oakland Planning
Ed Manasse	City of Oakland Planning
Fred Loeser	City of Oakland Public Works
Kevin Kashi	City of Oakland Public Works
Peter Chun	City of Oakland Public Works
Gus Amirzehni	City of Oakland Public Works
Wlad Wlassowky, City Traffic Engineer	City of Oakland Transportation Division
Heather Klein	City of Oakland Planning
Lily Soo Hoo	City of Oakland Planning
Peterson V. Vollman	City of Oakland Planning
Virenda Patel, City Traffic Engineer	City of Alameda
Bob Haun, Assistant City Manager	City of Alameda

Staff	Agency
Andrew Thomas, Planning Manager	City of Alameda
Erin Smith, Public Works Coordinator	City of Alameda
Gary Stern, Biologist	National Marine Fisheries Service
Sia Mozzaffari	CPUC Safety and Enforcement Division
Kevin Yoder, Manager of Industry and Public Relations	Union Pacific Railroad
Greg Pasquali	Carmel Partners
Fred Najadet	Caltrans Encroachment Permits Division
Matt Webber	Ellis Partners, Inc.

6.2.2 Tribes

The following tribes were notified about the proposed project and preparation of this EIR.

Contact	Tribe
Jakki Kehl	Ohlone/Costanoan
Katherine Erolinda Perez	Ohlone/Costanoan, Northern Valley Yokuts, Bay Miwok
Linda Yamane	Ohlone/Costanoan
Irenne Zwierlein	Amah Mutsun Tribal Band of Mission San Juan Bautista
Michelle Zimmer	Amah Mutsun Tribal Band of Mission San Juan Bautista
Tony Cerda	Coastanoan Rumsen Carmel Tribe
Ann Marie Sayers	Indian Canyon Mutson Band of Coastanoan
Rosemary Cambra	Muwekma Ohlone Indian Tribe of the SF Bay Area
Andrew Galvan	The Ohlone Indian Tribe
Ramona Garlbay	Trina Marine Ruano Family

7 DRAFT MITIGATION MONITORING AND REPORTING PLAN

7.1 CEQA REQUIREMENTS

CEQA requires the adoption of feasible mitigation measures to reduce the severity and magnitude of potentially significant environmental impacts associated with project development.

CEQA Guidelines Section 15091(d) states:

> When making the findings required in subdivision (a)(1), the agency shall also adopt a program for reporting on or monitoring the changes which it has either required in the project or made a condition of approval to avoid or substantially lessen significant environmental effects. These measures must be enforceable through permit conditions, agreements, or other measures.

CEQA Guidelines Section 15097(a) states:

> This section applies when a public agency has made the findings required under paragraph (1) of subdivision (a) of section 15091 relative to an EIR or adopted a mitigated negative declaration in conjunction with approving a project. In order to assure that the mitigation measures and project revisions identified in the EIR or negative declaration are implemented, the public agency shall adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects.

This chapter includes the Draft MMRP for the proposed project. This MMRP will be finalized after the preparation of the Final EIR, based on the outcome of the analysis and the Findings for the project.

7.2 MMRP MATRIX

The Draft MMRP is presented in Table 7.1-1 and Table 7.1-2 and lists all impacts identified in the Draft EIR as significant or potentially significant along with the proposed mitigation measures (Table 7.1-1) and EBMUD’s Practices and Procedures (Table 7.1-2) that are required to reduce impacts to less than significant levels. Note that the language of the mitigation measures may change in the Final EIR. The impacts are briefly summarized in the table.

For each mitigation measure or EBMUD Practice and Procedure, the following information is provided:

- **Responsibility for Implementation.** This column provides additional information on how the mitigation measures will be implemented to help clarify how compliance can be monitored
- **Responsibility for Monitoring.** This column contains an assignment of responsibility for the monitoring and reporting tasks
- **Timing.** This column indicated when the mitigation measure would be applied.
- **Impacts Being Mitigated.** This column indicated what impacts the mitigation measure would mitigate
- **Residual Effect.** This column indicates whether or not the impact being mitigated has been reduced to a less than significant level
- **Applicable Crossings.** This column indicates which one of the three Crossings would require the implementation of the mitigation measure

Table 7.2-1 Mitigation Monitoring and Reporting Plan

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Applicable Crossings: Crossing #1	Applicable Crossings: Crossing #2	Applicable Crossings: Crossing #3
Aesthetics								
Impact Aesthetics-1: Potential to substantially degrade the existing visual character or quality of the site and its surroundings. Impact Recreation-2: Potential to substantially degrade recreational experiences.	**Mitigation Measure Aesthetics-1. Tree Replacement.** EBMUD shall replant trees or landscaping vegetation that are removed as a result of construction activities, consistent with the following guidelines: 11. If any mature native tree (i.e., trees that are 6 inches in diameter at breast height [dbh] or ten inches aggregate dbh for multi-trunk trees) is removed, replanting shall be with the same species at a 1:1 ratio. To allow for access to the pipeline, replanted trees shall not be located within 20 feet of the pipeline. 12. All non-native protected trees that are removed shall be replaced at a 1:1 ratio with a non-invasive or native tree species. 13. All disturbed plant, bush, and ground cover landscaping shall be restored to pre-project conditions, using similar plants and materials.	EBMUD and/or EBMUD's Construction Contractor	EBMUD	Post-construction		X	X	X
Impact Aesthetics-2: Potential to introduce new sources of substantial light or glare which could adversely affect day or nighttime views in the area.	**Mitigation Measure Aesthetics-2. Shield Night Lighting.** Stationary lighting used during nighttime construction (if required) shall be shielded and directed downward or oriented such that the light source is not directed toward residential areas or into streets where glare could impact motorists or pedestrians.	EBMUD and EBMUD's Construction Contractor	EBMUD	For the duration of nighttime construction		X	X	X
Air Quality								
Impact Air-3: Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard. Impact Air-4: Potential to expose sensitive receptors to substantial pollutant concentrations.	**Mitigation Measure Air-1. Best Management Practices.** The construction crew shall implement the following Best Management Practices that are required of all construction projects: 1. When moisture content is low enough to create dust, all exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. All vehicle speeds on unpaved roads shall be limited to 15 mph. 5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible and feasible. Building pads shall be laid as soon as possible and feasible, as well, after grading unless seeding or soil binders are used.	EBMUD and EBMUD's Construction Contractor	EBMUD	For the duration of construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings			
					Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. 8. A publicly visible sign with the telephone number and email address to contact EBMUD regarding dust complaints will be posted at the site. If dust exceeds specified limits, EBMUD shall respond and take corrective action within 48 hours.							
Impact Air-4: Potential to expose sensitive receptors to substantial pollutant concentrations. Impact Hazards-3: Potential to create a significant hazard to children at nearby schools from the emissions and handling of hazardous or acutely hazardous materials.	**Mitigation Measure Air-2. Selection of equipment during demolition, grading and open trench construction phases to minimize emissions.** 1. All diesel-powered off-road equipment larger than 50 horsepower and operating during construction for more than 2 days continuously shall, at a minimum, meet USEPA particulate matter emissions standards for Tier 4 engines or equivalent. 2. The number of hours that equipment operates shall be minimized. Note that other measures may be used to minimize construction period DPM emissions to reduce the predicted cancer risk below the thresholds. Such measures may be the use of alternative powered equipment (e.g., liquefied petroleum gas-powered lifts), alternative fuels (e.g., biofuels), added exhaust devices, or a combination of measures, provided that the measures are approved by the lead agency and demonstrated to reduce community risk impacts to less than significant.	EBMUD and EBMUD's Construction Contractor	EBMUD	For the duration of construction		X		X
Biological Resources								
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS).	**Mitigation Measure Biology-1. Conduct a Pre-Construction Monarch Butterfly Survey.** Prior to tree removal at HDD sites for Crossing #2 and pipeline abandonments near Crossing #2, during the monarch butterfly overwintering period from October 1 through March 1, a qualified biologist shall conduct a late fall/early winter butterfly survey within all potential habitats within 200 feet of the proposed project area. If the results of the survey do not identify any potential overwintering of the monarch butterfly on-site, no further mitigation shall be required. If overwintering monarch butterflies are determined to use the site, tree removal shall be deferred until a qualified biologist has determined that overwintering monarch butterflies are no longer using the site, or, per the direction of CDFW.	EBMUD's Biologist	EBMUD	Prior to tree removal and during construction			X	

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS).	**Mitigation Measure Biology-2. Seasonal In-Channel Work Window.** In-channel pre-construction geotechnical borings shall be conducted between June 1 and November 30 to avoid impacts to special-status fish species. If work must occur between June 1 and November 30, EBMUD shall implement additional minimization measures, such as buffer zones and monitoring for herring spawn, in consultation with NMFS, USFWS, and CDFW.	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to construction, during pre-construction geotechnical investigation	X			
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS).	**Mitigation Measure Biology-3. Pile Driving.** No impact or vibratory pile driving shall occur within 200-feet of the Oakland Inner Harbor, Tidal Canal, or San Leandro Bay Channel.	EBMUD and EBMUD's Construction Contractor	EBMUD	During Construction		X	X	X
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS).	**Mitigation Measure Biology-4. Pre-Construction Special-Status Bird Survey.** A pre-construction survey shall be performed prior to construction activities that would require vegetation or tree removal during the nesting season. The following measures shall be implemented: 1. If construction activities (i.e., ground clearing and grading, including removal of trees or shrubs) are scheduled to occur during the nonbreeding season (September 1 through January 31), no measures are required. 2. If construction activities are scheduled to occur during the nesting season (February 1 through August 31), the following measures shall be implemented to avoid potential adverse effects on special-status birds: A qualified wildlife biologist shall conduct pre-construction surveys of all potential nesting habitat within 500 feet of construction activities. If active nests are found during pre-construction surveys, a no- disturbance buffer shall be created (acceptable in size to the CDFW) around active raptor nests and nests of other special-status birds during the breeding season, or until it is determined that all young have fledged. Typical buffers include 500 feet for raptors, 250 feet for other nesting birds, and 50 feet for passerines. The size of the buffer zones may be further modified in coordination with the CDFW. Nests initiated during construction are presumed to be unaffected, and no buffer would be necessary.	EBMUD's Biologist and EBMUD's Construction Contractor	EBMUD	Prior to Construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	3. Trees shall be removed outside of the nesting season to the extent feasible.							
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS).	**Mitigation Measure Biology-5. Marine Mammal Harassment Consultation.** EBMUD shall consult with the National Marine Fisheries Service (NMFS) to determine whether an Incidental Harassment Authorization (IHA) or Letter of Authorization (LOA) for marine mammals is necessary prior to initiation of in-channel pre-construction geotechnical borings. All IHA or LOA conditions and requirements shall be adhered to by EBMUD and its contractors.	EBMUD's Biologist and EBMUD's construction contractor	EBMUD	Prior to construction, during pre-construction geotechnical investigation	X			
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS).	**Mitigation Measure Biology-6. Marine Mammal Monitoring Plan.** EBMUD and its contractors shall prepare and implement a Marine Mammal Monitoring Plan. The Marine Mammal Monitoring Plan shall include the following elements: 1. Establishment of an appropriate buffer zone around the work area, generally 400 feet or as defined in consultation with NMFS, that would require work be slowed or otherwise modified if a marine mammal approaches the established buffer zone. 2. A qualified biologist shall be on board the geotechnical drilling vessel during construction. 3. The qualified biologist shall monitor marine mammal presence and behavior in the vicinity of the vessel and the surface above drilling operations. The qualified biologist shall have the authority to stop work until the marine mammal has left the buffer zone.	EBMUD's Biologist and EBMUD's construction contractor	EBMUD	Prior to construction, during pre-construction geotechnical investigation	X			
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS).	**Mitigation Measure Biology-7. Pre-Construction Bat Surveys.** A pre-construction survey shall be performed within 2 weeks prior to tree removal in the Telecare corporation parking lot and in Towata Park, and prior to construction near Otis Drive bridge, High Street bridge, Fruitvale Avenue bridge, and Park Street bridge. Areas within 200 feet of the construction work limits shall be surveyed. The biologist shall conduct a search for suitable entry points, roost cavities or crevices, and, survey for evidence of day roosts, and maternity roosts. The following measures shall be implemented: 1. If no roosting is observed, no additional mitigation is required. 2. If roosting surveys are inconclusive, indicate potential occupation by a special-status bat species, and/or identify a large day roosting population or maternity roost by any bat species within 200 feet of an active construction work area, a qualified biologist shall conduct focused day- and night-emergence surveys. 3. If active maternity roosts or day roosts are found in areas that would be removed or modified as part of project construction, activities shall commence before maternity colonies form (before	EBMUD's Biologist and EBMUD's construction contractor	EBMUD	Prior to and During Construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	March 1) or after young are flying (after July 31). Disturbance-free buffer zones (determined by a qualified biologist in coordination with CDFW) shall be observed during the maternity roost season (March 1 through July 31) for any active maternity colony identified during the surveys to protect maternity roosts. 4. If a non-breeding bat roost is found in a structure scheduled for modification or removal, the individual(s) shall be safely evicted, under the direction of a qualified biologist (as determined in consultation with CDFW) in such a way that ensures individuals are not injured.							
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS). Impact Bio-2: Potential to have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations or by CDFW or USFWS. Impact Bio-3: Potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means.	**Mitigation Measure Biology-8. Protection of Northern Coastal Salt Marsh.** Silt and exclusion fencing shall be installed at the edges of work areas where the work areas are near salt marsh habitat to delineate the areas and ensure that work does not occur in sensitive habitats or wetland areas, such as at the Alameda Island side of Crossing #2, Bay Farm 1 pipeline abandonment, and Bay Farm 2 pipeline abandonment locations.	EBMUD's Biologist and EBMUD's Construction Contractor	EBMUD	Prior to Construction			X	
Impact Bio-2: Potential to have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations or by CDFW or USFWS.	**Mitigation Measure Biology-9. Eelgrass Surveys and Avoidance.** A survey for eelgrass shall be conducted by a qualified biologist prior to pre-construction geotechnical drilling at Crossing #2, as described in the California Eelgrass Mitigation Policy and Implementing Guidelines (NOAA Fisheries 2014). If eelgrass is observed within the pre-construction geotechnical investigation work area, an alternative work area outside of eelgrass shall be chosen. The eelgrass survey shall be conducted during the growing season between April to October. The pre-construction geotechnical investigation shall commence within 60 days of completion of the eelgrass survey or anytime	EBMUD's Biologist and EBMUD's construction contractor	EBMUD	Prior to construction, during pre-construction geotechnical investigation	X			

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	between November and March if the survey was completed in October.							
Impact Bio-2: Potential to have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations or by CDFW or USFWS.	**Mitigation Measure Biology-10. Control of Invasive Marine Species.** In order to prevent introduction and spread of invasive marine species, EBMUD shall utilize a geotechnical contractor that can provide vessels that originate and operate in the San Francisco Bay. If the vessels to be used for pre-construction geotechnical borings have been operating outside the San Francisco Bay, then EBMUD shall develop an Invasive Marine Species Control Plan in order to effectively limit the introduction and spread of invasive marine species. The plan shall require that vessels or in-channel equipment originating or recently operating outside the San Francisco Bay prior to project use follow existing compliance measures established by the California State Lands Commission as part of the Marine Invasive Species Program relating to hull fouling and ballast water control. The plan shall also require that vessels and in-channel equipment originating or operating outside of San Francisco Bay be examined and any invasive species handled and disposed of according to the developed plan prior to vessel or equipment use on the project.	EBMUD's Biologist and EBMUD's construction contractor	EBMUD	Prior to construction, during pre-construction geotechnical investigation	X			

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
Cultural Resources								
Impact Cultural-1: Potential to cause a substantial adverse change in the significance of a historical resource.	**Mitigation Measure Cultural-1. Cultural Resources Sensitivity Training.** A professional archaeologist shall provide sensitivity training to supervisory staff, prior to initiation of site preparation and/or construction, to alert construction workers to the possibility of exposing significant historic and/or prehistoric archaeological resources within the proposed project area. The training shall include any prehistoric or historic objects that could be exposed, the need to stop excavation at the discovery and within 100 feet of the discovery, and the procedures to follow regarding discovery protection and notification. An "Alert Sheet" shall be posted in staging areas, such as in construction trailers, to alert personnel to the procedures and protocols to follow for the discovery of a potentially significant historic and/or prehistoric archaeological resources.[1]	EBMUD, Archeologist and EBMUD's Construction Contractor	EBMUD	During construction		X	X	X

[1] Significant prehistoric cultural resources may include:

a. Human bone, either isolated or intact burials.
b. Habitation, occupation or ceremonial structures as interpreted from rock rings/features, distinct ground depressions, differences in compaction (e.g., house floors).
c. Artifacts including chipped stone objects such as projectile points and bifaces; groundstone artifacts such as manos, metates, mortars, pestles, grinding stones, pitted hammerstones; and, shell and bone artifacts including ornaments and beads.
d. Various features and samples including hearths (fire-cracked rock; baked and vitrified clay), artifact caches, faunal and shellfish remains (which permit dietary reconstruction), distinctive changes in soil stratigraphy indicative of prehistoric activities.
e. Isolated prehistoric artifacts (Basin 2015).

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
Impact Cultural-1: Potential to cause a substantial adverse change in the significance of a historical resource. Impact Cultural-2: Potential to cause a substantial adverse change in the significance of an archaeological resource. Impact Cultural-5: Potential to cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resource Code Section 21074.	**Mitigation Measure Cultural-2. Cultural Resources Inadvertent Discoveries.** In the event that a historical or cultural resource is identified during pre-construction geotechnical investigation borings or during excavation for construction, all work within 100 feet of the resource shall be halted until a professional archaeologist, retained by EBMUD, can review, identify, and evaluate the resource for its significance. Should the archaeologist determine that a cultural resource has the potential to be a tribal cultural resource, then a Native American monitor shall be retained by EBMUD to monitor work in the area where the tribal cultural resource was discovered. If the historical resource can be preserved in place and no further impacts would occur, the resource shall be documented on California State Department of Parks and Recreation cultural resource record forms and no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, the professional archaeologist shall evaluate the resource and determine whether it is: (1) eligible for the CRHR (and thus a historical resource for purposes of CEQA), and/or (2) a unique archaeological resource as defined by CEQA. If the resource is determined to be neither a unique archaeological nor an historical resource, work may commence in the area. If the resource meets the criteria for either an historical or unique archaeological resource, or both, work shall remain halted, and the professional archaeologist shall consult with EBMUD regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA Guidelines Section 15064.5(b). Methods to be considered shall include preservation in place or evaluation, collection, recordation, and analysis of any significant cultural materials in accordance with a Cultural Resources Work Plan (known as data recovery) prepared by the professional archaeologist. The methods and results of evaluation or data recovery work at an archaeological find shall be documented in a professional level technical report to be filed with CHRIS. Work may commence upon completion of treatment, as approved by EBMUD. A *Monitoring Closure Report* shall be filed by EBMUD at the conclusion of ground-disturbing construction if archaeological and Native American monitoring of excavation was undertaken.	EBMUD, Archeologist and EBMUD's Construction Contractor	EBMUD	During construction		X	X	X
Impact Cultural-3: Potential to disturb human remains, including those interred outside of formal cemeteries.	**Mitigation Measure Cultural-3. Human Remains Inadvertent Discoveries.** a. The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity within the proposed project area shall comply with applicable state laws. Treatment shall include halting all work within 100 feet of the discovery and immediate	EBMUD, Archeologist and EBMUD's Construction Contractor	EBMUD	During construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	notification of the Alameda County Medical Examiner and the City of Alameda and/or the City of Oakland and EBMUD. b. In the event of the coroner's determination that the human remains are Native American, notification of the Native American Heritage Commission is required, who shall appoint a Most Likely Descendant (MLD) (PRC §5097.98). c. EBMUD, the professional archeologist, the landowner and MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5[d]). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. If the MLD and the other parties do not agree on the disposition of the remains, the reburial method will follow PRC §5097.98(b) which states that: . . . the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance.							
Impact Cultural-4: Potential to directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature.	**Mitigation Measure Cultural-4. Paleontological Resources.** a. A professional paleontologist shall provide sensitivity training to supervisory staff to alert construction workers to the possibility of exposing significant paleontological resources within the proposed project area. The training shall be conducted as defined by the Society of Vertebrate Paleontology's Conformable Impact Mitigation Guidelines Committee (1995), to recognize fossil materials in the event that any are uncovered during construction. b. An "Alert Sheet" shall be posted in staging areas, such as in construction trailers, to alert personnel to the procedures and protocols to follow for the discovery of unique paleontological resources. c. In the event that a paleontological resource is uncovered during project construction, all ground-disturbing work within 100 feet shall be halted. A qualified paleontologist shall inspect the discovery and determine whether further investigation is required. d. If the discovery can be avoided and no further impacts will occur, no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, a qualified paleontologist shall evaluate the resource and determine whether it is "unique" under CEQA, Appendix G, part V.	EBMUD, Paleontologist and EBMUD's Construction Contractor	EBMUD	During construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	e. If the resource is determined not to be unique, work may commence in the area. If the resource is determined to be a unique paleontological resource, work shall remain halted, and the paleontologist shall consult with EBMUD staff regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA. f. Other methods may be used but must ensure that the fossils are recovered, prepared, identified, catalogued, and analyzed according to current professional standards under the direction of a qualified paleontologist. All recovered fossils shall be curated at an accredited and permanent scientific institution according to Society of Vertebrate Paleontology standard guidelines. Work may commence upon completion of treatment.							
Geology, Soils, and Seismicity								
Impact Geology Soils-1: Potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; or landslides. Impact Geology Soils-3: Potential to be located on a geologic unit or soil that is unstable or that would become unstable as a result of the proposed project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse. Impact Geology Soils-4: Potential to be located on expansive or corrosive soils that would create substantial risks to life or property.	**Mitigation Measure Geology-1. Incorporation of Geotechnical Investigation into Construction and Design Requirements.** EBMUD shall incorporate the recommendations and results from the geotechnical investigation into construction and design of the pipeline, shoring systems, and dewatering methods to comply with current seismic standards and to withstand geologic and seismic hazards. Recommendations shall also be incorporated into the proposed project specifications for implementation during construction and shall be verified during construction by a qualified geotechnical engineer who shall monitor construction activities.	EBMUD	EBMUD	Prior to proposed project design and proposed project construction specifications		X	X	X
Hazards and Hazardous Materials								
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials.	**Mitigation Measure Hazards-1. Identifying Buried Utilities.** While any excavation is open, EBMUD shall protect, support, or remove underground utilities as necessary to safeguard employees. EBMUD shall notify local fire departments whenever damage to a gas utility results in a leak or suspected leak, or whenever damage to any utility results in a threat to public safety. EBMUD shall also contact utility	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to Construction	X	X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	owners if any damage occurs as a result of the project and coordinate repair with approval of the owner. EBMUD shall request as-built documents, drawings, and maps from all utilities within the proposed project vicinity; shall conduct a site visit; contact city, county, and utility owners in writing to inform them of the proposed project; and shall locate utilities including utilities under the Oakland Inner Harbor, Tidal Canal, and San Leandro Bay Channel by subsurface geophysical methods, potholing, test holes, or other excavation methods as determined by the site conditions.							
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials.	**Mitigation Measure Hazards-2. Excavation and Electrical Safety Plans.** The construction crew shall prepare and implement a project-specific Excavation Safety Plan and Electrical Safety Plan. The plans shall include the location of buried utilities identified in the proposed project vicinity, as described under Mitigation Measure Hazards-1. The Excavation Safety Plan shall include safety measures to protect the health of workers and the structural integrity of the buried utilities at the site. The Electrical Safety Plan shall include measures to protect workers from hazardous voltages on pipelines and appurtenances as a result of electromagnetic induction from nearby electrical transmission lines.	EBMUD and EBMUD's Construction Contractor	EBMUD	During Construction	X	X	X	X
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials. Impact Hazards-2: Potential to create a significant hazard to human health and/or the environment through the routine transport, use, or disposal of hazardous materials.	**Mitigation Measure Hazards-3. Site Assessment.** EBMUD shall perform a Site Assessment to identify potential soil and groundwater contamination that could be encountered during excavation for proposed project construction activities. The Site Assessment shall be performed in accordance with ASTM International's Standard Practice Method E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Assessment Process, which shall augment the existing Site Assessment procedures described in the Environmental Compliance Manual. The Site Assessment shall identify areas of concern where soil and/or groundwater contamination could be encountered during proposed project construction activities. The Site Assessment shall be prepared and evaluated by a licensed professional.	EBMUD and EBMUD's Licensed Professional	EBMUD	Prior to Construction	X	X	X	X
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials. Impact Hazards-2: Potential to create a significant hazard to human health and/or the environment through the routine transport, use, or disposal of hazardous materials.	**Mitigation Measure Hazards-4. Site Investigation.** EBMUD shall perform a Site Investigation to evaluate the chemical quality of soils and/or groundwater in the areas of concern identified during the Site Assessment (see Mitigation Measure Hazards-3). Based on the analytical results, the Site Investigation shall include an evaluation of potential health risks to construction workers and shall pre-characterize groundwater for disposal. In areas where soil will not be reused as excavation backfill, soil shall also be pre-characterized for disposal. The Site Investigation shall be prepared and evaluated by a licensed professional.	EBMUD and EBMUD's Licensed Professional	EBMUD	Prior to Construction	X	X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Applicable Crossings: Crossing #1	Applicable Crossings: Crossing #2	Applicable Crossings: Crossing #3
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials. Impact Hazards-2: Potential to create a significant hazard to human health and/or the environment through the routine transport, use, or disposal of hazardous materials.	**Mitigation Measure Hazards-5. Project Safety and Health Plan.** The construction crew shall prepare and implement a Project Safety and Health Plan. The plan shall incorporate the findings of the Site Assessment and Site Investigation (see Mitigation Measures Hazards-3 and Hazards-4) and describe appropriate monitoring measures, establishment of exclusions zones, and personal protective equipment for workers (as needed) who may encounter hazardous materials in soil and/or groundwater to ensure that workers and the public are protected.	EBMUD and EBMUD's Construction Contractor	EBMUD	During Construction	X	X	X	X
Impact Hazards-6: Potential to substantially increase boating hazards due to changes in vessel traffic.	**Mitigation Measure Hazards-6. Notify the US Coast Guard.** EBMUD shall notify the US Coast Guard and VTS of when, where, and the type of work that would be conducted within the Oakland Inner Harbor and San Leandro Bay Channel 90 days prior to any vessel work being conducted. As a part of the notification process, the US Coast Guard may require the establishment of a vessel safety zone. If required by the US Coast Guard, EBMUD shall establish a vessel safety zone, which may be delineated by fixed limits, such as buoys.	EBMUD and EBMUD's construction contractor	EBMUD	Prior to conducting geotechnical borings	X			

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
Hydrology and Water Quality								
Impact Hydro-5: Potential to substantially degrade water quality during construction due to releases of drilling lubricants during horizontal directional drilling. Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS). Impact Bio-3: Potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal areas) through direct removal, filling, hydrological interruption, or other means. Impact Bio-4: Potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or could impede the use of native wildlife nursery sites.	**Mitigation Measure Hydro-1. Frac-Out Contingency Plan.** A Frac-Out Contingency Plan shall be prepared by a qualified California-licensed professional geologist or engineer to address the potential for drilling fluids to be released during horizontal directional drilling operations. The plan shall include the following: 1. A monitor shall be on site during drilling operations to look for observable inadvertent release, frac-out conditions or lowered pressure readings on drilling equipment that may indicate a potential frac-out. 2. If the construction crew and/or drilling-machine operator suspect that there is a frac-out (i.e., notices a loss of circulation of drilling fluid) or drilling fluid is observed at the surface, all work shall stop, including the recycling of drilling fluid. The location and extent of the frac-out shall be determined. The construction crew shall implement measures to stop the frac-out, such as reducing the drilling pressure or thickening the drilling fluid (e.g., by using less water). 3. If the drilling fluid does not surface, no other actions shall be needed. 4. If the drilling fluid surfaces, EBMUD shall notify the regulatory agencies (NMFS, USACE, BCDC, CDFW, SFRWQCB) and if so directed, the affected area shall be surrounded with a barrier (e.g., silt fence) to prevent further dissemination of the fluid. If there is a visible plume in the waterway, a sediment boom or curtain shall be installed around the plume to attempt to capture the released drilling fluid. The drilling fluid shall then be removed using the minimum amount of equipment needed to remove it (e.g., manually or by suction hose using a vacuum truck) in order to minimize impacts to the surface area where the frac-out occurred. 5. Upon implementation of the response measures described above, and once the frac-out is contained, drilling may resume. 6. EBMUD shall ensure that the frac-out plan also includes notification procedures to applicable regulatory agencies for reporting frac-outs. EBMUD shall consult with the regulatory agencies to implement the most appropriate measures to protect water quality in the event of a frac-out. EBMUD shall provide a copy of the plan to the USACE, RWQCB, NMFS, BCDC and CDFW prior to construction.	EBMUD and EBMUD's Construction Contractor	EBMUD	Plan prepared prior to construction and implemented during construction activities		X	X	X
Noise								
Impact Noise-1: Potential to expose persons to or generate noise levels in excess of standards	**Mitigation Measure Noise-1. Noise Control.** EBMUD shall implement the noise control measures described below:	EBMUD and EBMUD's	EBMUD	During Construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Applicable Crossings: Crossing #1	Applicable Crossings: Crossing #2	Applicable Crossings: Crossing #3
established in the local general plan or noise ordinance or applicable standards of other agencies, and could result in a substantial temporary or periodic increase in ambient noise levels in the proposed project vicinity above levels existing without the proposed project.	***Time Limits*** 1. All construction activities shall be limited to the daytime weekday hours (7:00 a.m. - 7:00 p.m.) to the extent feasible. The HDD pullback operations, the pipeline connection work, and work in arterial intersections may extend or take place beyond these hours. 2. All haul and delivery truck operations shall be prohibited during the evening and nighttime hours (7:00 p.m. - 8:00 a.m.) to the extent feasible. 3. Equipment and vehicular activities (e.g., concrete saws, jackhammers, tractors, loaders, backhoes, excavators, pavers, rollers, and all other equipment identified in Tables 3.11-7 to 3.11-9) identified as generating noise levels in excess of an L_{eq} of 65 dBA in the vicinity of residential uses or an L_{eq} of 80 dBA in the vicinity commercial uses shall be limited to weekday hours between 8 a.m. – 7 p.m., and Saturdays between 8 a.m. - 5 p.m to the extent feasible. ***Noise Level Reduction*** EBMUD shall implement a combination of the following source control measures such that noise is reduced by a minimum of 5 dBA: 1. Best available noise-control techniques (including but not limited to mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) shall be used for all equipment and trucks to reduce construction noise impacts. 2. If impact equipment such as jack hammers, pavement breakers, and rock drills are proposed to be used during construction, hydraulically- or electric-powered equipment shall be used wherever feasible to avoid the noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically-powered tools is unavoidable, the construction crews shall place exhaust mufflers on the compressed-air exhaust and external jackets on the tools themselves where feasible. 3. If vibratory sheet piles are used for construction, pre-drill pile holes for shoring systems to eliminate or reduce noise and vibration from vibratory pile driving. 4. Stationary noise sources (e.g., pumps, compressors) shall be located as far from sensitive receptors as possible and practicable, and within the specified construction time limits. If they must be located near receptors, adequate muffling (with enclosures) shall be used. Enclosure openings or venting shall face away from sensitive receptors. A registered engineer qualified in noise control analysis and design shall design the enclosures. 5. If pipe-cutting equipment must be operated at pipeline tie-ins outside the hours of 8 a.m. - 7 p.m., temporary noise barriers or	Construction Contractor						

					Applicable Crossings			
Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	noise enclosures shall be used to minimize disturbance when construction occurs adjacent to residential uses. Operation of trucks and noisier types of heavy equipment shall be minimized to the extent feasible. EBMUD shall implement the following noise barrier measure, such that noise is reduced by 10 dBA: 6. Noise barriers (e.g., sound walls, sound curtains, etc.) shall be provided at the perimeter of HDD entry and insertion work areas and jack and bore construction sites. ***Administrative Controls*** 7. Residents located within one block of the project construction shall be notified at least 7 days in advance of extreme noise-generating activities, about the estimated duration of the activity and to update them prior to noise producing phases, such as open trench construction, pipeline connections, pipeline abandonment, HDD, or jack and bore construction. 8. Where pipeline construction zones are within 100 feet of school classrooms or childcare facilities (e.g., Earhart Elementary), construction crews shall coordinate with the school and schedule the operation of heavy equipment (including pumps, generators with no noise enclosures, tractors, loaders, backhoes, cement trucks) when the classroom windows facing or perpendicular to construction activities are closed, and students are indoors. 9. An EBMUD contact person shall be designated as a project liaison for responding to noise complaints during construction. The liaison's name and phone number shall be posted at construction areas and included in all advance notifications. The contact shall take steps to resolve complaints, which could include measuring noise levels, if necessary. The coordinator shall be available during normal business hours (8 a.m. - 5 p.m.) and shall work with residents and business owners and the construction crews to determine the noise problem and resolve conflicts. 10. Provide alternative lodging for residents, if requested, that are adversely affected by nighttime construction; this measure would only be used if nighttime construction occurs. EBMUD shall make a concerted attempt to notify residents located within one block of potential nighttime project construction at least 10 days in advance. Notified residents may request alternative lodging for the night(s) of the potential nighttime construction from EBMUD; alternative lodging shall consist of a standard room at a hotel located within 6 miles of the affected residence or as close as feasible. Alternative lodging shall be provided and approved by EBMUD the day before the known nighttime construction would occur, or sooner, based upon the types of construction activities that may occur during the nighttime hours (7:00 p.m. - 7:00 a.m.).							

<table>
<tr><th rowspan="2">Impacts Being Mitigated</th><th rowspan="2">Mitigation Measure/Standard Specification</th><th rowspan="2">Responsible for Implementation</th><th rowspan="2">Responsible for Monitoring and/or Enforcement</th><th rowspan="2">Timing of Implementation</th><th colspan="4">Applicable Crossings</th></tr>
<tr><th>Pre-Construction Geotechnical Investigation</th><th>Crossing #1</th><th>Crossing #2</th><th>Crossing #3</th></tr>
<tr><td></td><td>11. Noise monitoring will be conducted during HDD, jack and bore construction, and during the first 500 feet of open trench construction.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Impact Noise-2: Potential to expose persons to or generate excessive groundborne vibration or groundborne noise levels.
Impact Cultural-1: Potential to cause a substantial adverse change in the significance of a historical resource.
Impact Geology Soils-3: Potential to be located on a geologic unit or soil that is unstable or that would become unstable as a result of the proposed project, and potentially could result in onsite or offsite landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse.</td><td>Mitigation Measure Noise-2. Vibration.
Vibration limits are specified as follows:
<table>
<tr><th colspan="2">For Cosmetic Damage to Property</th></tr>
<tr><td>Any Buildings or Structures</td><td>0.3 in/sec PPV (continuous vibration)
0.5 in/sec PPV (single-source vibration</td></tr>
<tr><th colspan="2">For Impacts to Historical Significance</th></tr>
<tr><td>Potentially historic buildings or structures and/or buildings/structures older than 50 years</td><td>0.4 in/sec PPV (continuous source vibration)
0.5 in/sec PPV (single-source vibration)</td></tr>
<tr><th colspan="2">For Damage to Utilities</th></tr>
<tr><td>Adjacent utilities</td><td>4.0 in/sec PPV (continuous source)</td></tr>
</table>
EBMUD shall implement the following:
1. Vibration monitoring shall be conducted for the first 500 feet of pipeline construction for each side of the crossings to confirm vibration levels do not exceed vibration thresholds at the nearest receptors. If vibration levels exceed the limits of this mitigation measure, then construction practices shall be modified (i.e., use smaller types of construction equipment, operate the equipment in a manner to reduce vibration, or use alternate construction methods), and monitoring shall continue for an additional 200 feet or until construction practices meet the required vibration levels. The monitoring in this mitigation measure shall be repeated if the construction methods change in a manner that would increase vibration levels, or when structures are closer to the limits of construction than previous vibration monitoring has confirmed is below the vibration thresholds.
2. Smaller vibratory compactors and/or non-compacting materials (i.e., some types of gravel) will be used to minimize vibration levels during repaving activities where needed to meet vibration limits. Clam shovel drops and heavy trucks and loaders shall not be used within 15 feet of unreinforced masonry or non-engineered timber and/or plaster buildings, and alternative methods shall be used such as saw cutting and use of smaller equipment that causes less vibration.</td><td>EBMUD and EBMUD's Construction Contractor</td><td>EBMUD</td><td>During construction</td><td></td><td>X</td><td>X</td><td>X</td></tr>
</table>

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	3. Sheet piles shall be installed with vibratory drivers instead of impact drivers where feasible. Impact sheet pile installation shall be prohibited within 35 feet of the closest structures. Vibration monitoring shall be conducted within 100 feet of any buildings where impact sheet pile installation occurs, and within 35 feet of any building where vibratory sheet pile installation occurs to ensure that the above applicable performance standard is not exceeded. If vibration levels exceed the applicable threshold, the construction crews will use alternative construction methods. 4. With permission and at the request of homeowners, EBMUD shall conduct a preconstruction survey of homes and other sensitive structures within 15 feet of continuous vibration-generating activities (vibratory roller/compactor) for potential effects due to vibration-generating activities. EBMUD shall respond to any claims by inspecting the affected property promptly. 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 proposed project is determined to have caused the damage, EBMUD shall coordinate with the owner to have the damage repaired to pre-existing conditions.							
Recreation								
Impact Recreation-2: Potential to substantially degrade recreational experiences.	**Mitigation Measure Recreation-1. Coordination with Cities.** EBMUD shall coordinate with the City of Oakland Department of Parks and Recreation and the City of Alameda Department of Recreation and Parks regarding temporary park closures prior to construction within Estuary Park and Towata Park. EBMUD shall implement park closure methods after consultation with each City, and shall notify the members of the public of temporary park closures via the methods provided by the City of Oakland Department of Parks and Recreation and the City of Alameda Department of Recreation and Parks.	EBMUD	EBMUD	Prior to Construction		X	X	
Impact Recreation-2: Potential to substantially degrade recreational experiences.	**Mitigation Measure Recreation-2. Park Restoration.** Construction activities shall be located to avoid trees to the extent feasible. After completion of construction activities, public parks shall be restored to pre-project conditions in coordination with the City of Oakland or the City of Alameda. Park restoration shall include replacement of any other park amenities (park benches, sidewalks, signage, etc.) that were removed or impacted during construction.	EBMUD	EBMUD	Post-Construction		X	X	
Transportation and Traffic								
Impact Traffic-1: Potential to conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the	**Mitigation Measure Traffic-1. Construction Traffic Management Plan.** EBMUD shall develop and implement a project-specific Construction Traffic Management Plan (CTMP). EBMUD shall submit the plan to the Cities of Alameda and Oakland for review and approval at least 30	EBMUD and EBMUD's Construction Contractor	EBMUD	During Construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
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. Impact Traffic-2: Potential to substantially increase hazards resulting from a design feature or incompatible uses.	days prior to construction. The CTMP shall conform to the California Manual on Uniform Traffic Control Devices, and shall include provisions for the following: 1. Implementation of appropriate barriers and/or cones between vehicles and construction areas along partially or fully closed streets. 2. Installation of temporary lane delineation to direct traffic flows through construction areas. 3. Installation of “No Stopping Anytime” and “No Parking Anytime” signs (time and duration) in construction zones 48-hours prior to construction. 4. Use of flaggers and/or signage to guide vehicles through or around construction zones. 5. Use and location of changing message boards and/or appropriate signage indicating preferred detour routes. 6. Timing of material deliveries to use non-peak hours of traffic flow (9:00 a.m. to 4:00 p.m.). 7. Methods for keeping roadways clean. 8. Storage of all equipment and materials in designated work areas in a manner that minimizes traffic obstructions and maximizes sign visibility. 9. Methods and locations for limiting of vehicles to safe speed levels according to posted speed limits, road conditions, and weather conditions 10. Coordination with public transit providers to implement bus detours, bus stop modifications, and to inform public transit providers of potential construction related delays. 11. Methods and locations for routing trucks to avoid minor roads, where possible, to reduce congestion and potential asphalt damage in accordance with EBMUD’s specifications and the Cities of Alameda and Oakland permit requirements. 12. Repair of asphalt and other road damage (e.g., curb and gutter damage, rutting in unpaved roads) caused by construction vehicles. Roadway pavement conditions will be documented for all affected roadways before and after project construction. Roads found to have been damaged by construction vehicles will be repaired to the level at which they existed before project construction. 13. Detours for cyclists and pedestrians when bike lanes or sidewalks must be closed. 14. Abiding by any encroachment permit conditions (e.g., Union Pacific Railroad, Caltrans, City of Oakland, City of Alameda), which shall supersede conflicting provisions in the CTMP. 15. Requirement that heavy equipment brought to the construction site shall be transported by truck, where feasible.							

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Applicable Crossings: Crossing #1	Applicable Crossings: Crossing #2	Applicable Crossings: Crossing #3
	16. Notification procedures for adjacent property owners and public safety personnel related to major equipment deliveries, vehicle detours, and lane closures. 17. A process for responding to and tracking complaints pertaining to construction activities, including identification of an EBMUD contact person, designated as a project liaison for responding to traffic complaints. The liaison's name and phone number shall be posted at construction areas and included in all advance notifications. The project liaison shall determine the cause of the complaints and shall take prompt action to correct the problem.							
Impact Traffic-1: Potential to 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.	**Mitigation Measure Traffic-2. Traffic Control at Crossing #1.** EBMUD shall maintain a minimum of one open lane of southbound traffic flow during construction activities between 8th Street and 5th Street to reduce overall traffic impacts on Jackson Street.	EBMUD and EBMUD's construction contractor	EBMUD	During Construction of Crossing #1		X		
Impact Traffic-1: Potential to 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.	**Mitigation Measure Traffic-3. Provide flag persons at un-signalized intersections at Crossing #1 and Crossing #3.** EBMUD shall ensure that the construction contractor deploys flag persons at the following un-signalized intersections to facilitate the flow of directional traffic and improve vehicle progression through the intersection, improving overall operations (to the extent possible): 1. Oak Street and Embarcadero West 2. Blanding Avenue and Broadway	EBMUD and EBMUD's Construction Contractor	EBMUD	During Construction of Crossings #1 and #3		X		X
Impact Traffic-1: Potential to 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	**Mitigation Measure Traffic-4. Traffic Control and Maintaining Traffic Flow at Crossing #3.** Pipeline installation across Tilden Way at Everett Street shall use jack and bore construction methods so as to avoid closure of Tilden Way to through traffic.	EBMUD and EBMUD's Construction Contractor	EBMUD	During Construction of Crossing #3				X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
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.								
Impact Traffic-1: Potential to 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. Impact Recreation-2: Potential to substantially degrade recreational experiences.	**Mitigation Measure Traffic-5. Minimize Impacts to Pedestrians, Bicyclists, and People Using Public Transit.** The following measures would be implemented to minimize impacts to pedestrians, bicyclists, and public transit: 1. Flaggers shall be used to direct pedestrians and bicyclists using the bicycle lane during construction when material deliveries must cross the bicycle lane. 2. Warning signs shall be posted on sidewalks where construction limits pedestrian access and to identify which side of the street can be safely accessed at intersections prior to construction zones. 3. EBMUD and its contractors shall use "share the road" signs within the construction zones where partial closures would occur; obtain a temporary permit to allow bicyclists to use the sidewalks to bypass the construction zones where allowed by the local jurisdiction; and provide detours for bicyclists around areas with discontinuous sidewalks. 4. EBMUD shall post signs at the affected bus stop on Island Drive and at other bus stops along the route of AC Transit Line 21. The signs will be posted at least 2 weeks in advance of the HDD pipeline pull through activity at Crossing #2 and shall indicate when the bus stop at Island Drive would be unavailable and where the nearest bus stop for AC Transit Line 21 is located. 5. EBMUD shall coordinate with AC Transit to re-locate bus stops and/or re-route affected transit services via parallel streets during construction when affected transit service is subject to delays resulting from partial street closure or inaccessible transit stops due to full street closure. 6. EBMUD shall post signs at affected pedestrian intersections and bike routes at least 2 weeks in advance of construction. These signs shall state the date range of construction and shall indicate the route of pedestrian and/or bike path detours during construction.	EBMUD and EBMUD's Construction Contractor	EBMUD	During Construction		X	X	X
Impact Traffic-3: Potential to result in inadequate emergency access. Impact Hazards-5: Potential to impair implementation of or physically interfere with an adopted emergency response	**Mitigation Measure Traffic-6. Maintain Emergency Access.** 1. Emergency responders (i.e., local police, fire, and ambulance services) shall be notified at least 7 days in advance of any activities requiring full or partial roadway closures. Emergency access detour routes shall be determined in consultation with emergency responders as part of the notification process.	EBMUD and EBMUD's Construction Contractor	EBMUD	Just Prior to and During Construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
plan or emergency evacuation plan.	Businesses, commercial offices, and residents located within one block of construction shall be notified at least 7 days in advance of activities requiring roadway closures, outlining the proposed project schedule and the duration of construction activities. EBMUD will send notices to the individuals and businesses on the proposed project's mailing list to update them prior to any roadway closures. 2. Temporary barricades and directional cones that can be readily removed shall be used during full or partial roadway closures. 3. Road barricades shall be removed and open trenches shall be covered (plated) at the end of the day on a daily basis to provide access to businesses and residents. A portion of the on-street parking zones may be retained to allow for storage and/or staging of construction equipment.							

Table 7.2-2 EBMUD Practices and Procedures Monitoring and Reporting Plan

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Applicable Crossings: Crossing #1	Applicable Crossings: Crossing #2	Applicable Crossings: Crossing #3
Air Quality								
Impact Air-3: Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard.	**EBMUD's Standard Construction Specification 01 35 44** 1.1 (B) Site Activities 4. All construction equipment shall be properly serviced and maintained in good operating condition to reduce emissions. Contractor shall make copies of equipment service logs available upon request. 3.3 (B) Dust Control 1. Contractor shall implement all necessary dust control measures, including but not limited to the following: g. Water and/or coarse rock all dust-generating construction areas as directed by Engineer to reduce the potential for airborne dust from leaving the site. h. Cover all haul trucks entering/leaving the site and trim their loads as necessary. i. Using wet power vacuum street sweepers to: 1) Sweep all paved access road, parking areas and staging areas at the construction site daily or as often as necessary. 2) Sweep public roads adjacent to the site at least twice daily or as often as necessary. j. Gravel or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. k. Water and/or cover soil stockpiles daily. l. Hydroseed or otherwise stabilize exposed soil/rock side slopes. m. Restrict on-site construction vehicle speeds to fifteen (15) mph or less. 3.3 (C) Dust Monitoring During Demolition and Construction: 1. Provide air monitoring per the Dust Control and Monitoring Plan along the perimeter of the job site. A minimum of 4 stations, one on each side of the District property, shall be established, capable of daily measurement of total particulate concentration when any dust generating activity is occurring. a. All environmental and personal air sampling equipment shall be in conformance with the Association of Industrial Hygiene and National Institute of Safety and Health (NIOSH) standards. b. All analysis shall be completed by a California Department of Health Services certified laboratory for the specific parameters of interest. c. The Contractor shall provide to the Engineer, within 72 hours of sampling all test results. 3.4 (A) Air Quality and Emissions Control	EBMUD and EBMUD's Construction Contractor	EBMUD	During construction	X	X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	1. The Contractor shall ensure that line power is used instead of diesel generators at all construction sites where line power is available. 2. The Contractor shall ensure that for operation of any stationary, compression-ignition engines as part of construction, comply with Section 93115, Title 17, California Code of Regulations, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, which specifies fuel and fuel additive requirements as well as emission standards. 3. Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) shall be electrically powered unless the Contractor submits documentation and receives approval from the Engineer that the use of such equipment is not practical, feasible, or available. All portable engines and equipment units used as part of construction shall be properly registered with the California Air Resources Board or otherwise permitted by the appropriate local air district, as required. 4. Contractor shall implement standard air emissions controls such as: a. Minimize the use of diesel generators where possible. b. Limit idling of off-road compression ignition vehicles to 5 minutes or less. c. Minimize unnecessary idling of mobile construction equipment. d. Follow applicable regulations for fuel, fuel additives, and emission standards for stationary, diesel-fueled engines. e. Locate generators at least 100 feet away from adjacent homes and ball fields. f. Perform regular low-emission tune-ups on all construction equipment, particularly haul trucks and earthwork equipment. 5. Contractor shall implement the following measures to reduce greenhouse gas emissions from fuel combustion: a. On road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and re-inflated at regular intervals. b. Construction equipment engines shall be maintained to manufacturer's specifications. c. Demolition debris shall be recycled for reuse to the extent feasible (excluding wood treated with preservatives).							
Impact Air-4: Potential to expose sensitive receptors to substantial pollutant concentrations	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (11); (3.3) (B); (3.3) (C); 3.4 (A) (Details as previously listed)	EBMUD and EBMUD's Construction Contractor	EBMUD	During construction	X	X	X	X
Biological Resources								
Impact Bio-1: Potential to have a substantial adverse effect, either directly or through habitat	**EBMUD's Standard Construction Specification 01 35 44**	EBMUD and EBMUD's	EBMUD	Prior to and during construction	X	X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Applicable Crossings: Crossing #1	Applicable Crossings: Crossing #2	Applicable Crossings: Crossing #3
modifications, on candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	1.1 (B) (1) No debris, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan. 1.3 (B) Water Control and Disposal Plan: 1. Submit a detailed Water Control and Disposal Plan for the Engineer's acceptance prior to any work at the jobsite. a. Plan shall comply with all requirements of the Specification and with regulations of the California Regional Water Quality Control Board, California Department of Fish and Wildlife, County Flood Control Districts, and any other regulatory agency having jurisdiction. b. Plan shall include the sampling and analytical program for characterization of any wastewater, as needed, prior to disposal. c. Plan shall describe measures for containment, handling, and disposal of groundwater (if encountered), runoff of water used for dust control, tank heel water, wash water, sawcut slurry, test water and construction water or other liquid that has been in contact with any interior surfaces of District facilities. 2. Obtain and provide to the Engineer documentation from the agency having jurisdiction, authorizing the Contractor to dispose of the liquid and describing the method of disposal. Where applicable, provide documentation indicating acceptance for disposal by a wastewater treatment plant or other disposal facility. 3. All information pertinent to the characterization of the liquid shall be disclosed to the District and the disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the disposal facility. 4. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing. 1.3 (C) Construction and Demolition Waste Disposal Plan. 1. Prepare a Construction and Demolition Waste Disposal Plan and submit a copy of the plan for the Engineer's acceptance prior to disposing of any material (except for water wastes which shall be addressed in the Water Control and Disposal Plan). a. The plan shall identify how the Contractor will remove, handle, transport, and dispose of all materials required to be removed under this contract in a safe, appropriate, and lawful manner in	Construction Contractor						

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the disposal of removed materials. b. Include a list of reuse facilities, recycling facilities and processing facilities that will be receiving recovered materials. c. Identify materials that are not recyclable or not recovered which will be disposed of in a landfill (or other means acceptable by the State of California and local ordinance and regulations). d. List the permitted landfill, or other permitted disposal facilities, that will be accepting the disposed waste materials. e. Identify each type of waste material to be reused, recycled or disposed of and estimate the amount, by weight. f. Plan shall include the sampling and analytical program for characterization of any waste material, as needed, prior to reuse, recycle or disposal. 2. Materials or wastes shall only be recycled, reused, reclaimed, or disposed of at locations approved of by the District. 3. Submit permission to reuse, recycle, reclaim, or dispose of material from reuse, recycling, reclamation, or disposal site owner along with any other information needed by the District to evaluate the acceptability of the proposed reuse, recycling, or disposal site and obtain acceptance of the Engineer prior to removing any material from the project site. 4. All information pertinent to the characterization of the material or waste shall be disclosed to the District and the reuse, recycling, reclamation, or disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the reuse, recycling, reclamation, or disposal facility. 5. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing.							
Impact Bio-2: Potential to have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations or by CDFW or USFWS	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (B); (1.3) (C) (Details as previously listed)	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to and during construction	X	X	X	X
Impact Bio-3: Potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (B); (1.3) (C) (Details as previously listed)	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to and during construction	X	X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
coastal areas) through direct removal, filling, hydrological interruption, or other means								
Impact Bio-4: Potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or could impede the use of native wildlife nursery sites	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (B); (1.3) (C) (Details as previously listed)	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to and during construction	X	X	X	X
Geology, Soils, and Seismicity								
Impact Geology Soils-1: Potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; or landslides.	**EBMUD Engineering Standard Practices 512.1 and 550.1** EBMUD uses two primary Engineering Standard Practices for the design of water pipelines in its distribution system to address geologic hazards. Engineering Standard Practice 512.1 Water Main and Services Design Criteria, establishes basic criteria for the design of water pipelines and establishes minimum requirements for pipeline construction materials. Engineering Standard Practice 550.1 Seismic Design Requirements addresses seismic design of the pipelines to withstand seismic hazards including fault rupture, ground shaking, liquefaction-related phenomena, landslides, seiches and tsunamis and requires that EBMUD establish project-specific seismic design criteria for pipelines with a diameter of greater than 12-inches, such as the water mains that would be installed under the proposed project. The text of the Engineering Standard Practices is provided in Appendix D.	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to construction		X	X	X
Impact Geology Soils-2: Potential to result in substantial soil erosion or the loss of topsoil.	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1) to (1.1) (B) (12) 1.1 Description B. Site Activities 1. No debris, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan. 2. Excess material shall be disposed of in locations approved by the Engineer consistent with all applicable legal requirements and disposal facility permits.	EBMUD and EBMUD's Construction Contractor	EBMUD	During construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Applicable Crossings: Crossing #1	Applicable Crossings: Crossing #2	Applicable Crossings: Crossing #3
	3. Do not create a nuisance or pollution as defined in the California Water Code. Do not cause a violation of any applicable water quality standards for receiving waters adopted by the Regional Board or the State Water Resources Control Board, as required by the Clean Water Act. 4. Clean up all spills and immediately notify the Engineer in the event of a spill. 5. Stationary equipment such as motors, pumps, and generators, shall be equipped with drip pans. 6. Divert or otherwise control surface water and waters flowing from existing projects, structures, or surrounding areas from coming onto the work and staging areas. The method of diversions or control shall be adequate to ensure the safety of stored materials and of personnel using these areas. Following completion of Work, ditches, dikes, or other ground alterations made by the Contractor shall be removed and the ground surfaces shall be returned to their former condition, or as near as practicable, in the Engineer's opinion. 7. Maintain construction sites to ensure that drainage from these sites will minimize erosion of stockpiled or stored materials and the adjacent native soil material. 8. Furnish all labor, equipment, and means required and shall carry out effective measures wherever, and as often as necessary, to prevent Contractor's operations from causing visible dust emissions to leave the work areas. These measures shall include, but are not limited to, providing additional watering equipment, reducing vehicle speeds on haul roads, restricting traffic on haul roads, covering haul vehicles, and applying an Engineer-approved, environmentally safe, dust palliative to well traveled haul roads. The Contractor shall be responsible for damage resulting from dust originating from its operations. The dust abatement measures shall be continued for the duration of the Contract. Water the site in the morning and evening, and as often as necessary, and clean vehicles leaving the site as necessary to prevent the transportation of dust and dirt onto public roads. Dust control involving water shall be done in such a manner as to minimize waste and runoff from the site. 9. Construction staging areas shall be graded, or otherwise protected with Best Management Practices (BMPs), to contain surface runoff so that contaminants such as oil, grease, and fuel products do not drain towards receiving waters including wetlands, drainages, and creeks. 10. Furnish all labor, equipment and means required to prevent excessive noise from its Work activities. Comply with all local noise ordinances.							

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	11. All construction equipment shall be properly serviced and maintained in good operating condition to reduce emissions. Contractor shall make copies of equipment service logs available upon request. 12. Any chemical or hazardous material used in the performance of the Work shall be handled, stored, applied, and disposed of consistent with all applicable federal, state, and local laws and regulations.							
Impact Geology Soils-3: Potential to be located on a geologic unit or soil that is unstable or that would become unstable as a result of the proposed project, and potentially could result in on-site or off-site landslides, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse.	**EBMUD Engineering Standard Practices 512.1 and 550.1** The text of the Engineering Standard Practices is provided in Appendix D.	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to construction		X	X	X
Impact Geology Soils-4: Potential to be located on expansive or corrosive soils that would create substantial risks to life or property.	**EBMUD Engineering Standard Practices 512.1 and 550.1** The text of the Engineering Standard Practices is provided in Appendix D.	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to construction		X	X	X
Greenhouse Gases								
Impact GHG-1: Potential to generate annual GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	**EBMUD's Standard Construction Specification 01 35 44** Sections (3.4) (A) (5) (a-c) a. On road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and re-inflated at regular intervals. b. Construction equipment engines shall be maintained to manufacturer's specifications. c. Demolition debris shall be recycled for reuse to the extent feasible (excluding wood treated with preservatives).	EBMUD and EBMUD's Construction Contractor	EBMUD	During construction		X	X	X
Hazards and Hazardous Materials								
Impact Hazards-1: Potential to create a significant hazard to human health and/or the environment involving the release of hazardous materials	**EBMUD's Standard Construction Specification 01 35 24** 1.3 (C) Excavation Safety Plan 1. Submit detailed plan for worker protection and control of ground movement for the Engineer's review prior to any excavation work at jobsite. Include drawings and details of system or systems to be used, area in which each type of system will be used, de-watering, means of access and egress, storage of materials, and equipment restrictions. If plan is modified or changed, submit revised plan.	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to and during construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	2. All surface encumbrances that are located and determined to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees. 3. Tunnel work shall comply with the Tunnel Safety Orders. (1.3) (H) Electrical Safety Plan 1. Submit a detailed plan for worker protection from hazardous voltages on pipelines and appurtenances as a result of electromagnetic induction from nearby electrical transmission lines and short-circuits at the high-voltage lattice steel towers and tubular steel poles. 2. The safety plan shall include the following details at minimum: a. Procedures to limit worker contact with the bare metal on the pipeline and appurtenances, either through direct body contact or via equipment which has a direct metallic path to the pipeline (e.g., a crane or backhoe using metallic slings or chains). b. Procedures to avoid placing equipment and materials near any PG&E lattice towers or tubular steel poles. c. Details of protective equipment and clothing to be used when worker contact with the pipeline is unavoidable. d. Temporary pipeline grounding and bonding details to be used during construction. e. Procedures for the installation of temporary pipeline grounding and bonding by qualified personnel (e.g., electrician). f. Procedures to notify all persons on the job site of the electrical hazard. g. Procedures to limit access to the pipeline to the public and unqualified personnel.							
	EBMUD Environmental Compliance Manual Section 9 of the Environmental Compliance Manual includes a Trench Spoils Best Management Practices (BMP) program that describes procedures to ensure that worker exposure to contaminants of concern is minimized and that trench spoils are disposed of properly. The program involves a site assessment and investigations to collect and analyze soil and groundwater samples to determine if health and safety precautions are required and to determine disposal methods for both trench spoils and/or groundwater. **EBMUD's Standard Construction Specification 01 35 44** 1.3 (B) Water Control and Disposal Plan: 1. Submit a detailed Water Control and Disposal Plan for the Engineer's acceptance prior to any work at the jobsite.							

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	a. Plan shall comply with all requirements of the Specification and with regulations of the California Regional Water Quality Control Board, California Department of Fish and Wildlife, County Flood Control Districts, and any other regulatory agency having jurisdiction. b. Plan shall include the sampling and analytical program for characterization of any wastewater, as needed, prior to disposal. c. Plan shall describe measures for containment, handling, and disposal of groundwater (if encountered), runoff of water used for dust control, tank heel water, wash water, sawcut slurry, test water and construction water or other liquid that has been in contact with any interior surfaces of District facilities. 2. Obtain and provide to the Engineer documentation from the agency having jurisdiction, authorizing the Contractor to dispose of the liquid and describing the method of disposal. Where applicable, provide documentation indicating acceptance for disposal by a wastewater treatment plant or other disposal facility. 3. All information pertinent to the characterization of the liquid shall be disclosed to the District and the disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the disposal facility. 4. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing. 1.3 (C) Construction and Demolition Waste Disposal Plan: 1. Prepare a Construction and Demolition Waste Disposal Plan and submit a copy of the plan for the Engineer's acceptance prior to disposing of any material (except for water wastes which shall be addressed in the Water Control and Disposal Plan). a. The plan shall identify how the Contractor will remove, handle, transport, and dispose of all materials required to be removed under this contract in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the disposal of removed materials. b. Include a list of reuse facilities, recycling facilities and processing facilities that will be receiving recovered materials. c. Identify materials that are not recyclable or not recovered which will be disposed of in a landfill (or other means acceptable by the State of California and local ordinance and regulations).							

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Applicable Crossings: Crossing #1	Applicable Crossings: Crossing #2	Applicable Crossings: Crossing #3
	d. List the permitted landfill, or other permitted disposal facilities, that will be accepting the disposed waste materials. e. Identify each type of waste material to be reused, recycled or disposed of and estimate the amount, by weight. f. Plan shall include the sampling and analytical program for characterization of any waste material, as needed, prior to reuse, recycle or disposal. 2. Materials or wastes shall only be recycled, reused, reclaimed, or disposed of at locations approved of by the District. 3. Submit permission to reuse, recycle, reclaim, or dispose of material from reuse, recycling, reclamation, or disposal site owner along with any other information needed by the District to evaluate the acceptability of the proposed reuse, recycling, or disposal site and obtain acceptance of the Engineer prior to removing any material from the project site. 4. All information pertinent to the characterization of the material or waste shall be disclosed to the District and the reuse, recycling, reclamation, or disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the reuse, recycling, reclamation, or disposal facility. 5. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing.							
Impact Hazards-2: Potential to create a significant hazard to the human health and/or the environment through the routine transport, use, or disposal of hazardous materials	**EBMUD's Standard Construction Specification 01 35 24** Sections (1.3) (C) and (1.3) (H) (Details as previously listed)	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to and during construction		X	X	X
	EBMUD's Standard Construction Specification 01 35 44 Sections (1.3) (B) and (1.3) (C) (Details as previously listed)							
Hydrology and Water Quality								
Impact Hydro-1: Potential to violate water quality standards or waste discharge requirements.	**EBMUD's Standard Construction Specification 01 35 44** 1.1 (B) (1) No debris, soil, silt, sand, bark, slash, sawdust, asphalt, rubbish, paint, oil, cement, concrete or washings thereof, oil or petroleum products, or other organic or earthen materials from construction activities shall be allowed to enter into storm drains or surface waters or be placed where it may be washed by rainfall or runoff outside the construction limits. When operations are completed, excess materials or debris shall be removed from the work area as specified in the Construction and Demolition Waste Disposal Plan.	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to and during construction		X	X	X

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	1.3 (A) (2) (a) Alameda County Stormwater Permit: In addition to the State's General Construction Stormwater Permit, the Contractor shall obtain and comply with Alameda County Public Works Agency's Stormwater Permit to enable the inspection of C.6 construction stormwater BMPs. 1.3 (A) (3) (a) Storm Water Pollution Prevention Plan: Submit for acceptance a Stormwater Pollution Prevention Plan that describes measures that shall be implemented to prevent the discharge of contaminated storm water runoff from the jobsite. Contaminants to be addressed include, but are not limited to soil, sediment, concrete residue, pH less than 6.5 or greater than 8.5, and chlorine residual. 1.3 (B) Water Control and Disposal Plan: 1. Submit a detailed Water Control and Disposal Plan for the Engineer's acceptance prior to any work at the jobsite. a. Plan shall comply with all requirements of the Specification and with regulations of the California Regional Water Quality Control Board, California Department of Fish and Wildlife, County Flood Control Districts, and any other regulatory agency having jurisdiction. b. Plan shall include the sampling and analytical program for characterization of any wastewater, as needed, prior to disposal. c. Plan shall describe measures for containment, handling, and disposal of groundwater (if encountered), runoff of water used for dust control, tank heel water, wash water, sawcut slurry, test water and construction water or other liquid that has been in contact with any interior surfaces of District facilities. 2. Obtain and provide to the Engineer documentation from the agency having jurisdiction, authorizing the Contractor to dispose of the liquid and describing the method of disposal. Where applicable, provide documentation indicating acceptance for disposal by a wastewater treatment plant or other disposal facility. 3. All information pertinent to the characterization of the liquid shall be disclosed to the District and the disposal facility. Submit copies of any profile forms and/or correspondence between the Contractor and the disposal facility. 4. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will analyze samples for suspected hazardous substances. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform. Submit prior to any laboratory testing. 1.3 (D) Spill Prevention and Response Plan 1. Submit plan detailing the means and methods for preventing and controlling the spilling of known hazardous substances used on the jobsite or staging areas. The plan shall include a list of the hazardous substances proposed for use or generated by the							

Impacts Being Mitigated	Mitigation Measure/Standard Specification	Responsible for Implementation	Responsible for Monitoring and/or Enforcement	Timing of Implementation	Applicable Crossings: Pre-Construction Geotechnical Investigation	Crossing #1	Crossing #2	Crossing #3
	Contractor on site, including petroleum products, and measures that will be taken to prevent spills, monitor hazardous substances, and provide immediate response to spills. Spill response measures shall address notification of the Engineer and appropriate agencies including phone numbers; spill-related worker, public health, and safety issues; spill control, and spill cleanup. 2. Submit a Material Safety Data Sheet (MSDS) for each hazardous substance proposed to be used prior to delivery of the material to the jobsite.							
Impact Hydro-3: Potential to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (A) (2) (a); (1.3) (A) (3) (a); (1.3) (B); (1.3) (D) (Details as previously listed)	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to and during construction		X	X	X
Impact Hydro-4: Potential to create or contribute to runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.	**EBMUD's Standard Construction Specification 01 35 44** Sections (1.1) (B) (1); (1.3) (A) (2) (a); (1.3) (A) (3) (a); (1.3) (B); (1.3) (D) (Details as previously listed)	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to and during construction		X	X	X
Noise								
Impact Noise-1: Potential to expose persons to or generate noise levels in excess of standards established in the local General Plan or noise ordinance or applicable standards of other agencies, and potential to result in a substantial temporary or periodic increase in ambient noise levels in the proposed project vicinity above levels existing without the proposed project	**EBMUD's Standard Construction Specification 01 35 44** 1.3 (F) Noise Control and Monitoring Plan 1. Submit a plan detailing the means and methods for controlling and monitoring noise generated by demolition and other work on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan. 1.3 (G) Vibration Control and Monitoring Plan 1. Submit a plan detailing the means and methods for controlling and monitoring surface vibration generated by demolition and other work on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan.	EBMUD and EBMUD's Construction Contractor	EBMUD	Prior to construction		X	X	X

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