DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
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DEPUTY DIRECTOR

IN REPLY REFER TO:
PRO 11-004

January 7, 2011

Mr. Herman Tuiolosega, Acting Administrator
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Mr. Tuiolosega:

Subject: Draft Environmental Impact Statement for the Kaneohe/Kailua Wastewater Conveyance and Treatment Facilities, Koolaupoko, Oahu, Hawaii

The City and County of Honolulu Department of Environmental Services (ENV), submits the attached Draft Environmental Impact Statement (DEIS) which has been prepared pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 11-200-2, Hawaii Administrative Rules. Please publish notice of this DEIS in the January 23, 2011, issue of *The Environmental Notice*.

Enclosed are the following items:

- One (1) CD including the DEIS (Volumes 1 and 2) and the OEQC publication form in PDF format
- One (1) hardcopy of the DEIS
- DEIS Distribution List

Please do not upload the DEIS to OEQC's website until January 23, 2011. If you have any questions, please call Jack Pobuk at 768-3464.

Sincerely,

Ross S. Tanimoto

for Timothy E. Steinberger, P.E.
Director

Enclosures

cc: Earl Matsukawa, Wilson Okamoto Corporation

Draft Environmental Impact Statement

Volume 1 of 2

Kaneohe/Kailua Wastewater Conveyance and Treatment Facilities

Prepared For:

CITY AND COUNTY OF HONOLULU
DEPARTMENT OF ENVIRONMENTAL SERVICES

Prepared By:

WILSON OKAMOTO CORPORATION

January 2011

Draft
Environmental Impact Statement

Volume 1 of 2

Kaneohe/Kailua Wastewater Conveyance and Treatment Facilities

District of Koolaupoko, Island of Oahu

Prepared for:

CITY AND COUNTY OF HONOLULU
DEPARMENT OF ENVIRONMENTAL SERVICES

Prepared by:

WILSON OKAMOTO
CORPORATION

January 2011

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GLOSSARY OF ACRONYMS AND TECHNICAL TERMS

AAQS – Ambient Air Quality Standards

ACS – American Community Survey

ADF – Average Daily Flow

ADT – Average Daily Traffic Counts

BMP – Best Management Practices

BWS – Board of Water Supply

CDUA – Conservation District Use Application

CIA – Cultural Impact Assessment

CIP – Capital Improvement Program

COE – Corps of Engineers

CWG – Core Working Group

CWRM – Commission on Water Resource Management

CZM – Coastal Zone Management

DA – Department of the Army

dBA or dB – Decibels

dBL – Measurement of airblast levels

DLNR – Department of Land and Natural Resources

DNL – Day-Night Average Sound Level

DO – Dissolved Oxygen

DOE – Department of Education

DOH – Department of Health

DOT – Department of Transportation

DPP – Department of Planning & Permitting

GLOSSARY OF ACRONYMS AND TECHNICAL TERMS (CONTINUED)

EIS – Environmental Impact Statement

EISPN – Environmental Impact Statement Preparation Notice

ENV – Department of Environmental Services

EPA - Environmental Protection Agency

ESA – Endangered Species Act

F.M. – Force Main

FEMA – Federal Emergency Management Agency

FIRM – Flood Insurance Rate Map

FWHA – Federal Highway Administration

FY – Fiscal Year

HAR – Hawaii Administrative Rules

HDD – Horizontal Directional Drilling

HIMB – Hawaii Institute of Marine Biology

HRS – Hawaii Revised Statutes

HUD – Department of Housing and Urban Development

Hz – Hertz

I/I – Infiltration and Inflow

IPS – Influent Pump Station

Km – Kilometers

Leq – Equivalent sound level

Ldn – Day/Night sound level

LOS – Level of service

LUO – Land Use Ordinance

GLOSSARY OF ACRONYMS AND TECHNICAL TERMS (CONTINUED)

m - meter

m^2 – square meter

MCBH – Marine Corps Base Hawaii

µg/m3 – micrograms per cubic meter

mg/m3 – milligrams per cubic meter

Mgd – Million Gallons Per Day

Mph – Miles Per Hour

msl – Mean Sea Level

Muck - Removed drilling tunnel boring or HDD, regardless of composition, e.g. rock, clay, sand

NOAA – National Oceanic and Atmospheric Administration

NPDES – National Pollutant Discharge Elimination System

OP – Office of Planning

OTS – Oahu Transit Services

PER – Preliminary Engineering Report

pH – potential Hydrogen

PIM – Public Infrastructure Map

PPV – Peak Particle Velocities

Psi – Per square inch

PTS – Permanent Threshold Shift

PUMA – Public Use Microdata Area

PVC – Polyvinyl chloride

ROW – Right of Way

SCP – Sustainable Communities Plan

GLOSSARY OF ACRONYMS AND TECHNICAL TERMS (CONTINUED)

SHPD – State Historic Preservation Division

SIHP – State Inventory of Historic Places

SMA – Special Management Area

TBM – Tunnel Boring Machine

TMK – Tax Map Key

TSS – Total Suspended Solids

TTS – Temporary Threshold Shift

WCC – Windward Community College

WIC – Women, Infants, and Children

WMA – Wildlife Management Area

WOC – Wilson Okamoto Corporation

WWPTF – Wastewater Pre-Treatment Facility

WWTP – Wastewater Treatment Plant

YWCA – Young Women's Christian Association

PREFACE

This Draft Environmental Impact Statement (EIS) was prepared pursuant to Chapter 343, Hawaii Revised Statutes, and Title 11, Chapter 200, Administrative Rules, Department of Health, State of Hawaii. The City and County of Honolulu (City), Department of Environmental Services (ENV) proposes to undertake various improvements to the wastewater collection, treatment and disposal system in the Kaneohe-Kailua-Kahaluu wastewater service area, Koolaupoko District, Oahu. The primary improvement being proposed by the City is the construction of a new force main to supplement an existing 42-inch diameter force main conveying pre-treated wastewater from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant (WWTP). Completion of this new force main by 2014 is required in a Stipulated Order issued by the Environmental Protection Agency (EPA) in May 2007. While the City continues to progress towards initiating construction of the new force main, a potential new solution involving the construction of a gravity-flow sewer tunnel is now being considered. The primary focus of this Draft EIS is an assessment of impacts associated with these two alternative means of supplementing or replacing the existing 42-inch force main.

The alternative that is in the City's current Capital Improvement Program (CIP) involves the construction of a 2.9 mile long, 36-inch (inside diameter) force main through which wastewater would be pumped (as opposed to gravity flow) from the Kaneohe WWPTF to the Kailua Regional WWTP. This proposed pipe, referred to as Force Main No. 2, would provide system redundancy such that there will always be a force main available should one or the other be taken out of service, whether unexpectedly or by schedule, such as for maintenance.

The new force main would be constructed by one of two options beneath the seafloor of Kaneohe Bay, such that planned construction activity would not occur in or over bay waters. The first option is by horizontal directional drilling (HDD) staged from the Kaneohe WWPTF to the interchange area of Interstate H-3 and Kaneohe Bay Drive, where a secondary staging area would be located.

The other construction option is referred to as a hybrid tunnel method because it involves two tunneling methods, including micro-tunneling and long distance tunneling with a tunnel boring machine (TBM). The tunneling operation would be staged from the Kaneohe WWPTF and will construct a nine-foot interior diameter tunnel to the same interchange area as the HDD option. The force main would then be placed and secured within the tunnel.

Although the primary pipe installation activity will not occur within the waters of the bay, emergency or contingency work to remove obstructions or access machinery may be required within temporarily placed enclosures in the bay.

From the interchange area, both options would involve open trench construction and auger boring under highway ramps to place the force main to run along Kaneohe Bay Drive to the Kailua Regional WWTP.

The force main system also includes future construction of a 6.9 million gallon equalization facility with pumps, odor control, and pre-treatment equipment at the Kaneohe WWPTF and

a 2.1 million gallon equalization facility at the Kailua Regional WWTP. The equalization facilities are essentially enclosed wastewater storage reservoirs. They would store wastewater generated during periods of high rainfall when storm infiltration and inflow entering the wastewater collection system significantly increases the volume of wastewater that needs to be treated.

The alternative to the force main and equalization facilities involves constructing a tunnel up to 10 feet (interior diameter) between the two facilities. The tunnel will be constructed by a tunnel boring machine (TBM) that is designed to bore through rock. The proposed alignment was selected to keep the tunnel up to 95 percent within basalt rock. The TBM would be launched from a vertical shaft excavated at the Kailua Regional WWTP and will bore uphill toward the Kaneohe WWPTF.

When completed, the floor of the tunnel would begin at a depth of approximately 35 feet below sea level at the Kaneohe WWPTF. It would traverse approximately three miles, mostly beneath the Oneawa Hills range, reaching a floor depth of approximately 62 feet below sea level at the Kailua Regional WWTP, where the wastewater will be pumped to the surface for treatment by a new influent pump station (IPS) constructed in the vertical shaft. In addition to conveying wastewater by gravity flow, the tunnel would also serve the same storage function offered by the equalization facilities in the force main alternative as wastewater volumes increase during periods of high rainfall. The tunnel alternative would allow the existing Kaneohe WWPTF and the existing force main to be taken out of service.

In addition to the two wastewater conveyance and storage alternatives, there are two facility improvements proposed at the Kailua Regional WWTP that would be implemented regardless of which alternative is selected. One is the construction of a new headworks where the wastewater is received and pre-treated to remove debris and grit. It would replace the existing headworks to improve hydraulic efficiency and odor control. The other is a new sludge dewatering building to replace an aging building that has developed structural problems and was not designed to be closed during the loading of dewatered sludge onto trucks, an activity which is also a source of odor. No improvements are proposed to the ocean outfall line.

The Department of Environmental Services, the proposing agency, has determined that the proposed alternative actions require the preparation of an Environmental Impact Statement.

SUMMARY

Proposing Agency: City and County of Honolulu
Department of Environmental Services
1000 Ulu Ohia Street, Suite 308
Kapolei, Hawaii 96707
Timothy E. Steinberger, P.E., Director

Accepting Authority: City and County of Honolulu
Department of Environmental Services
1000 Ulu Ohia Street, Suite 308
Kapolei, Hawaii 96707
Timothy E. Steinberger, P.E., Director

Location: Koolaupoko District, Oahu, Hawaii

Tax Map Keys:

Alternative 1 – Force Main Route
4-4-08: 01
4-4-11: 81
4-5-30: 01 and 36

Alternative 2 - Tunnel Route
4-2-15: 09
4-2-17: 01, 16, 17, 18 and 21
4-4-1: 14
4-4-11: 03, 81, 82 and 83
4-4-12: 01, 02, 64 and 65
4-4-38:01
4-5-30:01 and 36
4-5-31: 76
4-5-32: 01
4-5-100: 01, 02, 03, 04 and 52
4-5-101: 33, 34, 35, 36, 37 and 38

Proposed Action: Two alternative wastewater conveyance and equalization facilities are proposed, one of which will be constructed:

1. Alternative 1 – Construct an approximately 2.9 mile long, 36-inch diameter force main from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant (WWTP) to convey pre-treated wastewater. The force main will traverse beneath the seafloor of Kaneohe Bay. The method of constructing the force main has yet to be determined. Additional improvements include a new 6.9-million gallon equalization facility at the Kaneohe WWPTF and a new 2.1-million gallon equalization facility at the Kailua Regional WWTP to store wastewater during periods of high rainfall. The equalization

facilities will each include an associated influent pump station, headworks and odor control facility.

2. Alternative 2 – Construct an approximately three mile long, 10-foot (inside diameter) tunnel from the Kaneohe WWPTF to the Kailua Regional WWTP to convey wastewater, and a new Influent Pump Station (IPS) to lift the wastewater up to the surface WWTP for treatment. The tunnel will be aligned to traverse mostly under the Oneawa Hills range, mauka of Kaneohe Bay Drive.

3. Other Treatment-Related Facilities - Regardless of which conveyance and storage alternative is selected, two improvements at the Kailua Regional WWTP are proposed, including a new headworks facility replacing the existing headworks and a new dewatering facility to replace the existing dewatering building**.**

Determination: The Proposing Agency has determined that the proposed action requires the preparation of an EIS based on the significance criteria set forth in Chapter 200, Title 11, Administrative Rules, State of Hawaii Department of Health.

Parties Consulted During the EISPN:

<u>Federal</u>

U.S. Geological Survey
U.S. Fish & Wildlife Service
U.S. Army Corps of Engineers, Civil Works Branch
U.S. Army Corps of Engineers, Regulatory Branch✓
U.S. Navy
U.S. Marine Corps
National Oceanic and Atmospheric Administration
Marine Corps Base Hawaii – Kaneohe Bay

<u>State of Hawaii</u>

Department of Business, Economic Development and Tourism (DBEDT)
Department of Education (DOE)
Aikahi Elementary School
Puohala Elementary School
Department of Health (DOH)
DOH, Environmental Management Division
DOH, Wastewater Branch
DOH, Environmental Health Service Division
DOH, Indoor and Radiological Health Branch
DOH, Office of Environmental Quality Control
Department of Land and Natural Resources (DLNR)
DLNR, Land Division

Parties Consulted During the EISPN (Continued):

State of Hawaii (continued)
- DLNR, Engineering Division
- DLNR, Division of Aquatic Resources
- DLNR, Division of Forestry & Wildlife
- DLNR, Historic Preservation Division
- DLNR, Office of Conservation and Coastal Lands
- DLNR, Division of State Parks

Department of Transportation (DOT)
- DOT, Highways Division

Office of Hawaiian Affairs (OHA)
University of Hawaii Environmental Center

City and County of Honolulu
Office of the Mayor
Honolulu City Council
Department of Planning and Permitting
Department of Design and Construction
Department of Transportation Services
Board of Water Supply
Police Department
Fire Department

Elected Officials
Senator Jill Tokuda, District 24
Representative Ken Ito, District 48
Representative Pono Chong, District 49
Representative Cynthia Thielen, District 50
Honolulu City Councilmember Ikaika Anderson, District 3

Organizations
Kaneohe Neighborhood Board, #30
Kailua Neighborhood Board, #31
Kaneohe Bay Regional Council
Pacific American Foundation (Waikalua Loko Fishpond)
Kaneohe Ranch
Koolaupoko Hawaiian Civic Club

Parties to be Consulted During the Draft EIS Comment Period:

Federal
U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Environmental Protection Agency
U.S. Fish & Wildlife Service
U.S. Geological Survey
U.S. Department of Agriculture,

Parties to be Consulted During the Draft EIS Comment Period:

Federal (continued)
- Natural Resources Conservation Service

National Marine Fisheries Service
Marine Corps Base Hawaii – Kaneohe Bay

State of Hawaii
Department of Agriculture
Department of Accounting & General Services
Department of Business, Economic Development and Tourism (DBEDT)
- DBEDT, Energy Division
- DEBDT, Office of Planning

Department of Defense
Department of Education (DOE)
- Aikahi Elementary School
- Puohala Elementary School

Department of Hawaiian Home Lands
Department of Health (DOH)
- DOH, Environmental Management Division
- DOH, Office of Environmental Quality Control

Department of Human Services
Department of Labor and Industrial Services
Department of Land and Natural Resources (DLNR)
- DLNR, Land Division
- DLNR, Engineering Division
- DLNR, Division of Aquatic Resources
- DLNR, Division of Forestry & Wildlife
- DLNR, Historic Preservation Division
- DLNR, Office of Conservation and Coastal Lands

Department of Transportation (DOT)
- DOT Highways Division

Hawaii Housing Finance and Development Corporation
Office of Hawaiian Affairs (OHA)
University of Hawaii Environmental Center
University of Hawaii Hamilton Library
Hawaii State Public Library
Kaneohe Public Library
Kailua Public Library
Legislative Reference Bureau

City and County of Honolulu
Office of the Mayor
Department of Parks and Recreation (DPR)
- DPR, Kaneohe Senior and Community Center

Department of Planning and Permitting
Department of Design and Construction
Department of Community Services

Parties to be Consulted During the Draft EIS Comment Period (continued):

City and County of Honolulu (continued)
Department of Facility Maintenance
Department of Transportation Services
Board of Water Supply
Police Department
Fire Department
Kaneohe Neighborhood Board, #30
Kailua Neighborhood Board, #31

Elected Officials
Senator Jill Tokuda, District 24
Representative Ken Ito, District 48
Representative Pono Chong, District 49
Representative Cynthia Thielen, District 50
Honolulu City Council Chair Nestor Garcia
Honolulu City Councilmember Stanley Chang, Chair for Public Works & Sustainability Committee
Honolulu City Councilmember Ikaika Anderson, District 3

Other
Hawaiian Electric Company
Hawaiian Telcom
Oceanic Time Warner Cable
The Gas Company
Honolulu Star Advertiser
Affected Residents
Bayview Golf Park (including the golf course)
Core Working Group Members
- Kaneohe Residents
- Kailua Residents
- Kaneohe Bay Regional Council
- Pacific American Foundation (Waikalua Loko Fishpond)
- Kaneohe Ranch
- Lani Kailua Outdoor Circle
- Kokokahi YWCA
- Hawaii's Thousand Friends
- Yacht Club Knolls
- Kaneohe Yacht Club
- Tax Foundation of Hawaii
- Koolaupoko Hawaiian Civic Club
- Kailua Chamber of Commerce
- Aikahi Gardens Association
- Hui o Koolaupoko
- Sierra Club
- Kaneohe Business Group

SIGNIFICANT BENEFICIAL AND ADVERSE IMPACTS AND PROPOSED MITIGATION MEASURES:

Water Quality: The proposed project alternatives and associated improvements will have beneficial water quality impacts on surface, ground, and coastal waters in the project area.

The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will minimize potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system, which will prevent or minimize wastewater spills during storms

Air Quality: The primary air quality concern associated with the proposed project alternatives will be potential odor nuisances. The proposed alternatives will include odor control for all new facilities, such as new covered equalization facilities, new influent pump station, and headworks for the force main alternative, as well as the enclosed drop shaft and influent pump station for the gravity tunnel alternative.

Also, regardless of which alternative is pursued, the proposed new headworks facility and dewatering building at the Kailua Regional WWTP will help to reduce odors. The new headworks at the Kailua Regional WWTP would include construction of a new facility in an enclosed building with odor control. The proposed new dewatering building will be designed so that trucks receiving the dewatered sludge for transport will be able to drive into the building and the building access will be closed while the trucks are being loaded. This will significantly reduce odors generated by the loading operation. The building will be equipped with odor control devices to prevent odorous gases from escaping.

Short Term Construction Impacts: The significant impacts associated with the proposed alternatives are temporary impacts associated with construction activities, including the following:

- Noise – In both major alternatives, significant noise will be generated at construction staging areas within the Kaneohe WWPTF and the Kailua Regional WWTP. This will include noise from truck traffic hauling away spoils generated by drilling and tunneling operations and trucks delivering construction materials, as well noise generated by vehicles of commuting construction workers. Noise will also be generated by specific support equipment for tunneling activities, including ventilation fans delivering air to workers in the tunnel. The hybrid tunneling operation in Alternative 1 will also require the use of electrical generators at the Kaneohe WWPTF. The gravity tunneling operation in Alternative 2 will likely require controlled blasting to excavate the access shaft at the Kailua Regional WWTP and will generate more spoils than the smaller hybrid tunnel. The HDD construction alternative for Alternative 1 Force Main No. 2 at the Kaneohe WWPTF will require driving a steel sleeve into the soft soils prior to the HDD work. The sleeve will be driven by machinery comparable to a pile driver.

- Construction Traffic – In both major alternatives, significant construction-related traffic will be generated in the vicinity of the Kaneohe WWPTF and the Kailua Regional WWTP. In Alternative 1 Force Main No. 2 and Equalization Facilities, most

of the construction traffic will be near the Kaneohe WWPTF. For Alternative 2 Gravity Tunnel, most of the construction traffic will be near the Kailua Regional WWTP.

- Contingency and Emergency Work – Construction of Alternative 1 Force Main No. 2 beneath Kaneohe Bay will not involve construction work in the waters of the bay, except in contingency or emergency situations where obstructions or machinery need to be accessed from the surface through the seafloor. In such instances, the water column above the work area must be isolated, and such work will not be allowed in specific ecologically sensitive areas.

ALTERNATIVES CONSIDERED:

The proposed project includes two major alternatives, one of which has two construction sub-alternatives, as discussed in Section 2.3.1.

Major alternatives considered include the No Action Alternative, alternative land routes for Force Main No. 2, alternative routes for Force Main No. 2 beneath the seafloor of Kaneohe Bay, and alternative alignments for the Gravity Tunnel.

Also considered were alternatives for addressing infiltration and inflow (I/I) which occurs when stormwater and groundwater enters the collection system, resulting in peak wastewater flows that can cause spills at “choke points” in the system. These include:

- Reduction of I/I in the wastewater collection system;
- Increase capacity for peak wet weather flow;
- Flow equalization; and
- Expansion of treatment plant.

UNRESOLVED ISSUES:

Unresolved issues include the determination of which of the two major alternatives, one of which has two construction sub-alternatives as described in the summary proposed action description, will be implemented. Currently, Alternative 1 Force Main No. 2 is being pursued to meet the 2010 Consent Decree deadline of December 2014. The determination of the construction method for Force Main No. 2 will be made when the contractor is selected.

With regard to Alternative 2 Gravity Tunnel, the City has petitioned the EPA, DOH, and the courts to extend the December 2014 Consent Decree deadline to December 2018 to allow implementation of Alternative 2, the gravity tunnel. The decision by the EPA, DOH, and the courts on the City’s petition will determine whether Alternative 2 may be implemented. Until the City receives a favorable decision, however, it must continue to pursue development of the force main to meet the original deadline in the event of an unfavorable decision.

It is unresolved as to whether the selected contractor would encounter the contingency and emergency situations that would require construction options to access the subsurface

below the seafloor to retrieve construction equipment or to remove blockages. These contingency and emergency construction options may not be used as part of the contractors' proposed construction methodology. Restrictions on the locations where contingency and emergency access may be allowed, as described in this Draft EIS, would apply.

The various alternatives and optional project descriptions offer conceptual designs of alignments, depths, locations, and dimensions based on available information. It is likely that adjustments will need to be made as the detailed design of the selected alternative and option proceeds. As such, the conceptual designs should be regarded as estimates and approximations.

The specific location and configuration of the proposed new headworks and dewatering building at the Kailua Regional WWTP is unresolved but will likely be in the vicinity depicted, based on an assessment of available space and functional relationship to the existing and planned operations.

The size and location of the equalization facilities in Alternative 1 are the least resolved components. As discussed in Chapter 2, the City is currently updating the 1999 I/I Plan, which is likely to lower peak design flows. If such a reduction is determined, the size of the equalization facilities would also be reduced, and the need for an equalization facility at the Kailua Regional WWTP could even be eliminated. If the sizes of the equalization facilities change, their locations within the Kaneohe WWPTF and at the Kailua Regional WWTP could also change, as could the locations and sizes of their associated influent pump stations, headworks, and odor control facilities.

COMPATIBILITY WITH LAND USE PLANS AND POLICIES:

The two major project alternatives generally conform with the various land use plans, policies and regulatory controls, including, but not limited to, the Hawaii State Plan, State Recreation Functional Plan, State Coastal Zone Management Program, and the City and County of Honolulu's General Plan, Koolaupoko Sustainable Communities Plan, and Land Use Ordinance. Components of the two major alternatives involving construction of facilities at the Kaneohe WWPTF may require a designation for facility modification on the City's Public Infrastructure Map (PIM).

The two major project alternatives are generally consistent with the respective State Land Use District classifications. The construction of Force Main No. 2 in Alternative 1 and the Gravity Tunnel in Alternative 2 traverse beneath Kaneohe Bay and Oneawa Hills, respectively. Both of these areas lie in the State Conservation District and would require processing and approval of a Conservation District Use Application (CDUA) pursuant to the State Department of Land and Natural Resources Administrative Rules, Title 13, Chapter 5 for lands designated in the Conservation District.

Components of the two major alternatives involving construction at the Kaneohe WWPTF will require a Special Management Area (SMA) Permit pursuant to Chapter 25, Revised Ordinances of Honolulu, since the facility is located in the City's SMA. In addition, the construction of Force Main No. 2 in Alternative 1 will also require a shoreline setback variance for two locations where it will traverse beneath the shoreline setback along

Kaneohe Bay. The shoreline setback variance request will be processed concurrently with the SMA permit.

REQUIRED PERMITS AND APPROVALS:

The following is a list of permits and approvals which may be required prior to construction and operation of the proposed improvements:

Federal

Department of the Army
- Section 404, Clean Water Act

Department of the Army and Coast Guard
- Section 10, Rivers and Harbors Act

State of Hawaii

Department of Health
- Section 401, Clean Water Act, Water Quality Certification
- National Pollutant Discharge Elimination System (NPDES) Individual Permit for Storm Water Associated with Construction Activity
- NPDES Permit for Dewatering
- Noise Permit
- Noise Variance

Department of Land and Natural Resources
- Conservation District Use Permit
- Chapter 6E, HRS, Historic Preservation Review

Office of Planning
- Coastal Zone Management (CZM) Program Consistency Determination

Department of Transportation
- Permit to Perform Work Within State Highways

City and County of Honolulu

Department of Environmental Services
- Environmental Impact Statement

Department of Planning and Permitting
- Special Management Area Permit
- Shoreline Setback Variance
- Grading/Grubbing Permit
- Excavation Permit
- Trenching Permit
- Flood Elevation Certification

Department of Transportation Services
- Street Usage Permit

Other

Rights of Entry

Utility Line Easements

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1 Introduction

Pursuant to a May 2007 Stipulated Order issued by the Environmental Protection Agency (EPA), the City and County of Honolulu (City) began pursuing construction of a new force main to supplement an existing force main conveying pre-treated wastewater from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant (WWTP). That Stipulated Order has since been incorporated into an overarching 2010 judicial Consent Decree, Civil No. 94-00765 DAE-KSC (D. Hawaii), hereinafter referred to as the 2010 Consent Decree.

The purpose of the proposed force main is to provide back-up capacity to the existing force main in the event of a conveyance failure. Should the existing force main fail, there is currently no conveyance alternative and wastewater spillage could occur. Since the proposed force main would supplement the existing force main, it is referred to as Force Main No. 2. The existing force main is referred to as Force Main No. 1.

The existing 42-inch diameter concrete force main conveys pre-treated wastewater along a length of approximately three miles from the Kaneohe WWPTF to the Kailua Regional WWTP. The existing force main is aligned primarily beneath Kaneohe Bay Drive.

The 2010 Consent Decree requires Force Main No. 2 to be completed and operational by December 2014, or the City could be subject to severe daily monetary fines. Therefore, over the past three years, the City has been diligently pursuing planning and design of Force Main No. 2 in order to meet the deadline. In 2010, however, a new solution involving the construction of a gravity-flow sewer tunnel to accomplish the same purpose as Force Main No. 2 is being considered. A deep, gravity flow sewer tunnel, hereinafter referred to as the Gravity Tunnel, is being considered as an alternative wastewater conveyance method to Force Main No. 2.

In addition to conveyance, the Gravity Tunnel can also be sized to store sudden high flows of wastewater, much like a reservoir. Force mains, on the other hand, are not capable of storing such flows. Peaks in wastewater flows can occur during periods of high rainfall when stormwater can enter the wastewater collection system as infiltration or inflow. Once in the system, the stormwater is wastewater and must be treated before disposal. During such peaks in flow, wastewater spillages can occur where the peaks overtax “bottlenecks” in the collection and treatment system. Wastewater storage facilities, also referred to as equalization facilities, can capture peak flows before they spill and feed them back into the system after peak flows subside. Construction of the Gravity Tunnel would also allow the existing Force Main No. 1 to be abandoned and the Kaneohe WWPTF to be decommissioned, as pre-treatment and pumping into the force main would no longer be necessary.

The Gravity Tunnel alternative was not considered in previous studies as the cost was thought to be prohibitive. Tunnel technology, however, has advanced such that, while costly, the life cycle cost of the tunnel could compare favorably to the cost of constructing, operating, and maintaining Force Main No. 2, maintaining the Kaneohe WWPTF and constructing the new flow equalization facilities.

The service area for the Kailua Regional WWTP, located on the wet windward side of Oahu, is subject to high peak flows and resulting wastewater spillages. Therefore, it is anticipated that the City will be required to construct wastewater storage facilities. Thus, in addition to wastewater conveyance, the gravity tunnel could also address this anticipated wastewater storage requirement. Therefore, while construction of the Gravity Tunnel alternative is anticipated to be substantially costlier than the Force Main No. 2, if the cost for future wastewater storage facilities is taken into account, as well as operation and maintenance costs, the Gravity Tunnel could be less costly over the long-term. In light of the comparable life cycle cost and the additional wastewater storage function, the Gravity Tunnel alternative merits further evaluation and comparison to the Force Main No. 2 alternative.

On-going planning work for Force Main No. 2 has narrowed the alternative pipeline routes to one alignment traversing beneath the seafloor of Kaneohe Bay. The Gravity Tunnel alternative is aligned to travel mostly beneath Oneawa Hills to take advantage of what is anticipated to be a relatively homogeneous basalt geological substrate. Additional test borings will be required to confirm ground conditions. If the substrate is relatively intact, unweathered basalt, the tunnel could be efficiently constructed using a specialized tunnel boring machine (TBM).

Toward deciding whether the Gravity Tunnel alternative should be pursued over the Force Main No. 2 alternative, the City is preparing a Preliminary Engineering Report (PER), which will develop both concepts as comparable alternative designs. A life-cycle cost analysis will be applied to both alternatives to determine if one alternative has a significant life-cycle cost advantage over the other.

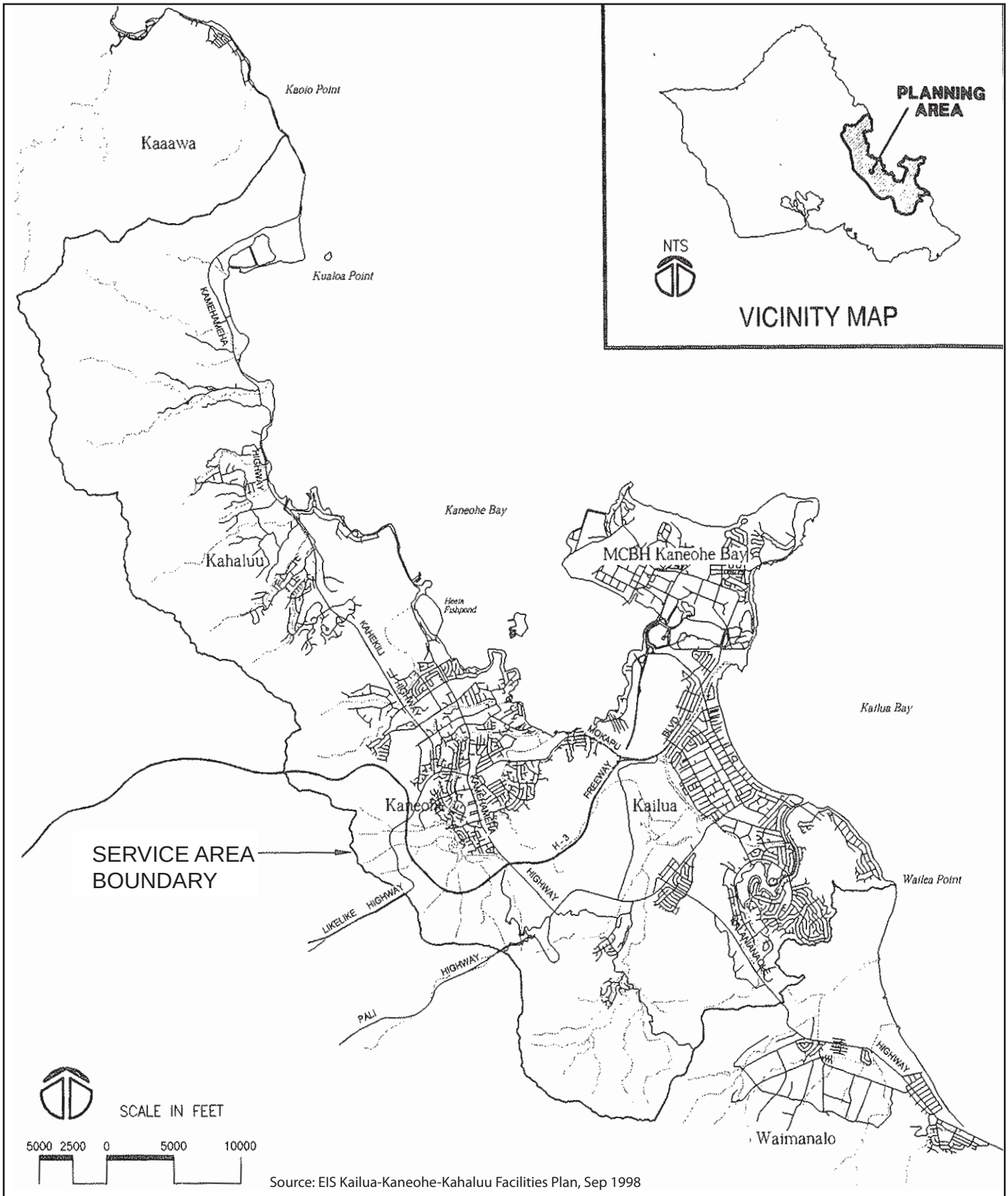
The City has also prepared this Draft Environmental Impact Statement (EIS), pursuant to Chapter 343, Hawaii Revised Statutes (HRS). The EIS assesses the environmental and socio-economic impacts of both alternatives, which will be taken into consideration in the City's decision. Preparation of an EIS is required pursuant to Chapter 343, HRS, and Chapter 200, Title 11, State of Hawaii Department of Health Administrative Rules (HAR), based on the use of County and State lands and County funds.

In addition, a community participation program conducted by the City will help determine what the community values in terms of potential benefits, costs, and impacts of the respective alternatives. These values are considered in the selection decision.

1.2 Background

The Kailua-Kaneohe-Kahaluu wastewater service area is in the Koolaupoko District on the windward side of the island of Oahu (see Figure 1-1). The service area boundaries extend from Kaoio Point and Waikane Valley to the north, to Wailea Point and Lanikai/Keolu Hills to the south, and inland along the ridgeline of the Koolau Mountain Range.

The service area encompasses approximately 36,500 acres, or 57 square miles, and includes the suburban communities of Kailua and Kaneohe and the rural-agricultural community of Kahaluu.



Source: EIS Kailua-Kaneohe-Kahaluu Facilities Plan, Sep 1998

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

KAHALUU - KANEOHE - KAILUA SERVICE AREA

FIGURE 1-1

The Kailua-Kaneohe-Kahaluu area is served by the Kailua Regional WWTP (see Figure 1-2). In late 1994, the former secondary treatment plants at Kaneohe and Ahuimanu were converted to wastewater pre-treatment facilities and the Kailua Regional WWTP was expanded to accommodate the flows from these areas. Wastewater flows conveyed to the Kailua Regional WWTP receive secondary treatment and are discharged to the receiving waters east of the Mokapu Peninsula through the Mokapu Outfall, which extends approximately 5,000 feet offshore to a depth of about 110 feet.

In 1996, the Kailua Regional WWTP processed an average of approximately 13.7 million gallons per day (mgd). According to the plant's records, the current volume of wastewater treated at the plant averages approximately 13 mgd.

The existing collection system consists of approximately 200 miles of gravity lines and force mains ranging in diameter from 6 to 66 inches, and 23 wastewater pump stations (WWPS), excluding the pump stations at the Kaneohe and Ahuimanu WWPTFs. The three major basins in the region are the Kailua Basin, Kaneohe Basin and Ahuimanu Basin. From the Kailua Basin, wastewater is collected primarily through gravity lines and conveyed to the Kailua Regional WWTP. From the Kaneohe and Ahuimanu Basins, wastewater is collected at the respective preliminary treatment facilities and conveyed via pumps and force mains to the Kailua Regional WWTP. Major problems that plague the system and contribute to hydraulic overloads are groundwater infiltration and stormwater inflow. Systems in low-lying areas along the coast are subject to seawater infiltration.

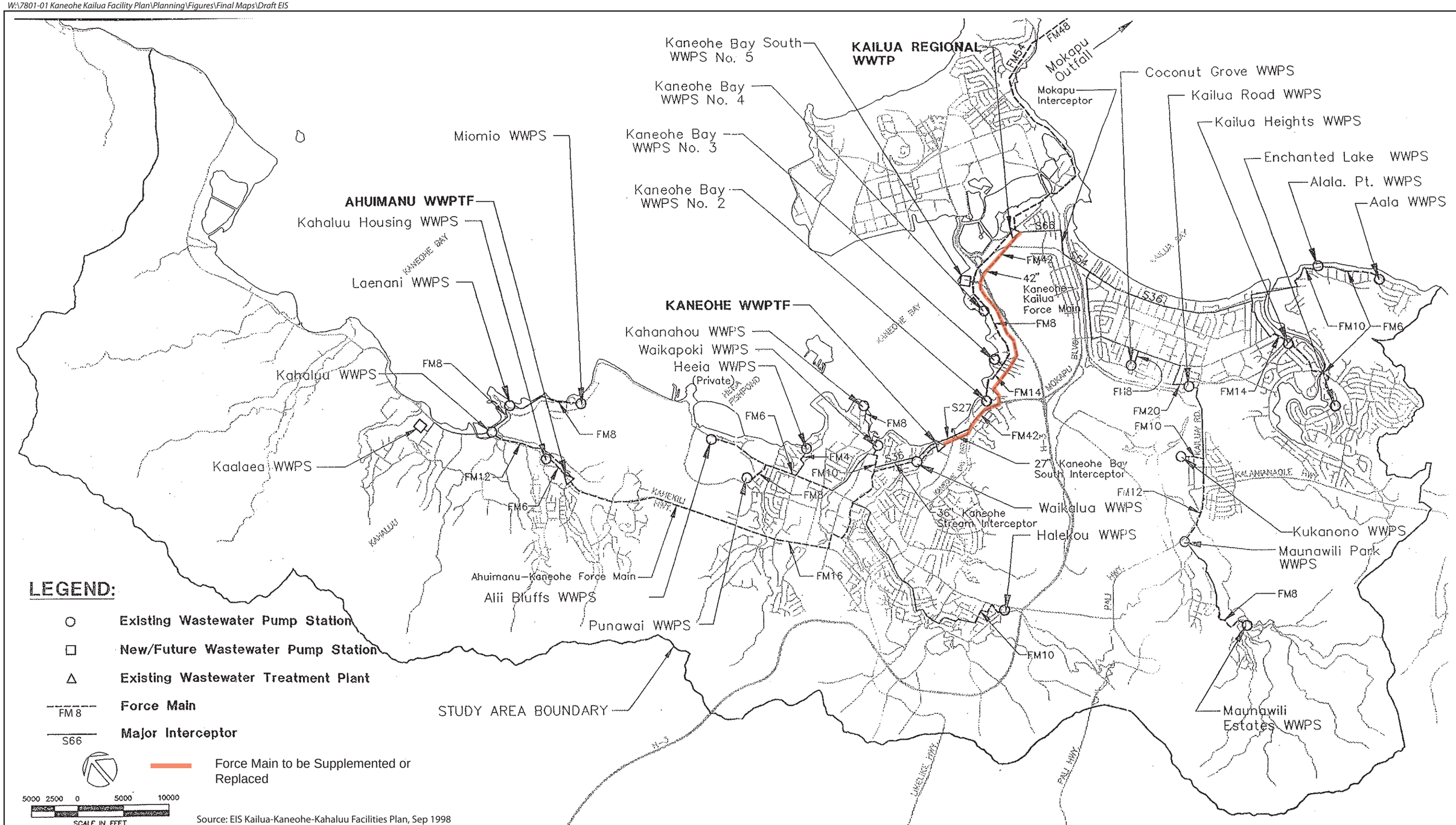
1.3 Project Location

The project is located within the service area, specifically between and including the Kaneohe WWPTF and the Kailua Regional WWTP. The project is identified by the Tax Map Keys (TMKs) listed in Table 1-1 and the respective TMK plats are illustrated in Figure 1-3.

Kaneohe WWPTF: The Kaneohe WWPTF is located on an approximately 15-acre parcel in the Puohala area owned by the City and is further identified as TMK 4-5-30:36. Surrounding land uses include the Bay View Golf Course to the west, Kawa Stream and the Bay View Golf Course to the south, open areas and Waikalua and Waikalua Loko Fish Ponds to the east, and Kaneohe Stream and residences to the north.

Kailua Regional WWTP: The Kailua Regional WWTP is located in Aikahi on an approximately 25-acre site owned by the City and is further identified as TMK 4-4-11:81. The site is bounded by Nuupia Ponds and the Marine Corps Base Hawaii (MCBH)-Kaneohe Bay facility to the north and west, Kaneohe Bay Drive and the Aikahi Gardens townhouse complex to the southwest, Aikahi Park and Aikahi Elementary School to the southeast, and Aikahi Park residences to the east.

Kaneohe/Kailua Force Main No. 1: The existing 42-inch diameter force main conveys pre-treated wastewater collected at the Kaneohe WWPTF to the Kailua Regional WWTP. The force main begins at the Kaneohe Effluent Pump Station located within the fenced site of the Kaneohe WWPTF. It traverses underground along the makai boundary of the Bay View Golf Park and the Kokokahi YWCA, then turns mauka to Kaneohe Bay Drive. The force main continues beneath Kaneohe Bay Drive until its termination at the Kailua Regional WWTP.



Source: EIS Kailua-Kaneohe-Kahaluu Facilities Plan, Sep 1998

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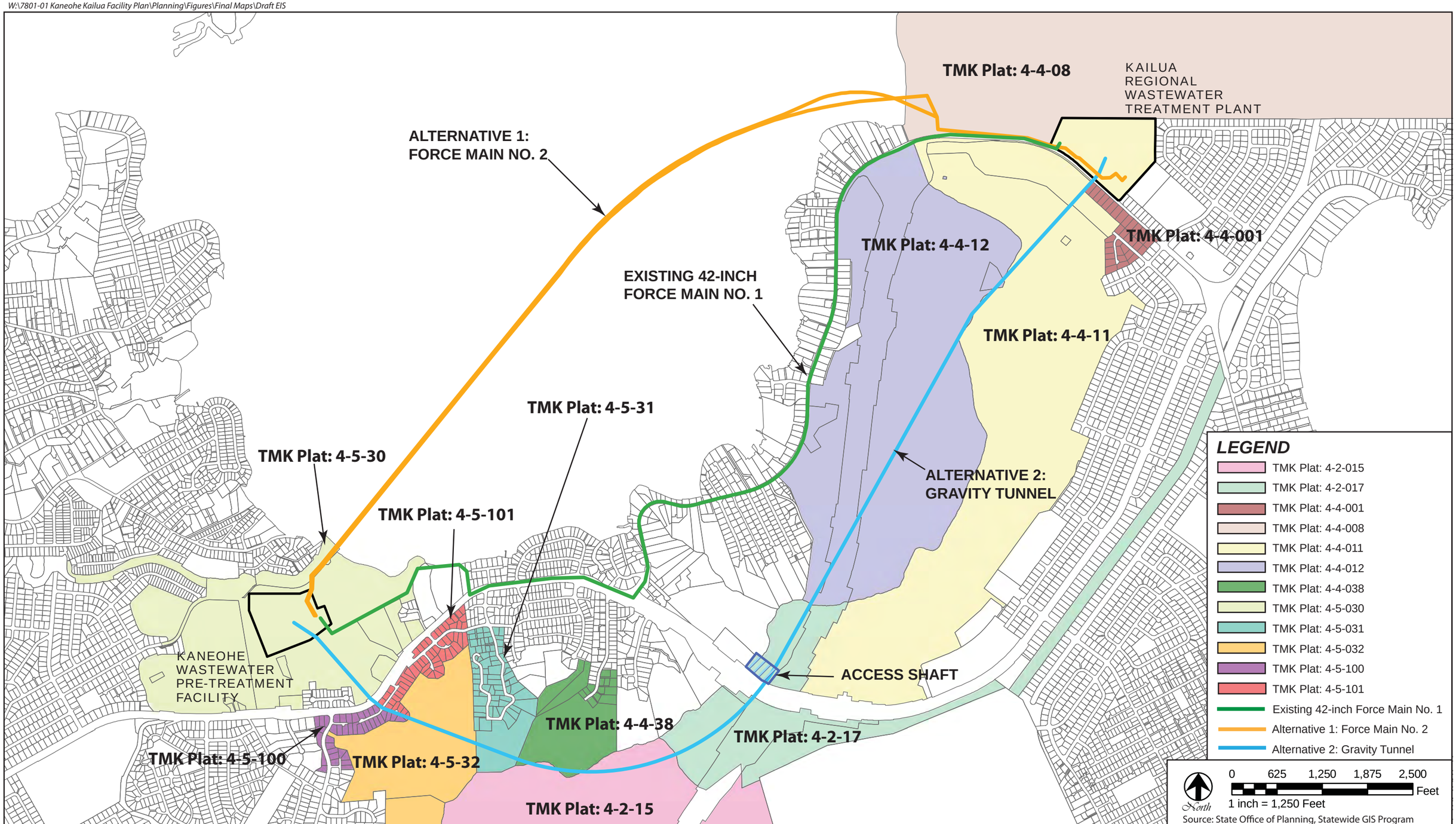
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

REGIONAL WASTEWATER SYSTEM

FIGURE 1-2

W:\7801-01 Kaneohe Kailua Facility Plan\Planning\Figures\Final Maps\Draft EIS



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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

TAX MAP KEY PLATS

FIGURE 1-3

Table 1-1 Tax Map Keys
Alternative 1 - Force Main No. 2 Route
4-4-08: 01
4-4-11: 81
4-5-30: 01 and 36
Alternative 2 – Gravity Tunnel Route
4-2-15: 09
4-2-17: 01, 16, 17, 18 and 21
4-4-1: 14
4-4-11: 03, 81, 82 and 83
4-4-12: 01, 02, 64 and 65
4-4-38: 01
4-5-30: 01 and 36
4-5-31: 76
4-5-32: 01
4-5-100: 01, 02, 03, 04 and 52
4-5-101: 33, 34, 35, 36, 37 and 38

1.4 Project Need

The need for the proposed project, including the two major wastewater conveyance alternatives assessed in this Draft EIS, is based on the requirement to reduce the potential for wastewater spillage in the event that the existing Force Main No. 1 should fail. This requirement is more specifically defined by the previously mentioned 2007 Stipulated Order, which was subsequently incorporated in the 2010 Consent Decree, to provide for a supplemental means to convey the wastewater. These regulatory mandates are described below in Section 1.4.1.

The Gravity Tunnel alternative raises the possibility of simultaneously addressing another recognized need in the service area. This need is to reduce wastewater spillages that may occur when wastewater flows peak as a result of excessive stormwater and groundwater entering the wastewater collection system. Therefore, for the purpose of assessing the two alternatives as equivalent projects in the aforementioned Preliminary Engineering Report (PER), the Force Main No. 2 alternative additionally includes wastewater storage facilities in the form of equalization facilities. Wastewater flows are discussed below in Section 1.4.2.

Finally, regardless of which alternative is implemented, the City has identified some needed improvements at the Kailuia Regional WWTP. These include the headworks, where raw wastewater enters the plant for screening and grit removal. The headworks remove abrasives, rags and other debris that could hamper or damage equipment as the wastewater is processed. The City has identified a hydraulic “bottleneck” in the system that reduces efficiency and potentially increases odors emanating from the headworks.

The existing sludge dewatering building houses equipment that dewaters processed sludge using centrifuges. After the sludge has been dewatered, it is loaded onto trucks for disposal. The aging building has developed structural deficiencies and needs to be replaced. Also, since the building was not designed to be fully enclosed while trucks are being loaded, it is a source of odors.

1.4.1 Regulatory Mandates

In May 1992, in response to incidences of wastewater spills, a citizens' suit was filed against the City by Save Our Bays and Beaches, Hawaii's Thousand Friends, Sierra Club, and the Surfrider Foundation. The suit alleged violations of the National Pollution Control Act (Clean Water Act) and the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) permits for discharges at the Kailua Regional WWTP and the Kaneohe WWPTF. A Consent Decree between the City and the Environmental Protection Agency (EPA) was executed in 1995 to resolve the claims against the City for the alleged violations at the Kailua and Kaneohe facilities from August 1989 to May 1992. Preparation of the Kailua-Kaneohe-Kahaluu Wastewater Facilities Plan (September 1998) fulfilled one of the terms of the Consent Decree. The Plan assessed existing deficiencies and projected future needs for the wastewater collection and conveyance system and the Kailua Regional WWTP. It presented a strategy for addressing these deficiencies and projected needs.

Subsequent to the 1998 Facilities Plan, the Final Sewer Infiltration and Inflow Plan (Final I/I Plan) was completed in 1999, also in compliance with the Consent Decree. The overall goal of the Consent Decree is to reduce and prevent sanitary sewer overflows. The Final I/I Plan projected I/I rates for each wastewater service basin and provided a key basis for developing design flows throughout the region. The Plan also includes a twenty year Rehabilitation Program that is mandated under the terms of the Consent Decree. It contains a prioritized list of conceptual Capital Improvement Program (CIP) projects developed to address structural and hydraulic deficiencies. The City has been implementing this Rehabilitation Program over the past ten years. Table 1-2 summarizes major CIP projects completed by the City.

Pursuant to the Rehabilitation Program, and following discussions with the City, the EPA issued a Stipulated Order in May 2007 for the implementation of a CIP project involving construction of a new force main (Force Main No. 2) from the Kaneohe WWPTF to the Kailua WWTP. The new force main would supplement the existing force main (Force Main No. 1) such that there would be an alternative means of conveying the wastewater should the aging existing force main fail. The Stipulated Order requires the force main be constructed and operational by the end of 2014. The City continues to pursue implementation of this project, which includes the preparation of this EIS pursuant to Chapter 343, Hawaii Revised Statutes (HRS). The 2007 Stipulated Order has since been incorporated into the overarching 2010 Consent Decree.

The City is also pursuing the evaluation of the tunnel alternative to determine whether the life cycle costs, environmental and social impacts, along with community input, prove favorable. Should the City determine that the sewer tunnel is the preferred alternative, it will need to obtain EPA's concurrence that it would fulfill the intent of the May 2007 Stipulated Order. Moreover, since the time required to design and construct the tunnel would unlikely meet the Order's current deadline of 2014, a time extension may also be required.

Table 1-2 CIP Projects Completed for the Kailua-Kaneohe-Kahaluu Service Area

Project Title	Construction Work
Alii Shores Sewer Rehabilitation	Rehabilitate approximately 2,356 feet of 36-inch pipe and eight manholes
Mokapu Boulevard/Ilimalia Loop Sewer Reconstruction	Rehabilitate 167 feet of 24-inch pipe
Kahanahou Circle Sewer Rehabilitation	Rehabilitate approximately 3,715 feet of 8- and 10-inch pipe
Kaneohe Bay Drive Sewer Rehabilitation	Rehabilitate 1,572 feet of 10- and 15-inch pipe
Kailua Road/Makalii Place Sewer Rehabilitation	Rehabilitate 1,124 feet of 21-inch pipe
Kailua/Kaneohe Sewer Rehabilitation	Plan, design, and construct improvements to the Enchanted Lakes and Kokokahi sub-basins
Kailuana Place Sewer Rehabilitation	Rehabilitate or reconstruct 4,975 feet of pipe and 25 manholes
Kainehe St, Hamakua Drive, Keolu Drive Sewer Reconstruction	Install approximately 8,500 feet of 18- to 36-inch pipe
Kainui Drive Trunk Sewer Reconstruction	Rehabilitate approximately 3,350 feet of 48-inch pipe
Kalaheo Avenue/Mokapu Road/ Aikahi Loop Sewer Rehabilitation	Rehabilitate approximately 3,400 feet of 66-inch pipe and 9 manholes
Kalaheo Avenue/Kainui Drive/Dune Circle Sewer Reconstruction	Install approximately 4,000 feet of 48-inch pipe and approximately 3,200 feet of 8-inch pipe
Kalaheo Avenue Sewer Reconstruction Phase 2	Install approximately 5,300 feet of 48-inch pipe, and approximately 3,600 feet of 8-inch pipe, and rehabilitate approximately 1,900 feet of 54-inch pipe
Kalaheo Avenue Sewer Reconstruction	Install approximately 4,000 feet of 48-inch pipe and approximately 3,200 feet of 8-inch pipe
Kaneohe Bay Drive Trunk Sewer Reconstruction	Correct hydraulic and physical deficiencies and rehabilitate approximately 1,606 feet of 10-inch pipe
Kamehameha Highway Sewer Reconstruction	Rehabilitate approximately 2,700 feet of 27-inch pipe and 12 manholes
Wanaao Road/Keolu Drive Reconstructed Sewer	Install approximately 9,000 feet of 8- to 42-inch pipe

1.4.2 Wastewater Flow

Average daily flow (ADF) includes the flow generated by the population in the service area, including residences, commercial and industrial uses. In addition to these flows, average daily flow also includes water that may enter the system through infiltration, where pipes and mains lie below the water table during normal dry weather.

Population in the service area was projected to increase slightly (3.23%) between 1995 and 2020, according to the Koolaupoko Sustainable Communities Plan (SCP) (August 2000), as shown in Table 1-3. A subsequent update of the population projections was prepared by the City Department of Planning & Permitting (DPP) in 2007, indicating a 3.5% decline in population between 2007 and 2035 for the service area, as shown in Table 1-4. This would suggest that the change in average wastewater flow attributable to population over the same period may also decline.

Table 1-3 Projected Population, 1995 and 2020

	1995	2020	Difference	Percent
Kailua	41,837	43,517	1,680	+4.02%
Kaneohe	47,742	46,550	-1,192	-2.50%
Kahaluu	16,240	19,169	2,929	+18.04%
Total	**105,819**	**109,236**	**3,417**	**+3.23%**
Oahu	882,509	1,071,226	188,717	+21.4%

Source: City DPP

Table 1-4 Projected Population, 2007 and 2035

	2007	2035	Difference	Percent
Kailua	40,206	38,791	-1,415	-3.5%
Kaneohe	38,983	37,013	-1,970	-5.1%
Kahaluu	13,964	14,087	123	+0.9%
Total	**93,153**	**89,891**	**-3,262**	**-3.5%**
Oahu	900,523	1,038,317	137,794	+15.3%

Source: City DPP

The low potential for population growth in the service area is evident in Figure 1-4, which is an aerial photo of the service area overlain by the Koolaupoko SCP Land Use Map. The Urban Community Boundary shown on the map indicates areas where future development may proceed through applicable land use entitlement processes, such as rezoning, without amending the SCP. Notably, the majority of the area encompassed by the Urban Community Boundary already hosts urban development. Any potential future growth within the boundary would likely be limited to infill development or redevelopment.

The previous population projections prepared by DPP for the Koolaupoko SCP were used to project wastewater flows for the Kailua–Kaneohe-Kahaluu Wastewater Facilities Plan (1998) (see Table 1-5). Based on the relatively modest growth rate of approximately 3.23% between 1995 and 2020, the ADF received at the Kailua Regional WWTP was 12.4 mgd in 1995. The ADF was projected to increase by approximately 12% to 13.9 mgd in 2020.

Although wastewater flows were not modeled using DPP's updated population projections for 2007 to 2035, the volume of average daily flow could decline slightly, commensurate with the projected 3.5% population decline.

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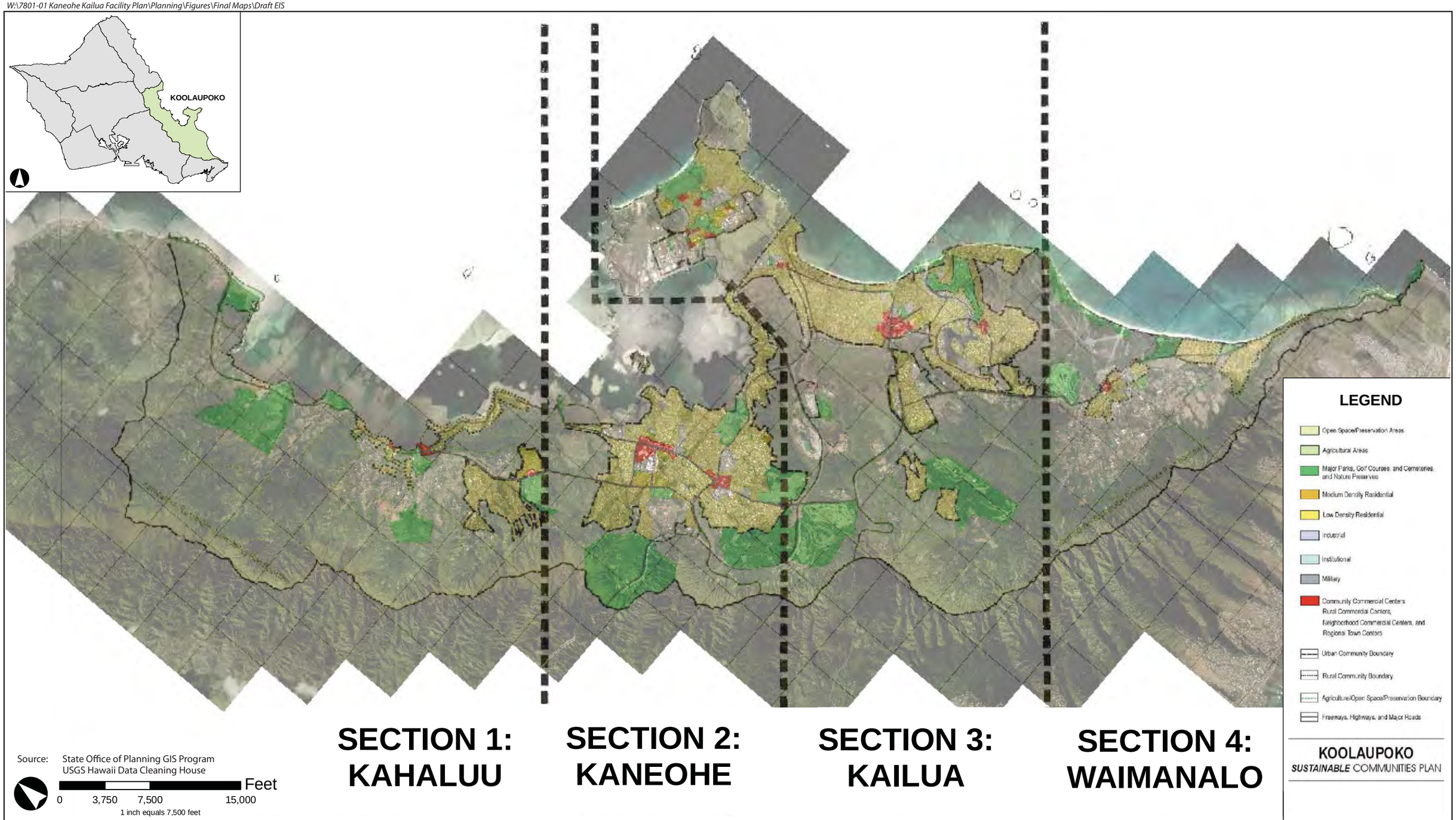

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KOOLAUPOKO SUSTAINABLE COMMUNITIES PLAN
LAND USE MAP WITH AERIAL PHOTO OVERLAY

FIGURE
1-4

Table 1-5 Modeled Wastewater Flows Kailua-Kaneohe-Kahaluu, 1995 and 2020 (in mgd)

Facility/ Basin	Existing Capacity	1995		2020	
		Ave.	Peak	Ave.	Peak
Ahuimanu WWPTF	3.3	0.9	4.4	1.6	7.1
Kaneohe WWPTF	10.0	5.6	51.5	6.0	52.9
Kailua Basin		5.9	40.0	6.2	41.5
Kailua Regional WWTP	28.0	12.4	98.2	13.9	99.6

Source: Kailua-Kaneohe-Kahaluu Wastewater Facilities Plan

In addition to average daily flow and groundwater infiltration, a characteristic of wastewater flows in the Kailua–Kaneohe–Kahaluu service area is high peak wet-weather flows. Peak flows occur during periods of high rainfall when runoff water can enter the wastewater collection system. The runoff entering the system is referred to as inflow. Sources of inflow include damaged sewer lines, pipes, and mains, as well as sewer manholes located in areas prone to flooding and illegal drain connections into the sewer system.

Infiltration occurs where pipes lie below the water table and water pressure causes water to leak into sewer pipes and mains. Depending on the location, the infiltrating water could be fresh, brackish or salty. Infiltration can also increase during periods of high rainfall when ground saturation causes water tables to rise over pipes.

In the worst circumstances, rapid increases in wastewater flow due to inflow and infiltration (I/I) can result in overflows and spillages. Overflows and spillages can occur at bottlenecks, such as at the treatment plant, or elsewhere upstream within the system.

Table 1-5 also shows peak flows, which can be seven to eight times greater than average daily flows. The peak flow for 1995 was 98.2 mgd, and peak flows are projected to increase to 99.6 mgd by 2020, an increase of 1.4%.

The City is currently preparing an update of the 1999 Final Sewer Infiltration and Inflow Plan. The updated plan will provide new peak design flows, which are anticipated to be somewhat lower than determined by the previous study. The earlier study was more conservative based on the historic data available at the time, while the current study will have the benefit of more recent data and information. After the updated Plan is accepted by the EPA, the new peak design flows will be used to size the equalization facilities associated with the Force Main No. 2 alternative. The updated peak design flows will not likely affect the storage capacity of the Gravity Tunnel, as its diameter will be based on a recommended minimum for a tunnel of its length. Its storage capacity will accommodate the previous peak design flows, as well as the anticipated lower peak design flows in the updated Plan.

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CHAPTER 2

ALTERNATIVES AND PROPOSED ACTION

2. ALTERNATIVES AND PROPOSED ACTION

The primary alternatives to be assessed in the Draft Environmental Impact Statement (EIS) involve the achievement of two objectives. The first objective is to provide an alternative or supplemental facility to convey wastewater from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant (WWTP). The primary alternatives address this objective by providing force main and gravity conveyance alternatives. The second objective is to address the problem of peak flows that can occur during wet weather, which can result in spills due to bottlenecks within the collection and treatment system. The primary alternatives address this problem by providing storage facilities to reduce peak flows by capturing and retaining the wastewater until after the peaks subside, when the stored wastewater can be safely and slowly discharged to the treatment system.

In addition to the primary alternatives, this Draft EIS also addresses replacement of two existing facilities at the Kailua Regional WWTP, regardless of which primary alternative is selected for implementation.

2.1 No Action

The no action alternative will not address either of the objectives. The existing force main will remain the only facility conveying wastewater between the Kaneohe WWPTF and the Kailua Regional WWTP (see Figure 2-1). Should the existing force main fail, there would be no other way to convey the flows and, as a result, untreated wastewater will likely spill at the Kaneohe WWPTF and/or at the point of pipe failure, and these spills may enter Kaneohe Bay. The problem of high infiltration and inflow (I/I) during periods of heavy rainfall, which can overwhelm the wastewater collection and treatment system, would remain unresolved. The no action alternative will also fail to fulfill the May 2007 Stipulated Order, which has since been incorporated in the 2010 Consent Decree. Failure to comply with this Consent Decree requirement by December 2014 could result in the imposition of monetary fines for each day thereafter that supplemental conveyance is not in operation.

The no action alternative will also fail to address the need to replace a structurally deficient sludge dewatering building and an inefficient headworks at the Kailua Regional WWTP.

2.2 Alternative Wastewater Conveyance

The Force Main No. 2 alternative was initially developed in response to the May 2007 Stipulated Order (see Figure 2-2). Various alternative routes were considered before the alignment beneath the seafloor of Kaneohe Bay was determined. The Gravity Tunnel alternative was considered when it appeared that tunnel boring technology had progressed to a stage that such a tunnel could be economically competitive, in the long-term, with the Force Main No. 2 alternative.

2.2.1 Alternative Force Main No. 2 Land Route Alignments

Various Force Main No. 2 alignments were evaluated before the route below the seafloor of Kaneohe Bay was selected as the primary alternative (see Figures 2-3 and 2-4). The alternative land routes must contend with the following challenges:

- Elevation changes in the area of Oneawa Hills;
- The risk of damaging the existing Force Main No. 1 during construction along existing rights-of-way that, in many areas, are already congested with various infrastructure such as waterlines and drainlines;

- The need to acquire additional rights-of-way or easements in private property where there is insufficient space for Force Main No. 2; and
- Disruption of traffic, as most of the existing rights-of-way lie within major roadways.

Five alternative land route options were considered for Force Main No. 2 as discussed below. They are referred to as "options" to avoid confusion with the two primary alternatives for the Proposed Action addressed in this Draft EIS. Table 2-1 includes a summary of cost estimates for Options 1 through 5.

Table 2-1 Cost Estimates for Land Route Options 1-5 Force Main No. 2

Route	Temporary Bypass	Open Trench, MISC. Improvements and contingency	Tunnel	Microtunnel	Booster Pump Stations	Total
Option 1 Existing Force Main No. 1	$40 million	$118 million	-------	$3 million	-------	$161 million
Option 2 H3	$40 million	$89 million	-------	$3 million	$20 million	$152 million
Option 3 Mokapu Boulevard	$40 million	$69 million	$26 million	$3 million	-------	$138 million
Option 4 Kawainui Canal Route	$40 million	$55 million	$26 million	$38 million	-------	$159 million
Option 5 Land Route Without Temporary Bypass Force Main	-------	$71 million	$80 million	$9 million	-------	$160 million

<u>Option 1: Existing Force Main No. 1 Route</u>
The existing Force Main No. 1 route has the major advantage of not having to cross Oneawa Hills or Kaneohe Bay and could lie almost entirely within the existing right-of-way, mostly within Kaneohe Bay Drive. The new Force Main No. 2 would be constructed by assembling the force main in an excavated open trench, burying it with fill material, and restoring the roadway above it. A short 200-foot segment under Kawa Stream, which borders the Kaneohe WWPTF, will be installed by a microtunneling method.

Microtunneling initially involves the excavation of a "launching" pit at one end of the canal and a "retrieval" pit at the other end of the canal. The walls of the pits would be shored by sheet piles to provide a dry working area. Dewatering pumps may be required to maintain the dry working area.

From the launching pit, a length of pipe with a microtunneling machine attached to the leading end would be pushed or "jacked" under the canal toward the retrieval pit. As the cutter head of the microtunneling machine progresses, carrying the pipe length forward, the spoils generated are removed through the rear end of the pipe at the launching pit. As each length of pipe is installed, another is attached behind it and jacked forward until the microtunneling machine and pipe behind it reach the retrieval pit, thereby installing a pipe

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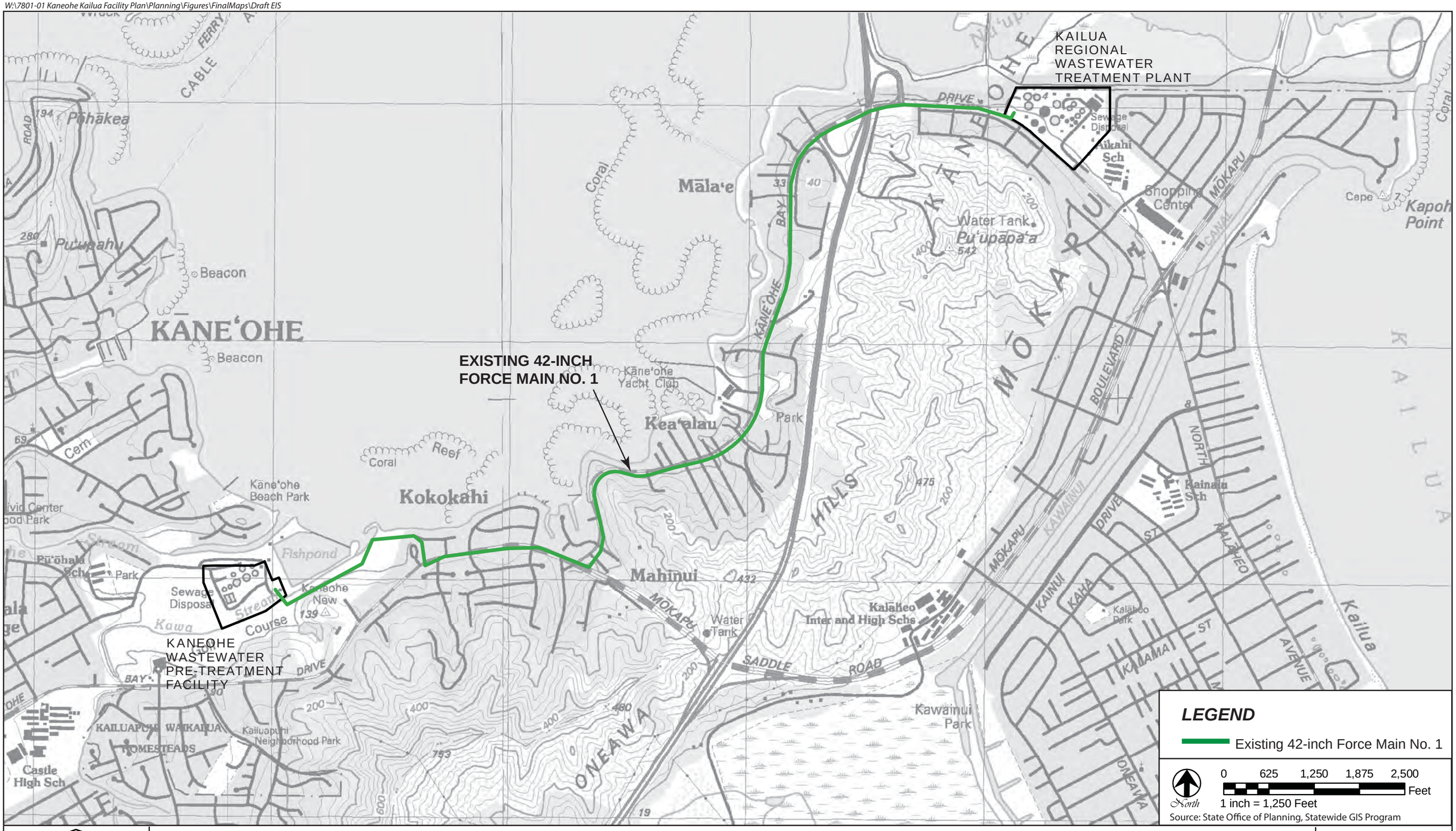

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EXISTING 42-INCH FORCE MAIN NO. 1

FIGURE

2-1

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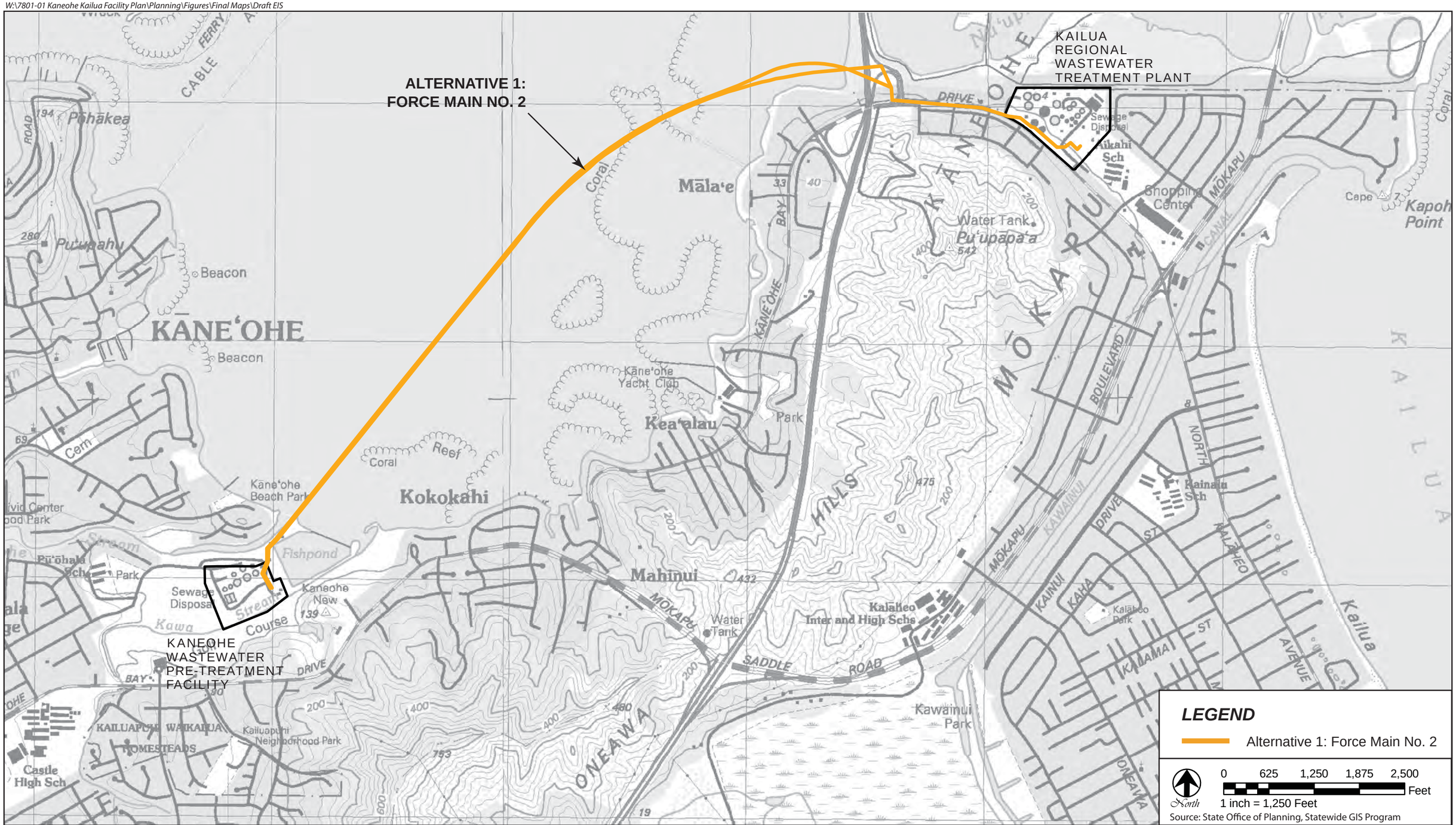

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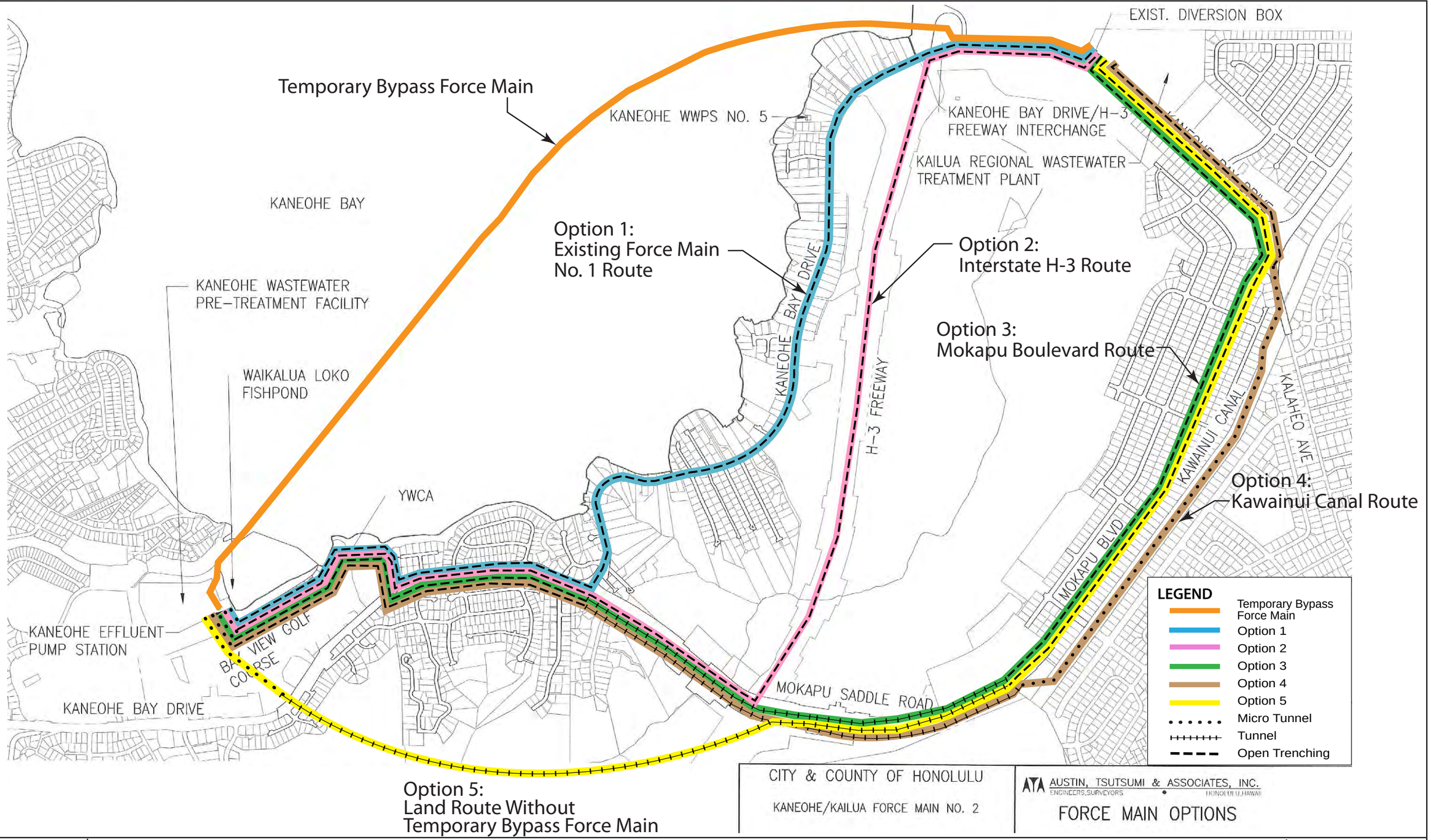
ALTERNATIVE 1: FORCE MAIN NO. 2

FIGURE

2-2



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ALTERNATIVE 1: FORCE MAIN NO. 2 - 5 OPTIONS

FIGURE 2-3

1. Simulated oblique aerial photo illustrating the topography challenging the alternative land routes. The routes are shown as they would be projected in the surface looking vertically downward as in Figure 2-3. Several of the optional routes overlap and are obscured.

2. Option 2 would require one or more pump stations, as it would climb Mokapu Saddle Road, then Interstate H-3.

3. Options 3 and 4 traversing Mokapu Saddle Road to Mokapu Boulevard and Kawainui Canal would tunnel through the saddle to avoid the need for a costly pump station.

4. Option 5 would require extensive tunneling due to the high elevation of its route through Oneawa Hills. This would include microtunneling from Kaneohe WWPTF to Kaneohe Bay Drive, and connection tunneling from Kaneohe Bay Drive to Mokapu Boulevard.

LEGEND

- Temporary Bypass Force Main
- Option 1: Existing Force Main No. 1 Route
- Option 2: Interstate H-3 Route
- Option 3: Mokapu Boulevard Route
- Option 4: Kawainui Canal Route
- Option 5: Land Route without Temporary Bypass Force Main

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OBLIQUE VIEW OF ALTERNATIVE 1 - FORCE MAIN NO. 2 – 5 OPTIONS

FIGURE **2-4**

segment beneath the canal. The pipe segment would then be connected at either end to the force main. I

The major disadvantages of this option include potential damage to the existing Force Main No. 1 and other utilities within the roadway, particularly during excavation; the need to acquire additional rights-of-way or easements, where required, to accommodate Force Main No. 2; and, disruption of traffic along the roadway. To address potential damage to the existing Force Main No. 1, this option would require a temporary bypass force main to convey wastewater during the construction period. Efforts to determine a cost effective route for the temporary bypass force main led to the concept of installing a pipe beneath the seafloor of Kaneohe Bay. After Force Main No. 2 is constructed adjacent to Force Main No. 1, the temporary bypass force main under Kaneohe Bay would likely be cut and abandoned in place.

The estimated cost for this option is $3 million for 200 feet of microtunnel installation of the force main under Kawa Stream, $118 million for 15,800 feet of new force main constructed by the open trench method, and $40 million for the temporary bypass force main beneath Kaneohe Bay. Hence, the total cost would be on the order of $161 million. This option was dropped from consideration since the cost of a permanent Force Main No. 2 beneath Kaneohe Bay is $54 – 85 million.

<u>Option 2: Interstate H-3 Route</u>
This option would follow the existing Force Main No. 1 route from the Kaneohe WWPTF along Kaneohe Bay Drive to Mokapu Saddle Road, ascend Mokapu Saddle Road to Interstate H-3, then travel along H-3 back to Kaneohe Bay Drive to the Kailua Regional WWTP. This option, which would be constructed by a short micro-tunneled segment under Kawa Stream, and the remainder by open trenching, was eliminated when the State Department of Transportation (DOT) and the Federal Highway Administration (FHWA) indicated that they would not allow such a project within the Interstate H-3 right-of-way (ROW).

This option also has the disadvantage of needing to overcome the rising elevation of Oneawa Hills. Beginning at a ground elevation of less than 10 feet at the Kaneohe WWPTF, the force main would reach an elevation of approximately 150 feet at the high point of Mokapu Saddle Road. It would then need to climb to an elevation of approximately 200 feet to run along Interstate H-3. To overcome this increase in elevation, a new booster pump station, and possibly a second new booster pump station, would need to be constructed. Since the City owns no property along this route, land would also need to be acquired for the booster pump station(s).

Moreover, since the route would share the existing Force Main No. 1 route along a particularly congested utility corridor within the Kaneohe Bay Drive ROW to Mokapu Saddle Road, the previously mentioned temporary bypass force main beneath Kaneohe Bay would also be required for this option. The City would require the temporary bypass force main to convey flows during the phase of construction where damage could occur to the existing Force Main No. 1.

The estimated cost of this option is $3 million for 200 feet of microtunnel installation of the force main under Kawa Stream, $89 million for the 17,600 feet of new supplemental force main constructed by open trenching, and $40 million for the temporary bypass force main beneath Kaneohe Bay. Although this option was abandoned before cost estimates for the

booster pump station(s) could be prepared, a rough estimate for one booster pump station would be on the order of $20 million and second could be an additional $10 million, excluding land acquisition. Hence, the total cost for this option would be on the order of $152 to $162 million.

Option 3: Mokapu Boulevard Route

Like Option 2 above, this option follows the existing Force Main No. 1 route to the intersection of Kaneohe Bay Drive and Mokapu Saddle Road, then along Mokapu Saddle Road. Instead of turning onto Interstate H-3, this option would continue on to Mokapu Saddle Road, then along Mokapu Boulevard, turning left onto Kaneohe Bay Drive and terminating at the Kailua Regional WWTP.

Like Option 2, this option has the disadvantage of overcoming the ascending grade along Mokapu Saddle Road, which reaches an elevation of approximately 150 feet. If the new Force Main No. 2 is constructed by open trenching, a new pump station would need to be constructed and land would need to be acquired for its location. A more cost-effective alternative, however, is to construct a tunnel through the saddle for a distance of approximately 4,500 feet. The tunnel will reduce the maximum elevation of the alignment to approximately 34 feet, thereby avoiding the cost of constructing and maintaining a new booster pump station. The tunnel would be approximately nine feet in diameter and would be constructed using a conventional drill-and-blast method. This would involve drilling a series of holes horizontally into the hillside, setting and detonating charges, and clearing out the resulting rubble using conventional excavation, and earth moving equipment.

Like Option 2, this option also has the disadvantage of sharing the existing Force Main No. 1 route along a particularly congested utility corridor within the Kaneohe Bay Drive ROW to Mokapu Saddle Road. Therefore, the previously mentioned temporary bypass force main beneath Kaneohe Bay would also be required for this option. The City would require the temporary bypass force main to convey flows during the phases of construction where damage could occur to the existing Force Main No. 1.

Open trench construction of the new supplemental force main along Mokapu Boulevard would significantly disrupt traffic due to the number of intersections and driveways that would be inaccessible during various phases of construction.

The estimated cost of this option is based on several construction methodologies. First, there is microtunneling to install approximately 200 feet of the force main under Kawa Stream at a cost of $3 million. Next, there is a cost of approximately $69 million for 14,800 feet of new supplemental force main constructed by open trenching along Kaneohe Bay Drive and Mokapu Boulevard. The 4,500-foot long tunnel beneath Mokapu Saddle Road would cost approximately $26 million. The temporary bypass force main beneath Kaneohe Bay would cost approximately $40 million. Hence, the total cost for this option would be on the order of $138 million.

Option 4: Kawainui Canal Route

This option is identical to Option 3 above, except that instead of trenching through Mokapu Boulevard, Force Main No. 2 would be installed beneath Kawainui Canal using microtunneling technology. The advantage of this option over Option 3 is that traffic disruptions during construction along Mokapu Boulevard would be significantly reduced.

This option was dismissed due to the limited amount of open space available on both sides of the canal for staging construction equipment. Moreover, the Kalaheo Avenue Bridge is pile supported, which would make access to the launching and receiving pits impractical for large construction equipment.

The estimated cost of this option is the same as Option 3, except that approximately 4,500 feet of the force main installation along Mokapu Boulevard, would replaced by microtunneling for the force main under Kawainui Canal at cost of $38 million. This option also requires the temporary bypass force main under Kaneohe Bay at a cost of $40 million. Thus, the approximate total cost of this option is $159 million. Excluded from this estimate is the cost of acquiring property and demolishing a home to provide access for machinery and materials to the Kawainui Canal to conduct the microtunneling operation.

Option 5: Land Route without Temporary Bypass Force Main

As part of the community outreach effort for the project, the City Department of Environmental Services (ENV) convened a Core Working Group (CWG), representing various interests in the Kaneohe and Kailua communities (see Chapter 11). After the preceding Force Main No. 2 options were presented to the CWG on August 25, 2010, the CWG requested the City to develop a land route option that would not require a temporary bypass force main during construction.

To do this, the route would need to avoid the Kaneohe Bay Drive ROW as it exits the Kaneohe WWPTF. The route for this option starts at the Kaneohe WWPTF and follows an alignment similar to the Gravity Tunnel alternative (see Section 2.2.3), but at a shallower depth (at approximately sea level, versus 35 feet below sea level for the Gravity Tunnel alternative). At this depth, the force main could traverse well below any utility lines that run along Kaneohe Bay Drive.

From the pump station at Kaneohe WWPTF, the force main would be installed by microtunneling under Bayview Golf Course to Kaneohe Bay Drive. The alignment would then traverse beneath Oneawa Hills via a drill-and-blast tunnel since the high elevation of the hills in this area would preclude an open trench option. Like Option 3, which includes installation of a tunnel under Mokapu Saddle Road, the route in this option would also continue underground until it reaches Mokapu Boulevard. From that point, the route would be identical to Option 3, where open trench construction would be used to install the force main beneath Mokapu Boulevard to the Kailua Regional WWTP.

The estimated cost of this option includes 1,400 feet of microtunneling from Kaneohe WWPTF to Kaneohe Bay Drive through highly compressible and saturated soils, at a cost of $9 million; 10,000 feet of drill-and-blast tunneling through assumed primarily rock under Oneawa Hills and likely segments of soft ground tunneling to Mokapu Boulevard, at a cost of $80 million, and, 8,500 feet of open trench construction from Mokapu Boulevard to the Kailua Regional WWTP. This is the longest option at 20,000 linear feet and the costliest, totaling $160 million.

2.2.2 Optional Routes Beneath Kaneohe Bay

After the decision was made to pursue a route beneath Kaneohe Bay for Force Main No. 2, seven different alignments for this option were considered. At the time, construction methods were limited to horizontal directional drilling (HDD) technology. HDD involves the

use of a drilling machine that can be steered to its destination from its launching point. After the initial pilot bore is completed, a reamer is launched and pulled through the pilot bore to increase the excavated diameter. Depending on the required diameter of the bore, progressively larger reamers are pulled through until that the desired diameter is achieved. For the proposed Force Main No. 2, the likely minimum bore diameter is 52 inches. Next, a 42-inch (inside diameter), minimum one-inch thick steel casing would be pulled through the completed bore. This would be followed by pulling a 36-inch (inside diameter) fusible Poly Vinyl Chloride (PVC) pipe through the steel casing. This fusible PVC pipe would serve as a 36-inch (inside diameter) force main.

HDD applications are limited by the distance over which a particular diameter of steel casing can be installed in a single operation. This limitation is related to the amount of friction exerted on the casing as it is pulled through the completed bore. Until recently, a single HDD operation, or "pull", had not accomplished a pipe installation across a distance as long as the approximately two miles beneath Kaneohe Bay for the proposed diameter of steel casing. More recent technology and methods, however, suggest that this may be possible, although some risk would be involved.

To account for the risks, this option initially assumed that work within Kaneohe Bay may be required as discussed in the EIS Preparation Notice (EISPN) preceding this Draft EIS. In anticipation of the potential work to be conducted in the bay, the City consulted various bay users, such as boaters and fishermen; nearby facilities, such as the University of Hawaii facility on Coconut Island and the Marine Corps Base Hawaii – Kaneohe Bay at Mokapu Peninsula, and regulatory agencies such as the U.S. Army Corps of Engineers and the State Department of Land and Natural Resources (DLNR). The City also conducted various studies to identify bay resources and sensitive areas, such as coral reefs and sea grass habitats where operations such as drilling or pipe pulling should be avoided. The City conducted borings within the seabed to determine conditions that would affect constructability; and, consulted various landowners whose properties would potentially be impacted by the alternative alignments. The preferred alignment beneath Kaneohe Bay was selected in consideration of the information obtained.

Subsequent to the publication of the EISPN in June 2010, and in recognition of concerns expressed by the various user groups, affected parties and the community in general, the City eliminated construction options that would require construction activities in the bay. Therefore, the HDD construction option is essentially limited to a "single-pull" installation through the selected alignment. The second "hybrid-tunnel" option discussed in the EISPN was later added to increase options for construction methods. Both of these construction options are described in greater detail in Section 2.3 Proposed Action.

2.2.3 Alternative Gravity Tunnel Alignments

Alternative gravity tunnel alignments were developed in consideration of factors such as minimizing easement acquisition through private lands, eliminating existing pump stations between Kaneohe WWPTF and the Kailua Regional WWTP, and minimizing the cost of tunnel construction. Two major options that optimize one or more of these considerations were developed. One option follows the existing Force Main No. 1 alignment, while the other is the proposed Gravity Tunnel alignment (see Figure 2-5).

Option 1 – Existing Force Main No. 1 Route

This option follows a route beneath the existing Force Main No. 1. Unlike the force main alternative following this route, however, the Gravity Tunnel would be much deeper, avoiding any damage to Force Main No. 1 during construction. Moreover, it would not involve construction activities at the surface which would disrupt traffic. The tunnel would be constructed using a tunnel boring machine (TBM), more conventional drill-and-blast methods, or a combination of both methods, as determined by the contractor. Since the route will be mostly within the City's existing ROW for Kaneohe Bay Drive, easement acquisition would be minimized. The only acquisitions required would be along the edges of some properties where the turning radius of the tunnel cannot be accommodated within the existing Force Main No. 1 ROW.

Another advantage of this route is the possibility of eliminating several existing pump stations and associated force mains (see Figure 2-6). These pump stations collect wastewater generated in the Kaneohe area between Kaneohe WWPTF and the Kailua Regional WWTP, and direct the flows to the Kaneohe WWPTF. The smallest of these pump stations, Pump Station No. 5, is located closest to the Kailua Regional WWTP. It collects wastewater from the easternmost portion of Kaneohe and pumps it southwest to the next larger Pump Station No. 4. Pump Station No. 4 collects wastewater from the area it serves, as well as from Pump Station No. 5, and pumps it further southwest to an even larger Pump Station No 3. This continues to Pump Station No. 2. Pump Station No. 2 pumps the accumulated flows to the Kaneohe WWPTF, from where flows from the Ahuimanu WWPTF and those from other areas of Kaneohe are collected and pumped to the Kailua Regional WWTP through Force Main No. 1.

In this option, it may be possible to direct flows from some or all of these pump stations into the gravity tunnel. Since the gravity tunnel would be located at a lower elevation than each of the pump stations, the flows would be conveyed by gravity through new connecting pipes, and the pump stations would no longer be required. This would eliminate the operation and maintenance costs for the pump stations and associated force mains.

The main disadvantage of this option is the cost of construction. Because the sub-surface conditions vary, different tunneling methods may be required. A TBM that can work in varying geological conditions is generally less efficient than a machinery that is specialized for a specific type of geological condition. In some conditions, TBM methods may not be feasible and alternative construction methods such as drilling and blasting may be required. Depending on the geology, structural support may also be required, such as the use of pre-cast concrete segmental tunnel liners. These are interlocking arc-shaped concrete blocks that are installed to form a structurally stable tunnel support system as the tunnel boring progresses. The loss in tunnel construction efficiency due to varying geological conditions increases construction costs.

Option 2 – Oneawa Hills Route

This option, which became the Gravity Tunnel Alternative, reduces cost by following an alignment that keeps the tunnel in basalt rock for approximately 95 percent of the route. A TBM that is designed specifically for tunneling through rock would be used. The high degree of efficiency possible with such a TBM in relatively homogenous geological conditions can significantly reduce construction costs. The selected alignment through Oneawa Hills also decreases the length of the overall tunnel, minimizing the length of tunneling through soft soils near the Kaneohe WWPTF, incorporating wide turns easily negotiated by the TBM, and minimizing the number of different landowners from whom easements would need to be

acquired. Approximately five percent of the alignment (approximately 800 feet) traversing softer lagoonal deposits near Bayview Golf Course and the Kaneohe WWPTF would likely be constructed using machinery such as hydraulic and mechanical excavators. Due to the soft ground conditions, the area to be excavated will be hardened by injecting a cementious fluid into the soft material. The TBM would not be used in these areas. This option would not offer the advantage of eliminating existing wastewater pump stations in Kaneohe, as they could not be easily connected to the Gravity Tunnel.

2.2.4 Alternatives Addressing Infiltration and Inflow

As discussed in Section 1.4 Project Need, I/I during wet weather conditions can result in extreme peaks in flow that potentially can be seven to eight times greater than the average daily flow within the service area. Discussed below are several alternative means of addressing I/I.

2.2.4.1 Reduce I/I in the Wastewater Collection System

The primary sources of I/I to the wastewater collection system are damaged sewer lines, pipes, mains, and manholes. Infiltration of the wastewater collection system is widespread, especially in older portions of the system which were constructed using materials and methods that cause sewer collection lines to be less durable than portions built to current standards with modern materials. These damaged sewer facilities can be repaired, replaced, bypassed with new lines, or rehabilitated, such as by placing durable liners within older pipes. Such methods may be cost-effective for areas of the sewer system where there are numerous cracks in the main sewer lines. In these areas, the rehabilitation will fix a significant amount of infiltration at one time. These methods are infeasible in other areas, such as areas where the deficiencies area spread out or difficult to fix, or occur mostly in the smaller lines. Within individual private properties, sewer line maintenance and repair is the responsibility of individual landowners, and not the City. Also, it has been the experience of some jurisdictions that rehabilitating sewer lines in one area frequently results in the infiltration problem simply moving up to the next adjacent area, or even up to the laterals in private property. Hence, it is anticipated that I/I to the wastewater collection system, although it may be decreased or controlled somewhat through rehabilitation, will continue to be significant in the future.

2.2.4.2 Increase Capacity for Peak Wet-Weather Flow

When sewer facilities are not sufficient to accommodate peak flows, back-ups can cause spills. In gravity flow lines, such spills can occur at manholes. In pump stations and force mains, insufficient capacity can result in a spill at the wastewater pump station. Capacity can be increased by replacement with a larger line or larger capacity force main and pump station, or installation of a relief line to add capacity while keeping the older line in service.

2.2.4.3 Flow Equalization

Flow equalization refers to the temporary storage of excess wastewater generated during periods of high flow. Stored flows can subsequently be fed back into the system at a controlled rate that the system can accommodate. To be effective, flow equalization must be provided upstream of potential bottlenecks, such as before a sewer main, wastewater pump station, or wastewater treatment plant that has insufficient capacity to accommodate peak flows. The equalization facility could be an open or closed reservoir, similar to a water tank, or an oversized underground sewer pipe, such as a sewer tunnel. There are unique requirements for each of these types of storage options involving the conveyance of

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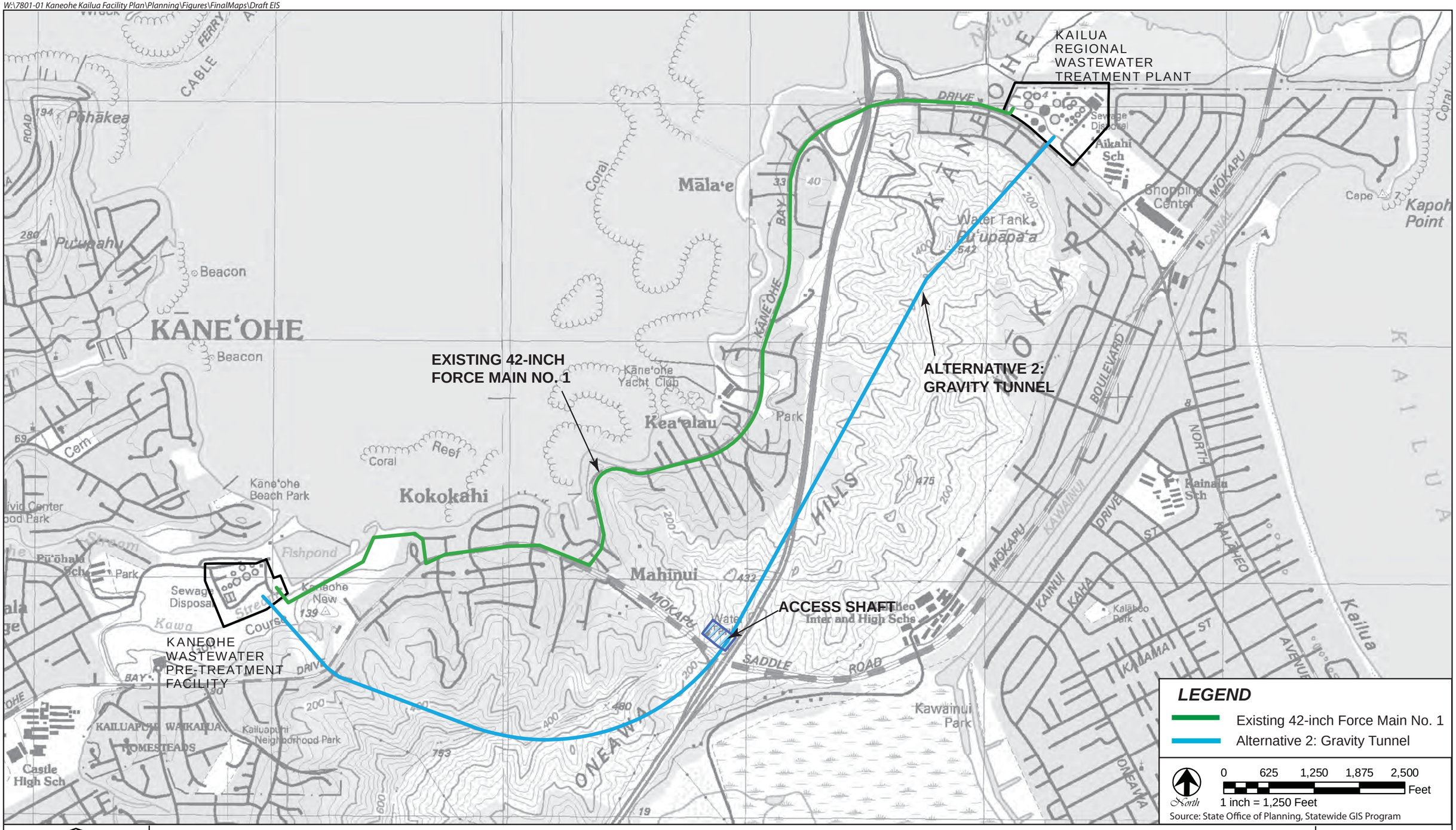

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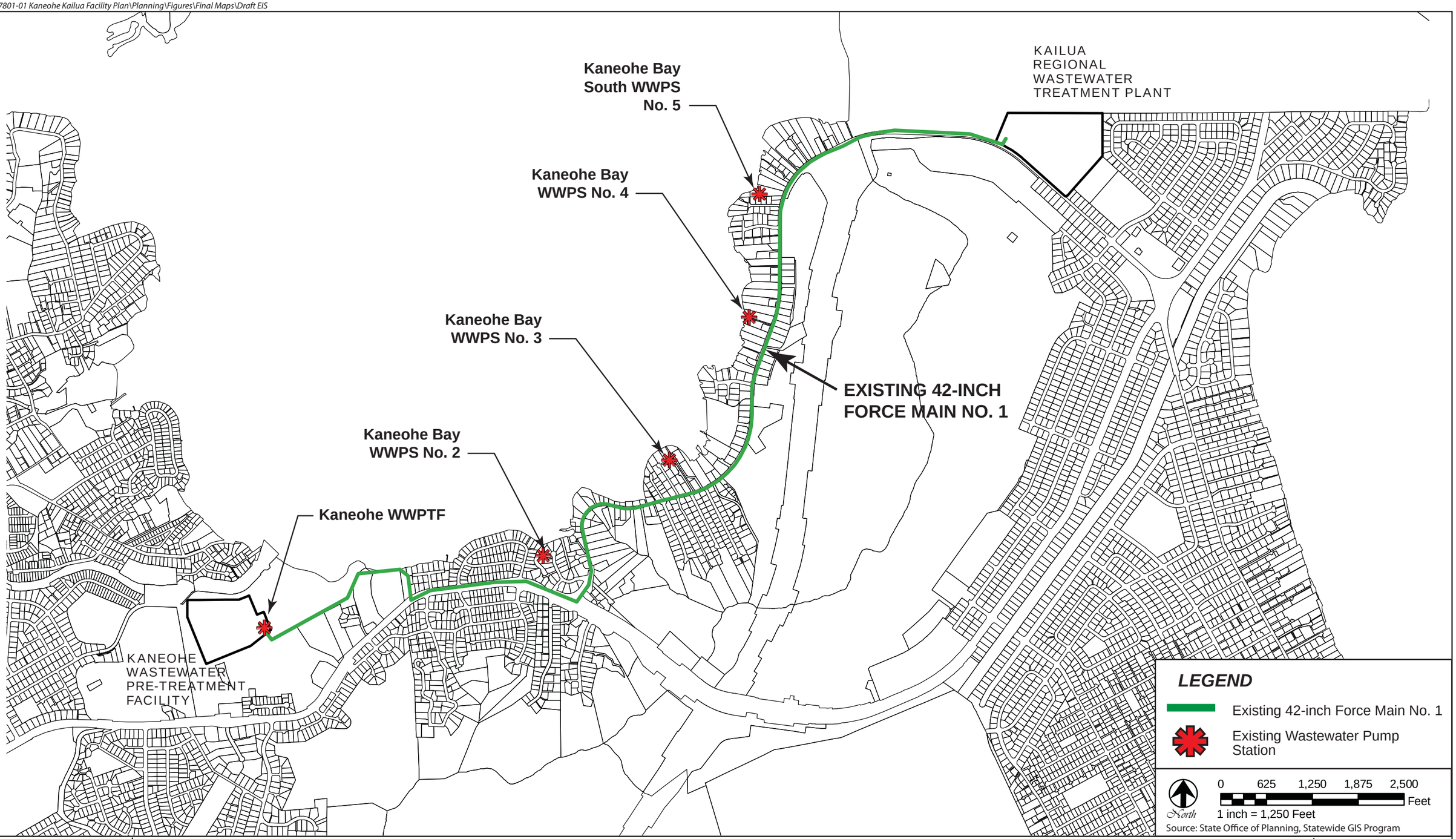
EXISTING 42-INCH FORCE MAIN NO. 1 AND ALTERNATIVE 2: GRAVITY TUNNEL

FIGURE

2-5



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LOCATION OF PUMP STATIONS

FIGURE 2-6

wastewater to the facility, how wastewater is drained and the facility cleaned, and how odors and debris are managed.

2.2.4.4 Treatment Plant Expansion

Once I/I enters the wastewater collection system, it becomes wastewater that must be treated along with the wastewater that is intended to be in the system. A wastewater treatment plant must be able to accommodate peak flows, but if the disparity between average flows and peak flows is too great, the efficiency of the treatment process may be compromised. Unless sufficient flow equalization is provided, it may be necessary to expand treatment plant processing capacity to accommodate peak flows.

2.3 Proposed Action

The proposed action consists of two primary alternatives to convey and store wastewater, one of which would be constructed (see Figure 2-7). To provide a basis for comparing the impacts of the two primary alternatives, they were developed to comparably address conveyance and storage needs. The two primary alternatives are described below.

2.3.1 Alternative 1: Force Main No. 2 and New Equalization Facilities

This alternative involves constructing a 36-inch diameter (interior diameter) force main beneath the seafloor of Kaneohe Bay. The force main will convey pre-treated wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. Since the force main will convey the wastewater under pressure, its profile need not be sloped downhill. Also, the pressurized force main has no air space to allow for storage of excess wastewater. The anticipated peak flows projected by the previous hydraulic modeling studies show that the force main alternative will require construction of a 6.9 million gallon equalization facility, which is essentially a wastewater reservoir, at the Kaneohe WWPTF, and a 2.1 million gallon equalization facility at the Kailua Regional WWTP. These equalization facilities are not currently required by the 2010 Consent Decree to be completed by the 2014 deadline for Force Main No. 2. It is anticipated, however, that they will be required to be completed by June 30, 2020, based on the Consent Decree because of the probable need for these facilities to reduce the potential for wastewater spills.

Force Main No. 2 would traverse a distance of approximately 14,900 lineal feet (2.8 miles) from the existing pump station at the Kaneohe WWPTF to the Kailua Regional WWTP. The first approximately 1,200 linear feet (0.2 mile) between the pump station and the spit of land forming the northwest side of Waikalua Loko Fishpond would be constructed by conventional open trenching methods. The next approximately 10,900 lineal feet (2.0 miles) beneath Kaneohe Bay to the area inside a looped ramp at the interchange of Interstate H-3 and Kaneohe Bay Drive would be constructed by HDD or tunneling, as described below. The final approximately 2,800 lineal feet (0.5 mile) from the interchange, along Kaneohe Bay Drive to the Kailua Regional WWTP, would be constructed by conventional open trenching methods and auger boring under roadways that are part of the H-3 Interchange and Kaneohe Bay Drive.

Construction of the approximately two-mile length of force main beneath Kaneohe Bay would be put out for bid by the City with two available options for construction. Neither of these sub-alternative construction methods would allow construction activity to be staged within Kaneohe Bay. However, for either sub-alternative, work may be allowed in the bay in the event of emergencies or unplanned need to access machinery beneath the seafloor in certain locations. These sub-alternatives are described below:

Sub-Alternative 1A – Horizontal Directional Drilling (HDD)

HDD involves a drilling rig that can steer a drill head to its destination from its launching point. The following is a generalized description of how a HDD operation is conducted.

Initially, a one-half inch diameter cable is laid on the seafloor over the planned route to guide the directional drilling using electronic signals. The drill rig is placed and secured to the ground at the start of the bore. The drill head is then launched from the bottom of a pit that will capture the bentonite drilling "mud", which is a purified form of non-toxic natural clay material mixed with water. The drilling rig at the launch point rotates a flexible drill shaft called a "drill string" (see Figures 2-8 and 2-9). The drill string is also a pipe that delivers a stream of mud to the drill head, where mud is ejected and mixed with muck generated by the head. The mud and muck mixture flows around the drill string through the drilled pilot hole back into the enclosure pit.

After the pilot hole has successfully reached its destination, the signal cable is removed from the seafloor. The pilot hole is then widened by attaching a reamer to the drill string and pulling it through the pilot hole (see Figure 2-10). The reamer also tows a drill string and, like the drill head, the reamer also spews mud as it cuts a larger hole. A second drill rig and pit to capture the mud and muck mixture is located on the other end of the bore. Several passes with successively larger reamers are made until the required diameter is achieved.

The mud and muck that emerges from the bore at the pits may be processed to produce reclaimed mud for reuse during the drilling operation. Depending on the characteristics of spoils remaining after the mud had been reclaimed, it may be further processed, dewatered and hauled away by trucks for disposal. Alternatively, unprocessed muck and mud may be hauled away in trucks with lined beds to prevent leakage. The construction contractor could dispose of the spoils as fill material, where permitted, as arranged through agreements with landowners desiring such fill. If not, the spoils could be disposed of at a landfill where it would be used as "daily cover" (each day's landfill disposal is required to be covered by a layer of earthen material).

Throughout the operation, the bore is filled with the mud and muck mixture. After the reamers have achieved the required diameter, a device referred to as a "swab" is pulled through the bore to remove the mud and muck mixture and fill the entire length of the bore with clean mud prior to inserting the steel casing.

For the HDD operation, the soft material underlying the bay near the Kaneohe WWPTF needs special attention and contingency considerations. The soft conditions make the bore prone to collapsing. In addition, as the drill head, reamers and swab are pulled through the bore, mud is pumped into the bore to flow out at either end into the pits. Pressure created by this flow could cause the soft material to fracture and release the mud and muck into the bay. This phenomenon is referred to in the industry as a "frac-out" (see Figure 2-11). To prevent this from happening, the force main design requires the installation of a 48- to 60-inch (inside diameter) steel sleeve in the soft bottom before commencing the HDD operations. The steel sleeve, which is essentially a pipe open at both ends, would be driven at a downward angle through the soft material using equipment similar to a pile driver. It is estimated that the steel sleeve could extend up to 1,000 feet in the bottom of the bay. Once placed, the HDD pilot drill would be launched through the steel sleeve, as would the reamers, swab, and the steel casing for the force main, through which the fusible PVC force main will be pulled. The steel sleeve will be left in place following construction.

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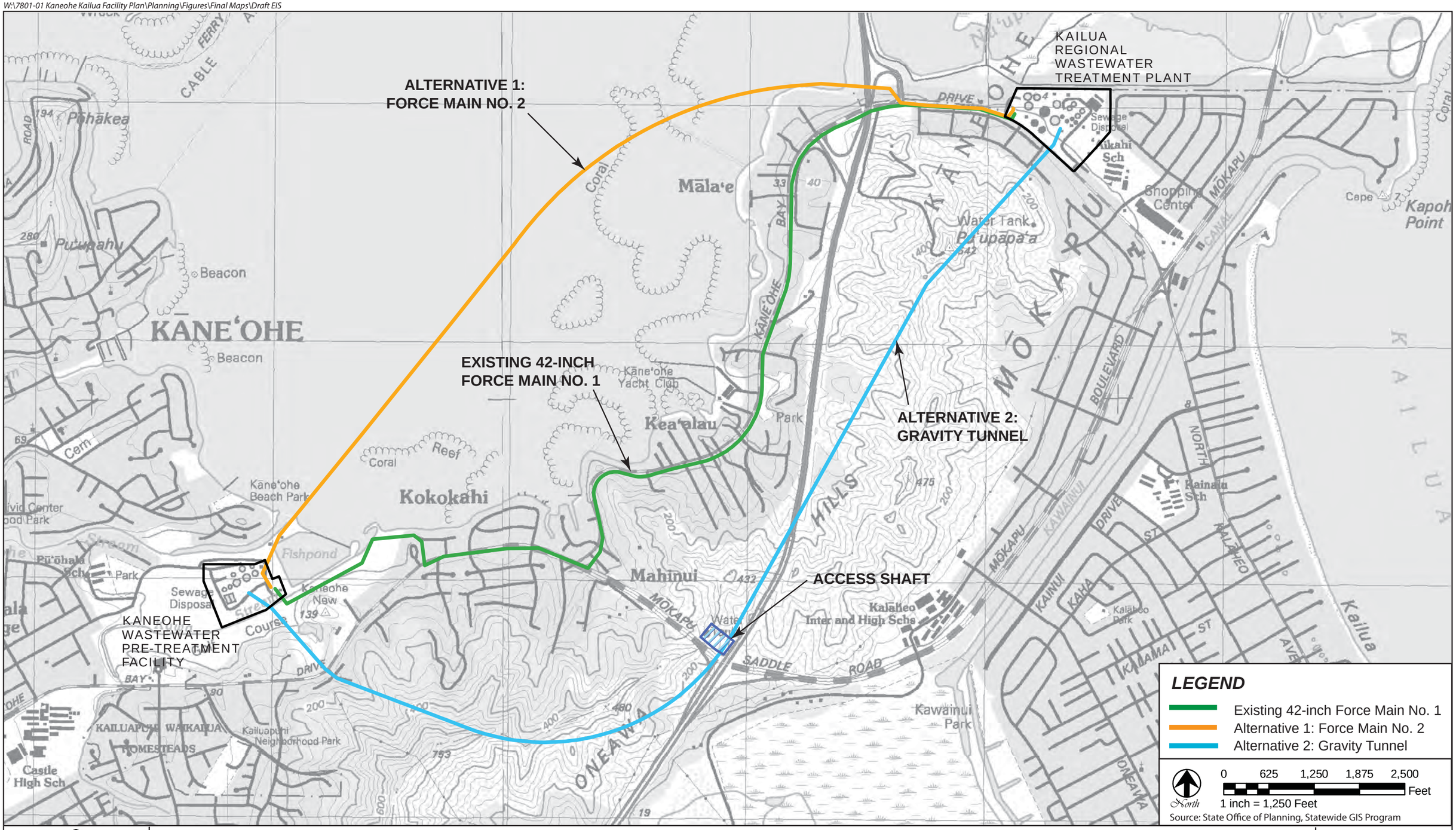

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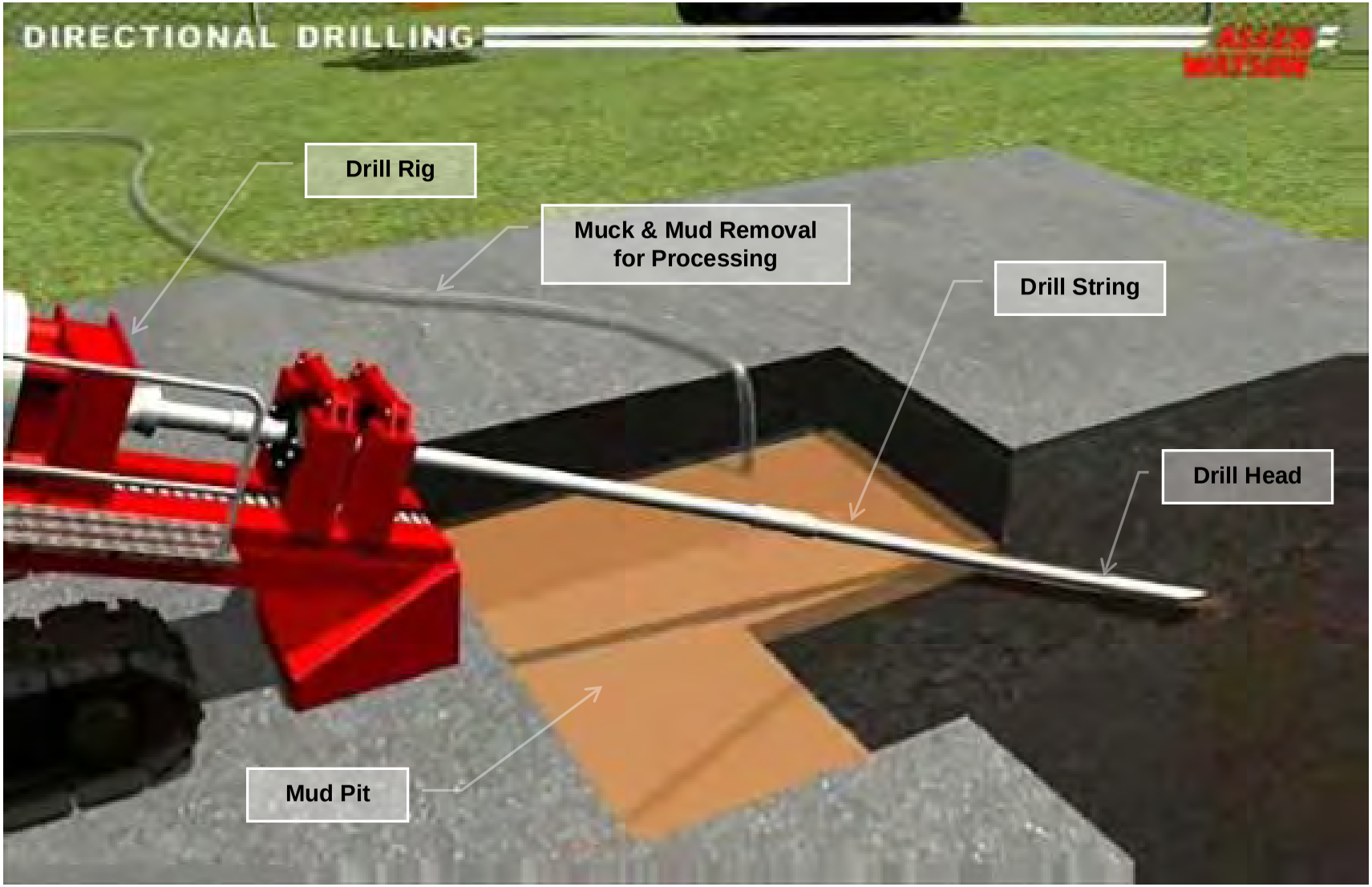
PRELIMINARY ROUTE ALTERNATIVES

FIGURE

2-7



Source: Allen Watson Video Animation at: *http://www.allenwatson.com/methods/directional.html*

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TYPICAL LAUNCHING OF THE PILOT DRILL THROUGH THE MUD PIT

FIGURE
2-8

HDD Drill Rig. Control cabin on right. Niu Valley, Hawaii, 2006

Bentonite mud rig. Processing to remove muck. Niu Valley, Hawaii, 2006

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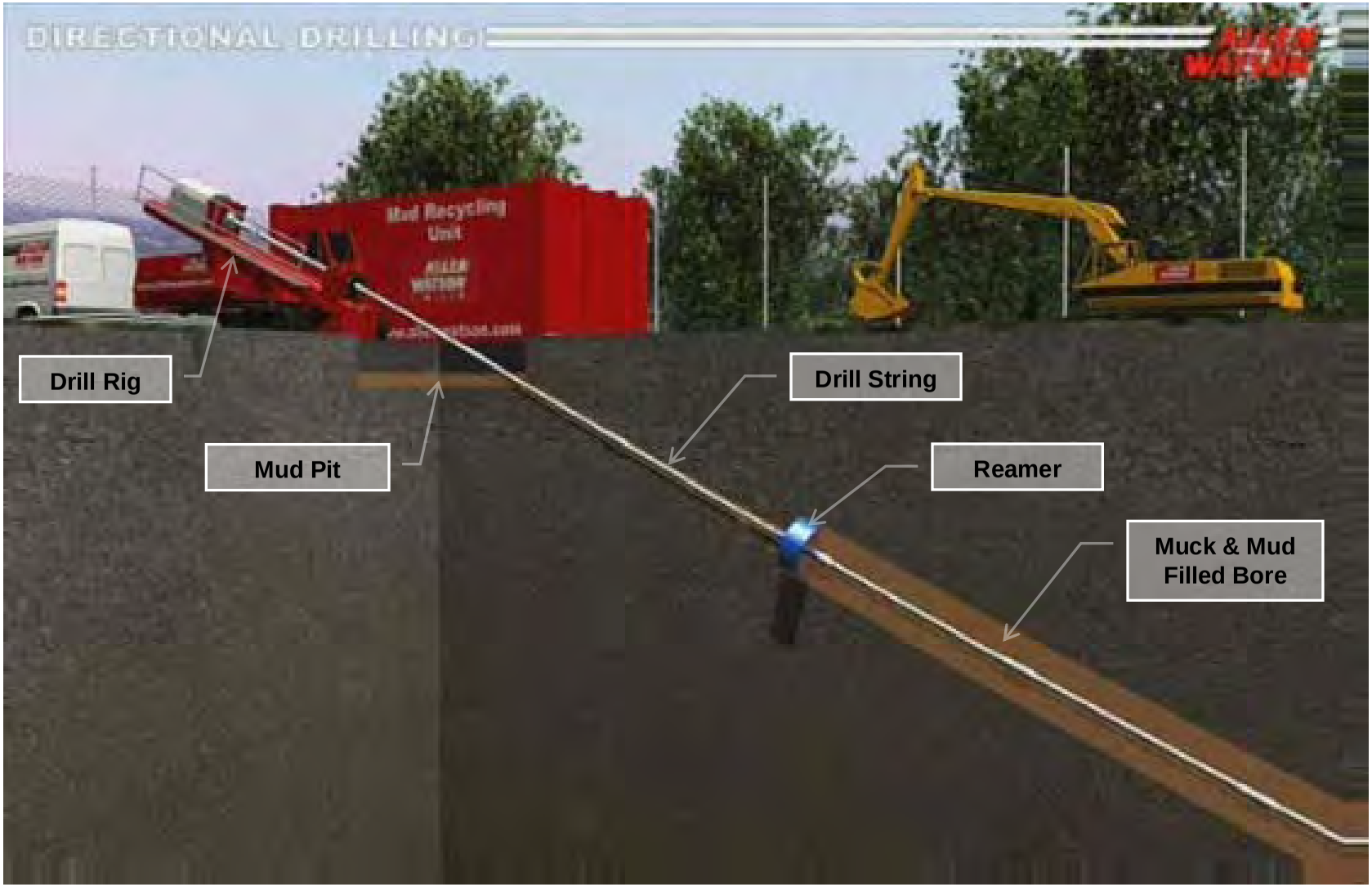
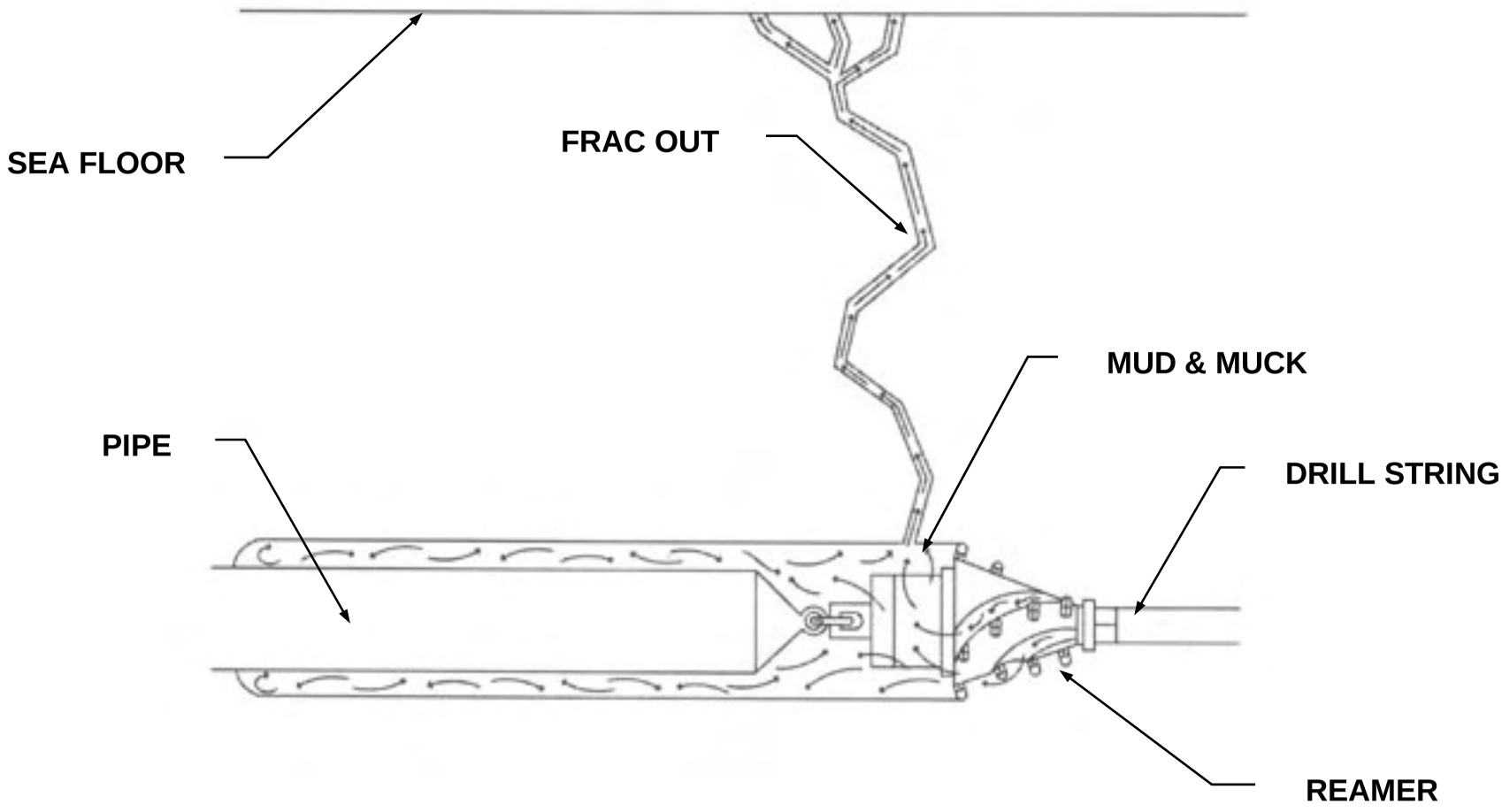
PHOTOS OF HAWAII HDD OPERATION

FIGURE
2-9



Source: Allen Watson Video Animation at: *http://www.allenwatson.com/methods/directional.html*

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	**KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES**	FIGURE
	TYPICAL WIDENING OF THE PILOT HOLE BY PULLING A REAMER	**2-10**



Source: *http://www.jackson-creek.com/soil-remediation/remediation/chapter03*

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	**KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES**	FIGURE
	HDD FRAC OUT	**2-11**

Another variation of the HDD operation that the selected contractor may pursue is to launch pilot drills from both ends. This would shorten the distance each drill head would need to travel and, thereby, increase the accuracy of its path. Once the drill heads meet under the bay, one would be retracted and the other would follow its path out of the bore.

After the minimum 52-inch bore is completed and swabbed, a 42-inch (inside diameter) steel casing would be pulled through the bore. Ideally, installation of the steel casing would be accomplished in a single pull without stopping. Stopping the pull causes momentum to be lost and allows materials around the pipe to settle, increasing the frictional force along the pipe upon resumption of the pull.

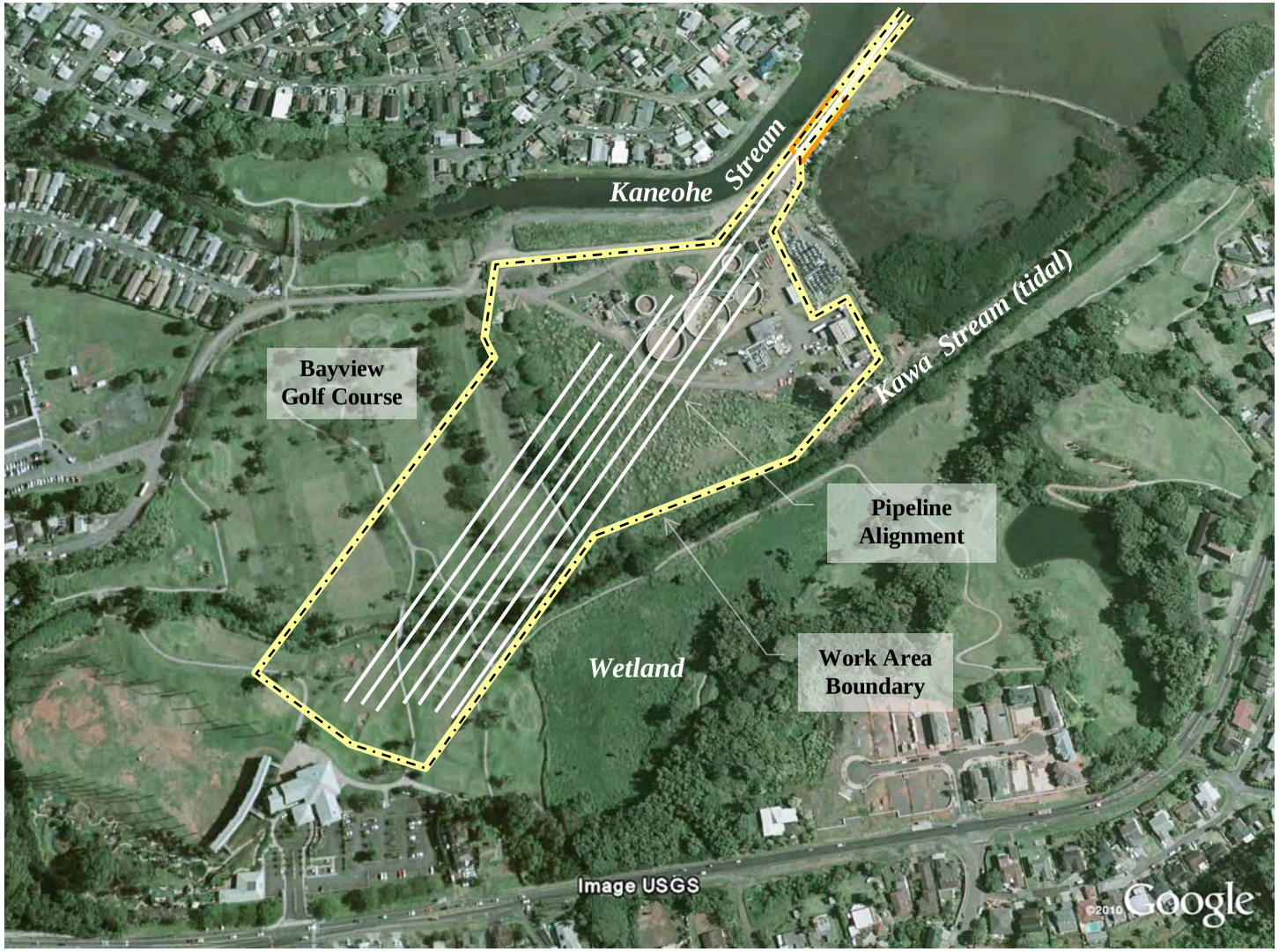
Ideally, the complete length of the relatively inflexible casing would need to be laid out and completely assembled before pulling it into the bore. As a two-mile long staging corridor is not possible, the City is seeking a staging area that would allow 1,300-foot long sections of the steel casing to be laid out. Since Kaneohe WWPTF has more available space for staging the HDD operation and assuming that a portion of the Bayview Golf Course would be used as a staging area, the casing would be assembled and inserted into the bore from this end (see Figure 2-12). This would allow the casing to be assembled in four major sections that will be joined and installed in four pulls in as quick succession as possible.

The leading end of the casing will be fitted with a cap to which a drill string extending to the retrieval end will be attached. The casing will be inserted into the steel sleeve that was previously driven into the soft ground and pulled by the cable from the Kailua end. As the casing goes through the mud filled bore, the displaced mud will come out of both ends to be captured in the enclosures.

After the steel casing is pulled through, trimmed and secured, the 36-inch, inside diameter fusible PVC plastic force main pipe will be pulled through the steel casing, which will likely be filled with water to reduce friction. Once installed, the force main pipe under the bay will be connected at each end to underground force main pipes that will be placed there by open trench, HDD or microtunnel methods of construction.

Although the HDD method of pipe installation will not require construction activity in Kaneohe Bay, there are contingency situations that may require work in and over the water. If, for example, the pilot holes are drilled from both ends but do not align close enough for one drill head to follow the other's bore as it is retracted, manual alignment may be necessary. To reach the drill heads, the bottom of the bay will need to be dredged. To minimize water quality impacts, interlocking sheet piles will be driven into the bottom to create an enclosure isolating the water column in which the dredging will occur. Watercraft will be used to install the sheet piles, dredge the bottom and receive the dredge material. Divers would then enter the excavation and manually realign the drill heads. This type of work would only be allowed along specific sections of the force main alignment. Specific areas with corals and sea grass will be off limit for such work.

Another potential situation contingency is frac-out. Although the steel sleeve will prevent this from happening in the most susceptible area near the Kaneohe WWPTF, frac-outs could conceivably occur in other areas along the route. They are more likely to occur where the bore is closer to the surface, near land, as opposed to where it is deep beneath the sea floor in the middle of the bay. Should a frac-out be detected, any further discharge into the bay can be controlled by ceasing operation including pumping of mud to the drill head, reamer or swab, or, stopping pulls that displace mud within the bore. Silt fences can be deployed to



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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

STAGING AREA AT KANEOHE WWPTF

FIGURE
2-12

contain discharges. Pressure that caused the frac-out could be reduced by slowing down the rate of pulls, or decreasing mud pumping rates.

Sub-Alternative 1B – Hybrid Tunnel

This sub-alternative involves construction of a tunnel up to nine feet in interior diameter in which the force main would be placed and secured. The tunnel would be constructed using two methods, hence the term "hybrid" (see Figure 2-13).

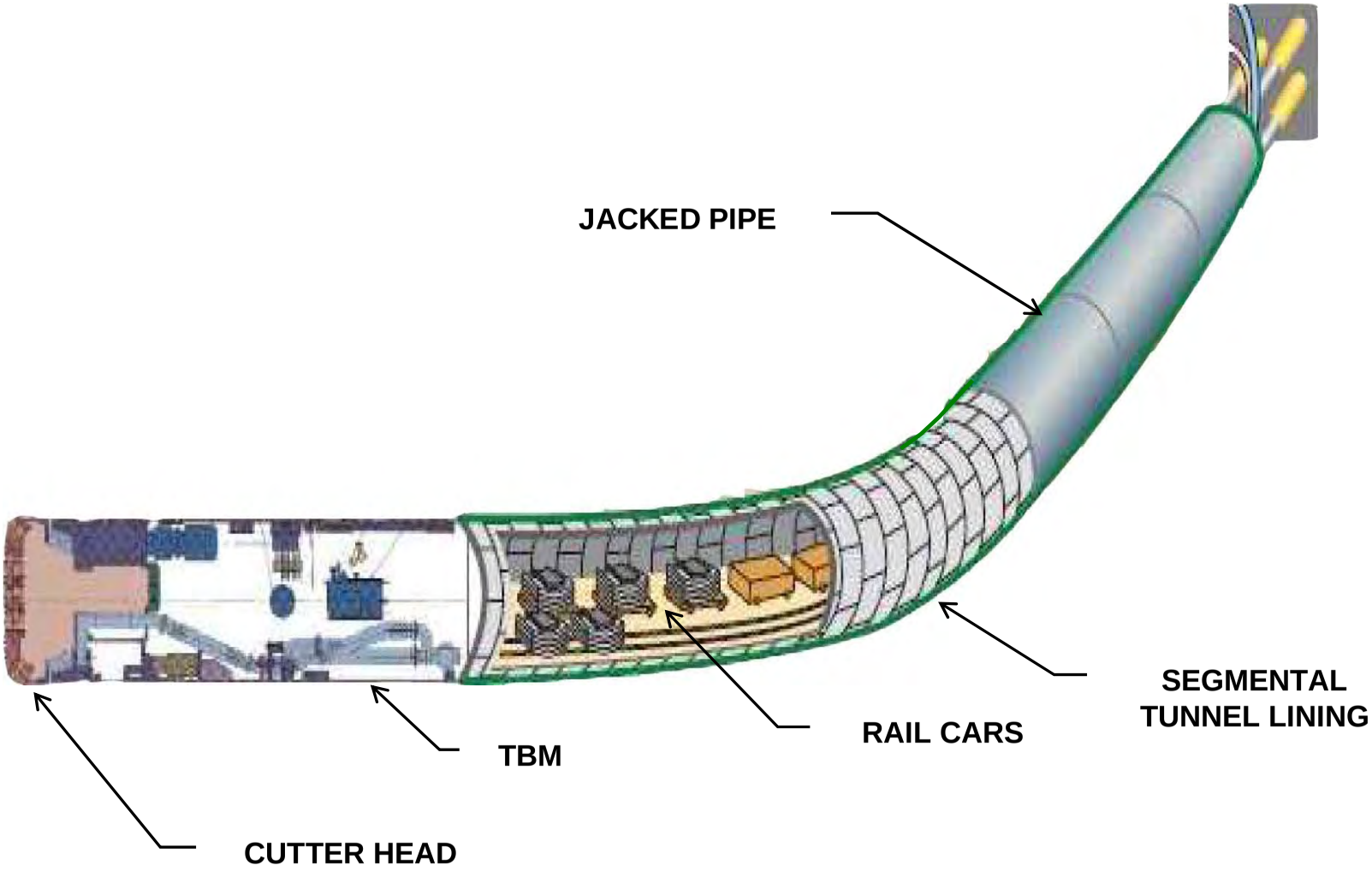
Initially, a long-distance pipe jacking operation comparable to micro-tunneling would be employed. The staging area for this operation would be the spit of land forming the northwest side of Waikalua Loko Fishpond at Kaneohe WWPTF. Pipe jacking equipment would be assembled and anchored at the site. A nine-foot exterior diameter steel casing that would become the tunnel would be fitted with a cutter head on its leading end. The casing would be pushed or "jacked" into the ground at a downward angle while the cutter head bores through the ground. Muck generated by the cutter head would be removed from the back end of the casing as slurry pumped through a pipe in the steel casing for processing. After the first section of casing is pushed into the ground, another section would be welded into place behind it and jacked forward. By continuing to add more sections to the pipe, a straight tunnel would be formed, extending up to 3,000 feet under Kaneohe Bay to a depth of approximately 120 feet below sea level with most of it more than 80 feet below the sea floor.

The second phase of construction will involve switching from long-distance pipe jacking to the use of a TBM. As the TBM proceeds with the excavation, pre-cast interlocking concrete segmental liners would be installed to form the walls of the tunnel which would have an interior diameter of nine feet. Muck generated by the TBM could be extracted as slurry. The segmental liners, workers and replacement parts would be delivered by rail car. Ventilation fans at the staging area would deliver air to the workers on the TBM through a duct. Electricity to run the TBM and for lighting and ventilation fans would be provided by Hawaiian Electric Company and supplemented by on-site generators. Depending on the composition of the spoils, the material may be processed, dewatered and hauled away by trucks for disposal. Alternatively, wet material would be hauled away in trucks with lined beds to prevent leakage. The construction contractor could dispose of the spoils as fill material, where permitted, or as arranged through agreements with landowners desiring such fill. If not, the spoils could be disposed of at a landfill where it would be used as "daily cover" (each day's landfill disposal is required to be covered by a layer of earthen material).

Before the TBM reaches the area inside a looped ramp at the H-3 Interchange and Kaneohe Bay Drive, the area will be excavated and shored. The TBM will complete its bore at the excavation, where it will be disassembled and removed. The PVC force main pipe will be pulled through the completed tunnel, secured and grouted in place. It is anticipated that the entire space between the force main and tunnel may not be completely grouted. Once installed, the force main pipe under the bay will be connected at each end to underground force main pipes that will be placed there by open trench method of construction.

A potential contingency situation for this hybrid tunnel method of construction is the possibility of encountering rocks that are too large for the TBM to remove or pulverize. Test bores along the alignment have not detected the presence of such rocks but they would need to be dealt with, if encountered.

Depending on the rock size and or composition, such obstructions could be broken into smaller pieces by drilling through them from watercraft in the bay. This would be



Source: *http://www.jackson-creek.com/soil-remediation/remediation/chapter03*

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	**KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES**	FIGURE
	HYBRID TUNNELING CONCEPT DIAGRAM	**2-13**

accomplished by inserting a pipe into the bottom of the bay floor, creating an isolated water column to the surface. Watercraft with a drilling rig would drill through the pipe, into the bottom of the bay and into the obstruction. The intent is to fragment a larger rock into smaller pieces that can be removed or pulverized by the TBM.

If the obstruction is too large or too hard to fragment, it could be removed or pushed out of the way. This would involve driving sheet piling into the bottom to create an isolated water column. The bottom would then be excavated to the obstruction, and the obstruction removed. Alternatively, material around the obstruction could be excavated below the level of the obstruction and the weight of the obstruction would cause it to settle out of the path of the TBM (see Figure 2-14).

Equalization Facilities

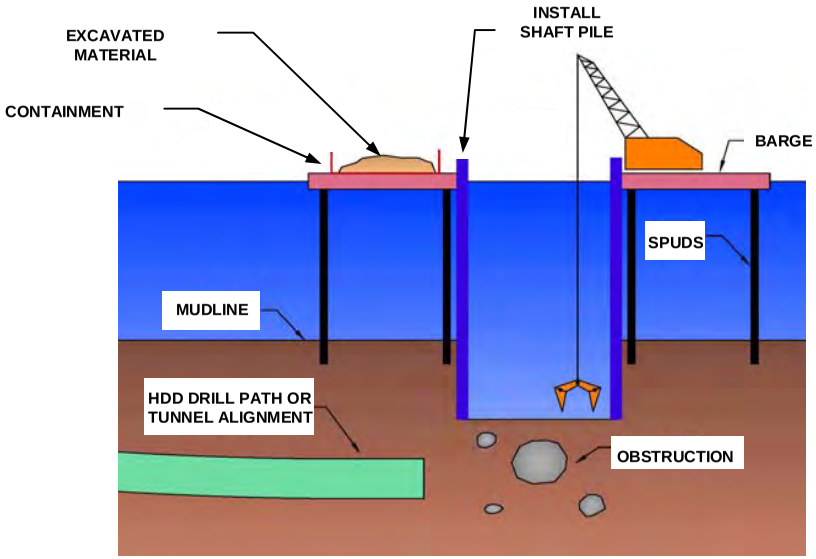
The Force Main No. 2 alternative includes the construction of covered equalization facilities at the Kaneohe WWPTF and the Kailua Regional WWTP to capture and store peak flows generated during wet weather events. Based on the peak flow projections prepared for the 1999 I/I Plan, the equalization facility at the Kaneohe WWPTF would require a capacity of 6.9 million gallons. The facility would store wastewater from the Kaneohe and Ahuimanu service areas during peak flow conditions and empty when flows subside. The facility would be located along the opposite side of the fenceline north of the Kaneohe WWPTF (see Figure 2-15). Its dimensions are estimated to be approximately 335.5 feet long, 232.5 feet wide, and 25.5 feet deep. The facility would be partially buried for hydraulic efficiency (see Figure 2-16). This would also reduce its visual profile by approximately seven feet, resulting in a total height of about 18-½ feet above ground. Adjoining the equalization facility will be a new pump station and odor control facility. In addition, new headworks will provide preliminary treatment consisting of screening and grit removal.

The equalization facility at the Kailua Regional WWTP would have a capacity of approximately 2.1 million gallons. The covered facility would store wastewater from the Kailua service area during peak flow conditions and empty when flows subside. The facility would be located on the south side of the Kailua Regional WWTP in a vacant area along the fenceline of Kaneohe Bay Drive (see Figure 2-17). Its dimensions are estimated to be approximately 212.5 feet long, 127.5 feet wide, and 25.5 feet deep. The facility would be mostly buried (see Figure 2-18). Due to the sloping topography along this portion of the plant, the visual profile will be further reduced such that, with the exception of the guard railing, the facility will not visibly protrude above ground. A headworks component adjoining the equalization facility will provide preliminary treatment. In addition, odor control will be housed in an adjacent single-story building. A new influent pump station with odor control is also proposed.

As noted previously in Section 1.4.2 Wastewater Flow, the City is updating the 1999 I/I Plan, which is likely to lower peak design flows. If such a reduction is determined, the size of the equalization facilities would also be reduced. Depending on the magnitude of the reduction, there is possibility that the need for an equalization facility at the Kailua Regional WWTP could be deferred pending future assessments.

2.3.2 Alternative 2: Gravity Tunnel

This alternative involves constructing an approximately three-mile long tunnel, up to ten feet in interior diameter, from the Kaneohe WWPTF to the Kailua Regional WWTP to convey wastewater by gravity flow. As such, the pre-treatment facility, including the pump stations at



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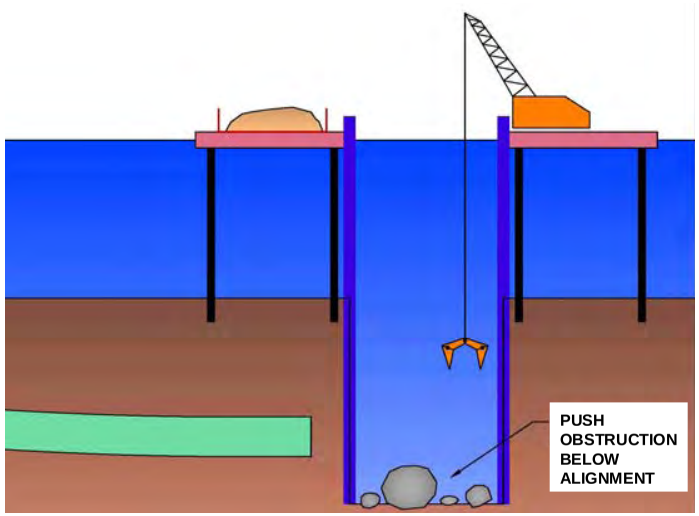

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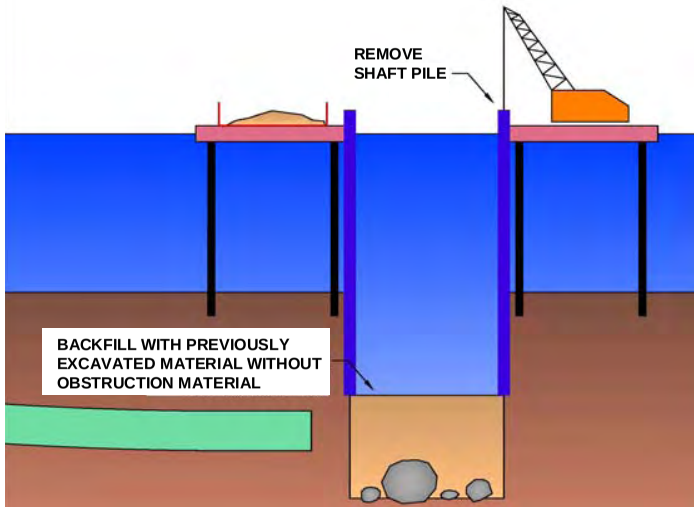

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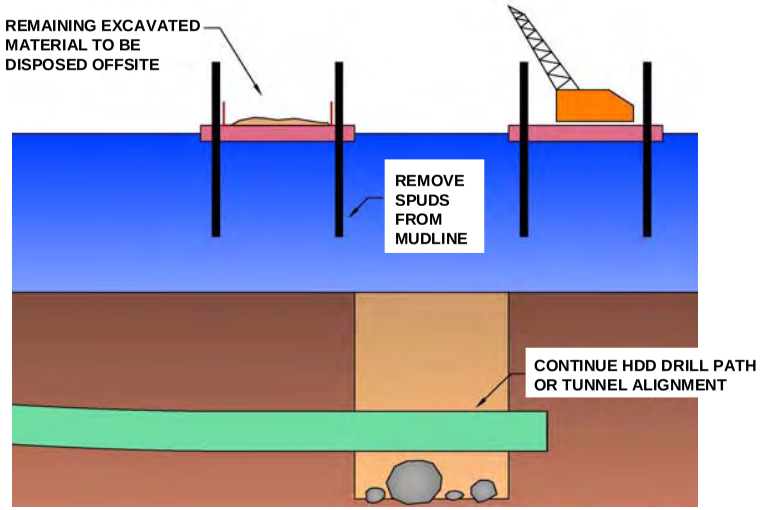

4

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CLEARING OBSTRUCTIONS

FIGURE
2-14

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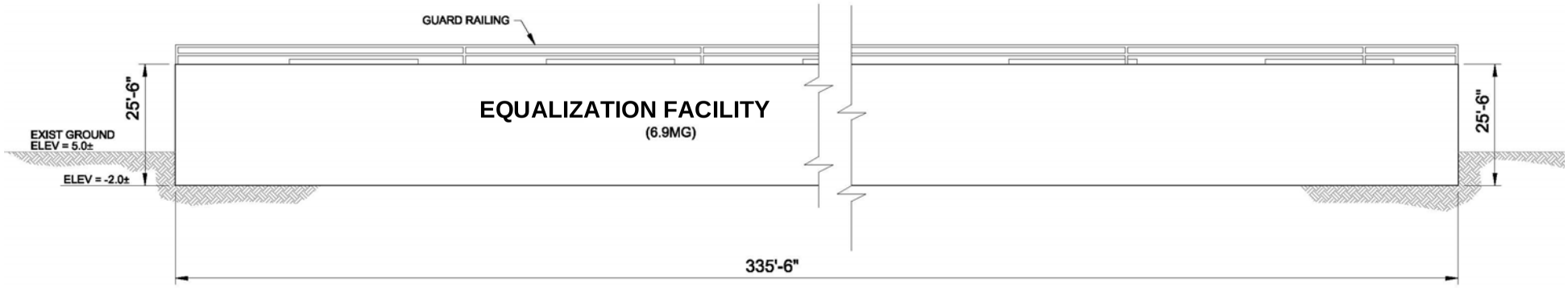
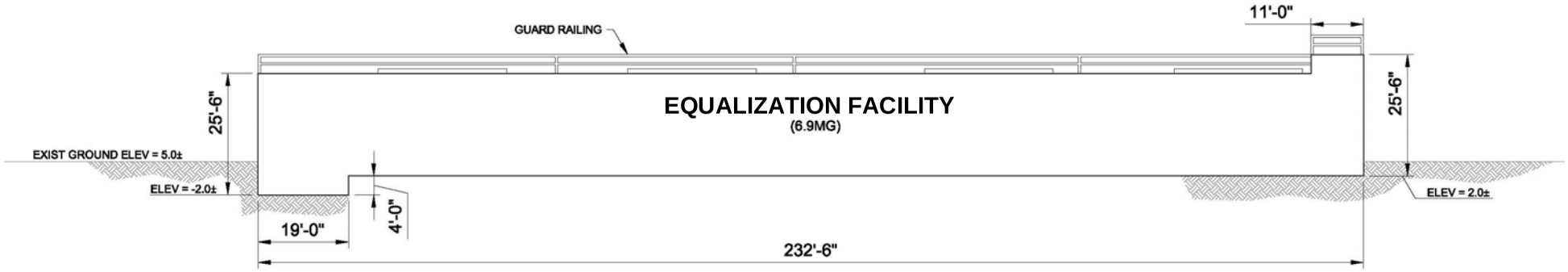
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

EQUALIZATION AND ASSOCIATED FACILITIES AT THE KANEOHE WWPTF

FIGURE
2-15





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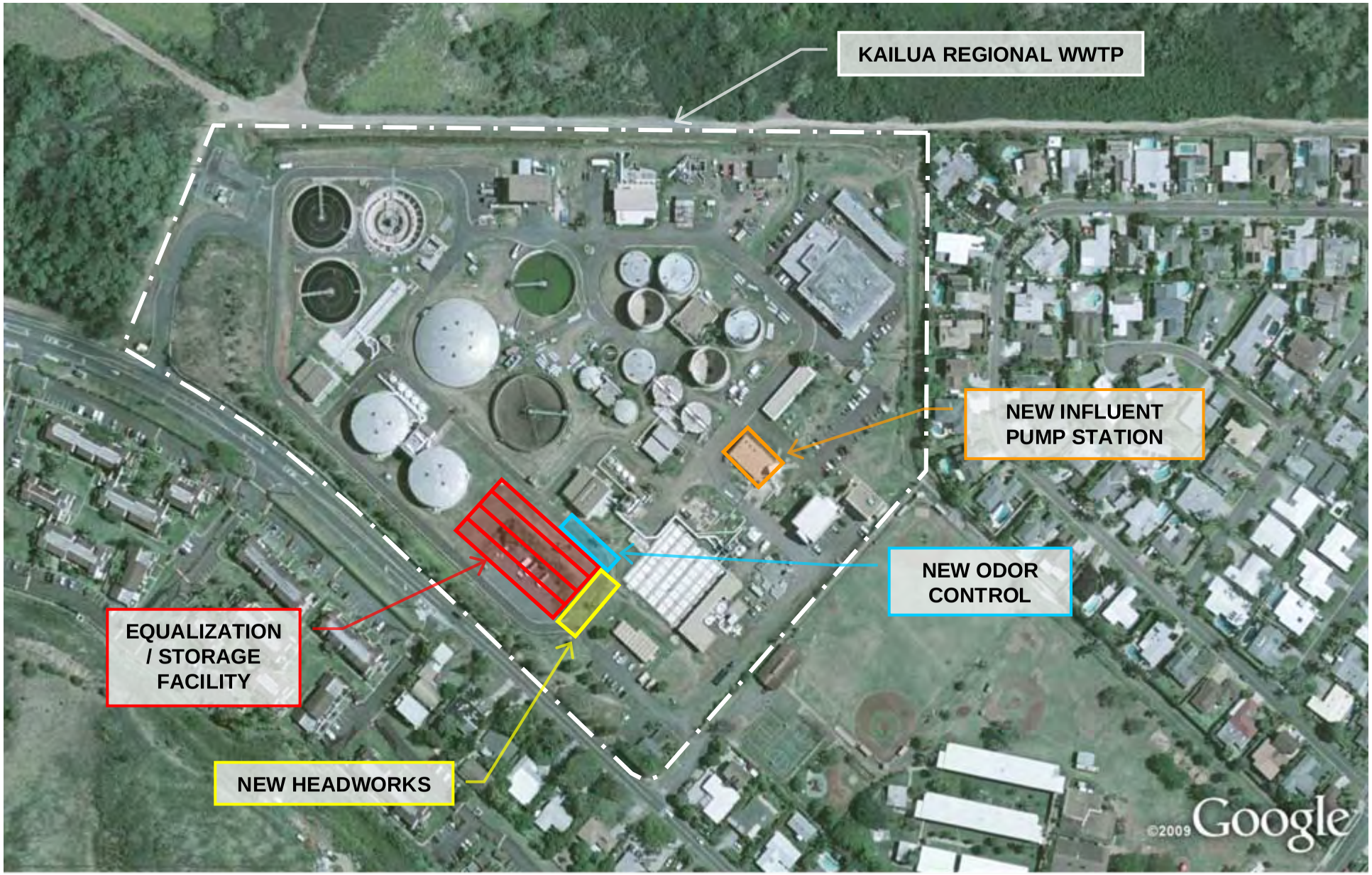
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

EQUALIZATION FACILITY AT KANEOHE WWPTF

FIGURE
2-16



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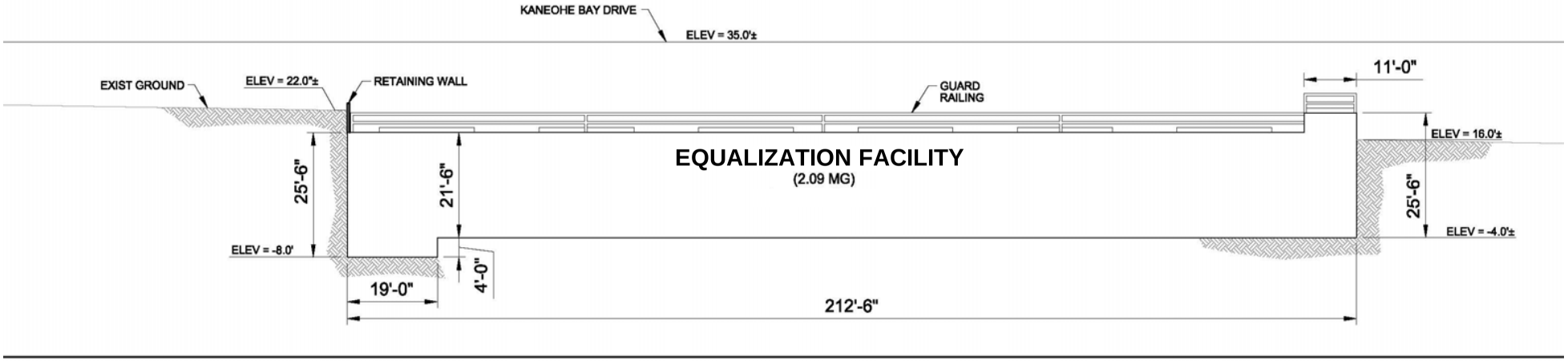
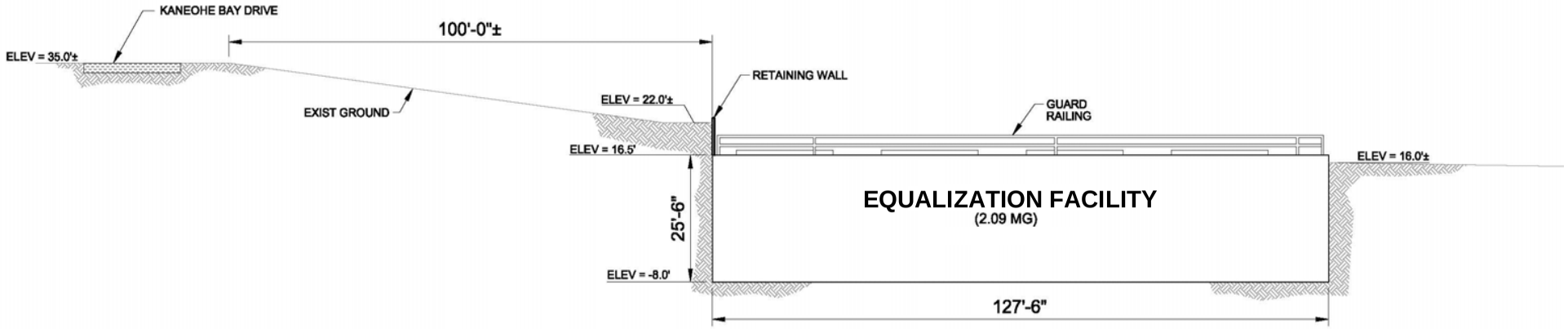
EQUALIZATION AND ASSOCIATED FACILITIES AT KAILUA REGIONAL WWTP

FIGURE 2-17





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EQUALIZATION FACILITY AT KAILUA REGIONAL WWTP

FIGURE
2-18

the existing Kaneohe WWPTF, could be discommissioned. Moreover, since the gravity tunnel is not pressurized like a force main, it could not spill wastewater like a damaged force main. Therefore, the existing force main No. 1 could also be discommissioned. The City plans to keep force main No. 1 in place so it can be reactivated by portable pumps that could be temporarily installed at the Kaneohe WWPTF in an emergency or during any maintenance work for the gravity tunnel. The tunnel would also be used as an equalization facility as it could store peak wet weather flows. The tunnel will be aligned to traverse under Oneawa Hills, mauka of Kaneohe Bay Drive, as previously shown in Figure 2-5.

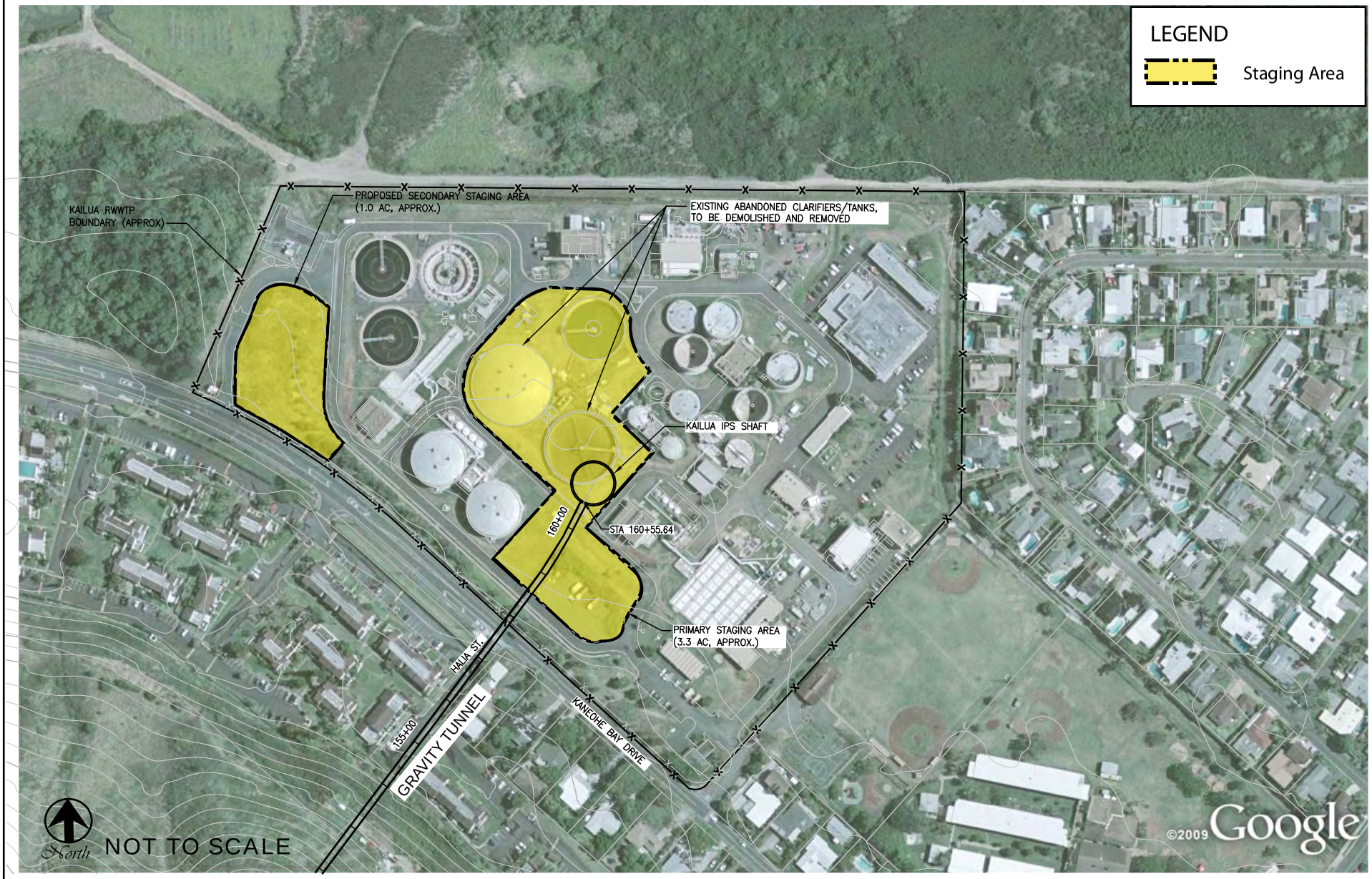
Tunnel construction would be staged primarily from the Kailua Regional WWTP and would involve the use of a specialized rock-boring TBM. Initially, a vertical access shaft would be excavated at the Kailua Regional WWTP (see Figure 2-19). The shaft, which would be approximately 80 feet in diameter, is sized to subsequently be used for an Influent Pump Station (IPS), that would pump wastewater to the surface for treatment.

The vertical shaft at the Kailua Regional WWTP would be approximately 90 feet deep. The upper portion of the shaft would be excavated through soil, consisting of various types of deposits and weathered basalt rock, while the lower portion would be in unweathered basalt bedrock (see Figure 2-20). Excavation of the upper portion of the shaft above the bedrock may be preceded by construction of a reinforced concrete perimeter wall cast in the ground. While different methods are available to achieve this, all methods would generally involve excavating the ground around the perimeter of the shaft down into the bedrock, placing steel reinforcement into the excavation and pouring in concrete, which would harden to form the supporting wall. Once formed, the area inside the perimeter concrete wall of the shaft would be excavated to bedrock using equipment such as hydraulic excavators, backhoes, and clamshell buckets to lift out the loose material. The portion of the shaft in the bedrock will require special methods for breaking and removing rock. Excavation methods may include hydraulic hammers (ho-rams), jack hammers, chisels, and controlled blasting to fracture the rock for removal.

After the shaft is excavated, a starter tunnel would be constructed approximately 100 to 200 feet into the tunnel alignment. The bottom of the tunnel would be approximately 77.5 feet below ground or at an elevation of -65.5 feet mean sea level (msl). The aforementioned rock fracturing and removal equipment would be used to construct the starter tunnel, which would be used as an area for assembling and launching the TBM.

The TBM will be used to bore an approximately 13- to 14-foot diameter tunnel through the 15,000 feet of the rock (see Figure 2-21). A key feature of the TBM is the use of hydraulic grippers that protrude from machine's sides. Pressed firmly against the sides of a rock tunnel, the grippers wedge the TBM in place so that its circular cutter head can be pushed forward with tremendous pressure to fracture the rock ahead of it.

The rotating cutter head has a series of hardened steel cutter discs that score and fracture the rock in a circular pattern as it is pushed forward. The falling rock fragments are caught by radiating blades in the cutter head that direct the rock to tumble toward the center of the head as it rotates. From the center of the cutter head, conveyors transport the rock fragments, referred to as "muck", through the TBM and out the rear where it is collected in rail carts to be transported out of the tunnel.



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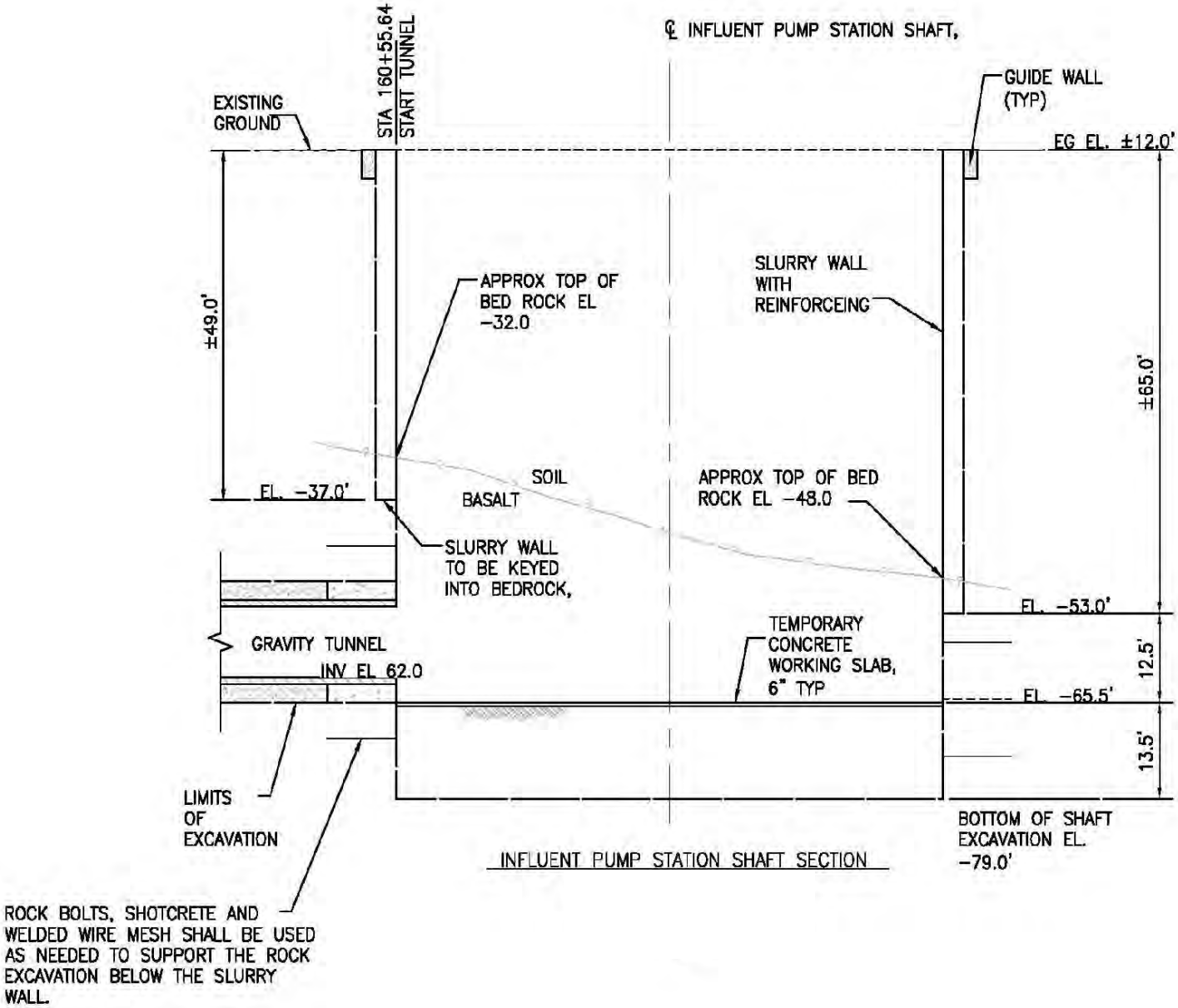
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

KAILUA REGIONAL WWTP - GRAVITY TUNNEL ALIGNMENT

FIGURE 2-19



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IPS SHAFT EXCAVATION AT KAILUA REGIONAL WWTP – GRAVITY TUNNEL

FIGURE
2-20

Rock Boring TBM with Rotating Cutter Head

Hydraulic Grippers

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PHOTOS OF ROCK BORING TBM

FIGURE
2-21

Once the cutter head has been fully extended into the newly excavated reach of the tunnel, the hydraulic grippers are retracted and the transporter mechanism moves the entire TBM forward. The grippers are then redeployed and the process is repeated.

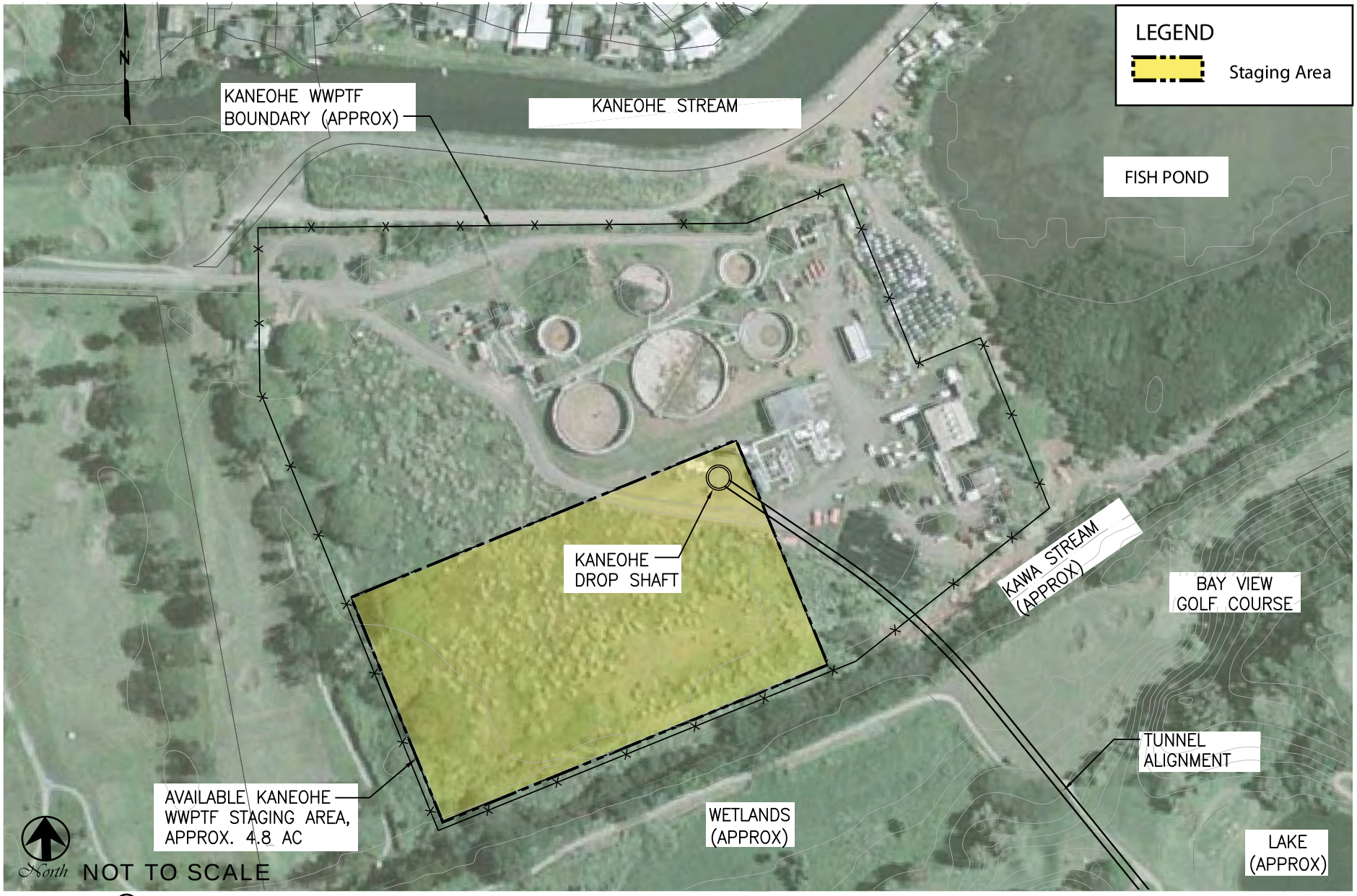
Due to the strength and massive nature of the basalt rock, ground support requirements for the tunnel are anticipated to be minimal. Where the TBM encounters fractured rock, it can install devices to provide structural support of the rock mass. As needed, the TBM can drill holes into the side of the tunnel and install five-foot long rock bolts to secure fractures. Where there are more fractures that need to be secured, welded wire mesh pinned by rock bolts will be installed. In even poorer conditions, the TBM can install circular steel rib supports to hold loose rock in place. The intent of these support measures is to maintain a stable tunnel opening until the tunnel liner can be installed and grouted into place. If significant amounts of groundwater are encountered in fractured basalt, holes can be drilled ahead of the TBM and grout injected under pressure to locally seal off groundwater infiltration into the tunnel.

Power for the TBM would be provided by Hawaiian Electric Company at the Kailua Regional WWTP. During construction of the tunnel, ventilation fans at the Kailua Regional WWTP would deliver fresh air through ventilation ducts along the tunnel crown to the TBM workers in the tunnel. A temporary rail car system constructed behind the TBM would remove the muck and deliver supplies such as replacement cutters, rock bolts and steel rib supports, as well as transport workers. By boring uphill from the Kailua Regional WWTP, groundwater encountered would flow out of the tunnel, by gravity, and drain into the shaft at Kailua Regional WWTP for removal.

The rock boring TBM cannot be used for the approximately 800 feet of the tunnel where the alignment crosses Bayview Golf Course into the Kaneohe WWPTF. This stretch of ground is comprised mostly of weak soils, mainly lagoonal deposits with a high groundwater table. As a result, it is too soft for the TBM grippers and cutter head to function. Therefore, a different tunnel construction method, staged from the Kaneohe WWPTF, would be required for this section of the tunnel.

Construction at this end of the tunnel would begin with the excavation of the drop shaft, where the wastewater would be discharged to enter the tunnel (see Figure 2-22). The drop shaft excavation will be approximately 35 feet in diameter and approximately 55 feet deep (see Figure 2-23). As in the case of the shaft at the Kailua Regional WWTP, the walls of the shaft would be constructed prior to excavation. Due to the weak soil conditions and high groundwater table, however, the shaft walls at the Kaneohe WWPTF will be even more critical for retaining the soils around the shaft and preventing water from entering it. Excavation to form the walls will likely need to be done in wet conditions and tremie concrete poured to cast the walls, which will extend approximately ten feet lower than the bottom of the drop shaft excavation. Tremie concrete is specifically formulated to displace groundwater and harden in flooded excavations. Excavation of the shaft within the watertight tremie concrete walls would follow. The bottom of the shaft would be sealed with a seven-foot thick steel reinforced tremie concrete slab, which would set the bottom depth of the shaft at elevation –41 feet or approximately 48 feet below the surface. After the slab is constructed, the groundwater would be pumped out to dewater the excavation.

While the shaft is being constructed, the underground tunnel path through the soft and wet ground would need to be stabilized before the tunnel could be excavated. This will be accomplished by “jet grouting.” Jet grouting involves the use of machinery to drill holes into



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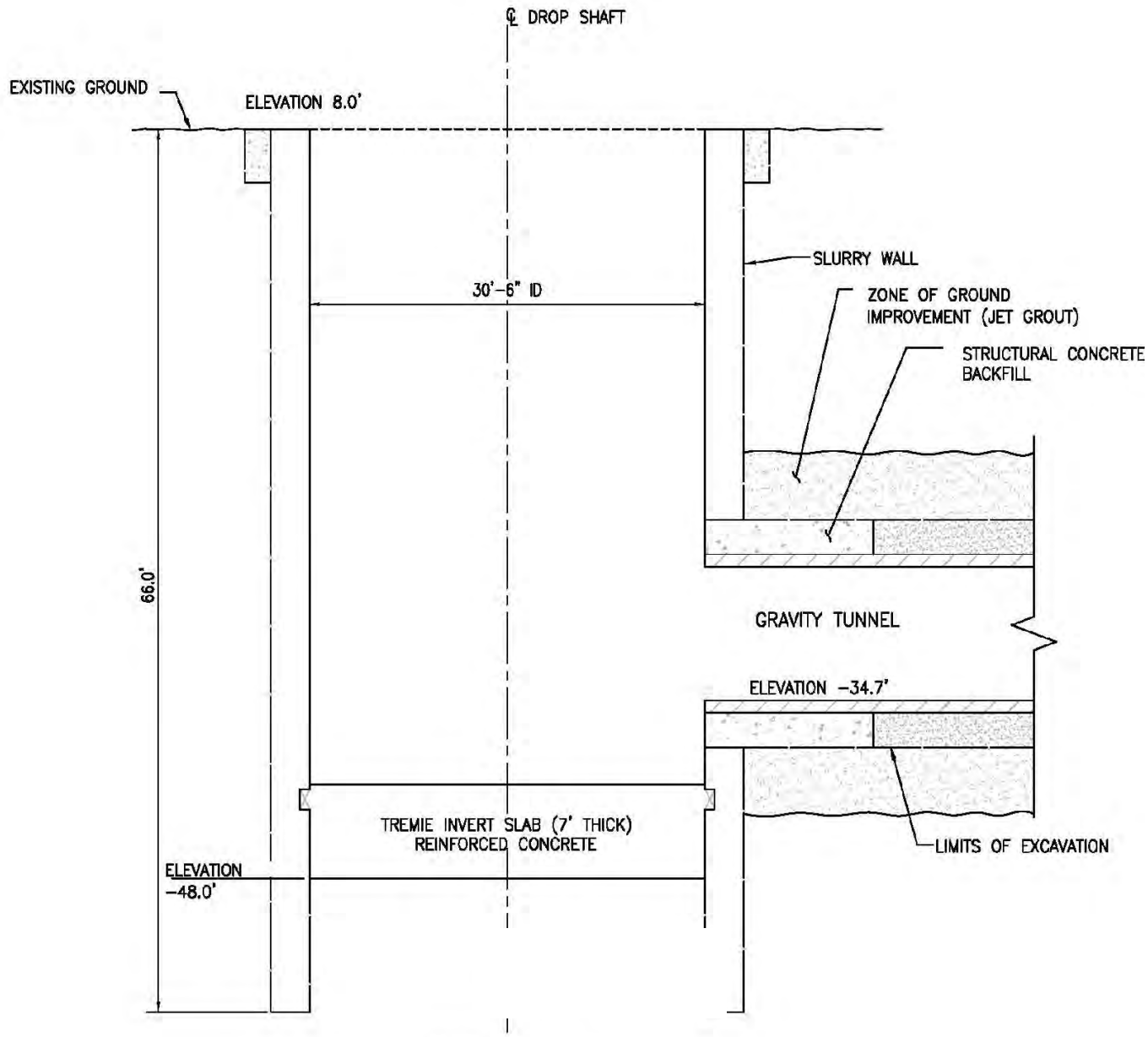
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

KANEOHE WWPTF - GRAVITY TUNNEL ALIGNMENT

FIGURE 2-22



DROP SHAFT SECTION

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DROP SHAFT EXCAVATION AT KANEOHE WWPTF – GRAVITY TUNNEL

FIGURE
2-23

the ground to a depth of at least five feet below the bottom of the tunnel. As the drill is retracted, cement, water and some air is laterally injected at high pressure into the ground, from ports on the side of the drill head, as it rotates. The combination of the high pressure jet and rotation creates a column of mixed soil and cement that hardens to provide stability and impedes groundwater movement. The jet grout columns would be formed to extend at least five feet above the top height of the tunnel, after which the jets would be turned off and the drill shaft retracted. Depending on the machinery used by the contractor, the drilling pattern will be a grid with holes between three and five feet apart along the path of the tunnel. The spacing of the grid is such that the grout columns overlap to form a solid, grouted mass to tunnel through. The jet grouted soil would extend at least five feet above, below, and around the tunnel to provide a uniform block of stabilized soil that would permit tunnel construction without excessive ground deformations (see Figure 2-24).

Where the tunnel path crosses beneath Kawa Stream, the jet grouting rig would be angled to drill beneath the stream so as not to require placement of the rig in the stream or too close to the banks where its weight could cause the banks to collapse.

After jet grouting, the tunnel path will be the strength of weak concrete. The contractor would excavate the tunnel, which may be up to about 17-feet in diameter, using equipment such as a roadheader hydraulic excavators and backhoes. The tunnel would be supported using steel ribs, sprayed-on concrete and/or timber.

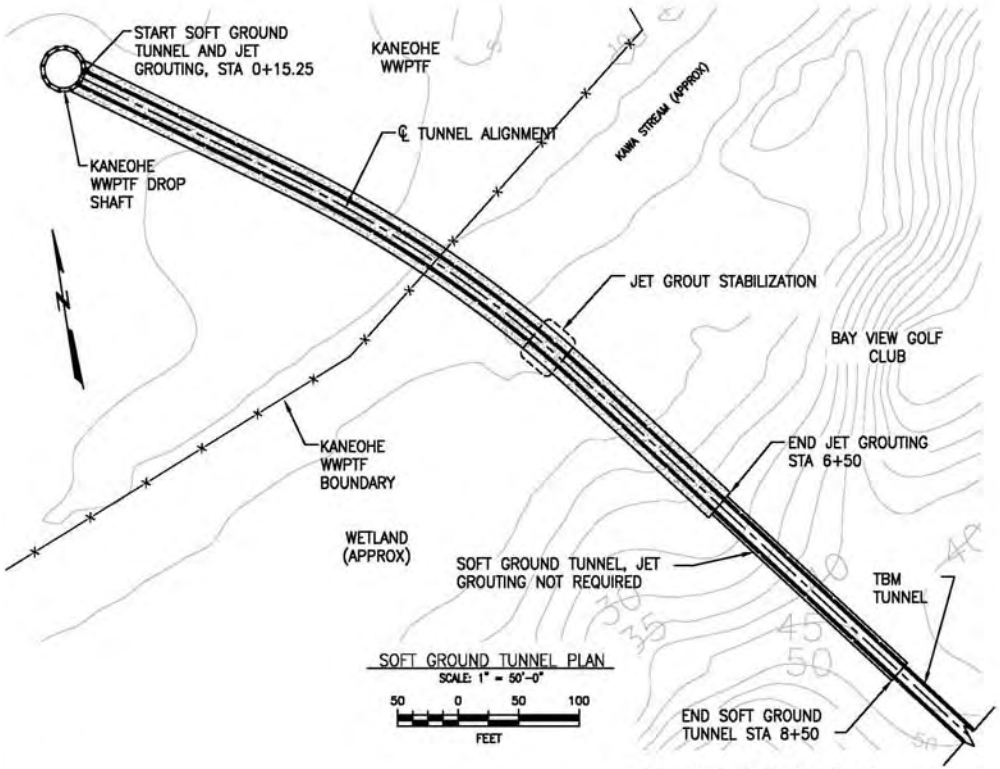
When the TBM bores through the rock and enters the excavated tunnel, it would be placed on skids and hauled to the drop shaft where it will be disassembled and removed.

A vertical access shaft, likely eight feet in interior diameter, would be constructed near the existing Board of Water Supply reservoir (see Figure 2-5). It is likely that this shaft would be constructed using the raise bore method. Initially, a pilot hole is drilled and cased from the surface to the tunnel below. A drill pipe is then placed in the pilot hole and a reamer is attached to it at the bottom of the shaft from inside the tunnel. A drill rig rotates and pulls the reamer up, enlarging the hole to a diameter of approximately 14 feet. The rock cuttings or “muck” generated by the reamer drops into the tunnel for removal. A concrete intersection, or riser, would then be constructed in the tunnel ceiling. Pre-cast concrete sections of manhole pipes would be stacked atop the riser and grouted in place, with the top, at the surface, sealed by a manhole cover.

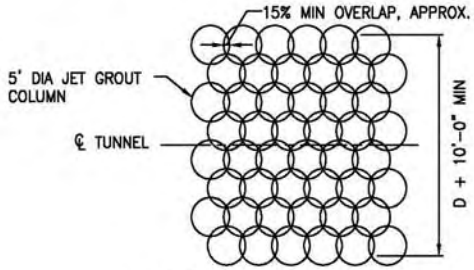
Workers, air, lighting, construction materials, machinery, and replacement parts such as cutter heads for the TBM would be delivered to the front of the bore through the tunnel, most likely by rail car on tracks.

The tunnel lining, with an interior diameter of 10 feet, would be made of a corrosion-resistant material such as polymer concrete or fiberglass pipe (see Figure 2-25). The pipe is placed on blocks within the tunnel to achieve the required slope and alignment. Then, the space between the pipe and the bored or excavated tunnel, referred to as the annular space, would be filled with grout.

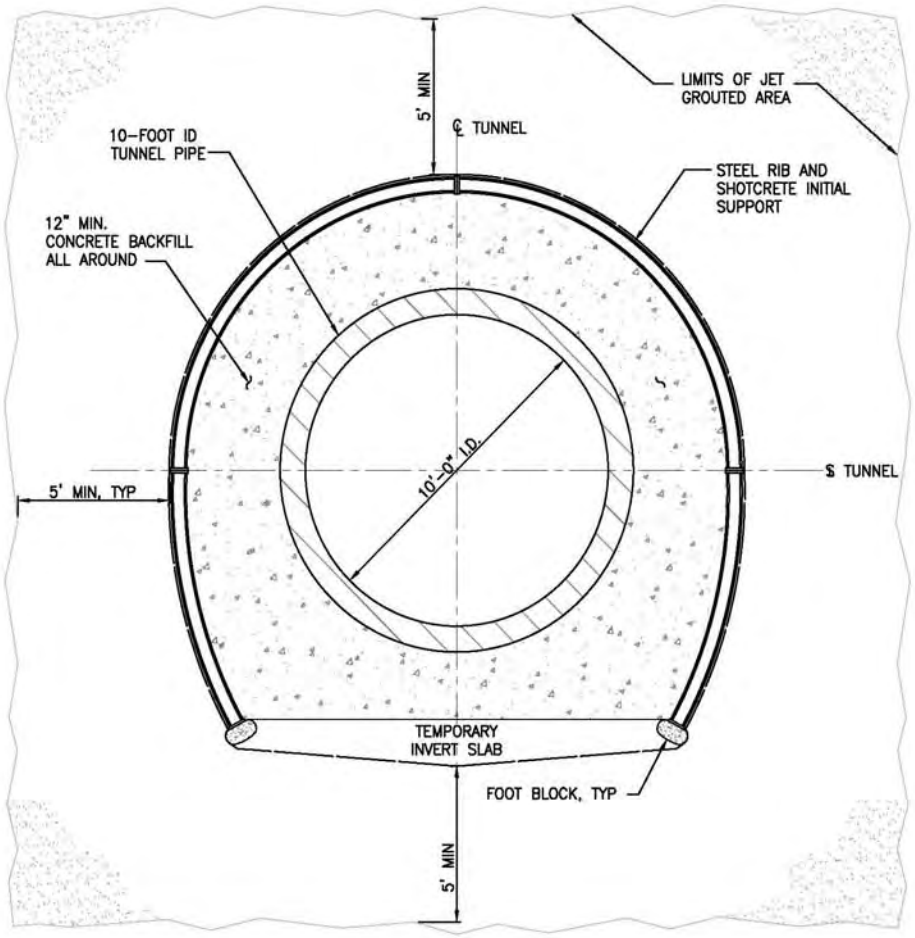
Following tunnel construction, the Gravity Tunnel IPS at the Kailua Regional WWTP would be constructed inside the shaft from where the tunneling operation was staged (see Figure 2-26). The Gravity Tunnel IPS will be constructed within the shaft excavated to launch the TBM, while the building to house administrative offices and odor control facilities will be located above at ground level . Under normal flow conditions, the Gravity Tunnel IPS would



SOFT GROUND TUNNEL PLAN
SCALE: 1" = 50'-0"



JET GROUT COLUMN LAYOUT



TYPICAL SOFT GROUND TUNNEL SECTION

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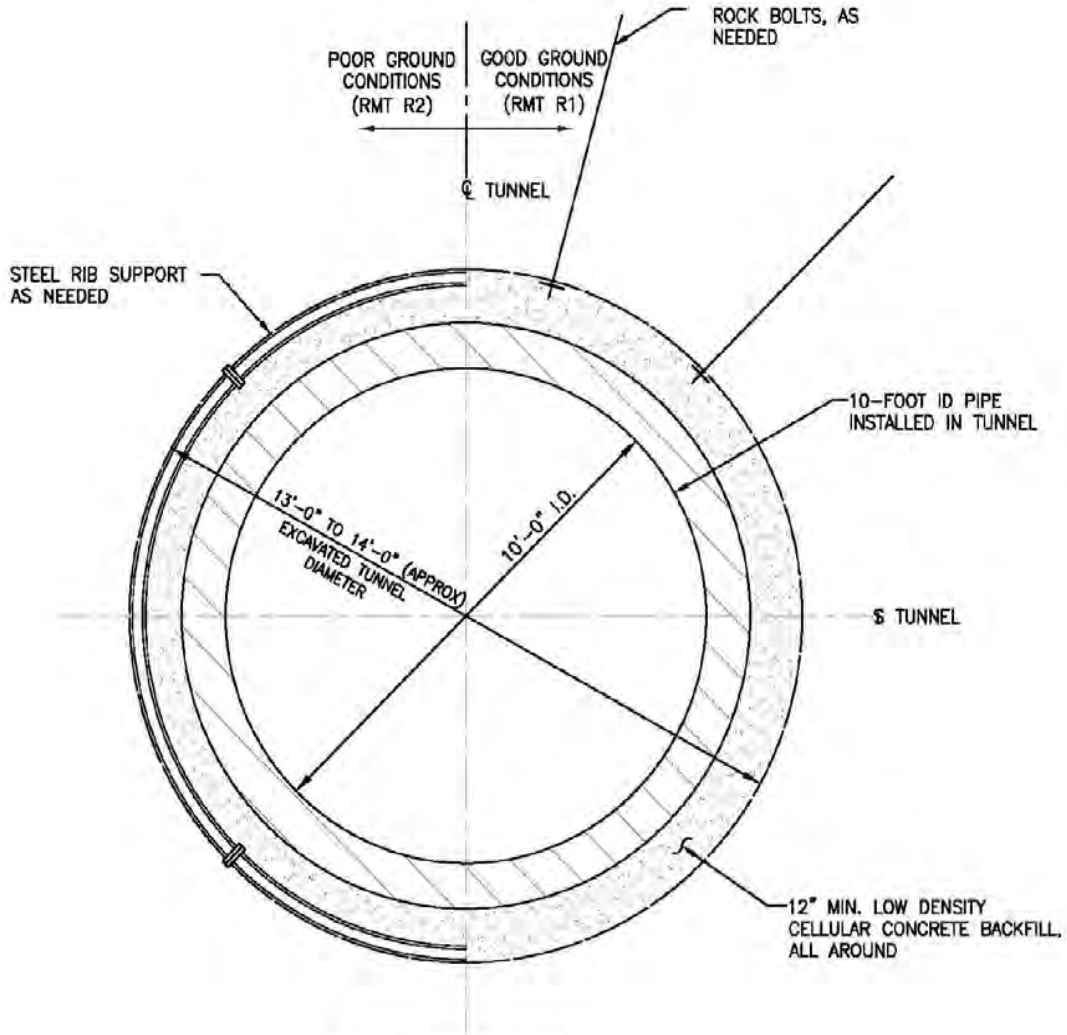
SOFT GROUND TUNNEL AT KANEOHE WWPTF

FIGURE
2-24



TYPICAL TUNNEL SECTION

NOT TO SCALE

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GRAVITY TUNNEL SECTION WITH STRUCTURAL SUPPORT ALTERNATIVES

FIGURE
2-25

pump wastewater to the headworks, where the flow is combined with flows from the existing IPS, which collects flows from the Kailua area. This would be the normal conveyance mode of operation for the Gravity Tunnel IPS. During peak flow events, when the combined flows reach and surpass the treatment plant's capacity of 24 mgd, the Gravity Tunnel IPS will enter storage mode where it will reduce pumping rates so that the combined flows will not exceed the plant's capacity. It will continue to reduce pumping rates if flows from the existing IPS continue to increase. If the flows to the existing IPS exceed its capacity, the excess flow from the existing IPS will be diverted into the Gravity Tunnel. As flows subside, the Gravity Tunnel IPS will pump out the stored wastewater from the tunnel as it returns to conveyance mode.

The drop shaft at the Kaneohe WWPTF will include a vortex structure to swirl the wastewater into a vortex as it enters the gravity tunnel. The vortex keeps solids suspended and helps dissipate the energy as the wastewater descends from the surface pipelines to the tunnel (see Figure 2-27).

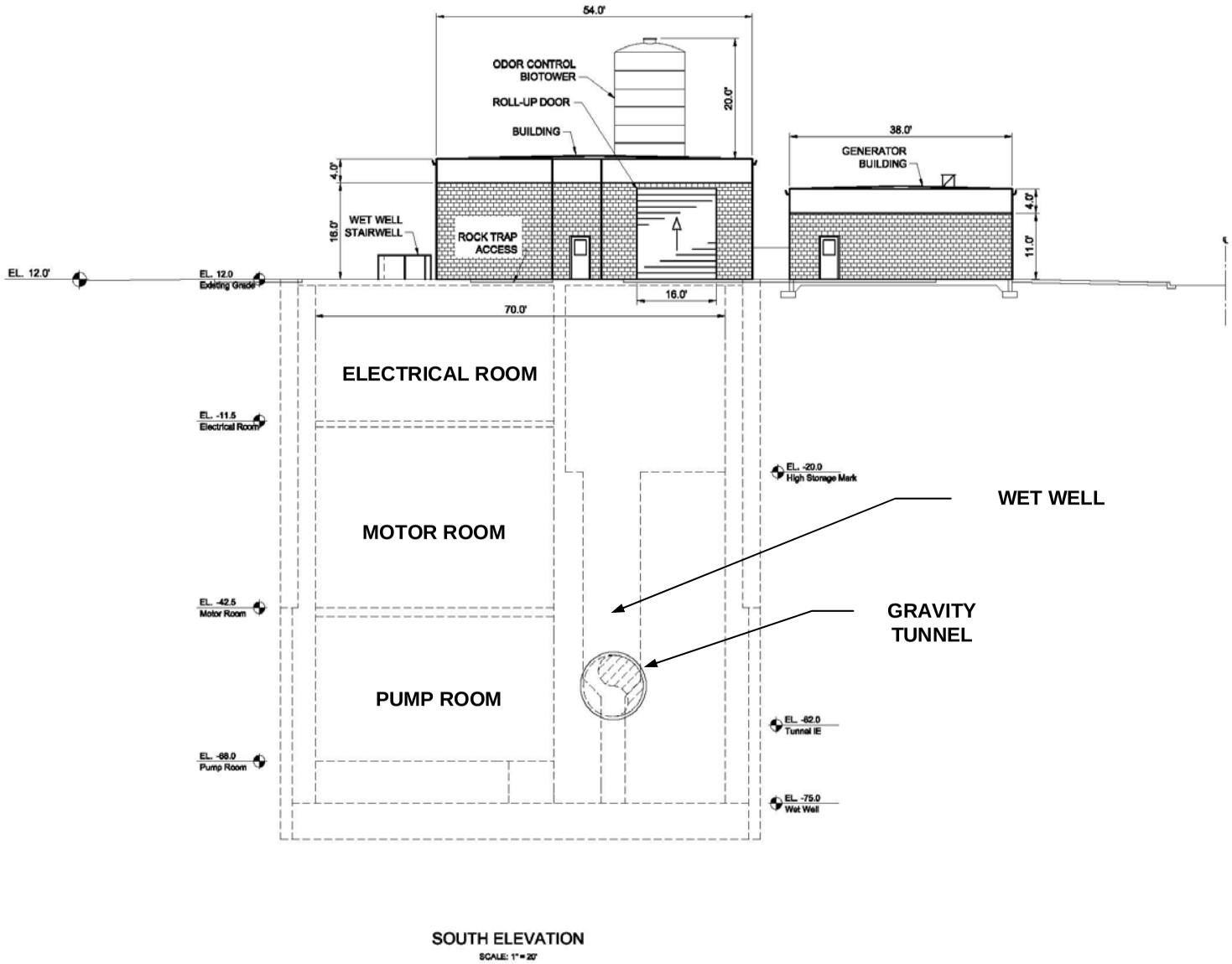
The muck generated by the TBM will be basalt fragments that may have commercial value as construction material. As such, it may be sold or offered for collection by private interests. Spoils such as those generated in the soft ground tunneling may be processed, dewatered and hauled away by trucks for disposal. Alternatively, wet material would be hauled away in trucks with lined beds to prevent leakage. The construction contractor could dispose of the spoils as fill material, where permitted, as arranged through agreements with landowners desiring such fill. If not, the spoils could be disposed of at a landfill where it would be used as "daily cover" (each day's landfill disposal is required to be covered by a layer of earthen material).

2.3.3 Other Treatment-Related Facilities

Regardless of which conveyance and storage alternative is selected, two improvements at the Kailua Regional WWTP are proposed, including a new headworks facility replacing the existing headworks and a new dewatering facility to replace the existing dewatering building. Figure 2-28 illustrates the new headworks and dewatering facilities, as well as other proposed improvements to the Kailua Regional WWTP.

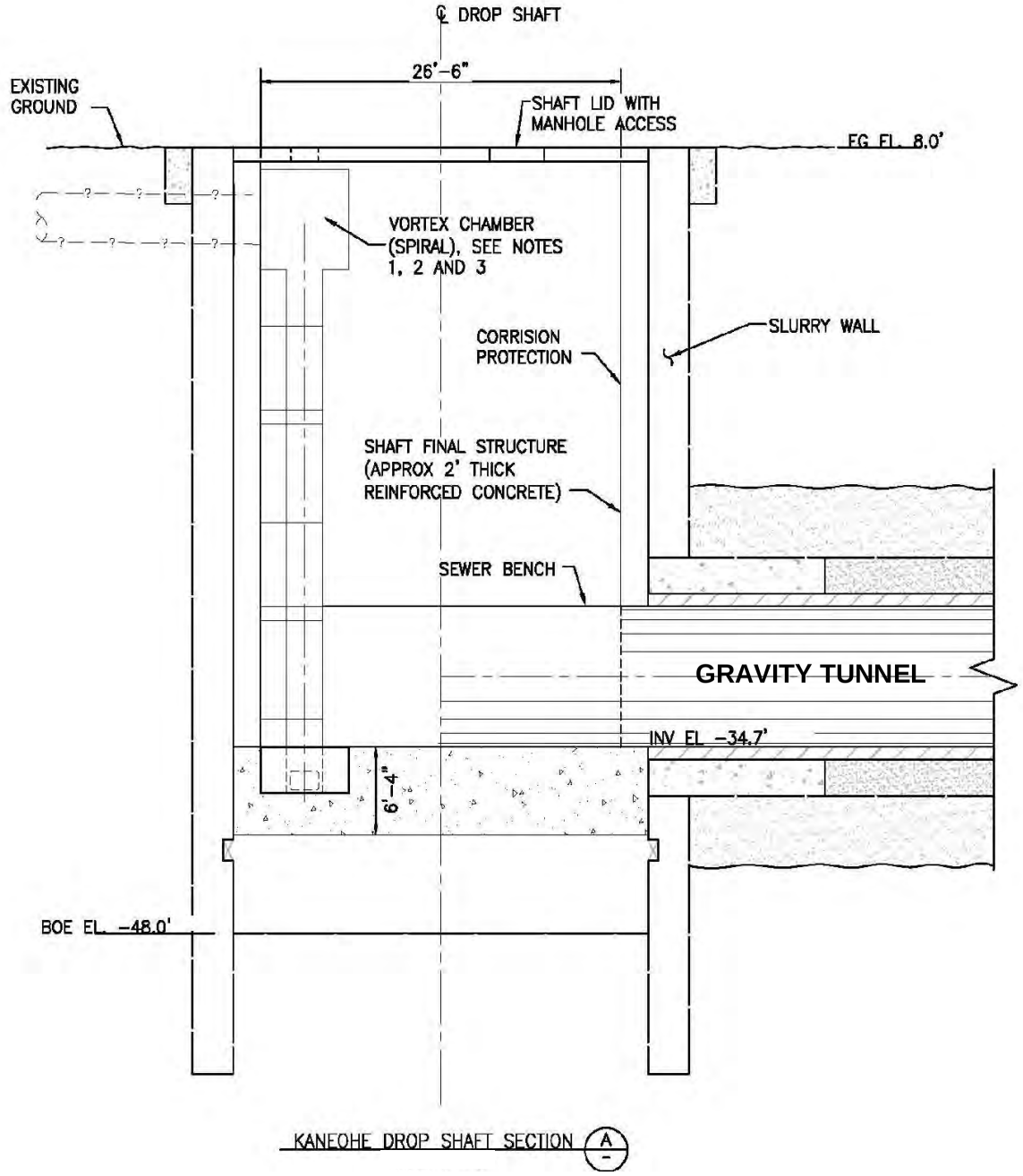
The headworks house equipment for screening and grit removal from wastewater prior to further treatment. Currently, this is accomplished at the Kaneohe WWPTF before being pumped through the existing force main from the Kaneohe portion of the service area. Flows from the Kailua area are screened, upstream of the existing IPS and at the existing Kailua Regional WWTP headworks. A new headworks at the Kailua Regional WWTP would include construction of a new facility in an enclosed building with odor control. It will be located near the existing headworks. The existing headworks will be decommissioned.

The aging biosolids dewatering building at the Kailua Regional WWTP has structural problems and needs to be replaced. Dewatering involves the use of centrifuges to remove water from digested sludge prior to disposal. The proposed new dewatering building will be designed so that trucks receiving the dewatered sludge for transport will be able to drive into the building and the building access may be closed while the trucks are being loaded. This will significantly reduce odors generated by the loading operation. The building will be equipped with odor control devices to prevent odorous gases from escaping. The existing dewatering building will be decommissioned.



NOT TO SCALE

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES GRAVITY TUNNEL IPS AT KAILUA REGIONAL WWTP - SOUTH ELEVATION	FIGURE 2-26



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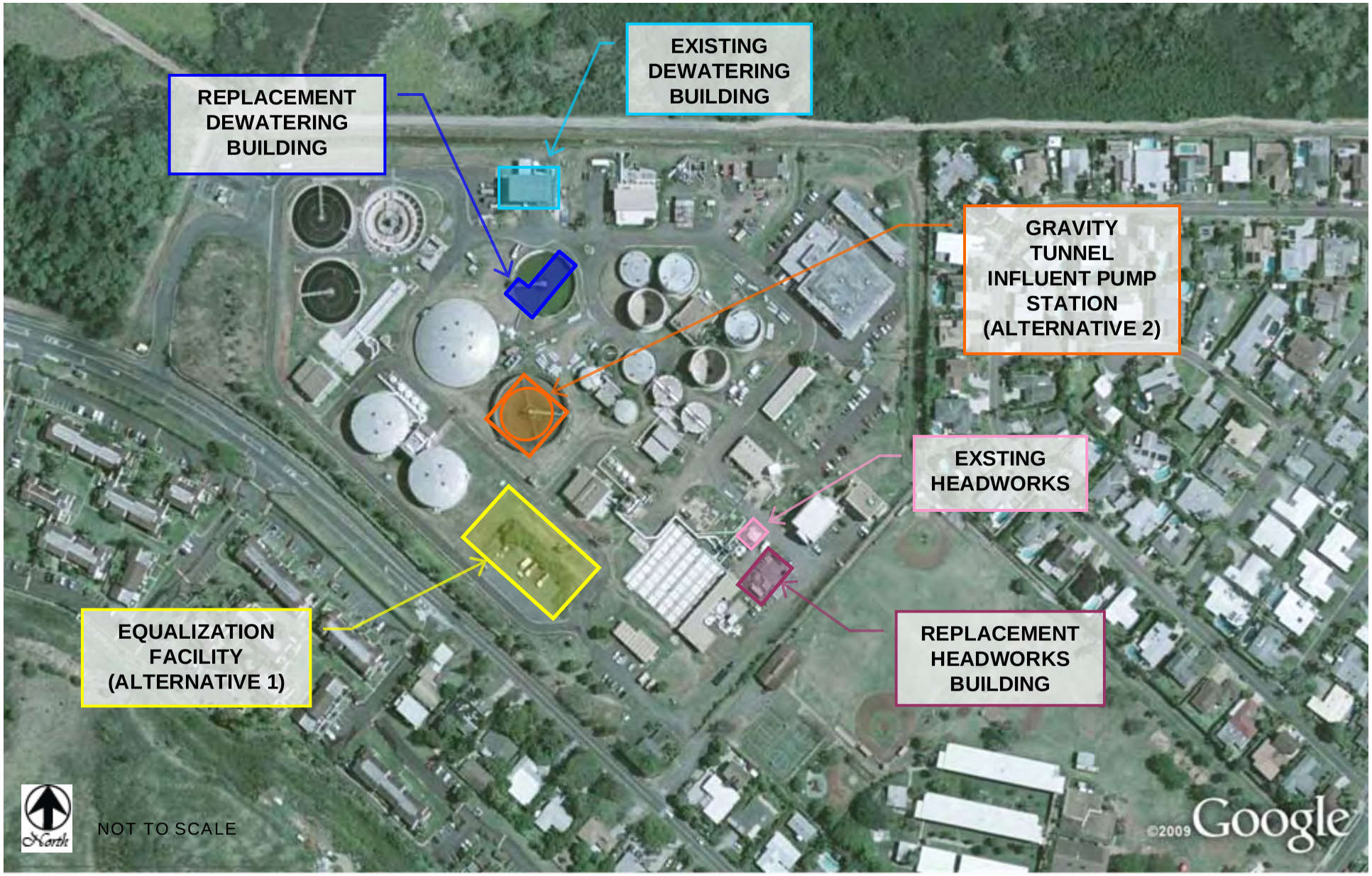
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

DROP SHAFT AT KANEOHE WWPTF – GRAVITY TUNNEL

FIGURE
2-27



Source: © 2009 Google

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROPOSED IMPROVEMENTS AT KAILUA REGIONAL WWTP	FIGURE 2-28

2.3.4 Estimated Cost and Schedule

The estimated costs and schedules for the alternatives, as well as proposed improvements at the Kailua Regional WWTP, are summarized in Table 2-2 below.

Table 2-2 Estimated Construction Costs and Schedule for Alternative 1 and 2, and Kailua Regional WWTP Improvements

Alternative 1 – Force Main No. 2 and Equalization Facilities			
	Cost	**Start**	**Completion**
HDD Option	$54-85 million	November 2011	December 2014
Hybrid Tunnel Option	$88-118 million	November 2011	December 2014
Equalization Facility at Kaneohe WWPTF	$47-67 million	2018	2020
Equalization Facility at Kailua Regional WWTP	$27-39 million	2018	2020
Total Cost	**$128-224 million**		

Alternative 2 – Gravity Tunnel			
	Cost	**Start**	**Completion**
Gravity Tunnel	$82-133 million	2013	2016
IPS at Kailua Regional WWTP	$20-30 million	2016	2018
Total Cost	**$102-163 million**		

Improvements at Kailua Regional WWTP			
	Cost	**Start**	**Completion**
New Headworks	$11.7-25 million	2014	2016
New Sludge Dewatering Building	$6.3-13.5 million	2016	2018
Total Cost	**$18-38.5 million**		

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CHAPTER 3

EXISTING ENVIRONMENTAL, IMPACTS AND MITIGATION MEASURES

3. EXISTING ENVIRONMENT, IMPACTS AND MITIGATION MEASURES

3.1 Climate

The climate in Koolaupoko is characterized as mild subtropical. Temperatures in the area are relatively uniform throughout the year, ranging from 71 degrees Fahrenheit (°F) to 78°F. Relative humidity ranges between 70 and 80%. Northeast tradewinds prevail throughout most of the year, with average wind speeds from 10 to 15 miles per hour (mph). In general, tradewinds are more persistent during summer months. Windward Oahu receives high average annual rainfall, with the most intense rainfall occurring along the ridgeline of the Koolau Range. Due to its proximity to the ridgeline, the project area experiences annual rainfall averages of approximately 50 inches along coastal areas and 150 inches along the crest of the Koolau Range.

Impacts and Mitigation Measures

No significant impacts on climate in the project area are anticipated. The proposed tunnel route and force main corridors are not anticipated to affect temperatures, wind, or rainfall levels in the project area.

3.2 Physiography

3.2.1 Topography and Geology

The topography and geology of Windward Oahu is dominated by the Koolau Range, the eroded remnants of a volcanic dome. The Koolau Range runs generally northwest to southeast and forms the western-southwestern boundary of the project area. Precipitous fluted cliffs (pali) extend for 20 miles on the windward side of the Koolau Range, transitioning to a fringing coastal plain. Offshore is Kaneohe Bay, a sheltered embayment that hosts the only barrier reef system in Hawaii.

Along the base of the Koolau Range, the land is characterized by deposits of both older and younger alluvium sediment predominantly comprised of silt and clay, with lesser amounts of sand and gravel and a few beds of poorly sorted gravel and cobbles. The younger alluvium, which extends up stream valleys, consists primarily of gravel, sand, and silt. Much of the coastal plain is underlain by calcareous sedimentary material.

Kaneohe WWPTF: The topography in the area of the Kaneohe WWPTF consists of gentle slopes extending from the backs of valleys to the shoreline. The coastal plain, which encompasses most of the relatively flat and developable areas, rises at a gentle slope from sea level to the 200-foot elevation. The Kaneohe WWPTF is located at an elevation ranging from three to eight feet above MSL. Higher elevations are a result of fill associated with roadways, and construction of facilities. Moderate slopes of less than 10% prevail in much of the Kaneohe area; however, steep to moderately steep ridges separate Kaneohe from the Waimanalo area to the south.

Kailua Regional WWTP: In the Kailua area, substratum generally consists of alluvial deposits, dune sand, colluvial deposits, mudflow deposits, and lagoonal deposits. Along the Kailua Bay coastline, coralline sand deposits occur for several thousand feet inland, along

with highly permeable dune and beach deposits. Much of the Mokapu Peninsula was formed by late-stage basaltic eruptions.

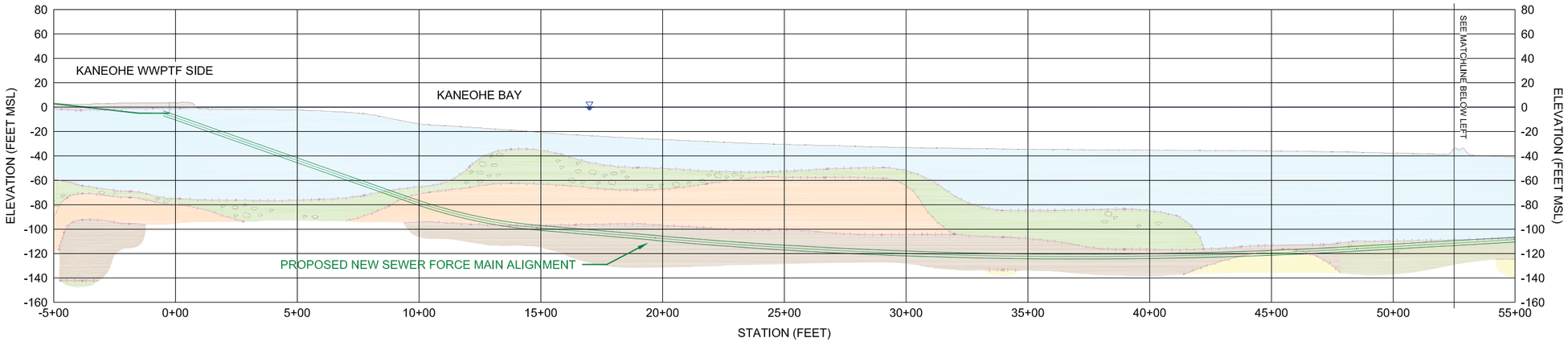
The Kailua Regional WWTP is located at an elevation ranging from 20 to 30 feet above MSL along Kaneohe Bay Drive to four to ten feet along the makai boundary. Moderate slopes of less than 10% occur across much of the Kailua area. In the southern portion of Kailua, steep to moderately steep slopes are present near the coast. Steep to moderately steep ridges separate Kailua from Waimanalo to the south.

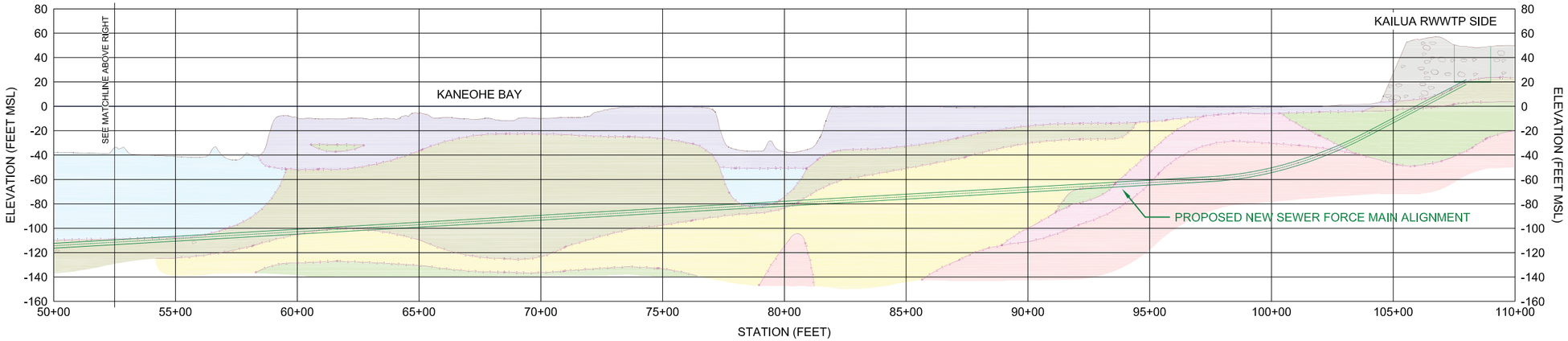
Alternative 1: Force Main No. 2 and Equalization Facilities: The proposed alignment for the Alternative 1: Force Main No. 2 beneath the seafloor of Kaneohe Bay will penetrate several types of deposits, as shown in Figures 3-1 and 3-2, for the HDD and hybrid tunnel sub-alternatives, respectively. On the Kaneohe side, estuarine deposits form a thick layer down to elevation -80 feet MSL. Deeper deposits include a layer of older alluvium containing basalt cobbles and boulders, and tuffaceous sediments of volcanic origin underlain by marine sediments. Toward the Kailua end, the estuarine deposits transition to alluvial marine and coralline deposits topped by lagoonal and corraline deposits that rise, as a result of coral growth, to near or even above the water surface at low tide. These marine deposits are underlain by weathered basalt material, as well a layer of basalt bedrock. Near the shoreline on the Kailua side are older alluvium, largely free of basalt cobbles and boulders. Upon emerging from Kaneohe Bay, the force main corridor will travel through layers of older alluvial, estuarine, and primary fill materials to the H-3 Interchange. The portion of the force main along Kaneohe Bay Drive to the Kailua Regional WWTP will be constructed within the right-of-way at shallower depth, mostly through fill material.

The equalization facilities will be constructed at both the Kaneohe WWPTF and the Kailua Regional WWTP, described previously in Section 2.3.1.

Alternative 2: Gravity Tunnel: At the Kailua Regional WWTP, the Gravity Tunnel will have a construction access shaft in which the influent pump station will subsequently be constructed. It will also have a construction access shaft at the Kaneohe WWPTF that will become the drop shaft. Both shafts will encounter deposits described previously for the Kailua Regional WWTP and the Kaneohe WWPTF, respectively. The Gravity Tunnel would also traverse beneath a portion of each facility to their respective boundaries. At the Kailua Regional WWTP, the access shaft will be placed at the end of the tunnel, well within the basalt bedrock. From the access shaft, the Gravity Tunnel will extend laterally through approximately 285 feet of rock to the boundary of the facility alongside Kaneohe Bay Drive. From the access shaft at the Kaneohe WWPTF, the Gravity Tunnel will extend laterally through approximately 220 feet of estuarine and lagoonal deposits under the facility to the boundary adjoining the Bayview Golf Course.

Approximately 95% of the Gravity Tunnel's approximately 16,000-foot route will be through basalt rock, much of which would be under Oneawa Hills (See Figure 3-3). From the direction of the Kailua Regional WWTP, the Gravity Tunnel will exit the basalt rock formation at a point estimated to be beneath the Bayview Golf Course and will continue toward the Kaneohe WWPTF, passing through layers of residual soil and weathered rock, alluvium, and lagoonal/estuarine/coral deposits. After traversing approximately 580 feet beneath the golf course, the tunnel will cross the boundary into the Kaneohe WWPTF.





HORIZONTAL SCALE: 1 INCH = 500 FEET
0 500 FEET
0 100 FEET
VERTICAL SCALE: 1 INCH = 100 FEET

GEOLOGIC UNITS

- PRIMARILY FILL MATERIALS
- PRIMARILY ESTUARINE DEPOSITS
- PRIMARILY OLDER ALLUVIUM
- PRIMARILY CORALLINE DEPOSITS
- PRIMARILY TUFFACEOUS SEDIMENTS
- PRIMARILY MARINE SEDIMENTS
- PRIMARILY LAGOONAL / CORALLINE DEPOSITS
- PRIMARILY ALLUVIAL / MARINE DEPOSITS
- PRIMARILY SAPROLITE / WEATHERED BASALT
- PRIMARILY BASALTIC ROCK
- WITH BASALT COBBLES AND BOULDERS

NOTES:

1. HDD ALIGNMENT TO CONSIST OF 36" NOMINAL DIAMETER PIPE INSIDE 42" MINIMUM STEEL CASING.
2. THIS FIGURE IS ONLY INTENDED TO SHOW THE DRAFT GENERALIZED GEOLOGIC CONDITIONS ALONG THE TRENCHLESS PIPELINE ALIGNMENT. FOR SPECIFIC DESCRIPTIONS OF SOILS ENCOUNTERED DURING THE FIELD INVESTIGATION REFER TO THE LOG OF BORINGS (APPENDIX A). REFER TO GEOTECHNICAL REPORT FOR SPECIFIC DESCRIPTIONS OF THE GEOLOGIC UNITS AND THE FULL RANGE OF ANTICIPATED SUBSURFACE CONDITIONS.
3. SUBSURFACE GROUND CONDITIONS WILL VARY OVER SHORT DISTANCES AND BETWEEN BORINGS. GEOLOGIC DESCRIPTIONS ARE GENERALIZED AND SUBSURFACE CONDITIONS SHOULD BE EXPECTED TO VARY FROM THOSE INDICATED. UTILITY TRENCHES AND BACKFILLS ARE NOT SHOWN IN THIS FIGURE, AND ARE PRESENT ALONG ALL UNDERGROUND UTILITY ALIGNMENTS.
4. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL DATUM.
5. REFER TO CIVIL DRAWINGS FOR ALL UTILITIES, PIPELINE PROFILE AND ALIGNMENT INFORMATION.

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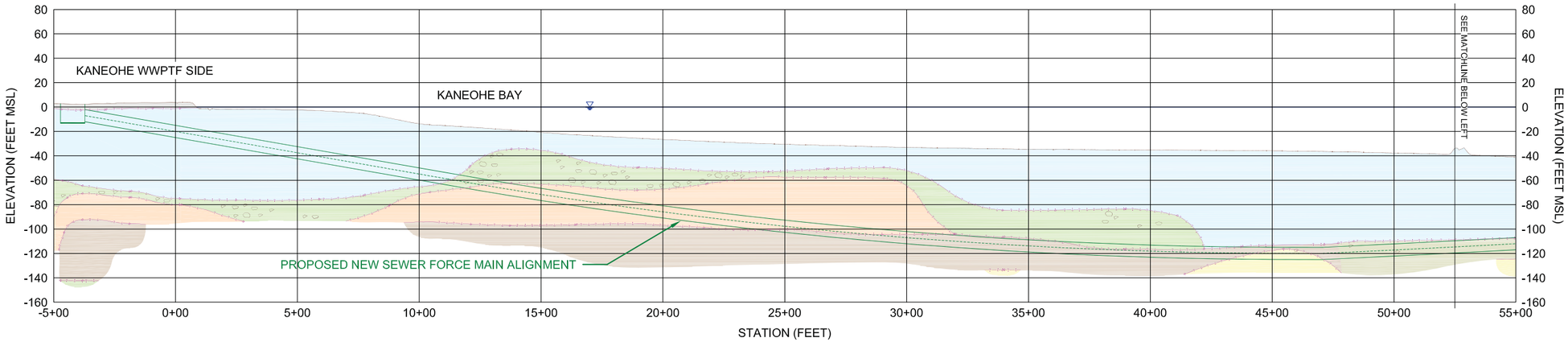
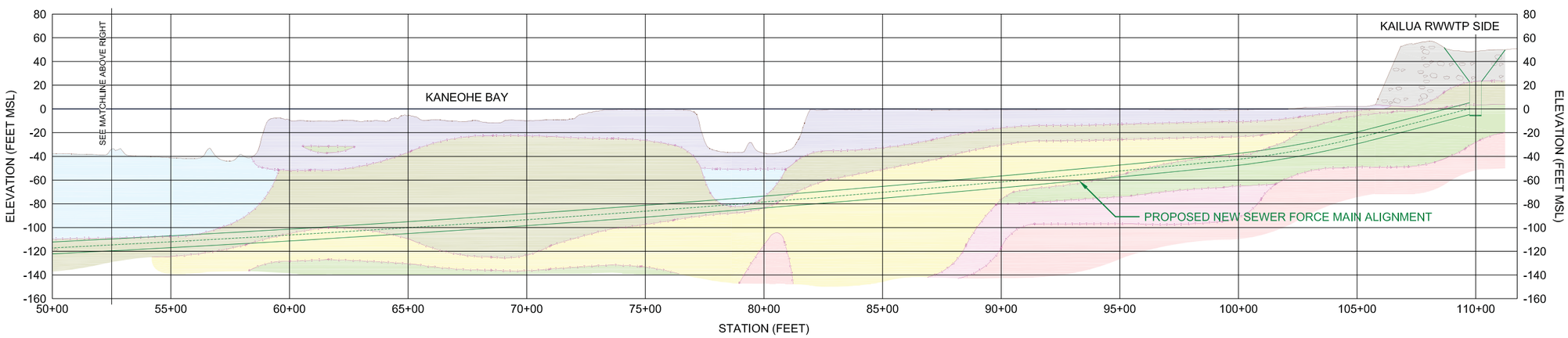
ALTERNATIVE 1: FORCE MAIN NO. 2 PROFILE - HDD

FIGURE 3-1





HORIZONTAL SCALE: 1 INCH = 500 FEET
0 500 FEET
0 100 FEET
VERTICAL SCALE: 1 INCH = 100 FEET

GEOLOGIC UNITS

- PRIMARILY FILL MATERIALS
- PRIMARILY ESTUARINE DEPOSITS
- PRIMARILY OLDER ALLUVIUM
- PRIMARILY CORALLINE DEPOSITS
- PRIMARILY TUFFACEOUS SEDIMENTS
- PRIMARILY MARINE SEDIMENTS
- PRIMARILY LAGOONAL / CORALLINE DEPOSITS
- PRIMARILY ALLUVIAL / MARINE DEPOSITS
- PRIMARILY SAPROLITE / WEATHERED BASALT
- PRIMARILY BASALTIC ROCK
- WITH BASALT COBBLES AND BOULDERS

NOTES:

1. TUNNEL ALIGNMENT TO CONSIST OF 36" NOMINAL DIAMETER PIPE INSIDE 8-FOOT MINIMUM INSIDE DIAMETER JACKING CASING PIPE AND SEGMENTAL LINER.
2. THIS FIGURE IS ONLY INTENDED TO SHOW THE DRAFT GENERALIZED GEOLOGIC CONDITIONS ALONG THE TRENCHLESS PIPELINE ALIGNMENT. FOR SPECIFIC DESCRIPTIONS OF SOILS ENCOUNTERED DURING THE FIELD INVESTIGATION REFER TO THE LOG OF BORINGS (APPENDIX A). REFER TO GEOTECHNICAL REPORT FOR SPECIFIC DESCRIPTIONS OF THE GEOLOGIC UNITS AND THE FULL RANGE OF ANTICIPATED SUBSURFACE CONDITIONS.
3. SUBSURFACE GROUND CONDITIONS WILL VARY OVER SHORT DISTANCES AND BETWEEN BORINGS. GEOLOGIC DESCRIPTIONS ARE GENERALIZED AND SUBSURFACE CONDITIONS SHOULD BE EXPECTED TO VARY FROM THOSE INDICATED. UTILITY TRENCHES AND BACKFILLS ARE NOT SHOWN IN THIS FIGURE, AND ARE PRESENT ALONG ALL UNDERGROUND UTILITY ALIGNMENTS.
4. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL DATUM.
5. REFER TO CIVIL DRAWINGS FOR ALL UTILITIES, PIPELINE PROFILE AND ALIGNMENT INFORMATION.

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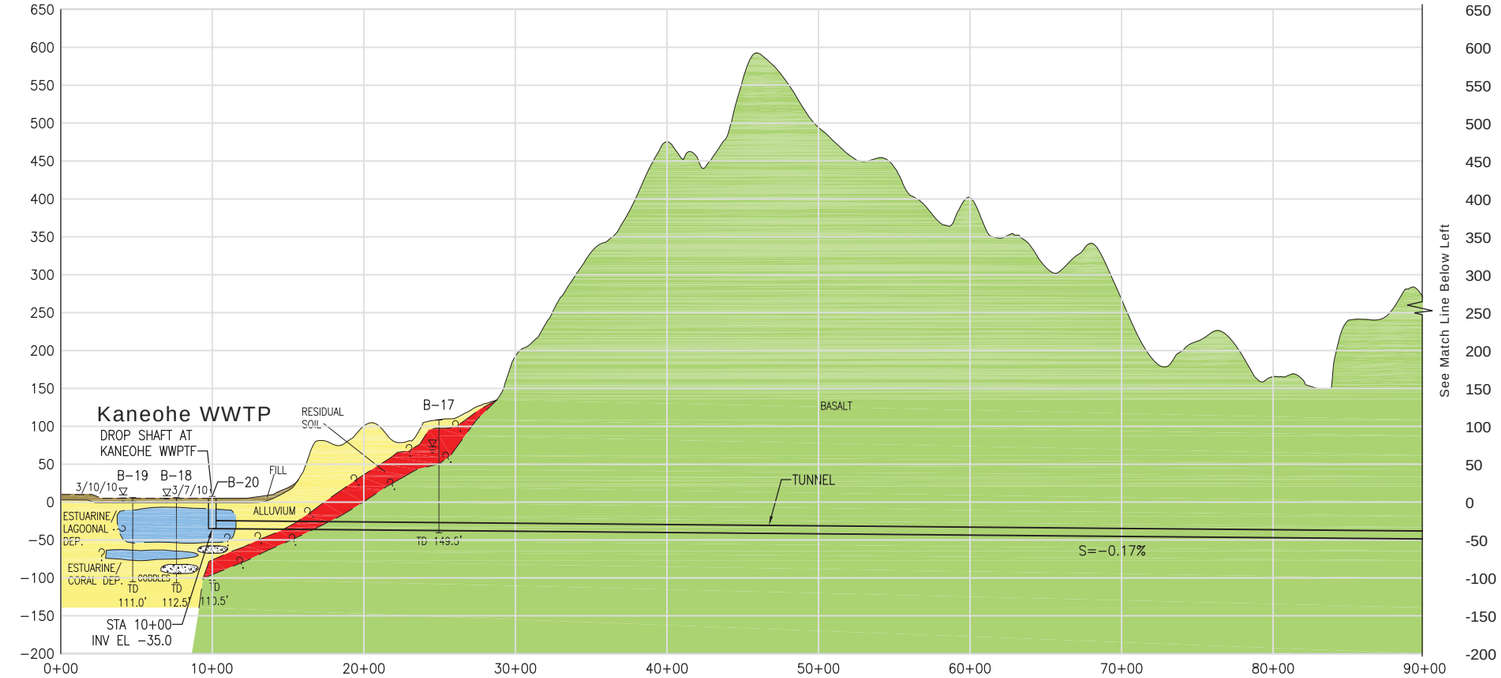
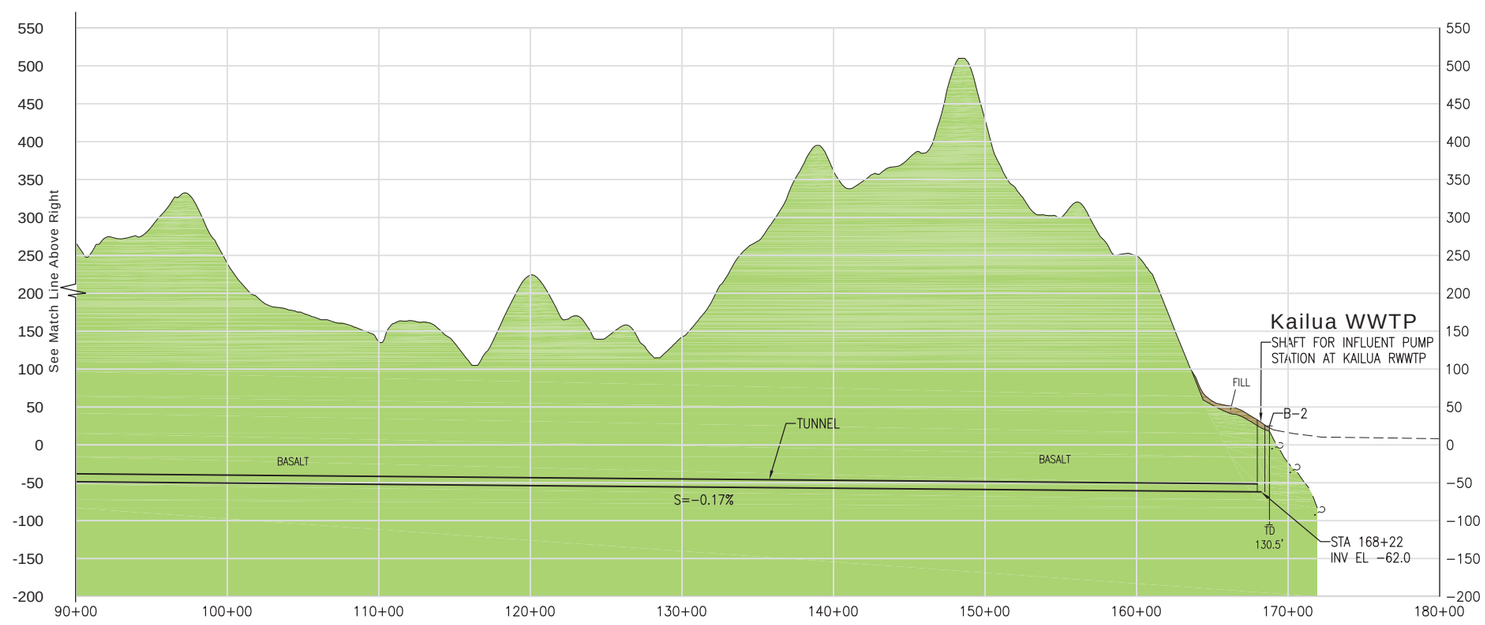
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

ALTERNATIVE 1: FORCE MAIN NO. 2 PROFILE - HYBRID TUNNEL

FIGURE 3-2





GEOLOGY LEGEND:

- FILL
- ALLUVIUM
- LAGOONAL/ESTUARINE/ CORAL DEPOSITS
- RESIDUAL SOIL/ WEATHERED ROCK
- BASALT
- COBBLES, BOULDERS
- GROUNDWATER LEVEL ON DATE SHOWN
- TD 141.5' TOTAL DRILL DEPTH

0' 500' 1000'
HORIZONTAL SCALE: 1"=500'

0' 100' 200'
VERTICAL SCALE: 1"=100'

Prepared by: Jacobs Associates Engineering/Consultants
May 19, 2010

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ALTERNATIVE 2: GRAVITY TUNNEL PROFILE

FIGURE 3-3

Impacts and Mitigation Measures

In the short-term, potential impacts to physiography would generally be associated with soil disturbances at the surface, which are discussed in the subsequent section. Sub-surface construction work including HDD, micro-tunneling and tunneling would not generally be regarded as having potential adverse impacts on area geology, especially at the relative scale of the proposed work. At the proposed depths and in consideration of the sizes of the proposed bores, it is highly unlikely that even a total collapse would disturb the ground or structures above them. In the case of HDD, the potential impact of frac-out would be the release of the non-toxic bentonite drilling mud and muck (drilling spoils) into the substrate.

3.2.2 Soils

The U.S. Department of Agriculture Natural Resources Conservation Service surveyed and classified soils on all of the major Hawaiian Islands. The survey included the soil profile from "the surface down into the parent material that has not been changed much by leaching or by the action of plant roots." There are nine different principal soil series in the project area based on classifications: the Hanalei series, Alaeloa series, Helemano series, Kaneohe series, Papaa series, Kokokahi series, Keaau series, Mamala series, and the Jaucas series (See Figure 3-4).

Kaneohe WWPTF: The Kaneohe WWPTF is located on Hanalei soils. Hanalei soils are found on bottom lands and low terraces along streams. They consist of somewhat poorly drained to poorly drained soils. Hanalei soils are formed in alluvium derived from basic igneous rock.

Kailua Regional WWTP: The Kailua Regional WWTP is located on four different types of soils series. The western and southern portions of the WWTP are located on Kokokahi soils. Kokokahi soils are found on coastal plains, alluvial fans, and talus slopes adjacent to uplands at elevations from sea level to 125 feet. They consist of deep, well drained soils that formed in alluvium and colluvium from basalt. The central portion of the WWTP is located on Keaau soils. Keaau soils are found on coastal plains at elevations of 5 to 40 feet. They consist of deep, poorly drained soils that formed in alluvium weathered from basic igneous rocks and deposited over reef limestone or consolidated coral sand. The northeastern portion of the WWTP is located on Mamala soils. Mamala soils are found on coastal plains at elevations near sea level to 100 feet. They consist of well drained soils formed in alluvium deposited over coral sand. A small area of the eastern portion of the WWTP is located on Jaucas soils. Jaucas soils are found above high tide on coastal beaches. They consist of very deep, excessively drained, very rapidly permeable soils formed from sand-sized fragments of coral and sea shells on vegetated beach areas along the coast.

Board of Water Supply (BWS) Reservoir Site: The BWS reservoir site, where the vertical access shaft to the tunnel will be constructed, is composed of Alaeloa silt clay.

Alternative 1: Force Main No. 2 and Equalization Facilities: Alternative 1: Force Main No. 2 will disturb soils in the construction staging area of the Kaneohe WWPTF and portions of the adjoining Bayview Golf Course, which may be used as a staging area for the steel casing and fusible PVC pipe that will be used to construct the force main. Soil disturbances will

affect Hanalei soils at the Kaneohe WWPTF and at the Bayview Golf Course. The equalization facility located at the Kaneohe WWPTF will be underlain by Hanalei soils. The sub-surface route from the Kaneohe WWPTF beneath Kaneohe Bay will not affect soils on the surface. However, after traversing the sub-surface beneath Kaneohe Bay, the force main will be constructed mostly by open trench methods that will affect surface soils, including Jaucas, Keaau, and Kokokahi soils from the Kaneohe Bay Drive/H-3 Freeway Interchange to the Kailua Regional WWTP. The equalization facility located at the Kaneohe WWPTF will be underlain by Hanalei soils, while the equalization facility at the Kailua Regional WWTP will be underlain by Kokokahi soils.

Alternative 2: Gravity Tunnel: The Gravity Tunnel will only affect soils at or near the surface within the construction staging area at both the Kaneohe WWPTF and the Kailua Regional WWTP. These are the Hanalei soils at the Kaneohe WWPTF and the Kokokahi and Keeau soils at the Kailua Regional WWTP, respectively. Beyond the staging areas, the shallowest depth from the ground surface affected by the Gravity Tunnel is at least 20 feet below the surface, including the soft soils to be stabilized by jet-grouting around the tunnel as it passes beneath the Bayview Golf Course and the Kaneohe WWPTF. The jet-grouting operation, however, will penetrate through Alaeloa and Hanalei soils to inject cementious material into the sub-surface ground.

Impacts and Mitigation Measures

In the short-term, there will be soil disturbance impacts related to construction activities staged at the Kaneohe WWPTF, at adjacent portions of the Bayview Golf Course, and at the Kailua Regional WWTP in either of the primary alternatives. Alternative 1 will also disturb soils along the section of Kaneohe Bay Drive from the Kailua Regional WWTP to and including the interchange area with Interstate H-3. Alternative 2 will disturb a relatively small area of soils at the BWS reservoir site.

Construction will entail disturbance of soils at the surface by activities such as site preparation, demolition of abandoned facilities, excavation, movement of construction equipment, placement and anchoring of machinery such as drill rigs, and stockpiling of construction materials and excavated material, as well as spoils from drilling and tunneling operations. The temporary disturbance of soils will not have a direct impact on any significant vegetation or crops growing in the area. Instead, soil disturbance is a potential concern in relation to facilitating erosion and sedimentation, as well as in generating airborne dust. These impacts are discussed in subsequent sections.

Neither of the proposed alternatives is anticipated to have any long-term impacts on area soils. Following construction, disturbed areas at the Kaneohe WWPTF and the Kailua Regional WWTP will be built over, paved over, or re-vegetated to control erosion. Similarly, soil will be stabilized following construction along Kaneohe Bay Drive from the H-3 Freeway Interchange to the Kailua Regional WWTP in Alternative 1. For Alternative 2, soils at the BWS reservoir site will be stabilized following construction of the access shaft.

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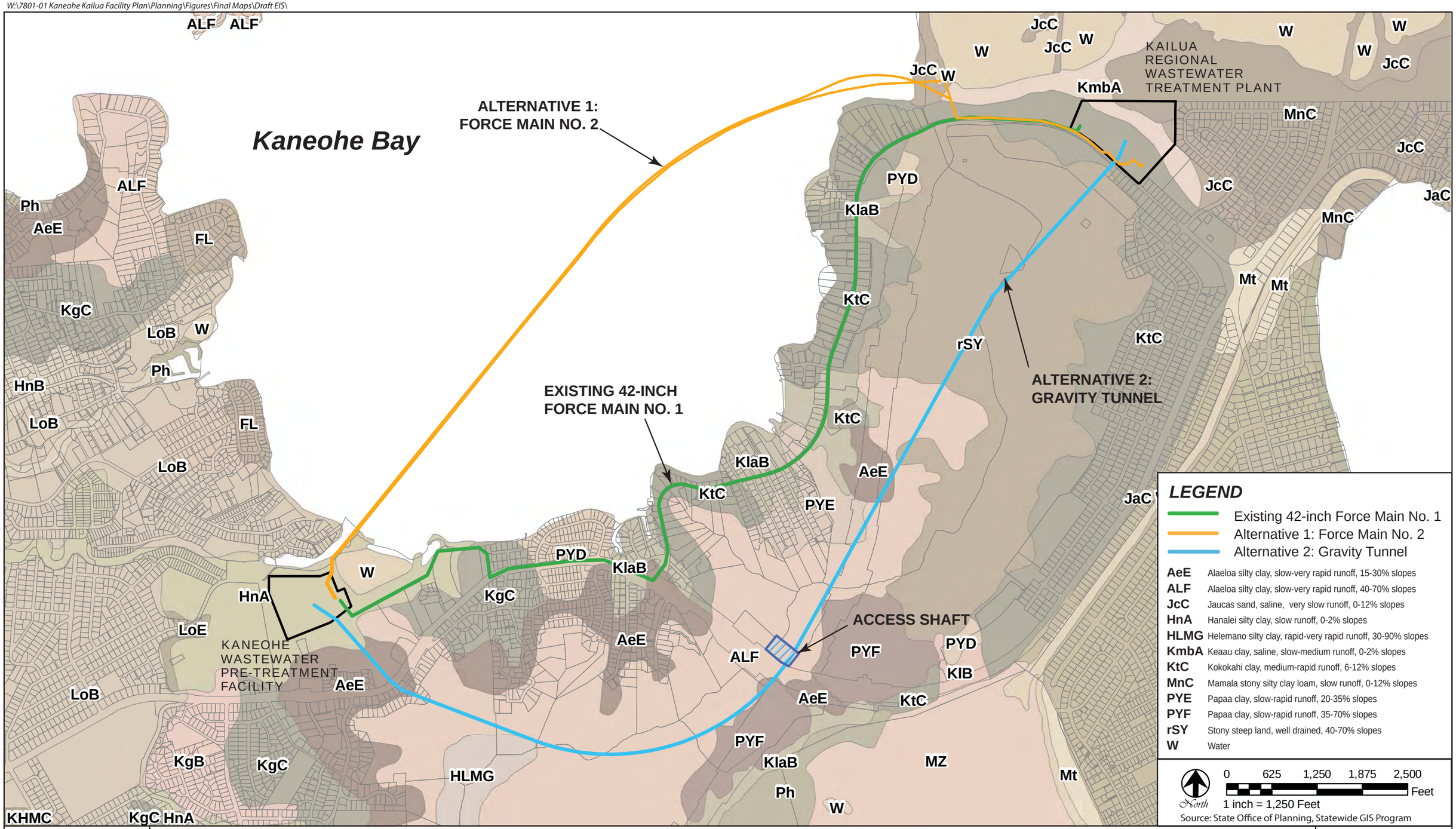

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SOILS MAP

FIGURE 3-4

3.3 Hydrology

3.3.1 Surface Water

The high quantity of rainfall on the Windward side of the Koolau Range supports numerous perennial streams. Perennial streams found within the project area include Kamooalii Stream, Kaneohe Stream, Kawa Stream, and Kawainui/Maunawili Stream (Hawaii Stream Assessment, 1990) (See Figure 3-5). There are no designated wild or scenic rivers in the project area as defined under the Federal Wild and Scenic Rivers Act.

Kaneohe WWPTF: Kaneohe Stream begins at the base of the Koolau Range in Hoomaluhia Park, about one-half mile to the southwest of Windward Community College. Together with its tributaries Kamooalii, Luluku, and Kapunahala Streams, Kaneohe Stream drains the entire Kaneohe area. Kaneohe Stream flows through Kaneohe Town 250 feet from the northern boundary of the Kaneohe WWPTF and enters Kaneohe Bay northwest of Waikalua Loko Fish Pond. The lower reach of Kaneohe Stream, below the confluence of Kamooalii and Kapunahala Streams, is approximately 1.2 miles long and discharges flows of 13 million gallons per day (mgd) (U.S. Fish and Wildlife, 1978). According to the Hawaii Stream Assessment, the Kaneohe Stream System has moderate aquatic resources and substantial riparian and recreational resources.

Kawa Stream flows along the southern boundary of the Kaneohe WWPTF and discharges into Kaneohe Bay makai of Kokokahi YWCA. It is a relatively short perennial stream (approximately 2.5 miles) with no tributaries. Kawa Stream has a mean daily flow of 1 mgd and has a drainage area of approximately 1,330 acres (Kailua Bay Advisory Council, 2002). It flows through the southern portion of Kaneohe Town and enters Kaneohe Bay near Waikalua Loko Fish Pond.

Kailua Regional WWTP: The Kailua Regional WWTP is located approximately 0.5 miles west of the Kawai Nui Canal. The Kawainui/Maunawili, Kawailoa, and Kawaiiki Streams are part of the Anahulu Stream System, which drains an area of approximately 10,394 acres on the slopes of Maunawili Valley and Mount Olomana. The stream flows north through Kawai Nui Marsh and into Kawai Nui Canal, which empties into Kailua Bay. Maunawili Stream is rated as a "candidate stream for protection" by the State Department of Land and Natural Resources (DLNR), Commission on Water Resource Management (CWRM) because of outstanding cultural, riparian and recreational values. According to the Hawaii Stream Assessment, Kawainui/Maunawili Stream has limited aquatic resources, outstanding riparian and cultural resources and substantial recreation resources.

Alternative 1: Force Main No. 2 and Equalization Facilities: The proposed force main route will directly enter the substrata beneath Kaneohe Bay, the nearest surface water body. It emerges at the H-3 Freeway Interchange with Kaneohe Bay Drive and continues along Kaneohe Bay Drive to the Kailua Regional WWTP. The area in which the looped ramp of the Interchange lies is adjacent to Nuupia Pond, a surface water body. The section of Kaneohe Bay Drive extending from the Interchange to the Kailua Regional WWTP, along which the force main will be constructed by open trench methods, lies 350 to 500 feet south of the Nuupia Pond.

Alternative 2: Gravity Tunnel: The proposed Gravity Tunnel route will traverse beneath the Kaneohe, Kawa, and Keaalu Streams.

Impacts and Mitigation Measures

In the short-term, construction activities, particularly soil disturbance, occurring at the Kaneohe WWPTF and the Kailua Regional WWTP have the potential to affect surface waters. Potential impacts to the quality of surface waters in streams and storm drain systems during construction will be mitigated by adherence to State of Hawaii and City and County of Honolulu water quality regulations governing grading, excavation, and stockpiling.

Dewatering of excavated areas may be required where facilities will lie below the water table. If required, the NPDES permit for dewatering activities will include a Best Management Practices (BMP) plan, an erosion control plan, and a water quality monitoring plan, as may be required. A BMP plan establishes procedures for operating the dewatering system, including appropriate or applicable structural or non-structural methods that will be established and implemented to reduce and control discharge or effluent resulting from dewatering activities. Typically, specific procedures are provided for the maintenance of dewatering equipment, including disposal of sediments collected in settling containers; monitoring water quality of samples collected from designated points in the dewatering system; preventing storm runoff and sediment from entering the excavated area; and procedures for modifying or terminating dewatering activities if the system is failing to operate as intended. Water quality impacts associated with the disposal of dewatering effluent will also be addressed in the BMP plan, including appropriate characterization of any potential pollutants such as sediments and nutrients in the effluent.

If it is determined that dewatering effluent will be discharged into a municipal storm drain system, a permit from the City and County of Honolulu Department of Planning and Permitting will also be required. The municipal storm drains in the project area discharge into area streams and canals and ultimately into either Kaneohe Bay or Kailua Bay.

The proposed improvements will have beneficial, long-term water quality impacts on surface waters in the project area by reducing the risk and volume of potential spills that could infiltrate surface waters. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills.

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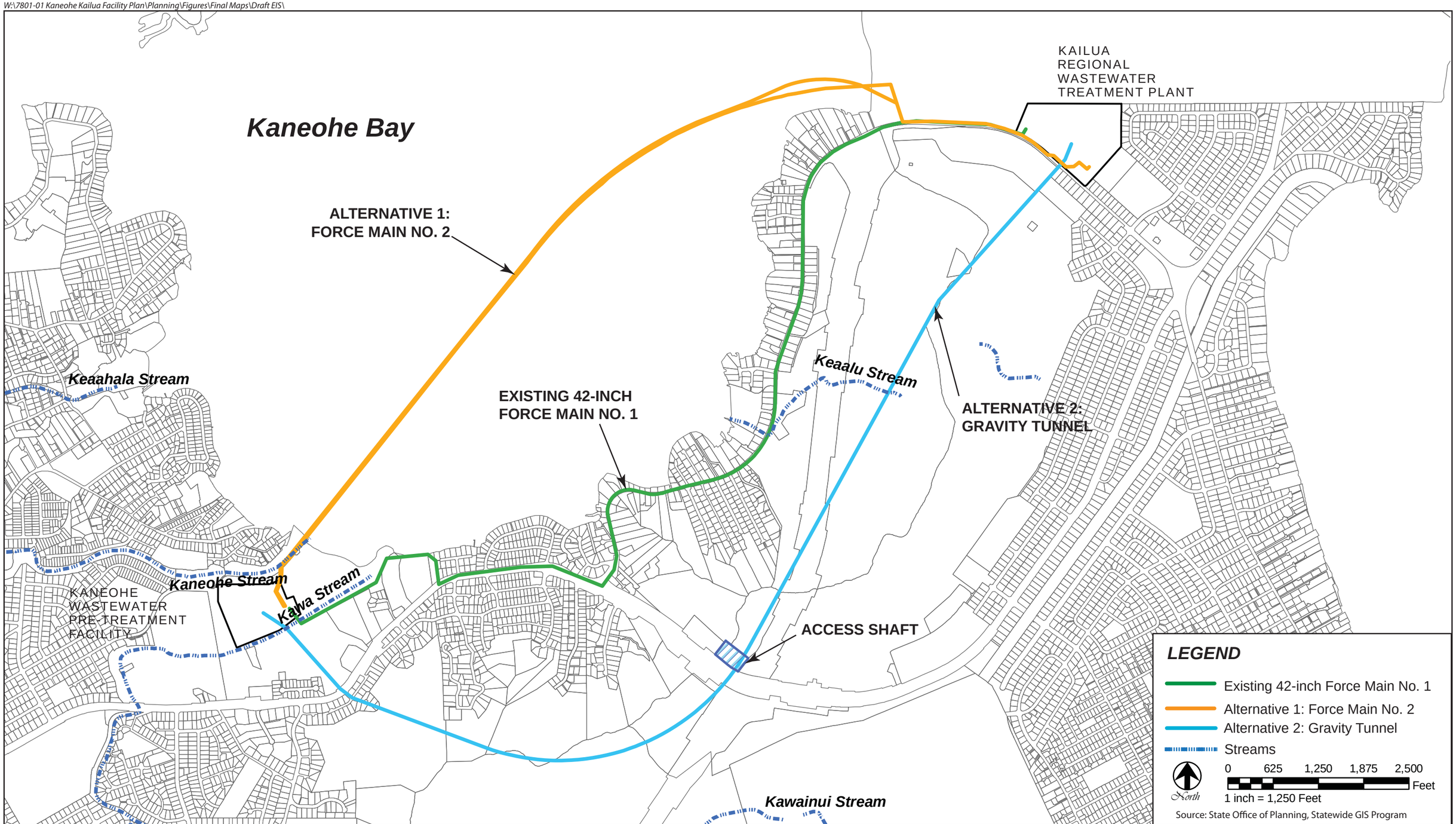

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

STREAM MAP

FIGURE

3-5

In Alternative 1, potential impacts due to leakage or accidental breakage of Force Main No. 2 would be reduced since Force Main No. 1 would be available to provide alternative conveyance until Force Main No. 2 can be repaired. In Alternative 2, breakage of the Gravity Tunnel could result in groundwater entering the tunnel, as opposed to wastewater leaking out. This is because the tunnel is not pressurized like a force main, and thus would be in negative pressure relative to any groundwater around it. In either alternative, the facilities would be designed to withstand breakage under most foreseeable conditions.

3.3.2 Groundwater

The project area overlies the Koolaupoko and Waimanalo Aquifer Systems within the Windward Aquifer Sector (See Figure 3-6), as delineated by the State DLNR Commission on Water Resource Management (CWRM). Groundwater occurs in these systems in basal aquifers, high-level dike aquifers, and dike basal aquifers, which are a combination of the first two. In the upper elevations of both the Waimanalo and Koolaupoko aquifer systems, CWRM has concluded that a direct relationship exists between surface water and groundwater conditions. At mid-elevations, surface water may be hydrologically separated from the basal and dike basal aquifers by layers of thick sediments. Lower elevation stream flows may or may not be affected by basal groundwater withdrawals. By definition, these aquifers are not shown on maps to extend seaward of the shoreline, although there is no sharply defined physical transition that occurs at the shoreline.

Kaneohe WWPTF: The Kaneohe WWPTF overlies the Koolaupoko Aquifer System Area. Extending from Waikane Valley to the Nuuanu Pali, the Koolaupoko aquifer system coincides with portions of streams that are sensitive to groundwater withdrawals, such as Waihee Stream. The aquifer system consists of a dike complex and marginal dike zone. Some groundwater from the system eventually drains to streams or emerges in wetlands, although flows also seep through the caprock to the ocean. The sustainable yield of the Koolaupoko Aquifer System Area is estimated to be 30 mgd.

Kailua Regional WWTP: The Kailua Regional WWTP overlies the Waimanalo Aquifer System Area. The Waimanalo aquifer system extends from Nuuanu Pali in Kailua to Makapuu Point, the easternmost point on Oahu. The system includes a dike complex, marginal dike zone, and the collapsed caldera of the original Koolau volcano. There is limited developable groundwater in the marginal dike zone. The sustainable yield of the Waimanalo Aquifer System Area is estimated to be 10 mgd.

Alternative 1: Force Main No. 2 and Equalization Facilities: The proposed force main route also begins at the Kaneohe WWPTF and travels through the Koolaupoko Aquifer System to the shore. After crossing beneath Kaneohe Bay, the force main route exits at Kaneohe Bay at the H-3 Interchange and travels through the Waimanalo Aquifer System to the Kailua Regional WWTP.

Alternative 2: Gravity Tunnel: The proposed tunnel route begins at the Kaneohe WWPTF and travels under the Oneawa Hills area mauka of Kaneohe Bay Drive through the Koolaupoko Aquifer System. The route then continues through the Waimanalo Aquifer System until it reaches Kailua Regional WWTP.

Impacts and Mitigation Measures

In the short-term, construction activities occurring at the Kaneohe WWPTF and the Kailua Regional WWTP have the potential to impact groundwater resources. Construction activities, however, are not likely to introduce, nor release from the soil, any materials which could adversely affect groundwater or groundwater sources for domestic use as these sources are located at higher elevations toward the Koolau Mountain Range.

Both wastewater conveyance alternatives will be constructed below the groundwater table and below sea level. Depending on sub-surface conditions, any groundwater encountered by Alternative 1: Force Main No. 2 and Equalization Facilities will likely be brackish or seawater. This is because both the Kaneohe WWPTF and the Kailua Regional WWTP are located relatively close to the shoreline. The route of the force main beneath Kaneohe Bay would suggest that seawater permeates the substrata.

In Sub-Alternative 1A, the HDD construction option, the process for forming the bore for the force main would keep the bore filled with bentonite mud and muck. Thus, there would be no net difference in pressure between the bore and the groundwater. When a device such as the pilot drill, reamer or swab is being pulled through the bore, however, pressure would increase within the bore and the mud and muck could leak out through the walls of the bore. This is unlikely to have an adverse impact on groundwater, but could affect seawater if a frac-out occurs.

In Alternative 2, as in the case of Alternative 1, groundwater encountered during sub-surface work at the Kaneohe WWPTF and Kailua Regional WWTP would likely be brackish or seawater. The route of the Gravity Tunnel beneath Oneawa Hills, however, would place it in areas where groundwater is likely to be brackish or even fresh, despite its location below sea level. In areas such as Central Oahu, the well-formed freshwater basal lens pushes the zone of fresh water below sea level. Near Oneawa Hills, however, the basal lens is not well formed, due to the complex geology. The Gravity Tunnel will encounter groundwater where the basalt is fractured.

During construction of the Gravity Tunnel, water flowing into the bore will need to be removed by the contractor(s). Since the bore will be proceeding uphill from the Kailua Regional WWTP, gravity will convey the flow to the TBM access shaft, where it can be pumped to the surface for disposal. Hence, any contaminant in the bore will not flow into the surrounding groundwater bodies. Should significant amounts of groundwater be encountered, holes could be drilled ahead of the TBM and grout injected into the fractured basalt to displace the water and seal the fractures.

Once the tunnel is completed, it will be isolated from the surrounding groundwater by the tunnel liner and grout will be used to fill the space between the liner and the bore.

In both alternatives, dewatering of excavated areas may be required to construct wastewater transmission facilities below the water table. An NPDES permit for dewatering activities will be required. The NPDES permit will also address the anticipated rate of dewatering.

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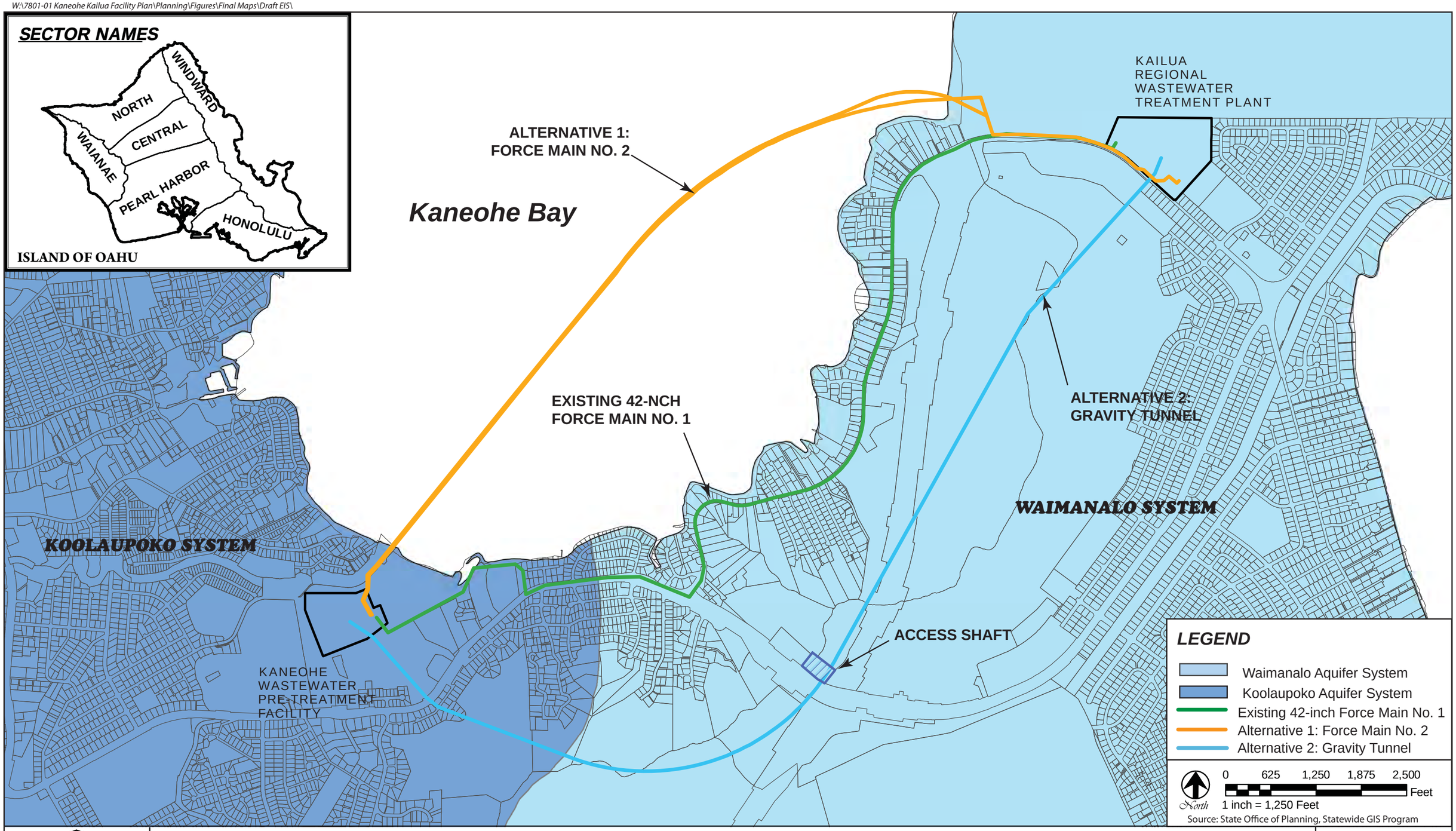

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

AQUIFER SYSYEM MAP

FIGURE

3-6

The proposed alternative improvements will have potentially beneficial long-term impacts on groundwater in the project area by reducing the risk and volume of potential spills that could infiltrate the groundwater table. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills.

While soils would effectively filter percolating wastewater, thereby preventing contamination of groundwater by microbes, constituents such as dissolved solids may not be captured. Unless used for domestic consumption, such groundwater contamination by dissolved solids would not necessarily be a concern. If such groundwater enters surface waters, including the ocean, however, they could be a source of nutrients that could promote algae growth.

The probability of wastewater entering groundwater through leaks in the proposed alternative conveyance methods is low. The Gravity Tunnel alternative will mostly be in the negative pressure state, where any leakage would be groundwater entering the tunnel. In the Force Main alternative, there will be a net positive pressure such that a leak during operation would outflow into groundwater. The purpose and design for the force main, however, is to convey wastewater under pressure without any leakage. Should a leak occur, it is unlikely that the outflow will migrate into Kaneohe Bay, as the gradient will draw groundwater downward from the force main, away from the waters of the bay. No potable groundwater would be affected.

3.3.3 Coastal Waters

A Biological Survey of Marine Resources was conducted within Kaneohe Bay by AECOS, Inc. from September through November 2009 to evaluate existing conditions within the bay in relation to the project area. The results are summarized below and the study is included as Appendix A. This section primarily pertains to Alternative 1: Force Main No. 2 as the proposed force main corridor will traverse beneath Kaneohe Bay.

Kaneohe Bay is the most prominent nearshore marine feature on the windward side of the island of Oahu, and is the largest sheltered embayment in the Hawaiian Islands, with the only well developed barrier reef system in the Islands. It is approximately 13 kilometers (km) by 4 km wide oriented in a northwest–southeast direction and receives the drainage of a watershed of approximately 97 square km from a number of streams that flow down from a boundary of near vertical cliffs that enclose the watershed.

The bay's seaward side is semi-enclosed by a barrier reef that extends across its mouth, with channels at the northwest and southeast ends of the barrier reef that allow increased access of open ocean water into the bay. The interior of the bay is a lagoon surrounded by fringing coral reefs and numerous patch reefs that become more numerous going northward in the bay. Salinities in the bay range from near oceanic levels in open water areas, but can drop to less than half that value in shallow depths following rainstorms. Bottom depths in the bay range from awash on flats during lowest tides to 33 feet in the lagoon. Sediments on the lagoon floor are flocculent silts and clays with a substantial terrigenous component and on

reef flats, sediments are fine to medium grain calcareous sands, with sand becoming a greater proportion of the sediment going northward in the bay.

The bay is generally characterized into three major areas based upon the degree of isolation from the open ocean, circulation patterns, and environmental attributes. The north bay section extends from the north entrance channel about one-third of the distance southward to Kahaluu Point, and is the most pristine part of the bay with the most patch reefs, highest coral cover, and lowest nutrient and particulate organic concentrations in the water. The central bay extends to an area between Mokapu Peninsula and Coconut Island and is intermediate in its characteristics of circulation, reef development and nutrient/particulate concentrations. The south bay is enclosed by land on three sides and consequently has the least exchange with open ocean circulation, the highest turbidity and nutrient levels, and most limited reef development in comparison with the other two sections.

During the last two decades, increasing popularity of Kaneohe Bay and perception of its value as a recreational and income-producing asset has resulted in competition among user groups for the bay's space and resources. The bay is now heavily used by recreational and commercial fishermen, power and sailing boaters, tourist-oriented businesses providing experiences in snorkeling, high speed watercraft, glass bottom boat tours, and scientific research at the Hawaii Institute of Marine Biology (HIMB), from which scientists have studied the bay for over 50 years.

The history of Kaneohe Bay illustrates a resource that has always been considered of high value, but has been highly affected by activities on its watershed and shoreline, as well as those occurring directly within the bay waters. Over the last century, the bay has gone from near pristine condition to a highly degraded state, followed by a degree of recovery after the cessation of sewage discharge. Subsequently, its present state is characterized by the reestablishment of reef corals and associated organisms, which are also accompanied by symptoms of decline and interference from introduced species.

Pursuant to Hawaii Administrative Rules (HAR) Title 11, Chapter 54, Water Quality Standards, Kaneohe Bay is classified as AA Marine waters. Class AA Marine waters are recognized as high quality coastal waters with the objective that "these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions".

DOH's water quality monitoring of Kaneohe Bay has shown a dramatic decline in phosphorous and turbidity since 1979, when effluent discharge was diverted to the Mokapu Outfall and terminated at two major outfalls in Kaneohe Bay. Effluent from the Kaneohe WWPTF was diverted to Mokapu in 1977 (3.57 mgd) and from the Kaneohe Marine Corps Air Station in 1978 (1.27 mgd) (City & County of Honolulu Water Quality Plan, 1990). The Kailua Regional WWTP operates under an NPDES Permit which authorizes the City to discharge secondary treated wastewater from the plant through the Mokapu Outfall.

3.3.3.1 Water Quality

A Water Quality Assessment was conducted within Kaneohe Bay by AECOS, Inc. in January 2010 to evaluate existing water quality conditions within the bay. The results are summarized below and the study is included as Appendix B.

Water quality samples were collected from five stations in southern Kaneohe Bay during three sampling events: September 23, October 15, and October 27, 2009. Figure 3-7 illustrates the station locations. Samples were collected in the surface waters at three nearshore stations, including Stations "Nuupia", "Kawa", and "Kaneohe". For Stations "B8000" and "B4500" located in the deeper waters of southern Kaneohe Bay, samples were collected from surface, mid-depth and bottom waters

The water quality in southern Kaneohe Bay is influenced by fresh water inputs and nutrient transport from both Kaneohe and Keaahala Streams, and to a lesser degree Kawa Stream.

Hoover and Mackenzie (2009) determined that storm events account for about 93% of suspended particulate matter entering Hawaii coastal waters and about 85% of nutrient levels. Additionally, several studies have demonstrated that nitrogen and phosphorus contained in Kaneohe Bay sediments have a direct effect on algal productivity (Larned and Stimson, 1996; Larned and Atkinson, 1997).

State of Hawaii water quality standards for embayments are divided into "wet" and "dry" criteria based upon fresh water inputs to the bay. Because there are substantial stream and groundwater inputs to Kaneohe Bay, as evidenced by the reduced salinity levels at the shallow nearshore stations, the results of the present study are compared with appropriate "wet" criteria.

Salinity and temperature during the three sampling events represent ambient conditions, to which future measurements might be compared and compliance with State criteria for these parameters determined. All dissolved oxygen (DO) saturation levels were greater than the minimum 75% specified by the DO saturation criterion. Potential hydrogen (pH) values were within the range of 7.60 to 8.70, as specified by the criterion for this parameter.

Turbidity geometric means in the surface and mid-depth waters at Stations B4500 and B8000 met the "wet" criterion, but the bottom waters of these two stations, as well as Stations Kawa, Nuupia, and Kaneohe, did not meet the State criterion. There are no State water quality criteria for Total Suspended Solids (TSS) in marine waters, but increases in TSS concentrations may occur from proposed project activities, and the values reported herein serve as a baseline to gauge any project effects.

Nitrate-nitrite geometric means were in compliance with the geometric mean "wet" criterion at Stations B4500 and B8000, but only at Station Nuupia of the three nearshore stations, suggesting Kawa and Kaneohe Streams are sources of high nitrates. Total nitrogen geometric means exceeded the State geometric mean "wet" criterion at the nearshore stations and the bottom samples further out in the bay. Total phosphorus geometric means met the "wet" geometric mean criterion at all stations, except for Station Kaneohe which was very slightly above.

Source: *AECOS, Inc.*

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	**KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES**	FIGURE **3-7**
	LOCATIONS OF WATER QUALITY SAMPLING STATIONS	

Impacts and Mitigation Measures

In the short-term, there is the potential for coastal water quality impacts resulting from construction activities at the Kaneohe WWPTF and the Kailua Regional WWTP. Potential impacts will be mitigated by adherence to State and City water quality regulations governing grading, excavation, and stockpiling.

As discussed in Section 2.3.1, although the HDD method of pipe installation will be accomplished well beneath Kaneohe Bay, there are contingency situations that may require work in and over the water. If, for example, the pilot holes are drilled from both ends but do not align close enough for one drill head to follow the other's bore as it is retracted, manual alignment may be necessary. To reach the drill heads, the bottom of the bay will need to be dredged. To minimize water quality impacts, interlocking sheet piles will be driven into the bottom to create an enclosure isolating the water column in which the dredging will occur. Watercraft will be used to install the sheet piles, dredge the bottom and receive the dredge material. Divers would then enter the excavated area and manually realign the drill heads. This type of work would only be allowed along specific sections of the force main alignment. Specific areas with corals and sea grass will be off-limits for such work. Figure 3-8 illustrates the specific areas of avoidance, which include the area between Stations 6000 and 8500 near the northwestern portion of the proposed force main alignment.

Another potential contingency situation is frac-out during HDD operations. Although the steel sleeve will prevent this from happening in the most susceptible area near the Kaneohe WWPTF, frac-outs could conceivably occur in other areas along the route. They are more likely to occur where the bore is closer to the surface, near land, as opposed to where it is deep beneath the sea floor in the middle of the bay. Should a frac-out be detected, any further discharge into the bay can be halted by stopping mud pumping to the drill head, reamer, or swab, or stopping pulls that displace mud within the bore. Silt fences can be deployed to contain discharges. Pressure that caused the frac-out could be reduced by slowing down the rate of the pull, or reducing the mud pumping rate.

With regard to the hybrid tunnel method of construction, a potential contingency situation may involve the possibility of encountering rocks that are too large for the TBM to remove or pulverize. Test bores along the alignment have not detected the presence of such rocks, but they would need to be dealt with, if encountered. As with the HDD method of construction, this type of work would only be allowed along specific sections of the force main alignment. To mitigate potential impacts to highly sensitive areas where corals and sea grass have been identified, such work shall be off-limits as illustrated in Figure 3-8.

Excavation in the bottom of southern Kaneohe Bay would result in the temporary suspension of bottom sediments into the water column. This suspension would directly affect turbidity and TSS concentrations in the water column. Based upon the studies cited above, it is likely that nitrogen and phosphorus will be released from these sediments and could be utilized by benthic algae and phytoplankton productivity. Sediment suspension may affect changes to DO and pH values, as well.

The proposed pipeline will be drilled horizontally, well below the surface of the bottom of the bay, avoiding disturbance of the sediment. The only instance when excavations would be needed is during the unlikely event of a contingency or emergency as previously discussed. The water column above sch work will be isolated by steel pipes or will be sheet piles to mitigate potential impacts. Disturbance of the bottom sediment in these locations will be temporary. Silt curtains will be deployed to further limit the spread of any turbidity plumes generated by the replacement and removal of stell pipes or sheet piles. Changes in water quality caused by construction activities can be expected to be localized and temporary.

Meetings were conducted with the U.S. Department of the Army (DA) Corps of Engineers (COE) and State of Hawaii DOH on November 22 and 23, 2010, respectively. The COE indicated that the project will require a DA permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, which regulates any work within, over and beneath navigable waters of the U.S. The project may also be subject to Sections 401 and 404 of the Clean Water Act, contingent on whether any discharge of materials is anticipated within U.S. jurisdictional waters. The project is also subject to Section 402 of the Clean Water Act, which requires an Individual National Pollutant Discharge Elimination System (NPDES) Permit for Construction Stormwater, as well as HAR, Chapter 11-54 regarding compliance with the DOH's water quality standards. A site-specific BMP Plan will be submitted for DOH review and approval in conjunction with the NPDES permit application. The project will comply with all regulatory requirements, and the City will continue to consult with the COE and DOH in this regard.

For dewatering that may be required during excavation and construction, an NPDES Permit for Construction Dewatering will be required prior to discharging dewatering effluent into City drainage systems and waters of the United States. The permit will require a site-specific BMP plan and water quality monitoring.

The proposed improvements will have beneficial long-term water quality impacts on coastal waters by reducing the risk and volumes of wastewater spills that could potentially enter coastal waters. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills.

3.3.4 Flood Hazard

Since the most reliable and cost-effective way to collect and convey wastewater is by gravity, major pump stations and wastewater treatment facilities are typically located in low-lying areas, which are also the most prone to flooding.

Floods are caused by heavy rainfall associated with tropical rain storms. In Hawaii, streams originate in steep mountains and flow relatively quickly to the ocean, triggering flash floods in coastal areas. Coastal plains and stream floodplains in the Kailua and Kaneohe areas are susceptible to flooding, especially where urban development prevents infiltration of water into the ground.

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

RECOMMENDED AVOIDANCE AREAS

FIGURE
3-8

A tsunami is a series of very long waves triggered by a water-displacing disturbance of the seafloor, either resulting from an earthquake, volcanic eruption, or underwater landslide. These waves travel rapidly and can cause significant damage to coastal areas. Tsunamis have such enormous energy that waves can reach far inland with great force.

Kaneohe WWPTF: According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Community Panel Numbers 15003C0290F dated June 2, 2005 and 15003C0270G dated September 30, 2004, the Kaneohe WWPTF, located between Kaneohe and Kawa Streams, is situated within the special flood hazard area subject to inundation by the 1% annual chance flood (Zone AE) with flood elevations ranging from eight to nine feet. An area within the southernmost portion of the Kaneohe WWPTF site is located within the floodway area in Zone AE. An area within the central portion of the site is located within Zone X, areas determined to be outside the 0.2% annual floodplain (See Figure 3-9).

Due to the protection offered by Hawaii's only barrier reef and the shape of the bottom of the bay, most of the Kaneohe Bay shoreline does not lie in the tsunami inundation zone. The Kaneohe WWPTF is not located in the tsunami inundation zone.

Kailua Regional WWTP: According to the FEMA FIRM, Community Panel Numbers 15003C0270G dated September 30, 2004 and 15003C0290F dated June 2, 2005, the Kailua Regional WWTP is situated within Zone D, areas in which flood hazards are undetermined, but possible, and Zone X, areas determined to be outside the 0.2% annual chance floodplain (also shown in Figure 3-9).

According to the Civil Defense Tsunami Inundation Map for Oahu, the shoreline areas in Kailua, from Lanikai to Mokapu Peninsula, are within the tsunami inundation zone. The inundation area encompasses the airfield area of Mokapu Peninsula. The Kailua Regional WWTP is the central part of Mokapu peninsula, which is not located in the tsunami inundation zone.

Alternative 1: Force Main No. 2 and Equalization Facilities: The proposed force main route begins at the Kaneohe WWPTF and traverses beneath Kaneohe Bay near Waikalua Loko Fish Pond, which is located in Zone AE. The equalization facility at Kaneohe WWPTF is also located in Zone AE. After crossing Kaneohe Bay, the force main route travels to the Kailua Regional WWTP, which is located in Zone D. The equalization facility at the Kailua Regional WWTP is also located in Zone D.

Alternative 2: Gravity Tunnel: The proposed tunnel route begins at the Kailua Regional WWTP, which is located in Zone D. The tunnel route then travels beneath the Oneawa Hills, through Zone X and Zone D to the Kaneohe WWPTF, which is located in Zone AE.

Impacts and Mitigation Measures

No significant long-term impacts on flood hazards in the project area are anticipated as a result of the construction and operation of the proposed improvements.

In the short-term, construction activities occurring at the Kaneohe WWPTF and the Kailua Regional WWTP have the potential to be affected by flooding. The design of the proposed facilities within the respective flood hazard districts, however, will be in

accordance with regulations set forth in Section 21-9.10 Flood Hazard Districts of the City and County of Honolulu's Land Use Ordinance (LUO) and will be subject to the preparation of flood studies, as may be required. Studies will be conducted to ensure that any proposed encroachment of facilities in the floodway will not result in any increase in the regulatory flood elevations during occurrence of the regulatory flood. The studies will identify a certified flood elevation and evaluate flooding impacts, including the potential impact of proposed structures on flood elevations. All improvements will be designed to withstand potential flooding impacts.

The proposed improvements will have beneficial long-term flooding impacts by providing facilities to accommodate and contain peak wet weather infiltration and inflow to the wastewater system. Both alternatives will reduce the potential for operational disruptions or wastewater spills during heavy rainfall events. This will prevent localized flooding due to system overflows by providing adequate capacity to collect excess rainwater that enters wastewater collection lines.

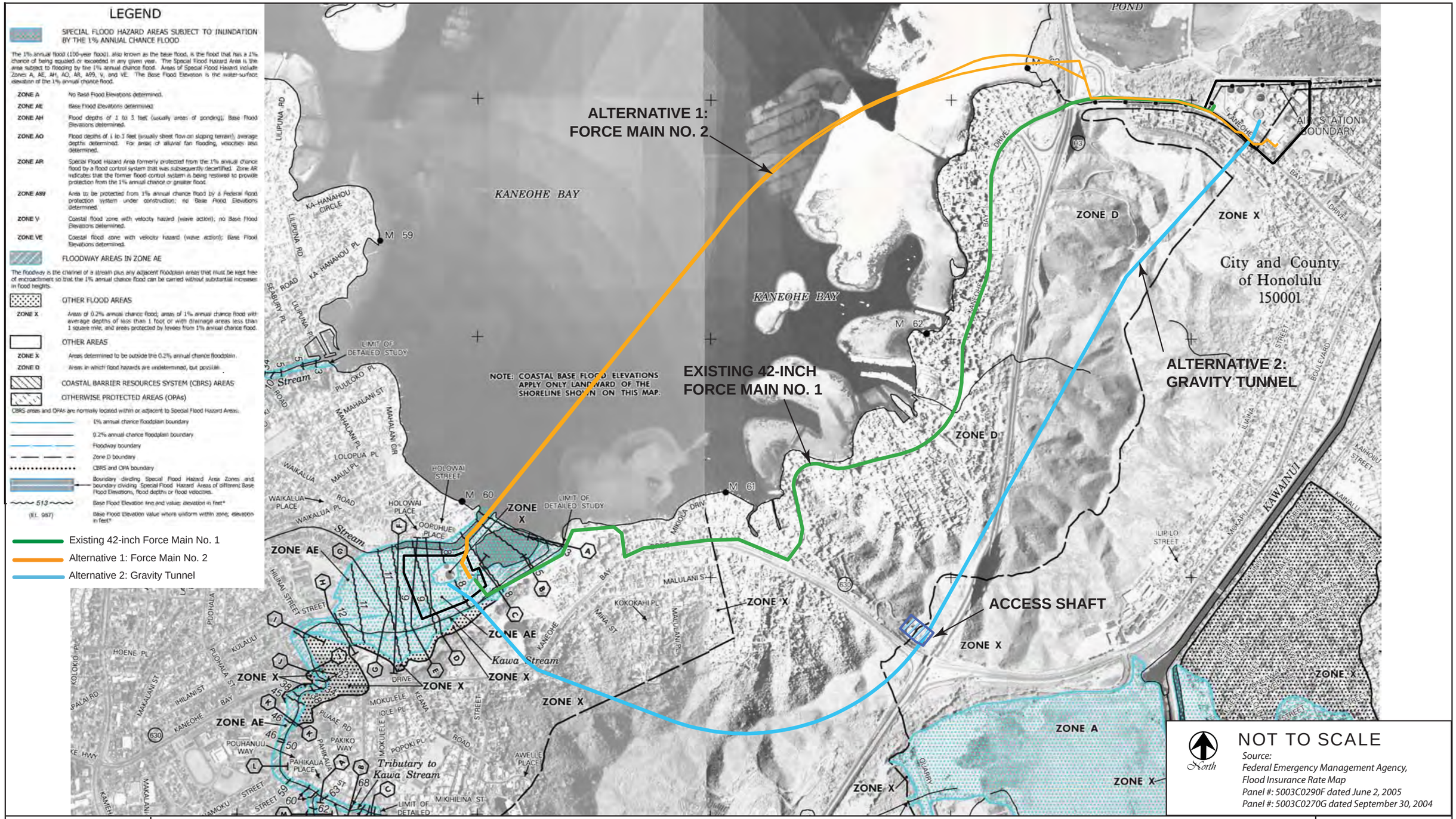
3.4 Natural Environment

3.4.1 Flora

A Botanical Survey was conducted in March 2010 by AECOS, Inc. to assess floral resources within Waikalua Loko Fishpond, the Kaneohe WWPTF, and the Bayview Golf Course. The survey area included Waikalua Loko Fishpond, the Kaneohe WWPTF, and Bayview Golf Course. A subsequent survey was conducted in August 2010 to supplement the assessment of wetland boundaries. The study is summarized below and the study is included as Appendix C.

The vegetation in all areas was identified as typical of disturbed or landscaped environments, with the exception of the mangrove forest *(Rhizophora mangle)* present along the shore, in Waikalua Loko fishpond, and up into lower Kawa Stream. Inland from the mangal is typically a sparse to moderate growth of milo (*Thespesia populnea*). Some areas that were not recently disturbed areas are covered by grasses and scattered shrubs. Landscaped areas predominate at the Kaneohe Pump Station, the Bayview Golf Course, the YWCA, and the H-3 Freeway Interchange. Landscaping involves both regular mowing of lawn grasses and maintenance of planted trees and shrubs, mostly comprised of typically ornamental species. Wetlands occur in two areas: along the shore and estuarine areas (mangal is a wetland type), and a freshwater wetland on undeveloped land at the Bayview Golf Course

The survey by AECOS (2008) on the Bayview Golf Course encompassed the channel of Kawa Stream and immediate surroundings, from Kaneohe Bay Drive to makai of the lowest cart path over the stream. The survey conducted in conjunction with this EIS started near the cart path and extended to the mouth of the stream. Portions of the golf course were also surveyed, although some undeveloped and forested areas not affected by the project were omitted.



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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

FLOOD INSURANCE RATE MAP

FIGURE 3-9

A mangrove forest is located along the H-3 Freeway shoreline in the general area at the Kailua end of the underbay crossing for both HDD and hybrid tunnel options in Alternative 1. The proposed project would pass deep below the shoreline at this point, therefore, no disturbance of the shore vegetation is anticipated.

Impacts and Mitigation Measures

There are no plant species listed as endangered, threatened, or currently proposed for listing under either federal or State endangered species statutes reported within the project site, nor are any expected given the highly disturbed nature of the area. Furthermore, no listed species were reported from the same areas in earlier botanical surveys (Linney & Char, 1994; AECOS, 2006, 2008).

No significant short- or long-term impacts on botanical resources are anticipated as a result of the construction and operation of the proposed improvements since the Kaneohe WWPTF and Kailua Regional WWTP sites do not provide unique habitats.

No significant short- or long- term impacts on botanical resources are anticipated as a result of the construction and operation of the proposed improvements since the Alternative 1: Force Main No. 2 corridor would traverse beneath the seafloor of Kaneohe Bay. The environment at the existing Kaneohe WWPTF and Kailua Regional WWTP is highly disturbed; therefore, the proposed equalization facilities are not anticipated to significantly impact floral species. See Section 3.4.3 for discussion of existing conditions and impacts to marine resources.

With regard to Alternative 2: Gravity Tunnel, the proposed tunnel will be built using a TBM where the bottom of the bore will be approximately 37 feet below sea level at the Kaneohe WWPTF to 64 feet below sea level at the Kailua Regional WWTP. Therefore, no species or habitat will be disturbed.

Alternative 2: Gravity Tunnel within the Kaneohe WWPTF and Bayview Golf Park, will require sub-surface ground improvement by jet-grouting. Jet-grouting is done from the ground surface with drilling equipment. While it is unlikely that the jet-grouting will directly disturb the ground surface, there will be ground disturbance during the positioning of the drilling equipment and the drilling operation itself to insert and retract the jet-grouting drill.

3.4.2 Fauna and Avifauna Resources

3.4.2.1 Fauna Resources

Kaneohe WWPTF and Kailua Regional WWTP: The areas surrounding the existing wastewater facilities are a highly disturbed, urban environment. Feral mammals found in the vicinity of the wastewater facilities include mongoose, mice, rats, dogs, and cats.

Alternative 1: Force Main No. 2 and Equalization Facilities: There are no terrestrial faunal resources in the project area for Alternative 1 since the corridor passes beneath the seafloor of Kaneohe Bay. See Section 3.4.3 for discussion of existing conditions and impacts to marine resources.

Alternative 2: Gravity Tunnel: The tunnel route traverses beneath the Oneawa Hills mauka of Kaneohe Bay Drive. On the surface, this region provides natural habitat and feeding areas for many introduced exotic birds such as cardinals, linnets, sparrows, and mynah birds.

3.4.2.2 Avifauna and Listed Species Resources

An Avifaunal and Listed Species Survey was prepared in December 2010 by AECOS, Inc. to assess these resources within project site. The study is summarized below and the study is included as Appendix D. Six avian count stations located near project work areas were surveyed for ten minutes each to identify species present in or transiting through the survey area. Stations were located:

1) Near the entry gate at Kaneohe WWPTF;
2) East end Kaneohe WWPTF;
3) Center of the western shore of Waikalua Fishpond;
4) Along the coastal area of Kaneohe Stream;
5) H-3 interchange/Kailua work area; and
6) Kapaa BWS reservoir site tunnel access shaft location off Mokapu Saddle Road

Auditory patterns or calls were not counted as individuals. Rather, identification and avian species counts were based on visual observations of physical features and flight patterns. Walking surveys for avifauna were also conducted to identify additional species not encountered during station counts. Walking surveys were conducted around both the Kaneohe WWPTF and Kailua Regional WWTP, Bayview Golf Course, the public path along southern Nuupia Ekahi Pond, the access road leading to the BWS reservoir site, and Kaneohe Bay Drive between the H-3 Freeway Interchange and Kailua Regional WWTP.

The findings of the avian survey are consistent with the habitat present at the surveyed sites and within the general location of coastal windward Oahu. Generally, birds were sighted much more commonly at count stations and during the walking survey at the Kaneohe end, as compared to the Kailua end of the project. A total of 180 individual birds representing 18 different species from ten separate families were recorded during the six station counts. Of the 18 total species recorded, 14 are considered to be introduced species, naturalized in the Hawaiian Islands. Doves (Family Columbidae), Common Waxbills (*Estrilda astrild*), and the ubiquitous Common Myna (*Acridotheres tristis*) account for over 68% of individual birds recorded during station counts.

Three species observed during station counts are native to Hawaii: Sanderling (*Calidris alba*) Plover (*Charadrius semipalmatus*), Hawaiian Stilt or *ae‘o* (*Himantopus mexicanus*), and the Pacific Golden Plover or *kolea* (*Pluvialis fulva*). One additional native species, the Black-crowned Night Heron or *‘auku‘u* (*Nycticorax nycticorax*) was observed during a walking survey near Nuupia Ekahi Pond. Several unidentified ducks were also observed in the pond, as well as flying over the project work area beside Kaneohe Stream.

Although not detected during the course of this survey, it is possible that the Hawaiian endemic sub-species of the Short-eared Owl (*Asio flammeus sandwichensis*) or *pue‘o*, as it is known locally, forages near the project sites on occasion. The Oahu population of this

species is listed as endangered under State endangered species statutes (DLNR, 1998), but it is not listed under the federal endangered species act.

The Kailua Regional WWTP is located adjacent to the 482-acre Nuupia Ponds Wildlife Management Area (WMA) on Marine Corps Base Hawaii-Kaneohe Bay. The ponds at Nuupia represent a primary breeding area for a population of 20 *ae'o* or Hawaiian Stilt (*Himantopus mexicanus knudseni*), a species listed as endangered under both federal and State laws (Drigot, et al, 2001). The ponds provide foraging habitat for three other federally listed endangered species: Hawaiian Duck (*Anas wyvilliana*), Hawaiian Coot (*Fulica alai*), and Hawaiian Gallinule (*Gallinula chloropus sandvicensis*).

The presence of *honu* or Green sea turtle (*Chelonia mydas*) in Kaneohe Bay is well documented (Aguirre, 1992; Aguirre, et al, 1994, 1995; Brill, et al. 1995; Balazs, et al, 2000; Zamzow, 1998). The species was identified near the proposed project corridor in October of 2009 (*AECOS*, 2009). Turtle tracks were also present on deep (>35 ft) soft sediment along the proposed force main route. Green sea turtles are protected by the Endangered Species Act (ESA) and the Hawaiian population is listed as threatened under both federal and State laws. The endangered Hawksbill turtle (*Eretmochelys imbricata*) is reported to occur historically in Kaneohe Bay (Balazs, 1978). Sightings of immature or adult hawksbills are uncommon in coastal waters of the Hawaiian Islands (Balazs, Katahira, and Ellis, 2000). Section 3.4.3 includes a discussion regarding the *honu* and recommendation measures in the unlikely event of any impacts.

The endangered Hawaiian monk seal (*Monachus schauinslandi*) is reported to visit Kaneohe Bay. In April of 1996, a pregnant monk seal hauled out along the shoreline west of Pyramid Rock (outside the Bay) to successfully birth and ween her pup (Drigot, et al, 2001). Monk seal populations are declining at an average rate of 4% per year, with about 1,100 individuals present throughout the Hawaiian Islands (Wilson, 2010). Most of these individuals reside in the Northwest Hawaiian Islands and the proposed project work areas do not include any sand shorelines, which are occasionally utilized by monk seals in the main Hawaiian Islands.

A species of concern, listed by the National Oceanic and Atmospheric Administration (NOAA) and known to occur within Kaneohe Bay, is irregularrice coral (*Montipora dilatata*). This species has a very small known population within the Bay as only three colonies were identified during extensive surveys in 2000 (NOAA, 2007). However, current taxonomic status of the species is unclear and, therefore, actual distribution is poorly known.

Another species of concern from Kaneohe Bay is the inarticulate brachiopod (*Lingula reevi)*. This species was found to be very abundant in 1967-69 in the area of the project marine surveys; Worcester (1969) found densities of up to 500 individuals per square meter (m^2) at sites on reef flats off the southeast shore of Kaneohe Bay. The population of this species has since plummeted (Hunter, et al., 2008, 2009). Surveys in 2004 found that the highest *L. reevi* densities in the same areas sampled in 1967-69 had fallen to four individuals per m^2. In 2007, no brachiopods occurred in this area, and the species was absent at eight of twelve sites where they were once common to abundant in the late 1960s. It is highly probable that these drastic reductions in *L. reevi* are due to the reduction in their food source resulting from cessation of sewage (nutrient) inputs into the Bay and the transition of Bay waters away from a eutrophic state.

Impacts and Mitigation Measures

Kaneohe WWPTF and Kailua Regional WWTP: No significant short- or long-term impacts on faunal species are anticipated as a result of the construction and operation of the proposed improvements. The Kaneohe WWPTF and Kailua Regional WWTP sites do not provide unique habitats.

Alternative 1: Force Main No. 2 and Equalization Facilities: No significant short- or long-term impacts on faunal species are anticipated as a result of the construction and operation of the proposed improvements. The force main corridor passes beneath Kaneohe Bay, through H-3 Freeway Interchance at Kaneohe Bay Drive to the Kailua Regional WWTP. See Section 3.4.3 for discussion of existing conditions and impacts to marine resources.

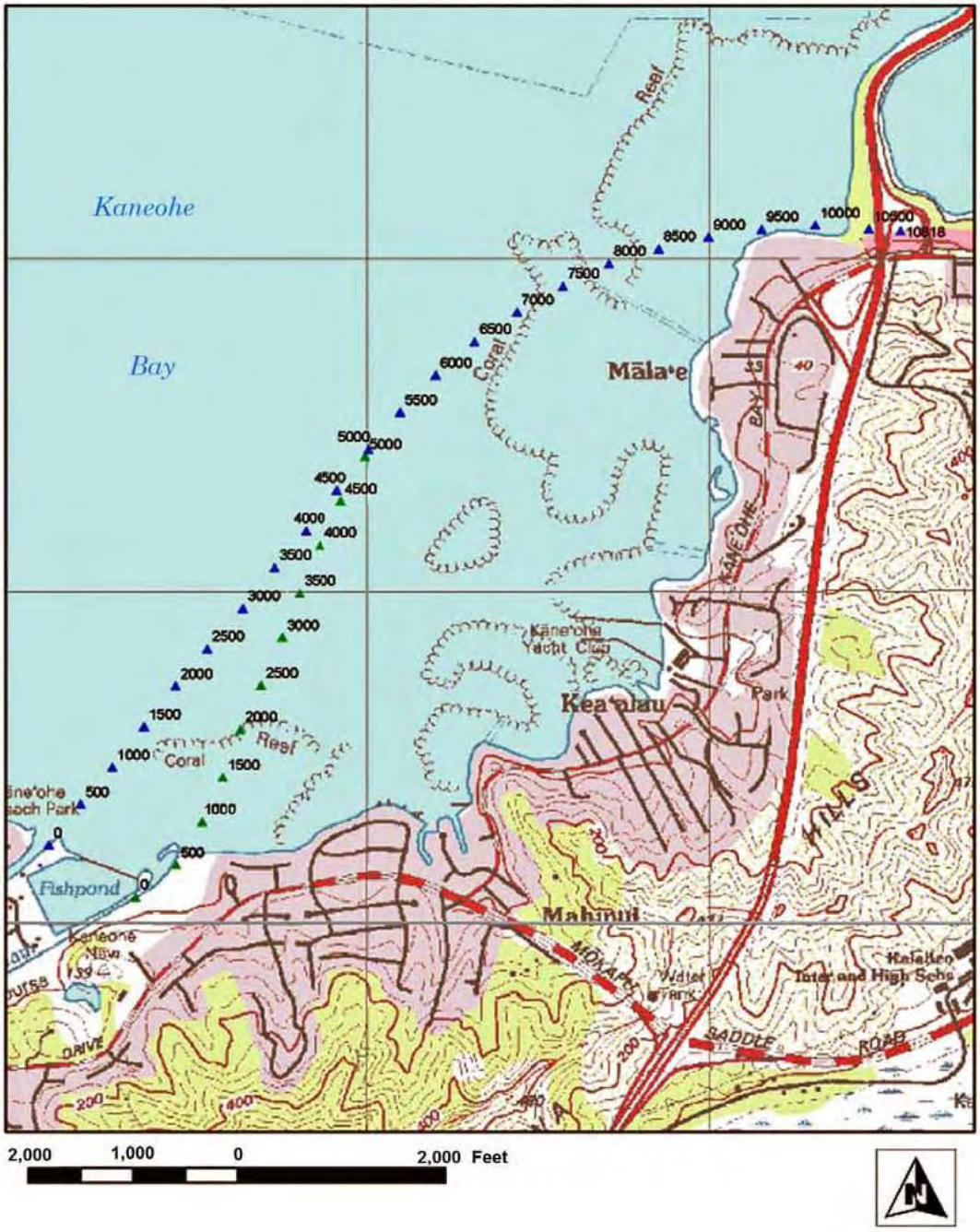
Alternative 2: Gravity Tunnel: No significant short- or long-term impacts on fauna species are anticipated as a result of the construction and operation of the proposed improvements. The proposed tunnel will be built using a TBM at depths ranging from approximately 35 feet below sea level at the Kaneohe WWPTF to 62 feet below sea level at the Kailua Regional WWTP. Therefore, no species or habitat will be disturbed.

The Kaneohe WWPTF and Kailua Regional WWTP and the work areas along Kaneohe Bay Drive are in proximity to waterbird habitats; however, the proposed work should not result in any adverse impacts on any of these species or their habitats. No ESA listed species is anticipated to utilize the work area near the BWS reservoir site.

3.4.3 Marine Resources

A Biological Survey of Marine Resources report was prepared by AECOS, Inc. in December 2010 to assess marine resources within Kaneohe Bay as they relate to the proposed project. AECOS, Inc. conducted surveys from September through November 2009 to identify existing conditions within the bay, focusing on the benthic community resources. The results are summarized below and the study is included as Appendix A. Notably, this section primarily pertains to Alternative 1: Force Main No. 2 where the proposed force main corridor will traverse beneath Kaneohe Bay. In addition, emergency contingencies (if needed) that are associated with Alternative 1 would potentially result in short-term localized impacts to marine resources.

The biological report evaluated two alternative routes for the force main that were being considered at the time the AECOS, Inc. survey was conducted (See Figure 3-10). The “Blue Line” reflects the current alignment for Alternative 1: Force Main No. 2, while the “Green Line” involved a deviation along the southwestern portion of the route that would terminate at the opposite side of Waikalua Loko Fishpond. The “Green Line”, however, has since been eliminated from consideration because of its proximity to coral reef resources, poor soil conditions, additional easement acquisition, and the removal of options requiring connections within Kaneohe Bay. Therefore, the discussion of marine resources herein focuses on the current alignment for Alternative 1: Force Main No. 2.



NOTE: Stations located 500 feet apart

Source: *AECOS, Inc.*

LEGEND

- **"Blue Line" (Alternative 1: Force Main No. 2)**
- **"Green Line" (Eliminated from consideration)**

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

MARINE RESOURCE SURVEY STATIONS

FIGURE
3-10

Visual assessments of the biota were conducted at stations located 500 feet apart along the proposed Alternative 1 route, specifically within Kaneohe Bay. Subsequent quantitative measurements (percent cover) were conducted for benthic organisms at each station using two, 10-meter long transects. At deeper lagoon sites found to be comprised entirely of fine sediment bottom, transects were not used, but counts were made of burrow openings as an indication of organisms living within the sediment. Sediment meiofauna (very small infaunal organisms) were sampled within the fine lagoon sediments, as well as offshore of the mouth of Kaneohe Stream and from coarser sediments on the reef flats.

Survey results showed that most of the reef flat environment along the proposed force main route is highly degraded and dominated by invasive algae, with reef corals absent and reef fishes present in low abundance. Macrobenthos and fish were virtually absent on the reef flat off Kaneohe Stream. The only substantial coral reef cover and reef fish populations occurred on a series of linear bottom features in a previously dredged area at a point where the proposed pipeline would bend toward the Aikahi shore between Stations 6000 and 7000. A substantial growth of seagrass was also observed between Stations 7000 and 8500.

The general characteristics and dominant organisms found at the sample stations and in some areas between stations are shown in Table 1 within Appendix A. Most of the sites were where the substratum was fine sediment at depths ranging from 12 to 42 feet (4 to 13 m), with burrow openings being the only indication of macrofauna occurring at ten sites from Stations 1000 to 5500. The second most frequent environment encountered was that of shallow sand flats dominated by introduced marine algae with depths of 3 feet (1 m) or less. This occurred from the shore to a point between Stations 500 and 1000, as well as from Station 7500 to the shore near Aikahi. Although there is some variability among dominant and secondary species, most of these areas were heavily covered with invasive red algae, *Acanthophora spicifera* and *Gracilaria salicornia;* the latter was very abundant between the Aikahi shore and Station 10000. Other abundant species were the blue-green alga, *Lyngbya majuscula*, and the green alga, *Dictyosphaeria cavernosa*; the latter once dominated shallow areas in south Kaneohe Bay, but has become less common in recent years.

No reef corals or associated organisms were found on reef flat locations, except at the reef margins adjacent to deeper water. Coral patch reefs occurred between Stations 5500 and 6000 and at Station 7000. The coral areas from Stations 6000 to 7000 involved a series of linear bottom features with high cover of *Montipora capitata* and *Porites compressa*, and abundant *Mycale grandis* (a sponge) and *Sabellastarte spectabilis* (feather duster worm) living among the corals. These features occurred at depths from 8 to 10 feet (2.5 to 3 m) and are separated from the reef flat by a sand channel. A large bed of the Hawaiian endemic seagrass, *Halophila hawaiiensis*, occurred between Stations 7000 and 7500, and coral coverage was minimal at the reef margin where bottom cover was dominated by *Gracilaria salicornia*.

Marine organisms recorded during the survey are listed in Table 3 within Appendix A. A total of 72 taxa were found: 18 macroalgae, 2 flowering plants, 34 invertebrates, and 18 fishes. Of these, 15 of the species are introduced or cryptogenic[5], or 21% of the total, and 57 are native species, including two species that are considered endemics (i.e. occurring only in the Hawaiian Islands): the sea-grass, *Halophila hawaiiensis*, and the coral, *Porites compressa*.

Sediment Infauna

Only algal thalli were very rarely seen attached on the bottom during underwater surveys. However, an abundance of burrow openings were present and a few burrows were observed to be occupied by alpheid shrimp or goby fish.

Sediment Meiofauna

A total of 1,706 invertebrates belonging to 53 taxa, including 329 polychaetes (worms) representing 37 taxa were identified for the meiofaunal samples collected from three environments: shallow reef flat, stream mouth, and lagoon bottom. Samples collected from the reef flat had the highest invertebrate abundance and greatest number of species. A total of 1,090 invertebrates from 58 taxa were found on the reef flat, and 231 of those invertebrates were polychaete worms from 34 taxa. Samples from the stream mouth contained 520 invertebrates from 40 taxa, 89 of which were polychaetes from 20 taxa. Samples collected from the lagoon floor contained 96 invertebrates from 10 taxa, nine of which were polychaetes from only five taxa.

Reef Fishes

Only 15 species were recorded for all of the sites, and numbers of species were very sparse at all except Stations 6000 and 6500, where more than 110 individuals were counted, and Station 7500 and 8000 (reef slopes), where 43 to 52 fishes were counted. By contrast, only three species with 11 individuals occurred at Station 7000, where the most abundant species on other transects, the goby *Asterropteryx semipunctatus*, was conspicuously absent.

Listed Species and Species of Concern

No endangered or threatened (listed) species, such as Hawaiian Monk seal or cetaceans, such as dolphins, were seen within the study area during field surveys from September through November, 2009. No previous reports could be found for Monk seal or wild cetaceans in south Kaneohe Bay during the approximately 60 years of operation of Hawaii Institute of Marine Biology, or from any published source. Green sea turtles (*Chelonia mydas*; Aguirre et al., 1994; Zamzow, 1998; Balazs et al., 2000; Russell and Balazs, 2009) and, less commonly, Hawksbill turtles (*Eretmochelys imbricata*; Balazs, 1978) occur in Kaneohe Bay. On October 28, 2009, an *AECOS* biologist observed a solitary green sea turtle resting on the mud bottom adjacent to the 2000' transect survey location. The turtle was not observed foraging or swimming. A large Green sea turtle was seen on the fringing reef around Coconut Island in November 2009 (S. L. Coles, pers. obs.). It is therefore probable that sea turtles occasionally frequent the project area to utilize reef macroalgae as a food source.

An additional species of concern to the National Oceanic and Atmospheric administration (NOAA) is the inarticulate brachiopod, *Lingula reevi*. This species was found to be very abundant in 1967-69 in the area of the present surveys by Worcester (1969), who found densities of up to 500 per m^2 at sites on reef flats off the southeast shore of the Bay, one of these near the location of Station 7500. No focused sampling for *L. reevi* was done in the present study, but recent studies describe that populations of this species have plummeted from the time when treated sewage and eutrophication was occurring in South Kaneohe Bay (Hunter et al., 2008, 2009). These surveys found that in 2004 the highest *L. reevi* densities in the same areas sampled in 1967-69 had fallen to four per m^2, occurring only at the above mentioned location, and in 2007 no brachiopods occurred at this site, and were also absent

at eight of 12 sites where they were common to very abundant in the late 1960s. It is highly probable that these drastic reductions in *L. reevi* are due to the reduction in their food source since cessation of sewage into the bay in 1977. The prolific growth of invasive algae on the reef flats may also have contributed to the brachiopod decline.

Impacts and Mitigation Measures

The proposed HDD and hybrid tunnel construction methods will be conducted well below the bottom of Kaneohe bay. Consequently, there will be no direct impact on marine organisms from shore-based drilling and deployment activities. However, should emergency conditions require that in- and over-water activities be conducted to complete the force main, is recommended that such activities avoid specific areas identified as potentially sensitive.

The marine communities along most of the proposed force main route are on highly degraded reef flats or in fine sediments with much lower meiofauna densities than found in coarser sediments on nearby reef flats or even on the highly silted reef flat along the mouth of Kaneohe Stream. The benthic communities on most of the reef flat areas along the routes have few to no reef corals, few reef fish species or numbers (with very low biomasses), and very low species diversity. Assemblages are dominated by introduced invasive algae and a few filter feeding invertebrates, such as sponges and tunicates. The only substantial coral bottom along the force main route is from Stations 6000 to 7000, where a series of low, linear outcrops support high coral cover and relatively high fish abundance. This area has recovered on a formerly dredged surface of the fringing reef. Another reef area showing moderate recovery from earlier documented degraded conditions is on reef slopes near Stations 7500 and 8000, where some live coral is growing and intermediate values for fish counts and biomass were recorded. A large bed of endemic seagrass occurs between Stations 7000 and 7500 that would be sensitive to excessive siltation. Since the force main will be constructed well below the ocean bottom, there is no potential impact to marine communities along the force main route from proposed construction activities.

The only work that is anticipated to have potential for short-term impact to species listed by either State or federal protective regulations is any contingency emergency access shaft in Kaneohe Bay. As needed, the emergency access shaft will need to implement special BMPs to protect sea turtles, water quality, and the general marine environment at the access shaft location.

In the short-term, there is the potential for coastal water quality impacts resulting from construction activities at the Kaneohe WWPTF and the Kailua Regional WWTP. Potential impacts will be mitigated by adherence to State and City water quality regulations governing grading, excavation, and stockpiling.

As discussed in Section 2.3.1, although the HDD method of pipe installation would be accomplished well beneath Kaneohe Bay, there are contingency situations that may require work in and over the water. If, for example, the pilot holes are drilled from both ends but do not align close enough for one drill head to follow the other's bore as it is retracted, manual alignment may be necessary. To reach the drill heads, the bottom of the bay will need to be dredged. To minimize water quality impacts, interlocking sheet

piles will be driven into the bottom to create an enclosure isolating the water column in which the dredging will occur. Watercraft will be used to install the sheet piles, dredge the bottom and receive the dredge material. Divers would then enter the excavation and manually realign the drill heads. This type of work would only be allowed along specific sections of the force main alignment. Specific areas with corals and sea grass will be avoided for such work.

Another potential contingency situation is frac-out during HDD operations. Although the steel sleeve will prevent this from happening in the most susceptible area near the Kaneohe WWPTF, frac-outs could conceivably occur in other areas along the route. They are more likely to occur where the bore is closer to the surface, near land, as opposed to where it is deep beneath the sea floor in the middle of the bay. Should a frac-out be detected, any further discharge into the bay can be halted by stopping mud pumping to the drill head, reamer, or swab, or stopping pulls that displace mud within the bore. Silt fences can be deployed to contain discharges. Pressure that caused the frac-out could be reduced by slowing down the rate of the pull, or reducing the mud pumping rate.

With regard to the hybrid tunnel method of construction, a potential contingency situation may involve the possibility of encountering rocks that are too large for the TBM to remove or pulverize. Test bores along the alignment have not detected the presence of such rocks but they would need to be dealt with, if encountered. As with the HDD method of construction, this type of work would only be allowed along specific sections of the force main alignment. To mitigate potential impacts to highly sensitive areas where corals and sea grass have been identified, such work shall be off-limits. As previously noted, Figure 3-8 illustrates the specific areas of avoidance, which include, the area between Stations 6000 and 8500 near the northwestern portion of the proposed force main alignment.

Meetings were conducted with the U.S. COE and State DOH on November 22 and 23, 2010, respectively. The COE indicated that the project will require a DA permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, which regulates any work within, over and beneath navigable waters of the U.S. The project may also be subject to Section 401 and 404 of the Clean Water Act, contingent on whether any discharge of materials is anticipated within U.S. jurisdictional waters. The project is also subject to Section 402 of the Clean Water Act, which requires an Individual NPDES Permit for Construction Stormwater, as well as HAR, Chapter 11-54 regarding compliance with the DOH's water quality standards. A site-specific BMP Plan will be submitted for DOH review and approval in conjunction with the NPDES permit application. The project will comply with all regulatory requirements and the City will continue to consult with the COE and DOH in this regard.

For dewatering that may be required during excavation and construction, an NPDES Permit for Construction Dewatering will be required prior to discharging dewatering effluent into City drainage systems and waters of the United States. The permit will require a site-specific BMP plan and water quality monitoring.

The proposed improvements will have beneficial long-term water quality impacts on coastal waters by reducing the risk and volumes of wastewater spills that could potentially enter coastal waters. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills.

Impacts to Sea Turtles

The project, as planned, will not affect any marine or protected species. However, a contingency 20 by 20 foot (6 by 6 meter (m)) emergency access shaft in Kaneohe Bay—to be constructed by driving sheet piles and excavating enclosed sediment—for equipment realignment/repair or removal of an obstruction as needed, may have impacts. This contingency plan will require the use of a work barge, landing craft, or pontoon assembly to access the shaft area and a vibratory or hydraulic driver to place sheet piles. The assembly, use, and removal of such an emergency shaft would potentially impact Green sea turtles (*C. mydas*) foraging or resting near the shaft site. Further, damage to sea turtle foraging resources could occur if this work site is needed in an area supporting a sea grass bed. BMPs to ensure protection of the threatened Green sea turtle should be included as part of the under-Bay emergency work area contingency plan. These BMPs would also protect hawksbill turtle in the unlikely event that this species is encountered during construction.

Impacts to threatened Green sea turtle and turtle habitat from the construction, use and removal of the emergency shaft may include:

- Loss or degradation of foraging, resting, or shelter habitat.
- Increased motorized vessel traffic.
- Proliferation of non-native invasive algal species.
- Degradation of habitat or water quality by dredging/excavation activity.
- Elevated noise levels during driving of sheet piles and other work.

However, these impacts will be both temporary and brief. Construction, access, and removal of an emergency access shaft will likely be completed in a matter of hours or days. No long-term adverse impacts to sea turtles or their habitat are anticipated to occur from construction of a temporary access shaft, although areas identified as “sensitive” in the marine survey report (AECOS, 2010b) could suffer long-tem adverse impacts.

Best Management Practices for Sea Turtles

Research into turtle hearing is limited, but available information suggests that Green sea turtles are believed to be most acoustically sensitive between 200 and 700 hertz (Hz) (Ridgeway et al, 1969), a frequency range that overlaps with noise associated with driving sheet piles (Cal Tran, 2007). To reduce adverse impacts to turtles, the project could limit noise/acoustic disturbance to ensure that sound emanation from the driving of sheet piles is below the threshold recommended for marine mammals (NOAA, 2005). Sea turtles are believed to be less sensitive to sound than marine mammals relying more heavily on visual cues, rather than auditory input (Hazel, et al. 2007; Ridgeway et al. 1969).

Underwater sound energy travels outward spherically in all directions, and dissipates through mechanisms such as spreading, scattering, and absorption (Bradley and Stern 2008). The existing conditions in south Kaneohe Bay, like turbid water to scatter sound and a soft sediment sea floor to absorb sound, will likely aid this process and shorten the distance sound travels before dissipating below TTS.

Published methods to limit sound travel during projects in marine waters include physical barriers, such as silt containment devices and bubble curtains created by releasing air from pipes, tubing or hosing placed on the seafloor surrounding all or a portion of the work area (Caldrons, 2007). Utilizing “soft starts” with pile-driving by starting at very low impact velocities and slowly building up to full energy may allow sea turtles and other marine life to travel away from the area before full acoustic levels are reached. Halting pile-driving when protected species are within the 50 m (164 ft) range, a conservative estimate, may prevent permanent hearing damage to sea turtles caused by exposure to acoustic disturbance in the permanent threshold shift (PTS) range.

Sea turtle research indicates that Green sea turtles, like other turtle species, cannot be expected to consistently notice and avoid vessels that are traveling faster than two knots (Hazel, et al. 2007). Directing vessels operators to limit speeds to five knots or less when transiting to work areas, keeping at least 50 m away from sea turtles when vessels are under way, and slowing vessel speed to below two knots when turtles are in the direct vicinity, can limit the potential for vessel impacts to sea turtles.

Following is a list of general BMPs typically issued by federal regulatory agencies that can be implemented to prevent adverse impacts to sea turtles and other marine life in Kaneohe Bay during the project construction phase:

1. Turbidity and siltation from project-related work should be minimized and contained to within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.
2. Any construction-related debris that may pose an entanglement hazard to marine protected species must be removed from the project site if not actively being used and certainly at the conclusion of construction work.
3. All project-related materials and equipment placed in the water should be free of pollutants.
4. No project-related materials (fill, revetment, rock, pipe, etc.) should be stockpiled in the water (inertial zones, reef flats, stream channels, etc.).
5. No contamination (trash or debris disposal, alien species introductions, etc.) of marine (reef flats, lagoons, open ocean, etc.) environments adjacent to the project site should result from project-related activities.
6. Fueling of project-related vehicles and equipment should take place away from the water. A contingency plan to control the accidental spills of petroleum products at the construction site should be developed. Absorbent pads, containment booms, and skimmers should be stored on-site to facilitate the cleanup of petroleum spills.

7. Under layer fills should be protected from erosion with core-loc units (or stones) as soon after placement as practicable.
8. Attempts must be made to prevent discharge of dredged material into the marine environment during the transporting and off-loading of dredged material.
9. Return flow of or run-off from dredged material stored at inland dewatering or storage sites must be prevented.
10. A visual survey of the project area (by either the contractor or State personnel) must be performed just prior to commencement or resumption of construction activity to ensure that no State or ESA protected species are in the area. If protected species are detected, construction activities must be postponed until protected species voluntarily leave the area.
11. If any ESA-listed species enters the area during construction activities, all activities must cease until they voluntarily depart the area.
12. All on-site project personnel must be apprised of the status of any ESA listed species potentially present in the project area and the protections afforded to those species under federal laws.
13. Any incidental take of marine mammals must be reported immediately to the NOAA 24-hour hotline at 1-888-256-9840. Any injuries to sea turtles must be reported immediately to NOAA at 1-808-983-5730. Information must include the name and phone number of a point of contact, location of the incident, and the nature of the take and/or injury.

No significant long-term impacts or adverse effects are anticipated from the installation and operation of the force main. The force main will be located at least 20 feet below the sea floor of Kaneohe Bay and will be installed via direct drilling or micro-tunneling; therefore, no habitat or species will be disturbed.

3.4.4 Wetlands

According to the U.S. Fish and Wildlife Service and State Office of Planning GIS Program, in the general vicinity of the project site there are 30 different wetland and coastal aquatic sites comprised mostly of marine and estuarine systems. These are summarized in Table 3-1 and shown in Figure 3-11. An additional wetland is located mauka of the Kaneohe WWPTF within the Bayview Golf Course. The wetland is unnamed and is not included in the U.S. Fish and Wildlife Service and State Office of Planning GIS Program inventories. However, according to the Botanical Survey prepared by AECOS, Inc. in August 2010 (see Appendix C), the wetland was previously identified in other studies. As such, the wetland is included for discussion herein and shown in blue in Figure 3-11.

Kaneohe WWPTF: Located adjacent to the Kaneohe WWPTF is Kaneohe Stream (identified as Area 4), Waikalua Loko Wetland (identified as Areas 5 and 6), Kawa Stream (identified as Area 7), and a pond within Bayview Golf Course (identified as Area 8). The unnamed wetland is located immediately mauka of the WWPTF.

Table 3-1
Wetlands and Aquatic Sites

ID	Code	System	Subsystem	Class	Subclass	Regime	Modifier
1	M1RF1L	Marine	Tidal	Reef	Coral	Subtidal	N/A
2	M1RF1L	Marine	Tidal	Reef	Coral	Subtidal	N/A
3	M1RF1L	Marine	Tidal	Reef	Coral	Subtidal	N/A
4	E1OWLx	Estuarine	Subtidal	Open Water/ Unknown Bottom	N/A	Subtidal	Excavated
5	M1UBLh	Marine	Subtidal	Unconsolidated Bottom	N/A	Subtidal	Diked/ Impounded
6	E2SS3N	Estuarine	Intertidal	Scrub-Shrub	Broad-Leaved Evergreen	Regular	N/A
7	R3UBHx	Riverine	Upper Perennial	Unconsolidated Bottom	N/A	Permanent	Excavated
8	PUBHx	Palustrine	N/A	Unconsolidated Bottom	N/A	Permanent	Excavated
9	E2SS3N	Estuarine	Intertidal	Scrub/Shrub	Broad-leaved Evergreen	Regular	N/A
10	E2SS3N	Estuarine	Intertidal	Scrub/Shrub	Broad-leaved Evergreen	Regular	N/A
11	M1RF1L	Marine	Tidal	Reef	Coral	Subtidal	N/A
12	M1RF1L	Marine	Tidal	Reef	Coral	Subtidal	N/A
13	M1RF1L	Marine	Tidal	Reef	Coral	Subtidal	N/A
14	M1RF1L	Marine	Tidal	Reef	Coral	Subtidal	N/A
15	E2SS3N	Estuarine	Intertidal	Scrub/Shrub	Broad-leaved Evergreen	Regular	N/A
16	E2SS3N	Estuarine	Intertidal	Scrub/Shrub	Broad-leaved Evergreen	Regular	N/A
17	E2SS3N	Estuarine	Intertidal	Scrub/Shrub	Broad-leaved Evergreen	Regular	N/A
18	M1RF1L	Marine	Tidal	Reef	Coral	Subtidal	N/A
19	E2SS3N	Estuarine	Intertidal	Scrub/Shrub	Broad-leaved Evergreen	Regular	N/A
20	E2US2P	Estuarine	Intertidal	Unconsolidated Bottom	Sand	Irregular	N/A
21	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	E2SS3N	Estuarine	Intertidal	Scrub/Shrub	Broad-leaved Evergreen	Regular	N/A
23	E2US2P	Estuarine	Intertidal	Unconsolidated Bottom	Sand	Irregular	N/A
24	E2US2P	Estuarine	Intertidal	Unconsolidated Bottom	Sand	Irregular	N/A
25	E2US2P	Estuarine	Intertidal	Unconsolidated Bottom	Sand	Irregular	N/A
26	E2US2P	Estuarine	Intertidal	Unconsolidated Bottom	Sand	Irregular	N/A
27	E1OWLx	Estuarine	Subtidal	Open Water/ Unknown Bottom	N/A	Subtidal	Excavated
28	PEM1C	Palustrine	N/A	Emergent	Persistent	Seasonal	N/A
29	PEM1F	Palustrine	N/A	Emergent	Persistent	Semi-permanent	N/A
30	PEM1C	Palustrine	N/A	Emergent	Persistent	Seasonal	N/A

* Wetlands 20-26 are associated with the Nuupia Pond Complex
Source: U.S. Fish and Wildlife Service and State Office of Planning GIS Program

Kailua Regional WWTP: Located near the Kailua Regional WWTP are approximately seven aquatic sites identified as Areas 20 through 26. These seven wetland areas are a part of the Nuupia Ponds Wildlife Management area. This area encompasses significant natural and cultural features, including a historic fishpond complex, and provides habitat for the endangered Hawaiian stilt. The ponds encompass approximately 231.8 acres which comprise the fishpond complex. The area also serves as a natural buffer for Marine Corps activities. Area 22 is an estuarine, intertidal system classified as a scrub/shrub area containing mostly broad-leaved Evergreen species. Area 21 is unclassified. Areas 20 and 23 through 26 are described as estuarine, intertidal systems and classified as having unconsolidated bottoms, consisting mostly of sand.

Alternative 1: Force Main No. 2 and Equalization Facilities: The force main corridor will pass beneath three areas identified as Area 4, 18, and 19. Area 4 is described as an estuarine, subtidal system and classified as having an open water/or unknown bottom. Area 18 is a marine tidal system classified as reef mainly containing coral species. Area 19 is an estuarine, intertidal system classified as a scrub/shrub area containing mostly broad-leaved Evergreen species.

Alternative 2: Gravity Tunnel: The tunnel route will not pass directly beneath any wetland or special aquatic areas.

Impacts and Mitigation Measures

Kaneohe WWPTF and Kailua Regional WWTP: No significant short- or long-term impacts are anticipated as a result of the construction and operation of the proposed improvements since there are no wetlands specifically within the Kaneohe WWPTF and Kailua Regional WWTP sites. Mitigation measures described in Section 3.3.1 Surface Water will also minimize impacts on nearby wetlands and aquatic areas.

Alternative 1: Force Main No. 2 and Equalization Facilities: No significant short- or long- term impacts are anticipated as a result of the construction and operation of Alternative 1: Force Main No. 2 since the line will be installed via directional drilling or micro-tunneling 20 feet below the sea floor of Kaneohe Bay through H-3 Freeway Interchange at Kaneohe Bay Drive to the Kailua Regional WWTP. Nuupia Ponds are located to the north of the Kailua Regional WWTP and will not be impacted by the project.

Alternative 2: Gravity Tunnel: No significant short- or long-term impacts are anticipated as a result of the construction and operation of the proposed improvements since the tunnel will be built using a TBM where the bottom of the bore will be approximately 37 feet below sea level at the Kaneohe WWPTF, to approximately 64 feet below sea level at the Kailua Regional WWTP.

Alternative 2: Gravity Tunnel within the Kaneohe WWPTF and Bayview Golf Park, will require sub-surface ground improvement by jet-grouting. Jet-grouting is done from the ground surface with drilling equipment. While it is unlikely that the jet-grouting will directly disturb the ground surface, there will be ground disturbance during the positioning of the drilling equipment and the drilling operation itself to insert and retract the jet-grouting drill.

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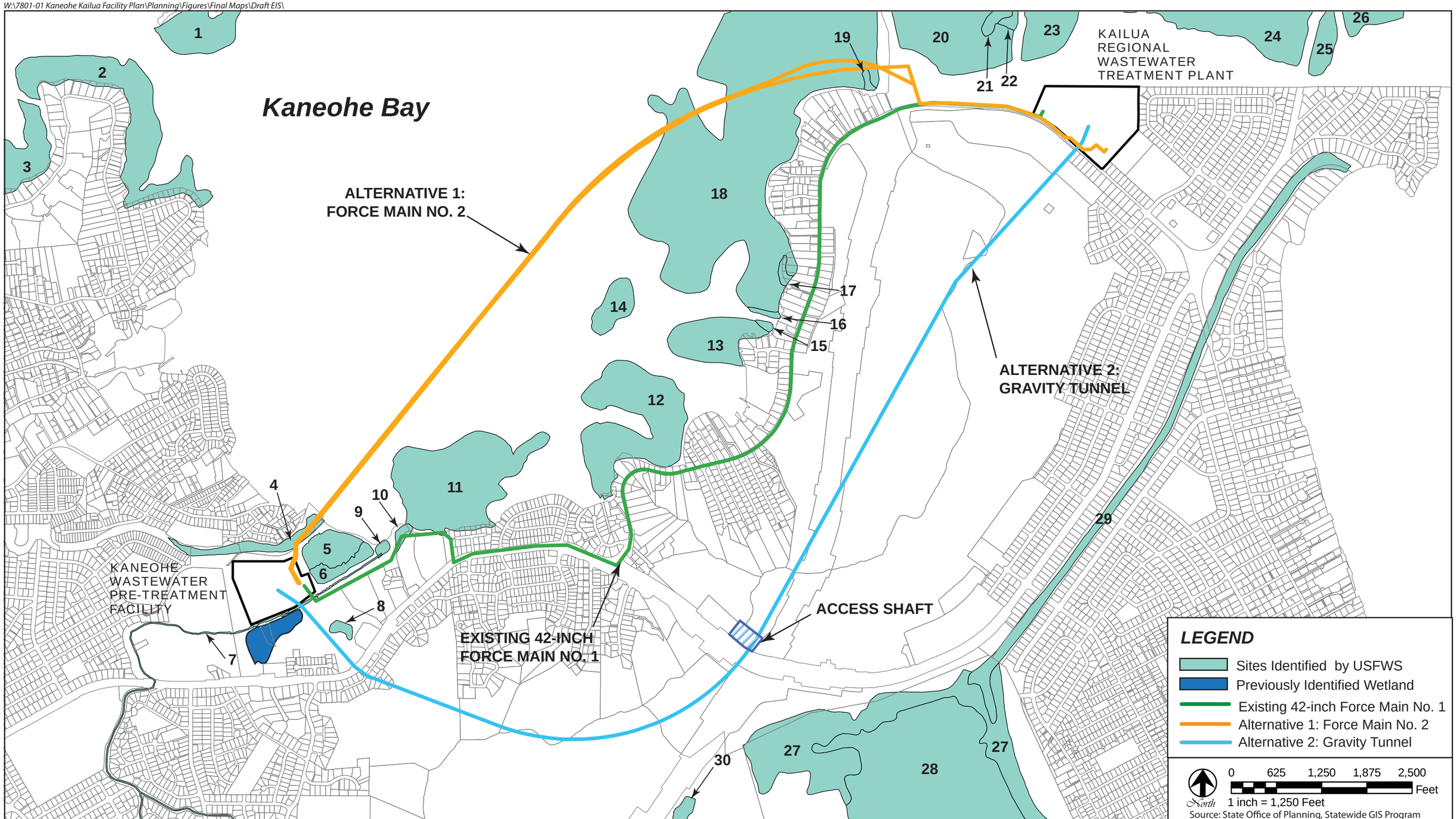

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ENGINEERS • PLANNERS

KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

WETLANDS AND AQUATIC SITES

FIGURE 3-11

3.4.5 Historic and Archaeological Resources

Separate archaeological assessment reports consisting of literature reviews and surface surveys were conducted for Alternative 1: Force Main No. 2 and Equalization Facilities and Alternative 2: Gravity Tunnel by Aki Sinoto Consulting and Cultural Surveys Hawaii, Inc. (CSH), respectively; in November 2010. The results are summarized below and the studies are included as Appendices E and F, respectively. The archaeological literature review involved historical research including archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if historic properties have been recorded in or near the project area. The limited surface inspection of the project area was conducted to identify any surface archaeological features and to investigate and assess the potential for impact to such sites, as well as to identify sensitive areas that may require further investigation or mitigation before the project proceeds.

Kaneohe WWPTF: No surface historic properties were identified within the Kaneohe WWPTF. The Kaneohe WWPTF has undergone extensive land modification associated with the development and use of the site as a wastewater treatment facility. Sub-surface historic properties may be present within Kaneohe WWPTF lands. This location may be characterized a quilt of traditional Hawaiian taro patches as documented in the 19 circa 1848 Land Commission Awards. This pattern of intensive traditional Hawaiian agriculture may have existed for centuries prior to Western contact in this area of unique natural abundance bordered by perennial Kawa and Kaneohe Streams and the rich margins of Kaneohe Bay.

Limited sub-surface testing was previously conducted adjacent to Kaneohe WWPTF lands (Hammatt and Borthwick 1989). A series of eight trenches, 20 to 25 feet long, were excavated along a 600-foot long transect near the western boundary of the plant property on the north side of Kawa Stream, however, no cultural materials or features, including *auwai* or earthen field boundaries believed to have been in the immediate vicinity were discerned.

An archaeological site about 2,000 feet inland of the Kaneohe WWPTF revealed a prehistoric habitation area with an assemblage of lithic artifacts. This site dated to A.D. 1070-1405, suggesting that this area housed craftsmen specializing in the production of adzes and other stone tools. Recent archaeological surveys near the Kaneohe WWPTF also documented a terrace and sub-surface agricultural soil indicative of taro and historic rice production.

The Waikalua Loko Fishpond, designated as State Inventory of Historic Places (SIHP) Site # 50-80-10-349, is a known historic fishpond located immediately inland of Kaneohe Bay between Kaneohe Stream and Kawa Stream. The fishpond covers an area of 11 acres with a wall 1,420 feet long, built of water worn basalt 3 to 4 feet in height and about 4 feet wide. Waikalua Loko Fishpond's walls were rebuilt in the 1930's and three mortared gates were also added at this time.

Kailua Regional WWTP: No surface historic or archaeological resources were identified within the Kailua Regional WWTP. Most of the areas planned for development contain various tanks, buildings, and other structures. A very small area in the northeastern portion of Kailua Regional WWTP in the vicinity of the administration building contains Jaucas sand. This area is beyond the Area of Potential Effect (APE) of the currently proposed project.

Human burials have been found throughout the Hawaiian Islands within Jaucas sand deposits. Currently, no new facilities are planned in this area.

The Nuupia Fishpond Complex, designated as SIHP # 50-80-11-1002, is located just north of the Kailua Regional WWTP within Marine Corps Base Hawaii-Kaneohe Bay. The Nuupia Fishpond Complex consists of eight fishponds that extend from Kaneohe Bay east to Kailua Bay. Archaeological sites near Nuupia Fishpond include surface scatters of basalt tools, adze blanks, and flakes associated with stone tool manufacture. The small quantity of marine shell midden recovered archaeologically suggests that Hawaiians once lived near the fishponds only on a temporary or periodic basis.

Alternative 1: Force Main No. 2 and Equalization Facilities: There are no known historic or archaeological sites along the project corridor since the proposed force main route traverses beneath the bottom sediments of Kaneohe Bay. Kaneohe Bay is the largest sheltered body of water in the main Hawaiian Islands, encompassing a surface area of roughly 11,000 acres at mean sea level. It is a complex estuarine system incorporating more than ten streams, an outer barrier reef, an intermediate lagoon with numerous patch reefs, and fringing reefs near the shoreline. There are five islets within Kaneohe Bay with three, Ahu o Laka, a sand bar; Kekepa; and Kapapa, that occur on the barrier reef. The other two are prominent islets within the bay: Mokolii and Moku O Loe. Mokolii, better known as Chinaman's Hat, is in the northern end of the bay at Kualoa. Moku o Loe, also known as Coconut Island and occupied by the Pauley-Pagen Marine Laboratory, is owned by the State of Hawaii and located in the southwestern part of the bay in the neighboring *ahupuaa* of Heeia.

Alternative 2: Gravity Tunnel: There are no known historic or archaeological sites along the proposed Gravity Tunnel route. The proposed location of the BWS reservoir site access shaft currently contains a water tank, construction debris, piping, and soils for and/or from BWS projects. Geotechnical boring testing conducted within the BWS reservoir site portion of the project, in the vicinity of the existing water tank, show that basalt extends from 61 centimeters (cm) below surface (2 feet) to the bottom of the excavation, 98 m below surface (320.5 feet).

Impacts and Mitigation Measures

Kaneohe WWPTF: No significant short- or long-term impacts to historic or archaeological resources are anticipated as a result of the construction and operation of the proposed improvements. A program of pre-construction survey sub-surface testing is recommended in consultation with the State Historic Preservation Division (SHPD) based on project plans and scoped to address the specific locations of planned excavations. Based on the findings of the archaeological testing and in consultation with SHPD, monitoring will be conducted during construction-related sub-surface excavations within Kaneohe WWPTF.

Project activities related to the proposed Kaneohe WWPTF upgrades should avoid direct or indirect adverse impacts to Waikalua Loko Fishpond (SIHP # 50-80-10-349) and its vicinity (TMK: (1) 4-5-030:001, (por.)). Consultation with SHPD and the Waikalua Loko Fishpond Preservation Society, and consideration of the Waikalua Loko

Fishpond Preservation Plan (Dasheill 1995), is on going for construction staging or other activities planned within the fishpond's vicinity. As an interim protection measure during construction, a buffer zone of roughly 30 feet shall be established along the land-based perimeter of Waikalua Loko Fishpond to prevent inadvertent intrusions and damages to the structural components of the fishpond. Also, should any boulders or stones suitable for use by the stewardship group in stabilizing or restoring the pond walls be encountered, these shall be recovered and stockpiled on the peninsula area beyond the construction zone.

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

Kailua Regional WWTP: No significant short- or long-term impacts to historic or archaeological resources are anticipated as a result of the construction and operation of proposed improvements. Jaucas sand is present within a very small area in the vicinity of the Kailua Regional WWTP administration building in the northeastern portion of the WWTP site. Human burials have been found throughout the Hawaiian Islands within Jaucas sand deposits. If any sub-surface disturbance is planned for this area, a program of archaeological inventory survey sub-surface testing is recommended in consultation with SHPD.

Nuupia Fishpond (SIHP Site # 50-80-11-1002) is located within Marine Corps Base Hawaii-Kaneohe Bay, and no adverse effects or impacts to the fishpond are anticipated as a result of the proposed project.

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

Alternative 1: Force Main No. 2 and Equalization Facilities: No significant short- or long-term impacts to historic or archaeological resources are anticipated as a result of the construction and operation of this alternative. Pre-construction sub-surface testing shall be undertaken if Alternative 1 is selected for implementation. The force main will be installed 20 to 80 feet below the sea floor of Kaneohe Bay via directional drilling or tunneling. Therefore, it is unlikely that construction will have any impact on historic or archaeological resources in the project area.

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

Alternative 2: Gravity Tunnel: No significant short- or long-term impacts are anticipated as a result of the construction and operation of this alternative since horizontal boring associated with the construction of the Gravity Tunnel would occur at depths greater than 45 feet (13.7 m). Therefore, adverse impacts on historic or archaeological resources within the project area are not anticipated. No further work is recommended for the proposed tunnel access shaft located at the BWS reservoir site

based on geotechnical testing results showing basalt extending from 61 cm below surface (2 feet) to 98 m below surface (320.5 feet). However, if a new location for the proposed tunnel access shaft is identified, additional literature review and field inspection is recommended.

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

3.4.6 Cultural Resources

Cultural Impact Assessments (CIAs) for Alternative 1: Force Main No. 2 and Equalization Facilities and Alternative 2: Gravity Tunnel were conducted by Aki Sinoto Consulting in December 2010 and Cultural Surveys Hawaii, Inc. (CSH) in November 2010, respectively. The results are summarized below and the studies are included as Appendices G and H, respectively. The CIAs involved: examination of cultural and historical resources, including Land Commission documents, historic maps and previous research reports, with the specific purpose of identifying traditional Hawaiian activities, including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record; review of previous archaeological work at and near the project area that may be relevant to reconstructions of traditional land use activities to identify cultural resources, practices, and beliefs associated with the project area; and, consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or near the parcel, and present and past uses of the project area, and/or other practices, uses, or traditions associated with the parcel and environs.

Kaneohe WWPTF: The Kaneohe WWPTF is located near the Waikalua Loko Fishpond and Naonealaa. Archaeological investigations in the neighboring areas have uncovered evidence of stone tool production and habitation.

Waikalua Loko Fishpond (SIHP Site # 50-80-10-349) is a known historic fishpond located immediately inland of Kaneohe Bay between Kaneohe Stream and Kawa Stream. Founded in 1995, the Waikalua Loko Fishpond Preservation Society was formed as a stewardship entity to care-take, stabilize, maintain, and ensure preservation of the fishpond. The mission of the society involves three parts: to preserve, stabilize, and beautify the Waikalua Loko Fishpond; to educate the Windward (Oahu) Community about ancient Hawaiian and modern Hawaiian fishpond practices; and to provide an educational resource to be made available for use by educational institutions or community organizations with respect to ancient and modern Hawaiian fishpond practices.

Naonealaa, or the sands of Laamaikahiki, is located on the north side of the mouth of Kaneohe Stream at the present-day Kaneohe Beach Park. The famous navigator Laamaikahiki from Kahiki, the ancestral homeland of Hawaiians, landed his canoe there and built three heiau, or temples, and oral traditions state that he resided there.

Loi kalo and other forms of agriculture, including the cultivation of uala, uhi, maia, hala, wauke, and awa, took place in areas of Kaneohe. Surveys near the Kaneohe WWPTF documented a terrace complex and sub-surface agricultural soil indicative of taro production. Commercial rice, sugar cane, and pineapple farming were also attempted in Kaneohe.

Kailua Regional WWTP: The Kailua Regional WWTP is located near the Nuupia Fishpond Complex (SIHP # 50-80-11-1002), which is located just north of the Kailua Regional WWTP within Marine Corps Base Hawaii-Kaneohe Bay and the Mokapu sand dunes which were most likely established burial grounds for several villages located on the leeward half of peninsula. Excavations in the mid-twentieth century unearthed over 1,000 individual burials on the leeward half of Mokapu Peninsula. Archaeological surveys in the vicinity of these areas have uncovered evidence of stone tool production and habitation, as well as a possible burial. Further, the Kailua Regional WWTP is located adjacent to Jaucas sand deposits, which often contain burials.

Alternative 1: Force Main No. 2 and Equalization Facilities: Cultural practices, such as fishing, crabbing, and clamming, and recreational activities, such as paddling and sailing, occur along the coast and in the waters of Kaneohe Bay. Kaneohe Bay is a complex estuarine system that has long been recognized as a unique marine environment with an abundance and associated marine resources, including five islets, more than ten streams, an outer barrier reef, an intermediate lagoon with numerous patch reefs, and fringing reefs near the shoreline. However, most of the recreational activities take place in the north and central bay areas rather than in the southern part of the bay.

Alternative 2: Gravity Tunnel: There are no known historic or archaeological sites along the proposed Gravity Tunnel route. The proposed route location of the BWS reservoir site tunnel access shaft currently contains a water tank, construction debris, piping, and soils for/from BWS projects. Geotechnical boring tests conducted within the BWS reservoir site tunnel access shaft portion of the project, in the vicinity of the existing water tank, show that basalt extends from 61 cm below surface (2 feet) to the bottom of the excavation, 98 m below surface (320.5 feet).

Impacts and Mitigation Measures

Kaneohe WWPTF: Land-disturbing activities occurring at Kaneohe WWPTF may inadvertently uncover cultural remains that have been covered by the existing wastewater systems. Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

If construction of the proposed project (e.g. removal of excavated material from the proposed tunnel) results in adverse water quality (e.g. silt, sewage) of the streams, fishponds, and bay waters near the Kaneohe WWPTF, there may be impacts to these resources and activities. The City shall implement Best Management Practices to avoid or reduce impacts of the project construction on the marine environment and nearby water-based cultural and recreational activities.

Kailua Regional WWTP: Land-disturbing activities occurring at Kailua Regional WWTP may uncover cultural resources that have been covered by the wastewater systems, and excavation of the tunnel construction access shaft may penetrate into unknown cultural resources, including possible burials.

If construction of the proposed project (e.g. removal of excavated material from the proposed tunnel) results in adverse water quality (e.g. silt, sewage) of the streams, fishponds, and bay waters near the Kailua Regional WWTP, there may be impacts to these resources and activities. The City shall implement Best Management Practices to avoid or reduce impacts of the project construction on the marine environment and nearby water-based cultural and recreational activities.

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

Alternative 1: Force Main No. 2 and Equalization Facilities: No significant short- or long-term impacts on cultural resources in the project area are anticipated as a result of the construction operation of this alternative since no over-water structures, floating pipes, or other obstructions would be on the surface of the bay. The proposed force main will be installed 20 to 80 feet below the sea floor of Kaneohe Bay via directional drilling or micro-tunneling. Therefore, it is unlikely that construction will have any impact on significant cultural resources in the project area.

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

Alternative 2: Gravity Tunnel: No significant short- or long-term impacts on cultural resources in the project area are anticipated as a result of the construction and operation of this alternative since horizontal boring associated with the construction of the Gravity Tunnel would occur at depths greater than 45 feet (13.7 m). Therefore, adverse impacts on cultural resources within the project area are not anticipated.

The boring of the proposed Gravity Tunnel involves the extraction of a substantial amount of crushed basalt rock which will need to be transported off-site. The City shall implement Best Management Practices to avoid or reduce impacts of the removal of excavated material (e.g. high volume of dump trucks and associated increase in noise disturbance and blowing dust) on any cultural practices (e.g. prayers or gathering of medicinal plants).

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

3.5 Socio-Economic Characteristics

3.5.1 Existing Social Context

The proposed project spans several communities, thus, from a social perspective, the entire Koolaupoko District is considered as the social context for this project.

The U.S. Decennial Census occurs every 10 years, in years ending in zero, to count the population and housing units for the entire United States. Its primary purpose is to provide

the population counts that determine how many seats in the U.S. House of Representatives are appointed. Census data is also a basis for the distribution of funds for government programs such as Medicaid; planning the locations for schools, roads, and other public facilities; and identifying trends over time that can help predict future needs.

The most recent Decennial Census was conducted in 2010 and detailed information for the study area has not been released at the time of this writing. The American Community Survey (ACS) is a relatively new nationwide survey designed to provide communities a fresh look at how they are changing. This survey collects and produces population and housing information every year instead of every ten years, and provides more up-to-date information. While it is based on estimates, the information is a good indicator of recent characteristics of the Koolapoko District. Table 3-2 provides a 2009 profile of Koolaupoko in terms of demographics, and social, housing, and economic characteristics as compared to the profile of the entire City and County of Honolulu.

Comparing both the 1990 and 2000 Decennial Census as well as the ACS 1-year estimates, the population of Koolaupoko is slowly declining. From 1990 to 2000, the population remained fairly stable as there was only 0.3% increase in the population (117,694 people versus 117,994 people, respectively). However, from 2000 to 2009, there was a decrease in the population of approximately 10% (117,994 people versus 105,712 people, respectively). This decrease was also forecast in the Koolaupoko Sustainable Communities Plan population projections.

Based upon the data shown in Table 3-2, Koolaupoko has a slightly younger population than the County. The median age of the population for Koolaupoko was 35.3 versus 37.3 for the County.

By racial mix, Koolaupoko has a slightly lower percentage of Blacks or African Americans (2.1%) than the County (3.0%) and a greatly lower percentage of Asians (23.4%) than the County (41.7%). Koolaupoko has a higher percentage of Whites (34.6%), those with two or more races (31.8%), and those with a race other than listed (1.7%) than the County (23.0%, 23.0%, and 0.8%, respectively). Whites, Asian, and those of two or more races make up the majority of the population of Koolaupoko. Percentages of Native Hawaiian and other Pacific islanders are slightly lower than the County at 6.4% and 8.2%, respectively.

According to the 2009 1-year estimates, median household income and median family income for Koolaupoko ($80,552 and $88,905, respectively) are higher than those for the County ($67,774 and $78,956, respectively).

For the educational attainment, those 25 years and older that obtained a high school diploma or higher was 94.7% while bachelor's degree or higher was 36.3% for Koolaupoko. The County data is slightly lower compared to the Koolaupoko data (90.5% and 31.3% respectively).

Koolaupoko has a slightly higher housing occupancy rate, 94.9%, than the County, 77.2%. Housing units in this region are largely occupied by home owners (63.8%). The County data is split between homes being occupied by either home owners or renters (50.2% and 41.5% respectively).

Table 3-2
Demographic Characteristics Comparison of the Koolaupoko District with the City and County of Honolulu

Subject	Koolaupoko (PUMA 0302)		City and County of Honolulu	
	Number	**Percent**	**Number**	**Percent**
Total Population	**107,718**	**100**	**907,574**	**100**
AGE				
Under 5 Years	7,921	7.3	62,926	6.9
5 – 19 Years	22,001	20.4	160,409	17.7
20 – 64 Years	61,735	57.3	548,702	60.5
65 Years and over	16,061	15.0	135,537	14.9
Median age (years)	35.3	(X)	37.3	(X)
RACE				
White	37,260	34.6	208,888	23.0
Black or African American	2,101	2.1	27,677	3.0
American Indian and Alaska Native	58	<0.1	2,392	0.3
Asian	25,250	23.4	378,101	41.7
Native Hawaiian and other Pacific Islander	6,898	6.4	74,736	8.2
Two or more races	34,294	31.8	208,287	23.0
Other	1,857	1.7	7,493	0.8
HOUSEHOLD (BY TYPE)				
Total Households	**34,224**	**100**	**309,896**	**100**
Family Households (families)	2,6514	77.5	218,085	70.4
Married-couple family	19,963	57.5	162,764	52.5
With own children under 18 year	9,065	26.5	93,380	30.1
Female householder, no husband present	5,268	15.4	37,377	12.1
With own children under 18 years	2,445	7.1	15,958	5.1
Nonfamily households	7,710	22.5	91,811	29.6
Average household size	2.96	(X)	2.84	(x)
HOUSING OCCUPANCY AND TENURE				
Total Housing Units	**35,541**	**100**	**338,119**	**100**
Occupied units	34,224	96.3	309,896	91.7
By owner	22,687	63.8	169,532	50.2
By renter	11,537	32.5	140,364	41.5
Vacant units	1,317	3.7	28,223	8.3
SOCIAL CHARACTERISTICS				
Population 25 years and over	69,747	**100**	**616,653**	**100**
High school graduate or higher	66,079	94.7	558,062	90.5
Bachelor's degree or higher	25,352	36.3	193,097	31.3
ECONOMIC CHARACTERISTICS				
Population 16 years and over	**85,433**	**100**	**729,226**	**100**
In labor force	57,304	67.1	489,322	67.1
Median household income (dollars)	80,552	(X)	67,744	(X)
Median family income (dollars)	88,905	(X)	78,956	(X)
Per capita income (dollars)	32,105	(X)	28,894	(X)

Source: 2009 American Community Survey 1-Year Estimates

Impacts and Mitigation Measures

No significant impacts on the population in the project vicinity are anticipated as the proposed project is not a population generator.

The proposed project will generally have positive social and economic impacts in the region. In the short term, the project will confer some positive benefits in the local area with additional construction jobs and indirect economic benefits to local retail businesses resulting from construction activities. Construction activities will create some adverse impacts, such as potential disruptions to local area traffic near the activity sites and increased noise nuisances in the immediate vicinity of the work sites.

In the long-term, the proposed wastewater facility improvement alternatives will reduce the risk of wastewater spillage during high rainfall events. This will allow the wastewater system to safely and efficiently accommodate projected flows up to the year 2030 and provide an adequate wastewater system to support the needs of the population and economy in the service area.

3.5.2 Economic Impact Analysis

An Economic and Fiscal Impact Analysis was conducted by Plasch Econ Pacific LLC in December 2010. The results are summarized below and the study is included as Appendix I. The economic analysis is based on an estimated construction period of approximately three years for both alternatives.

3.5.2.1 Economic Impacts of Construction

Construction Expenditures

Over the 3-year development period, total construction expenditures for Alternative 1: Force Main No. 2 and Equalization Facilities are estimated at $128 to $224 million. This translates into average construction expenditures of about $42.7 to $74.7 million per year. In practice, construction expenditures will vary from year to year. For Alternative 2: Gravity Tunnel, total construction expenditures are estimated at $102 to $163 million, or about $34 to $54.3 million per year.

Indirect Sales Generated by Construction Activity

In addition to construction expenditures, construction activity will generate indirect sales associated with supplying goods and services to construction companies and to the families of construction workers. In turn, the companies supplying goods and services, and the families of their employees, will purchase goods and services from other companies, and so on. These indirect sales will include sales by companies that supply building materials (cement, steel, lumber for forms, dynamite, etc.); sell or rent out construction equipment (excavators, cranes, drills, compressors, fans, welding torches, etc.); and provide services (repairs, trucking, shipping, warehousing, etc.). Indirect sales also include sales by grocery stores, drugstores, restaurants, service stations, beauty salons, medical providers, accountants, attorneys, insurance agents, etc.

Based on State economic multipliers, these indirect sales are expected to average $38.7 to $67.6 million per year for the Force Main construction activity, and $30.8 to $49.2 million per year for the Gravity Tunnel construction activity.

Total Construction Expenditures and Indirect Sales

Construction expenditures, plus indirect sales generated by construction, are expected to average $81.3 to $142.3 million per year for the Force Main alternative, of which $46.9 to $82 million per year will be subject to the State and City 4.5% excise tax on final sales, and $34.4 to $60.3 million per year will be subject to the 0.5% excise tax on intermediate sales. Corresponding annual figures for the Gravity Tunnel alternative are $64.8 to $103.6 million for total construction expenditures and indirect sales, of which $37.4 million to $59.7 million will be subject to the 4.5% tax on final sales, while $27.4 to $43.9 million will be subject to the 0.5% tax on intermediate sales.

Profits on construction and indirect sales are estimated to average $10.3 to 18 million per year for the Force Main construction activity, and $8.2 to $13.1 per year for the Gravity Tunnel construction activity.

Construction Employment

Over the 3-year construction period, construction employment is expected to average between 55 and 96 jobs for the Force Main alternative, and between 44 and 70 jobs for the Gravity Tunnel alternative. Construction jobs will include supervisors, heavy-equipment operators, cement workers, iron workers, carpenters, electricians, laborers, etc. Other jobs related to construction will include architects, civil engineers, draftsmen, government inspectors, etc. These jobs will range over a variety of skill levels, including entry-level, semi-skilled, skilled, management, and professional positions.

Indirect Employment Generated by Construction Activity

As with indirect sales, construction activity will generate indirect jobs associated with supplying goods and services to construction companies and to the families of construction workers. In turn, the companies supplying goods and services, and the families of their employees, will purchase goods and services from other companies, and so on. The jobs will range over a variety of skill levels, including entry-level, semi-skilled, skilled, and management positions.

Based on State employment multipliers, indirect employment related to the Force Main construction activity is expected to average from 77 to 134 jobs, and 62 to 98 jobs for the Gravity Tunnel construction activity.

Total Construction Employment and Indirect Jobs

Total direct-plus-indirect employment associated with the Force Main construction activity will average from 132 to 230 jobs, and 106 to 168 jobs for the Gravity Tunnel construction activity.

Payroll Related to Construction Activity

Force Main construction activity is expected to generate a total payroll of $7.7 to $13.4 million per year, of which $4.3 to $7.5 million will be for construction workers and $3.4 to $5.9 million will be for indirect employment. Corresponding annual figures for the Gravity Tunnel construction activity are $3.4 to $5.4 million for construction workers, and $2.7 to $4.3 million for indirect employment, for a total of about $6.1 to $9.8 million.

Annual wages for both Alternatives 1 and 2 will range from about $25,000 to over $100,000 per year, and are expected to average about $78,000 for construction jobs, and about $44,200 for indirect jobs.

Population and Housing Supported by Construction Activity
During the construction period, direct and indirect jobs provided by the Force Main construction activity will support 274 to 479 residents housed in 91 to 158 homes. Corresponding figures for the Gravity Tunnel construction activity are 221 to 350 residents housed in 73 to 115 homes.

Sources of Construction Workers
Except for a small number of specialized supervisors and workers, it is expected that over 90% of the construction workers for both Alternatives 1 and 2 will come from Oahu.

3.5.2.2 Economic Impacts of Operations

Operating Expenditures
Annual operating expenditures are expected to average $1.7 to $2.4 million for the Force Main alternative, and $500,000 to $800,000 for the Gravity Tunnel alternative.

Indirect Sales Generated by Operations
In addition to operating expenditures, operations will generate indirect sales associated with 1) the City's purchase of goods and services to support operations, and 2) the purchase of goods and services by the families of employees. In turn, the companies supplying goods and services, and the families of their employees, will purchase goods and services from other companies, and so on. These indirect sales will include sales by companies that supply chemicals, electricity, repair services, etc. Indirect sales also include sales by grocery stores, drugstores, restaurants, service stations, beauty salons, medical providers, accountants, attorneys, insurance agents, etc.

Based on State economic multipliers, these indirect sales are expected to average $1.6 to $2.3 million per year for the Force Main alternative, and $400,000 to $700,000 per year for the Gravity Tunnel alternative.

Total Operating Expenditures and Indirect Sales
Operating expenditures plus indirect sales generated by operations are expected to average $3.3 to $4.7 million per year for the Force Main alternative, of which $1.1 to $1.6 million per year will be subject to the State and City 4.5% excise tax on final sales, and $1.1 to $1.5 million per year will be subject to the 0.5% excise tax on intermediate sales. Corresponding annual figures for the Gravity Tunnel alternative are $940,000 to $1.5 million for total operating expenditures and indirect sales, of which $320,000 to $510,000 will be subject to the 4.5% excise tax on final sales, and $300,000 to $480,000 will be subject to the 0.5% excise tax on intermediate sales.

Profits Related to Operations
Profits of the companies that provide goods and services to support project operations and indirect sales are estimated at $220,000 to $310,000 per year for the Force Main alternative, and $60,000 to $100,000 per year for the Gravity Tunnel alternative.

Operating Employment and Related Jobs
Operating employment is expected to range from 13 to 19 employees for the Force Main alternative, and three to five employees for the Gravity Tunnel alternative.

Indirect Employment Generated by Operations
Additional jobs will be generated by the City's purchase of goods and services to support operations, and the purchase of goods and services by the families of the project employees. Based on State economic multipliers, these purchases are expected to generate seven to ten indirect jobs for the Force Main alternative, and two to three jobs for the Gravity Tunnel alternative.

Total Operating Employment and Indirect Jobs
Operating employment plus indirect jobs are expected to total 20 to 29 jobs for the Force Main alternative, and five to eight jobs for the Gravity Tunnel alternative.

Payroll Related to Operations
Force Main operations are expected to generate a total payroll of $970,000 to $1.4 million per year, of which $660,000 to $940,000 will be for operations employees and $310,000 to $440,000 will be for indirect jobs. Corresponding figures for the Gravity Tunnel operations are $165,000 to $260,000 for operations employees, and $90,000 to $130,000 for indirect jobs, for a total of about $250,000 to $400,000 annually. Annual wages will range from about $25,000 to over $100,000 per year, and are expected to average about $49,800 for operations jobs, and about $44,200 for indirect jobs.

Population and Housing Supported by Operations
Direct and indirect jobs provided by the Force Main operations activity will support 42 to 61 residents housed in 14 to 20 homes. Corresponding figures for the Gravity Tunnel operations activity are 10 to 16 residents housed in three to five homes.

Sources of Operating Workers
Most workers for project operations will be drawn from existing positions within the City's Department of Environmental Services, including positions associated with the existing wastewater conveyance and treatment facilities in Kaneohe and Kailua.

Impacts of Construction Activity on State and City Finances
State: Force Main construction is projected to generate a total of $7.6 to $13.2 million in tax revenues for the State, while Gravity Tunnel construction is projected to generate a total of $6 to $9.6 million in revenues. State revenues will be derived from excise taxes on final and intermediate sales (taxed at 4% and 0.5%, respectively), and from corporate and personal income taxes. State services for construction workers and their families are, for the most part, already provided since most of the needed construction workers are current residents of Oahu.

City: For the City, Force Main construction is projected to generate a total of $700,000 to $1.2 million in tax revenues, while Gravity Tunnel construction is projected to generate a total of $560,000 to $900,000 in revenues. City revenues will be derived from the 0.5% excise tax on final sales that helps fund the rapid transit system. As with the State, City services for construction workers and their families are already provided since most of the needed construction workers are current residents of Oahu. Also, the City will not incur costs for on-site security, sanitation, etc., since these services will be provided by the construction companies.

Impacts of Operations on State and City Finances

State: For the Force Main alternative, project operations will generate $100,000 to $140,000 per year in tax revenues to the State. Corresponding figures for the Gravity Tunnel alternative are $30,000 to $40,000 per year. State revenues will be derived from excise taxes on final and intermediate sales (taxed at 4% and 0.5%, respectively), and from corporate and personal income taxes. The revenues will help fund State services to those residents supported by project operations.

City: For the Force Main alternative, project operations will generate $5,000 to $8,000 per year in tax revenues to the City, while the Gravity Tunnel operations will generate $1,500 to $2,500 per year. City revenues will be derived from the 0.5% excise tax on final sales that helps fund the rapid transit system.

3.5.3 Community Impacts

Alternative 1: Force Main No. 2 and Equalization Facilities: This alternative involves constructing a 36-inch force main beneath the seafloor of Kaneohe Bay. This alternative will traverse a distance of approximately 14,900 linear feet from the existing pump station at the Kaneohe WWPTF to the Kailua Regional WWTP. The first 1,200 linear feet between the pump station and the spit of land forming the northwest side of Waikalua Fishpond will be constructed by HDD or tunneling, as described in Section 2.3.1. The final approximately 2,800 linear feet from the Interstate H-3 Interchange and Kaneohe Bay Drive (Kailua end) will be constructed by conventional open trenching methods and auger boring, or microtunneling under roadways that are part of the H-3 Freeway Interchange and Kaneohe Bay Drive.

Although the Force Main No. 2 will be placed under the seafloor of Kaneohe Bay, construction work above ground will occur at primary locations where construction equipment noise sources may be operating. These primary locations will be at or near the Kaneohe WWPTF and Waikalua Loko Fishpond (Kaneohe end) and the H-3 Freeway Interchange/Kaneohe Bay Drive (Kailua end) and Kailua Regional WWTP.

The majority of the alignment will be under the seafloor of Kaneohe Bay. Figure 3-12 shows the existing and surrounding uses in proximity to the Kaneohe WWPTF and Kailua Regional WWTP. The surrounding area is generally developed and is predominantly characterized by residential neighborhoods with supporting business establishments located along major thoroughfares.

Alternative 2: Gravity Tunnel: This alternative involves constructing an approximately 16,000 foot long tunnel from the Kaneohe WWPTF to the Kailua Regional WWTP. The tunnel will be aligned to traverse under Oneawa Hills, mauka of Kaneohe Bay Drive.

Although the Gravity Tunnel will be placed under the Oneawa Hills, construction work above ground will occur at primary locations where construction equipment noise sources may be operating. These primary locations will be at the Kaneohe WWPTF (Kaneohe end), the Kailua Regional WWTP (Kailua end), and the BWS reservoir site (mid-point access shaft).

The majority of the alignment will be under the Oneawa Hills where the land is open and undeveloped. The developed areas are located around the Kaneohe WWPTF and Kailua Regional WWTP. These developed areas consist of neighborhoods, predominantly residential, with supporting business establishments located along major thoroughfares.

Kaneohe WWPTF: The Kaneohe WWPTF encompasses approximately 15 acres in the Puohala Village Subdivision. Puohala Village is predominantly a single-family residential subdivision. Surrounding land uses include the Bayview Golf Course to the west and south, Waikalua Loko Fish Pond to the east-northeast, Kokokahi YWCA to the east, and residences and Kaneohe Stream to the north.

Bayview Golf Park encompasses approximately 140 acres and consists of an 18-hole par-three golf course, with a driving range, pro shop, and a zipline attraction.

Kokokahi YWCA is located one-fourth mile to the east of Kaneohe WWPTF. Located along Kaneohe Bay, Kokokahi YWCA encompasses approximately 11 acres of waterfront property which includes a gymnasium, kitchen and dining area, pool with lockers, cabins, classrooms, and meeting spaces.

Puohala Elementary School serves students from Puohala Village, Pikoiloa, and Kokokahi. Approximately 200 students were enrolled at Puohala Elementary School during the 2009-2010 school year (State Department of Education, November 2010).

Waikalua Loko Fishpond is one of the few remaining intact Hawaiian fishponds in the State. Waikalua Loko Fishpond is located immediately to the east of Kaneohe WWPTF and encompasses approximately 11 acres. Waikalua Loko Fishpond is maintained by the Waikalua Loko Fishpond Preservation Society and provides cultural and educational resources for the community.

Waikalua and Kokokahi neighborhoods, located one-fourth mile to the south and southeast of Kaneohe WWPTF, consist of single-family residences.

Kailua Regional WWTP: The Kailua Regional WWTP is located in Aikahi on approximately 25 acres. The site is bounded by Nuupia Ponds and the Marine Corps Base Hawaii-Kaneohe Bay facility to the north and west, Aikahi Gardens townhouse complex to the southwest, Aikahi Elementary School to the southeast, and Aikahi Park residences to the east.

Constructed in 1971, Aikahi Gardens is a fee-simple townhome development encompassing approximately 23 acres and consists of approximately 148 units. Aikahi Gardens is located along Kaneohe Bay Drive, across from the Kailua Regional WWTP.

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

EXISTING AND SURROUNDING USES

FIGURE 3-12

Aikahi Park, located northeast of the Kailua Regional WWTP, is mostly single-family homes built in the 1960s.

Aikahi Elementary School is located to the east of the Kailua Regional WWTP. Approximately 420 students were enrolled during the 2009-2010 school year (State Department of Education, November 2010).

Nuupia Ponds, located to the northwest of the Kailua Regional WWTP, is a large waterbody at the neck of Mokapu Peninsula and is within the Marine Corps Base Hawaii-Kaneohe Bay. Nuupia Pond is under federal protection and management as a habitat for endangered species.

Oneawa Hills, or Kalaheo Hillside, is located to the south of the Kailua Regional WWTP, along Mokapu Road in Kailua. The majority of these homes were constructed in the late 1950s and early 1960s, and consist of single family homes.

Impacts and Mitigation Measures

Construction activities associated with the proposed project will create some adverse impacts, such as temporary disruption of traffic and on-street parking on nearby streets; unavoidable noise impacts in the vicinity of the Kaneohe WWPTF and Kailua Regional WWTP; and ambient air quality from dust generated by soil disturbance and emissions from construction vehicles and equipment. The properties which are anticipated to be most affected by construction activity impacts are those residences, schools, and businesses located in the immediate vicinity of the Kaneohe WWPTF and Kailua Regional WWTP. Refer to Sections 3.6 through 3.9 in this Chapter regarding Air Quality, Noise, Vibration, and Traffic, respectively, for further discussion on potential impacts.

In the long-term, operation of either alternative will have no significant impact on noise, air, vibration, and traffic in the vicinity of the Kaneohe WWPTF, Kailua Regional WWTP, or along the alternative alignments.

3.5.4 Community Concerns

As part of the community outreach program (further discussed in Chapter 11), a Core Work Group (CWG) was convened by the City to maintain discussion of the project with a diverse group of people over several months. The most significant contribution the CWG had in this project was to ensure that community values were considered during the process. The CWG was asked to identify community values of the various interests represented in the group. A total of 19 values emerged and the CWG was asked to weigh them in terms of importance. The following were the top five community values:

1. Operational impacts on the water quality of Kaneohe Bay and groundwater
2. Reliability / Fail-safe
3. Impacts on cultural resources and landscapes
4. Operational impacts on neighborhood (odor, noise, visual)
5. Construction impacts on Kaneohe Bay and Waikalua Loko Fishpond

The results of this exercise revealed the community is concerned with construction and operational impacts on Kaneohe Bay, Waikalua Loko Fishpond, cultural resources, and nearby neighborhoods.

Discussions on the above concerns and potential impacts and mitigation measures are further discussed in applicable sections of Chapter 3.

3.6 Air Quality

An Air Quality Study was prepared by B.D. Neal and Associates in April 2010. The results are summarized below and the study is included as Appendix J. Present air quality in the project area is mostly affected by air pollutants from motor vehicles, industrial sources, military facilities, agricultural operations, and to a lesser extent by natural sources. Air pollutant emissions for the island of Oahu are only available for calendar year 1993, the latest information that is available. Although it has become dated, some useful information may still be derived from it. The emission rates pertain to manmade emissions only, i.e., emissions from natural sources are not included. Much of the particulate emissions on Oahu originate from area sources, such as the mineral products industry and agriculture. Sulfur oxides are emitted almost exclusively by point sources, such as power plants and refineries. Nitrogen oxides emissions emanate predominantly from industrial point sources, although area sources (mostly motor vehicle traffic) also contribute a significant share. The majority of carbon monoxide emissions occur from area sources (motor vehicle traffic), while hydrocarbons are emitted mainly from point sources.

Based on previous emission inventories that have been reported for Oahu, emissions of particulate and nitrogen oxides may have increased during the past several years, while emissions of sulfur oxides, carbon monoxide and hydrocarbons probably have declined. The State DOH operates a network of air quality monitoring stations at several locations on Oahu, although all of the stations are located in leeward areas. Data from some of these stations include annual summaries of air quality measurements that were made at selected stations for several of the regulated air pollutants for the period 2004 through 2008.

During the 2004-2008 period, sulfur dioxide was monitored by the State DOH at an air quality station located in downtown Honolulu. Concentrations monitored were consistently low compared to the standards. Annual second-highest 3-hour concentrations (which are most relevant to the air quality standards) ranged from 36 to 57 micrograms per cubic meter (µg/m3), while the annual second highest 24-hour concentrations ranged from 5 to 18 µg/m3. Annual average concentrations were only about 1 to 3 µg/m3. These values represent only about 5% or less of the allowable maximum concentrations. There were no exceedances of the State/National 3-hour or 24-hour Ambient Air Quality Standards (AAQS) for sulfur dioxide during the 5-year period.

Particulate matter less than 10 microns in diameter (PM-10) is also measured at the Honolulu monitoring station. Annual second highest 24-hour PM-10 concentrations ranged from 23 to 35 µg/m3 between 2004 and 2008. Average annual concentrations ranged from 13 to 15 µg/m3. These values are less than about 30% of the allowable concentrations. All values reported were within the State and National AAQS.

Carbon monoxide measurements were also made at the Honolulu monitoring station. The annual second-highest 1-hour concentrations ranged from 1.8 to 3.1 milligrams per cubic meter (mg/m3). The annual second highest 8-hour concentrations ranged from 1.2 to 1.6 mg/m3. These values represent about 30% or less of the allowable concentrations. No exceedances of the State or National 1-hour or 8-hour AAQS were reported.

Nitrogen dioxide is monitored by the DOH at the Kapolei monitoring station. Annual average concentrations of this pollutant ranged from 8 to 9 µg/m3, safely inside the State AAQS of 70 µg/m3. The nearest available ozone measurements were obtained at Sand Island. The second-highest 8-hour concentrations for the 2004-2008 monitoring period ranged from 69 to 108 µg/m3. These concentrations are within the State and Federal standards which limit the three-year average of the fourth-highest value to 157 µg/m3.

The nearest and most recent measurements of ambient lead concentrations that have been reported were made at the downtown Honolulu monitoring station between 1996 and 1997. Average quarterly concentrations were near or below the detection limit, and no exceedances of the State AAQS were recorded. Monitoring for this parameter was discontinued during 1997. Air quality in the project area is likely better than that measured at leeward locations because of the windward situation. Thus, although there is no specific air quality monitoring data for the project area, it is probable that the present air quality is within standards, except perhaps for small areas around industrial sources or near traffic congested locations.

Impacts and Mitigation Measures

Kaneohe WWPTF: Construction of the equalization facilities at the Kaneohe WWPTF associated with the Alternative 1: Force Main No. 2 and Equalization Facilities will disturb a greater area of soil at the facility than Alternative 2: Gravity Tunnel. Fugitive dust will be created from construction activities, as well as from the handling of spoils, particularly dry spoils. Potential air quality impacts during construction of the proposed project will be mitigated by complying with DOH Administrative Rules, Title 11, Chapter 60-11.1, “Air Pollution Control”. Compliance with State regulations will require adequate measures to control fugitive dust by methods such as water spraying of loose or exposed soil or ground surface areas and dust-generating equipment during construction. Exhaust emissions from construction vehicles are anticipated to have a negligible impact on air quality in the project vicinity, as the emissions would be relatively small and readily dissipated.

In the long-term, the primary air quality concern will be potential odor nuisance associated with the equalization facilities in Alternative 1. The equalization facilities will only be in use during periods of heavy rainfall to hold excess wastewater until it can be pumped to the Kailua Regional WWTP for treatment and disposal. After such periods of heavy rainfall, the empty equalization facilities will be cleaned and allowed to dry until it is needed again. In the Gravity Tunnel alternative, odor control will be provided at the drop-shaft, where wastewater will enter the tunnel.

Kailua Regional WWTP: Short-term construction-related impacts may occur at the Kailua Regional WWTP with the Force Main alternative associated with the open

trenching work proposed along Kaneohe Bay fronting the Kailua Regional WWTP. This will generate excavated materials which will be temporarily stored and later backfilled to the trench. Excess materials will be removed from the site and disposed of properly. Fugitive dust will be generated by construction activities and from excavated materials, particularly dry soils. In general, the Gravity Tunnel alternative will involve significantly greater construction activity and spoils removal compared to the Force Main alternative.

Potential air quality impacts during construction of the proposed project will be mitigated by complying with DOH Administrative Rules, Title 11, Chapter 60-11.1, "Air Pollution Control". Compliance with State regulations will require adequate measures to control fugitive dust by methods such as water spraying of loose or exposed soil or ground surface areas and dust-generating equipment during construction. Exhaust emissions from construction vehicles are anticipated to have a negligible impact on air quality in the project vicinity, as the emissions would be relatively small and readily dissipated.

In the long-term, the primary air quality concern will be the odor generated from the Kailua Regional WWTP. In the Force Main alternative, odor control measures being designed for the plant will also address odor control for the new force main, including the equalization facilities. The equalization facilities will only be in use during periods of heavy rainfall to hold excess wastewater until it can be treated. In the Gravity Tunnel alternative, odor control will be provided at the influent pump station where wastewater will be drawn from the tunnel for processing.

Alternative 1: Force Main Route: No significant short- or long-term air quality impacts are anticipated along the corridor. Force Main No. 2 will be installed using directional drilling or micro-tunneling technology 20 feet below the sea floor of Kaneohe Bay.

Alternative 2: Gravity Route: No significant short- or long-term air quality impacts are anticipated along the route. The Gravity Tunnel will be built using a TBM where the bottom of the bore will be approximately 37 feet below sea level to approximately 64 feet below sea level at the Kailua Regional WWTP.

3.7 Noise

The noise descriptor currently used by Federal Highway Administration (FHWA) and Department of Housing and Urban Development (HUD) to assess environmental noise is the Day-Night Average Sound Level (DNL). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels.

As a general rule, noise levels of 55 DNL or less occur in rural areas, or in areas which are removed from high volume roadways. In urbanized areas which are shielded from high volume streets, DNL levels generally range from 55 to 65 DNL, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 DNL, and as high as 75 DNL when the roadway is a high speed freeway. In the project area immediately adjacent to Kaneohe Bay, traffic noise levels (as well as background noise levels) tend to be very low, and are at or less than 55 DNL.

For purposes of determining noise acceptability for funding assistance from federal agencies, an exterior noise level of 65 DNL or less is considered acceptable for residences. This standard is applied nationally, including Hawaii.

The State DOH regulates noise from construction activities through the issuance of permits for allowing excessive noise during limited time periods. The limited time periods normally permitted are the daytime hours on weekdays and Saturdays, with noisy construction activities not permitted on Sundays and holidays. State DOH noise regulations are expressed in maximum allowable property line noise limits rather than DNL. Although they are not directly comparable to noise criteria expressed in DNL, State DOH noise limits for residential, commercial, and industrial lands equate to approximately 55, 60, and 76 DNL, respectively.

Separate noise studies were conducted for Alternative 1: Force Main No. 2 and Equalization Facilities and Alternative 2: Gravity Tunnel by Y. Ebisu & Associates. The results are summarized below and the studies are included in Appendices K and L. The existing and potential construction noise levels associated with trenchless construction methods were evaluated. In addition, the potential construction noise levels and impacts associated with open trenching operations and the transportation of spoils and materials from the construction sites were evaluated.

The coastline of Kaneohe Bay is removed from major roadways such as Kaneohe Bay Drive, H-3 Freeway, and Kamehameha Highway. As a result, the existing background ambient noise levels within the project environs are relatively low and controlled by the sounds of natural and human activities, and distant traffic and local traffic on roadways in the project area. The natural sounds could include the sound of surf, birds, animals, insects, and foliage moving with the wind. The sounds of human activities could include lawn mowers, leaf blowers, music, home construction, and conversations. Background noise levels during the daytime tend to be higher with intermittent excursions to the 60 or 80 decibels (dBA) level during intermittent noise events, while background noise levels during the nighttime tend to be lower and drop to levels below 30 dBA during the quietest periods.

Existing evening, nighttime, and early morning background noise levels were measured at six locations (A, B, C, D, E, and F) to provide a basis for describing the existing background noise levels at noise sensitive receptors (See Figure 3-13). Noise measurements were performed during the months of December 2008 and October 2009.

Table 3-3 contains the results of the nighttime background noise measurements at Locations A, B, and D through F. At Location C, background noise was measured continuously in December 2008. The results indicate that residents along the shoreline of Kaneohe Bay probably experience relative low levels of background noise during the nighttime period, particularly when they are located away from or shielded from the major roadways. Existing average background noise levels during the daytime hours probably range from 55 to 60 dBA, and existing average background noise levels during the nighttime hours probably range from 35 to 45 dBA, and are probably similar to the State DOH property line noise limits of 55 dBA and 45 dBA for daytime and nighttime periods, respectively.

Along the major roadways in the project area, such as Kaneohe Bay Drive, existing background noise levels are controlled by traffic noise. At approximately 50 feet from the centerline of Kaneohe Bay Drive, traffic noise levels range from 72 to 86 dBA during motor vehicle passbys, with average noise levels ranging from 56 to 66 dBA. Traffic noise levels tend to be highest at the first row of dwellings which front the roadway, and diminish at dwellings which are further removed from the roadway or which are shielded by the terrain and structures which block the visual line of sight between the dwelling and roadway vehicles. Traffic noise levels tend to be highest during the daytime hours, increasing rapidly during the morning commuting period, remaining relatively constant during the daytime hours, increasing slightly during the afternoon commuting period, and decreasing during the evening and nighttime period to its lowest level at 3:30 a.m. to 4:30 a.m..

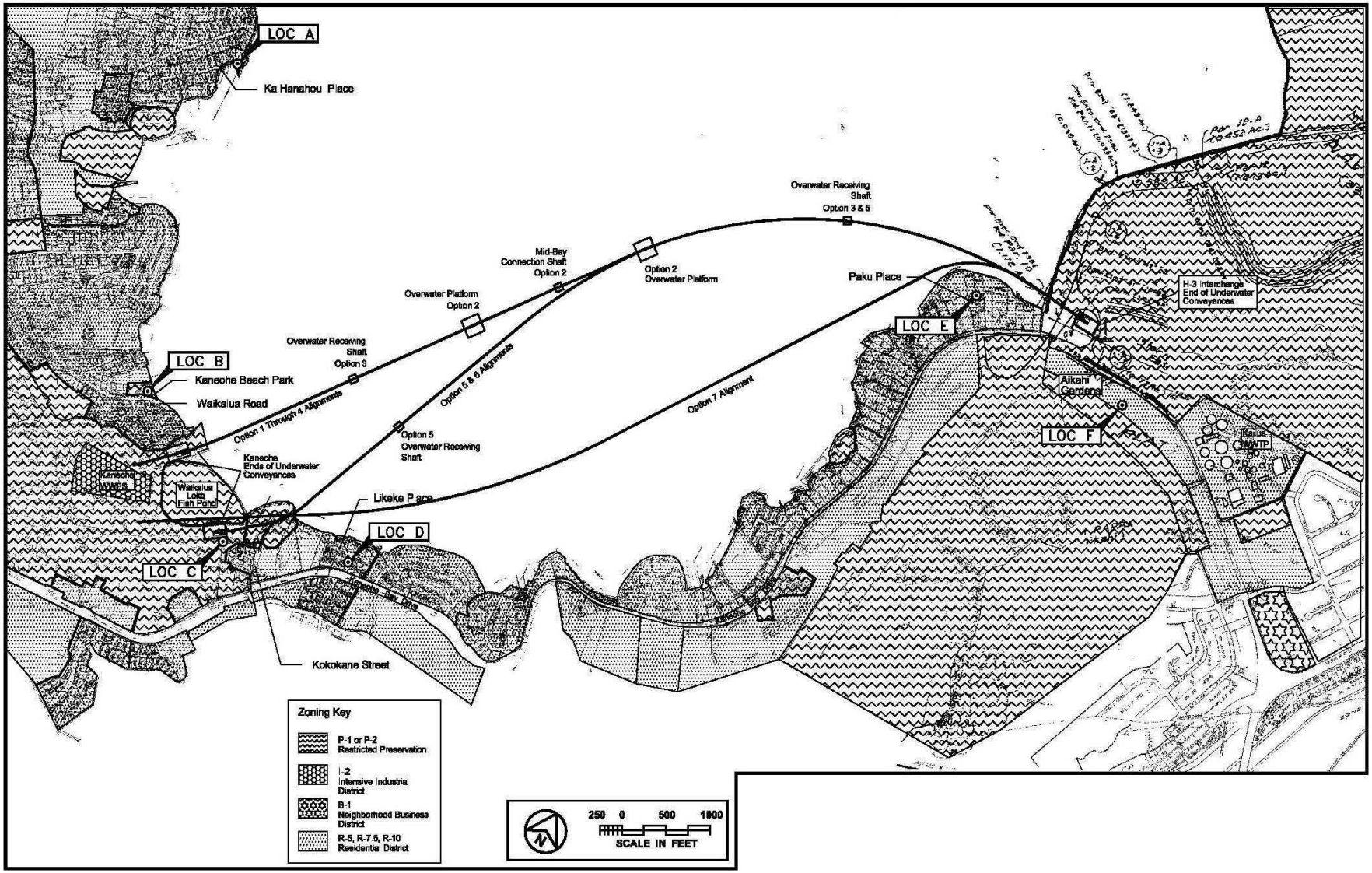
Noise levels from the existing wastewater facilities are primarily associated with equipment used in the collection and treatment process. Primary noise sources are electrical motor generators, air compressors and standby electrical generators.

Impacts and Mitigation Measures

Alternative 1: Force Main No. 2 and Equalization Facilities: Potential noise impacts are associated with the construction of Alternative 1: Force Main No. 2. Although the force main will be placed under the seafloor of Kaneohe Bay, construction work above ground will occur at primary locations where noise generating equipment will be operating. These locations include the perimeter of the Waikalua Loko Fish Pond, a portion of the Bayview Golf Course (Kaneohe end), and the H-3 Freedway Interchange at Kaneohe Bay Drive (Kailua end).

Typical noise levels of construction equipment are shown in Table 3-4 and Figure 3-14. Noise from construction equipment will decrease with increasing distance from the project site. The setback distances between the residences and the construction equipment at the Kaneohe WWPTF and Kailua Regional WWTP is relatively small, therefore the relatively high noise levels during construction may be unavoidable, especially during operations of mobile equipment such as trenchers, loaders, diesel trucks, backhoes, vacuum trucks, and cranes. This type of equipment tends to operate over short periods of time. Equipment which tends to operate continuously, such as generators, pumps, slurry plant, ventilation fans, etc., are typically fixed at specific locations on the construction site and could be fitted with sound attenuation treatments (barriers, enclosures, silencers, etc.); such equipment typically will generate less noise than mobile construction equipment.

At the Kaneohe end, the existing residences which surround Bayview Golf Course and Waikalua Loko Fish Pond would have the highest risk of adverse noise impacts from Alternative 1: Force Main No. 2. At the H-3 Freeway Interchange end of the project route, lower risks of adverse noise impacts are expected due to the proximity of the construction site to the H-3 Freeway and wider expanse of vacant lands around that area.



Source: Y. EBISU & ASSOCIATES, *Acoustic Study for the Gravity Tunnel Between Kaneohe WWPS and Kailua WWTF, December 2010*

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	**KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES**	FIGURE **3-13**
	NOISE MEASUREMENT LOCATIONS	

Table 3-3
Nighttime Background Noise Measurements
At Locations A, B, And D Through F

Location: Kaneohe Bay For Kaneohe / Kailua Force Main No. 2
Date: October 22-23, 2009

Start Time	End Time		Leq	Lmax	Lmin	L1	L10	L50	L90	L99	Event Description
Location "A" – Kahanahou Place											
1858	1913		51.9	72.1	46.1	60.0	54.1	50.6	47.9	46.6	
2144	2159		53.6	72.9	46.3	60.3	56.8	51.7	48.7	47.2	
2347	0002		40.9	59.8	31.4	49.3	45.4	36.2	32.9	31.9	
0156	0211		31.9	54.2	28.4	37.5	33.4	31.4	29.7	28.8	
0353	0408		44.9	70.4	29.9	58.5	39.4	34.1	32.3	30.8	
Location "B" – Waikalua Road, Kaneohe Beach Park											
1924	1939		48.7	68.6	43.3	56.8	51.5	46.7	44.7	43.5	
2121	2136		45.6	70.9	39.8	52.6	47.6	44.4	42.1	40.4	
2322	2337		35.9	57.1	31.9	42.0	37.3	34.7	33.2	32.3	
0134	0150		40.4	58.4	34.7	46.5	43.1	39.6	36.6	34.6	
0332	0347		37.1	68.3	29.6	42.7	38.2	34.2	31.5	30.0	
Location "D" – Likeke Place											
1950	2005		54.7	71.3	41.9	60.7	57.0	53.6	50.7	43.8	Loud Music From Nearby Home
2056	2111		55.9	65.9	40.9	60.3	58.0	55.7	52.9	47.0	Loud Music From Nearby Home
											Intermittent Weak Music
0108	0123		41.9	53.7	39.8	46.3	43.3	41.4	40.6	40.0	Music Not Audible
0308	0323		36.3	55.2	31.7	44.0	38.6	34.1	32.5	32.0	
Location "E" - Paku Place											
2035	2050		45.8	61.1	39.6	54.8	48.3	43.9	42.2	41.2	
2234	2249		46.8	71.9	40.0	57.7	46.4	45.0	44.1	40.4	
0046	0101		38.1	62.8	33.9	44.5	39.9	36.8	34.8	34.2	
0247	0302		39.0	54.3	37.2	42.7	40.1	38.6	37.9	37.1	
Location "F" – Aikahi Gardens											
2016	2031		56.3	71.8	40.4	64.8	60.6	52.1	44.3	42.0	
2215	2230		55.1	73.9	37.6	64.9	59.7	49.1	41.0	38.6	
0019	0034		50.1	71.1	34.6	64.0	51.2	38.4	36.1	35.2	
0228	0243		49.7	71.0	32.7	64.0	49.6	38.1	35.2	33.8	

Notes:

a. Leq = Average A-Weighted Sound Level (in dBA)
b. Lmax = Maximum A-Weighted Sound Level (in dBA)
c. Lmin = Minimum A-Weighted Sound Level (in dBA)
d. L10 = A-Weighted Sound Level (in dBA) which was exceeded 10 percent of the time.
e. Lxx = A-Weighted Sound Level (in dBA) which was exceeded xx percent of the time.

Source: Y. Ebisu & Associates. Acoustic Study For The Kaneohe / Kailua Force Main No. 2 Trenchless Options Under Kaneohe Bay. December, 2010.

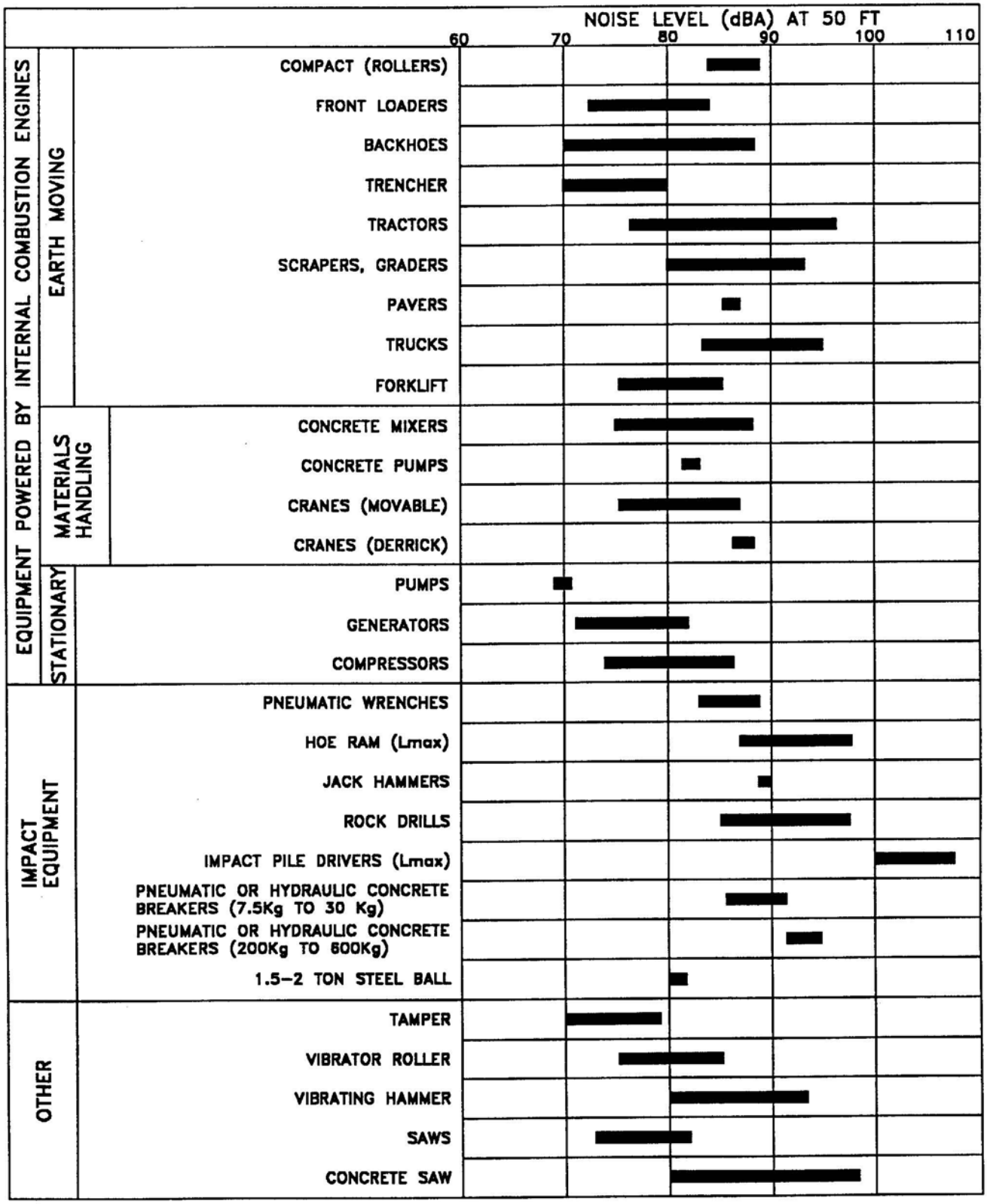
Sub-Alternative 1A - Horizontal Directional Drilling (HDD): Sub-Alternative 1A involves the use of HDD rigs operating at both the Kaneohe WWPTF and H-3 Freeway Interchange ends of the route. Sheet pile driving will be required at both ends during open trenching and pit excavation activities. In addition, insertion of a steel casing approximately 1,500 feet into the soft bottom of Kaneohe Bay prior to pilot hole drilling at Kaneohe WWPTF will be required to prevent frac out during the drilling activity. This casing will need to be driven into the ground along the slanted drill path using a pneumatic hammer.

Table 3-4
Ranges Of A-Weighted Sound Levels Of Construction Equipment At 50-Foot Distance

Equipment	Sound Levels (dBA) (Minimum / Maximum)
Excavator	70 / 90
Backhoe	72 / 85
Forklift / Loader	72 / 85
25 Ton Crane	78 / 87
225 KW Generator	67
Trash Pump	70 / 80
Vacuum Truck	72 / 85
80 Ton KRUPP Crane (quiet)	62 / 73
40 Ton KRUPP Crane	73 / 83
Ventilation Fan	70 / 70
Beeper Type Back Up Alarm	86 / 91
Broadband Back Up Alarm	86 / 89

Source: Y. Ebisu & Associates. Acoustic Study For The Gravity Tunnel Between Kaneohe WWPS And Kailua WWTP. December 2010.

Table 3-5 summarizes the potential noise impacts at the Kaneohe and Kailua ends of the force main alignment for the two construction methods being proposed. Construction noise levels will be highest (73 to 79 dBA) at residences across Kaneohe Stream toward Heeia due to the relatively small buffer distances (150 to 250 feet) between the residences and the construction equipment. Residences which are west of the Kailua Regional WWTP will experience the next highest construction noise levels of 65 to 66 dBA, followed by Aikahi Gardens residences with construction noise levels of 59 to 60 dBA. Residences to the south of the Kaneohe WWPTF are predicted to experience the lowest construction levels of 55 to 58 dBA. During impact pile driving activities at the Kaneohe WWPTF, maximum noise levels associated with the pile driving impacts are predicted to be 8 to 11 dBA higher than during the other construction activities.



Source: Y. EBISU & ASSOCIATES
Acoustic Study for the Gravity Tunnel Between Kaneohe WWPS and Kailua WWTF, December 2010

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	**KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES**	FIGURE **3-14**
	RANGES OF CONSTRUCTION EQUIPMENT NOISE LEVELS	

Table 3-5
Alternative 1 Force Main No. 2
Summary Of Predicted Noise Levels For
HDD And Hybrid Tunnel Sub-Alternatives

Construction Method	Kaneohe / Bayview End	H-3 Interchange/Kailua End
Sub-Alternative 1A: HDD	HDD Rig; Cranes during pullback 73 to 79 dBA at Heeia Side 55 to 58 dBA at Kaneohe Bay Drive Side	HDD Rig; Cranes during pullback 65 to 66 dBA at Kaneohe Bay Drive West 59 to 60 dBA at Aikahi Gardens to East
Sub-Alternative 1A: HDD	Impact Pile Driving: 85 to 90 dBA at Heeia Side 65 to 67 at Kaneohe Bay Drive Side	Impact Pile Driving: 74 to 76 dBA at Kaneohe Bay Drive to Southwest 66 to 68 dBA at Aikahi Garden's to Southeast
Sub-Alternative 1B: Hybrid Tunnel	Tunnel Boring Machine: 70 to 79 dBA at Heeia Side 55 to 58 dBA at Kaneohe Bay Drive Side	Tunnel Boring Recover: 68 dBA @ Kaneohe Bay Drive to Southwest 62 dBA at Aikahi Gardens to Southeast
Sub-Alternative 1B: Hybrid Tunnel	Impact Pile Driving: 85 to 90 dBA at Heeia Side 65 to 67 at Kaneohe Bay Drive Side	Impact Pile Driving: 76 to 78 dBA at Kaneohe Bay Drive to Southwest 70 to 72 dBA at Aikahi Garden's to Southeast

Source: Y. Ebisu & Associates, Acoustic Study For The Kaneohe / Kailua Force Main No. 2 Trenchless Options Under Kaneohe Bay. December 2010.

Sub-Alternative 1B - Hybrid Tunnel: Sub-Alternative 1B involves the use of Hybrid Tunneling (microtunneling for the first 3,000 feet using jacked steel casing, followed by the same TBM system). The majority of the construction work for this option will occur at the Kaneohe WWPTF, including jacking/launching pit, with work at the Kailua Regional WWTP involving construction of the TBM recovery pit and recovery of TBM.

Table 3-5 shows the predicted noise levels at the residences closest to the construction sites at both the Kaneohe WWPTF and the Kailua Regional WWTP. Construction noise levels will be highest (70 to 79 dBA) at residences across Kaneohe Stream toward Heeia due to the relatively small buffer distances between the residences and the construction equipment. Residences west of the Kailua Regional WWTP will experience the next highest construction noise levels of approximately 68 dBA, followed by Aikahi Gardens residences with construction noise levels of approximately 62 dBA. Residences to the south of the Kaneohe WWPTF are predicted to experience the lowest construction noise levels of 55 to 58 dBA. The noise from impact pile driving activities will be associated with the installation of shoring plates during trenching and pit construction at both ends of the alignment.

Open Trenching: Construction noise levels during open trenching operations are anticipated to be similar to those previously shown in Figure 3-14, and range between 80 to 90 dBA at 50 feet distance from the operating equipment. Those residences which are within direct lines-of-sight and which are closest to the construction equipment will tend to experience the highest noise levels. Force main construction using the open trenching method is expected to occur between the Kaneohe end of the tunnel to the Kaneohe WWPTF, and between the H-3 Freeway Interchange end of the force main to Kailua Regional WWTP. The open trenching work at the Kailua end will follow the Kaneohe Bay Drive ROW between the H-3 Freeway Interchange end of Force Main No. 2 and the Kailua Regional WWTP.

Transportation Truck Operations: Materials excavated from Alternative 1: Force Main No. 2 will be collected at the Kaneohe WWPTF and possibly at the H-3 Freeway Interchange end of the route. These materials will need to be transported to off-site locations at a maximum frequency of 6 loads per hour from both ends of the Force Main alternative.

The maximum noise level during the truck passby may be as high as 90 dBA at 50 feet and 94 dBA at 25 feet distance from the roadway centerline. At a total of 12 (6 in bound and 6 outbound) heavy truck trips per hour, the average hourly noise level (Leq(h)) from the truck trips could be as high as 65 Leq(h) at 50 feet, and 69 Leq(h) at 25 feet from the roadway centerline. Assuming that this rate of heavy truck traffic is maintained for 8 hours per day, the average DNL value of the truck noise is predicted to range between 60 DNL at 50 feet to 64 DNL at 25 feet from the roadway centerline.

The heavy truck route between Kaneohe Bay Drive and the Kaneohe WWPTF will be along Puohala and Kulali Streets, which passes through residential areas. This situation is considered to have the worst-case potential for adverse truck traffic noise impacts due to the relatively short setback distances from residences and because of the relatively lower levels of existing traffic and background noise along these two streets. The typical setback distances from the centerlines of these streets to the residences range from approximately 35 to 55 feet. Therefore, predicted noise levels during an 8-hour materials hauling day from the heavy truck traffic could range from 60 to 64 DNL. These levels are below the FHA/HUD noise standard of 65 DNL for residences and should be below the federally accepted threshold for adverse noise impact.

Mitigation Measures: Audible construction noise will be unavoidable during the entire project construction period. The total time period for actual construction is estimated to be approximately two years, with most of the work being performed during the normally permitted hours of 7:00 a.m. to 6:00 p.m. on weekdays, and between 9:00 a.m. to 6:00 p.m. on Saturdays. The actual length of exposure to construction noise at any receptor location will probably be less than the total construction period for the entire project.

Mitigation of construction noise to inaudible levels will be impractical due to the intensity of construction noise sources (80 to 90+ dBA at 50 feet distance) and the exterior nature of work (excavating, grading, earth and spoils moving, trenching, crane operations, hammering, etc.). The use of properly muffled construction equipment

should be required on the job site. The anticipated noise levels during actual construction activities are typical of other construction activities (exterior earthwork, open trenching, or building erection). The following noise mitigation measures are recommended for inclusion within the project construction documents:

- Provide sound attenuation treatments to reduce all steady, continuous noise sources (generators, pumps, plants, fans, etc.) which operate during the normally permitted daytime hours so that they do no exceed 65 dBA at the closest residences.
- Require that fixed machinery used in nighttime or weekend work during the noise variance periods do not exceed 45 dBA at the closest residences.
- Require the installation and use of broadband back-up alarms in place of beeper-type back-up alarms for all mobile equipment operating on the project work sites. The broadband alarms should be less audible at the longer distances, and should be less annoying at all distances from the mobile construction equipment. Use broadband alarms which automatically adjust the alarm sound level for differences in background noise level.
- If prolonged periods of work are required during the non-permitted (or noise variance) hours, consider the use of Hawaiian Electric Company (HECO) electrical service drops at the two ends of the force main alignment in place of portable generators and engine driven equipment (pumps, lights, etc.). These service drops may also be used to meet the 65 dBA maximum daytime level recommendation and the 45 dBA nighttime level recommendation.
- Investigate the feasibility of adding an alternate truck route between Kaneohe Bay Drive and the Kaneohe side construction site for spoils removal.
- Notify nearby residents prior to commencing excessively noisy construction activities so that they have an opportunity to schedule their activities to avoid adverse noise impacts from construction activities. Also, maintain a complaint phone line that is continuously manned during periods of construction at both the Kaneohe WWPTF and Kailua Regional WWTP.

Short-term impacts will also be mitigated to some degree by complying with the provisions of DOH Administrative Rules, Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if noise levels from construction activities are expected to exceed the allowable range. It shall be the contractor's responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment and to maintain noise levels below allowable regulatory limits. The contractor must also adhere to the guidelines for the hours of heavy equipment operation and noise curfew times as set forth by DOH noise control regulations.

No significant increase in noise levels over the long-term is expected from operation of the proposed project alternative.

No significant long-term impacts on noise levels are anticipated as a result of the construction and operation of Alternative 1: Force Main No. 2 and Equalization Facilities.

Alternative 2: Gravity Tunnel: Potential noise impacts are associated with the construction of Alternative 2: Gravity Tunnel. Although the Gravity Tunnel will be placed under Oneawa Hills (mauka lands), construction work above ground will occur at primary locations where construction equipment noise sources may be operating. These locations include excavating access shafts at the Kaneohe WWPTF (Kaneohe end), and the Kailua Regional WWTP (Kailua end), and the BWS reservoir site (mid-point).

In constructing the Gravity Tunnel, a Tunnel Boring Machine (TBM) is expected to be launched from the Kailua Regional WWTP following the excavation of the access shaft. Blasting is expected to be used during the excavation of the access shaft, as well as during the excavation of the initial portion of the Gravity Tunnel. The TBM is expected to be powered by commercial electrical power and will be supported with a conveyor, ventilation fan, and materials handling equipment operating near the Kailua access shaft. Trucking of the excavated materials from the onsite storage locations at the Kailua Regional WWTP to offsite locations will occur primarily during the normal working hours. During the tunnel excavation phase, an average of 60 trucks per day will be entering and 60 trucks per day will be leaving the Kailua Regional WWTP while transporting excavated materials. The TBM may operate 24 hours per day, unless the adverse noise or vibration impacts (discussed in Section 3.8) preclude such operations.

At the Kaneohe WWPTF, a tunnel access shaft will be excavated using conventional methods, and the excavated materials will be trucked from the Kaneohe WWPTF to an off-site disposal site. It is anticipated that construction operations will be limited to normally permitted periods during construction of the access shaft and during recovery of the TBM.

<u>Construction Noise and Transporting Traffic Operations:</u> At the Kailua Regional WWTP where the TBM will be launched construction equipment is expected to be in continuous operation and this will probably result in the need to quiet the fixed equipment (ventilating fans, conveyors, pumps, etc.) supporting the TBM operations to 45 dBA at the mauka and makai property lines of the Kailua Regional WWTP (which face existing residential developments). The Gravity Tunnel excavation activities at the Kailua Regional WWTP are expected to exceed seven months if 24 hour operations are allowed. Because it will be difficult for the neighboring residences to adjust to recurring and daily nighttime noise disturbances over a prolonged period, it is unlikely that excessively noisy construction activities would be allowed during the nighttime periods. Therefore, noise mitigation measures designed to comply with the State DOH nighttime noise limit of 45 dBA limit for fixed noise sources will be applied; it is expected that the noise levels of mobile equipment will also be attenuated during operation within the area surrounded by the noise barriers.

At the Kaneohe WWPTF where the TBM is expected to be recovered, construction activities will be limited to normal permitted daytime periods. Noise levels during construction at the tunnel access shaft may range from 80 to 90 dBA at 50 feet distance from the operating equipment. Those residences which are within direct lines-of-sight and which are closest to the construction equipment will experience the highest noise levels.

Noise from construction equipment will decrease with increasing distance from the project site. The primary locations where noise generating equipment may be operating are in the vicinity of the Gravity Tunnel access shafts located at the Kaneohe WWPTF, the Kailua Regional WWTP, and the BWS reservoir site. The setback distances between the residences and the construction equipment at the Kaneohe WWPTF and the Kailua Regional WWTP are relatively small, therefore, the relatively high noise levels during construction may be unavoidable, especially during operations of mobile equipment such as trenchers, loaders, diesel trucks, backhoes, vacuum trucks, and cranes. This type of equipment tends to operate over short periods of time. Equipment that tends to operate continuously, such as generators, pumps, ventilation fans, etc., are typically fixed at specific locations on the construction site and could be fitted with sound attenuation treatments (barriers, enclosures, silencers, etc.); such equipment typically will generate less noise than mobile construction equipment.

Trucking of the excavated materials from the on-site storage locations at the Kailua Regional WWTP to off-site locations will occur primarily during the normal working hours. During the Gravity Tunnel excavation phase, an average of 60 trucks per day will be entering and 60 trucks per day will be leaving the Kailua Regional WWTP while transporting excavated materials. The TBM may operate around the clock (24 hours), unless adverse noise or vibration impacts preclude such operations.

At the Kaneohe WWPTF, a tunnel access shaft will be excavated using conventional methods, and the excavated materials will also be trucked to an off-site disposal site. It is anticipated that construction operations will be limited to the normally permitted periods during construction of the access shaft and during recovery of the TBM.

Materials excavated from the Kaneohe WWPTF will need to be transported off-site at a maximum frequency of four loads per hour from Kaneohe WWPTF. The maximum noise level during the truck passbys may be as high as 90 dBA at 50 feet and 94 dBA at 25 feet distance from the roadway centerline. At a total of eight (4 inbound and 4 outbound) heavy truck trips per hour, the average hourly noise level from the truck trips could be as high as 61 Leq (h) at 50 feet, and 65 Leq(h) at 25 feet from the roadway centerline. Assuming that this rate of heavy truck traffic is maintained for 10 hours per day, the average DNL value of the truck noise is predicted to range between 57 DNL and 50 feet, to 61 DNL at 25 feet from the roadway centerline. The residences along Puohala and Kulauli Streets will be impacted due to the relatively short setback distances to the residences and because of the relatively lower levels of existing traffic and background noise along these two streets. The typical setback distances from the centerlines of Kulauli Street to residences range from approximately 35 to 55 feet. Therefore, predicted noise levels during a 10-hour period of truck traffic could range from 57 to 59 DNL. These levels are below the FHA/HUD noise standard of 65 DNL for residences, and should be below the federally accepted threshold for adverse noise impact.

Materials excavated from the Kailua Regional WWTP will be transported off-site at a maximum frequency of 20 loads per hour from the Kailua Regional WWTP. During a 10-hour period, a maximum of 200 truck passbys along the truck route could occur during the Gravity Tunnel excavation phase. The maximum noise level during the truck passbys may be as high as 90 dBA at 50 feet from the roadway centerline. The predicted hourly

(or average) noise level due to the project's heavy truck traffic is 67 Leq(h). This level is probably comparable to the existing traffic noise levels along Kaneohe Bay Drive and Mokapu Boulevard and is well below the FHA/HUD noise standard of 65 DNL for residences. Assuming that this rate of 20 heavy truck passbys is maintained for 10 hours per day, the average DNL value of the truck noise is predicted to be 63 DNL at 50 feet. This level is below the FHA/HUD noise standard of 65 DNL for residences, and should be below the federally accepted threshold of adverse noise impact.

Mitigation Measures: Audible construction noise will be unavoidable during the entire project construction period. It is estimated the Gravity Tunnel will be constructed in about three years, with most of the work at the Kaneohe WWPTF being performed during normally permitted hours of 7:00 a.m. to 6:00 p.m. on the weekdays and between 9:00 a.m. to 6:00 p.m. on Saturdays. As mentioned earlier, typical levels of exterior noise from construction activities at Kaneohe WWPTF are expected to range between 50 and 70 dBA at the closest residential receptors. Construction noise levels will probably be audible at the closest residences and will exceed existing daytime background noise levels of 10 to 25 dBA.

Mitigation of construction noise to inaudible levels will not be practical due to the intensity of construction noise sources (80 to 90+ dBA at 50 feet distance) and the nature of the work (excavating, grading and earth and spoils moving, trenching, crane operations, hammering, etc.). The use of properly muffled construction equipment should be required at the job sites. The anticipated noise levels during actual construction activities are typical of other construction activities (exterior earthwork, open trenching, or building erection).

At the Kailua Regional WWTP, the preference is to operate the TBM 24-hours a day. The 24-hour operation would require noise attenuation for equipment to be operating continuously or during the nighttime and curfew hours due to the long construction period (seven to 14 months). The use of sound attenuating walls around the tunnel access shaft, as wells as the addition of special attenuating treatments to the noisy equipment, will probably be required to reduce construction noise levels to the allowable nighttime limit of 45 dBA at the Kailua Regional WWTP property lines.

The following noise mitigation measures are recommended:

- Provide sound attenuation treatment (walls, enclosures, or silencers) to reduce all steady, continuous noise sources (generators, pumps, plants, fans, etc.) which operate during the normally permitted daytime hours so that they do not exceed 65 dBA at the closest residences. Figure 3-15 includes proposed sound walls.
- For fixed and stationary equipment (generators, pumps, plants, fans, etc.) which need to operate 24 hours per day, provide sound attenuation treatments (walls, enclosures, or silencers) to reduce their noise levels to the allowable State DOH limits of 45 or 50 dBA or less at the station boundaries which face residences.

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

KAILUA REGIONAL WWTP GRAVITY TUNNEL ALIGNMENT
PROPOSED SOUND ATTENUATION WALL

FIGURE
3-15

- Require the installation and use of broadband back-up alarms in place of beeper-type back-up alarms for all mobile equipment operating at the work sites.
- If prolonged periods of work are required during the non-permitted (or noise variance) hours, consider the use of HECO electrical service drops at the Kaneohe WWPTF and Kailua Regional WWTP in place of portable generators and engine driven equipment. These service drops may also be used to meet the 65 dBA maximum daytime level recommendation, and the 45 dBA nighttime level recommendation.
- Investigate alternative truck routes between Kaneohe Bay Drive and the Kaneohe side construction site for spoils removal.

Short-term impacts will also be mitigated to some degree by complying with the provisions of DOH Administrative Rules, Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if noise levels from construction activities are expected to exceed the allowable range. It shall be the contractor's responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment and to maintain noise levels below allowable regulatory limits. The contractor must also adhere to the guidelines for the hours of heavy equipment operation and noise curfew times as set forth by DOH noise control regulations.

No significant increase in noise levels over the long term is expected from operation of Alternative 2: Gravity Tunnel.

No significant long-term impacts on noise levels are anticipated as a result of the construction and operation of Alternative 2: Gravity Tunnel.

Blasting Operations: The use of blasting to break rock during excavation of the tunnel and access shaft at the Kailua Regional WWTP is proposed. Distances from the tunnel access shaft to the closest residences are expected to be approximately 330 feet (See Figure 2-19). Blast induced ground and air vibrations have the potential to startle or annoy surrounding residents and to also cause damage to structures. However, when properly controlled, blasting operations at the proposed Kailua Regional WWTP should not pose significant risks of damage or annoyance to neighboring buildings or residents.

The air blasts associated with blasting are concussion type, low frequency vibrations, which are of relatively short duration and generally described in terms of peak over pressure or psi, or in dBL. The dominant sources of the air blast are the Air Pressure Pulse, which is caused by the large displacement of the ground surface near the charge, and the Stemming Release Pulse, which is caused by gas pressure ejecting the stemming (fill) material from the hole bored for the explosive charge. The low frequency characteristic, referred to as bass sounds, of air blast noise tends to induce vibrations in structures (and subsequent complain reactions) due to the low resonant frequency (10 to 25 Hz) of buildings. High frequency sounds of amplitudes equal to blast noise generally do not induce vibrations and cause physical damage to structures. In general, the inception point of sound induced vibration is difficult to establish, but may occur at levels as low as 80 dBL. These levels are significantly below the peak levels of 120 to 136 dBL which have been associated with low risk of damage to structures.

If blasting is used to break rock, the charge weights per delay will be adjusted so as to eliminate any risk of damage to nearby structures. The levels of air blast are anticipated to be well below the structural damage criteria for buildings, so risks of window glass breakage from the blasting at the proposed project are considered to be very low. Since complaints resulting from air blast noise levels may occur at levels considerably below those necessary to cause damage to structures (120 to 136 dBL), additional analyses were conducted to estimate the percent of the neighboring population which may be highly annoyed by blasting operations. At air blast noise levels of 119 dBL, and with no more than two blasts per day, the average noise exposure levels from blasting operations are predicted to be 47 Lcdn, which is analogous to 47 DNL except for the use of C-weighting rather than A-weighting filters. An exposure level of 47 Lcdn (or 47 DNL) is very low, and less than two percent of the population exposed to this level are expected to be highly annoyed. For these reasons, risks of adverse airborne noise impacts from blasting operations of up to two blasts per day, which are also controlled to avoid risks of damage to structures, are considered to be very low.

Mitigation Measures for Blasting Operations: Blasts may be perceived as both physical vibrations and audible noises in surrounding communities. As a result, mitigation measures will probably be required to minimize the risks of annoying nearby residents. Recommended mitigation measures are listed below:

- Regularly monitor air blast and ground vibration levels simultaneously at the closest noise sensitive residence(s) or structure(s) during the blasting operations to develop the data base for the surrounding area.
- For initial blasts, prior to establishment of a data base of ground vibration and air blast levels versus scaled distance, use the minimum practical charge weight (in equivalent pounds of TNT) per delay as well as the minimum practical number of delays (or bore holes).
- If practical, reduce maximum air blast levels to less than 110 dBL at the nearest noise sensitive residences in response to air blast complaints. Possible methods of accomplishing this are: reducing charge sizes; increasing delay intervals; increasing hole depth; orienting bore holes to direct the Stemming Release Pulse away from noise sensitive receptors; trucking in high quality stemming material to minimize stemming blowouts; and filling (sandbagging) over the area to be blasted and the detonating chord.
- Schedule blasting during the warm periods of the day to minimize the possibility of thermal ducting and focusing of air blast noise at large distances from the blast. If possible, schedule blasting during fixed time periods so that members of the community can also schedule their activities accordingly.
- The most conservative vibration criteria for damage to “ruins and ancient monuments” is 0.15 inches per second. In order to address any resident’s concerns regarding the possible aggravation of ground settlement problems by the proposed blasting operations, it is recommended that additional study of the effect of low level vibrations on ground settlement be conducted.

3.8 Vibration

A vibration study for Alternative 1: Force Main No. 2 was prepared in December 2010 by Yogi Kwong Engineers, LLC (YKE). The results are summarized below and the study is included as

Appendix M. The potential construction vibration impacts from trenchless alternatives associated with Alternative 1 were evaluated.

A separate vibration study was conducted in December 2010 by Y. Ebisu & Associates for both alternatives. The results are summarized below and the study is included as Appendix L. Although the methods of analysis are slightly different between consultant studies, the findings of both reports are generally consistent.

The FHWA Transit Noise and Vibration Impact Assessment manual (FHWA, 2006), identifies three land-use categories for vibration impact assessment. Category 1 (High Sensitivity) includes vibration-sensitive research and manufacturing, hospitals with vibration-sensitive equipment, and university research operations. Category 2 (Residential) includes all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 (Institutional) includes schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have potential for activity interference. Other buildings (Special Buildings), such as concert halls, TV and recording studios, and theaters, do not fit into any of the three categories, but are considered to be vibration-sensitive.

Based on available information, including site reconnaissance, land-use within one-fourth mile of the project area can be classified as Vibration Category 2 (Residential) and 3 (Institutional). Residential homes primarily consisting of one- to two-story structures are located within one-fourth mile on each end of the alignment, along the shoreline of Kaneohe Bay and Oneawa Hills.

A seismograph was used to record ambient vibration levels expressed as Peak Particle Velocities (PPV) at various locations. Based on the proposed work and staging areas, YKE identified five measurement locations (See Figure 3-16). The data shows ambient levels of vibration, recorded as Peak Particle Velocities (PPV), ranging from 0.001874 inches per second to 0.02311 inches per second (see Table 3-6). The majority of the ambient noise levels of PPV are lower than the threshold of perception for humans (0.01 inches per second PPV) and are comparable to the typical background vibration velocity levels of 0.003 inches per second in residential areas used by the FHWA Transit Noise and Vibration Impact Assessment Manual (2006). Higher vibration peaks were recorded; however, the elevated levels were attributable to vehicles passing near the seismograph.

Impacts and Mitigation Measures

Alternative 1: Force Main No. 2 and Equalization Facilities: An assessment of potential vibrations generated by the proposed Force Main alternative and an evaluation of collected seismograph data collected by YKE during past sewer construction projects in Kailua and Honolulu was performed. The vibration measurements were obtained during sheetpile driving using a pneumatic hammer with a rated energy of 24,000 lb-ft in Kailua. Based on past project seismograph data, reference PPV for sheetpile driving was estimated (See Table 3-7).

The reference PPV for sheetpile installation using a pneumatic hammer is lower than the reference PPVs in Table 3-8.

Based on past experience during previous trenchless construction in Hawaii, vibrations are seldom felt at the ground surface, even when standing directly above the 20-foot or deeper below-ground trenchless equipment. Vibrations resulting directly from trenchless construction are expected to fall below the levels of human perception (less than 0.01 in/sec PPV) and, thus, below the levels of potential structural damage within very short distances of 10 to 20 feet.

The HDD construction method will initially involve installing a steel sleeve (48-inch to 60-inch diameter) at the Kaneohe end, into the very soft silt. The sleeve will be installed by a pile driving hammer, such as a pneumatic hammer, which will generate vibration similar to driving sheet piles.

In addition to the vibration source and distance to receptors, other factors that may influence the levels of ground-borne vibrations include site geology and the receiving building. Sub-surface investigations conducted for Alternative 1: Force Main No. 2 show the project route is underlain by basalt rock at depths of 40 to 70 feet deep, with some soil borings not encountering basalt until 100 feet deep. Based on the regional geology and available sub-surface information, it is not anticipated that the hard basalt is shallow or close enough to affect the propagation of vibrations that will significantly impact existing structures near the trenchless alignment. However, the stiff soils near the H-3 Freeway Interchange may propagate vibrations more efficiently.

Figure 3-16
Locations for Vibration Measurements

Source: Yogi Kwong Engineers, LLC. Potential Construction Vibration Impacts From Trenchless Alternatives And Mitigation Measures Kaneohe / Kailua Force Main No. 2. December 2010.

Table 3-6
Ambient Levels Of PPV At Measurement Sites

Site	Range of PPV			Recording Period (date & time)
	Transverse	Vertical	Longitudinal	
Site 1: Waikalua Loko Fish Pond near Kaneohe Bay Shoreline	.001874 - .003126	.001874- .003126	.001874- .003126	03-18-10 10:36 – 10:51
Site 2: Waikalua Loko Fish Pond and Kaneohe WWPS	.001874 - .003748	.001874- .003126	.008174-.00437	03-18-10 11:07 – 11:22
Site 3: Waikalua Loko Fish Pond and Bayview Golf Course	.001874-.02311	.001874-.01563	.001874-.01189	03-18-10 11:40 – 11:55
Site 4: YWCA near Kaneohe Bay shoreline	.001874-.00437	.001874-.00437	.001874-.00937	03-18-10 12:35 – 12:50
Site 5: H-3 Interchange	.001874-.00626	.001874- .003126	.001874-.00563	03-18-10 13:41 – 13:56

Source: Yogi Kwong Engineers, LLC. Potential Construction Vibration Impacts From Trenchless Alternatives And Mitigation Measures Kaneohe / Kailua Force Main No. 2. December 2010.

Table 3-7
Vibration Source Levels For Construction Activities

Construction Activity	Site Material / Geology	Reference PPV at 25 feet (in/sec)
Installation of sheetpiles using a pneumatic hammer	In loose material	0.38
	In stiff clay	0.30
	In sand	0.34

Source: Yogi Kwong Engineers, LLC. Potential Construction Vibration Impacts From Trenchless Alternatives And Mitigation Measures Kaneohe / Kailua Force Main No. 2. December 2010.

The highest ground-borne vibrations during the construction of Alternative 1: Force Main No. 2 will likely result from sheetpile driving and removal, HDD steel sleeve installation, and the use of a pneumatic hammer. These activities are expected to generate the highest vibrations during work related to trenchless construction, with reference at 25 feet of up to approximately 0.6 inches per second (see Table 3-8). The work will be limited to the Kaneohe WWPTF and Kailua Regional WWTP.

Based on the calculated data, the vibrations resulting from sheetpile driving will be barely perceptible within 135 feet of the vibration source. The closest structures to work areas involving potential sheetpile driving are located on the Kaneohe end, where residential homes on the opposite bank of Kaneohe Stream are within 300 feet.

Below is a summary of vibration results for Sub-Alternatives 1A and 1B from the Y. Ebisu & Associates report.

Table 3-8
Vibration Source Levels For Construction Equipment

Equipment		Reference PPV at 25 feet (inches/second)
Crack-an-set operations		2.4
Pile driver (impact)	**upper range** **typical**	**1.518** **0.644**
Pile driver (sonic)	**upper range** **typical**	**0.734** **0.170**
Vibratory hammer		0.65
Vibratory roller		0.210
Clam shovel drop (slurry wall)		0.202
Hoe ram		0.089
Large bulldozer		0.089
Caisson drilling		0.089
Loaded trucks		0.076
Jackhammer		0.035
Hydromill (slurry wall)	in soil In rock	0.008 0.017
Small bulldozer		0.003

Source: Yogi Kwong Engineers, LLC. Potential Construction Vibration Impacts From Trenchless Alternatives And Mitigation Measures Kaneohe / Kailua Force Main No. 2. December 2010.

Ground vibrations generated during pile driving operations are generally described in terms of peak particle (or ground) velocity in units of inches per second. The human being is very sensitive to ground vibrations, which are perceptible at relatively low particle velocities of 0.01 to 0.04 inches per second. Damage to structures, however, occurs at much higher levels of vibration as indicated in Figure 3-17. The most commonly used damage criteria for structures is the 2.0 inches per second limit derived from work by the U.S. Bureau of Mines.

Based on measured vibration levels during pile driving operations under various soil conditions at various distances from receptors, estimates of ground vibration levels versus distance from the pile driver have been made for various soil conditions and for various energy ratings of pile drivers (see Figure 3-18). When coral layers are penetrated, higher vibration levels can be expected, particularly if the adjacent structures are supported by the common coral layer. For wet sand soil conditions, the 0.2 inches/second vibration damage criteria will be exceeded at a scaled energy distance factor of approximately 0.7. The scaled energy distance factor is equal to the square root of the energy (in foot-pounds) per blow of the hammer divided by the distance (in feet) between the pile tip and the monitoring location. For a 2,500 foot-pound small pile driver, a scaled energy distance of 0.7 equates to a required separation distance of 71 feet.

Because the separation distances between the pile drivers and the closest residences are much greater than 71 feet, risks of architectural or structural damage from pile driving using a 2,500 foot-pound small pile driver are considered to be low.

PEAK GROUND VELOCITY (mm/sec)	PEAK GROUND VELOCITY (in/sec)	COMMENT
193.04	7.6	Major damage to buildings (mean of data).
137.72	5.4	Minor damage to buildings (mean of data).
101.16	4.0	'Engineer structures' safe from damage.
50.8	2.0	Safe from damage limit (probability of damage <5%).
		No structural damage.
33.02	1.3	Threshold of risk of 'architectural' damage for houses.
25.4	1.0	No data showing damage to structures for vibration <1 in./sec.
15.24	0.6	No risk of 'architectural' damage to normal buildings.
10.16	0.4	Threshold of damage in older homes.
5.08	0.2	Statistically significant percentage of structures may experience minor damage (including earthquake, nuclear event, and blast data for old and new structures).
		No 'architectural' damage.
3.81	0.5 to 0.15	Upper limits for ruins and ancient monuments.
1.0	0.04	Vertical vibration clearly perceptible to humans.
0.32	0.01	Vertical vibration just perceptible to humans.

Source: 'State-of-the-Art Review: Prediction and Control of Groundborne Noise and Vibration from Rail Transit Trains'; U.S. Department of Transportation; December 1983.

Source: Y. EBISU & ASSOCIATES
Acoustic Study for the Gravity Tunnel Between Kaneohe WWPS and Kailua WWTF, December 2010

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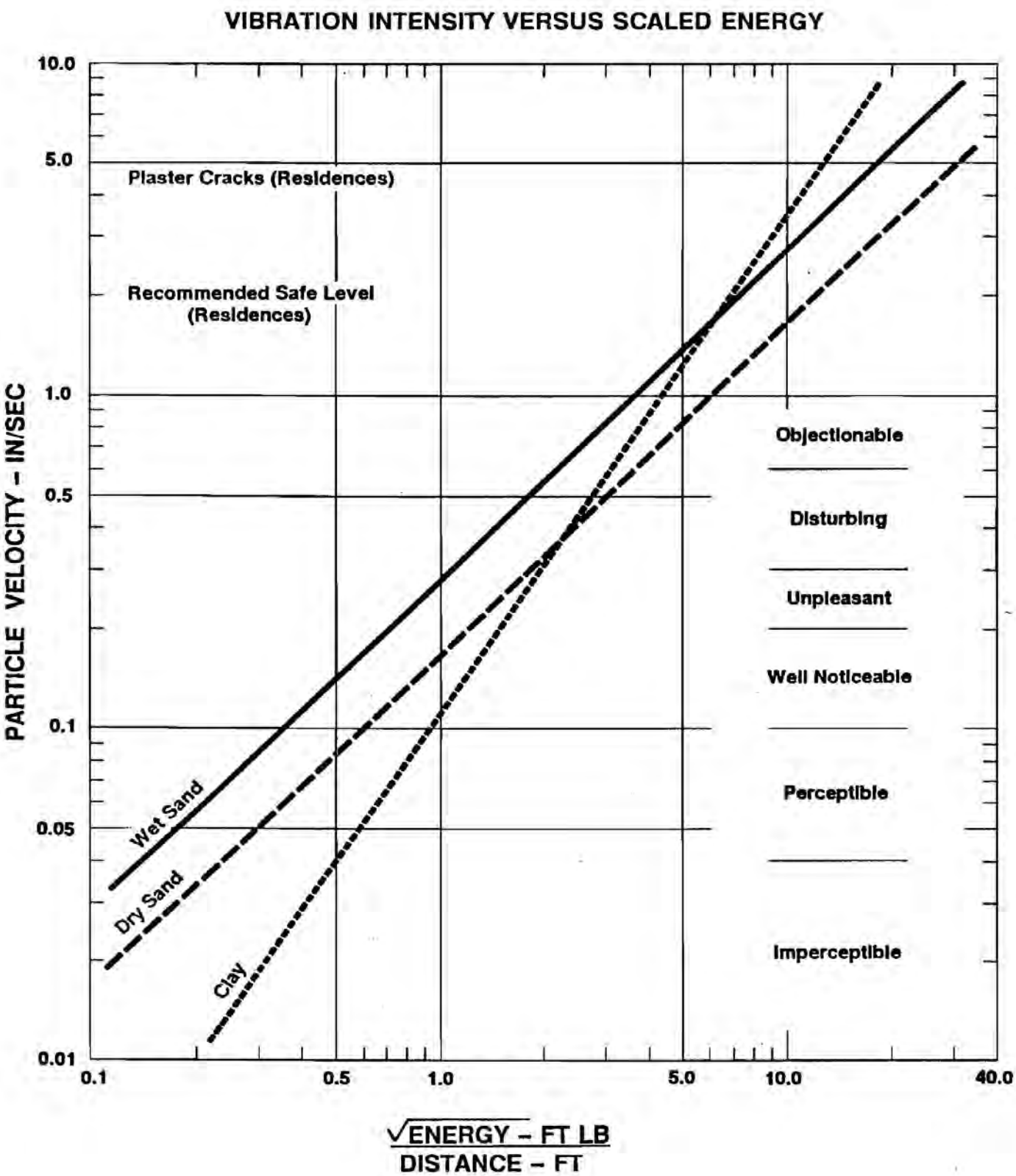
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

SUMMARY OF BUILDING DAMAGE CRITERIA

FIGURE 3-17



Source: Y. EBISU & ASSOCIATES
Update Of Noise Impact Assessments for the Kaneohe / Kailua Force Main No. 2 Alternative Under Kaneohe Bay, December 2010

WILSON OKAMOTO CORPORATION ENGINEERS • PLANNERS	KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES MINIMUM VIBRATION INTENSITIES EXPECTED FROM PILE DRIVING	FIGURE 3-18

Using the more conservative methodology, it is possible that ground vibrations may be perceptible (at approximately 0.001 inches/second) out to distances of approximately 500 feet from a 2,500 foot-pound small pile driver. However, risks of adverse impacts from vibrations at these levels are considered to be low as long as pile driving activities occur only during the daytime hours normally permitted by DOH for pile driving activities.

Sub-Alternative 1B - Hybrid Tunnel: This option does not involve pile driving of sheetpiles for the steel casing. The vibration impacts are less than that of Sub-Alternative 1A - HDD. Construction of the force main would be about three years instead of two years compared to Sub-Alternative 1A. At the Kailua Regional WWTP end, the TBM recovery pit will be closer to Aikahi Gardens residences. However construction activities under this option will occur primarily in conjunction with construction of the TBM recovery pit and TBM recovery operations after the hybrid tunnel has been completed.

Mitigation Measures: The anticipated equipment and activities related to trenchless construction are not anticipated to generate vibrations exceeding the given thresholds for structural damage of the known nearest structures and buildings. However, it is possible that the anticipated construction-related vibrations may reach the given thresholds for barely perceptible human response. YKE suggests the following mitigation measures:

- Conduct predrilling to break up boulders prior to sheetpile installation.
- Excavation of appropriate trenches between the vibration source and sensitive areas to accelerate decay of vibration energy.
- Recommend the use of pneumatic impact pile driving or press-in-piling systems that use hydraulic static loading and previously installed sheet piles as reaction piles to install the sheetpiles; prohibit the use of diesel impact hammers; and vibratory hammer usage to pulling sheets out of very soft mud.
- If impact pile driving is chosen, pile cushioning can increase the period of time over which the energy from the driver is imparted to the pile, and thus reduce the resultant vibrations.
- Schedule construction during business hours on weekdays, while many residents will be at work and thus not affected.
- Leave sheetpiles in-place after construction, and cutting off the top five feet in the event of future utility installation (removing the sheet piles after construction using a vibratory hammer may result in excessive vibrations).

Mitigation measures are limited to minimizing vibrations during sheetpile installation and removal. In addition to the above mitigation measures, vibration monitoring during sheetpile driving should be conducted. Vibration monitoring can help determine whether vibration levels are excessive and warrant implementation of further mitigation measures.

Alternative 2: Gravity Tunnel: A noise and vibration study was conducted in December 2010 by Y. Ebisu & Associates, and the results are summarized below and included as Appendix L. The potential impacts resulting from ground vibrations during tunneling operations were also evaluated.

Ground Vibration from Blasting: As discussed in Section 3.7.2, the use of blasting to break rock during excavation of the tunnel access shaft at the Kailua Regional WWTP is proposed. Distances from the tunnel access shaft to the closest residences are expected to be approximately 330 feet. Blast-induced ground and air vibrations have the potential to startle or annoy surrounding residents and also cause damage to structures. However, when properly controlled, blasting operations at the Kailua Regional WWTP should not pose significant risks of damage or annoyance to neighboring buildings or residents.

Ground vibrations, or seismic waves, are generated during blasting operations, and are generally described in terms of peak particle velocity in inches per second. Most of the seismic energy remains trapped in the ground, but some energy is released as an over pressure pulse in the air (or Rock Pressure Pulse). In general, the ground vibrations as well as the airborne Rock Pressure Pulse, are expected to be less intrusive than the Air Pressure and Stemming Release Pulses.

Predictions of peak over pressure or ground vibration levels versus scaled distances from the blast are not precise, with initial uncertainties for a given location on the order of 20 to 30 dBL. For this reason, it is standard practice to employ seismograph monitoring of air and ground vibrations during blasting operations.

The shortest separation of distances between the potential blasting areas and the surrounding noise sensitive neighbors are relatively small and range from approximately 330 feet to approximately 120 feet. At these small distances between the blast areas and surrounding noise-sensitive neighbors, charge weights may need to be limited to less than one pound of explosives per delay. At one pound of explosives per delay, the predicted vibration levels at a separation distance of 125 feet are on the order of 0.070 to 0.40 inches per second. These predicted levels of ground vibration. Based on these predictions, vibration levels from blasting operations can be very low, but the size of the charge weights per delay may need to be kept at relatively small values in order to minimize risk of damage to nearby structures.

Mitigation Measures for Ground Vibration from Blasting: Blasts may be both felt and audible in surrounding communities. As a result, mitigation measures will probably be required to minimize the risks of impacting nearby residents. Recommended mitigation measures are listed below:

- Regularly monitor air blast and ground vibration levels simultaneously at the closest noise sensitive residence(s) or structure(s) during the blasting operations to develop the data base for the surrounding area.
- For initial blasts, prior to establishment of a data base of ground vibration and air blast levels versus scaled distance, use the minimum practical charge weight (in equivalent pounds of TNT) per delay as well as the minimum practical number of delays (or bore holes).

- If practical, reduce maximum air blast levels to less than 110 dBL at the nearest noise sensitive residences in response to air blast complaints. Possible methods of accomplishing this are: reducing charge sizes; increasing delay intervals; increasing hole depth; orienting bore holes to direct the Stemming Release Pulse away from noise sensitive receptors; trucking in high quality stemming material to minimize stemming blowouts; and filling (sandbagging) over the area to be blasted and the detonating chord.
- Schedule blasting during the warm periods of the day to minimize the possibility of thermal ducting and focusing of air blast noise at large distances from the blast. If possible, also schedule blasting during fixed time periods, so that the members of the community can also schedule their activities accordingly.
- The most conservative vibration criteria for damage to "ruins and ancient monuments" is 0.15 inches per second. In order to address any resident's concerns regarding the possible aggravation of ground settlement problems by the proposed blasting operations, it is recommended that additional study of the effect of low level vibrations on ground settlement be conducted.

Ground Vibration from TBM: Ground vibrations from the TBM may be observed whenever the TBM is relatively close to inhabited buildings. In general, the greater the separation distance between the TBM and the receptor, the lower the ground vibration level during excavation of the Gravity Tunnel should be at the receptor. From the medium diameter TBM, ground vibration levels should be at or less than 0.01 inches per second at 150 feet separation distance between the TBM and receptor. A vibration level at or less than 0.01 inches per second should be barely perceptible to humans. This level of 0.01 inches per second is much lower than the 0.15 inches per second as the most conservative vibration level for potential damage to "ruins and ancient monuments", as previously referenced in Figure 3-16. In order to reach this higher level of 0.15 inches per second, the separation distance needs to be reduced to approximately 25 feet. All separation distances between the TBM and the structures closest to the Gravity Tunnel should exceed 25 feet, so there should be a low risk of structural or architectural damage resulting from the vibrations of the TBM.

The TBM will cross under residences at the Aikahi Gardens at separation distances between 100 to 150 feet, and also cross under residences along Kaneohe Bay Drive at separation distances between 100 to 150 feet. At these distances, vibration levels from the TBM are predicted to range from 0.019 to 0.010 inches per second. These relatively low vibration levels may be perceptible to humans, as indicated in Figure 3-16, and are well below the levels associated with risk of damage to buildings. Because these levels may be perceptible to some residents, mitigation measures may be required during TBM operations within 150 feet of a residence.

Mitigation Measures for Ground Vibration from TBM: Because vibrations may be felt during the relatively close operations of the TBM within 150 feet of residences, mitigation measures will probably be required to minimize the risk of impacting nearby residents during those periods. Recommended mitigation measures are as follows:

- Minimize the incidents where very short (less than 100 feet) separation distances occur between residential structures and the TBM to minimize risk of complaints due to vibrations during tunnel excavation operations.
- Regularly monitor ground vibration levels at the closest noise-sensitive residences(s) or structure(s) as the TBM approaches to develop the vibration data base for the surrounding area. Based on these monitoring efforts, determine if vibration levels at or near the closest point of approach could be noticeable and, if so, advise the affected residents, and be prepared to discontinue nighttime operations at the request of any affected residents.

3.9 Traffic

3.9.1 Area Roadway System

The regional roadway system map is shown in Figure 3-19. Vehicular access to the Kaneohe WWPTF is provided via Kulauli Street, a two-lane, two-way roadway generally oriented in the east-west direction. Southwest of the Kaneohe WWPTF, Kulauli Street intersects Puohala Street. At this unsignalized intersection, the Kulauli Street approaches have a one stop-controlled lane that serves all traffic movements. Puohala Street is a two-lane, two-way roadway generally oriented in the north-south direction. At the intersection with Kulauli Street, both approaches of Puohala Street have one lane that serves all traffic movements.

Southeast of the Kulauli Street/Puohala Street intersection, Puohala Street intersects Kaneohe Bay Drive. At this signalized intersection, the Puohala Street approach has one lane that serves left-turn and right-turn traffic movements. In the vicinity of the Kaneohe WWPTF, Kaneohe Bay Drive is predominantly a four-lane, two-way divided roadway generally oriented in the east-west direction. At the intersection with Puohala Street, the eastbound approach of Kaneohe Bay Drive has an exclusive left-turn and two through lanes, while the westbound approach has two lanes that serve through and right-turn traffic movements.

From the intersection with Puohala Street, Kaneohe Bay Drive heads eastward towards Mokapu Saddle Road and then turns northward towards the Kailua Regional WWTP.

Vehicular access to the Kailua Regional WWTP is provided by Kaneohe Bay Drive. In the vicinity of the Kailua Regional WWTP, Kaneohe Bay Drive predominantly is a two-lane, two-way divided roadway generally oriented in the east-west direction. South of the access point to the Kailua Regional WWTP, Molo Street and Lale Street intersect with Kaneohe Bay Drive. These streets serve two of four driveways into the Aikahi Gardens townhouse units. Further south, the Interstate H-3 Freeway on- and off-ramps provide access to the H-3 Freeway where it intersects with Kaneohe Bay Drive. These intersections are unsignalized.

A Construction Traffic Impact Report for Alternative 2: Gravity Tunnel was prepared in December 2010 by Wilson Okamoto Corporation (WOC). The results are summarized below and the study is included as Appendix N. Field investigations were conducted on November 23, 2010 during mid-day peak hours of 11:00 a.m. and 1:00 p.m. when construction-related truck traffic is expected to be utilizing the surrounding roadways. The field investigation consisted of manual turning movement count surveys and traffic flow assessments at the

intersections of Puohala Street with Kulauli Street and Kaneohe Bay Drive. In addition, 24-hour mechanical traffic county data was collected along Kulauli Street, Puohala Street, and Kaneohe Bay Drive in the vicinity of the Kaneohe WWPTF, as well as along Kaneohe Bay Drive in the vicinity of the Kailua Regional WWTP.

The intersections were assessed using the methodologies presented in the *Highway Capacity Manual*, Transportation Research Board 2000, and the *Highway Capacity Software*, developed by the Federal Highway Administration.

Operating conditions at these intersections are described in terms of their level-of-service (LOS). LOS is defined by LOS "A" through LOS "F". LOS "A" represents ideal or free-flow traffic operating conditions, and LOS "F" represents unacceptable or potentially congested traffic operating conditions.

The mid-day peak hour of traffic generally occurs between the hours of 11:45 a.m. and 12:45 p.m.

Based on WOC's analysis, the operating conditions at the aforementioned intersections are as follows:

<u>Puohala Street and Kulauli Street</u>
At the intersection of Puohala Street and Kulauli Street, Puohala Street carries 241 vehicles northbound and 243 vehicles southbound during the mid-day peak period with both approaches operating at LOS "A" during this period. The Kulauli Street approaches carry 13 vehicles eastbound and 39 vehicles westbound during the mid-day peak period with both approaches operating at LOS "B" during this period.

<u>Puohala Street and Kaneohe Bay Drive</u>
At the intersection of Puohala Street and Kaneohe Bay Drive, Puohala carries 249 vehicles southbound during the mid-day peak period and operates at a LOS "C." The Kaneohe Bay Drive approaches to this intersection carry 471 vehicles eastbound and 684 vehicles westbound during the mid-day peak period. The eastbound left-turn traffic movement and the westbound approach of Kaneohe Bay Drive operate at LOS "C" while the eastbound through traffic movement operates at LOS "B" during the mid-day peak period.

West of the intersection with Puohala Street, Kaneohe Bay Drive carries 488 vehicles eastbound and 509 vehicles westbound during the mid-day peak period. Both directions of traffic along this roadway operate at a LOS "A" during the mid-day peak period.

<u>Kaneohe Bay Drive Near Kailua Regional WWTP`</u>
West of the Kailua Regional WWTP, Kaneohe Bay Drive carries 153 vehicles eastbound and 264 vehicles westbound during the mid-day peak period. Both directions of traffic along this roadway operate at a LOS "B" during the mid-day peak period.

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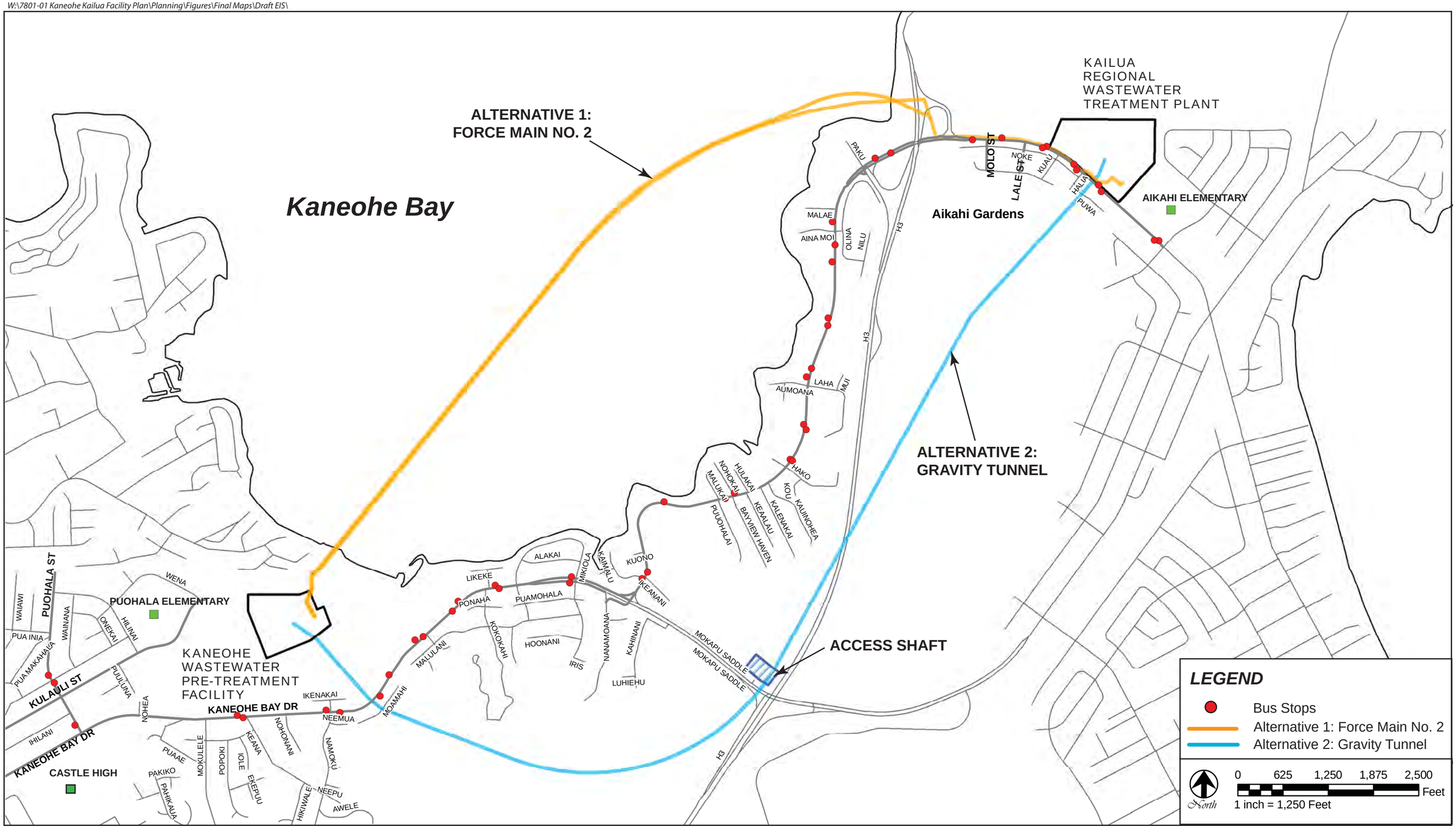

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ROADWAY MAP

FIGURE

3-19

Impacts and Mitigation Measures

Alternative 1 Force Main No. 2 and Equalization Facilities:
A Traffic Assessment Report for Alternative 1: Force Main No. 2 and Equalization Facilities was prepared in December 2010 by Austin, Tsutsumi & Associates Inc. The results are summarized below and the study is included as Appendix O and the traffic impact assessment findings are summarized below:

In the short-term, temporary traffic impacts associated with construction activities at both the Kaneohe WWPTF and the Kailua Regional WWTP are anticipated.

Alternative 1: Force Main No. 2 and Equalization Facilities will construct a force main between the Kaneohe WWPTF and the Kailua Regional WWTP. Both sites will serve as staging areas for construction. The project will be divided into three segments, two of which are associated with temporary constructed-related impacts as indicated by bold-face text below:

1. **Segment A – between the Kaneohe WWPTF and Kaneohe Bay: open trench method will be used.**

2. Segment B – beneath the seafloor of Kaneohe Bay.

3. **Segment C – between the Kailua Regional WWTP and the H-3 Freeway Interchange: open trench method will be used.**

Relative to traffic operations, the project will have temporary construction impacts as follows:

Kaneohe WWPTF: The only traffic-related impact of the project on the roadway system near Kaneohe WWPTF would be the routing of approximately six heavy vehicles per hour through the local and collector roadways near the site. The cumulative mid-day peak hour traffic conditions with construction-related truck traffic utilizing the surrounding roadways are summarized in Tables 3-9.

Both Kaneohe Bay Drive/Puohala Street intersection and the Puohala Street/Kulauli Street intersection currently operate at LOS “C” or better on all approaches and will continue to do so even with the construction-related traffic.

Two access routes for construction-related vehicular traffic are proposed:

1. Access to Kaneohe Bay Drive provided through Kulauli Street and Puohala Street, or

2. Access to Kaneohe Bay Drive provided through the existing Bayview Golf Course entrance/exit.

Traffic impact on the Bayview route would be relatively limited due to the low volume of heavy vehicles planned.

Table 3-9
Kaneohe WWPTF Level of Service (LOS) Summary

Intersection	Existing Conditions (Midday)			With Project (Midday)		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
Kaneohe Bay Drive/Puohala Street						
Eastbound LT	7.4	0.18	A	7.7	0.21	A
Eastbound TH	6.6	0.23	A	6.6	0.23	A
Westbound TH/RT	14.2	0.77	B	14.2	0.77	B
Southbound LT	25.7	0.58	C	25.7	0.58	C
Southbound RT	20.4	0.05	C	20.4	0.05	C
Overall	13.6	0.72	B	13.6	0.72	B
Puohala Street/Kulauli Street						
Eastbound LT/TH/RT	11.6	0.03	B	11.6	0.03	B
Westbound LT/TH/RT	13.0	0.09	B	13.1	0.09	B
Northbound LT/TH/RT	0.1	0.00	A	0.1	0.00	A
Southbound LT/TH/RT	0.5	0.01	A	0.5	0.01	A

[1] LT = Left turn [2] TH = Through [3] RT = Right turn

Source: Austin, Tsutusmi & Associates, Inc. Traffic Assessment – Kaneohe/Kailua Force Main No. 2 Addendum January 2011.

The addition of six heavy vehicles per hour will only have a marginal impact on traffic operation along Puohala Street and Kaneohe Bay Drive.

When using the Kulauli Street and Puohala Street access route, there is a potential for conflicts between heavy vehicles entering and exiting.

Based on the analysis of the traffic data, the following are recommended:

- Construction-related heavy vehicles should utilize either Kulauli Street and Puohala Street or the Bayview Golf Course route to access Kaneohe Bay Drive.

- If the Kulauli Street and Puohala Street route is used, it is recommended that;

  - Heavy vehicle drivers coordinate their route schedules as to prevent entering and exiting heavy vehicles from crossing the paths while on Kulauli Street or Puohala Street.

  - Neighborhood residents should be informed of the heavy vehicle routes and construction hours.

- Heavy vehicle traffic should not traverse Puohala Street and Kulauli Street between 15 minutes before and 30 minutes after Castle High School and Puohala Elementary School are dismissed.

- During construction, parking shall be prohibited in a 75-foot radius at the Puohala Street/Kulauli Street intersection.

- It is recommended that a Construction Traffic Management Plan be prepared prior to construction.

Kailua Regional WWTP: The primary impacts to the roadway system near the Kailua Regional WWTP would be the narrowing of the travelway along Kaneohe Bay Drive and restriction of turning movements onto and off of the H-3 on- and off- ramps near the site.

Project-related heavy vehicle traffic is assumed to occur at a rate of six vehicles per hour. Given that this is a relatively small volume occurring outside the peak hours of traffic, the impact of these trucks should be minimal relative to traffic operations. The cumulative mid-day peak hour traffic conditions with construction-related truck traffic utilizing the surrounding roadways are summarized in Tables 3-10.

Table 3-10
Kailua Regional WWTP Level of Service (LOS) Summary

Intersection	Existing Conditions (Midday)			With Project (Midday)		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
Kaneohe Bay Drive/H-3 On/Off Ramps						
EB LT	7.7	0.04	A	7.8	0.04	A
EB TH	0.00	0.13	N/A	0.00	0.13	N/A
WB TH/RT	0.00	0.17	N/A	0.00	0.17	N/A
SB LT	12.7	0.17	B	13.2	0.19	B
Kaneohe Bay Drive/Molo Street						
EB TH/RT	0.00	0.19	N/A	0.00	0.19	N/A
WB LT	7.9	0.01	A	8	0.02	A
WB TH	0.00	0.17	N/A	0.00	0.16	N/A
NB LT/TH	11.7	0.02	B	12.6	0.04	B
Kaneohe Bay Drive/Lale Street						
EB TH/RT	0.00	0.18	N/A	0.00	0.18	N/A
WB LT	7.9	0.01	A	7.9	0.03	A
WB TH	0.00	0.17	N/A	0.00	0.17	N/A
NB LT/TH	11.2	0.03	B	11.4	0.05	B

[1] LT = Left turn [2] TH = Through [3] RT = Right turn

Source: Austin, Tsutusmi & Associates, Inc. Traffic Assessment – Kaneohe/Kailua Force Main No. 2 Addendum January 2011..

All three intersections currently operate at LOS "B" or better on all approaches and will continue to do so even with the construction-related traffic.

Based on the analysis of the traffic data, it is recommended that a Traffic Construction Management Plan be prepared prior to construction. The plan should allow for left-turn in and out access to be maintained for at least two of the four accesses to the Aikahi Gardens townhouses during any given phase. These include Molo Street, Lale Street, Kuau Street, and Halia Street, as left-turn in and out access will be restricted on two of them at a time.

Alternative 2 Gravity Tunnel:
In the short-term, temporary traffic impacts associated with construction activities at both the Kaneohe WWPTF and the Kailua Regional WWTP are anticipated.

The proposed Gravity Tunnel is expected to be constructed over 32 months, in four major phases. Of these phases, construction-related truck traffic is expected to be highest during the tunnel excavation phase. Construction truck traffic is expected to be restricted to daytime work hours, although construction activities may extend throughout the day and night. These work hours are expected to occur between 9:00 a.m. and 3:00 p.m., resulting in approximately 6 hours of the day during which truck traffic is expected to access both ends of the tunnel (Kaneohe WWPTF and Kailua Regional WWTP).

Kaneohe WWPTF: Construction-related truck traffic hauling away excavated material to the off-site disposal area is expected to utilize Kulauli Street, Puohala Street, and Kaneohe Bay Drive to access the Interstate H-3 Freeway. All construction-related truck traffic is expected to utilize the Interstate H-3 Freeway and the Interstate H-1 Freeway. Approximately 10 trucks per hour (5 entering and 5 exiting) are anticipated to access the Kaneohe WWPTF on average with a maximum of 14 trucks anticipated per hour (seven entering and seven exiting). Entering truck traffic is assumed to head westbound on Kulauli Street, turn left onto Puohala Street, and turn right onto Kulauli Street, while exiting truck traffic is assumed to head westbound on Kulauli Street, turn left onto Puohala Street, and turn right onto Kaneohe Bay drive to access the Interstate H-3 Freeway.

Kailua Regional WWTP: Construction-related truck traffic hauling excavated material is expected to utilize Kaneohe Bay Drive to access the Interstate H-3 Freeway. All construction-related truck traffic is expected to utilize the Interstate H-3 Freeway and the Interstate H-1 Freeway. Approximately 20 trucks per hour are anticipated on average (10 entering and 10 exiting) with a maximum of approximately 24 trucks per hour (17 entering and 17 exiting). Entering truck traffic is expected to head eastbound on Kaneohe Bay Drive from the Interstate H-3 Freeway and turn left into the Kailua Regional WWTP, while exiting truck traffic is expected to turn right from the WWTP and head eastbound on Kaneohe Bay Drive to access the Interstate H-3 Freeway.

The cumulative mid-day peak hour traffic conditions with construction-related truck traffic utilizing the surrounding roadways are summarized in Tables 3-11 and 3-12.

Table 3-11
Kaneohe WWPTF
Baseline and Projected Intersection
Levels Of Service (LOS) Traffic Operating Conditions

Intersection	Traffic Movement		LOS		
			Baseline	w/ Average	w/ Maximum
Puohala St/ Kulauli St	Eastbound	LT[1]-TH[2]-RT[3]	B	B	B
	Westbound	LT-TH-RT	B	B	B
	Northbound	LT-TH-RT	A	A	A
	Southbound	LT-TH-RT	A	A	A
Puohala St/ Kaneohe Bay Dr	Eastbound	LT	C	C	C
		TH	B	B	B
	Westbound	TH-RT	C	C	C
	Southbound	LT-RT	C	C	C

[1] *LT = Left turn* [2] *TH = Through* [3] *RT = Right turn*

Source: Wilson Okamoto Corporation. Construction Traffic Impact Report Kaneohe To Kailua Conveyance & Treatment Facility Gravity Tunnel Alternative. December 2010.

Table 3-12
Kailua Regional WWTP
Baseline and Projected Intersection
Roadway LOS Traffic Operating Conditions

Intersection	Direction	Baseline	w/ Average	w/ Maximum
Kaneohe Bay Dr (west of Puohala St)	Eastbound	A	A	A
	Westbound	A	A	A
Kaneohe Bay Dr (west of Kailua Regional WWTP)		B	B	B

Source: Wilson Okamoto Corporation. Construction Traffic Impact Report Kaneohe To Kailua Conveyance & Treatment Facility Gravity Tunnel Alternative. December 2010.

Traffic operations with the average and maximum volume of construction related truck traffic are expected to remain similar to baseline conditions during the mid-day peak period. The intersection of Puohala Street with Kulauli Street are expected to continue operating at LOS “B” or better, while the intersection of Puohala Street with Kaneohe Bay Drive is expected to continue operating at LOS “C” or better. Along Kaneohe Bay Drive, both directions of traffic west of Puohala Street are expected to continue operating at LOS “A”, while the roadway is expected to continue operating at LOS “B” west of the Kailua Regional WWTP.

Based on the analysis of the traffic data, the following are recommended:

1. Ensure construction-related trucks are not staged off-site along the adjacent public roadways.

2. Ensure that queues at the Kaneohe WWPTF and Kailua Regional WWTP do not extend onto the adjacent public roadways.

3. Restrict parking along Puohala Street and Kulauli Street along the proposed construction-related truck route during daytime work hours to maximize the roadway widths for passing and turning along the route.

4. Prepare a Construction Traffic Management Plan to minimize the impact of construction-related traffic on the adjacent residential and school uses, as well as the surrounding roadways.

With the implementation of the aforementioned recommendations, the anticipated construction–related truck traffic is not expected to have a significant impact to the surrounding roadways since project conditions are expected to remain similar to baseline conditions. However, due to the close proximity of residential and school uses, the preparation of a Construction Traffic Management Plan is recommended for the proposed project to minimize the impact of construction activities on these uses.

In the long-term, no significant traffic impacts are anticipated during the operation of the proposed improvements. As the project involves improvements to a wastewater collection system and is not a population generator, no significant increase in associated traffic is expected.

3.9.2 Public Transportation System

The City and County of Honolulu Oahu Transit Services (OTS) operates a county-wide public transportation bus system. Within the project region, several routes service the area (See Figure 3-20). Routes 55, 56, and 65 provide local access between Kailua and Kaneohe, as well as regional access to downtown and the Ala Moana Center. Route 85 provides access between Kailua, Kaneohe, downtown, and the University of Hawaii at Manoa. Route PH5 provide access between Kailua, Kaneohe, and Pearl Harbor via the H-3 Freeway. There are a total of 45 bus stops located in the project area as previously illustrated in Figure 3-19.

Kaneohe WWPTF: In this area, Route 56 traverses Puohala Street. The buses turn on/off of Puohala Street to/from Kaneohe Bay Drive. There are three bus stops located in this area. The time between successive buses is between 15 and 30 minutes in either direction.

From the Kaneohe WWPTF towards the Kailua Regional WWTP, there are 32 bus stops located along Kaneohe Bay Drive.

Kailua Regional WWTP: In this area, Route 56 traverses Kaneohe Bay Drive. There are ten bus stops situated along Kaneohe Bay Drive in the vicinity of the Kailua Regional WWTP.

Impacts and Mitigation Measures

In the short-term, temporary traffic impacts associated with construction activities at both the Kaneohe WWPTF and the Kailua Regional WWTP are anticipated.

Kaneohe WWTPF: It is recommended that OTS be contacted to inform them of the planned routing of heavy vehicles.

Kailua Regional WWTP: It is recommended that accommodations be made to ensure the continuing operation of Route 56, as it is the only bus route that services the area. If the bus stops will be obstructed as a result of construction operations, OTS should be notified.

In the long-term, no significant traffic impacts are anticipated to affect the public transportation system during the operation of the proposed improvements. As the project involves improvements to a wastewater collection system, and is not a population generator, no significant increase in associated traffic is expected.

3.10 Visual Resources

Kaneohe WWPTF and Kailua Regional WWTP: The wastewater facility sites are currently occupied by wastewater treatment and collection system facilities.

Alternative 1: Force Main No. 2 and Equalization Facilities: Alternative 1: Force Main No. 2 would be located beneath Kaneohe Bay, which is an important scenic resource from diverse areas around the bay.

Alternative 2: Gravity Tunnel: The Gravity Tunnel would be located beneath Oneawa Hills, which is an important scenic resource visible from many surrounding areas of Kaneohe and Kailua.

Impacts and Mitigation Measures

Kaneohe WWPTF and Kailua Regional WWTP: In the short-term, visual impacts would be associated with the construction of sound attenuation measures, including temporary walls and enclosures. A temporary noise wall will be constructed in conjunction with Alternative 1, however, the height and location are yet to be determined. In Alternative 2, a noise wall is also proposed at the Kailua Regional WWTP to mitigate noise impacts during construction of the tunnel access shaft. The wall will measure approximately 20 feet high by approximately 1,000 feet long and will surround the proposed drop shaft and nearby construction staging area. The noise wall will be removed following construction.

In the long-term, as described in Section 2.3.1, Alternative 1 includes the construction of equalization facilities at the Kaneohe WWPTF and the Kailua Regional WWTP to capture and store peak flows generated during wet weather events. Associated facilities also include a new headworks, odor control and influent pump station in an adjoining single-story structure.

Based on the peak flow projections prepared for the 1999 I/I Plan, the equalization facility at the Kaneohe WWPTF would have a capacity of 6.9 million gallons. The facility would store wastewater from the Kaneohe and Ahuimanu service areas during peak flow conditions and emptied when flows subside. The facility would be located on currently vacant land in the western portion of the Kaneohe WWPTF property (See

Figure 2-15). Its dimensions are estimated to be approximately 335-½ feet long, 232-½ feet wide, and 25-½ feet deep. The facility would be partially buried so that it could be filled by gravity flow (See Figure 2-16). This would also reduce its visual profile by approximately seven feet, resulting in a total height of about 18-½ feet above ground. Adjoining the equalization facility will be a new pump station and odor control facility. In addition, new headworks will provide preliminary treatment consisting of screening and grit removal.

The equalization facility at the Kailua Regional WWTP would have a capacity of approximately 2.19 million gallons. The covered facility would store wastewater from the Kailua service area during peak flow conditions and emptied when flows subside. The facility would be located on the south side of the Kailua Regional WWTP in a vacant area along the fenceline of Kaneohe Bay Drive (See Figure 2-17). Its dimensions are estimated to be approximately 212-½ feet long, 127-½ feet wide, and 25-½ feet deep. The facility would be mostly buried for hydraulic efficiency and filled by the influent pumping station housed in a separate single-story structure (See Figure 2-18). Due to the slope of the hill along this portion of the plant, the visual profile will be further reduced such that, with the exception of the guard railing, the facility will not visibly protrude above ground. A headworks component adjoining the equalization facility will provide preliminary treatment. In addition, odor control will be housed in an adjacent single-story building. A new influent pump station with odor control is also proposed.

As noted previously in Section 1.4.2 Wastewater Flow, the City is updating the 1999 I/I Plan, which is likely to lower peak design flows. If such a reduction is determined, the size of the equalization facilities would also be reduced. Depending on the magnitude of the reduction, there is a possibility that the need for an equalization facility at the Kailua Regional WWTP could be deferred pending future assessments.

The proposed facility improvements at the existing Kaneohe WWPTF and the Kailua Regional WWTP will be generally similar in visual character to those of the existing facilities and would be sensed as an intensification of the existing use. The proposed equalization facilities and associated facilities in Alternative 1 would significantly intensify the visual character of the Kaneohe WWPTF because of its size and location on currently undeveloped land within the property. Existing trees surrounding the site would help to obstruct views of the facility. The smaller equalization facility at the Kailua Regional WWTP would be partially buried, resulting in a low profile. The force main will be located below Kaneohe Bay and would not affect its visual character.

In Alternative 2, the additional drop structure at the Kaneohe WWPTF and the new single-story influent pump station building would slightly increase the intensity of use. The Gravity Tunnel would be located beneath Oneawa Hills and would not affect its visual character. The new access shaft at the existing BWS reservoir site would be a covered manhole consistent with the existing use.

In both Alternatives 1 and 2, the new headworks and dewatering building at the Kailua Regional WWTP would slightly intensify the visual character of the existing uses.

3.11 Infrastructure and Utilities

3.11.1 Wastewater System

Collection System

The wastewater collection system includes gravity lines, force mains and pump stations that extend through most of the developed areas of the region.

Kaneohe WWPTF: Influent wastewater enters the Kaneohe WWPTF through sewer lines, including the Ahuimanu and Waikalua Force Mains, which enter from the western side of the WWPTF. The existing 42-inch Force Main No. 1 conveys pre-treated wastewater from the Kaneohe WWPTF beneath Kaneohe Bay Drive to the Kailua Regional WWTP.

Kailua Regional WWTP: Influent wastewater enters the Kailua Regional WWTP through two separate lines: the Mokapu Interceptor Sewer from the Kailua Basin and the existing 42-inch Force Main No. 1 from the Kaneohe WWPTF.

Treatment and Disposal System

Kaneohe WWPTF: The Kaneohe WWPTF was previously a secondary treatment plant. The facility was converted to a preliminary treatment facility in 1994 as part of the regionalization plan for the Kailua Regional WWTP. The facility provides screening, grit removal and some flow equalization processes. Grit and solid collection from screening are trucked to the Waimanalo Gulch Landfill for disposal.

Kailua Regional WWTP: The Kailua Regional WWTP is a secondary treatment facility using the biotower/solids contact process for secondary treatment and anaerobic digestion for solids treatment. The facility is currently designed to treat an average daily flow of approximately 15.25 mgd.

Impacts and Mitigation Measures

Kaneohe WWPTF and Kailua Regional WWTP: Proposed improvements within the Kaneohe WWPTF and the Kailua Regional WWTP will not affect the existing wastewater collection system. Staging areas at the Kaneohe WWPTF and the Kailua Regional WWTP will be designed to avoid impacting any existing sewer pipes in the vicinity of the project site.

The proposed improvements will have beneficial long-term water quality impacts on coastal waters by reducing the risk and volumes of wastewater spills that could potentially enter coastal waters. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills.

Alternative 1: Force Main No. 2 and Equalization Facilities: Proposed improvements associated with Alternative 1: Force Main No. 2 will not affect the existing wastewater collection system along the proposed force main route since there

are no sewer lines underneath Kaneohe Bay. However, where the Force Main No. 2 reaches the H-3 Freeway Interchange, open trenching will be designed to avoid impacting existing sewer lines.

Open trenching for Alternative 1: Force Main No. 2 will occur beneath the makai side of the Kaneohe Bay Drive Right Of Way (ROW). Open trenching will continue beneath the median of Kaneohe Bay Drive until it reaches the Kailua Regional WWTP. The existing wastewater collection system along Kaneohe Bay Drive, including the existing 42-inch Force Main No. 1, will not be affected since open trenching will occur underneath the existing sewer lines.

Alternative 2: Gravity Tunnel: Proposed improvements associated with Alternative 2: Gravity Tunnel will not affect the existing wastewater collection system since construction of the gravity tunnel will begin at a depth of approximately 90 feet. The proposed tunnel route will cross existing sewer lines at Kaneohe Bay Drive, however, existing sewer lines will not be affected since construction of the Gravity Tunnel will be done at depths greater than 45 feet (13.7 m).

3.11.2 Drainage System

Drainage in the project area follows a basic mauka to makai flow pattern. Water is channeled through streams that flow from the valleys in the Koolau Range to the ocean. Other factors that affect drainage patterns include area topography, natural features, and manmade drainage structures. In urbanized areas, surface water runoff is collected in catch basins and storm drain pipes which are located mainly along streets. Most storm drain pipes, swales, culverts and channels, empty into area streams and canals. All of the streams and canals in the project area empty into Kaneohe Bay.

Storm drainage pipes in the vicinity of the project site are located along roadways, including 24- and 48-inch drainage pipes along Kaneohe Bay Drive near the Kailua Regional WWTP. Existing drainage facilities are managed by the City and County of Honolulu Department of Facility Maintenance.

Impacts and Mitigation Measures

Kaneohe WWPTF and Kailua Regional WWTP: Proposed improvements within the Kaneohe WWPTF and the Kailua Regional WWTP will not affect the existing storm drain collection system. Staging areas at the Kaneohe WWPTF and the Kailua Regional WWTP will be designed to avoid impacting any existing storm drain lines in the vicinity of the project site.

Alternative 1: Force Main No. 2 and Equalization Facilities: Proposed improvements associated with Alternative 1: Force Main No. 2 will not affect the existing storm drainage collection system along the proposed force main route since there are no storm drain lines underneath Kaneohe Bay. However, where the Force Main No. 2 reaches the H-3 Freeway Interchange, open trenching will be designed to avoid impacting existing storm drain lines.

Open trenching for Alternative 1: Force Main No. 2 will occur underneath the makai side of the Kaneohe Bay Drive ROW. Open trenching will continue underneath the median of Kaneohe Bay Drive until it reaches the Kailua Regional WWTP. The existing storm drainage collection system along Kaneohe Bay Drive will not be affected since open trenching will occur beneath the existing storm drain lines.

Alternative 2: Gravity Tunnel: Proposed improvements associated with Alternative 2: Gravity Tunnel will not affect the existing storm drainage collection system since construction of the Gravity Tunnel will begin at a depth of approximately 90 feet and continue beneath Oneawa Hills at depths greater than 45 feet (13.7 m).

3.11.3 Electrical System

Electrical service in the project area is provided by Hawaiian Electric Company, Inc. (HECO) through a network of underground ductlines and aerial power lines. There are numerous 46-kV substations located throughout the project area. Extending from these HECO substations are 46-kV aerial and underground transmission lines that run throughout the project area and over the Koolau Range toward Honolulu.

Electrical service for the Kaneohe WWPTF and Kailua Regional WWTP is provided by underground transmission lines. Transmission lines along Kaneohe Bay Drive include both aerial and underground lines.

Impacts and Mitigation Measures

Kaneohe WWPTF and Kailua Regional WWTP: Proposed improvements within the Kaneohe WWPTF and the Kailua Regional WWTP will not affect the existing electrical utility services. Staging areas at the Kaneohe WWPTF and the Kailua Regional WWTP will be designed to avoid impacting any existing electrical lines in the vicinity of the project site.

Alternative 1: Force Main No. 2 and Equalization Facilities: Proposed improvements associated with Alternative 1: Force Main No. 2 will not affect the existing electrical utility services along the proposed force main route since there are no electrical lines underneath Kaneohe Bay. However, where the Force Main No. 2 reaches the H-3 Freeway Interchange, open trenching will be designed to avoid impacting any existing electrical lines.

Open trenching for Alternative 1: Force Main No. 2 will occur beneath the makai side of the Kaneohe Bay Drive ROW. Open trenching will continue beneath the median of Kaneohe Bay Drive until it reaches the Kailua Regional WWTP. Existing electrical utility services along Kaneohe Bay Drive will not be affected since open trenching will occur beneath the existing electrical lines.

Alternative 2: Gravity Tunnel: Proposed improvements associated with Alternative 2: Gravity Tunnel will not affect the existing electrical utility services since construction of the Gravity Tunnel will begin below existing electrical lines at a depth of approximately 90 feet and continue beneath Oneawa Hills at depths greater than 45 feet (13.7 m).

Alternative 2 will include construction of an influent pump station at the Kailua Regional WWTP. The existing electrical utilities have sufficient electrical capacity to support this new facility.

3.11.4 Communications System

Telephone service in the project area is provided by Hawaiian Telcom. Existing underground and aerial telephone lines are located throughout the project area, serving private residential and commercial properties. The Hawaiian Telcom Papaa Radio Station is located in the Oneawa Hills.

Cable service in the project area is provided by Oceanic Time Warner Cable. Existing underground and aerial cable lines are located throughout the project area, serving private residential and commercial properties.

Impacts and Mitigation Measures

Kaneohe WWPTF and Kailua Regional WWTP: Proposed improvements within the Kaneohe WWPTF and the Kailua Regional WWTP will not affect the existing telephone and cable system. Staging areas at the Kaneohe WWPTF and the Kailua Regional WWTP will be designed to avoid impacting any existing telephone and cable lines in the vicinity of the project site.

Alternative 1: Force Main No. 2 and Equalization Facilities: Proposed improvements associated with Alternative 1: Force Main No. 2 will not affect the existing telephone and cable systems along the proposed force main route since there are no telephone or cable lines underneath Kaneohe Bay. However, where the Force Main No. 2 reaches the H-3 Freeway Interchange, open trenching will be designed to avoid impacting existing telephone and cable lines.

Open trenching for Alternative 1: Force Main No. 2 will occur beneath the makai side of the Kaneohe Bay Drive ROW. Open trenching will continue beneath the median of Kaneohe Bay Drive until it reaches the Kailua Regional WWTP. The existing telephone and cable system along Kaneohe Bay Drive will not be affected since open trenching will occur beneath the existing telephone and cable lines.

Alternative 2: Gravity Tunnel: Proposed improvements associated with Alternative 2: Gravity Tunnel will not affect the existing telephone and cable system since construction of the Gravity Tunnel will begin at a depth of approximately 90 feet and continue beneath Oneawa Hills at depths greater than 45 feet (13.7 m).

3.11.5 Gas System

Gas service throughout the project area is provided by Citizens Energy Services' The Gas Company. Propane gas is transported throughout the area by underground lines which are located along Kaneohe Bay Drive. Locations not connected to a gas line have propane gas tanks at the individual private residential and commercial properties, which are served by tanker trucks.

There are no existing gas lines in the vicinity of the Kaneohe WWPTF and the Kailua Regional WWTP.

Impacts and Mitigation Measures

Kaneohe WWPTF and Kailua Regional WWTP: Proposed improvements within the Kaneohe WWPTF and the Kailua Regional WWTP will not affect the existing gas system as no gas facilities are located in the vicinity of the properties.

Alternative 1: Force Main No. 2 and Equalization Facilities: Proposed improvements associated with Alternative No. 1: Force Main No. 2 will not affect the existing gas system along the proposed force main route since there are no gas lines underneath Kaneohe Bay, however, where the Force Main No. 2 reaches the H-3 Freeway Interchange, open trenching will be designed to avoid impacting any existing gas lines along Kaneohe Bay Drive to the Kailua Regional WWTP.

Alternative 2: Gravity Tunnel: Proposed improvements associated with Alternative 2: Gravity Tunnel will not affect the existing gas system since construction of the Gravity Tunnel will begin at a depth of approximately 90 feet and continue underneath Oneawa Hills at depths greater than 45 feet (13.7 m).

3.12 Public Services and Facilities

3.12.1 Police Protection

Kaneohe: Police protection is provided by the City through the Kaneohe Police Station, located at 45-270 Waikalua Road, approximately one mile northwest from the Kaneohe WWPTF.

Kailua: Police protection is provided by the City through the Kailua Police Station, located at 219 Kuulei Road, approximately two miles southeast from the Kailua Regional WWTP.

3.12.2 Fire Protection

Kaneohe: Fire protection is provided by the City. The nearest station is the Kaneohe Fire Station, located at 45-910 Kamehameha Highway, approximately one mile northwest from the Kaneohe WWPTF.

Kailua: Fire protection is provided by the City. The nearest station is the Kailua Fire Station, located at 211 Kuulei Road, approximately two miles southeast from the Kailua Regional WWTP.

3.12.3 Health Care Services

Health care services for residents of the Kaneohe area are available at Straub Family Health Center located at Windward Mall in Kaneohe. The facility offers diagnosis and treatment of illness and injury, physical examinations, complete obstetrics/gynecology and family planning services, lab testing and on-site x-ray, mammography, and dietary and health education counseling. The Kaiser Permanente Koolau Clinic, located at 45-602 Kamehameha Highway, provides family medicine, internal medicine, obstetrics/gynecology, and pediatrics,

as well as behavioral health services, diabetes education, diagnostic imaging, health education, laboratory, medical social services, medication and nutrition counseling, pharmacy services, and physical therapy. In addition, the Windward Comprehensive Health Center, a State facility located along Keaahala Road, provides services including dental health, early intervention, family health, health promotion and education, mental health for children and for adults, public health nursing, and a Women, Infants, and Children (WIC) program. The adjacent Hawaii State Hospital is a 244-bed facility dedicated to serving adults with serious mental illnesses. Medical care and emergency services are available to both Kaneohe and Kailua residents at the Castle Medical Center in Kailua.

3.12.4 Public Schools

Kaneohe: The State Department of Education (DOE) administers seven public schools within the Kaneohe area, including Heeia Elementary School (K-6), Benjamin Parker Elementary School (K-6), Kapunahala Elementary School (K-6), Puohala Elementary School (K-6), Kaneohe Elementary School (K- 6), King Intermediate (7-8), and Castle High School (9-12). The University of Hawaii's Windward Community College (WCC) campus provides post-secondary education services. The public library serving the Kaneohe area is the Kaneohe Regional Library, which is part of the State of Hawaii Public Library System.

Kailua: DOE administers five public schools and one charter school within the Kailua area, including Aikahi Elementary School (K-6), Kailua Elementary School (K-6), Kainalu Elementary School (K-6), Lanikai Elementary PCS (K-6), Kailua Intermediate School (7-8), and Kalaheo High School (9-12). The public library serving the Kailua area is the Kailua Public Library, which is part of the State of Hawaii Public Library System.

3.12.5 Recreational Facilities

Majority of the shoreline is occupied by private property, including residences, fishponds, yacht clubs, and military use areas. Public access to Kaneohe Bay is provided by City and State parks, boat ramps, and a few small shoreline access points. Kaneohe Beach Park is the only public access point in the southern portion of Kaneohe Bay.

Public recreational facilities within the project vicinity include Kaneohe Beach Park, Kailua Neighborhood Park, and Aikahi Community Park. These facilities are operated by the City Department of Parks and Recreation.

In close proximity to the Kaneohe WWPTF, Bayview Golf Park, which includes the Bayview Golf Course, a Mini Putt course, a golf range, a golf shop, and a restaurant, is located at 45-285 Kaneohe Bay Drive. Access to the Kaneohe WWPTF is provided through a City access road through the Bayview Golf Park.

Recreational activities, such as paddling, sailing, speed boating and water-skiing, jet-skiing, and fishing, occur along the coast and in the waters of Kaneohe Bay. The nearest public boating facility is Heeia Kea Harbor, which is located approximately 3.0 miles northwest of Kaneohe WWPTF. Heeia Kai Harbor is the primary boat launching access for Kaneohe Bay. Fishing, recreational, and commercial boats are all launched from Heeia Kai Harbor. The Kokokahi YWCA, with permission from the property owner, is also used for launching small boats. The State's Kaneohe Bay Offshore Mooring Areas (moorings allocated by permit) and

the private Kaneohe Yacht Club are located within the immediate vicinity of the existing 42-inch Force Main No. 1 alignment.

Kaneohe Bay falls within the Windward Oahu Ocean Recreation Management Area. Further discussion on the Windward Oahu Recreation Management Area is provided in Chapter 5.

Impacts and Mitigation Measures

Short-term, construction-related impacts to recreational facilities are anticipated at the Kaneohe WWPTF. Construction vehicles and equipment and commuting construction workers will have to access the Kaneohe WWPTF through the City access road through Bayview Golf Course.

No significant impacts on recreational activities occurring in Kaneohe Bay are anticipated since no over-water structures, floating pipes, or other obstructions would be on the surface of the bay. Recreational activities may be impacted if the contingency or emergency measures that involve work in the waters of Kaneohe Bay are necessary (e.g. removal of excavated material from the proposed hybrid tunnel) and result in adverse water quality (e.g. silt, sewage) in bay waters near the Kaneohe WWPTF and the Kailua Regional WWTP.

During construction of the proposed improvements, storm runoff may carry increased amounts of sediment into the storm drain system and streams due to erosion from exposed soils. This could potentially impact the water quality of recreational coastal waters in the area. Potential water quality impacts during construction of the proposed facility improvements will be mitigated by adherence to State of Hawaii and City and County of Honolulu water quality regulations governing grading, excavation and stockpiling.

For dewatering that may be required during excavation and construction of the proposed improvements, an NPDES General Permit for Construction Activity Dewatering will be required for discharging dewatering effluent into City drainage systems and waters of the United States. The permit will require a Best Management Practices (BMP) plan, erosion control plan and water quality monitoring plan.

The proposed improvements will have beneficial long-term water quality impacts on recreational coastal waters. The proposed improvements to provide supplemental or alternative conveyance of wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP will prevent spillage from the existing Force Main No. 1, should it fail. In addition, wastewater storage capabilities in either alternative will allow peak flows to be captured, thereby minimizing the probability of spills and bypasses to the coastal waters during rain storms and enable flows that would otherwise potentially be sewer overflows to be treated to a secondary level and eventually discharged through the Mokapu Outfall.

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CHAPTER 4

INDIRECT AND CUMMULATIVE IMPACTS

4. INDIRECT AND CUMULATIVE IMPACTS

4.1. Indirect Impacts

Indirect or secondary effects are described as those effects caused by a project but occur later in time or farther removed in distance than direct impacts but are still reasonably foreseeable. Such effects may include impacts on environmental resources or public facilities that occur as a result of the project's influence on land use.

The proposed project is not expected to have secondary impacts on resident population or land use and settlement patterns. Changes to land use patterns and future development in the Koolaupoko District, which includes the service area, are administered by the City and County of Honolulu Planning Department through its Koolaupoko Sustainable Communities Plan. Notably, the proposed project alternatives are intended to accommodate the projected population of the service area, as well as to address peak flows generated by infiltration and inflow during wet-weather conditions. As such, the proposed project is not a population generator, nor is the project anticipated to induce population growth. Notably, both the American Community Survey population data (as discussed in Section 3.5.1) and the Koolaupoko Sustainable Communities Plan project a slight decrease in the actual population of the service area.

Without a significant impact on population growth, this project would not have significant secondary impacts on other infrastructure or governmental facilities and services. Thus, the project is not anticipated to indirectly increase demand for transportation, water or solid waste disposal that would necessitate additional long-term infrastructure improvements. Likewise, the project would not have a significant indirect impact on public facilities such as schools, medical facilities, and recreational facilities. Coordination with government agencies and utility companies will continue during the preparation of design plans to address any direct impacts on roadway and other infrastructure facilities.

Creation of short-term construction jobs may induce in-migrating of workers to the island to temporarily fill these positions, however, it is not anticipated that a significant number of these workers will become permanent residents on the island or in the Koolaupoko District. It is anticipated that qualified local contractors on or within the State of Hawaii would be used for the project's construction. Therefore, construction of the project should not contribute to significant secondary impacts associated with in-migration of workers from outside of the State.

4.2. Cumulative Impacts

Cumulative impacts are typically defined as the effects on the environment which result from the incremental impact of a project when added to past, present, and reasonably foreseeable future actions. The estimation of future impacts is important for cumulative impact analysis. However, the focus must be on "reasonably foreseeable" actions which are those that are likely to occur or probable, rather than those that are merely possible or subject to speculation. The prediction of reasonably foreseeable impacts thus requires judgment based on information obtained from reliable sources such as adopted plans and similar documents.

Short-Term Cumulative Impacts

Cumulative short-term impacts would be associated with construction activities that may occur concurrently with other construction projects in the immediate vicinity. While no such overlap of construction activity is foreseeable at this time, it could contribute to increased temporary disruptions and nuisance effects such as noise, dust, and traffic delays. However, mitigation measures, as discussed in other sections of this document would reduce the intensity of any cumulative impacts.

Long-Term Cumulative Impacts

In terms of physical and biological resources, no significant long-term cumulative impacts at or within the vicinity of the alternative project sites are anticipated, such as on soils, topography, flora, fauna, marine life, natural hazards, noise, air quality and aesthetics. Appropriate mitigation measures were identified to address direct impacts, which would primarily be associated with short-term construction-related activities.

In the vicinity of the Kaneohe WWPTF and, particularly, the Kailua Regional WWTP, the cumulative impact of the proposed project on odors will be positive. The proposed alternatives will include odor control for all new facilities, such as the covered equalization facilities, the influent pump stations, and headworks for the force main alternative, as well as the new enclosed drop shaft and influent pump station for the gravity tunnel alternative. Also, in the long-term, regardless of which alternative is pursued, the proposed new headworks facility and dewatering building at the Kailua Regional WWTP will help to reduce odors. The new headworks at the Kailua Regional WWTP would include construction of a new facility in an enclosed building with odor control. The proposed dewatering building will be designed so that trucks receiving the dewatered sludge for transport will be able to drive into the building and the building access will be closed while the trucks are being loaded. This will significantly reduce odors generated by the loading operation. The building will be equipped with odor control devices to prevent odorous gases from escaping.

On an island-wide scale, the 2010 Consent Decree requires the City to implement a range of improvements to wastewater facilities on Oahu to prevent wastewater spills. The proposed project is one of these improvements. Cumulatively, these improvements will have and overall positive impact on the environment. On the other hand, the cumulative cost of these improvements will be borne by the residents of Honolulu who are served by these wastewater systems. The City estimates that sewer fees may increase three to five percent per year to cover costs for improvements that will be spread out up to 28 years into the future.

CHAPTER 5

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

5. RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

This section discusses State and City land use plans, policies and controls relating to the proposed project.

5.1. Hawaii State Plan

The Hawaii State Plan, Chapter 226, HRS, serves as a guide for goals, objectives, policies, and priorities for the State. The Hawaii State Plan also provides a basis for determining priorities, allocating limited resources, and improving coordination of State and County Plans, policies, programs, projects, and regulatory activities. It establishes a set of themes, goals, objectives, and policies that are meant to guide the State's long-range growth and development activities. The proposed project alternatives are consistent with the following applicable objectives and policies:

Section 226-11 Objectives and policies for the physical environment – land based, shoreline, and marine resources.

- *(b)(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.*
- *(b)(3) Take into account the physical attributes of areas when planning and designing activities and facilities.*
- *(b)(8) Pursue compatible relationships among activities, facilities, and natural resources.*

In the short-term, construction activities in either alternative will be subject to regulatory requirements that will mitigate or minimize potential impacts to natural resources and ecological systems.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on recreational coastal waters. Both proposed project alternatives, will reduce the probability and volume of spills and bypasses to coastal waters during extended periods of rainfall.

Section 226-13 Objectives and policies for the physical environment – land, air, and water quality.

- *(b)(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.*
- *(b)(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.*

In the short-term, construction activities in either alternative will be subject to regulatory requirements that will mitigate or minimize potential impacts to surface, ground and coastal waters, as well as impacts to ambient noise levels and air quality. Should contingency or emergency measures be required during construction of the force main beneath Kaneohe Bay in Alternative 1, transitory water quality impacts on coastal waters would result. This would likely occur during the placement and removal of the steel pipes or sheet pilings required to isolate a water column within which the sea floor would be excavated to reach any subsurface obstructions or equipment. Such contingency activities will not be permitted in specifically identified sensitive areas of Kaneohe Bay where sea grass and coral reefs occur.

Should a frac-out occur during HDD operations in Alternative 1, non-toxic bentonite drilling mud and spoils from drilling operations could be released into coastal waters. However, this transitory water quality impact would be minimized by ceasing operations and implementing BMPs such as silt curtains.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on surface, ground, and coastal waters in the project area.

The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

In the long-term, the primary air quality concern associated with the proposed project alternatives will be potential odor nuisances. The proposed alternatives will include odor control for all new facilities, such as the covered equalization facilities, an influent pump station, and headworks for the force main alternative, as well as the new enclosed drop shaft and influent pump station for the gravity tunnel alternative.

Also, in the long-term, regardless of which alternative is pursued, the proposed new headworks facility and dewatering building at the Kailua Regional WWTP will help to reduce odors. The new headworks at the Kailua Regional WWTP would include construction of a new facility in an enclosed building with odor control. The proposed dewatering building will be designed so that trucks receiving the dewatered sludge for transport will be able to drive into the building and the building access will be closed while the trucks are being loaded. This will significantly reduce odors generated by the loading operation. The building will be equipped with odor control devices to prevent odorous gases from escaping.

Section 226-15 Objectives and policies for facility systems – solid and liquid wastes

(b)(1) Encourage the adequate development of sewage facilities that complement planned growth.

The capacity of the proposed alternatives is based on: (1) wastewater flows generated by the population in the service area, according to the City's 2007 population forecasts for the Koolaupoko Sustainable Communities Plan; and (2) peak flow projections determined by the 1999 Sewer Rehabilitation and Infiltration and Inflow Study (I/I Study). Notably, both the 2007 population forecasts for the Koolaupoko Sustainable Communities Plan and the American Community Survey population data (as discussed in Section 3.5.1) indicate a declining population in the service area.

5.2. State Functional Plans

In conjunction with the County General Plans, the State Functional Plans are the primary guideposts for implementing the Hawaii State Plan. The Functional Plans delineate specific strategies or policies and priority actions that need to be addressed in the short term. The Plans guide implementation of State and County actions in the following areas: agriculture, conservation lands, education, employment, energy, health, higher education, historic preservation, housing, human services, recreation, tourism, transportation, and water

resource development. The proposed project alternatives are consistent with the following State Functional Plan objectives and policies:

State Recreation Functional Plan

Objective IV-B: Prevent Degradation of the Marine Environment

Policy IV-B(1): Enhance water quality to provide high-quality ocean recreation opportunities.

Implementing Action IV-B(1)a:
Regularly monitor water quality at key ocean recreation sites.

In the short-term, construction activities in either alternative will be subject to regulatory requirements that will mitigate or minimize potential water quality impacts to coastal waters. Should contingency or emergency measures be required during construction of the force main beneath Kaneohe Bay in Alternative 1, transitory water quality impacts on coastal water quality would result. This would likely occur during the placement and removal of steel pipes or sheet pilings required to isolate a water column within which the sea floor would be excavated to reach any subsurface obstructions or equipment

Should a frac-out occur during HDD operations in Alternative 1, non-toxic bentonite drilling mud and spoils from drilling operations could be released into coastal waters. However, this transitory water quality impact and its potential impacts on marine life and ecosystems would be minimized by ceasing operations and implementing BMPs such as silt curtains.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on coastal waters in the project area. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

The proposed improvements would not cause a significant change in the ambient coastal water quality condition, which under normal circumstances meets State Water Quality Standards.

As part of the NDPES permit under which the Kailua Regional WWTP operates, the City is required to regularly monitor shoreline, nearshore and offshore stations to ensure that nutrient levels do not exceed State water quality standards.

Historic Preservation:

Objective B: Protection of Historic Properties

Policy B.2. Establish and make available a variety of mechanisms to better protect historic properties.

Objective C: Management and Treatment of Historic Properties

Policy C.3. Explore innovative means to better manage historic properties.
Policy C.4. Encourage proper preservation techniques.

An archaeological literature review and field investigation was conducted for both proposed alternatives.

At the Kaneohe WWPTF, no significant short- or long-term impacts to historic or archaeological resources are anticipated as a result of the construction and operation of the proposed alternatives. A program of pre-construction archaeological inventory survey subsurface testing is recommended in consultation with SHPD based on project plans and scoped to address the specific locations of planned excavations. Based on the findings of the archaeological testing and consultation with SHPD, monitoring will be conducted during construction-related subsurface excavations within Kaneohe WWPTF.

At the Kailua Regional WWTP, no significant short- or long-term impacts to historic or archaeological resources are anticipated as a result of the construction and operation of proposed improvements. Jaucas sand is present within a very small area in the vicinity of the Kailua Regional WWTP administration building in the northeastern portion of the WWTP property. Human burials have been found throughout the Hawaiian Islands within Jaucas sand deposits. If any subsurface disturbance is planned for this area, a program of archaeological inventory survey subsurface testing is recommended in consultation with SHPD.

No significant short- or long-term impacts to historic or archaeological resources are anticipated as a result of the construction and operation of the Force Main No. 2 alternative. Preconstruction subsurface testing shall be undertaken if the underbay force main project is selected for implementation. The force main will be installed at least 20 feet below the sea floor of Kaneohe Bay via directional drilling or tunneling. Therefore, it is unlikely that construction will have any impact on historic or archaeological resources in the project area.

No significant short- or long-term impacts are anticipated as a result of the construction and operation of the gravity tunnel alternative since the construction of the gravity tunnel would occur at depths greater than 45 feet (13.7 m). Therefore, adverse impacts on historic or archaeological resources within the project area are not anticipated. No further monitoring work is recommended for the proposed tunnel access shaft location based on geotechnical testing results that show basalt extending from 61 cm (2 feet) below the surface to 98 meters below the surface (320.5 feet). However, if a new location for the proposed tunnel access shaft is identified, additional literature review and field inspection is recommended.

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

State Water Resources Development Functional Plan:

Objective: Maintain the Long-Term Availability of Freshwater Supplies, Giving Consideration to the Accommodation of Important Environmental Values.

Policy B (1). *Promote sound watershed and aquifer management practices.*
Policy B (2). *Manage surface drainage areas and ground water aquifers to prevent contamination of sources of water supply.*
Policy B (3). *Seek a balance among development and environmental values in the planning, evaluation, permitting, and construction of water resources projects.*

In the short-term, construction activities in either alternative will be subject to regulatory requirements that will mitigate or minimize potential water quality impacts to groundwater and surface water resources.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on groundwater by reducing the potential for wastewater spills which could percolate into the groundwater or flow to surface water bodies.

The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

In Alternative 2, the gravity tunnel will traverse designated aquifers. Although it will lie below sea level, it is uncertain if the groundwater that may be encountered will be fresh or brackish. In any event, should there be any damage to the pipe carrying the wastewater, the pressure from the groundwater will cause infiltration into the tunnel, as opposed to the exfiltration of wastewater out of the tunnel and into groundwater bodies.

5.3. State Land Use District

The State Land Use Law, Chapter 205, Hawaii Revised Statutes (HRS), is intended to preserve, protect and encourage the development of lands in the State for uses which are best suited to the public health and welfare for Hawaii's people. All lands in the State are classified into four land use districts by the State Land Use Commission: Urban, Agricultural, Conservation, and Rural.

Two land use districts are found in the planning area: Urban and Conservation (see Figure 5-1). Conservation lands are the most prevalent, encompassing the Oneawa Hills bordering Kaneohe and Kailua and Kaneohe Bay. Urban lands comprise the remainder of the proposed project area, encompassing both the existing Kaneohe WWPTF and Kailua Regional WWTP sites. The proposed project alternatives, as well as additional improvements, are consistent with the respective Urban and Conservation District classifications.

Within the Conservation District, there are five subzones as follows: Protective (P), Limited (L), Resource (R), General (G), and Special Subzone (SS). Excluding the Special Subzone, the four remaining subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (Protective) to the least sensitive (General). The objective of these subzones is to protect valuable resources in designated areas such as restricted watersheds, marine, plant, wildlife sanctuaries, significant historic, archaeological, geological, volcanological features and sites, and other designated unique areas. The routes of the proposed project alternatives traverse beneath the Resource, General, and Protective subzones (see Figure 5-2).

The Alternative 1 Force Main No. 2 route traverses beneath Kaneohe Bay, which is mostly located in the Resource (R) subzone, but is also located in the General (G) and Protective (P) subzones of the Conservation District. The proposed improvements associated with this

alternative would be subject to a CDUA pursuant to the State DLNR Administrative Rules, Title 13, Chapter 5 for lands designated in the Conservation District.

Alternative 2 Gravity Tunnel is located in the General (G) subzone of the Conservation District. The proposed improvements associated with this alternative would also be subject to a CDUA.

5.4. Coastal Zone Management Program

Hawaii's Coastal Zone Management (CZM) Program, established pursuant to Chapter 205A, HRS, as amended, is administered by the State Office of Planning (OP) and provides for the beneficial use, protection and development of the State's coastal zone. The objectives and policies of the Hawaii CZM Program encompass broad concerns such as impact on recreational resources, historic and archaeological resources, coastal scenic resources and open space, coastal ecosystems, coastal hazards, and the management of development. The applicability of the CZM objectives and policies to the proposed project alternatives are as follows:

(1) <u>Recreational Resources</u>

<u>Objective:</u>

(A) Provide coastal recreational opportunities accessible to the public.

<u>Policies</u>

(A) Improve coordination and funding of coastal recreational planning and management; and

(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

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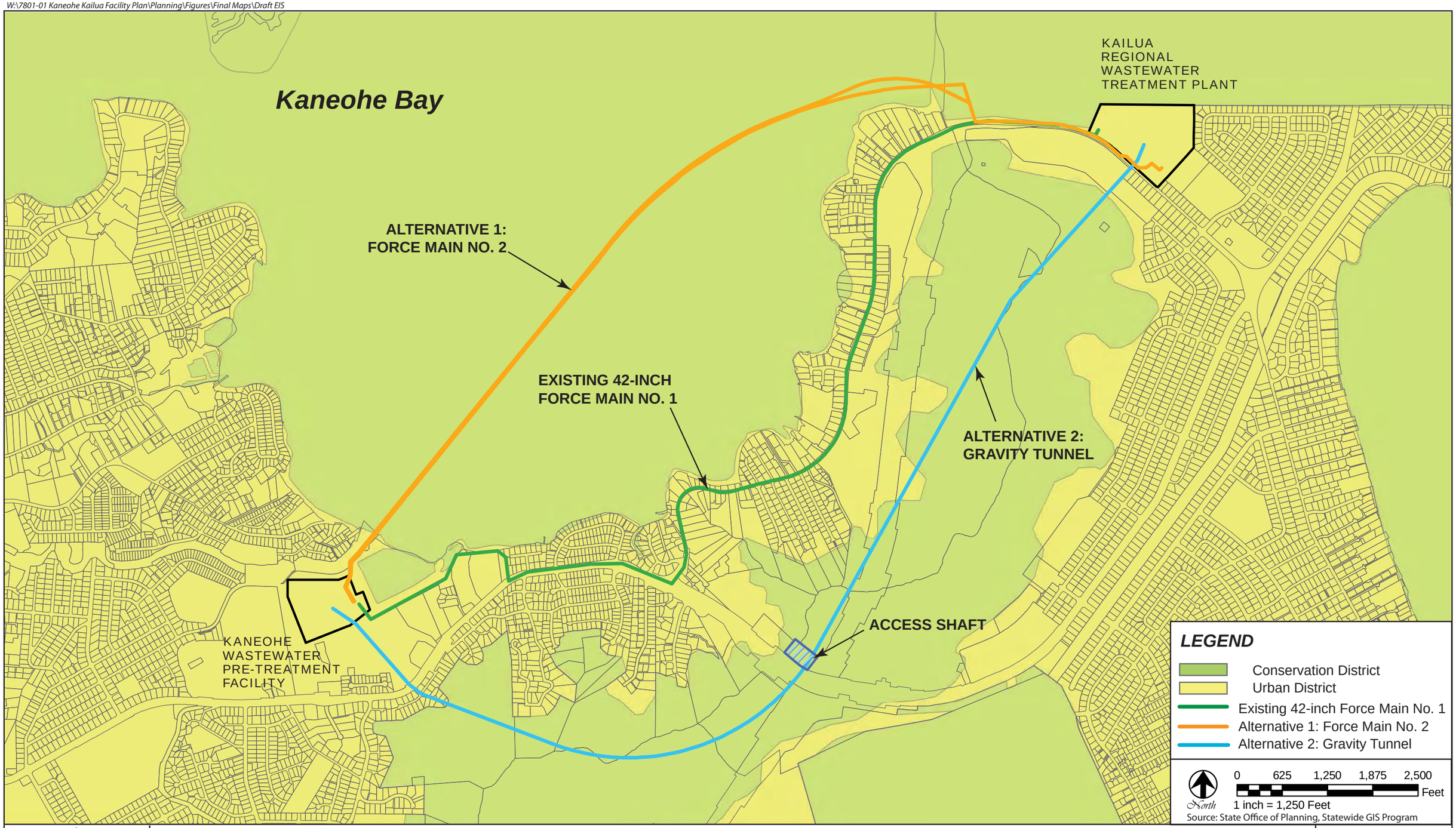

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

STATE LAND USE DISTRICTS

FIGURE 5-1

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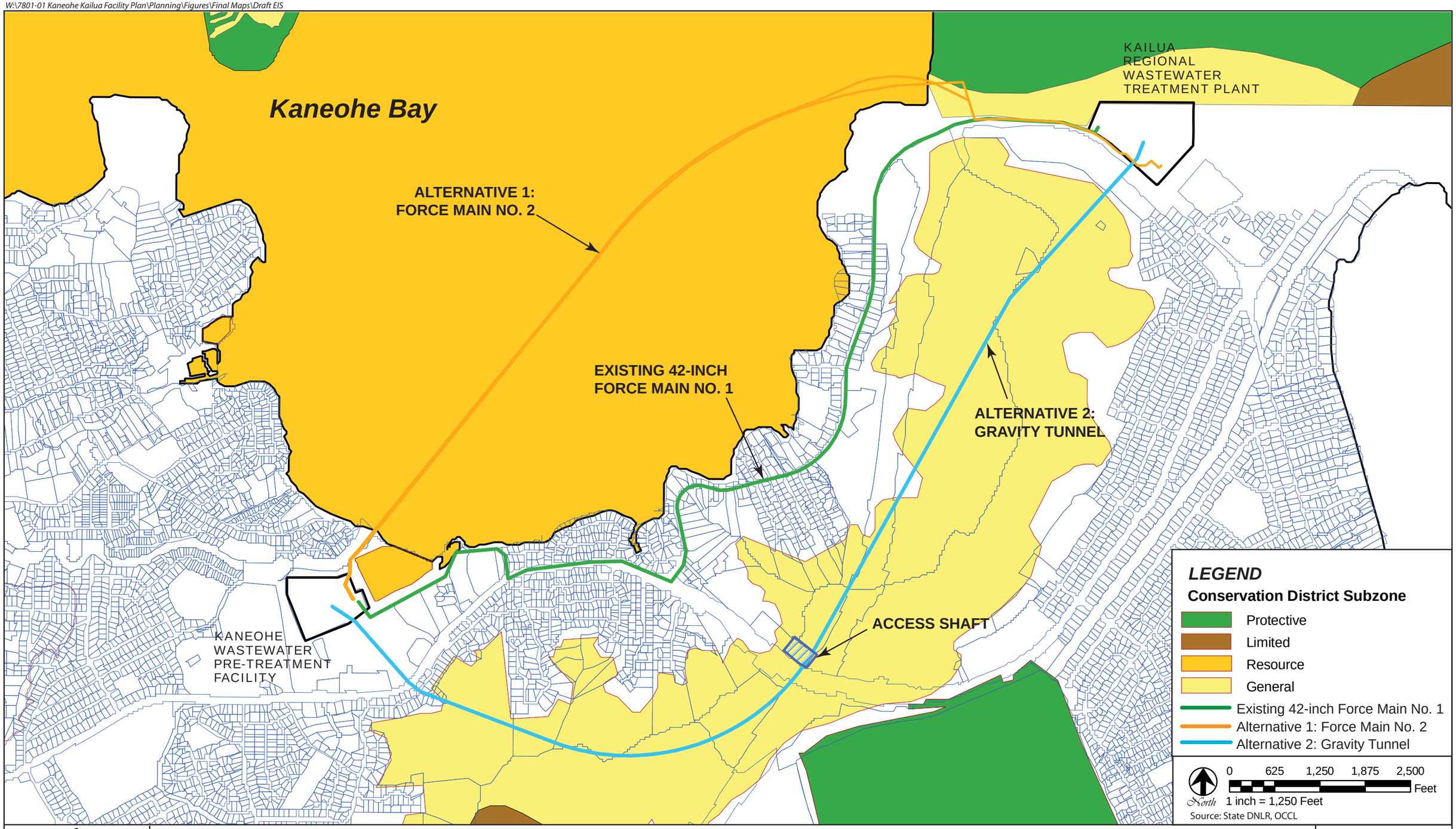

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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

CONSERVATION DISTRICT SUBZONES

FIGURE 5-2

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities, and crediting such dedication against the requirements of section 46-6.

In the short-term, construction activities in either alternative will be subject to regulatory requirements that will mitigate or minimize potential water quality impacts to coastal waters, which are used for recreation in Kaneohe Bay. In Alternative 1, the force main beneath Kaneohe Bay could temporarily interfere with recreational boating in the event of a contingency or emergency during which the bay bottom would need to be excavated to access blockages or equipment. Watercraft would be used to install pipes or sheet piles to isolate water columns and to access the obstruction or equipment.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on coastal waters in the project area, including Kaneohe Bay, which is used for a variety of water recreation. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

(2) Historic Resources

Objective:

(A) Protect, preserve, and where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(A) Identify and analyze significant archaeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

An archaeological literature review and field investigation was conducted for both proposed alternatives.

At the Kaneohe WWPTF, no significant impacts to historic or archaeological resources are anticipated as a result of the proposed alternatives. A program of pre-construction archaeological inventory survey subsurface testing is recommended in consultation with SHPD based on project plans and scoped to address the specific locations of planned excavations. Based on the findings of the archaeological testing and in consultation with SHPD, monitoring will be conducted during construction-related subsurface excavations within the Kaneohe WWPTF.

At the Kailua Regional WWTP, no significant impacts to historic or archaeological resources are anticipated as a result of the proposed improvements. Jaucas sand is present within a very small area in the vicinity of the Kailua Regional WWTP administration building in the

northeastern portion of the WWTP. Human burials have been found throughout the Hawaiian Islands within Jaucas sand deposits. If any subsurface disturbance is planned for this area, a program of archaeological inventory survey subsurface testing is recommended in consultation with SHPD.

No significant impacts to historic or archaeological resources are anticipated as a result of Alternative 1 Force Main No. 2. Preconstruction subsurface testing shall be undertaken if the underbay force main project is selected for implementation. The force main will be installed at least 20 feet below the sea floor of Kaneohe Bay via directional drilling or tunneling. Therefore, it is unlikely that construction will have any impact on historic or archaeological resources in the project area.

No significant impacts are anticipated as a result of Alternative 2 Gravity Tunnel since the construction of the gravity tunnel would occur at depths greater than 45 feet (13.7 m). Therefore, adverse impacts on historic or archaeological resources within the project area are not anticipated. No further work is recommended for the proposed tunnel access shaft location based on geotechnical testing results indicating the presence of basalt extending from 61 cm (2 feet) below the surface to 98 meters (320.5 feet) below the surface. However, if a new location for the proposed tunnel access shaft is identified, additional literature review and field inspection is recommended.

Should any significant historic or archaeological resources be found during construction activities, all work shall cease within the immediate area and SHPD shall be notified immediately.

(3) *Scenic and Open Space Resources*

Objective:

(A) Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(A) Identify valued scenic resources in the coastal zone management area;
(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms;
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
(D) Encourage those developments which are not coastal dependent to locate in inland areas.

In the short-term, sound attenuation measures, including temporary walls and enclosures, are recommended to mitigate short-term construction-related noise impacts. A temporary noise wall will be constructed in conjunction with Alternative 1, however, the height and location are yet to be determined. In Alternative 2, a noise wall is also proposed at the Kailua Regional WWTP to mitigate noise impacts during construction of the tunnel access shaft. The wall will measure approximately 20 feet high by approximately 1,000 feet long and will surround the proposed drop shaft and nearby construction staging area. The noise wall will be removed following construction.

In the long-term, since the proposed facility improvements at the existing WWTP, WWPTF and pump station sites will be similar in visual character to those of the existing facilities, the

change in views from public places will be of an intensification of the existing use. The proposed equalization facilities associated with Alternative 1, if pursued, would significantly intensify the visual character of the Kaneohe WWPTF because of its size and location on currently undeveloped land within the property. Existing trees surrounding the site would help to obstruct views of the facility. The smaller equalization facility at the Kailua Regional WWTP would be partially buried, resulting in a low profile.

(4) *Coastal Ecosystems*

Objective:

(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems;
(B) Improve the technical basis for natural resource management;
(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs;
(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

In Alternative 1, the force main beneath Kaneohe Bay will traverse well below the bottom of Kaneohe bay. Consequently, there will be no direct impact on marine life and ecosystems. However, should contingency or emergency activities be required during construction, transitory water quality impacts on coastal water quality could result with potential impacts on marine life and ecosystems. This would likely occur during the placement and removal of steel pipes or sheet piling required to isolate a water column within which the sea floor would be excavated to reach any subsurface obstructions or equipment. Such contingency activities will not be permitted in specifically identified sensitive areas of Kaneohe Bay where sea grass and coral reefs occur.

Should a frac-out occur during HDD operations in Alternative 1, non-toxic bentonite drilling mud and spoils from drilling operations could be released into coastal waters. However, this transitory water quality impact and its potential impacts on marine life and ecosystems would be minimized by ceasing operations and implementing BMPs such as silt curtains.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on coastal waters in the project area, including Kaneohe Bay and Kailua Bay. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

(6) Coastal Hazards

Objectives:

(A) Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Policies:

(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;
(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
(D) Prevent coastal flooding from inland projects.

In the long-term, the proposed improvements will have beneficial impacts by providing facilities to accommodate and contain infiltration and inflow to the wastewater system. Both alternatives will mitigate any potential for operational disruptions or wastewater spills during heavy rainfall events. The improvements will prevent localized flooding and contamination of runoff with untreated sewage from system overflows by providing adequate capacity to collect excess rainwater that enters wastewater collection lines.

(8) Public Participation

Objective:

(A) Stimulate public awareness, education, and participation in coastal management.

Policies:

(A) Promote public involvement in coastal zone management processes;
(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Public and private entities have been provided multiple opportunities to comment on the proposed project alternatives, as discussed in Chapter 12 of this document. Government agencies, community organizations, and other interested parties have been consulted through meetings and the Environmental Assessment/Environmental Impact Statement Preparation Notice (EISPN) comment process. The public comment period for the Draft EIS will also provide an opportunity for further agency and public input.

(10) Marine Resources

Objective:

(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
(B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
(C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
(D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and
(E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

In Alternative 1, the force main beneath Kaneohe Bay will traverse well below the bottom of Kaneohe Bay. Consequently, there will be no direct impact on marine resources. However, should contingency or emergency measures be required during construction, transitory water quality impacts on coastal water quality would result in potential impacts to marine resources. This would likely occur during the placement and removal of steel pipes or sheet pilings required to isolate a water column within which the sea floor would be excavated to reach any subsurface obstructions or equipment. Such contingency activities will not be permitted in specifically identified sensitive areas of Kaneohe Bay where sea grass and coral reefs occur.

Should a frac-out occur during HDD operations in Alternative 1, non-toxic bentonite drilling mud and spoils from drilling operations could be released into coastal waters. However, this transitory water quality impact and its potential impacts on marine resources would be minimized by ceasing operations and implementing BMPs such as silt curtains.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on coastal waters in the project area, including Kaneohe Bay, which is used for a variety of water recreation. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

5.5. Ocean Recreation Management Rules and Areas

The purpose of the Ocean Recreation Management Rules and Areas, administered by the DLNR Division of Boating and Recreation, HAR Chapter 256 , is to reduce conflicts among ocean water users, especially in areas of high activity. In Alternative 1, the proposed force main traverses a portion of the Windward Oahu Ocean Recreation Management Area. This

management area encompasses all waters from Kahana Bay to Makapuu Point. Within this larger area, smaller areas are identified. The proposed force main traverses through what is referred to as "Kaneohe Bay Waters". As the project's particular route does not traverse through any restricted zones, the area of the Bay in which Alternative I traverses is subject to the following general restrictions:

> *(b) Commercial ocean recreation activities shall be restricted within Kaneohe Bay waters as follows:*
>
> > *(1) No commercial operator, holding a valid ocean recreational management area commercial use permit, shall operate a thrill craft, engage in water sledding or commercial high speed boating, or operate a motor vessel towing a person engage in water sledding during weekends and state or federal holiday.*
> >
> > *(2) All commercial ocean recreation activities in Kaneohe Bay waters are prohibited on Sunday, effective January 1, 1991.*

In the short-term, construction activities in either alternative will be subject to regulatory requirements that will mitigate or minimize potential water quality impacts to coastal waters, which are used for recreation in Kaneohe Bay. In Alternative 1, the force main beneath Kaneohe Bay could temporarily interfere with recreational boating in the event of a contingency or emergency during which the bay bottom would need to be excavated to access blockages or equipment. Watercraft would be used to install pipes or sheet piles to isolate water columns as well as access the obstruction or equipment.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on coastal waters in the project area, including Kaneohe Bay, which is used for a variety of water recreation. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

5.6. City and County of Honolulu General Plan

The General Plan for the City and County of Honolulu, initially adopted in 1977, is a statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity of the people of Oahu. The Plan is also a statement of broad policies which facilitate the attainment of the objectives of the Plan. Eleven subject areas provide the framework for the City's expression of public policy concerning the needs of the people and functions of government. These areas include population; economic activity; the natural environment; housing; transportation and utilities; energy; physical development and urban design; public safety, health and education; culture and recreation; and, government operations and fiscal management. The relationship of the proposed project improvements to the relevant objectives and policies of the General Plan are as follows:

III. Natural Environment

Objective A: To protect and preserve the natural environment.

Policy 7: Protect the natural environment from damaging levels of air, water, and noise pollution.

In the short-term, construction activities in either alternative will be subject to regulatory requirements that will mitigate or minimize potential impacts to surface, ground and coastal waters, as well as impacts to ambient noise levels and air quality. Should contingency or emergency measures be required during construction of the force main beneath Kaneohe Bay in Alternative 1, transitory water quality impacts on coastal waters would result. This would likely occur during the placement and removal of the steel pipes or sheet pilings required to isolate a water column within which the sea floor would be excavated to reach any subsurface obstructions or equipment. Such contingency activities will not be permitted in specifically identified sensitive areas of Kaneohe Bay where sea grass and coral reefs occur.

Should a frac-out occur during HDD operations in Alternative 1, non-toxic bentonite drilling mud and spoils from drilling operations could be released into coastal waters. However, this transitory water quality impact would be minimized by ceasing operations and implementing BMPs such as silt curtains.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on surface, ground, and coastal waters in the project area.

The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

In the long-term, the primary air quality concern associated with the proposed project alternatives will be potential odor nuisances. The proposed alternatives will include odor control for all new facilities, such as covered equalization facilities, the influent pump station, and headworks for the force main alternative, as well as the enclosed drop shaft and influent pump station for the gravity tunnel alternative.

Also, in the long-term, regardless of which alternative is pursued, the proposed new headworks facility and dewatering building at the Kailua Regional WWTP will help to reduce odors. The new headworks at the Kailua Regional WWTP would include construction of a new facility in an enclosed building with odor control. The proposed new dewatering building will be designed so that trucks receiving the dewatered sludge for transport will be able to drive into the building, and the access can be closed while the trucks are being loaded. This will significantly reduce odors generated by the loading operation. The building will be equipped with odor control devices to prevent odorous gases from escaping.

V. Transportation and Utilities

Objective B: To meet the needs of the people of Oahu for an adequate supply of water and for environmentally sound systems of waste disposal.

Policy 5: Provide safe, efficient, and environmentally sensitive waste-collection and waste-disposal services.

In the short-term, construction activities in either alternative will be subject to regulatory requirements that will mitigate or minimize potential water quality impacts to coastal waters. Should contingency or emergency measures be required during construction of the force main beneath Kaneohe Bay in Alternative 1, transitory water quality impacts on coastal water quality would result. This would likely occur during the placement and removal of steel pipes or sheet pilings required to isolate a water column within which the sea floor would be excavated to reach any obstructions or equipment

Should a frac-out occur during HDD operations in Alternative 1, non-toxic bentonite drilling mud and spoils from drilling operations could be released into coastal waters. However, this transitory water quality impact would be minimized by ceasing operations and implementing BMPs such as silt curtains.

In the long-term, the proposed project alternatives and associated improvements will have beneficial water quality impacts on coastal waters in the project area. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

Objective C: To maintain a high level of service for all utilities.

Policy 1: Maintain existing utility systems in order to avoid major breakdowns.

Policy 2: Provide improvements to utilities in existing neighborhoods to reduce substandard conditions.

Policy 3: Plan for the timely and orderly expansion of utility systems.

The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

The proposed project alternatives are designed to accommodate the existing service area and to address the current infiltration and inflow problems. As the proposed project is not a population generator, the project is not anticipated to induce population growth. Likewise, both the American Community Survey population data (as discussed in Section 3.5.1) as well

as data from the Koolaupoko Sustainable Communities Plan depict a decrease in the actual population of the service.

5.7. Koolaupoko Sustainable Communities Plan

The Koolaupoko Sustainable Communities Plan has been prepared in accordance with the Charter-prescribed requirements for development plans and is to be accorded force and effect as such for all Charter- and ordinance-prescribed purposes. It is one of eight community-oriented plans intended to help guide public policy, investment, and decision-making through the 2020 planning horizon. Each of these eight plans address one of eight geographic planning regions on Oahu, responding to the specific conditions and community values of each region.

Two of the eight planning regions, Ewa and the Primary Urban Center, are the areas to which major growth in population and economic activity will be directed over the next 20 years and beyond. The plans for these regions continue to be titled "Development Plans," and will serve as the policy guides for the development decisions and actions required to support that growth. The remaining six planning regions, including Koolaupoko, are envisioned to remain relatively stable. The plans for those regions have been titled "Sustainable Communities Plans" and are focused on serving as policy guides for public actions in support of that goal. The vision statement and supporting provisions of the Koolaupoko Sustainable Communities Plan are oriented toward maintaining and enhancing the region's ability to sustain its unique character and lifestyle.

The Koolaupoko Sustainable Communities Plan sets forth general policies and principles for public facilities and infrastructure in the region. The general policies and principles for wastewater treatment are as follows:

4.3.3 General Policies

- *Direct all wastewater produced within the Urban Community Boundary and Rural Community Boundary to municipal or military sewer service systems.*

- *Treat and recycle, where feasible, wastewater effluent as a water conservation measure.*

- *Delay further sewer connections in Kailua, Kaneohe and Kahaluu, except for areas with existing cesspools or septic tanks that need to be sewered for public health reasons, until flow equalization/wet weather surge protection has been provided for the Kailua Regional WWTP, as outlined in the Preferred Alternative of the Kailua-Kaneohe-Kahaluu Facilities Plan (Final Plan, September 1998).*

- *Mitigate visual, noise, and odor impacts associated with wastewater collection and treatment systems, especially when they are located adjacent to residential designated areas.*

4.3.4 Planning Principles and Guidelines

Recycling of Wastewater Effluent. *Encourage or require, as feasible and appropriate, the use of recycled water from the WWTP as a source for irrigating golf*

courses and other uses compatible with the State's rules and guidelines for the treatment and use of recycled water.

Use of Buffer Zones and Landscape Elements. *Adequate horizontal separations and landscape elements (e.g. berms and windrows) should be provided between wastewater facilities and adjacent residential designated areas. In order to mitigate negative impacts of the wastewater treatment plant, site-specific studies should be conducted to determine the width of the buffer zone and specific types of landscaping elements to use.*

In general, the proposed project alternatives are consistent with the Koolaupoko Sustainable Communities Plan as their respective capacity is based on the City's 2007 population forecasts prepared for the Plan. Their capacities are also based on accommodating peak flows projected by the 1999 Sewer Rehabilitation and Infiltration and Inflow Study (I/I Study). The I/I Study was prepared after the 1998 Kailua-Kaneohe-Kahaluu Facilities Plan, and developed I/I rates for each wastewater service basin to establish design flows throughout the region.

As previously noted, the City is updating the 1999 I/I Plan, which is likely to lower peak design flows. If such a reduction is determined, the size of the equalization facilities would be reduced and the need for an equalization facility at the Kailua Regional WWTP may be eliminated.

Alternative No. 2, Gravity Tunnel, does not provide for equalization facilities, but it does allow for in-pipe storage of wastewater. The updated peak design flows will not likely affect the storage capacity of the gravity tunnel, as its diameter is based on a recommended minimum for a tunnel of its length. Its storage capacity will accommodate the previous peak design flows, as well as the anticipated lower peak design flows in the updated I/I Plan.

The proposed project alternatives will mitigate visual, noise, and odor impacts associated with the proposed improvements.

In the long-term, no significant increase in noise levels are expected from the operation of the proposed project alternatives.

In the long-term, since the proposed facility improvements at the existing WWTP, WWPTF and pump station sites will be similar in visual character to those of the existing facilities, the change in views from public places will be of an intensification of the existing use. The proposed equalization facilities associated with Alternative 1, if pursued, would significantly intensify the visual character of the Kaneohe WWPTF because of its size and location on currently undeveloped land within the property. Existing trees surrounding the site would help to obstruct views of the facility. The smaller equalization facility at the Kailua Regional WWTP would be partially buried, resulting in a low profile.

In the long-term, the primary air quality concern associated with the proposed project alternatives will be potential odor nuisances. The proposed alternatives will include odor control for all new facilities, such as covered equalization facilities, an influent pump station, and headworks for the force main alternative, as well as the enclosed drop shaft and influent pump station for the gravity tunnel alternative.

Also, in the long-term, regardless of which alternative is pursued, the proposed new headworks facility and dewatering building at the Kailua Regional WWTP will help to reduce odors. The new headworks at the Kailua Regional WWTP would include construction of a new facility in an enclosed building with odor control. The proposed new dewatering building will be designed so that trucks receiving the dewatered sludge for transport will be able to drive into the building, and the access can be closed while the trucks are being loaded. This will significantly reduce odors generated by the loading operation. The building will be equipped with odor control devices to prevent odorous gases from escaping.

5.8. Public Infrastructure Map

The Public Infrastructure Maps (PIM) show the symbols of certain major public infrastructure, such as roads, wastewater, and drinking water facilities, as defined in the PIM ordinance, Revised Ordinances of Honolulu, Section 4-8.

These symbols are required to be shown on the PIM prior to the appropriation of land acquisition or construction funds in the City's budget and the infrastructure must be consistent with the General Plan and the Development Plans and/or Sustainable Communities Plans. They represent long-term future improvements and more immediate priority projects of importance. These projects, when included in the Capital Improvement Program and Budget, provide an opportunity to carry out the intent of City plans and policies, shape the communities we live in, and meet the many needs of its people.

The PIMs follow the boundaries of the eight Development Plan and/or Sustainable Communities Plan areas on Oahu. The project is located within the Koolaupoko PIM.

The Koolaupoko PIM depicts a STP/M symbol at the Kailua Regional WWTP, which indicates modification of an existing sewage treatment plant. There is no symbol at the Kaneohe WWPTF. In Alternative 1 Force Main No. 2, the supplemental force main would utilize the existing pump station, which will also continue to be used for the Force Main No. 1, the existing force main. This is because only one of the two force mains would be used at any time. Since a new pump station would not be constructed at the Kaneohe WWPTF, a new facility modification symbol may not be required. On the other hand, construction of the equalization facility and, possibly, construction of a segment of Force Main No. 2 would require a facility modification symbol.

In Alternative 2, the gravity tunnel would allow the decommissioning of the existing pump station, which would not require a facility modification symbol. On the other hand, construction of drop shaft and a section of gravity tunnel at the Kaneohe WWPTF may require a facility modification symbol.

The proposed improvements at the Kailua Regional WWTP in both Alternatives 1 and 2 should be allowed with the current facilities modification symbol.

5.9. City and County of Honolulu Zoning

The City's Land Use Ordinance (LUO) regulates land use in accordance with adopted land use policies, including the Oahu General Plan and the Development Plans. The provisions are also referred to as the zoning ordinance. The LUO presents permitted uses and structures, development standards, and height controls for each zoning district. Zoning designations are shown on the zoning maps for the City.

The zoning designations for the existing and proposed wastewater facilities in the planning area are shown in Figure 5-3. According to the City DPP, wastewater facilities are permitted uses in all zoning districts; however, if the proposed facility exceeds the affected district's development standards (i.e., height, setbacks, etc.), a Waiver of Requirements would need to be obtained from the City Department of Planning and Permitting (DPP).

The project lies within several zoning districts, including P-1 Restricted Preservation District; P-2 General Preservation; R-5, R-7.5 and R-10 Residential Districts; and I-2 Intensive Industrial District (see Figure 5-3).

Under the LUO, all uses, structures and development standards within lands zoned P-1 Restricted Preservation District shall be governed by the appropriate State agencies. In Alternative 1, the force main beneath the seafloor of Kaneohe Bay traverses beneath land designated P-1, which is located adjacent to and makai of the Kaneohe WWPTF. Lands designated P-1 are in the State Conservation District and are administered by the DLNR Office of Conservation and Coastal Lands. This section of the force main, as well as the portion underlying Kaneohe Bay which is also in the Conservation District, will require a Conservation District Use Permit. In Alternative 2, most of the gravity tunnel traverses Oneawa Hills, which is in the State Conservation District and will, likewise, require a Conservation District Use Permit processed by the Office of Conservation and Coastal Lands and approved by the State Board of Land and Natural Resources.

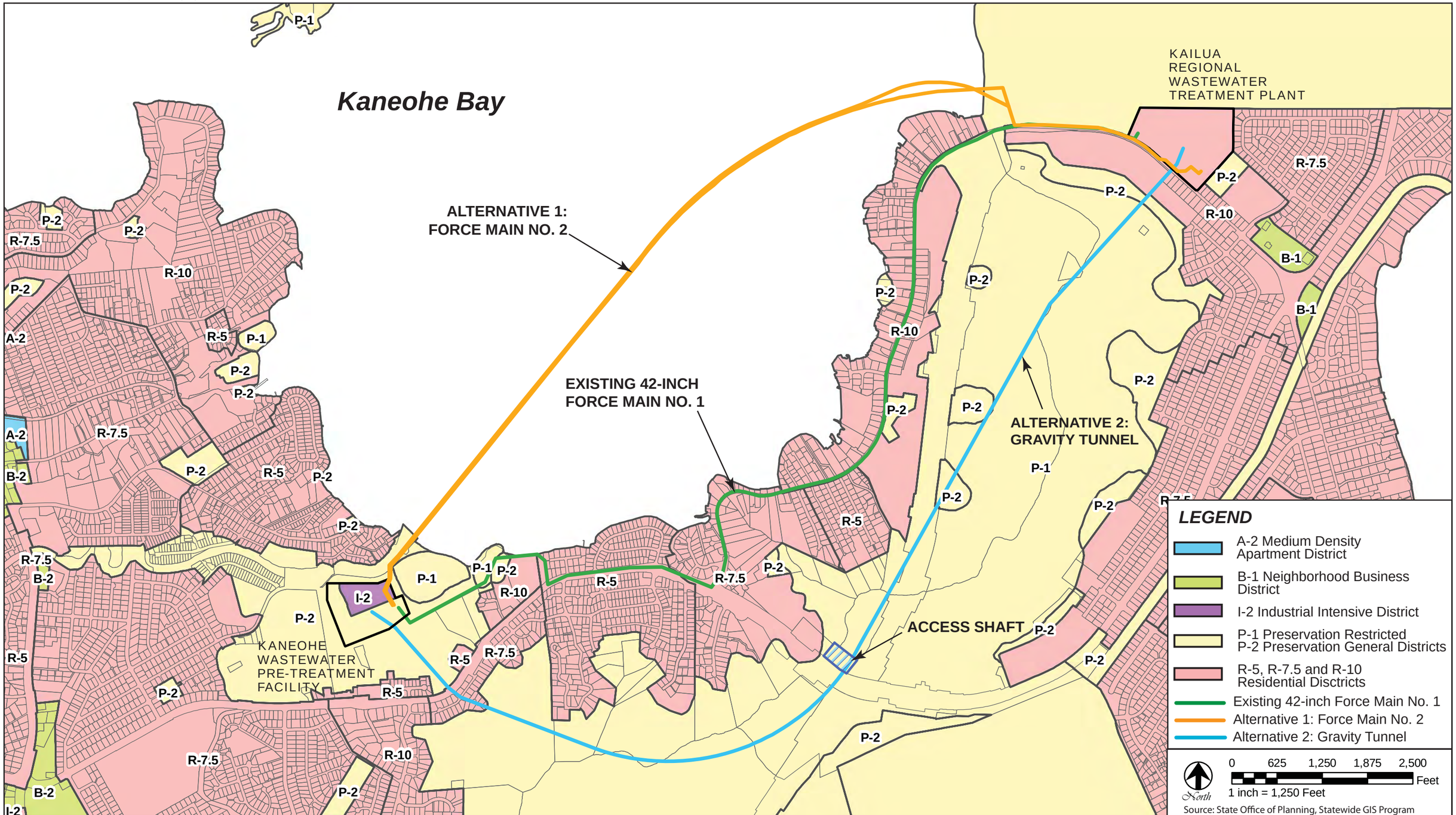
5.10. Special Management Area

The Coastal Zone Management Act contains the general objectives and policies upon which all counties within the State have structured specific legislation which created Special Management Areas (SMA). Any "development" within the SMA requires a SMA Use Permit, which is administered by the DPP pursuant to Ordinance No. 84-4, 85-105. Approval of a SMA Use Permit is granted by the Honolulu City Council.

According to Chapter 205A-22, Hawaii Revised Statutes, "development" means any of the uses, activities or operations on land or in or under water within the SMA. "Development" does not include repair and maintenance of underground utility lines and minor appurtenant structures such as sewer pump stations; repair, maintenance or interior alterations to existing structures; and, installation of underground utility lines and appurtenant aboveground fixtures less than four feet in height along existing corridors.

Portions of the project alternatives that lie within the boundary of the SMA are shown in Figure 5-4. This includes the entire Kaneohe WWPTF. In Alternative 1, the force main traverses beneath the SMA area from the Kaneohe WWPTF to the shoreline of Kaneohe Bay and, on the Kailua side, between the shoreline of Kaneohe Bay to, but not including, the Kailua Regional WWTP. In Alternative 2, the gravity tunnel traverses beneath the SMA from the Kaneohe WWPTF through the Bayview Golf Course to, but not including, Kaneohe Bay Drive. The proposed wastewater facility improvements, which would be regarded as a "development" within the SMA, will require a SMA Use Permit.

W:\7801-01 Kaneohe Kailua Facility Plan\Planning\Figures\Final Maps\Draft EIS



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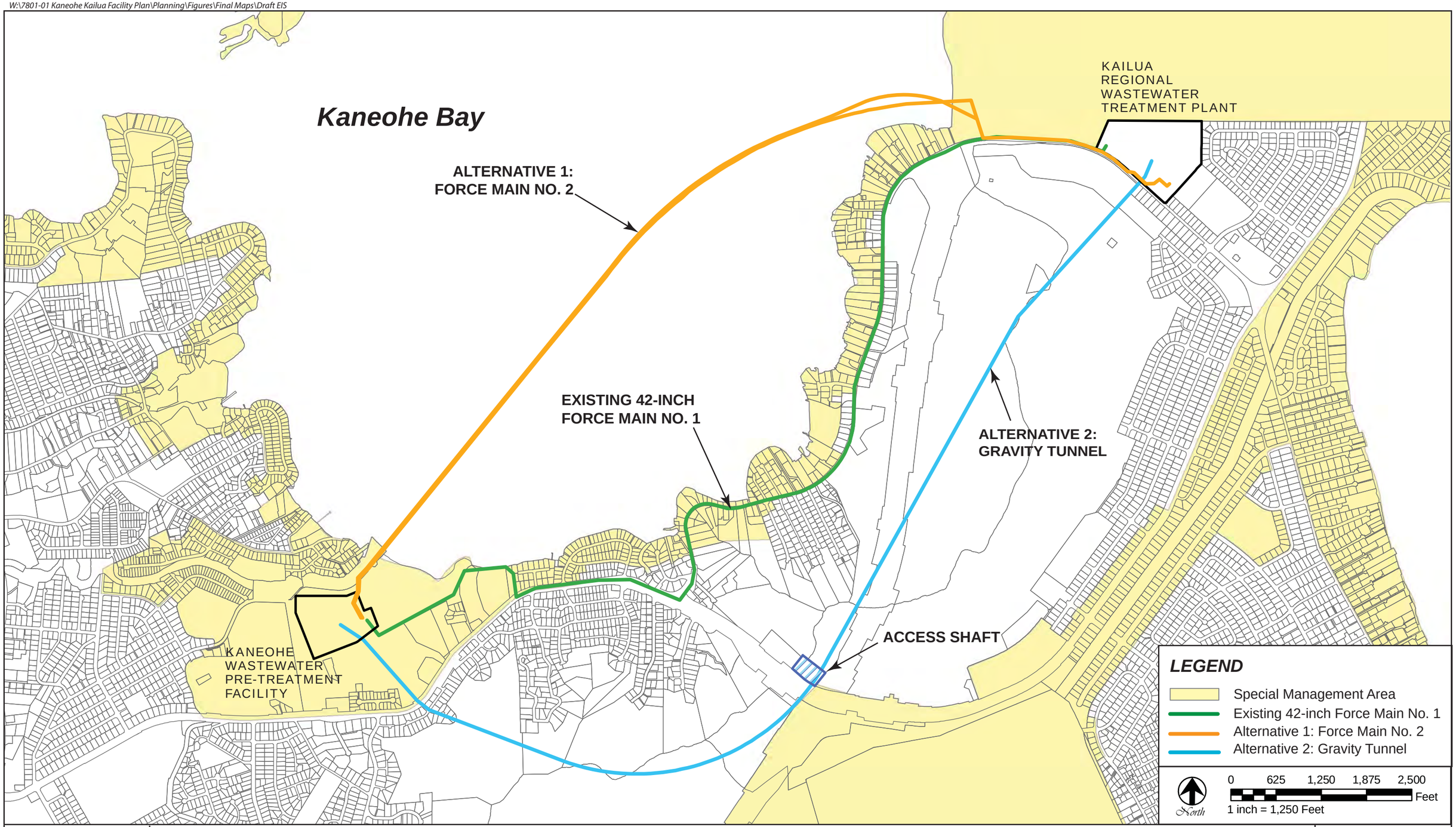
KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

COUNTY ZONING

FIGURE 5-3

W:\7801-01 Kaneohe Kailua Facility Plan\Planning\Figures\Final Maps\Draft EIS



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KANEOHE / KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES

SPECIAL MANAGEMENT AREA

FIGURE

5-4

5.11. Shoreline Setback

The purpose of the shoreline setback is to protect the natural shoreline and preserve public pedestrian access along the shoreline. The force main in Alternative 1 would traverse beneath the shoreline setback, which lies within 40 feet of the certified shoreline, on both sides of Kaneohe Bay. Inasmuch as the force main would be well beneath the surface, it would not affect littoral processes that could promote shoreline erosion, which, in turn, could reduce shoreline access. The force main would also be a public facility, which is permissible in the shoreline setback.

5.12. Permits and Approvals

The following is a list of permits, approvals, and reviews that may be required prior to construction and operation of the proposed project.

Federal

Department of the Army
- Section 404, Clean Water Act

Department of the Army and Coast Guard
- Section 10, Rivers and Harbors Act

State of Hawaii

Department of Health
- Section 401, Clean Water Act, Water Quality Certification
- National Pollutant Discharge Elimination System (NPDES) Individual Permit for Storm Water Associated with Construction Activity
- NPDES Permit for Dewatering
- Noise Permit
- Noise Variance

Department of Land and Natural Resources
- Conservation District Use Permit
- Chapter 6E, HRS, Historic Preservation Review

Office of Planning
- Coastal Zone Management (CZM) Program Consistency Determination

Department of Transportation
- Permit to Perform Work Within State Highways

City and County of Honolulu

Department of Environmental Services
- Environmental Impact Statement

Department of Planning and Permitting
- Special Management Area Permit
- Shoreline Setback Variance
- Grading/Grubbing Permit

City and County of Honolulu (continued)

- Excavation Permit
- Trenching Permit
- Flood Elevation Certification

Department of Transportation Services
- Street Usage Permit

Other

Rights of Entry

Utility Line Easements

CHAPTER 6

RELATIONSHIP BETWEEN LOCAL AND SHORT TERM USES OF HUMANITY'S ENVIRONMENT AND THE MAINTENANCE OF LONG TERM PRODUCTIVITY

6. RELATIONSHIP BETWEEN LOCAL AND SHORT-TERM USES OF HUMANITY'S ENVIRONMENT AND THE MAINTENANCE OF LONG-TERM PRODUCTIVITY

6.1. Short-Term Effects

The proposed project alternatives will involve short-term uses of the environment during the construction phase. These uses will have both positive and negative impacts. Construction activities associated with the proposed project alternatives will create temporary adverse impacts, including increased noise, airborne dust, traffic disruptions, and loss of on-street parking in the vicinities of the Kaneohe WWPTF and the Kailua WWTP.

In the short-term, the propose project alternatives will also confer some positive economic benefits in the local area. Direct economic benefits will result from construction expenditures both through the purchase of materials from local suppliers and through the employment of local labor. Indirect economic impacts may include benefits to local retail businesses resulting from construction activities. If contingency measures are required for Alternative 1 Force Main No. 2, impacts to coastal waters would be mitigated or minimized by regulatory controls over the activities.

6.2. Long-Term Effects

In the long-term, the proposed project alternatives and associated improvements will have beneficial impacts on long-term maintenance of the system and enhancement of the environment, including improvements to coastal water quality, ecosystems, public health, and safety. The purpose of both alternatives is to eliminate sole reliance on the existing force main to convey wastewater from the Kaneohe WWPTF to the Kailua Regional WWTP. This will prevent potential wastewater spills should the existing force main fail. Both alternatives also provide for storage of peak wet-weather inflow and infiltration in the collection system to prevent or minimize wastewater spills and bypasses of untreated wastewater to the ocean outfall during storms.

The Gravity Tunnel alternative would encumber private property with easements. However, the use of the affected property would not be substantially impacted. The affected landowner would not be prevented from placing permanent structures over the easement and from its general use, as the depth of the tunnel will be so far below grade that it would not be feasible to access the tunnel from the surface for any repairs.

A substantial amount of financial resources would be required to construct, operate, and maintain the proposed alternatives and associated improvements. The funds would be drawn from a generally limited pool of assessment and operating fees. Therefore, the capital improvement and annual operating costs associated with the proposed facility improvements would result in an increase in sewer rates for the wastewater system customers on Oahu.

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CHAPTER 7

IRRETRIVABLE AND IRREVERSIBLE COMMITMENTS OF RESOURCES

7. IRRETRIVABLE AND IRREVERSIBLE COMMITMENTS OF RESOURCES

In the short-term, construction of the proposed wastewater facility improvement alternatives will require an irreversible and irretrievable commitment of a number of resources, including land, capital, construction materials, manpower, energy, fuel, and water. Financial, material and manpower resources will also be irretrievably committed to the planning and design of the improvements.

There will be a long-term commitment to the use of land with the proposed action. Where the collection system improvements would encumber private property with easements for the location of lateral lines, the use of the affected property would not be substantially impacted. The affected landowner would not be prevented from placing permanent structures over the easement and from its general use, as the depth of the tunnel will be so far below grade that it would not be feasible to access the tunnel from the surface for any repairs. Both proposed alternatives and their associated improvements are located on publicly-owned property and would not unreasonably burden neighboring property owners or the general public.

Effective operation of the project will also require irreversible and irretrievable commitments of labor, materials and resources (consumption of potable water and fuel). Certain materials, however, may be derived from renewable sources. Also, substitution of renewable non-fossil derived fuel to power the facilities may be realized in the future.

Financial resources used for construction and operation of the proposed wastewater facility improvements, once committed and used for the project, will not be available for other uses. The extent of irreversible and irretrievable financial commitment towards capital expenses will increase steadily with time as the value of the facilities decline due to the effects of age and depreciation. The funds used for operation and maintenance of the facilities are largely irreversible and irretrievable upon expenditure.

In the long-term, the impact of undertaking these irreversible and irretrievable commitments of resources should be weighed against the environmental and public health benefits to be derived from the improved operation of the Kaneohe/Kailua wastewater conveyance and treatment facilities.

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CHAPTER 8

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

8. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Adverse impacts can be defined as short- and long-term effects relative to the construction and implementation of a specific use. Short-term impacts are usually construction-related impacts that will occur during the course of construction and cease upon completion of the project. Long-term impacts generally result from the implementation of the proposed project.

8.1. Short-Term Effects

Unavoidable short-term impacts, despite mitigation efforts, include those related to noise and air quality, and traffic inconveniences.

Noise: Construction noise will be unavoidable during the duration of the respective project construction periods. Short-term increases in noise levels will result from construction activities, vehicles and equipment. Despite compliance with Chapter 46, Title 11, *Community Noise Control*, DOH, Hawaii Administrative Rules (HAR), noise generated by construction activity, will adversely impact nearby residents and schools. The use of muffled equipment, noise barriers, and restrictions on construction hours, as well as adherence to State DOH regulations on noise mitigation, will minimize construction and traffic-related noise. For construction work to be performed at night or on weekends and holidays, a Community Noise Variance permit from the DOH will be required if it exceeds regulatory noise levels.

Air Quality: Construction-related air quality impacts would result from site preparation and earth moving activities, the movement of construction vehicles on unpaved areas of the site, emissions from construction equipment, and construction of structures. The construction contractor is responsible for complying with State DOH regulations which prohibit visible dust emissions at property boundaries. Nevertheless, the presence of nearby residences and buildings in the vicinity of most of the affected project sites suggest that open-air areas and naturally ventilated structures could be impacted by dust in spite of compliance with these regulations.

Traffic: During construction, traffic along the respective corridors located near the Kaneohe WWPTF and Kailua Regional WWTP will be impacted for the period of the construction activity. Residents and schools in the immediate work area may be periodically inconvenienced by restrictions to driveway access and on-street parking. To avoid potential traffic congestion, a construction traffic management plan is recommended to minimize construction-related traffic on the adjacent residential and school uses, as well as, the surrounding roadways. The increased traffic from construction-related vehicles should be insignificant during off-peak traffic periods, but may cause inconveniences to residents, businesses and motorists in the vicinity.

8.2. Long-Term Effects

Unavoidable long-term impacts resulting from development of the proposed wastewater facility improvements include those on air quality, noise, aesthetics, and energy consumption.

Air Quality: The primary air quality concern associated with the proposed project alternatives will be potential odor nuisances. The proposed alternatives will include odor control for all new facilities, such as covered equalization facilities, the influent pump station, and headworks for the force main alternative, as well as the enclosed drop shaft and influent pump station for the gravity tunnel alternative.

Regardless of which alternative is pursued, the proposed new headworks facility and dewatering building at the Kailua Regional WWTP will help to reduce odors. The new headworks at the Kailua Regional WWTP would include construction of a new facility in an enclosed building with odor control. The proposed new dewatering building will be designed so that trucks receiving the dewatered sludge for transport will be able to drive into the building, and the access can be closed while the trucks are being loaded. This will significantly reduce odors generated by the loading operation. The building will be equipped with odor control devices to prevent odorous gases from escaping.

Noise: There may be instances when noise from the Kaneohe WWPTF and/or Kailua Regional WWTP would be audible to residents in the vicinity. This may potentially occur during periods of no wind or southwesterly (Kona) wind conditions as these climatic conditions create a channeling effect and thus could result in less attenuation of noise. Both facilities must comply with the noise requirements of the DOH, pursuant to Chapter 46, Title 11, *Community Noise Control*, HAR.

Aesthetics: Since the proposed facility improvements at the existing Kaneohe WWPTF and the Kailua Regional WWTP sites will be similar in visual character to those of the existing facilities, the change in views from public places will be of an intensification of the existing use. The proposed equalization facilities associated with Alternative 1, if pursued, would significantly intensify the visual character of the Kaneohe WWPTF because of its size and location on currently undeveloped land within the property. Existing trees surrounding the site would help to obstruct views of the facility. The smaller equalization facility at the Kailua Regional WWTP would be partially buried, resulting in a low profile.

Energy Consumption: Implementation of either proposed alternative will periodically increase demand in energy consumption as both alternatives involve operation of pumps required to convey peak flows captured by storage facilities.

In Alternative 1, the conveyance of flows from the Kaneohe WWPTF to the Kailua Regional WWTP is anticipated to consume the same amount of energy currently utilized, since the existing pump station will be used. With the new equalization facilities at the Kaneohe WWPTF and Kailua Regional WWTP, the conveyance of additional peak wet weather flows would increase energy consumption.

In Alternative 2, the pump station at the Kaneohe WWPTF would be decommissioned and associated energy consumption eliminated. Wastewater would be conveyed by gravity to the Kailua Regional WWTP. However, the new influent pump station at the Kailua Regional WWTP will create new demand for energy consumption. Energy will be required to lift the wastewater, including additional captured peak wet weather flows, to the surface for processing.

CHAPTER 9

SUMMARY OF UNRESOLVED ISSUES

9. SUMMARY OF UNRESOLVED ISSUES

Unresolved issues are invariably associated with projects in the planning and conceptual design stages. Consequently, the various planning processes being pursued by the City, including the preparation of this EIS, the Preliminary Engineering Report, and community outreach efforts, are based on the best available information and expertise of those knowledgeable in the design and construction of the proposed types of facilities. The EIS identifies impacts based on the available information and develops appropriate mitigation measures. The unresolved issues are discussed below in terms of how the final outcome of the proposed action may be determined.

2010 Consent Decree: As discussed in Chapter 1, the 2010 Consent Decree requires that a supplemental force main (Force Main No. 2) be constructed and operational by December 2014. This requirement was originally part of the 2007 Stipulated Order that was subsequently incorporated in the 2010 Consent Decree.

The primary unresolved issue is determining which primary alternative will be selected for implementation. Currently, the City is continuing to pursue implementation of the force main in Alternative 1 to meet the required deadline. The City has petitioned the EPA, DOH, and the courts to extend the December 2014 Consent Decree deadline to December 2018 to allow implementation of Alternative 2, the gravity tunnel. The decision by the EPA, DOH, and the courts on the City's petition will determine whether Alternative 2 may be implemented. Until the City receives a favorable decision, however, it must continue to pursue development of the force main to meet the original deadline, in the event of an unfavorable decision.

Construction Methods: In Alternative 1, the method of constructing Force Main No. 2 will be unresolved until the City selects a contractor for the project. The two construction options, including HDD and the hybrid tunnel, were identified as the two most feasible means of constructing the force main based on current technology. The description of the two construction options is based on likely means and methods the contractor may employ.

Whether the selected contractor would encounter the contingency and emergency situations, which would require construction options for removing blockages and accessing equipment in the seafloor, is unresolved. These contingency and emergency construction options may not be used as part of the contractors' proposed construction methodology. Restrictions on the locations where contingency and emergency access may be allowed, as described in this Draft EIS, would apply.

Project Description: The various alternative and optional project descriptions offer conceptual designs of alignments, depths, locations and dimensions based on available information. It is likely that adjustments will need to be made as detailed design of the selected alternative and option proceeds. As such, the conceptual designs should be regarded as estimates and approximations.

For example, in Alternative 2, the method of constructing the gravity tunnel is based on observations of cuts made into the Oneawa Hillside for projects such as Interstate H-3 and on available test boring data. Additional test borings will be required before the design can

be finalized. It is conceivable that test results could require adjustments in the alignment of the tunnel, for example, to avoid highly fractured basalt deposits.

The specific location and configuration of the proposed new headworks and dewatering building at the Kailua Regional WWTP is unresolved but will likely be in the vicinity depicted, based on an assessment of available space and functional relationship to the existing and planned operations.

The size and location of the equalization facilities in Alternative 1 is the least resolved component. As discussed in Chapter 2, the City is currently updating the 1999 I/I Plan, which is likely to lower peak design flows. If such a reduction is determined, the size of the equalization facilities would also be reduced and the need for an equalization facility at the Kailua Regional WWTP could even be eliminated. If the size of the equalization facilities change, their locations within the Kaneohe WWPTF and at the Kailua Regional WWTP could also change, as could the locations and sizes of their associated influent pump stations, headworks and odor control facilities.

CHAPTER 10

REFERENCES

10. REFERENCES

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CHAPTER 11

PREPARERS OF THE EIS

11. PREPARERS OF THE EIS

Proposing Agency

City and County of Honolulu
Department of Environmental Services

Timothy E. Steinberger, P.E.	Director
Jack Pobuk	Project Manager
Elizabeth Ngo	Project Engineer

EIS Consultant

Wilson Okamoto Corporation

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Richard Harada, P.E.	Project Manager and Civil Engineer
Laura Mau, AICP	Senior Planner
Tracy Fukuda	Senior Planner
Yukino Tanaka	Planner
Lauren Yasaka	Planner
Kellen Tanaka	Planner

EIS Technical Studies/Support

AECOS, Inc.

Eric Guinther	Botanical, Avifauna & Fauna Resources
S. Allen Cattell	Water Quality Analysis & Marine Biology
Steve Coles	
Katie Laing	
Chad Linebaugh	

Aki Sinoto Consulting, LLC

Aki Sinoto	Archaeological and Cultural Resources
Paul Tichenal	
Melissa Lehuanani Kaakau-Delizo	
Moana LJ Lee	

Austin Tsutsumi & Associates, Inc.

Ivan Nakatsuka	Alternative 1 Force Main Design
DeAnna Hayashi	Traffic Impact Analysis
Matt Nakamoto	

B.D. Neal and Associates

Barry Neal	Air Quality Analysis

Brown and Caldwell

Woodie Muirhead	Environmental Engineering
Peter Ono	
Jennifer Honda	
Dustin Yamamoto	

EIS Technical Studies/Support (continued)

Cultural Surveys Hawaii, Inc.	
Hallett H. Hammatt, Ph.D.	Archaeological and Cultural Resources
David W. Shideler, M.A.	
Randy Groza, M.A.	
Joseph H. Genz, Ph.D.	
Earthplan	
Berna Cabacungan	Community Consultation and Outreach
Geolabs	
Robin Lim	Geotechnical Engineering
Jacob Engineering	
Steve Klein	Alt. 2 Gravity Tunnel Design Engineering
Plasch Econ Pacific LLC, December 2010	
Bruce Plasch	Economic Impact Analysis
Wilson Okamoto Corporation	
Pete Pascua	Traffic Impact Analysis
Cathy Leong	
Y. Ebisu & Associates	
Yoichi Ebisu, P.E.	Noise and Vibration Analysis
Yogi Kwong Engineers, LLC	
James Kwong, Ph.D., P.E.	Alt. 1 Force Main Design Engineering
Devin Nakayama, P.E.	Geotechnical and Vibration Analysis

CHAPTER 12

CONSULTATION

12. CONSULTATION

The pre-assessment consultation process included efforts to inform the community and solicit input in scoping the Draft EIS well beyond the requirements of Chapter 343, HRS. This process included formal written consultation pursuant to Chapter 343, HRS and Title 11, Chapter 200, HAR; meetings with elected officials, agencies, and stakeholders; public informational/scoping meetings; and a core working group process. These outreach efforts are documented below.

12.1 Environmental Impact Statement Preparation Notice Consultation

The following agencies, organizations, and individuals were consulted during the Environmental Impact Statement Preparation Notice (EISPN) process. Consultation was conducted to solicit comments from the public regarding their concerns and agency requirements. Notice of availability of the EISPN was published in the July 8, 2010 issue of *The Environmental Notice*. Copies of all written comments received along with response letters are reproduced and included following this chapter. Of those who formally replied, some had no comments, while others provided substantive comments as indicated by the ✓ and ✓✓, respectively.

Federal Agencies

✓✓ U.S. Geological Survey
U.S. Fish & Wildlife Service
✓✓ U.S. Army Corps of Engineers, Civil Works Branch
✓✓ U.S. Army Corps of Engineers, Regulatory Branch✓
U.S. Navy
U.S. Marine Corps
National Oceanic and Atmospheric Administration
Marine Corps Base Hawaii – Kaneohe Bay

State Agencies

Department of Business, Economic Development and Tourism (DBEDT)
Department of Education (DOE)
- Aikahi Elementary School
- Puohala Elementary School

Department of Health (DOH)
DOH, Environmental Management Division
✓✓ DOH, Wastewater Branch
DOH, Environmental Health Service Division
✓✓ DOH, Indoor and Radiological Health Branch
DOH, Office of Environmental Quality Control
Department of Land and Natural Resources (DLNR)
✓✓ DLNR, Land Division
DLNR, Engineering Division
✓✓ DLNR, Division of Aquatic Resources
DLNR, Division of Forestry & Wildlife
DLNR, Historic Preservation Division
DLNR, Office of Conservation and Coastal Lands
✓ DLNR, Division of State Parks

State Agencies (continued)

✓✓ Department of Transportation (DOT)
DOT, Highways Division
Office of Hawaiian Affairs (OHA)
University of Hawaii Environmental Center

County Agencies

Office of the Mayor
Honolulu City Council
✓✓ Department of Planning and Permitting
✓ Department of Design and Construction
✓✓ Department of Transportation Services
✓ Board of Water Supply
✓ Police Department
✓✓ Fire Department

Elected Officials

Senator Jill Tokuda, District 24
Representative Ken Ito, District 48
Representative Pono Chong, District 49
✓✓ Representative Cynthia Thielen, District 50
Councilmember Ikaika Anderson, District 3

Organizations

Kaneohe Neighborhood Board, #30
Kailua Neighborhood Board, #31
Kaneohe Bay Regional Council
Pacific American Foundation (Waikalua Loko Fishpond)
Kaneohe Ranch
✓✓ Koolaupoko Hawaiian Civic Club

12.2 Draft EIS Consultation

Pursuant to Chapter 343, HRS and Title 11, Chapter 200, HAR consultation will be conducted during the Draft EIS comment period to solicit comments from public agencies, elected officials, and community organizations regarding their concerns and agency requirements. Copies of all written comments received along with their respective responses will be reproduced and included in the forthcoming Final EIS.

Federal

U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Environmental Protection Agency
U.S. Fish & Wildlife Service
U.S. Geological Survey
U.S. Department of Agriculture
Natural Resources Conservation Service
National Marine Fisheries Service
Marine Corps Base Hawaii – Kaneohe Bay

State of Hawaii

Department of Agriculture
Department of Accounting & General Services
Department of Business, Economic Development and Tourism (DBEDT)
DBEDT, Energy Division
    DEBDT, Office of Planning
Department of Defense
Department of Education (DOE)
    Aikahi Elementary School
    Puohala Elementary School
Department of Hawaiian Home Lands
Department of Health (DOH)
    DOH, Environmental Management Division
    DOH, Office of Environmental Quality Control
Department of Human Services
Department of Labor and Industrial Services
Department of Land and Natural Resources (DLNR)
    DLNR, Land Division
    DLNR, Engineering Division
    DLNR, Division of Aquatic Resources
    DLNR, Division of Forestry & Wildlife
    DLNR, Historic Preservation Division
    DLNR, Office of Conservation and Coastal Lands
Department of Transportation (DOT)
    DOT Highways Division
Hawaii Housing Finance and Development Corporation
Office of Hawaiian Affairs (OHA)
University of Hawaii Environmental Center
University of Hawaii Hamilton Library
Hawaii State Public Library
Kaneohe Public Library
Kailua Public Library
Legislative Reference Bureau

City and County of Honolulu

Office of the Mayor
Department of Parks and Recreation (DPR)
    DPR, Kaneohe Senior and Community Center
Department of Planning and Permitting
Department of Design and Construction
Department of Community Services
Department of Facility Maintenance
Department of Transportation Services
Board of Water Supply
Police Department
Fire Department
Kaneohe Neighborhood Board, #30
Kailua Neighborhood Board, #31

Elected Officials
Senator Jill Tokuda, District 24
Representative Ken Ito, District 48
Representative Pono Chong, District 49
Representative Cynthia Thielen, District 50
Honolulu City Council Chair Nestor Garcia
Honolulu City Councilmember Stanley Chang,
Chair for Public Works & Sustainability Committee
Honolulu City Councilmember Ikaika Anderson, District 3

Other
Hawaiian Electric Company
Hawaiian Telcom
Oceanic Time Warner Cable
The Gas Company
Honolulu Star Advertiser
Affected Residents
Bayview Golf Park (including the golf course)
Core Working Group Members
Kaneohe Residents
Kailua Residents
Kaneohe Bay Regional Council
Pacific American Foundation (Waikalua Loko Fishpond)
Kaneohe Ranch
Lani Kailua Outdoor Circle
Kokokahi YWCA
Hawaii's Thousand Friends
Yacht Club Knolls
Kaneohe Yacht Club
Tax Foundation of Hawaii
Koolaupoko Hawaiian Civic Club
Kailua Chamber of Commerce
Aikahi Gardens Association
Hui o Koolaupoko
Sierra Club
Kaneohe Business Group

12.3 Meetings with Elected Officials, Agencies, and Stakeholders

Meetings were conducted with the following agencies, organizations, elected officials and stakeholders:

1. March 30, 2010 – Joint meeting with Senator Jill Tokuda, Representative Ken Ito, and Representative Pono Chong

2. April 7, 2010 - Kaneohe Bay Regional Council

3. April 8, 2010 - Telephone call with the office of Representative Cynthia Thielen

4. April 9, 2010 - Pacific American Foundation (Waikalua Loko Fishpond)

5. April 15, 2010 – Joint meeting with Council Chair Todd Apo and Councilmember Ann Kobayashi

6. April 15, 2010 - Councilmember Ikaika Anderson

7. April 22, 2010 – Telephone call with Kaneohe Ranch

8. April 29, 2010 – Joint meeting with U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, and State DLNR Division of Aquatic Resources

9. August 17, 2010 – City and County of Honolulu, Board of Water Supply

10. June 8, 2010 – DLNR Office of Conservation and Coastal Lands

11. June 22, 2010 – City and County of Honolulu Department of Planning and Permitting

12. November 22, 2010 – U.S. Army Corps of Engineers, Regulatory Branch

13. November 23, 2010 – Department of Health

12.4 Public Information/Scoping Meeting

A public information/scoping meeting was held on September 28, 2010 at Benjamin Parker Elementary School. The meeting notes are attached following this chapter. The purpose of the scoping meeting is to determine what will be considered for inclusion in the EIS. Below is a summary of scoping comments and responses.

- *Comment:* Three things should be in the EIS:

  1. Comparison of odor abatement methods for gravity feed versus force main which has the aerobic bacteria in it.
  2. Methods the contractor can use to get approval to pull pipes under the Kaneohe Bay
  3. Comparison of options 1 and 2 for immediate and long term traffic impact on Kaneohe Bay Drive especially close to the MCAS.

  Response:

  1. Section 3.6 in the Draft EIS discusses odor control for both alternatives as well as proposed improvements at the Kailua Regional WWTP. The effectiveness of odor control between the two alternatives cannot be feasibly compared, particularly at this early stage of design.
  2. Chapter 4 includes a list of anticipated permits required for each of the major alternatives.
  3. Section 3.9 and Appendices N and O in the Draft EIS include traffic studies examining construction-related impacts for both alternatives. Notably, in the long-

term, neither alternative would generate significant additional traffic as both would become part of the existing wastewater collection and treatment facility operations.

- *Comment:* Representing Waikalua Loko Fish Pond Society. The fishpond is located immediately makai from the Kaneohe WWPTF and along Kaneohe Bay. I sit on the CWG. Thank you for allowing us to study this.
  1. At the last CWG meeting, we requested info on spills. Include in EIS all the data on spills at least over a 20-year period. Reason being the Kaneohe WWPTF went to the Full to Pre-treatment plant in 1994. I want to see the difference in operation from a full to a pre-treatment plant. We have been trying to restore the pond since 1995 and recall the major spills around early to mid 1990s.
  2. Concern raised regarding opportunity to the whole consent decree was civil suit raised in 1982 by residents about spillage. It bothers me that consent decree between everyone was made only for the force main beneath K-bay even though the EIS will study both alternatives. It would behoove both alternatives a fair chance. We should ask EPA, state and city to consider consent decree now to include both studies and give it a fair chance, regardless of the time period.

  Response:

  1. The proposed project alternatives addressed in the EIS are responding to the requirement for a supplemental wastewater conveyance method by the 2010 Consent Decree. The wastewater storage requirements for the alternatives are based on a design storm standard. Neither of these requirements is directly derived from actual frequencies or volumes of wastewater spills that have historically occurred at the Kaneohe WWPTF. Therefore, there is no direct rationale for citing these wastewater spillage data.
  2. Again, the force main alternative was not based on a history of wastewater spillages. It initially was required by the 2007 Stipulated Order by the EPA following negotiations with the City. The City has initiated discussion with the EPA regarding the potential for pursuing the gravity tunnel alternative.

- *Comment:* You have in essence taken out part of the EIS process by saying you have only two alternatives. You do not. You have alternatives that have been mentioned relative to land tunneling and I don't think you can legally take those out before you go through the EIS process. They need to be included at the same level as the main two alternatives. It bothers me an immense amount to see this happening with a government agency. It's bad enough when private developers does this, its worse when the government does it. I urge you to consider all alternatives equally in the EIS.

  Response: Chapter 343, Hawaii revised Statutes (The Hawaii EIS law) requires a discussion of alternatives considered, but subsequently dismissed. Full assessment is only required for the preferred alternative. For this project, however, the City has decided to pursue a full assessment of the two primary alternatives before selecting the preferred alternative.

- *Comment:* Effects on the ocean resources need to be included in the EIS.

  Response: Section 3.3 and 3.4 includes a discussion of the proposed alternatives' impacts on ocean resources and also includes a biological survey of marine resources (see Appendix A).

- *Comment:* Like to see an evaluation of how surge situations will be handled under alternative A for the decade from when the tunnel is completed and when the equalization basins are completed.

  Response: At the Kaneohe WWPTF, the City is currently using the abandoned tanks, formally used for the treatment plant, to store peak flows. For the Kailua Regional WWTP, recent sewer improvements include storage capacity within over-sized sewer lines that were installed along Mokapu Boulevard.

- *Comment:* Question is regarding the sizing for storm surges. Is it two year? What happens in larger storm events. I'd like to see the EIS addresses higher storm surges, i.e. 100 yr 24-hour storm, 50 year too since it's the shortest life span.

  Response: The design storm for the wastewater facilities is the 2 year – 6 hour storm. The technical rationale is complex, but the 2 year – 6 hour storm is roughly comparable to a 100 year storm probability used to calculate flood hazards on the Flood Insurance Rate Maps.

- *Comment:* I would like to see the EIS at least explain why the city is not going to EPA now to say other alternatives aren't going to meet the 2014 deadline. It seems strange that the deadline must be met and won't even consider discussing the deadline.

  Response: To the contrary, the City has held discussions with the EPA regarding their current efforts to evaluate the gravity tunnel alternative and has submitted a letter requesting extending the deadline to 2018. Refer to Chapter 1 for further discussion.

- *Comment:* I would like to see close detail of the land options so we can see what streets will be impacted. As much detail of the land routes as possible.

  Response: Chapter 2 includes a discussion of the various land routes that were considered for the supplemental force main.

Another public information meeting will be held after the publication of the Draft EIS.

12.5 Core Working Group

The City convened the Core Working Group (CWG) to maintain a discussion of the proposed project with a diverse group of people over several months. The CWG was used as a way to establish and maintain dialogue with various parts of the community. The CWG was made up of three types of community groups:

a. Individual stakeholders with unique interests – This includes people who live, operate a business, or conduct cultural or social activity near the proposed alignments of the two alternatives.

b. Organizations and agencies – This includes public agencies, Kaneohe and Kailua Neighborhood Boards, various community associations, environmental and cultural organizations, and other organized groups.

c. General public – Both tax and rate payers are included in this group, as well as those who may have an interest in the project but are not connected to any Windward-based organization.

The CWG was designed to have representation from all three segments of the community in a balanced way from both interest and geographic perspectives. The CWG was made up of 23 people who represented one of the above community groups. A report on the CWG and the process is attached following this chapter.

12.5.1. Meeting Summaries

Five CWG meetings were conducted. The first meeting was designed as a half-day workshop and the rest were two-hour meetings conducted once a month for five months.

1. July 24, 2010 Half-Day Workshop: This workshop served as a project orientation, and included the initial process of identifying community values. In the first half of the workshop, an overview of the existing wastewater system was provided, and the two Alternatives were described. In the second half of the workshop, the CWG were led through a Big Picture Scenario exercise to help identify community values related the proposed project. In addition, draft guiding principles were presented to CWG members.

2. August 25, 2010: Various alignments and construction variations for both Alternative No. 1 Force Main No. 2 and Equalization Tanks, and Alternative No. 2 Gravity Tunnel were presented as well as the rationale for selecting the preferred alignments and construction methods for both Alternatives. The revised guiding principles and preliminary community values were also presented.

3. September 22, 2010: In CWG meeting #2, the CWG asked the project team to explore another land-based force main alignment that would not require a temporary force main in Kaneohe Bay and would minimize easement and land acquisition requirements. Initial findings regarding a “new” Mokapu Boulevard alignment (land-based force main) were presented. The engineering analysis for both Alternatives was presented in terms of technology and construction, operational implications and how cost factors are being analyzed.

4. October 20, 2010: The focus of this meeting was the Draft EIS and preliminary findings. Topics discussed were traffic impact analysis; noise and vibrations; archaeological and cultural impacts; economic impacts; and water quality and aquatic biological assessment.

5. November 16, 2010: The last meeting included discussion on how the CWG would be presented in the Draft EIS. An update of Alternative No. 1 Force Main No.2 and Equalization Tanks construction contingencies was also presented.

12.5.2. Core Working Group Products

The most significant contribution the CWG had in this project was to ensure that community values were considered during the process. As aforementioned, a report on the CWG process is attached at the end of this chapter and includes products of the CWG process as follows:

- Guiding principles: A guiding principle is a fundamental statement of community values that will guide discussion with the CWG and the project team. Collectively, the guiding principles reflect basic values that will help the City evaluate the alternatives and conduct project studies. There are nine Guiding Principles.

- Identification of community values: The CWG was asked to identify community values of the various interests represented in the group. A total of nineteen community values emerged.

- Prioritizing of community values: The CWG was asked to weigh community values using the pairwise comparison method, in which two values are compared in terms of importance. The most important values received the highest points.

As mentioned earlier, a total of 19 values emerged and the CWG was asked to weigh community values in terms of importance. The following were the top five community values:

1. Operational impacts on the water quality of Kaneohe Bay and groundwater
2. Reliability / Fail-safe
3. Impacts on cultural resources and landscapes
4. Operational impacts on neighborhood (odor, noise, visual)
5. Construction impacts on Kaneohe Bay and Waikalua Loko Fishpond

The results of this exercise revealed the CWG is concerned with construction and operational impacts on Kaneohe Bay, Waikalua Loko Fishpond, cultural resources and nearby neighborhoods. Discussions on the above concerns and potential impacts and mitigation measures are further discussed in applicable sections of Chapter 3.

12.5.3. Frequent Core Working Group Discussion Themes

In CWG meeting discussions and assignments, there were several themes that emerged are summarized below.

<u>Impacts on Kaneohe Bay:</u> The CWG had concerns about how Kaneohe Bay waters would be impacted by construction activities and during operations. The construction of Alternative 1 Force Main No. 2 and Equalization Facilities would not occur in the bay waters given the depth of the force main under the seafloor of the bay; this depth would likely preclude

impacts on the bay during operations. Concerns about impacts on Kaneohe Bay increased when information on construction contingencies was presented.

The high level of concern about Kaneohe Bay is also reflected in the results of the pairwise comparison exercise, in which water quality of Kaneohe Bay ranked first and fifth out of the nineteen community values.

Discussions on the above concerns and potential impacts and mitigation measures are further discussed in applicable sections of Chapter 3.

Request for Third Alternative: There was an overall concern that Alternative 1 Force Main No. 2 and Equalization Facilities and Alternative 2 Gravity Tunnel were drastically different from existing facilities and construction methods. While some CWG members seem to have accepted the two alternatives, others wanted a "third alternative" to be considered.

Alternative alignments were considered for both proposed alternatives. Refer to Section 2.2 for further discussion.

Need to Have Comparable Information for the Alternatives: In reviewing the economic aspects of the project, the CWG asked for full cost implications of both Alternatives. Estimated construction cost for both Alternatives is included in Section 2.3.4.

The equalization facilities for Alternative 1 will be constructed at a later date if Alternative 1 Force Main No. 2 is constructed. Estimated construction costs were not available during the CWG process, but are included in this Draft EIS. As mentioned in Section 2.3.1 the City is updating the 1999 I/I Plan, which is likely to lower peak design flows. If such a reduction is determined, the size of the equalization facilities would be reduced and the need for an equalization facility at the Kailua Regional WWTP may be eliminated.

Consent Decree Implications: CWG members have expressed frustration about the consent decree deadline from two perspectives. First, the deadline restriction limits the level of information on Alternative 2 Gravity Tunnel that is available in the EIS and community outreach efforts. Second, although the CWG was not asked to select an alternative, some CWG members prefer Alternative 2 Gravity Tunnel for various reasons.

The disparity between available information on the two alternatives is due to the difference in timing. As discussed in Chapter 1, the City is actively pursuing Alternative 1 Force Main No. 2 and Equalization Facilities to meet the deadline set forth in the Consent Decree issued by the EPA.

Usefulness of CWG Input: CWG members questioned the usefulness of their input considering that Alternative 1 Force Main No. 2 and Equalization Facilities is moving ahead to comply with EPA Consent Decree. Some CWG members doubt the City's ability to successfully petition the appropriate agencies to extend the deadline and allow for the implementation of Alternative 2 Gravity Tunnel.

Input from the CWG is useful because it is included among the factors being considered in selecting a preferred alternative. Further, City officials indicated that the decision to pursue Alternative 2 Gravity Tunnel would be made by the end of 2010 and have initiated the

process to petition the U.S. Department of Justice. Agreement by various parties will be required if Alternative 2 is pursued.

Vibration Impacts Due to Earth Work: CWG members who live on or near Oneawa Hills are concerned with vibrations due to blasting and tunneling for Alternative 2 Gravity Tunnel. Discussion on vibrations and potential impacts are discussed in Section 3.7 and 3.8.

Odor Control: The regional community, particularly in the areas near the Kailua Regional WWTP has historically experienced odor problems near this facility. Overall odor issues at both Kailua Regional WWTP and Kaneohe WWPTF are being addressed in other on-going projects (see Section 3.6).

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Report on Core Working Group
December 2010

Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project

Report on Core Working Group

Prepared by Earthplan

For Wilson Okamoto Corporation

December 2010

Contents

1 Background and Purpose

1.1 Project Background

The City Department of Environmental Services, hereafter referred to as ENV, is exploring two alternatives for conveying untreated sewage from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant (WWTP). The Kaneohe to Kailua Wastewater Conveyance and Treatment Facilities Project, hereafter referred to as the K-K Project, includes two alternatives:

1. A new force main, hereafter referred to as the Force Main Alternative, that provides a redundant conveyance system and is intended to meet the requirements of a consent decree issued by the Environmental Protection Agency (EPA); and
2. A new gravity tunnel, hereafter referred to as the Gravity Tunnel Alternative, that would convey the wastewater, as well as store flows generated during periods of high rainfall.

The City administration will decide on the preferred alternative based on three simultaneous project efforts:

- The Environmental Impact Statement, or EIS, is studying the effect of these two alternative actions on the physical, social, cultural and economic environments.
- The Preliminary Engineering Report, or PER, is studying engineering aspects and their effects on short and long terms costs.
- The Community Outreach Program is intended to understand community concerns and values regarding the two alternative actions.

1.2 Overview of the Community Outreach Program

The intent of the K-K Project's Community Outreach Program is to ensure that community values play a major role in the City's selection of the preferred alternative. In addition to meeting requirements of the EPA consent decree, any future action will have implications related to the community's social, cultural, environmental and economic resources.

The Community Outreach Program was designed to be an objective, legible and credible process, one that is based on a realistic understanding of interest groups and the affected communities. The program was also designed as a systematic and consistent approach, while still having the flexibility to meet with people in venues that are comfortable and non-confrontational.

The Community Outreach Program needed to address certain challenges and opportunities inherent to this project. First, the project itself needs clarity so that community conversations are consistent and meaningful. Second, wastewater issues are long-standing in the affected communities and communication on these issues has been limited to certain segments of the community. This project provides the opportunity to expand the dialogue on wastewater improvements with the wider community.

The following sections summarize project-related challenges and community-related opportunities, and provide an overview of the components of the Community Outreach Program.

1.2.1 Project-Related Challenges

The two alternatives are at very different stages in planning. The Force Main Alternative is a project already in design, and its timetable is governed by the consent decree issued by the EPA. This alternative has legal standing, and the City is required to comply.

The Gravity Tunnel Alternative emerged after the issuance of the consent decree and is in early planning stages. Its implementation would require an amendment to the consent decree, which would require the City to petition the EPA, the U.S. Department of Justice and various non-governmental organizations. This alternative may include advantages that could benefit the City and the community in the long run. While this alternative may present short and mid term legal complications, its long term implications may potentially have more benefits to the City and the community.

In a simultaneous EIS evaluation of the two alternatives, the incongruous timing of the two efforts presents challenges in discussing the projects on a level playing field. While the City is evaluating alternatives, it is also implementing the Force Main Alternative, which is a project in advanced stages.

The community may infer that the advanced stage of the Force Main Alternative means that this alternative has already been selected. If so, then public input on the two alternatives may be considered moot, in which case it would be very difficult to engage the community in productive and constructive dialogue.

Further, the EIS for this project is somewhat atypical. In most EISs prepared in conjunction with Chapter 343, Hawaii Revised Statutes (HRS), requirements, the preferred alternative is the proposed action. Typically, the proposed action of an environmental document focuses on a single development project, a defined set of infrastructure improvements, such those related to a highway bypass, or the proposals of a single plan, such as the environmental assessment for the Kakaako Makai Area Plan.

In contrast, the project for this EIS is not a single action. There is no preferred alternative. Both proposed actions are being evaluated in an equal manner. Conveying this information, in terms of both the process for selection and the subject of the EIS, needs to be done in a clear manner so that the community understands the process and the project.

1.2.2 Community-Related Opportunities

From a community perspective, wastewater projects in Hawaii, and particularly in the affected communities, have elicited public controversy and lawsuits. Many of the existing facilities cannot keep up with the needs of growing communities, environmental regulations require more safeguards, and expansion and improvements are costly. Also, budget conflicts have become more pronounced, given our current economic times.

Windward Oahu communities have experienced a history of wastewater facility problems, and residents have attributed health and environmental problems to facility operations and failures. Plant failure has elicited lawsuits and the Force Main alternative is the result of legal challenges by environmental and community groups.

While these active groups have contributed extremely valuable input in improving the wastewater system, it is nevertheless important to elicit participation from a broad cross-section of the community to ensure that other interests and general opinions are incorporated in the project as well. The Community Outreach Program for the K-K Project affords the City an opportunity to reach out to all segments of the community that may have a stake or interest in the proposed actions.

1.2.3 Community Outreach Program Components

The three parts to the Community Outreach Program are as follows:

- Stakeholder meetings: These include meetings with people who have a distinct and unique interest in one or both of the proposed actions. These people generally are public and private landowners, government officials who would review the preferred alternative in a regulated process, and users who may operate a unique activity in the vicinity of one or both of the proposed actions.
- Public information meetings: These include meetings intended to reach out to the general community, provide information on the project, and solicit input on the EIS. The first meeting was held in September 2010 and served as an information and scoping meeting. The second will be held at the completion of the Draft EIS and will present findings and recommendations for public review and comment.
- A Core Working Group: The City convened this group to maintain a focused discussion of the project with a diverse group of people over several months.

The Core Working Group is the subject of this report, which will be summarized in and appended to the EIS.

2 Overview of the Core Working Group

2.1 Basic Characteristics of the Core Working Group Process

A Core Working Group, hereafter referred to as CWG, approach was used as a way to establish and maintain dialogue with various parts of the community. The basic characteristics of this program are as follows:

1. Dialogue with a core of three "segments" of the community

   As discussed earlier, the K-K Project provided the City an opportunity to reach out and discuss this effort with a wide range of interests. There are three types of community dialogue on this project:

   a. Individual stakeholders with unique interests – This includes people who live, operate a business, or conduct a cultural or social activity near proposed alignments of the two alternatives, and landowners.

   b. Organizations and agencies – This includes public agencies, Kaneohe and Kailua Neighborhood Boards, various community associations, environmental and cultural organizations, and other organized groups.

   c. General public – Both tax and rate payers are included in this group, as well as those who may have in interest in the project but are not connected to any Windward-based organization.

   The CWG was designed to have representation from all three segments in a balanced way from both interest and geographic perspectives.

2. Expectation management

   It is crucial that the project team clearly identify how community input will be used in the outreach program for this project. Community participants in outreach programs can likely experience frustration and disillusionment if they feel their input is not considered in the project. In addition to feeling that they wasted their time and energy, they also can feel that their participation was moot since a decision seemed to have been made with little or no consideration of community input.

3. Meaningful input

   Related to expectation management is the assurance that the CWG will provide input that is integrated into project efforts. The interaction between the project and community input needs to be clearly defined so that participants understand that their input has clear implications in the evaluation of two alternative actions.

4. Focused discussions

   It is important that, from the outset, the K-K Project is put in its proper context within the overall wastewater system. The proposed project is just one part of a complex system that has historical issues. Wastewater management is a systemic effort. In addition to the various parts of the system, including facilities, collection, transmission, conveyance, and treatment, there are compatibility impacts related to location and neighboring uses. When the community and CWG raise issues not included in the project's scope, every effort should be made to redirect those issues to the appropriate entity or project.

2.2 Core Working Group Schedule Within the Project's Overall Time Frame

Prior to the implementation of the CWG portion of the Community Outreach Program, the following occurred:

- The PER defined the project in terms of the general characteristics and alignment of both alternatives.
- The PER project description was then the basis for the EIS Preparation Notice.
- The EIS Preparation Notice was published.

This sequence was intended to ensure that there is clear definition of the project that will be documented in a public and transparent process. Once the EIS Preparation Notice was published, the CWG meetings were to commence.

The findings of the CWG process were intended to be included in the Draft EIS, and the process was therefore to be completed during the preparation of the Draft EIS.

2.3 Core Working Group Products

As noted earlier, managing community expectations for the outreach program was essential in establishing a working relationship. While community input will be incorporated, it will not be the deciding factor in the selection process.

Realistically, the most significant contribution the CWG can have in this project is to ensure that community values are properly considered in the evaluation process. Community values can help to shape the project's studies and influence the actual criteria that will be used in weighing the two alternatives.

Products of the CWG process include:

- Guiding principles – A guiding principle is a fundamental statement of community values that will guide discussions within the CWG and the project team. Collectively, the guiding principles reflect basic values that will help the City evaluate the alternatives and conduct project studies.
- Identification of community values -- The CWG was asked to identify community values of the various interests represented in the group.
- Prioritizing of community values – The CWG was encouraged to weigh community values in terms of importance to specific interest groups and to the group as a whole. This information provides valuable input to the City in its evaluation of the two alternatives.

2.4 Core Working Group Composition

Twenty-three people agreed to participate in this process, and Table 1 lists CWG members and their affiliations.

Table 1: Core Working Group Members

Name	Affiliation
Jeff Argov	President of Yacht Club Knolls
Robert Bourke	Kailua resident
Kathy Bryant-Hunter	Kailua resident
Lois Crozer	Member of Sierra Club
Todd Cullison	Executive Director of Hui o Koolaupoko
Mahealani Cypher	President of Koolaupoko Hawaiian Civic Club
Randy Fujiki	Kailua resident
Linda Goldstein	Kaneohe Business Group
Chester Hughes	Kaneohe Ranch
Lowell Kalapa	Executive Director of Tax Foundation of Hawaii
Alexis Kane	Principal of Puohala Elementary School
Barbara Sullivan	Resident of Aikahi Gardens Association
Annetta Kinnicut	Lani Kailua Outdoor Circle
Gay Kong	Principal of Aikahi Elementary School
David Krupp	Member of the Kaneohe Bay Regional Council

Name	Affiliation
Herb Lee	Executive Director of Pacific American Foundation
Cheryl Kauhane Lupenui	President and Chief Executive Officer of Kokokahi YWCA
Puna Nam	President of Kailua Chamber of Commerce
Ken Rakta	General Manager of Kaneohe Yacht Club
Robert Richmond	Kewalo Marine Laboratory
Bill Sager	Secretary and Environment Chair of Kaneohe Neighborhood Board
Donna Wong	Executive Director of Hawaii Thousand Friends and member of Kailua Neighborhood Board
Myles Yamamoto	Member of Kaneohe Neighborhood Board

3 Summary of Core Working Group Input

3.1 Meeting Highlights

Five CWG meetings were held. Except for the first meeting, which was designed as a half-day workshop, the meetings were conducted within a two-hour time frame. They were held during early evening hours, and meeting locations alternated between Kailua and Kaneohe. In addition to CWG members, City officials and consultants participated as appropriate. Guests were welcome.

Discussion on CWG products are presented further in this section. Meeting summaries are appended to this report. Further discussion on frequent themes in CWG meetings are presented in Section 4.

3.1.1 Meeting 1

The first CWG meeting was a half-day workshop held on July 24, 2010 at the Aikahi Elementary School Cafeteria. This workshop served as a project orientation, and included the initial process of identifying community values.

In the first half of the workshop, an overview of the existing wastewater system was provided, and the two K-K Project alternatives were described. Topics raised by the CWG during this portion of the workshop included:

- Characteristics of the overall wastewater system
- The basis for projecting future wastewater flows
- Implications for the existing system, including facilities such as the existing force main, pump stations and the Kaneohe and Kailua wastewater plants
- Leak detection mechanisms in both alternatives
- A comparison of storage requirements for both alternatives
- Impacts of soil borings, blasting and tunneling on nearby residences
- Precedence for the length of hydraulic drilling to implement the Force Main Alternative
- Impacts on Kaneohe Bay waters during construction and operation
- What would be required to extend the deadline of the consent decree issued by the EPA

- The desire to see more conventional methods, such as open trenching along the existing force main alignment

In the second half of the workshop, participants were led through a Big Picture Scenario exercise to help in identifying community values related to the wastewater system. In addition, draft guiding principles were presented to CWG members. They were asked to revise, add, delete as they saw fit and to submit their comments prior to the next meeting.

3.1.2 Meeting 2

The second meeting was held on August 25, 2010 in the Kauwila Akau Building at the Kaneohe Community and Senior Center. The project team presented revised guiding principles and a preliminary list of community values. In addition, the EIS Preparation Notice, which was previously provided to the CWG, was discussed.

In the first meeting, the CWG noted that the existing force main was constructed along existing roadways using familiar technology. There was strong concern about using significantly different technology and new routes. It was noted that the Force Main Alternative would be located under the floor of Kaneohe Bay and the Gravity Tunnel would be drilled deep within Oneawa Hills.

Because of CWG concerns, the project team focused the second meeting on the various alignment and construction variations that were previously studied and the rationale for selecting the Force Main and Gravity Tunnel Alternatives.

Topics raised by the CWG are as follows:

- The impacts of earthquakes on the gravity tunnel structure
- The impacts of blasting and drilling related to construction of the gravity tunnel on homes on Oneawa Hills
- The effect of the size of the gravity tunnel on allowing or supporting further development and growth in the Windward region
- The impacts of construction activities and operations of the Force Main Alternative on Kaneohe Bay
- The community's experience with wastewater spills in Kaneohe Bay
- Which alternative would significantly reduce or eliminate spills in Kaneohe Bay
- Maintenance requirements of both alternatives
- Leak detection of both alternatives

- The timeliness and need for CWG efforts given the advance stage of the Force Main Alternative and the deadline required by the EPA

The CWG asked the project team to 1) provide a history of spills for a 20-year period, and 2) explore another land-based force main alignment that would not require a temporary force main in Kaneohe Bay and would minimize easement and land acquisition requirements. The CWG was asked to finalize the guiding principles and review and modify the preliminary list of community values prior to the next meeting.

3.1.3 Meeting 3

The third CWG meeting was held on September 22, 2010 at the Aikahi Elementary School Cafeteria. The focus of this meeting included PER findings to date.

The project team presented initial findings regarding a "new" Mokapu Boulevard alignment that would not require a temporary force main and would minimize the need for easement and property acquisition. Topics raised by the CWG are as follows:

- General characteristics of this alignment
- The preference for open trenching rather than tunneling through Oneawa Hills
- The relatively high cost of the short tunneling segment in the "new" Mokapu alignment when compared to the length of the Gravity Tunnel Alternative
- The Force Main Alternative's inability to provide storage capacity when compared to the storage capacity of the Gravity Tunnel Alternative

The project team presented findings on a ten-year history of spills, and CWG members asked for a longer time frame, i.e. 20 years.

The engineering analysis for both alternatives was presented in terms of technology and construction, operational implications and how cost factors are being analyzed. Topics raised by the CWG are as follows:

- Characteristics of the equalization basins
- Odor control at both the Kaneohe WWPTF and Kailua Regional WWTP
- The inability of the Force Main Alternative to provide storage without new equalization basins
- Qualitative comparisons between the life expectancy of the two alternatives

- The need to compare the full cost of both alternatives, including the cost of equalization basins in the Force Main Alternative and long term maintenance costs
- The effect of salt water on the Force Main Alternative and its leakage detection system
- Previous unsuccessful attempts by the City in its request to extend the consent decree deadline
- The effect of vibrations related to construction of the Gravity Tunnel Alternative
- The extent of employing the local labor force

The CWG was asked to complete a pairwise comparison of community values prior to the next meeting.

3.1.4 Meeting 4

The fourth meeting was held on October 20, 2010 in the Hale Akoakoa Building of Windward Community College. The focus of this meeting was the Draft EIS, which was still being prepared, and preliminary findings. In addition, the results of the pairwise comparison assignment were presented.

In the presentation of the overall EIS and its studies, there was a review of how variations on the force main alignment will be addressed. It was noted that the EIS will discuss both the Force Main and Gravity Tunnel Alternatives equally. It was further noted that the land-based force main options that were eliminated in the alternative selection process will be discussed in the EIS. Oblique aerial photographs were used to illustrate the need for tunneling through Oneawa Hills in the land-based force main options. Discussion topics in this portion of the meeting are as follows:

- The manner in which the Gravity Tunnel Alternative would leave the Kaneohe WWPTF
- The elimination of the H-3 alternative
- The status of the EIS

Several studies were discussed and the following lists topics raised by the CWG on the respective studies:

- Traffic impact analysis
  - The destination of trucks transporting excavated materials

- Noise and vibrations
  - The distance between the Gravity Tunnel Alternative and residences
  - If tunneling will impact surface streets
  - The hours of construction for the Gravity Tunnel Alternative
  - Detecting inflow and infiltration problems in the Gravity Tunnel Alternative
- Archaeological Literature Review and Field Investigation and Cultural Impact Assessment
  - Identification of interviewees in the Cultural Impact Assessment
- Economic impact analysis
  - Definition of "sales"
  - The ability of local contractors to qualify for these projects
  - The need to weigh short and long term costs of both alternatives on an equal basis
  - The desire for a cost-benefit analysis that attached a dollar amount to the spills that might be prevented
- Water quality and aquatic biological assessment
  - Background and experience of AECOS, the consultant performing this study
  - The underground crossing of Kawa Stream for the Gravity Tunnel Alternative
  - The use of historic spillage information in this assessment
  - Contingency for possible future spills
  - Whether excess sewage might continue to spill into Kaneohe Bay with the Force Main Alternative
- Additional topics discussed by CWG members
  - The process for petitioning the EPA to extend the consent decree deadline so that the Gravity Tunnel Alternative can be further evaluated and possibly implemented
  - Clarification of the difference between flow estimates and volume measurements
  - The design storm event
  - The need for the City to consider short and long term ramifications, especially costs, when considering both alternatives
  - The role of the community in petitioning the U.S. Department of Justice and the EPA

3.1.5 Meeting 5

The fifth meeting was held on November 16, 2010 at Kainalu Elementary School Cafeteria. The initial focus of this meeting was how the CWG process will be represented in the Draft EIS. An update of the force main construction contingencies was also presented based on information that had become available since Meeting 4.

A preliminary table of contents of the report on the CWG, as well as a draft of the section on frequent CWG topics, was provided to the CWG. The frequent CWG topics up to Meeting 5 were highlighted and the revised version is included in Section 4 of this report. It was noted that the Draft EIS will be published in January 2011, and that the final CWG report will be published as part of the EIS. There were no questions or discussion on this matter.

The project team presented an update on the status of construction contingencies for the Force Main Alternative. Since the last meeting, the City received responses to a Request for Interest (RFI) sent to prospective contractors. The contractors requested contingencies to be included in the requests for bids to implement construction work. It was noted that construction contingencies are common, especially in projects of this magnitude. The construction contingencies were related to inadvertent slurry returns, unforeseen obstruction (i.e. large boulders) and emergency access to in-hole tools. Contingency measures in shallow waters would include installation of silt curtains. In deeper waters, sheet pile enclosures to create isolated water columns would be transported by small boats or barges

The project team also indicated that construction contingencies will be part of the Project Description section of the EIS and will be discussed in relevant impact sections.

Discussion topics in this portion of the meeting are as follows:

- Any work in bay waters is unexpected due to previous project information that indicated no work would be needed in bay waters
- The potential damage to bay waters, coral beds and overall ecosystem due to construction contingencies
- Likelihood of need for construction contingencies and possible rate of occurrence
- How boulders would be detected
- The size of drill machines for the horizontal directional drilling method
- Whether construction activities would be monitored by marine scientists and archaeologists

- The inability to evaluate the two alternatives on the same level due to the differences in timing of these alternatives
- The need to petition EPA and the U.S. Department of Justice to extend the consent decree deadline and allow for evaluation of comparable information on the two alternatives
- A preference for the Gravity Tunnel Alternative because it will include storage as part of the initial construction (versus the Force Main Alternative, in which the storage basins would be constructed after the force main is installed)
- How the community can convey its concerns and preferences to the City administration

3.2 Guiding Principles

Guiding principles were developed to guide the CWG process, including community and City participants, as well as the selection of a preferred alternative and project implementation. The following is based on an initial draft generated by the project team and revised by the CWG members.

Evaluation of most feasible alternatives: The project's most feasible alternatives should be evaluated in a systematic and logical process based on information developed in the community outreach process, the Environmental Impact Statement and the Preliminary Engineering Report.

Incorporation of community values: Community values identified in the Core Working Group and in public meetings are a key component in this project and must be incorporated in the evaluation of most feasible alternatives.

Weighing short and long term benefits and impacts: Regardless of their time frame, benefits and impacts of the project's most feasible alternatives should be given equal consideration in evaluating alternatives.

Open and transparent communication: There should be open and transparent dialogue between the City and the community during the planning process, and during construction and operation of the preferred alternative.

Cultural and Environmental Assets: The project should provide for the protection of the environment and cultural assets, including land, air, and water resources, such as Kaneohe Bay. It should promote measures that are the least disruptive to our ecosystem and wahi pana (legendary places) while meeting our wastewater needs.

Technological advances: The project should anticipate future technology advances in the design of improvements.

Consistency and compliance with public plans, policies and regulations: The project should be consistent with the Koolaupoko Sustainable Communities Plan, the Kaneohe Bay Master Plan and other such plans developed by the City and County of Honolulu. Further, the project should meet or exceed regulatory requirements pertaining to wastewater collection and treatment.

Community compatibility: The project should protect the health and safety of the surrounding community. It should be compatible with the surrounding community during its construction phase and operation.

Incorporation of cultural values: Ensure that the process and the project are pono (balanced, fair and correct), and that both address the values of malama aina and malama i ke kai (land and sea stewardship).

3.3 Community Values

3.3.1 Identification and Prioritizing of Community Values

The identification of community values was based on scenario planning exercises conducted during Meeting 1. "Big Picture" scenario planning is intended to engage a group's imagination while studying anticipated impacts that might actually occur. This process helps corporations, public agencies and community groups think through possible futures. These futures are generally extreme depictions of what might occur.

Typical planning exercises use forecasts, which start with a current situation and possible future paths, then deduces an end state. In this project, scenario planning was based on "backcasting," which starts with the current situation and an end-state, then deduces possible paths from the current to the end state. In the first meeting, CWG participants were asked to explore three Big Picture scenarios:

- Model for Environmental Stewardship - In 2020, the City's system for conveying and storing wastewater from Kaneohe WWPTF to Kailua Regional WWTP is recognized as one of the most environmentally friendly systems in the United States. The EPA cites this system as a model for environmental stewardship.

- Optimal Community Compatibility - In 2020, the City's system for conveying and storing wastewater from Kaneohe WWPTF to Kailua Regional WWTP is barely noticed by the surrounding community. Only 10 complaints were filed by nearby residents and schools, and all were addressed to the satisfaction of the complainants.
- Minimum Financial Burden for System Users - In 2020, the project has been implemented and is in full operation. Users of the system have had minimal financial burden. Other municipalities are looking to replicate the financing of the overall project to achieve similar results.

The CWG was asked to think about their personal values and those of their peers and answer two questions:

- How were these scenarios achieved (strategies, changes, etc.)
- What were problems along the way that presented challenges to the community and the City

They worked in small groups and posted their own individual responses.

Several values emerged and these were provided to the CWG at the next meeting to revise, add and delete as they saw fit. Table 2 contains the final list of community values and their definitions.

Table 2: Community Values

Community Value	Definition
Construction cost	The cost to design and construct the improvements
Construction impacts on neighborhoods (noise, traffic, length of time, etc.)	How construction activities affect surrounding neighborhoods
Construction impacts due to vibrations and blasting (if any)	How vibrations during construction would impact nearby homes and other uses
Construction impacts on Kaneohe Bay and Waikalua Loko Fishpond	How construction activities might impact these resources
Footprint for construction staging area	The location and size of the area needed for construction staging
Time frame for construction	The amount of time needed to construct the project
Technology precedence	Whether the technology has been done to a comparable level or extent considered in this project

Community Value	Definition
Reliability / fail-safe	The ability for the project to ensure reliability and include measures to deal with system failures
Long range accessibility and monitoring capability	The ability to access the project and monitor its operations
Life expectancy	How long the project is projected to be operational
Storage capability	Does the project have the means to store wastewater
Operations and maintenance costs	The costs of operating and maintaining the project and the system
Energy requirements	How much energy will be required to keep the project running
Operational impacts on the water quality of Kaneohe Bay and groundwater	How day to day operations may impact these resources
Impacts on cultural resources and landscapes	If and how a project would impact cultural resources and landscapes
Compliance with current stipulated order	If the project meets the time frame and other requirements of the current stipulated order
Operational impacts on neighborhood (odor, noise, visual)	How the project might impact adjacent communities once its operational
Effect on sewer rates and taxes	How the project will affect sewer rates and taxes
Impact on potential growth of Kaneohe and Kailua	Whether the project will enable unplanned growth in the region

3.3.2 Prioritized Community Values

The CWG prioritized these values using the pairwise comparison method, in which two values are compared in terms of relative importance to each other. The following point system was used. The most important values received the highest points.

If A is	much more important	than B, enter	5
	more important		4
	equal		3
	less important		2
	much less important		1

Fourteen of the 23 CWG members, or 61 percent, responded, and Table 3 shows the ranking of community values.

Table 3: Ranking of Community Values

Community Value	Ranking
Operational impacts on the water quality of Kaneohe Bay and groundwater	1
Reliability / fail-safe	2
Impacts on cultural resources and landscapes	3
Operational impacts on neighborhood (odor, noise, visual)	4
Construction impacts on Kaneohe Bay and Waikalua Loko Fishpond	5
Long range accessibility and monitoring capability	6
Life expectancy	7
Energy requirements	8
Operations and maintenance costs	9
Storage capability	10
Effect on sewer rates and taxes	11
Compliance with current stipulated order	12
Impact on potential growth of Kaneohe and Kailua	13

Community Value	Ranking
Technology precedence	14
Construction impacts due to vibrations and blasting (if any)	15
Construction impacts on neighborhoods (noise, traffic, length of time, etc.)	16
Construction cost	17
Time frame for construction	18
Footprint for construction staging area	19

4 Frequent Core Working Group Discussion Themes

In meeting discussions and assignments, there were several themes that emerged and are hereby discussed.

4.1 Impacts on Kaneohe Bay

CWG members had strong concerns about how Kaneohe Bay waters would be impacted by construction activities and during operations. The project team explained that construction of the Force Main Alternative would not occur in bay waters given the depth of the force main under the floor of the bay; this depth would likely preclude impacts on the bay during operations. While some CWG members seemed to accept this information, others remained adamant that no work should be done in Kaneohe Bay. Concerns about impacts on Kaneohe Bay increased when information on construction contingencies was presented.

Another perspective was that the Force Main Alternative would not completely eliminate the potential for possible spillage into Kaneohe Bay. While it would provide a redundant force main, the conveyance process would remain the same and there is still a potential for spills. CWG members noted that there has been an extensive history of spills into Kaneohe Bay, and that City resources should be put into an alternative that would virtually eliminate the potential for spills. As the meetings progressed, these CWG members tended to prefer the Gravity Tunnel Alternative because it would convey wastewater, provide storage and result in the decommissioning of the Kaneohe WWPTF and the existing force main.

The high level of concern about Kaneohe Bay is reflected in the results of the pairwise comparison exercise, in which water quality of the bay ranked first (during operations) and fifth (during construction) out of 19 community values.

4.2 Request for a "Third Alternative"

At the first meeting, there was an overall concern that the Force Main and the Gravity Tunnel Alternatives were drastically different from existing facilities and construction methods. Drilling under Kaneohe Bay and tunneling through Oneawa Hills are vastly different from the conventional open trench method used along existing roadways.

The project team explained that a temporary force main would be needed during construction of any new force main occurring near the existing force main. The temporary force main would provide backup in the event that construction activities damage the existing force main. Placing the temporary force main under the floor of Kaneohe Bay would add an estimated $40 million to construction costs and the temporary force main would be removed when the new force main is operational. The cost of the temporary force main and time requirements for implementation ruled out all of the land-based force main alignments.

At the request of the CWG, the project team explored a new alignment along Mokapu Boulevard (also referred to as the "new" Mokapu Boulevard option) that would not require a temporary force main and would minimize requirements for easement and land acquisition. This new alignment traversed along Mokapu Saddle Road. Given the slope and elevation of this roadway, either a new pump station would be needed to convey the wastewater over the high point, or micro-tunneling would be needed to extend the force main through the mountain. A new pump station would not be possible because the City does not own land in the location of the needed facility and several private properties would need to be acquired.

The "new" Mokapu alignment would therefore require micro-tunneling, which would include drilling and blasting, and an open trench segment. Various oblique aerials were used to illustrate the need for tunneling through Oneawa Hills. This would be the longest alignment and is estimated to cost over $277 million. The project team noted that this alignment would not be feasible.

While some CWG members seem to have accepted the selection of the two project alternatives for further consideration by the City, a few members remain firm that a "third alternative" needs to be considered. They feel that the community should have been part of the overall alignment selection and have asked that the EIS study all of the possible alignments equally. They have also expressed concern that the community was not part of the process for selecting the two alternatives.

4.3 Need to Have Comparable Information for the Alternatives

In reviewing the economic aspects of the project, the CWG has asked for the full cost implications of both alternatives. Estimated construction costs for both alternatives were provided. The equalization basins for the Force Main Alternative would be constructed after the actual force main and construction costs for these facilities were not available during the CWG process. In addition, estimated long term maintenance costs for both alternatives were unavailable during this process. The CWG has asked that these costs be included in the EIS so that the two alternatives can be evaluated on an equal basis.

Cost was not the only information requested by the CWG for comparative purposes. After the CWG learned of possible construction contingencies for the Force Main Alternative, they asked that such information be provided for the Gravity Tunnel Alternative as well. While preliminary information on this matter was available at the time of Meeting 5, it was not as fully developed as that for the Force Main Alternative.

4.4 Consent Decree Implications

The disparity between available information on the two alternatives is due to the difference in timing. As discussed in Section 1, the City is actively pursuing the Force Main Alternative to meet the deadline set forth in the consent decree issued by the EPA. The Gravity Tunnel Alternative was explored after the consent decree was issued because of technological advances and other aspects. Its implementation would require an extension of the consent decree deadline.

A consent decree extension deadline would require legal petition by the City to the U.S. Department of Justice, and would involve the EPA and several non-governmental organizations, and agreement from these parties. It is unknown if these parties would approve this petition, and the time frame for this legal pursuit is also unknown. The City has informed the CWG that it will decide if it will pursue the petition by the end of 2010.

CWG members have expressed frustration about the consent decree deadline from two perspectives. First, the deadline restriction limits the level of information on the Gravity Tunnel Alternative that is available in the EIS and in community outreach efforts. CWG members feel that they and the City cannot compare "apples to apples."

Second, although the CWG was not asked to select an alternative, some CWG members prefer the Gravity Tunnel Alternative for various reasons. They are concerned that the Force Main Alternative may be implemented anyway because of the deadline restriction.

4.5 Usefulness of CWG Input

CWG members questioned the usefulness of their input considering that the Force Main Alternative is moving ahead to comply with the EPA consent decree. Some CWG members doubt the City's ability to successfully petition the appropriate agencies to extend the deadline and allow for the implementation of the Gravity Tunnel Alternative.

The project team told the CWG that their input is indeed useful because it is part of the factors being considered in selecting a preferred alternative. Further, City officials have indicated that the decision to pursue the Gravity Tunnel Alternative will be made by the end of 2010. If the City decides to pursue this alternative, it will petition the U.S. Department of Justice and will require agreement by various parties.

4.6 Vibration Impacts Due to Earth Work

CWG members, particularly those who live on or near Oneawa Hills, have expressed repeated concern that vibrations due to blasting and tunneling for the Gravity Tunnel Alternative might cause damage to homes. They noted that this area has a history of earthquakes and tremors, and that houses have suffered structural damages as a result.

The project team explained that blasting will only occur at the Kailua Regional WWTP and will need to be done carefully so as not to damage wastewater facilities or disrupt operations. Further, tunnel boring will occur about 100 feet below the surface, and vibrations would be barely perceptible immediately above the tunneling activity. The information will be provided in the EIS and the project team will continue to discuss this item with interested citizens.

4.7 Odor Control

The regional community, particularly in the areas near the Kailua Regional WWTP, has historically experienced odor problems near this facility. At the onset of the CWG process, CWG members wanted to make sure that odor was addressed in either alternative. The project team discussed how both alternatives incorporated odor control at force main outlets and the gravity tunnel shaft. It was noted that the overall odor issues at both Kailua and Kaneohe are being addressed in other ongoing projects.

Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project

Report on Core Working Group

Meeting Summaries

Meeting 1 Summary

Kaneohe to Kailua Wastewater Conveyance and Treatment Facilities Project

Core Working Group

Workshop on July 24, 2010

Workshop Summary

The first meeting of this Core Working Group was a workshop held at the Aikahi Elementary School cafeteria from 9AM to 1PM. Core Working Group (CWG) participants included:

- Annetta Kinnicutt, Lani-Kai Outdoor Circle
- Jeff Argov, Yacht Club Knolls
- Bob Bourke, Kailua resident
- Mahealani Cypher, Koolaupoko Hawaiian Civic Club
- Randy Fujiki, Kailua resident
- Chester Hughes, Kaneohe Ranch
- Catherine Kaehu (alternate), Aikahi Gardens Homeowners Association
- Lowell Kalapa, Tax Foundation of Hawaii
- Alexis Kane, Puohala Elementary School
- Cheryl Kauhane Lupenui, Kokokahi YWCA
- Dave Krupp, Kaneohe Bay Regional Council
- Ken Rakta, Kaneohe Bay Yacht Club
- Bob Richmond, Kaneohe resident
- Dane Robertson (alternate), Kaneohe Chamber of Commerce
- Bill Sager, Kaneohe Neighborhood Board
- Myles Yamamoto, Kaneohe Neighborhood Board
- Donna Wong, Hawaii Thousand Friends and Kailua Neighborhood Board

Project team participants included:

- Jack Pobuk, City Dept. of Environmental Services
- Carl Arakaki, City Dept. of Design and Construction
- Richard Harada, Wilson Okamoto Corporation (WOC)
- Earl Matsukawa, WOC
- Laura Mau, WOC
- Tracy Fukuda, WOC
- DeAnna Hayashi, Austin Tsutsumi and Associates
- James Kwong, Yogi Kwong Engineering
- Woodie Muirhead, Brown and Caldwell
- Berna Cabacungan, Earthplan

Welcome and Introductions

Jack Pobuck opened the workshop and thanked everyone for participating. He noted that this session is a workshop because the meeting served as both an orientation and a working session. Each person did self-introductions.

Purpose of the Core Working Group

Berna Cabacungan discussed the purpose of the CWG and how input will be used in this project. She noted that this group will help the City in its evaluation of two alternatives on conveying untreated sewage from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant (WWTP). The CWG is being asked to share their values and ideas that the City needs to consider in evaluating the alternatives and selecting the preferred alternatives.

The three products from the CWG will include 1) guiding principles, 2) values important to the community and 2) a priority of these values. The CWG input will be documented in the EIS and considered in weighing the two alternatives. A preliminary outline of subsequent CWG meetings was presented.

Overall Wastewater System

Earl Matsukawa discussed the overall wastewater system that serves the Ahuimanu, Kaneohe and Kailua regions. He described how wastewater is currently conveyed from the Kaneohe WWPTF to the Kailua Regional WWTP via a 42-inch force main.

He further noted that, while population-based projections indicate very little increase between 2000 and 2030, a significant increase in wastewater quantity is projected for peak flows during that time frame. He attributed this increase to 1) infiltration that occurs when water enters through pipes lying below the ground water table, and 2) inflow that occurs when water enters the wastewater collection system during storms. While there are solutions to infiltration and inflow, the major issues include a reliance on a single force main that has no back-up and peak flows resulting in flows.

Earl then provided an overview of the history from the 1992 consent decree to the overarching consent decree issued earlier this year. A stipulated order was issued in 2007 to construct a supplemented force main that would convey wastewater from the Kaneohe WWPTF near the Bayview Golf Course to the Kailua Regional WWTP in Aikahi.

A summary of questions and answers on this portion of the presentation is as follows:

- Are the CIP projects listed in Table 1-5 of the EISPN completed or projected?
  - *Response:* These were completed in the first 10 years of the rehabilitation program.
- Do you have the complete list of projects, regardless of completion, and can you include the list in the Draft Environmental Impact Statement (EIS)?
  - *Response:* The complete list of projected projects is part of the Sewer Infiltration/Inflow Plan that was produced in 1999 and it is not covered in the EIS. This list can be included in the Draft EIS for informational purposes only.
- Is the projected 91 million gallon per day (mgd) peak flow for the entire Kailua wastewater system or just for the route from Kaneohe to Kailua wastewater

treatment facility? If it is for the entire area, can you show the peak flow from Kaneohe side?
  - *Response*: The 91 mgd is the projected peak flow based on design storm event in both Kaneohe WWPTF and Kailua WWTP. The peak capacity is unknown and will be investigated.

- Is the storm drainage system connected to the wastewater system or are the systems separate. Also, are there inflows entering the wastewater system.
  - *Response*: The City and County of Honolulu has two separate systems: one for storm drainage and one for wastewater. There are some illegal connections (ex. Damaged pipes) to the wastewater collection system though you are not supposed to discharge it into wastewater system. During the occasional storm events, overflow happens and runs between the manhole covers sometimes.

- What is the impact of the completion of this project on the community, including population growth? Does this mean in the future, more development in north of Kaneohe?
  - *Response*: The completion of this project will not generate increase in population in the area. The Department of Planning and Permitting Koolaupoko Sustainable Community Plan shows the projected population growth is -3.2 percent through 2035. The design of system is based on that projection. Further, the decisions on land use and zoning to allow more developments are based on the sustainable community plan, not on wastewater systems.

- Which jurisdiction has separate systems for storm water drainage and wastewater?
  - *Response*: The City and County of Honolulu does, and so do other islands.

- Is the projected overflow is based on the 2020 or 2030 model?
  - *Response*: We need to verify that.

Project Alternatives

Earl described the two alternatives that will be addressed in the EIS. One alternative is to convey wastewater from Kaneohe WWPTF to the Kailua Regional WWTP in a Supplemental Force Main that would be located under the seafloor of Kaneohe Bay and would be approximately three miles long. The two construction options include 1) horizontal directional drilling and 2) the construction of a nine-foot tunnel. The force main would be located either within the 36-inch steel-encased PVC placed by directional drilling or in a 42-inch pipe in the tunnel. In either construction option, the force main would be located approximately 100 feet below sea level.

The other alternative is to convey wastewater from Kaneohe WWPTF to the Kailua Regional WWTP by gravity flow in Sewer Tunnel that would be located under Oneawa Hills. The tunnel would be approximately three miles long, and 13 to 14 feet in diameter. The elevation would decrease from 35 feet below sea level at the Kaneohe WWPTF to 62 feet below sea level at the Kailua WWTP.

Earl then discussed the Preliminary Engineering Report (PER), EIS process, and community outreach program for the evaluation of the two alternatives. He provided a schedule for these three components.

A summary of questions and answers on this portion of the presentation is as follows:

- What will happen to the existing 42 in force main?
  - *Response:* The existing force main will stay operational, as a back up. The City needs to decide how and which force main will be used. The City made the conversion in 1994.

- How would leakage on both routes be monitored and what are the methods in detecting leakage?
  - *Response:* For the temporary force main project in Waikiki, the State Department of Health required monitoring the flow at the beginning of the force main near pump station and end of force main after it goes through Ala Wai canal. The flow meter is only + or – 10% accurate. Kaneohe to Kailua average flow is approximately 6 mgd, so there could be 700,000 gallons/day leakage into the bay. For that amount it wouldn't be too hard to find the leakage by observing the ocean.

    The other way to find the leakage is to conduct laboratory testing of the water to monitor the amount of bacteria.

    If there is a leak in the force main, the existing force main could also be used as bypass.

    The tunnel alternative is a gravity sewer line 35 feet below sea level and subject to infiltration. If there are leaks it would go in to tunnel due to pressure and carried to Kailua WWTP.

- What is the comparison in storage between the gravity tunnel and equalization tanks? Will equalization tanks have the same capacity as gravity tunnel?
  - *Response:* Equalization basins for force main based on the Sewer Infiltration/Inflow Plan, 7 million gallon reservoir facility at Kaneohe, and tunnel diameter will be determined by matching the peak flow.

- I am concerned about the soil boring impacts on the hill side of the residential area . There have been instances of earth movement in this community.
  - *Response:* Noise and vibration studies will be conducted in the EIS to find what will be encountered and how much vibration will be generated by the tunnel boring machine.

- When will the equalization (EQ) basin be installed? It is basically storing in the collection system now. What is the benefit of the force main if it can't store?
  - *Response:* The EQ basin will be installed after the force main is constructed in 2020. The force main is under a strict deadline. Currently when it's storing in the collection system, it backs up in the collection system. It is not spilling but it is what happens at peak.

- Will a toxic analysis on sediments in the Kaneohe Bay be conducted? Environmental issues, including where the fill would go, dewatering and etc. should be assessed. Will seismic activities in boring tunnel route be taken into account?
  - *Response:* Those issues will be addressed in the draft EIS. The route will be selected based on the materials under the bay. The tests are still undergoing.

- Have there been preliminary discussions on the tunnel alternative with the Environmental Protection Agency?
  - *Response:* The overarching Consent Decree does not include the tunnel alternative. The City will have to petition the court to include the tunnel alternative.

- Will both alternatives fit in the current footprint of the existing facilities?
  - *Response:* Both improvements can be implemented within the footprint of the existing facilities. Especially for Kaneohe, there is a lot of decommissioned space, so no expansion will be needed.

- Is the technology for the force main alternative a unique first time effort, or is there something somewhere else comparable to what is being discussed? How safe and how successful has it been?
  - *Response:* At this time, the longest horizontal directional drilling project is in Saudi Arabia. This project will be the longest for 42"inch pipe. It is 10,000 feet with a 36" steel casing in Saudi Arabia. The longest in the U.S. is 7,500 feet with 36" casing. Our project is about 3,500 feet longer than the longest pull in the U.S.

    The ground condition is considered very preferable in the force main route. There are three or four contractors who verified that it's feasible, and they will be bidding on this project.

- Why is a new force main running parallel to the existing 42" force main not being considered as an option?
  - *Response:* At this point, it is not an option because there are significant issues regarding ownership right-of-way, width and construction method. This will be discussed in the draft EIS.

- What is the deadline if the court has to approve the tunnel alternative?
  - *Response:* The project team is still in the process of preparing a Preliminary Engineering Report and an EIS and is currently conducting a community outreach program. These processes will help the City select a preferred alternative. We are looking at the end of 2010 for the City to make final decision. If the tunnel is selected, the City will petition the court to consider this option.

- Is there a website for public to follow the progress of this project?
  - *Response:* A website is under construction and the CWG members will be notified when it is ready.

- The City built a tunnel from Honouliuli to Sand Island under the harbor and it has been completed and successful. Why is "the old fashion way" (trenching along roadway) not the first alternative?
  - *Response:* The City has looked at three land options: 1) along Kaneohe bay drive, 2) H-3 and 3) Mokapu Road. For H-3, both State of Hawaii and the Federal Highways Administration have a policy that any utilities are not allowed in their rights-of-way. Further, there is a soil problem under the Mokapu Saddle Road, so it's the least favorable option.

- It will be a lot cheaper to go along the existing alignment and not with the proposed force main or tunnel alternatives.
  - *Response:* There is an issue running a force main along H-3. The elevation difference between H-3 and Kaneohe WWPTF increases the pressure at the Kaneohe WWPTF to be plant too high because the wastewater would have to be pumped up. An additional pump station would have to be constructed somewhere between the Kaneohe WWPTF and H-3. It is high risk and dangerous condition to put sewer pipe under that much pressure.

- I am not satisfied that the Kaneohe Bay Drive alignment is not considered as an option, not even in the EISPN.
  - *Response:* This alternative will be discussed in the next meeting and this option would be included in DEIS. We are open to consider it as a possible option.

- You should consider placing the force main tunnel alternative route under Mokapu Saddle Road to eliminate the pressure issue.

Break

Big Picture Scenario

Berna discussed the use of scenario planning to help participants think about bold future scenarios. Scenario planning is used by public and private organizations to visualize various future possibilities and plan ways to achieve these futures. She said that typical planning efforts are based on forecasts, whereby futures are extrapolated based on current conditions. In this workshop, "backcasting" would be used, whereby participants would start with a future and discuss how these futures were achieved.

She noted that participants were not asked to say whether these scenarios are desirable or achievable. Rather, they were asked to think about 1) how these scenarios were achieved and, 2) what were problems along the way that presented challenges to the community and the City.

Three scenarios were presented as follows:

- Optimal Community Compatibility: In 2020, the City's system for conveying and storing wastewater from Kaneohe Pre-Treatment to Kailua Wastewater Treatment Plant is barely noticed by the surrounding community. Last year, only 2 complaints were filed by nearby residents and schools, and both were addressed to the satisfaction of the complainants.
- Model for Environmental Stewardship: In 2020, the City's system for conveying and storing wastewater from Kaneohe Pre-Treatment to Kailua Wastewater Treatment Plant is recognized as one of the most environmentally friendly systems in the United States. The EPA cites this system as a model for environmental stewardship.
- Minimum Financial Burden for System Users: In 2020, the project has been implemented and is in full operation. Users of the system do not feel it was a financial burden. Other municipalities are looking to replicate the financing of the overall project to achieve similar results.

The scenarios were posted on large paper in different locations around the room. Participants were divided into three groups and each group was provided a pad of post-it notes. Participants then visited each scenario station as a group, and posted their responses. Participant comments are contained in full in Attachment A.

Preliminary Draft Guiding Principles

Berna described guiding principles as statements to help guide the evaluation and selection of the two alternatives, and the implementation and operation of the selected alternatives. She stressed that the statements presented at the workshop are very preliminary, and intended to elicit participants' own guiding principles. Participants were asked to revise, add, delete before the next meeting.

The draft guiding principles were in the areas of:

- Evaluation of the two alternatives
- Weighing short and long term benefits and impacts
- Incorporation of community values

- Open and transparent communication
- Environmental protection
- Technological advances
- Consistency and compliance with public plans, policies and regulations
- Community compatibility.

Next Steps

Tracy Fukuda asked the group to select a time to meet for the monthly meetings. The group decided to meet at 6:00 pm – 8:00 pm. The meeting locations would alternate between Kaneohe and Kailua.

CWG participants were asked to provide input on two items prior to the next meeting. First, they were asked to discuss how they felt other people would react to the three Big Picture scenarios. Second, they were asked to comment on the draft guiding principles.

The next meeting will be held on Wednesday, August 25, 2010 in Kaneohe. Location to be determined.

ATTACHMENT A

CORE WORKING GROUP MEETING 1

COMMENTS ON BIG PICTURE SCENARIO

Optimal Community Compatibility

In 2020, the City's system for conveying and storing wastewater from Kaneohe Pre-Treatment to Kailua Wastewater Treatment Plant is barely noticed by the surrounding community. Last year, only 2 complaints were filed by nearby residents and schools, and both were addressed to the satisfaction of the complainants.

How was this scenario achieved? (e.g. technology, partners, funding, public policies, etc.)

Pink Group	Yellow Group	Orange Group
Double enclosure of odor releasing facilities New odor eliminating technologies has contained 100% of smell. The geodesic dome covering the whole plant controls all odors The fully grown and well maintained trees and hedges are helping to mitigate odor. Eucalyptus grove surrounding the WWTP both secludes the site & filters any odors. The odor control contract awarded for $12-13 M in 2010 eliminated 99% of the odor. The flat roof structure covering the plant doubles as roller park & tennis facilities.	Operating efficiently, no odors or esthetic problems The treatment plant is least invasive because of 21st c. technology and pre-construction considerations of the communities where the plant is located. Immediate response to the few complaints that were lodged indicated the state-of-the-art construction and implementation of the plant design. (problems quickly and easily resolved because the plant is so well-constructed). No spills in the Bay Minimal disruption during construction Newer system means less O & M and less need for city maintenance at plant and along route. Lots of money was put in to eliminating odor Land adjacent to treatment plant is bought by city to create buffer zone. Award winning landscaping No breaks – everything works Tunnel provides storage for waste water. No need for storage at Kaneohe PT facility. Current property decommissioned and turned into a public park. Looked at all options • Use the most technically advance technology to accomplish to job.	Can the discharge be used or sold to end user as grey water. Like golf courses, etc. Out-of-sight – no visual blight odor control technology How are these projects financed? Odor generation as result of gravity versus force main Weighed the plus + minus of the technology & cost • explored alternatives to financing improvements Understanding the pre-existing restrictions that preclude other alternatives Pipes/tunnel were sealed well. No spills. Contractor's work was carefully inspected.

Pink Group	Yellow Group	Orange Group
	• Weigh all options and choose the option that the majority could live with (federal, state, city & the ---- of Kaneohe/Kailua) New technology has beneficial for odor control Odor issues have been addressed Fewer sewer breaks due to greater efficiency in managing flow.	
What were problems along the way that presented challenges to the community and the City?		
Obtaining state of the art technology costs money Incorporate sustainable ideas from community groups, who will volunteer Ensuring adequate O & M budgets	Complaints are handled quickly with courtesy and sensitivity to concern of complainant – i.e. the city really listens Problem would be finding and getting enough money We suffered stinky odor complaints Rally by community against the project Educate the public on the problem, issues facing the "fix", accomplish the "fix" Find a technology that will control odor Redundant power supplies Tunnel: residents complain about noise and vibrations during construction process	Which alternative is projected to be finished first? Minimal traffic impacts Major spill occurs Generation of spoils – muck generation versus rock and reuse of material Spoils removal • Effective public information about construction activities Staging areas for both alternatives – which one has "smaller footprint"?

Model for Environmental Stewardship

In 2020, the City's system for conveying and storing wastewater from Kaneohe Pre-Treatment to Kailua Wastewater Treatment Plant is recognized as one of the most environmentally friendly systems in the United States. The EPA cites this system as a model for environmental stewardship

How was this scenario achieved? (e.g. technology, partners, funding, public policies, etc.)

Pink Group	Yellow Group	Orange Group
Creating rewards for conservation at the individual homeowner level. Collection in human urine to be used for natural homeopathic supplements. The storm water hold facility doubles as wetland ponds.	City solve sewage disposal/treatment problem w/out creating any new long term environmental or cultural problem (or adverse impact). There is no reliable and accountable monitoring of flows to address leak detection.	Drilling under bay- bad idea- long term- drilling on-land is better/smarter decision!! (even if the "perception" only is such) Odor generation is a result of gravity versus force main

Pink Group	Yellow Group	Orange Group
By incorporating student/faculty sustainable efforts, we have achieved zero/no environmental impact. Holding facility water held and pumped into separate grey water watering system for golf course & public spaces. The public home education program to eliminate illegal connections to replace leaky lids has eliminated 50% of the storm water inflow. Holding tanks outside with water lilies to purify water and sell roots for furniture making.	Innovative technology (risk) used: • Comprehensive cultural and environmental study. • Transparent decision making process-open architecture • Full allocation of $ resources • Guiding principle consensus to protect our cultural: environmental assets Use to most up-to-date technology: • Provided "back up" system(s) to lower possible problem(s) that might occur. • Addressed/or try to address possible uncontrollable future natural disasters. Oneawa Hills was left undisturbed. Ocean and Kaneohe Bay waters, corals & sea life are healthy and fish population are thriving. Energy consumption: Because the tunnel option was selected, the energy investment in maintaining the gravity flow system was minimal (restricted primarily to pump bring wastewater up) Partnering community has an opportunity to express its opinions. Comply or exceed with all environmental laws and regulations Specifically target nearby residents concerns and address them (noise, odor, visual, etc.) Kaneohe Bay is designated AAA water. That policy must be maintained. Tunnel adequate water storage for high flow periods. Testimony from officials who have been involved with a similar project and how it has been beneficial to the recipients of the project. Including shortcomings and benefits of the project. Hooray the tunnel is chosen. What a miracle. Community and its leaders have swayed EPA to chose the right project.	Life of system- which one will last longer? • Use of cutting edge technology • Shared funding of project- federal, state, local government and direct beneficiaries. Which system will have more storage at the end? Using treated water for irrigation rather than discharged into the ocean Eliminated sanitary sewer overflows • Eliminated odors at the fenceline • Met water quality standards consistently • Produces own energy for on-site use. A combination of both: • reduction and • storage of wet weather flows was provided, to achieve good protection against sewer spills Illegal connections of stormwater to sewer system are eliminated. City partners with private owners and businesses that could use RI water for irrigation to upgrade Kailua WWTP.

Pink Group	Yellow Group	Orange Group
	Relief main was installed along Mokapu Saddle Road, in part with the concurrence of Kailua NB. All controversial concerns were addressed and satisfactorily resolved. The community fully supported the decision. Spills no longer happen & there is enough storage to contain storm runoff. System upgraded to meet environmental standards and did not lead to population growth on WW coast. Sound investigative research of all feasible alternatives were first established, shared w/all appropriate officials and affected publics prior to a decision that was made.	
What were problems along the way that presented challenges to the community and the City?		
Addressing earth movements in areas to prevent damage to undergrowth pipes. R&M of conveying and storage system. Costs of development to incorporated green initiatives. DOH Environmental Department revised its attitudes about the re-use of grey water for irrigation	Additional financial resources needed -- "creative financing" • Time constraints • Unexpected findings. Initial construction may cause ground vibration affecting nearby homes on hillsides. Cost • Community disruption (traffic) temporary • Court sanctions Odor is controlled & not an issue in community • Problem: odor is clear & costly a problem at Aikahi Dealing with sediment & rock waste from tunneling Tunnel - Ensuring wall integrity it earthquakes occur Educating the general public on issues facing engineers/construction companies in completing a project of this magnitude. Short term (maybe not so short 2-3 yrs) impacts – noise, vibration, traffic	Problem of demanding a higher standard of community acceptance. Was repair/replacing existing system too costly? Not environmentally friendly? Public acceptance: Cost of sustainable features.

Minimum Financial Burden for System Users		
In 2020, the project has been implemented and is in full operation. Users of the system do not feel it was a financial burden. Other municipalities are looking to replicate the financing of the overall project to achieve similar results.		
How was this scenario achieved? (e.g. technology, partners, funding, public policies, etc.)		
Pink Group	**Yellow Group**	**Orange Group**
Having developed the technology to tunnel very cheaply Hawaii licenses this technique to other governments 90% of total cost was achieved by hiring locally and stimulating local (HI) economy. Recycle rock, etc. State incentives for technical advancement R&D Jail time for illegal connections to sewer No stormwater in sewer Holding facility 7mg doubles as a sports stadium.	Community buy-in from the beginning with commitment to incur the "price" to ensure the best solution for the whole vs. individual interests. • Use of social media technology to ensure widespread conversation & possible fundraising towards best alternative. Economy ----- and rate payers are able to absorb deferred costs of construction. Technology is simple and not too complex and easy to maintain and easy to repair We are all millionaires and of course higher sewer rates are no problem Minimal costs for continued maintenance and energy consumption for pumps etc. Partnership was created between the federal state, and city governments that addressed what were best for all (especially the -----) and not getting "hung up" on individual "turf". Native Hawaiian rate payers' fees are funded by federal government as partial compensation/Akaka Bill settlement – which ensure significant support for operations Taxes were not increased. Sewage fees not ridiculously increased. Public thoroughly convinced that the decision made was arrived at by open, collaborative decision-making on the part of the legislators, agencies responsible for this project, the public and the general community. • For whatever reason, this region operates cheaper than other regions.	Consolidation of treatment in Kailua. • Storage of peak period water Privatization of one or more parts of system Cellaus use of Preevat Activity Bonds Long-term maintenance costs operating force main versus gravity. Private/public partnership • High fines for illegal connections to sewer system Reduce electricity usage • Resource recovery e.g. energy production on site • Reduced O&M cost Banks give no/low interest loans to city for initial cost of construction.

Pink Group	Yellow Group	Orange Group
	City decides to adjust rates per region. People do not feel burdened because other regions are paying more. City partners to privatize system, they have deeper pockets and less red tape this translates to lower cost.	
What were problems along the way that presented challenges to the community and the City?		
Costs associated with inspections on illegal connections	Pipe got stuck during under Kaneohe Bay pull. Native American tribal systems see Honolulu as a model for offsetting sewer costs thru federal grants to NA rate payers. Lack of community engagement (apathy, lack of awareness…) Getting governments (Federal, State, and City) out of their "box" and looking "big picture". The mayor fighting with EPA. Seems if we don't need it we won't build it. Quote Mufi Hanneman Costs incurred if construction causes damage to nearby homes (e.g. from tunneling vibrations)	Reducing the ongoing cost of O&M including finding alternative energy resources Plants run on renewable energy, greatly reducing power costs. High initial costs, but lower life cost for system. Initial cost: Public acceptance Rate structure was designed to be fair and there were very few instances of customers refusing to pay.

Meeting 2 Summary

Kaneohe to Kailua Wastewater Conveyance and Treatment Facilities Project

Core Working Group

Meeting on August 25, 2010

Workshop Summary

The second meeting of the Core Working Group was held at the Kaneohe Community and Senior Center, Kauwila Akau Building, from 6:00 to 8:00 PM. Core Working Group (CWG) participants included:

- Jeff Argov, Yacht Club Knolls
- Lois Crozer, Sierra Club
- Todd Cullison, Hui O Koolaupoko
- Mahealani Cypher, Koolaupoko Hawaiian Civic Club
- Randy Fujiki, Kailua resident
- Chester Hughes, Kaneohe Ranch
- Annetta Kinnicutt, Lani Kailua Outdoor Circle
- Dave Krupp, Kaneohe Bay Regional Council
- Herb Lee, Pacific American Foundation
- Myles Yamamoto, Kaneohe Neighborhood Board
- Donna Wong, Hawaii Thousand Friends and Kailua Neighborhood Board

Project team participants included:

- Tim Steinberger, City Dept. of Environmental Services
- Jack Pobuk, City Dept. of Environmental Services
- Markus Owens, City Dept. of Environmental Services
- Eldon Franklin, City Dept. of Design and Construction
- Carl Arakaki, City Dept. of Design and Construction
- Dennis Kaneshiro, City Dept. of Design and Construction
- Guy Inouye, City Dept. of Design and Construction
- Wes Yokoyama, City Dept. of Design and Construction
- Emily Dong, City Dept. of Design and Construction
- Austin Wong, City Dept. of Design and Construction
- Russell Nour, City Dept. of Design and Construction
- Jay Hamai, City Dept. of Design and Construction
- Richard Harada, Wilson Okamoto Corporation (WOC)
- Earl Matsukawa, WOC
- Laura Mau, WOC
- Tracy Fukuda, WOC
- Yukino Tanaka, WOC
- Ivan Nakatsuka, Austin Tsutsumi and Associates
- DeAnna Hayashi, Austin Tsutsumi and Associates
- James Kwong, Yogi Kwong Engineers
- Devin Nakayama, Yogi Kwong Engineers
- Woodie Muirhead, Brown and Caldwell
- Berna Cabacungan, Earthplan

Guest: Charlotte Lyman

Welcome and Introductions

Tim Steinberger, Director of the City Department of Environmental Services (ENV), opened the meeting and thanked everyone for participating. He noted that ENV is the environmental arm of the City, and the owner and operator of wastewater facilities.

Each person did self-introductions.

Recap of Meeting 1 and Homework Results

Berna Cabacungan reviewed the first CWG workshop and the three items of "homework" that CWG members were asked to address. These items included 1) a description of how CWG peers and neighbors might react to the three planning scenarios, 2) revisions to the draft guiding principles, and 3) questions and topics CWG members wanted addressed in future meetings.

She reviewed the agenda for this meeting. She noted that there was a strong theme of CWG members wanting to see a "third alternative" in both the previous meeting and in the homework results. The agenda for this meeting therefore focuses on a discussion of project alternatives.

The revised guiding principles, including a new principle, were presented based on the homework and CWG members were asked to make final revisions for the next meeting. In addition, questions and topics raised by CWG members were categorized, and Berna indicated when each topic would be addressed in this and future meetings.

Preliminary Community Values

Berna presented a list of common themes that emerged in the Big Picture scenario exercise of the previous meeting. These included:

- Construction cost
- Construction impacts on neighborhoods
- Construction impacts on Kaneohe Bay
- Footprint for construction staging area
- Technology precedence
- Reliability/ fail-safe
- Monitoring capability
- Life expectancy
- Storage capability
- Operations and maintenance costs
- Energy requirements
- Future reuse potential
- Cultural impacts
- Time frame for construction
- Compliance with current stipulated order
- Operational impacts on neighborhoods (odor, noise, visual)
- Impacts on rates and taxes

These values will be used in the City's evaluation of project alternatives. CWG members will be asked to weigh and evaluate these values relative to each other using the pairwise comparison method that will be explained at the next meeting.

EISPN Purpose and Studies

Earl Matsukawa reiterated EIS information from the previous meeting and discussed the purpose of the Environmental Impact Statement (EIS). He provided an overview of standard EIS requirements, including a discussion of options to the proposed alternatives and an analysis of public policies. He noted that, in addition to the standard areas of study, the EIS for this project will include findings of specialized studies, including a noise impact analysis, a vibration analysis, archaeological and cultural assessments, an economic analysis, a study of aquatic biology and water quality, and an evaluation of impacts related to construction traffic. He then provided an overview of landownership and neighborhoods in the affected environment.

Questions, comments and responses on his presentation are summarized as follows:

- Where is the EISPN available?
  - *Response:* The document is available at the Kaneohe and Kailua libraries and downloadable from OEQC's website. Tracy Fukuda will send the link to download.
- It seems like the EIS is focusing on the two major alternatives. Is it possible to revisit the other alternatives that were raised at the last meeting?
  - *Response:* This was a strong concern expressed at the last meeting. We will spend a lot of time talking about it tonight.

How Alternatives Were Selected

Earl reviewed the consent decree and subsequent stipulated order that led to the force main project. He also noted that the gravity tunnel alternative was developed after the force main alternative and that both alternatives are the subject of the EIS.

He explained that Yogi Kwong Engineers (YKE) and Austin Tsutsumi & Associates (ATA) conducted a thorough evaluation of eleven options in the force main alternative. Wilson Okamoto Corporation (WOC) conducted review of four tunnel options before arriving at the current tunnel alternative beneath Oneawa Hills. An analysis of these 15 options resulted in the identification of the two alternatives that are being evaluated in the EIS.

James Kwong provided an overview of options that were developed for the force main alternative. The initially preferred option was along the H-3 Highway alignment, The City and the consultant project team met with the State Department of Transportation and was informed that this work would not be allowed within the H-3 corridor. This option was then dropped.

James said that the project team then needed to look at other alignments for a new force main. He explained that the initial 3,000 - 4,000 feet of each of the land-based force main options share the same alignment. Along this segment there are many utility lines within a shallow, narrow easement and/or right-of-way (ROW). Major sections of Kaneohe Bay Drive would have to be closed during construction, and approximately 40 private properties between the Bay View Golf Course and the YWCA would need to be condemned in the narrower areas.

In addition, in the land-based force main options, the proximity of the existing force main and construction activities of the new force main could endanger the existing force main. Should any disruption or damage to the existing force main occur, this would result in a potential leakage of one million gallons per day. Based on other force main breaks, it is estimated that it could take approximately seven days to repair the broken force main. This means that approximately seven million gallons of wastewater could spill during the repair period.

To avoid impacts on the existing force main, an additional temporary force main would be required to allow continued operations, A floating temporary bypass in Kaneohe Bay would require concrete block anchors and wave action would also be concern because the temporary bypass could be damaged and/or break. Further, there would likely be navigation issues. As a result, the option is to place temporary bypass under the sea floor of Kaneohe Bay for all of the land-based force main alternatives. He noted that the additional cost of this temporary force main is $40 million.

James described a land-based option for new force main that would traverse Kaneohe Bay Drive. Given the limited ROW and insufficient work areas, major roadway closures would be required. He further noted that there are numerous sub-surface and overhead utilities along this corridor and utilities may need to be relocated.

He discussed another land-based force main option on Mokapu Boulevard. He noted that Mokapu Boulevard is very busy during peak traffic and that street closures would be required during construction, as well as condemnation of private property.

A variation of the Mokapu Boulevard option is to follow Kawainui Canal rather than traverse Mokapu Boulevard. However, it is likely that the canal banks cannot support construction vehicles and activities. Private properties adjacent to the canal would therefore need to be acquired so that a construction staging area can be established.

James concluded that, given the limitations of the land-based force main options, a force main under the floor of Kaneohe Bay was selected for further study in engineering and environmental studies.

Earl presented how options were developed for the gravity tunnel. He explained that the tunnel alterative is intended for gravity flow. He noted that four options were considered, including 1) one that would begin in Kaneohe Bay and traverse on land, 2) one that would be located under the sea floor of Kaneohe Bay, 3) one that would generally follow Kaneohe Bay Drive and 4) one that would go through Oneawa Hills.

The determining factor for selecting the Oneawa Hills alignment for further study is soil condition. The first three gravity tunnel options would be through variable soils, which means that the tunnel boring machine would need to change cutter heads several times during construction. This would be time consuming, costly and generally inefficient.

In the Oneawa Hills corridor, geologic conditions are favorable for the tunnel alternative. Existing conditions are 95 percent basalt, which would require fewer changes of the cutter heads.

The gravity tunnel would start at 38 feet below sea level at the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) and end at 65 feet below sea level at the Kailua Regional Wastewater Treatment Plan (WWTP).

Questions, comments and responses are summarized as follows:

- The EISPN doesn't mention testing for earthquakes. I live in the Oneawa Hills area and my lanai cracked in previous earthquakes. I'm concerned about drilling because I live in a brick house. Is WOC or the City going to build me a new house? You should know the severity of earthquakes.
  - *Response*: We will address vibrations and earthquakes in the Draft EIS. Typically, the EIS has a section on seismic impacts based on earthquake ratings. Also, the EIS will have a study on vibration impacts.
  - *Response:* We did consider how the pipeline would perform under earthquake loading. The force main as proposed has been designed within the stiff clay to the extent possible. If you are deep down especially in the force main tunnel, case history shows that pipe does better. We are performing engineering analysis to confirm the pipe will perform satisfactorily during a credible worse case earthquake.
- I heard there will be blasting. Will you be blasting be during the entire construction period?
  - *Response:* There will be no blasting for force main alternative under Kaneohe Bay.
  - *Response:* There will be initial excavation for the gravity tunnel to get the machine under rock. Engineers are considering controlled blasting to shatter the rock to get deep enough to construct the tunnel shaft at the Kailua WWTP.
- When was the stipulated order signed?
  - *Response*: May 2007.
- It has taken three years to get to this point with the deadline of 2014?
  - *Response*: The consultant contract for the force main with ATA was awarded at the end of 2006 and planning proceeded shortly thereafter. A lot of planning work was required over a period of more than two years before being able to proceed into the design phase. Design has been for about a year and the force main is at 70 percent design stage.
  - *Response:* In addition we waited almost nine months to obtain U.S. Army Corps of Engineer (COE) permits for the bay borings. The last boring was completed last week.
  - *Response:* ATA was proceeding with the EIS for the force main alternative when the gravity tunnel alternative became a viable option. WOC came on board last year to do the EIS for both the force main and gravity tunnel alternatives.
- I reviewed the guiding principles and want confirmation that they apply to everyone involved, including the Core Working Group (CWG), the City, and consultants, and apply to the process as well as the project.

- *Response*: Confirmed.

- The change to "major alternatives' in the guiding principles doesn't address that other alternatives should be brought back for consideration. The disadvantages of the dropped alternatives seem heavily weighted when compared to the alternatives selected for further study. For example, when you talk about the eliminated alternatives, you use "condemnation." When you talk about the selected force main alternative, you use "easement." All alternatives need to be fairly weighted. I also question the fairness of the cost estimates.
  - *Response:* We understand that you want to see a fair comparison of all alternatives and will work on that.

- I am still troubled by the weighting of the advantages vs. disadvantages.
  - *Response*: Initially, the force main was the only alternative, and the Kaneohe Bay alignment was selected for further study. The City is looking at the tunnel to look at the best way to use public monies in improving the wastewater system. The EIS will document the process of selecting the two alternatives, and will not fully assess the options that were eliminated.
  - *Response*: To clarify the land requirements, a small sliver of land near fishpond is not other wise usable, so the City is negotiating with Bay View. The Navy is also cooperating. We stress the condemnation of private property because City doesn't want to force people out of homes. Even with dominant domain, that doesn't mean that the City has the right to force people out of their homes.

- I would like you to clarify that there might be a better route that would require less relocation.
  - *Response:* The Mokapu Boulevard option has the least impact on affected properties. We would need to build the temporary bypass first, and this would require an extension of the consent decree deadline.

- Isn't a pump station required for the various options?
  - *Response*: A new pump station is not required for the force main alternative.
  - *Response:* For the gravity tunnel option, a pump station is not required because it is a gravity tunnel. The gravity tunnel would begin at 35 feet sea level (Kaneohe WWPTF), and flow downhill to 65 feet below sea level to the Kailua WWTP. There is a pump station at the shaft at Kailua WWTP.

- I appreciate your presentation of how the alternatives were studied. The two alternatives that are being studied are very different from what we have now. It's scary for everyone. The CWG and the public need to get over the fear through education. I think you need to look at a realistic surface route that would avoid the challenges of having a temporary bypass and still use Mokapu Boulevard. It would be tough, but it's not unrealistic to close one lane. Closure along Kalaheo Avenue was considered not impossible. People lived with it. Is there a place where we don't need to do a bypass? At least look into the option.

- *Response:* For the force main alternative, at the H-3 end, for about 1,500 feet or so, we would be getting into basalt. For horizontal directional drilling (HDD), which we talked about the last time, the effective pull length will be shorter because the drill hole in basalt rock is expected to stay open. Also a long section of the HDD alignment is expected to be drilled in stiff clays, about another 4,000 – 5,000 feet of the drilled alignment can probably be maintain as open hole, as a result, geotechnical concerns are less for the long pull. Based on the information obtained and feasibility discussions with HDD contractors we have a high level of confidence that contactors will bid the project. But basaltic rock is considered not as favorable for the force main tunnel option. We did a 3-D geophysical survey, and identified a low spot to re-align the force main tunnel option to reduce the potential for encountering basalt rock near the H-3 end of the bay crossing. I can look into an option following the gravity tunnel alignment then under Mokapu Boulevard.

- How much is the tunnel option going to cost? Is it comparable to force main?
  - *Response*: We are still working on costs. The initial cost will be more expensive than force main.

- Is there a way to go on Mokapu Boulevard without a temporary bypass force main?
  - *Response*: I will price out a combined tunnel and open trench option following that alignment, get under Mokapu Blvd. and prepare an estimate.

- On the gravity tunnel alternative, why is it gravity and not forced?
  - *Response*: The concept of the gravity tunnel was to avoid a force main. The tunnel would be sloped from Kaneohe WWPTF to Kailua Regional WWTP. This would preclude the need to pump at the Kaneohe WWPTF. Plus, peak wet weather flow results in infiltration and inflow problems. The gravity tunnel has the capacity to store wastewater during peak periods. For cost analysis purposes, the force main alternative will require equalization basin to handle the peak flows during rain events. We are currently considering 7mg reservoir and smaller facility at Kailua Regional WWTP for the force main alternative. The advantage of the gravity tunnel is that it precludes the need for equalization basins.

- Are there contractors who can do both alternatives with a high degree of confidence?
  - *Response*: Yes, we have a tunnel consultant from California. Tunnel technology has moved forward and could have cost savings in the long run.

- Does the project anticipate the increase in flow from expansion of the Hawaii Pacific University (HPU)?
  - *Response*: HPU has built a force main from HPU campus going to our pump station at Halekoa. HPU will connect to the City's system. The City Department of Planning and Permitting issued a connection permit for HPU. HPU previously had septic tanks. We will check into future expansion plans with DPP.

- Regarding the acquisition of property from the YWCA, is this because of the mid-bay connection?
  - *Response*: We ere looking at an alignment under Kaneohe Bay from the YWCA property and closer to the shoreline because it's a shorter route. We did

exploration in this area and there are knolls of basalt rock. This would be in the drill path and tunnel, therefore dropped. Construction of the force main tunnel under the seafloor of Kaneohe Bay is designed to go around the basalt knolls.

- The EPA has accepted the force main route proposed under Kaneohe Bay. Isn't that the go-ahead to meet the deadline?
  - *Response*: The City is not required to submit force main plans to EPA for approval and we are trying to meet the deadline.
- If the under-bay alternative is already moving forward to meet the deadline, what has the past history been with EPA's flexibility in schedule? Otherwise, I question the need for the CWG to be here. If the tunnel is selected, what's the likelihood of EPA agreeing to extend deadline for the gravity tunnel. What is the history of this happening in Hawaii with EPA?
  - *Response*: This process gives the City an opportunity to assess our options. The gravity tunnel addresses the long-term benefit for storage. The City wants to take the time to see if this will work. If EPA refuses, the City will have the opportunity to petition.
  - *Response*: We're looking at minimizing environmental risk and maximizing public benefit. EPA's response is anyone's guess. EPA is interested in what the City is doing. The City is having discussions with EPA. The City needs to discuss with EPA and will petition the court if needed to request deadline extension.
  - *Response*: If the City goes with force main, the City must build storage by 2020.
  - *Response*: The gravity tunnel alternative will address need and storage.
- I have strong concerns regarding blasting near Oneawa hillside because of impacts to homes. Many are built on clay soil.
  - *Response*: The need for blasting is not certain. We still need to assess this possibility.
- Is the holding tank needed? This is the first thing to consider with the gravity tunnel alternative.
  - *Response*: Yes, the holding tank/well to capture wastewater is needed.
- Is the gravity tunnel going to be fully assessed as part of the EIS, fully evaluated with the force main?
  - *Response*: Yes.

- I have been involved with the fishpond restoration for 15 years. There have been many spills during this time. The distribution lines coming from Kaneohe plant will continue to be a concern. I am interested in whatever it will take to eliminate spills in the area. Even if the Kaneohe Plant hasn't treated sewage for a while, we've still had a lot of spills. There's been a 20-year history of spills, including 200 spills prior to the Bay View Golf Course EIS. If the force main option is pursued, there will still be a requirement to build reserve capacity for storage. The gravity tunnel option is looking very interesting to me. If Kaneohe WWPTF is decommissioned, it would eliminate the spills into the fishpond. Any alternative contributing to spills doesn't solve the problem. If you don't realize what happened, it's unacceptable to have any more opportunity to have spills and overflows. Can we find out for the record how many spills have happened in the last 20 years? We have events with close to 100-yr. flood, 10 inches of rain in 24 hour period, which is totally beyond the system's capacity. This will continue to happen because it rains a lot in Kaneohe. If we don't fix this, it's totally unacceptable. I appreciate the presentation to discuss the other alternatives and want to make sure we don't have to go through process again after this project is constructed.
  - *Response:* We will try to obtain information on previous spills.
- To reiterate, we used to have the best clamming and crabbing area near fishpond. Due to history of spills, no one can eat the seafood from here anymore. It's a cultural and natural issue to have lost that resource. Wouldn't the time extension apply to the other force main alternatives, because of the temporary bypass, not only the tunnel alternative? Out of all of the alternatives, what is the impact on maintenance? Which one is easiest and less costly to maintain? It seems to me that a shallow trench alternative would be easiest and cheapest to maintain than the force main under Kaneohe Bay or a gravity tunnel.
  - *Response*: The engineering analysis will be presented at next meeting, in which life cycle and operation/maintenance costs will be included.
- Is the force main and gravity tunnel 42-inches?
  - *Response*: The force main has 36-inch internal diameter with 42-inch steel casing.
  - *Response*: The gravity tunnel has 13-foot internal diameter.
- Once you increase capacity size, there's always more room should development happen. The bypass line could also be used for increased capacity? This is related to HPU's expansion and the non-growth of the Koolaupoko area. Does this increase capacity? I am concerned that the gravity tunnel has tremendous capacity for increased development.
  - *Response*: The gravity tunnel is sized based on DPP-based projections from the Koolaupoko Master Plan. This is what drives the design process. DPP is the land use agency that determines where growth will occur based on their long term sustainable community plan.
  - *Response:* A 7 million-gallon equalization basin would be built with the force main to accommodate peak flows. The tunnel is larger because the tunnel is also the storage, so it's accommodating the peak flows.

- The gravity tunnel will not increase capacity of Kailua Regional WWTP?
  - *Response*: No.
  - *Response*: The EPA requires that the City implements improvements but not to accommodate more development.
- What is the chance of completing either option in three years?
  - *Response*: In order to meet the deadline, the force main project needs to be bid by next spring (2011). Directional drilling under the bay would be done faster. The force main tunnel option under the bay would take longer.
- How many sewer projects have come in on time? What about the Kalaheo project?
  - *Response*: In Kailua, there was a sewer project that was on budget and on time, however it was a smaller project.
- You need to start discussion with EPA, because it will take longer than 3 years.
- What is the schedule for the equalization basins?
  - *Response*: They must be completed by 2020.
- Will there be different methodology options for other bay alternatives? Will impacts also be assessed?
  - *Response:* There are no mid-bay connections at this point, so there should be no direct impacts to the bay.
- Comment from James: We appreciate your comments and concerns. In the 70 percent plans for the force main alternative, there is leak detection at each end, no grouting, and leak detection in manholes. The mid-bay connection was eliminated. In 50 years, the city can remove the lining and last another 50 years. Cathodic protection may be available at that time and may be less expensive. We included this in the design because of comments from the CWG at the last meeting.
- If gravity tunnel leaks, will it have same detection capability?
  - *Response*: The gravity tunnel will start 35 feet below sea level and end at 65 feet below sea level. If it leaks, the pressure dictates that groundwater will leak into the pipe rather than sewer leaking out.

Next Steps

CWG members were asked to 1) modify guiding principles for final revisions, 2) review and modify the community values, and 3) provide additional questions for future discussions. They were asked to submit their responses by Monday, September 6, 2010.

Future meetings include

- CWG #3: Wednesday, September 22, 2010, 6:00 pm – 8:00 pm, Aikahi Elementary School Cafeteria

- Public Information/Scoping Meeting #1:
  Tuesday, September 28, 2010, 6:00 pm – 8:00 pm
  Benjamin Parker Elementary School Cafeteria
- CWG #4: Wednesday, October 20, 2010, 6:00 pm – 8:00 pm, Windward Community College, Hale Akoakoa

Tracy noted that the project website is under construction, and that CWG members will be informed when it is up and running.

Meeting 3 Summary

KANEOHE TO KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT

CORE WORKING GROUP

MEETING ON SEPTEMBER 22, 2010

MEETING SUMMARY

The third meeting of the Core Working Group was held at the Aikahi Elementary School Cafeteria from 6:00 to 8:00 P.M. Core Working Group (CWG) participants included:

- Lois Crozer, Sierra Club
- Mahealani Cypher, Koolaupoko Hawaiian Civic Club
- Randy Fujiki, Kailua resident
- Kathy Bryant-Hunter, Kailua resident
- Linda Goldstein, Kaneohe Business Group
- Annetta Kinnicutt, Lani Kailua Outdoor Circle
- Dave Krupp, Kaneohe Bay Regional Council
- Herb Lee, Pacific American Foundation
- Bill Sager, Kaneohe Neighborhood Board
- Myles Yamamoto, Kaneohe Neighborhood Board

Project team participants included:

- Tim Steinberger, City Dept. of Environmental Services
- Jack Pobuk, City Dept. of Environmental Services
- Markus Owens, City Dept. of Environmental Services
- Eldon Franklin, City Dept. of Design and Construction
- Guy Inouye, City Dept. of Design and Construction
- Carl Arakaki, City Dept. of Design and Construction
- Jay Hamai, City Dept. of Design and Construction
- Dennis Kaneshiro, City Dept. of Design and Construction
- Jan Dacanay, City Dept. of Design and Construction
- Gary Okamoto, Wilson Okamoto Corporation (WOC)
- Richard Harada, Wilson Okamoto Corporation (WOC)
- Earl Matsukawa, WOC
- Laura Mau, WOC
- Tracy Fukuda, WOC
- Yukino Tanaka, WOC
- Ivan Nakatsuka, Austin Tsutsumi and Associates
- DeAnna Hayashi, Austin Tsutsumi and Associates
- James Kwong, Yogi Kwong Engineers
- Devin Nakayama, Yogi Kwong Engineers
- Woodie Muirhead, Brown and Caldwell
- Steve Klein, Jacobs Associates
- Bruce Plasch, Plasch Econ Pacific
- Berna Cabacungan, Earthplan

Welcome and Introductions

Berna Cabacungan opened the meeting, thanked everyone for participating and reviewed the agenda. She mentioned that the first CWG meeting was an orientation

meeting and broad-based look at project, the second meeting focused on how alternatives were developed, and this meeting would focus on engineering aspects of project.

Other items on the agenda included a review of homework, and a description of the process for weighing community values.

Recap of Meeting 2 and Homework Results

Berna explained that in the previous meetings, the CWG reviewed and modified guiding principles and community values. The final guiding principles and community values are included in this meeting's packet.

Consultant Homework on Mokapu Boulevard Option Findings: At CWG meeting 2, the CWG asked James Kwong to look at another alignment along Mokapu Boulevard which would not require a temporary sewer bypass and have the least impact on condemnation and displacement.

James presented findings on a variation of the Mokapu Boulevard alignment. This alignment would traverse an alignment south of the existing force main and would not need a temporary sewer bypass because of its distance away from the existing force main.

It would traverse an alignment through Oneawa Hills and sections between Bayview Golf Course and Kawainui Canal would use microtunneling. Conventional drill and blast method would be used under Oneawa Hills. The segment under Oneawa Hills follows an alignment similar to the gravity sewer tunnel alternative; it would be a few feet above mean sea level and not as deep as the gravity tunnel. Once it reaches Mokapu Boulevard, the force main would be installed using open trenching. This alignment would go between and under only two homes and traverse land owned by probably one landowner.

Based on historical pricing, the following are estimated costs:

- Microtunneling segment: approximately $9 million
- Drill and blast tunneling segment with tunnel support and force main pipe: approximately $80 million
- Open trench segment: approximately $35 million
- Geotechnical investigations: approximately $3.5 million partly due to hilly terrain and the need for helicopter lifting of drill equipment and drill fluids.

The total pre-feasibility study is estimated at $160 million. The relatively high cost is partly due to the need for drilling and blasting through the mountain and allowances were given to stabilize soil conditions for sections of the tunnel.

The advantages of this alignment are that it would not require a temporary sewer bypass, and local contractors can be used. Further, work on the tunnel segment and open trenching segment can be done concurrently.

The disadvantages are that this alignment is the longest route and would need nine to twelve months to perform feasibility and design support related to drilling through the mountain after the City receives rights of entry and applicable permits are obtained. Compared to the Kaneohe Bay alignment, this alignment would need 24-7 tunneling work to meet consent decree deadline. In addition, time is needed for permits and easement acquisition. Further, design-phased geotechnical investigation would delay bid and construction dates, resulting in a force main construction time frame that would not meet the consent decree deadline.

Questions, comments and responses are summarized as follows:

- We appreciate that you did your homework. I am surprised that there is an $80 million price tag for the tunneling effort. Why can't we just follow the original Mokapu route?
  - *Response:* In the original Mokapu route, we would still be working near the existing force main, and a temporary sewer bypass would be needed.
- Is it two or four lanes? Is it too narrow? Can it be done with simple trenching method?
  - *Response:* In the original Mokapu route, there will be several areas where the proposed force main would have to cross under the existing force main. While portions along Mokapu Boulevard allows for open trenching, other areas are still narrow.
- Is the micro-tunnel for this force main alignment comparable in price to the cost of the gravity tunnel? Is this an apples to apples comparison to the gravity tunneling alternative?
  - *Response:* If ground conditions are similar, the order of magnitude costs are similar. For the drill and blast method, there isn't much information on the geologic conditions for this alignment. If the ground condition is better than expected, it may be less costly.
  - *Response:* This alternative route is similar to the gravity sewer tunnel route. The difference is this route is staying at sea level, while the gravity sewer tunnel is going deeper. There will be substantial requirements for staging of tunnel equipment and operations at the Mokapu end of the tunnel.
- It would be good to see the comparison between this alternative and gravity sewer tunnel. There are sections that could use the same alignment. Some sections would be close to the existing force main, right? Are those areas narrow or are there large shoulders? The biggest cost is the $80 million for 10,000 feet of tunnel. Is there a way to avoid $80 million and use on-grade only from Kaneohe Bay Drive? Is it more expensive than tunneling through the mountain? It's probably easier to maintain a pipe that's accessible.
  - *Response:* The key issue is the need for a temporary bypass. It ultimately boils down to exposures to the risk of damaging the existing force main and resultant spills into the bay and who takes responsibility. It is not advisable to transfer this risk to the contractor. Based on past experience, the contractor will try to shift the risk back to designer/client.

- What happened at the Ala Wai? Was a bypass needed?
  - *Response:* Yes is a bypass in the canal. A portion of the pipe was sunken in the water all the way to the Ala Moana Park.
- Is that line temporary or permanent?
  - *Response:* It is a temporary solution and will be replaced by the permanent force main. It will be removed after construction of the new force main.
- This is the force main versus gravity sewer tunnel. The force main has no reserve capacity for peak flows? Does this mean that the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) will continue to stay open? I understand that the gravity sewer tunnel alternative would close the Kaneohe WWPTF.
  - *Response:* The Kaneohe WWPTF would remain open with the force main alternative and close with the gravity sewer tunnel alternative.

Consultant Homework on History of Spills: Richard Harada summarized the history of spills from 2000 to present based on data provided by the City. He provided data for both the Kaneohe WWPTF and Kailua Regional WWTP. The larger spills were unusual events.

There were no questions regarding history of spills.

Prioritizing Community Values

Berna noted that, in the previous meeting, preliminary community values were presented. The community values were modified and two more values were added based on the comments received by the CWG. Berna explained how to do the pairwise assignment. There are three parts of the assignment: 1) a list of community values and definitions, 2) instructions, and 3) the pairwise worksheet.

It was noted that the pairwise assignment is about comparing values to each other. These are personal values, and the values of each person are different. CWG participation is vital because community values will be part of the City's evaluation of the alternatives. The CWG is broad-based, and more participation will be a good reflection of values important to this group.

Questions, comments and responses are summarized as follows:

- I have a question about timeframe for construction. Timeframe is cost because there are fees if you go over the consent decree deadline. Are there hidden things that we should discuss?
  - *Response:* There is a list of definitions that clarifies the terms. If you have questions, please contact Tracy.
- In regards to cost of operating project and maintaining system, I'm concerned about maintenance cost once it's in place. Is this included?
  - *Response:* Yes, maintenance cost is included with the operational and maintenance costs (O&M). Construction cost and OM cost are distinguished.
- Results of tabulations will be compiled. How will it be used?

  - *Response:* Tabulations will be included in the EIS. The City will have a list of community values that they will see on a broad based level which ones are the most important.
- I'm concerned if the CWG is not reflective enough of the broader community.
  - *Response:* Collectively, the CWG is very broad based. Even though everyone may always not be present, there are people who do homework even if they can't make it to all the meetings.

Status of Engineering Analysis

Earl Matsukawa presented the design analysis for the alternatives in terms of: 1) Technology and Construction, 2) Operation Implications, and 3) How Cost Factors are Being Analyzed.

Earl reiterated that the design parameters for the project are based on the Koolaupoko Sustainable Community Plan (SCP) and the City's Infiltration and Inflow analysis (I/I Plan). The cost analysis for the two alternatives is being refined based on many design, construction and operational factors.

The project is taking three-prong approach:

1. Community Outreach: Involves the CWG meetings, meetings with stakeholders and public information meetings. For stakeholder meetings, notices to landowners have been sent out especially for gravity sewer tunnel alignment. There are two public information meetings. The first is an information and scoping meeting on September 28, 2010. The public meeting will identify issues that the public feels need to be addressed
2. Environmental Impact Statement (EIS): The EIS will assess environmental and social impacts for both alternatives.
3. Preliminary Engineering Report (PER): The project team is still working on this and taking into consideration the many factors to come up with cost.

The force main alternative is moving forward to meet the consent decree, however the City is looking if gravity sewer tunnel as another alternative. If the City decides it's a viable option the City needs to petition Environmental Protection Agency (EPA) and the Court. Until then the City is still moving forward with force main.

Technology and Construction: Force Main Alternative

James stated there have previous force main projects crossing bays including Pearl Harbor, Ford Island, and Hart Street on Oahu. The ground condition is similar to Kaneohe Bay.

James referred to photos while explaining the Horizontal Direction Drilling (HDD) method and experience with other projects. The HDD starts off with drilling a pilot hole by using a 6 - 9 inch pipe. There is a sensor at the tip of the drill which keeps the drill on alignment. Upon day lighting at the other end, a reamer will be passed back through the pilot hole. Then a swab is passed back making the hole larger and pipe pull back will

begin. The pipe will be pulled back from golf course side. The golf course will be used as a staging area where the pipes will be laid out and stored.

James referred to photos showing examples of equipment, drilling pilot holes, reamer, pipe staging area, pull back casing. HDD would cost less than hybrid tunnel.

If the City is unable to stage at the golf course, the hybrid tunnel method would be implemented. Conventional tunneling involves segmental liner (started in 1960s) and microtunneling (started in 1980s). Microtunneling method has been used for sewer projects in Kailua. A microtunneling machine is used to install a steel casing. When the alignment starts curving, segmental liners are placed. For the hybrid tunnel, the alignment has been realigned to avoid the basalt area near the Kailua end.

Technology and Construction: Gravity Sewer Alternative

Steve Klein presented the gravity tunnel alternative. The alternative involves a 3 mile tunnel that would convey wastewater by gravity from Kaneohe WWPTF to Kailua Regional Wastewater Treatment Plant (WWTP). The tunnel is designed to also store peak flows. The tunnel is about 30 feet deeper at the Kailua WWTP than the Kaneohe WWPTF to provide positive slope for conveying the flows by gravity. The alignment mainly goes through strong basalt bedrock. The exception is the last 800 feet of the tunnel adjacent to the Kanoehe WWPTF where weak, saturated soil deposits (soft ground tunneling conditions) will be encountered. Overall about 95% of the alignment is in basalt and about 5% is in the soil deposits.

There will be a tunnel drop shaft constructed at the Kaneohe WWPTF to divert the flows into the gravity tunnel. Existing lines will be redirected to the tunnel drop shaft. The tunneling work will be initiated at Kailua WWTP from a vertical shaft that will later be used for construction of the influent pump station. This shaft will be about 90 feet deep and 80 feet wide. Abandoned facilities at the Kailua WWTP will be demolished to create space for construction staging.

Steve generally described the proposed construction methods and equipment using a series of photographs and a video.

Steve explained how the rock is excavated mechanically by cutters at the front of the tunnel boring machine. The machine is pushed against the rock applying a pressure to the rock and the cutterhead is rotated which cuts the rock into small chips. The excavated rock fragments are picked up by buckets and conveyed to the back of machine via a conveyor. Sometimes the tunnel may need support, so rock bolts, wire mesh, steel ribs/arches are installed r along the circumference of the tunnel. The tunnel boring machine advances like an inch worm. Side grippers are pushed again the tunnel wall which supports the machine as it is pushed forward. After each advance cycle the grippers are retracted and the body of the machine slides forward, then the side grippers can be extended again and the cycle repeated.

At west end of the tunnel next to the Kaneohe WWPTF, jet grouting methods are proposed to stabilize the weak, saturated soils. This portion of the tunnel will be excavated from the Kaneohe WWPTF to meet up with the rock tunnel being excavated from the other end. Steve referred to several photographs showing the proposed

approach for this section of the tunnel, and the slurry wall method proposed for the drop shaft at the Kaneohe WWPTF and the shaft for influent pump station at the Kailua WWTP.

Operation Implications

Earl summarized the operational implications and cost and schedule for the two alternatives. Earl reviewed the history of O&M cost (2005 – 2010) for Kaneohe WWPTF. The cost varies year to year because costlier improvements (construction and/or maintenance) may occur during certain years and cost of electricity is higher some years and lower for some. The cost for the two alternatives is still being refined.

Earl explained how the overall system would function regardless of construction method:

- Operational implications for the force main: 1) existing force main kept in place, 2) equalization basins at Kaneohe WWPTF and Kailua Regional WWTP (constructed by 2020 and subject to EPA approval), and 3) Kaneohe WWPTF effluent pump station improvements.
- Operational implications for the gravity sewer tunnel: 1) Kaneohe WWPTF decommissioned, 2) existing sewer lines discharged to tunnel shaft, 3) existing force main kept in place for emergency, and 4) new influent pump station at Kailua WWTP.

How Cost Factors Are Being Analyzed

Bruce Plasch explained the cost analysis being used to systematically compare the force main and gravity sewer tunnel. Final costs will not be presented at this time, as project team is still looking at all of the variables and factors to be considered in the analysis.

The objective of the analysis is to find the least expensive alternative over the long term. Bruce gave an example on determining what car to buy, a standard or high-tech car. The buyer considers the initial cost, financing, O&M, and longevity. By considering all of these factors and calculating annual payment, the buyer identifies which car is least expensive.

In the cost analysis, forecasts over the life of each alternative are analyzed. There's many other factors to consider such as construction costs (new and replacement), equipment costs (new and replacement), operations and maintenance, and total cost by year. There are bout 70 components to look at for the analysis.

Calculating annualize cost includes looking at debt service (principal and interest) on construction and equipment, "average" operation and maintenance cost, and total annual cost. By doing these calculations, the alternative with the least annualized cost will be identified.

In addition, a sensitivity analysis is conducted to test the results. If results are the same, then the analysis is complete. If the results change, then the analysis will be refined.

Questions, comments and responses are summarized as follows:

- For the gravity sewer tunnel, will the Kaneohe WWPTF be decommissioned or will there be a bunch of pipes left?
  - *Response:* Existing pipes will be redirected to tunnel shaft and there will be odor control equipment left and Kaneohe WWPTF decommissioned.
- If we say it will cost $600,000 in 2010, it will be different in 2020. How will your study look at that?
  - *Response:* There are two ways of analyzing costs: 1) assume inflation and use a discount rate that includes inflation, or 2) ignore inflation, use the current value of dollars, and use a discount rate that excludes inflation. The two approaches are equivalent. The second approach is the more common.
- Are you doing economic analysis on just the two main alternatives or are you including Mokapu Boulevard force main alternative too?
  - *Response:* So far it's only on the two main alternatives.
- When we talk about equalization basins, are we talking about an open pond? Or is it contained? What does the equalization basin look and stink like?
  - *Response:* The equalization tanks will hold excess flows during wet weather. The tanks are concrete, will be covered and both will be partially buried. Odor control equipment will be used to counteract the odor impacts.
- What kind of footprint will the basins have?
  - *Response:* At Kaneohe WWPTF, the equalization tank will be about 300 feet by 200 feet rectangle. Kailua will be about 250 feet by 100 feet.
- Is there enough room at both sites?
  - *Response:* Yes, there is room and no additional land will be required.
- Do the tanks have floating tops?
  - *Response:* There will be no floating top. It's a regular concrete cover.
- We're comparing apples to oranges. The gravity sewer tunnel will be sized for the excess storage capacity, while the force main will not and it will be accommodated by equalization basins. Why don't you make gravity sewer tunnel smaller and use equalization basins? Why don't we reduce the gravity sewer tunnel to match the size of force main? How often will equalization tanks be used? Can you make the gravity tunnel smaller? If you vary the tunnel and force main sizes then does it vary the cost to build and operate either alternative?
  - *Response:* The force main plus equalization tanks and gravity sewer tunnel, both will give the same result to convey and handle overflow. So both alternatives give the same result.
  - *Response:* The equalization basins are only used to store wastewater during wet weather flows.
  - *Response:* We can't make the tunnel much smaller. It's a little larger than the minimum size. Incremental cost savings is not that much. A 14 foot tunnel is

being proposed and it could be reduced to 12 to 13 feet, but it won't save too much. It's a benefit of using the tunnel in the first place.

- Is the tunnel fairly standard? Has it been done before?
  - *Response:* Yes, we've done it in Chicago, Milwaukee, Cleveland, and San Francisco.
- So it's a tested method?
  - *Response:* Yes.
- The other part of the question is why the tunnel can't be smaller. Why can't we make the force main bigger to eliminate the equalization basins?
  - *Response:* It has been discussed and there are issues with the pump station. Also discussed the possibility of the hybrid option so over time the City could change to force main.
  - *Response:* This project would require additional work to get to the pump station. A whole round of evaluation would be required.
  - *Response:* To put it into context again, when expanding the force main, the rain doesn't come all the time. It's to catch flows at the rate it was designed for. It's part of the design requirement to accommodate spillage for wet weather flow. It's not to capture the rare storm events.
  - *Response:* The reason why the gravity sewer tunnel can be storage is that there's a big air space to fill up. The force main is completely filled with water with no air space so no matter how big the force main diameter is, there's no air space and no cushion.
- What is the life expectancy of force main and gravity sewer tunnel?
  - *Response:* Design life for gravity sewer tunnel is 100 years; for the force main, 50 years.
- The gravity tunnel has capacity to store wet weather flow. How is this estimated?
  - *Response:* The size of the tunnel is based on wet weather flow data from i/i plan.
- Can extra storage be used to accommodate future development?
  - *Response:* Average daily flow is based on the Koolaupoko Sustainable Community Plan (KSCP).
- Which Koolaupoko SCP numbers were used? I have concerns about the potential for future development despite limitations based on the Kooloupoko SCP.
  - *Response:* The data is probably based on 2000 census, and not current census. Environmental Management (ENV) uses the numbers that the Department of Planning and Permitting provides.
- Can I assume the formula is based on the current load plus storm wet weather flows? With zero additional growth? We have to consider natural growth but it is DPP's estimates, right?

- *Response:* Yes. This project is only about conveyance. With population growth, the Kailua WWTP will need to be expanded, not the force main.
- *Response:* There are no plans to expand the Kailua WWTP, which ultimately limits future development plans.

- What connects the segments liners in the force main alternative?
  - *Response:* Stainless steel bolts, reinforced concrete, and rubber gaskets connect segmental liners. Reinforced concrete provides longevity. The force main is a separate pipe. The liner should last 100 years. The design life for force main is 75 years.

- So this will withstand a salty environment? Can't seawater pass through concrete?
  - *Response:* The rate is very slow. The force main will be placed deep below the seafloor. Inside the segmental liner, it will be filled with fresh water for equilibrium with the exterior environment. Therefore migration of water from outside of the concrete liner to the annulus space inside filled with potable water should not happen.

- For clarification, regarding the two-year difference in start up dates between both alternatives, what is the reason for the two year delay?
  - *Response:* The force main was already underway. The tunnel alternative came later. To meet 2014 deadline, the force main alternative must continue to go forward. There is no way for the gravity sewer tunnel alternative to catch up and meet the 2014 deadline. In addition, still need studies, design work and permits.

- The gravity tunnel has nice elements and is appealing. Like the idea of decommissioning Kaneohe WWPTF. Also understand Oneawa Hills residents' concerns about vibration impacts. What do we know about the potential vibration impacts due to blasting?
  - *Response:* There will be slight vibration created by the tunnel boring machine. For a similar tunnel project in San Francisco, when the tunnel was greater than 100 feet deep, we didn't feel any vibration at the ground surface above the machine. When machine is launched at Kailua, it's at a depth of 80 to 90 feet. By the time we reach the first house it's at a depth of 100 feet or more, so we don't anticipate any significant vibration impacts. By the time we get past the homes, residents should not feel vibration at all. Limited blasting is proposed, using delays to minimize detonation at any given time. Most of the blasting will be at Kailua end within the treatment plant site. We need to do a study to address the specific concerns. For the San Francisco project this involved pre-construction surveys, vibration monitoring, and schedule coordination with residents.
  - *Response:* Noise and vibration studies will be prepared for the EIS. The noise consultant will be at next week's public information meeting.

- Soils on Kalaheo Hillside have long history of movement. Is there any risk that boring under will exacerbate or risk additional soil movement?

  - *Response:* The small vibrations generated by tunneling should not have any impact on the stability of the slopes above the tunnel. Frequently, stability problems occur during very wet, rain storms. Since groundwater will be allowed to freely drain into the tunnel, it will act as a drain and it could actually improve stability of the slopes above the tunnel.

- Will the main two alternatives employ local labor?
  - *Response:* The City must comply with Act 86 which requires 80 percent local labor. This will increase the directional drilling cost because they import labor from the mainland. But they can also fill the requirement with local apprentice labor. But the key contractor personnel must be very experienced.

- The idea is to keep the taxes here so the income stays here.
  - *Response:* Yes, I'm certain the requirement will be in there and it will be scrutinized.
  - *Response:* Gravity sewer tunnel is very specialized and will require skilled trained labor. Supervisors and management personnel will come in from the mainland with some skilled labor to train local labor. It will be a blend of both. If the City has an 80 percent local labor requirement, then the project we will need to meet the requirement.

- I want to make sure the EIS will evaluate both alternatives and will include costs and for both.
  - *Response:* Yes, both will be examined in full detail. Other alternatives will be discussed to explain the process of arriving at the two alternatives.

- If it's not in the EIS, the City will be way behind. So whatever decision the city makes, they don't have to go back to reassess the tunnel.

- Are we comparing apples to apples? Will the cost for the equalization basins be disclosed with the force main alternative costs in the EIS? We need to compare costs equally at the same level.
  - *Response:* We need to discuss costs in the EIS. But it's not the focus of the EIS. The real analysis for the costs is with the PER.

- So the reservoir for the force main will really not be part of the EIS?
  - *Response:* Yes, we are covering it too so that in the future, the City can build the basins later.

- Is there a seven year shelf life for EISs?
  - *Response:* It's been the debate.

- Again there will be costs in the EIS in terms of equalization basins?
  - *Response:* The best cost estimated costs available at the time of the EIS will be included. The costs will be refined in the PER.

- Is the Mokapu route totally abandoned?
  - *Response:* Yes.

- *Response:* It won't meet the consent decree deadline.

- Neither does the tunnel.
  - *Response:* The City is pursuing the force main Kaneohe bay alternative. The project team looked at Mokapu alternative at the request of the CWG. The other force main alternatives will not be assessed to the same degree as the main two alternatives.
  - *Response:* As far as the force main alternative is concerned, EPA will not give an extension to change the route. The force main has already been mandated and the City is on its way to fulfill mandate. EPA would not entertain an extension just because of another route.

- Length of gravity sewer tunnel is 3 miles long and has 13-foot diameter. From previous meeting, the cost of gravity sewer tunnel is $80 million. Today you're saying the cost of the Mokapu Boulevard alternative 8,000 feet, 8-foot diameter tunnel is $80 million for a shorter length and smaller tunnel. How can that be?
  - *Response:* Yes, because the drill and blast method is going through rock and would progress slower. Mechanized tunneling can be faster if the ground conditions are suitable. The cost estimate was derived with very little boring information. Ground conditions at certain sections and particularly under Mokapu off ramp is expected to be horrible, as the embankment may be creeping due to the existing cracks and uneven road surface and the ground conditions may not be the same as the gravity sewer tunnel. The ground conditions may not be entirely the same and tunnel stabilization needs are included in the estimate. The cost for this alternative comes out to about $8,000 per foot.

- Do we need a tunnel and not just a pipeline? Upon reaching the top of Mokapu Boulevard and Kaneohe Bay Drive intersection the sewer can be conveyed by gravity and a pump station would not be needed at the end of Mokapu Boulevard to pump sewer up. There may be some cost savings there.
  - *Response:* We need to build the pipeline 10,000 feet underground by either tunnel or directional drilling. In addition, there's no staging or pull back area for that length of pipeline for an HDD option. There may be some cost savings, maybe $10 million, but it's dependent upon geologic conditions and type of equipment used. The difference between this alternative and the gravity sewer tunnel alternative is that the latter has no liner support and going deeper for better anticipated ground conditions. This alternative isn't going as deep as the available information is limited and the geologic conditions may not be ideal.
  - *Response*: In order to use tunnel boring machine, the geologic conditions must be suitable. There's uncertainty with Mokapu Boulevard with regards to geologic conditions. The other factor is this method needs at least two acres for staging near the entrance of the tunnel. It doesn't really look like there's enough space at either end of the tunnel to support a tunnel boring machine operation. Also you need at least a year to fabricate the tunnel boring machine. If the gravity sewer tunnel is chosen, the tunnel shaft can be constructed while the tunnel boring machine is being fabricated. The force main alternative is trying meet the consent decree deadline and doesn't have the option to wait for tunnel boring

machine to be fabricated. The economics could change if the geology was found to be favorable, and adequate staging area and time was available.
  - *Response*: It doesn't' seem likely that the cost could be reduced by a factor of two to get it down to the cost of the other force main alternatives.

- For the force main, once completed, if there's a leak because of the pressure, what kind of technology is there to quickly respond to the fix
  - *Response:* Casing pipe will be minimum of 1 inch thick steel pipe deep in the ground. Corrosion rate is expected to be very slow due to embedment in clays and rocks under the bay and PVC pipe will have design life of 75 years. If the City decided to change the pipe in 50 years, the steel casing will still be there for the replacement. Annulus space will not be grouted and will be filled with fresh water. Provisions to monitor potential leakage can be provided to detect pressure changes caused by leaks. Areas where the steel casing gets close to sea level, we will encase the underground pipeline with concrete.

- Seems like the City is taking extra precautions to ensure that it won't happen, but things sometimes go wrong. If so, how quickly will we be able to respond? What technology do we have to detect and fix.
  - *Response:* When leakage is detected, some pump stations switch off. Leak could be addressed in one to two hours. EPA will require both force mains to remain open, maintained and exercisable.

Next Steps

CWG members were asked to do pairwise assignment and to submit to Tracy by Monday, October 4, 2010.

Future meetings include:

- Public Information/Scoping Meeting #1:
  Tuesday, September 28, 2010, 6:00 pm – 8:30 pm
  Benjamin Parker Elementary School Cafeteria

- CWG #4: Wednesday, October 20, 2010, 6:30 pm – 8:30 pm, Windward Community College, Hale Akoakoa Room, 107/109

The CWG members were asked to network and notify others of the PIM.

The CWG members agreed to change the meeting time to 6:30 pm.

Meeting 4 Summary

KANEOHE TO KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT

CORE WORKING GROUP

MEETING ON OCTOBER 20, 2010

MEETING SUMMARY

The fourth meeting of the Core Working Group was held at the Windward Community College, Hale Akoakoa Room 107/109 from 6:30 P.M. to 8:30 P.M. Core Working Group (CWG) participants included:

- Jeff Argov, Yacht Club Knolls
- Bob Bourke, Kaneohe Resident
- Randy Fujiki, Kailua resident
- Dave Krupp, Kaneohe Bay Regional Council
- Herb Lee, Pacific American Foundation
- Annetta Kinnicutt, Lani Kailua Outdoor Circle
- Puna Nam, Kailua Business of Commerce
- Ken Rakta, Kaneohe Yacht Club

Project team participants included:

- Jack Pobuk, City Dept. of Environmental Services
- Eldon Franklin, City Dept. of Design and Construction
- Guy Inouye, City Dept. of Design and Construction
- Carl Arakaki, City Dept. of Design and Construction
- Dennis Kaneshiro, City Dept. of Design and Construction
- Jan Dacanay, City Dept. of Design and Construction
- Gary Okamoto, Wilson Okamoto Corporation (WOC)
- Earl Matsukawa, WOC
- Laura Mau, WOC
- Tracy Fukuda, WOC
- Yukino Tanaka, WOC
- Ivan Nakatsuka, Austin Tsutsumi and Associates
- DeAnna Hayashi, Austin Tsutsumi and Associates
- James Kwong, Yogi Kwong Engineers
- Woodie Muirhead, Brown and Caldwell
- Jennifer Honda, Brown and Caldwell
- Steve Klein, Jacobs Associates
- Aki Sinoto, Aki Sinoto Consulting
- David Shideler, Cultural Surveys Hawaii, Inc.
- Yoichi Ebisu, Y. Ebisu & Associates
- Snookie Mello, AECOS
- Bruce Plasch, Plasch Econ Pacific
- Berna Cabacungan, Earthplan

Guests included:

- Robert Harris
- Aaron Uno
- Mike Saltikov

Welcome and Introductions

Berna Cabacungan opened the meeting, thanked everyone for participating and reviewed the agenda. She mentioned that the first CWG meeting was an orientation meeting and broad-based look at project. The second meeting focused on how alternatives were developed, and the third meeting focused on engineering aspects of project. This meeting would be an overview of the EIS process and the studies being prepared for the project.

Recap of Meeting 3 and Results of Community Value Exercise

Berna discussed highlights of the previous meeting and focused on the results of the pairwise comparison homework. She noted that primary intent of the CWG is to provide the project team with a good reference for community values. The broad-based nature of the CWG will help in providing an indication of values of a cross section of the community. The pairwise comparison exercise is a way for each person to weigh each value.

Of the 23 CWG members, 14 submitted responses, which is a 61 percent return rate. The top five values expressed by the CWG included:

1. Operational impacts on water quality on Kaneohe Bay and groundwater
2. Reliability/Fail safe
3. Impacts on cultural resources and landscapes
4. Operational impacts on neighborhood
5. Construction impacts on Kaneohe Bay and Waikalua Loko Fishpond

The results of the pairwise exercise were distributed to the meeting attendees.

EIS Purpose and Process

Earl Matsukawa reviewed the EIS purpose and process. He noted that the EIS is being prepared pursuant to Chapter 343 Hawaii Revised Statutes. The EIS triggers for this project include the use of County lands and County Funds. The EIS is a disclosure document that evaluates environmental impacts of the project. It is not a permit or approval to proceed with project implementation.

He identified required contents and how these will be included in the EIS. He further explained that the project EIS will not identify a preferred alternative, but will cover both alternatives equally.

Earl noted that, typically, an EIS will have a preferred alternative as the proposed action, while other alternatives are discussed. The project for this EIS is not a single action, but rather two proposed actions.

There is no preferred alternative. The City will decide which of the two proposed actions will become the preferred action.

Because some CWG members continued to express concerns regarding the selection of the current the force main option, Earl explained and clarified the reasons why those options were not chosen. He presented a map showing the force main options and various aerial photographs of Kaneohe/Kailua area.

The Mokapu options involve constructing a one mile tunnel through the mountain. This tunnel is necessary because, due to the elevation ranges, a pump station would be required to facilitate flows over the mountain if the force main were at grade. The pump station would require acquiring land and the City doesn't have any land around the routes.

In response to a previous CWG request, a new Mokapu alignment was explored. This new alignment would involve drilling and blasting a 10,000-foot tunnel (compared to the 16,000 foot long gravity tunnel) and open trenching the rest of the way. The cost for this tunnel is estimated at about $80 million as compared to the proposed gravity tunnel, which is estimated at $100 million (tunnel portions only).

A summary table was presented for various options of the force main alternative.

Questions, comments and responses are summarized as follows:

- How does the gravity tunnel and Mokapu alternative leave the Kaneohe WWPTF? How does it get up the mountain? Does it go under Kawa Stream?
  - *Response:* The existing force main follows the golf course and goes under the Kokokahi YWCA, emerges before the houses and then proceeds along Kaneohe Bay Drive.
- Has the H-3 alternative been eliminated?
  - *Response:* Yes.
- Why aren't we showing the gravity tunnel alternative on the same map?
  - *Response:* The reason we focused on the force main options is because of the additional concerns raised in previous meetings to evaluate other force main options. The gravity tunnel was not included on the map to not to confuse the force main options.
- Do we have an EIS?
  - *Response:* The EIS is being worked on and the studies will be discussed in the following section of the presentation.

Berna concluded that the other force main options will not be discussed to the same level as the two major alternatives. There will be a discussion in the EIS on why the other force main and gravity tunnel options were not chosen.

EIS Studies

Earl presented the consultant studies that are being prepared to support the EIS. He explained that an EIS often focuses on the long-term impacts from a project. This

project, however, will emphasize short-term impacts related to construction. The DEIS will include all studies and will be published in January 2011.

EIS Studies - Traffic Impact Analysis

The construction traffic assessment will be two-fold. ATA will assess the force main and WOC will assess the gravity tunnel. A summary table on the construction truck traffic counts was presented for the gravity tunnel as an illustration of possible impacts. A similar assessment will be prepared for the force main. Steve clarified that the 150 trucks per day is assumed to be the maximum over a couple of days, and is not anticipated to occur on a regular daily basis. It is anticipated that the excavated materials will be stockpiled on site and hauled off on subsequent days. This is given as a worse-case scenario.

- Where are the trucks taking the excavated materials?
  - *Response:* A site hasn't been determined yet. Materials could possibly be used by commercial takers and reused as aggregate material.

EIS Studies - Noise and Vibration

Y. Ebisu and Associates will prepare a Noise Impact Analysis for both alternatives as well as a Vibration Impact Analysis for the tunnel alternative. Yogi Kwong has prepared a Vibration Analysis for the force main alternative. Power generators will not be used at Kailua WWTP, however ventilation equipment will be used 24/7 at Kailua and will require noise attenuating equipment to mitigate the noise impacts.

Noise sensitive uses include residences, such as Aikahi Gardens and Aikahi and Puohala Elementary Schools.

- How close will a house be to the gravity tunnel?
  - *Response*: At the Kailua WWTP, the closest home to the shaft is about 350 feet away. The shaft was moved further inside the Kailua WWT plant to increase the distance to homes. When the tunnel is under the hills, it is about 100+ feet below the any homes. Approaching Kaneohe we reach another public street (Moakaka Place) where the tunnel will be 150+ below the homes.
  - *Response:* There is a public street where the tunnel boring machine will be under.
- There will be a hole at Kailua WWTP, from there go under Kaneohe Bay and the hills. There should not be anything happening close to the surface?
  - *Response*: No. At the plant, the shaft will be excavated to about 90 feet deep and stay under the surface.
- The street I live on has just been repaved.
  - Steve: The streets will be left intact. The work will be under the street, about 100 feet below.

- Will construction be running 24/7?
  - *Response*: It is not yet been determined. We are assuming two 10-hour shifts. If impacts associated with the hours are not acceptable, the hours can be modified. Ventilation fans would be on when mining.
- Will the construction be reduced during evening hours?
  - *Response*: In the evening the ambient noise levels are low. Construction activities can be modified and mitigation measures employed in consideration of impacts.
- The main issues are related to the problem. How do we know if there will be not a lot of inflow and infiltration problems on the tunnel?
  - *Response*: There will be a liner in the tunnel to prevent groundwater inflows from infiltrating into tunnel. We would first excavate tunnel in rock, add support if required, an impervious lining will added and grouted in place. What goes in the tunnel is whatever enters the Kaneohe WWPTF at the drop structure.

EIS Studies - Archaeological Literature Review and Field Investigation and Cultural Impact Assessment

Aki Sinoto will prepare the archaeological study for the force main alternative and Cultural Surveys Hawaii will prepare the study for the tunnel alternative. Earl emphasized that the alternatives are generally well below the surface. The closest burial site is located about ½ mile from the Kaneohe PTF, while others are located a mile or more away from the project area.

The same consultants will be preparing Cultural Impact Assessments for the respective alternatives. Consultants will be following the Office of Environmental Quality Control's guidelines in preparing avcultural assessment.

Ten interviews were conducted; five for each alternative. Issues raised were impacts on Waikalua Fishpond and the effects of increased development.

- Who were the interviewees?
  - *Response*: For the force main alternative, prospective list of interviewees resulted in only five actual interviews. We had made extensive efforts to reach several people and only five responded. One interesting interview (1995) included the last caretaker of the pond, Mr. George Nomura, who gave information about the pond itself. Heavy rainfall impacted the walls of the fishpond. The 1969 Hoomaluhia flood ceased commercial operations of the fishpond. The commercial use of the pond ceased. We also interviewed Mr. Ben Wong, whose family is from the area. His grandfather is Henry Wong of Kaneohe Ranch. We also interviewed Major Miranda, retired Honolulu Police Department Officer, who lived on Coconut Island, and Kaohua Lucas of the fishpond society, as well as Mr. Fred Takebayashi, who used to live at one of the nearby ponds and has many child hood memories of the area.

- Response: For the gravity tunnel alternative the primary interviews were Mahealani Cypher, Fred Takebayashi, Alice Hewitt, Rocky Kaluhiwa, and Emile Wolfgramm, Coochie Cayan, and a dozen informal discussions.

EIS Studies - Economic Impact Analysis

Bruce Plasch will conduct economic impact assessment for the EIS. Bruce is also doing the economic analysis for the ... His analysis will include construction and operation/maintenance activities as well as an evaluation of direct and indirect impacts as they relate to construction materials sales, employment and payroll, and tax revenues.

Berna stated the project team's awareness that the CWG has previously asked for project costs, and they are working on those costs. General costs were provided for the force main and gravity tunnel options.

- What is meant by "Sales?"
  - *Response*: This is a general term for construction expenditures on goods and services that generate indirect sales. We are looking at construction expenditures as well as those generated by construction activities by the company and their employees, such as construction workers buying groceries, gas or services. These are economic activities generated by the purchase of good and services by construction workers, companies, family members. We are looking at both direct and indirect sales.
- How many local construction companies would be able to quality for a construction job like this?
  - *Response*: I know of at least one construction company that will be looking at this project, Coluccio is here on Oahu. There will be a lot of local firms that would be subcontracted. There will be some companies that will be may be based on the mainland. The gravity tunnel will use a blend of local and mainland companies.
- In terms of general contractor, is Coluccio the only one?
  - *Response*: Obayashi has done tunnels in the mainland. Kewiett Construction has also done tunnels.
  - *Response*: We are expecting Frank Coluccio Construction, Hawaiian Dredging, Kiewett, and Parsons. Quite often, in projects of this size, not a whole lot of local contractors have the capability to put up bonding. There may only be three companies that qualify.
- In having a mainland general contractor, it might have bearing on economic impact looking at the multiplier. The general will use some local subs, but it's no guarantee.
  - *Response*: Public projects end up being awarded to the lowest bidder. To do so, you have to use local companies otherwise you won't be the lowest bidder. The general contractor would provide local workers. Specialized work from mainland but other tasks could be local, like hauling, site maintenance, etc. Local union

labor will be employed, local trucks will be used. Companies must use union labor. Key people will probably come from the mainland, but the rest will likely be local.

  - *Response*: Even if we are talking about mainland companies, the three-year duration of construction will likely result in key personnel relocating their families to Hawaii. Their families will be buying local as well.

EIS Studies - Water Quality and Aquatic Biological Assessment

There are wetlands near the golf course that will be assessed. There are no threatened or endangered species that will be impacted by the project. Based on a single pull for the force main, there are no significant impacts anticipated.

- Can you give a background on AECOS and some of the projects that you've been involved with?
  - *Response:* AECOS has been in business since 1971 and have done studies throughout Hawaii and the Pacific. We are a small company of 16 people, including 3 marine biologists, 2 biologists, an ecologist, wetlands specialists, and water quality sampling and testing specialists.
- So this is a local company?
  - *Response:* Yes, the majority of our staff live in the Kaneohe and Kahaluu areas. Our office is located near Benjamin Parker Elementary School. You can go to our website: www.aecos.com
- I'm still trying to envision how the gravity tunnel will cross Kawa Stream. Will the gravity tunnel go through the 6-acre wetland at the golf course?
  - *Response*: We've shifted the alignment to avoid the wetland near the 11th hole. We also were able to thread the needle to avoid the lake. We do cross under Kawa Stream, about 35 feet, and will have to drill and angle holes beneath the stream. It's not a large stream and it's something we have to work around.

Other questions and comments are as follows:

- Where is the City in terms of design for the gravity tunnel in relation to the force main? I understand the force main design is underway.
  - *Response*: The force main is at 80 percent completion. Our goal for the gravity tunnel is to do preliminary design level, 30 percent, in the next few months for the EIS until the City makes its decision.
- Once the force main reaches 100 percent design, what is the next step?
  - *Response:* The City needs to make a decision on the alternative.
  - *Response*: The City wants to make the decision on whether to pursue the gravity tunnel by the end of the year. The key is to complete the EIS so the City can obtain permits and bid on force main.

- *Response*: In order to complete by the December 2014 deadline, we need to go out to bid by early 2011.

- How is the record of the spillage that occurs at the Kaneohe WWPTF as it impacts Kaneohe Bay? What's the history of spills in the Kaneohe Bay area and how does it relate to AECOS's study?

  - *Response:* The AECOS study does not include spills impactst. We can discuss further with AECOS. We are not looking at what was impacted in the past, but we are looking at this project as preventing future spills. The gravity tunnel will have in-pipe storage, and the force main will eventually have storage capacity.

- I'm looking at the project holistically. I'm concerned with construction as well as long-term operational costs and implications. One advantage of the gravity tunnel is that it will prevent spills at Kaneohe WWPTF, because Kaneohe WWPFT would be shut down. Its' important for the City to make the decision based on the long-term implications of the project.

  - *Response*: We will look at potential contingencies for possible future spills during construction. We can't predict if something will happen, but we can discuss what can be done if spills occur. Wastewater is transitory so we can discuss with AECOS about what kind discussion could be included.

- Don't you historical data to identify scope of project?

  - *Response*: We have data back to 2000, and are trying to get additional data prior to that from the City and will include discussion in the EIS.

  - *Response*: One of the points to make is back in 1994, requirements for reporting spills was different that current requirements. Much of the old data is not kept anymore.

- There was a 100-yr storm that created a 4-foot wall of water that came right into the Kaneohe WWPTF. It was one of three or four huge events.

- We understand that the existing force main is big enough to handle normal flows, so purpose the purpose of the project is to prevent untreated sewer flows from entering Kaneohe Bay during I/I events?

  - The stipulated order requires the City to provide a supplemental force main so that, in the event something happens to the existing force main, there is a backup. There is only one force main from Kaneohe to Kailua and EPA wanted a redundant force main. With the tunnel alternative, this would serve a dual purpose of conveyance and storage. The initial purpose is for the redundant force main.

- Do other communities have duplicate force mains?

  - *Response*: No, for example the Ahuimanu area. I don't know what the island wide situation is.

- What is the cost of this project in prevent sewage spillage into Kaneohe Bay? How many dollars per gallon? What is the value in that? It would be an interesting number to know. What is the 7 million gallon (mg) holding capacity? We know the peak flow from storms is upwards of 90 to 100 mgd. Obviously we know the 7mg tank will not hold up to 90 mgd and prevent the I/I flows into the bay.

  - *Response* The 90 mgd is a rate, whereas the 7mg is a volume. The 90 mgd doesn't occur over the whole length of the day. It's a hydrograph peak. We're not looking at the 90 mgd over 24 hours.

- This was not clear in the materials provided to me. We need to make it very clear. Excess flows will spill into the bay. We are paying a lot of money for this solution and we need to know that spills might still occur. What kind of design storm will the 7 mg tank accommodate?

  - *Response:* We will be clear in terms of the storm event that we're designing for.

  - *Response:* I'm not sure exactly what needs to be clarified. The City is set up on a 2yr, 6-hr storm. That is what is generating our numbers now, based on a previous I/I study. The City has another consultant to update the I/I study. The City is hoping to get improved numbers from the current study. So it's possible the new study could reduce the peak flows and storage required.

- One would hope that the new I/I study will. If City planning two mile tunnel under the bay that won't leak, maybe need to see how much would it cost to do the rest of the sewer system not have I/I problems, so we don't have 90 cfs coming down the pipeline. Is there another solution to the problem?

  - *Response*: In our Capital Improvements Program, we assess line pipes. That is effective in preventing spills and has cut down I/I.

  - *Response:* As a result the I/I study will understand the I/I issues better, be able to solve with lining and don't need 7 mg tank.

  - *Response*: The City has been doing sewer rehabilitation and good work to address the spill problems. The new I/I study will be reflective of that.

- This solution will go 50 to 100 years from now. This new sewer system will go for four generations. We have to predict ourselves to the future and see if there are other solutions. Otherwise three generations from now, this system will be a dinosaur and useless. I hope this will be taken into account in the economic study.

  - *Response*: We're not second guessing EPA's requirement to do this project. Storage capacity will be deferred. City is under a consent decree, which is what is driving this project now.

- This is the most critical point about the whole project. If we do the force main in 2014 when its done, if there's a big rain event (10-, 20-, 50-year is not that uncommon for the Kaneohe area), were going to have spills in Kaneohe Bay and around the ponds even after spending millions of dollars on the force main. The gravity tunnel addresses the reservoir problem to take higher inflow. We don't even

know the size and cost of equalization facilities for force main. My big concern is that the current consent decree forces the project and is favoring the force main under Kaneohe Bay because it's the only one that complies with the consent decree. But gravity tunnel is not a fair alternative because it won't meet the time frame. If gravity tunnel will be in the EIS, we should ask EPA to allow flexibility with the deadline instead of City being strapped to the schedule. I'm hearing the gravity tunnel will be on hold until the City decides on the alternative. Let the City Council decide on the alternative.

  - *Response*: When we had discussion with EPA over the last few years, we asked for flexibility for either alternative. EPA didn't like that. They wanted only one option with a firm deadline. They had doubts that the City could even build one option. We gave them a comment letter in Sept. 2010, and are waiting for EIS and PER to be completed. The City will be making a decision by the end of the year.

- It is incumbent on the community to work with the City. There was previously no support either way. Now that we go through this process, and we are informed, I feel its incumbent to be on the same side and push with you guys. We need to tell EPA this is what we want, instead of the City fighting this by itself. That's why were going through this process right? I couldn't tell from the scoping meeting, but the more people get informed about it, the more they favor the gravity tunnel over the force main. So, if there's a way to work out a win-win situation, it's better for us. If this is the community sentiment, we should go back to the EPA. We're better informed about it and can make a better decision. The force main looked better at the time before there was all this disclosure.

- Isn't the City waiting until the EIS is completed before making decision? So you're not going to have the benefit of Final EIS.

  - *Response*: Not necessarily. The two options are about the same in terms of solution, conveyance, storage, costs. But there are non cost factors. The next step is for the City to decide whether to petition the court to change the deadline on the consent decree. I'm neutral. But there are people who support one over the other alternative. There's a risk to waiting for something to be done. The City wanted to use the CWG to understand the community's concern.

Next Steps

Berna stated CWG Meeting #5 will be rescheduled from Nov. 3 to November 16 or 17. The team will present how the CWG's input will be incorporated in the EIS. The meeting will be confirmed based on venue.

Meeting 5 Summary

Kaneohe to Kailua Wastewater Conveyance and Treatment Facilities Project

Core Working Group Meeting #5

November 16, 2010

Meeting Summary

The fifth and last scheduled meeting of the Core Working Group (CWG) was held at Kainalu Elementary School cafeteria from 6:30 to 8:30 P.M. CWG participants included:

- Jeff Argov, Yacht Club Knolls
- Bob Bourke, Kaneohe resident
- Kathy Bryant, Kailua resident
- Lois Crozer, Sierra Club
- Randy Fujiki, Kailua resident
- Chester Hughes, Kaneohe Ranch
- Annetta Kinnicutt, Lani Kailua Outdoor Circle
- Herb Lee, Pacific American Foundation

Project team participants included:

- Jack Pobuk, City Dept. of Environmental Services
- Markus Owens, City Dept. of Environmental Services
- Eldon Franklin, City Dept. of Design and Construction
- Guy Inouye, City Dept. of Design and Construction
- Carl Arakaki, City Dept. of Design and Construction
- Jay Hamai, City Dept. of Design and Construction
- Dennis Kaneshiro, City Dept. of Design and Construction
- Jan Dacanay, City Dept. of Design and Construction
- Richard Harada, Wilson Okamoto Corporation (WOC)
- Earl Matsukawa, WOC
- Laura Mau, WOC
- Tracy Fukuda, WOC
- Yukino Tanaka, WOC
- Ivan Nakatsuka, Austin Tsutsumi and Associates
- DeAnna Hayashi, Austin Tsutsumi and Associates
- Woodie Muirhead, Brown and Caldwell
- Berna Cabacungan, Earthplan

Guests included:

- Aaron Uno

Welcome and Introductions

Berna Cabacungan opened the meeting and welcomed the meeting attendees. She noted that the first CWG meeting was an orientation meeting and broad-based look at project. The second meeting focused on how alternatives were developed, the third meeting focused on engineering aspects of project, and the fourth meeting focused on the EIS process and the studies being prepared for the project. In this last meeting we

will discuss how the CWG input would be incorporated into the EIS, as well as provide an update on the status of force main construction contingencies.

Recap of meeting 4

Berna explained that the CWG meeting #4focused on the EIS studies and alternatives development process. She noted that Earl Matsukawa presented oblique aerials to illustrate the land-based alternatives, including the "new" Mokapu route. These aerials showed the necessity of drilling through the mountain in all of the land-based force main routes. Consultants also attended and were available to answer questions about their respective specialized reports.

How the CWG will be discussed in the EIS

Berna stated that the CWG is not being asked to select an alternative. Rather, this group was convened to understand what is important to the community. . Understanding community values identified by the CWG is important as the City moves ahead in making a decision between the force main and the sewer gravity tunnel.

The DEIS will be published in January 2011. The CWG report will be appended to the DEIS and will include summaries of the five CWG meetings. Results of the pairwise exercise will also be included.

The project team prepared a draft report and a draft table of contents was distributed to the CWG. The last section of the report will discuss frequent CWG topics. The following six topics were highlighted:

- Impacts on Kaneohe Bay: Impacts on Kaneohe Bay during construction and operation are a concern. The importance of Kaneohe Bay was clearly identified during the pairwise exercise as two of the top five values related to impacts on Kaneohe Bay.
- Request for a third alternative: The two project alternatives are very different from each other and from existing infrastructure. The CWG requested that the City look at a third alternative and James Kwong looked at a land-based alternative along Mokapu Boulevard. Despite its elimination due to the high costs related to the need for a tunnel through Oneawa in addition to significant land-based improvements, some CWG members continue support the Mokapu Blvd. alternative.
- Vibration impact due to earth work: The CWG noted a history of earth movement along Oneawa Hills and there are concerns with vibrations due to blasting and tunneling for the Gravity Tunnel alternative.
- Usefulness of CWG input: CWG questioned the usefulness of their input into the process if the Force Main alternative is moving forward to comply with the Consent Decree.
- Need to have comparable costs for both alternatives: There is a need to compare full cost implications of both alternatives, including the cost of the equalization basins and maintenance and operational costs.

- Odor control: Odor is a historical issue near the wastewater facilities in this region, and the community wanted to make sure that odor control is incorporation in both alternatives.

The report is still being prepared. There was no discussion.

Update on the Status of the Force Main Construction Contingencies

Berna provided a background leading to the status of Force Main Construction Contingencies. The City sent out a request for information to determine the level of interest from potential contractors who might bid on the project. She emphasized that the Force Main alternative is designed to stay out of the Kaneohe Bay waters. In a project this size, however, it is expected that there will be changes and adjustments based on what the City learns in the engineering and environmental studies, and how the contractors respond to City notifications.

Contingency and risk mitigation are an important part of planning, especially for projects of this magnitude. Contingencies are intended to be for preventive and mitigative purposes. This is considered standard practice for construction contractors.

She also noted that the timing of a community outreach program for a project of this magnitude can be a challenge. There are some people who may think we convened too early (before all of the information is available) or too late (after the two alternatives were selected). We wanted to include the community values in the EIS, which is part of the process in selecting the preferred alternative. As a result, e project team t does not have all the answers and we expect there will continue to be updates.

Richard Harada presented the results of the request for information (RFI) process and the construction contingency measures. During the RFI process, potential contractors requested contingencies to implement the construction work. It is not uncommon to identify such contingencies. It is important that the City identify these measures now so that the EIS can include these measures and can be used to support permit applications. Three contingencies were described:

- Inadvertent slurry returns – Migration of drill mud (primarily bentonite clay) to the surface, commonly known as "frac-out". This may occur when unknown weaknesses in the ground or excessive drilling pressure results in the drilling mud to migrate to the surface.

  Two contingency actions can be taken if this occurs.

  - In shallow areas, the contractor would contain mud with silt curtains then remove.
  - In deeper areas, if silt curtains cannot be used, the contractor would contain the mud using a sheet pile enclosure that is brought to the site with a barge then removed.

- Unforeseen obstruction resolution – If the drill or tunneling machine (TBM) encounters a large boulder, one of the following would be implemented to address the problem:

  - Breakup obstruction by drilling holes from a barge or small craft with full casing isolation of water column
  - Remove/move obstruction away from the drill path by excavation within a sheet pile enclosure with silt curtain.

- Emergency access to in-hole tools – In the event that something happens to the drilling or TBM equipment below the sea floor, the same measures described in unforeseen obstruction resolution would be applied.

Several graphics were shown explaining the contingency measures.

Laura Mau explained that the contingency measures will be included in the EIS in the project description section and other appropriate impact sections such as ocean recreation, water quality and marine environment. Further, the City will continue to consult with regulating agencies (US Fish and Wildlife Services, Department of Health, and US Corps of Engineers), and the results of this consultation will be included in the EIS.

Questions, comments and responses are summarized as follows:

- The contingency measures are not what I expected. You always said that construction would not occur in bay waters. What is the likelihood that these contingencies will occur?
  - *Response:* To put this in the proper framework, for a project this size, you're always considering risk assessment/mitigation. The City is trying to be proactive in this regard. One thing they will do is to pre-qualify the contractors that can bid on the project. This will ensure that the contractors bidding are experienced with this kind of work and know what they're doing.

    Inadvertent returns are not unheard of. They do occur when the pressure in the hold exceeds the confining pressure of the soil and water above it. This potential is contingent on depth and geology. You might expect this in the shallower areas. An experienced contractor would be prepared to address this.
- What is the percent chance of occurrence? Is this rare? Is this a contractor just trying to cover his butt? How concerned should we be about this?
  - *Response:* It's difficult to determine. It's definitely less than 20-25 percent and even this percentage is probably too high.
- How do you identify the boulder?
  - *Response:* If the TBM machine encounters a boulder (larger than about ¼ of the machine diameter), the tunnel machine will stop.
- Do you know where the drill is at all times for horizontal direction drilling (HDD)? Like the zoo? The City lost the drill for that project and had to do several borings to find it.
  - *Response:* Yes. The HDD and the tunneling is tracked the whole way.

- *Response:* As part of the design, Yogi Kwong Engineers (YKE) did several borings a couple hundred feet apart. If we encountered undesirable geologic conditions, the route was shifted. We purposely shifted the alignment to avoid areas of potential problems.

- On the boring profiles, it doesn't identify soils information for the bottom of the profiles (referring to Figure 2-2 in the EISPN).
  - *Response:* YKE our consultant did the borings. We will follow up with him on the profiles.

- What is the size of the drilling machine?
  - *Response:* The drill size will be bigger than 42 inch steel casing that will be inserted.

- So the drill would be able to take care of boulders up to 25 percent bigger than the actual drill size?
  - *Response:* The drill size is referring to the tunnel boring machine.

- I echo the concern stated earlier regarding impacts to Kaneohe Bay. Not that you guys are trying to mislead us, but I pictured that the drill would go underground and there would never be a need to enter the bay floor from the surface. These measures are the most intrusive methods I've seen so far.

  It flies in the face of the number one concern expressed by the CWG so far. I know you can't tell us how many boulders there are. But just one of the silt curtains is a major impact to the bay. You can't recover that section of the bay after you do something like that.

  - *Response:* This is our effort to disclose this information to the CWG and to be transparent in the EIS process. If this information is not provided in the EIS and the contingency methods need to be implemented, we won't be able to obtain permits and we go back two steps.
  - *Response:* From the environmental side the bentonite clay is a natural material and not toxic, so it will not be harmful to the environment. This natural material can be contained by the silt curtain. As soon as the drilling is stopped the pressure is relieved, it will not continue to leak, and the drill can be pulled at a slower pace. There will be turbidity when inserting and removing the sheet piles. Under the coral reefs and sea grass, there will be no recovery effort. These areas are off limits and silt curtains and sheet pile enclosures would not be permitted. Only in the open area will these contingency measures be allowed. The sheet piles are one of two contingency measures identified. The casing and sheet pile enclosure are needed to isolate the water column.

- Once you hit the brown part (mud), you're disturbing the floor of the bay. We don't know how many times you need to do this. Hopefully none, but no one knows.
  - *Response:* The seafloor would be disturbed if these events occur and the number of times is unknown.
  - *Response:* The team will work with the agencies to formalize the mitigation measures.

- Will there be a marine scientist and archaeologist to assess prior to any disturbance?
  - *Response:* We don't foresee that. Sensitive areas have been identified and will be avoided. If you're in the sensitive areas, we'll need to redirect or start over again.
  - *Response:* Consultation with the various agencies may require this and, if so, we will include it in the mitigation plan.
  - *Response:* The HDD method was used at Honolulu Harbor and Hart Street Pump Station where two drills were used. Hart St. Pump Station crosses Honolulu Harbor (near Best Buy) by the fish auction/fishing village, to Sand Island surfacing at Matson Container Yard. This pull was a couple thousand feet and we did not encounter problems. We also crossed Manoa (near Kaimuki High School) and Waikalua Streams. Nothing is guaranteed, but we have had good success with past projects. It's better to plan for the worst and hope for the best.

- Is the size of the drill comparable to this one?
  - *Response:* It's the same as Hart Street project.

- Did I hear it will not be under the coral bed? Will there be impact to Kaneohe Bay Yacht Club?
  - *Response:* There are areas where the contingency measures are allowed and other areas where they are not allowed, such as the coral reef and sea grass areas (sensitive areas). If something happens under the sensitive areas, we'll need to redirect or start over again. The route is off shore. Barges may be in Kaneohe Bay, so bay users would need to navigate around the barge.

- Since the community is concerned with impacts to Kaneohe Bay, it would be very favorable to have a marine biologist to monitor the work once in the bay.

- The EIS will come out, but will not talk about contingency measures for the second alternative, the sewer gravity tunnel, in the same detail. The information on the contingency measures will not be available for the sewer gravity tunnel. The information is appreciated, but we're comparing apples and oranges.
  - *Response:* Generally, the technology for the gravity tunnel has been around a long time, so we have a better idea of problems that might occur. For example, the condition of the rock is completely known. Based on the available information it appears the geology is all basalt and there are not many fractures. Based on geology, it doesn't seem to be interbeded. A potential issue is that the route will be below the basal water. There is a solution to this. If the conditions are hydrofractured, the tunnel would have to be sealed with grout to seal off the potential for water leakage.
  - *Response:* Point well taken. We recognize the force main is well on its way. The tunnel alternative is still in the planning stage, although we are progressing with the alternative. It's possible that the sewer gravity tunnel will encounter problems as the project develops.

    Tunnel technology is a little more standard and this project is not as ambitious as the HDD, so there may not be as many construction contingencies. There will be design contingencies. Some of what was mentioned earlier is yet to be determined and that could cause problems with the tunnel.

- I hate to bring it up over again. The EIS is a disclosure document. The decision was made by the City to include two separate and distinct proposals, with one alternative

being very far along. One is 80 percent and the other is 30 percent done. So, if the EIS is supposed to help people choose, it's not fair to not have all the information on both alternatives. Then why have the sewer gravity tunnel alternative at all. It seems like the tunnel is not having fair disclosure. The Consent Decree mandated the December 2014 completion date, which kicks out the tunnel alternative and forces the force main alternative. It's not fair. We should be asking EPA or decision making body to ensure full disclosure. The process should be fair and equitable.
  - *Response:* We have prepared many EISs in the past 30 years. There are situations where you don't know everything. EISs require that you assess very early. At the same time, if it's too early, you don't have the design information. That's what we always deal with. We do the best we can with the information available. In this case, we have one alternative that's progressed more than the other. We are planning to disclose contingencies for both alternatives in the EIS. In the case of the force main alternative, the contingencies were raised by the contractors. In the case of the sewer gravity tunnel, we will try to disclose as best we can. The EIS will not alone make the decision. But, it will be part of the decision making process.

- EPA is like an oxymoron. Here we have a solution with problems with the environment. Why don't we extend the deadline so we can adequately address the situation?
  - *Response:* We are required to build a redundant force main by the Consent Decree. The EPA doesn't really care how the City complies with the Consent Decree. We have to do it and we have a looming December 2014 deadline.

    The City has the same requirement for a redundant force main in three areas on Oahu. In every one we have a tunnel alternative. The completion date requirements are the same for Sand Island WWTP and Honouliuli WWTP.

    The City has hundreds of projects that are being imposed throughout the island. The City pays for it with sewer rates. These projects are hugely expensive and we have to take a fiscal view point and solve it based on the best information we have.

    That's not to say we will ramrod the force main. We have to do our due diligence and then petition the EPA, which is one of several other parties. The EPA has been kept informed about the pros and cons of the decisions and in our discussions, there seems to be support for the gravity tunnel. It's taken under advisement and the lawsuit will drive the process.

    The best thing we can do is come up with the most economical system. If you look at life cycle, O&M (operations and maintenance) expenses, investments in other projects, the tunnels look good. They look the best in metro Oahu. We reduce our exposure in force mains.

    The City is getting a lot of information to come up with risk analysis. The City will make a decision on whether to pursue the gravity tunnel and is taking input from several sources, including technical, community, environmental studies.

    It is likely that the City will file a petition with the Department of Justice and the EPA to extend the deadline. But even if the City does this, the legal system

doesn't respond quickly. We will continue with force main initiative during the legal process.

    Our current budget is about $350 million. The one proposed for 2011 is also $350 million. In today's economy, it's a huge burden. We have to be careful not to over burden the residents.

- I appreciate everything you say and I think we all support the redundant system. I represent the Waikalua Loko Fishpond and the DOH is legally required to notify us of any spills. We've been there for 16 years and have gotten many notices. We need a redundant system. All the information you've shared over the last several months has been great. We are trying to understand how the City is making the best decision. We're all rate payers and concerned about the environment. As soon as the force main is completed and we have a major rain event, we'll have another spill in Kaneohe Stream/Bay because of inflow. It will take another million dollars to fix the lines that feed Kaneohe WWPTF.

    The attraction of the sewer gravity tunnel is that storage will not be required and the Kaneohe PTF closed. In the short term it might cost more, but in the long term, it satisfies every question we have from an environment and cost standpoint. We don't have to worry about any more spills into the stream and bay. That's the bottom line. I want this to be a win-win situation as we move forward on the same path together.

    Based on the available information, it makes the compelling logical solution at this point, even though we only know 30 percent of the information, it already looks way better than the force main.
  - *Response:* We are not asking the CWG to make a selection of an alternative. You may whatever you want on a personal level or within your own organization, but not as the Core Working Group.

- How can we help? Who can we direct our help to?
  - *Response:* You are helping now by participating in this process. The City administration will make the decision. You can email department or the mayor and also participate in the public review of the EIS. It would be good to make your concerns known that way. But, the final analysis must be made by the City.

- When will the Draft EIS be completed and will we be notified? I don't need the whole copy, but will have access to it?
  - *Response:* We anticipate publishing the Draft EIS in January 2011 and a copy of the Draft EIS will be mailed to each CWG member. At that time, we will ask the CWG if they would like to convene a meeting to discuss the EIS. There will be a 45-day comment period.

- By the time the Draft EIS is published, the City will have made its decision?
  - *Response:* That is the goal, but the decision is whether the courts should be petitioned. I suspect the City will pursue that to ensure that the alternative is alive.

- We have until the end of the year to communicate that to the Mayor?
  - *Response:* Yes, The Mayor has lots to review and has a major budget deficit. We have to be good stewards of the funds. We currently have $100 million deficit, so the administration is also looking to save money.

- -*Response:* There are two departments working on this project - Department of Design and Construction (DDC) and Department of Environmental Management (ENV). You can send your comments to them and, even if letter goes to the Mayor, the letter will get directed to the appropriate department.

- It has to be made clear that the EIS is looking at a solution that has been forced upon us by the Consent Decree. It's very important to understand the cost-benefit ratio for this very expensive project. The public needs to understand that we are being forced to spend this money because we're being forced by the EPA. There may be other higher benefit projects that could happen if the City wasn't forced to spend this money on this project.
  - *Response*: Good point. The EIS is a public disclosure process and it's not a decision making document.

- I understand, but I was disappointed that the City buckled under the EPA. There are big problems that could use the money to benefit society as a whole. It won't make a difference in the EIS, but next time it might.
  - *Response:* The EIS is not required to include life cycle costs.
  - *Response:* It's how you identify the project need. The need was imposed by the EPA and we have to find an alternative redundant conveyance method.

- The reason we're doing this project is to keep sewage out of the bay. If you take that another step, it seems responsible to determine how much sewage are we preventing from getting to the bay and at what cost?
  - *Response:* This information is included in the Infiltration/Inflow (I/I) Study. The study determined how much is expected and how to size the equalization basins. We are assuming a certain size based on the existing I/I Study. We're framing the EIS so it's a management situation, and the fundamental need is to address the Consent Decree.

- If the force main goes through, would the City be willing to commit to the equalization tanks at both treatment plant facilities instead of leaving it off until 2020? If the force main goes in, and there are still spills, then the next measure will cost money. Like it was said earlier, we will size it now and both will be needed at both facilities.
  - *Response:* Not necessarily. We have to look at storage capacity, but it doesn't have the same compliance deadline. We've been looking at the real requirement. In the mean time, we're still implementing other improvements along collection system and at Ahuimanu. Equalization basins are very expensive.

- I know you have to build the force main, but won't the equalization basins help prevent a lot more spills?
  - *Response:* Not necessarily. There are other problems in the collection system and we need to look at the whole system. The City has been making other improvements.

- The second force main will only prevent spill during catastrophic event?
  - *Response:* No, it will help to provide a redundant conveyance line.

- There are a lot of solutions. But the equalization basins will prevent more than the force main.
  - *Response:* If you have a busted pipe, you'll have a huge spill.

  - *Response:* For example, if we build a redundant force main, you have an existing 42 inch primary line that can also be used for storage. You also have 1.4 mg tank for clarifiers. There's ways to capture it now. Now 7 MG seems to be overkill.

Next Steps

Tracy Fukuda reminded everyone that the DEIS will be published in January 2011. At that time, we will ask the CWG if they would like to reconvene. The website is also active.

Jack Pobuk closed the meeting by thanking everyone, especially the CWG members for their time and commitment to the process.

Public Information/Scoping Meeting #1 Summary, Comments and Responses

KANEOHE TO KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT

PUBLIC INFORMATION / SCOPING MEETING #1

MEETING ON SEPTEMBER 28, 2010

MEETING SUMMARY

The first public information/scoping meeting was held at Benjamin Parker Elementary School Cafeteria from 6:00 pm to 8:30 pm.

CLARIFYING QUESTIONS

- I live in Kahaluu and the area that I live in is not served by the wastewater treatment plant. If we are going to go through all the expense to update, will there be any plans to expand sewer service to the areas that are not sewered at this present time?
  - *Response:* The City has plans in the future to provide public sewer service to the unsewered areas. A facilities plan was done in 1998 that identified some of the unsewered areas. It is included in the long-range program over the next 20 years. Unfortunately, the City has a lot of high priority projects to rehabilitate the existing system and upgrade treatment requirements. These are taking precedence over sewering unsewered areas. It would help to talk to your council member so that they can advocate the project.

- For the force main, are both options considered to be supplemental to the existing force main and will existing force main be maintained, or will the existing force main be abandoned?
  - *Response:* There are two optional construction methods. The existing force main will remain in place and operational. The City will probably switch off between the existing and new systems. The main idea is to keep both systems operational so there will be no spillage in case something happens to one of the systems. Maintenance of the existing force main will require that Kaneohe Bay Drive continue to be torn up.

- The sewer gravity tunnel will be a complete solution in itself in the sense that it will not require equalization tanks, and will have its own storage capacity. Therefore, the price and completion date year 2017 is for the entire project. Whereas with the force main, the cost does not include the two equalization facilities nor is there an estimate of completion. I would like to know the total cost of the force main alternative and anticipated completion date for total project including two equalization facilities. What and when are the anticipated cost and completion date for force main alternative?
  - *Response:* The force main must be completed by 2014, without the equalization facilities. City anticipates completion of the equalization basins by 2020, and will be completed as separate projects by the City. The environmental impact statement (EIS) will cover both force main and two equalization facilities so that they will not have to repeat the EIS process again. The EIS includes the force main with two equalization facilities while gravity tunnel has its own storage capacity.

- What is the estimated cost for the equalization basins?
  - *Response:* Still working on the cost. It will be part of Preliminary Engineering Report (PER) that is being prepared.

- Would it be fair to suggest the cost of the equalization basins will push the cost well over the cost of the gravity tunnel?
  - *Response:* Yes it could, but the tunnel alternative will not need the consent decree requirement because it'll be completed in 2017.

- How do you intend to do any maintenance on the force main under Kaneohe Bay and gravity tunnel? What is the life span of the PVC liner?
  - *Response:* The existing force main would be kept in place for emergencies. The gravity tunnel flows will be diverted to the existing force main and access to the tunnel will from either end as well as through the access shaft at the Board of Water Supply (BWS) site. The gravity tunnel is being design for 100 year design life and would not need frequent maintenance.
  - *Response:* PVC pipe has a 75-year design life. The PVC pipe is one of the pipes that will be installed. A minimum 1-inch steel casing will be buried in the ground first. Where the steel casing nears the surface, the pipe will be totally encased in concrete and will use cathodic protection. As a result of working with Core Working Group (CWG), the annulus space between steel casing and PVC pipe will not be grouted and instead filled with potable water to detect leaks. PVC pipes are replaceable. The CWG had concerns about maintenance. The existing force main will be maintained and rehabilitated. As EPA required, the City will make sure that the systems switch back and forth.

- In 1995, the City was given about 20 years to pull this project off, and now it is 4 years before the project is supposed to be completed and we have to take force main (alternative 1) because the City hasn't gotten it together?
  - *Response:* The City is already half-way through the 20-year plan. The City has already built a lot of improvements as part of the 20 year plan. In 2007, the City received the stipulated order to provide redundant force main and subsequently issued this project.

- I'm little confused that you keep insisting the only force main (Alternative 1) will get us done in time.
  - *Response:* Stipulated Order for supplemental force main was issued in 2007 and the City is proceeding with the force main (Alternative 1). The EPA knows that the City is exploring the gravity tunnel. The gravity tunnel alternative became an appealing alternative late in the game and turned out it's a possible alternative. The City needs to obtain approvals from all agencies (EPA, DOJ, etc), and cannot take the chance on not complying with the consent decree to finish the existing force main, so that proceeding. However, if EPA does not agree with extending the deadline for the gravity tunnel, at least the force main will meet the deadline.

- How and where do we intend to dispose of slurry or muck?
  - *Response:* The Contractor determines what to do. There may be economic value to the rock fromr the tunnel. Contractors may also be interested in using the force main muck as well, i.e. Daily earthen cover material at the landfill. If it's wet, they will use lined trucks to avoid spillage along the roadways or they may dry it at the site.

- Impacts of the ventilation fans at the Kaneohe end for the tunnel. What is the impact of the ventilation fans on the neighborhood?
  - *Response:* Ventilation fans will be at the Kailua WWTP and will generate noise. They can have mufflers to reduce the sound. We can also build sound walls between the plants and nearest home to further reduce the sound. Yoichi Ebisu will evaluate the noise impact to the community.

- Where are the assumptions for the future of this side of the island that guide this project?
  - *Response:* The amount of flow is based on the projected population of the area. The numbers were prepared by the City Department of Planning and Permitting (DPP) for the Koolaupoko Sustainable Communities Plan, and they are collected from the Koolaupoko district. The community expressed a desire to not invite more growth in the area. The most recent projections for 2035 show a slight decrease in population in the area. All the agencies design projects are based on the projection. The second number pertains to inflow that is based on a 2-year design storm. This is how the tunnel and equalization facilities are sized.

- Why are we not enlarging the existing facilities? The Kaneohe and Kailua WWTP can be expanded. Why are they pushing sewage through the system with a new force main and tunnel? It would save a lot of money.
  - *Response:* The City switched to a regional system in 1994 and with great expense in order to get the discharge out of Kaneohe Bay and to put it to a more acceptable location. To switch back to previous system would cost a lot of money for not much benefit. The regional system meets our requirements now and is the most economical.

- Concerns regarding leakages with the under bay force main alternative. Are there any records of malfunctions or leakages for the Mokapu outfall?
  - *Response:* The City will get back to you with more info. The City has four outfalls including Mokapu. The Environmental Quality Division oversees inspections and monitors the outfalls and quality of the ocean. As reports show, there are no major problems at this time.

- In reference to the force main system, it will be staged mostly from the Kaneohe side. Is this correct? My concern and question is whether the actual impact upon the community for entry and exit for all the pipes and materials has been looked at. There is a narrow driving area and a lot of school children. Has that been a concern?
  - *Response:* That is something that the EIS will take a look at. The traffic study will address impacts during construction. That should include the schools, narrow road width, etc. We may also look into alternative access options. Again those are still being studied and they will be discussed in the Draft EIS.

- Has there been any thought given as to the effects upon the businesse(s) at Kaneohe Bay View Golf Course?
  - *Response:* We will need to look into a construction easement. The golf course will be impacted if the City needs to use a portion of the golf course for construction.

- This was designed or still under thought, but you mentioned there will be a casing pipe for HDD then pull the carrier pipe, and grout the annulus. Can you please clarify?
  - *Response:* The annulus space will not be grouted. It is difficult to grout long distance with a small space and costs a lot. We will not grout, and will use potable water to help as well as reduce the net pressure of the pipe when it's operational.

- The Casing pipe will last for how long?
  - *Response:* Casing will last for at least 50 years, and we will do corrosion protection and hopefully last up to 75 years for PVC pipe. City may replace the pipe after 50 years.

- The secondary treatment process at Kailua WWTP is not efficient odor control, the system can't handle rain water, etc. One of the alternatives will not have holding tanks. How does that work and how do you control odor?
  - *Response:* The gravity tunnel alternative does not have equalization tanks because it can hold the storage. City has plans to do odor control improvements through other projects. But the only odor control part of the gravity tunnel alternative is for the new pump station.

- How do you control odor with the force main alternative?
  - *Response:* The City has a program to address odor control problems at Kailua WWTP. One project is starting construction and will take about 2 years to complete. This meeting doesn't focus on odor control.
  - *Response:* $12 mill contract with civil - mechanical engineers and we have pre-construction meeting set up on October 12th. The contractors also need to obtain all the permits and they are under way. If everything goes well, we can give notice-to-proceed November 1st. This is a 15-month project so it will be completed by end of 2011.

- The slide regarding part of the project that overlaps for both alternatives. Is that the part that we're proceeding with no matter what?
  - *Response:* This is where we were trying to find options. One of the options was to follow the existing force main, another one follows the H-3. Total of four major options were considered. However, most of the alignments have to pass through dense areas and would either be next to existing force main or would need to cross the existing force main. There are risks in damaging the existing force main by passing the congested utility corridors, so the City would need a temporary sewer bypass during construction to handle any leakage from the existing force main. As a result, the temporary sewer bypass became the permanent supplemental force main.

- Sounds like the gravity tunnel is cheaper to construct. Is there any operating and maintenance costs?
  - *Response:* The PER will include a long-term analysis of costs including operation and maintenance costs, replacement, lifecycle, projected electrical costs, annualized basis, debt service. The analysis will be done for both alternatives.

- Is it a done deal to go under Kaneohe Bay? To me, it seems better idea to go through Old Saddle Road. I am an advocate for protection of resources. Life spans area confusing. Kaneohe Bay is too precious to have wastewater leak into the bay.
  - *Response:* All the land based routes (force main) would require temporary bypass under Kaneohe Bay to take the flow. That's why the City decided it would be cheaper and faster to make the temporary sewer bypass permanent. It's done in that the City is committed to meet the consent decree deadline 2014. The force main under Kaneohe Bay is the only alternative that would meet 2014 deadline. The gravity tunnel route is the only other route, but it doesn't meet the deadline. If the City pursues the gravity tunnel they need to obtain approval from EPA, DOJ, court, etc. If they approve, only then can the tunnel be constructed.

- If it's temporary, how long is that? Years or months?
  - *Response:* Until the land route is completely constructed. It would take years. If we go with Mokapu route, the City would need to construct temporary sewer bypass first and the City won't met the deadline. EPA won't accept the solution at this point.

- Guarantee no leakage?
  - *Response:* For example, there are existing pressurized pipelines that two force mains have similar steel casings, high density polyethylene pipe, mentioned Honolulu and Pearl Harbor force mains. I helped to design and install all of those pipelines. They are all working. For Kaneohe Bay, we want to go into the stiff clay material. Ground conditions that the steel casing will be embedded in. We were hitting sheet pipes that were 40-50 years and having difficulty getting through. We are verifying the 1-inch casing and possibility of using the cathodic protection.

- Regarding the electrical supply for the force main option, what will happen with longer term power outages? Do we have back up generators?
  - *Response:* The Kaneohe WWPTF has five pumps and three engine driven pumps. There is no typical standby generator. Instead there is direct engine driven pumps that will still operate and there three of them.

- One of the benefits of using the gravity tunnel was that the force main would no longer be needed so the potential for leaks and failures would totally be eliminated. So Kaneohe WWPTF would no longer spill into the ocean. We should look at adding the cost for equalization basins plus operating costs to see the overall cost for each option in the EIS. Will the EIS have cumulated information of not only the cost of force main, but also the equalization facilities?
  - *Response:* Draft EIS will include general costs. But operational costs may not. The PER will include that type of information.

- What is the cost for Mokapu alternative and why was it eliminated?
  - *Response:* The Kaneohe Bay route is estimated to be $66 million by directional drilling to $110 million by tunnel (force main), depending on the construction methods. The City is still negotiating the directional drilling staging with the golf course. We are preparing, in the meantime, to meet the consent decree deadline on 2014, so the force main tunnel is still an option just in case the staging area is not available.

    The Mokapu Saddle Road would require a temporary sewer bypass because it would cross under the existing force main. The existing force main stands a good chance of leakage by loosening the soils. If so, the leakage will be 10 to 12 million gallons/day and it would take about a week to fix. Leaks to the bay would continue for a week and we want to avoid that risk.

    The other Mokapu alternative (drill and blast) would require a large staging area. It would be very expensive, about $158 million. Problem with alignment is still need to do geotechnical investigation. Drilling alone will take 9 months that would put us way beyond the consent decree deadline.

- This is what we're getting in the CWG. You didn't mention permits during the CWG meeting.

SCOPING COMMENTS

Purpose of the scoping meeting is to determine what will be considered for inclusion in the EIS.

<u>Comment:</u>
Three things should be in the EIS:
1. Comparison of odor abatement methods for gravity feed vs FM which has the aerobic bacteria in it.
2. What method can the contractor use to get approval to pulling pipes under the Kaneohe Bay?
3. Compare options 1 and 2 immediate and long term traffic impact on K-bay drive especially close to the MCAS.

<u>Response:</u>
1. The Draft EIS will discuss odor control for both alternatives as well as proposed improvements at the Kailua Regional WWTP. The effectiveness of odor control between the two alternatives cannot be feasibly compared, particularly at this early stage of design.
2. The Draft EIS will discuss anticipated permits required for each of the major alternatives.
3. The Draft EIS will include traffic studies examining construction-related impacts for both alternatives. Notably, in the long-term, neither alternative would generate a significant additional traffic as both would become part of the existing wastewater collection and treatment facility operations.

Comment:
Representing Wailakua Loko Fish Pond Society. The fishpond is located immediately makai from the Kaneohe WWTP and along Kaneohe Bay. I sit on the CWG. Thank you for allowing us to study this.

1. At the last CWG meeting, we requested info on spills. Include in EIS all the data on spill at least over a 20-year period. Reason being the Kaneohe WWTP went to the Full to Pre-treatment plant in 1994. I want to see the difference in operation from a full; to a pre-treatment plant. We have been trying to restore the pond since 1995 and recall the major spills around early to mid 1990s.
2. Concern raised regarding opportunity to the Whole consent decree was civil suit raised in 1982 by residents about spillage. It bothers me that consent decree between everyone was made only for the FM beneath K-bay even though the EIS will study both alternatives. It would behoove both alternatives a fair chance. We should ask EPA, state and city to consider consent decree now to include both studies and give it a fair chance, regardless of the time period.

Response:

1. The proposed project alternatives addressed in the EIS are responding to the requirement for a supplemental wastewater conveyance method by the 2010 Consent Decree. The wastewater storage requirements for the alternatives are based on a design storm standard. Neither of these requirements are directly derived from actual frequencies or volumes of wastewater spills that have historically occurred at the Kaneohe WWPTF. Therefore, there is no direct rationale for citing these wastewater spillage data.
2. Again, the force main alternative was not based on a history of wastewater spillages. It initially was required by the 2007 Stipulated Order by the EPA following negotiations with the City. The City has initiated discussion with the EPA regarding the potential for pursuing the gravity tunnel alternative.

Comment:
You have in essence taken out part of the EIS process by saying you have only two alternatives. You do not. You have alternatives that have been mentioned relative to land tunneling and I don't think you can legally take those out before you go through the EIS process. They need to be included at the same level as the main two alternatives. It bothers me an immense amount to see this happening with a government agency. It's bad enough when private developers does this, its worse when the government does it. I urge you to consider all alternatives equally in the EIS.

Response:
Chapter 343, Hawaii revised Statutes (The Hawaii EIS law) requires a discussion of alternatives considered, but subsequently dismissed. Full assessment is only required for the preferred alternative. For this project, however, the City has decided to pursue a full assessment of the two primary alternatives as one of the basis for selecting the preferred alternative.

Comment:
Effects on the ocean resources need to be included in the EIS.

Response:
The Draft EIS will include a discussion of the proposed alternatives' impacts on ocean resources and will also include a biological survey of marine resources.

Comment:
Like to see an evaluation of how surge situations will be handled under alternative A for the decade from when the tunnel is completed and when the equalization basins are completed.

Response:
At the Kaneohe WWPTF, the City is currently using the abandoned tanks, formally used for the treatment plant, to store peak flows. For the Kailua Regional WWTP, recent sewer improvements include storage capacity within over-sized sewer lines that were installed along Mokapu Boulevard.

Comment:
Question is regarding the sizing for storm surges. Is it two year? What happens in larger storm events. I'd like to see the EIS addresses higher storm surges. Ie. 100 yr 24hour storm, 50 year too since it's the shortest life span.

Response:
The design storm for the wastewater facilities is the 2 year – 6 hour storm. The technical rationale is complex, but this event would not be equivalent to the storm probability used to calculate flood hazards on the Flood Insurance Rate Maps, e.g. the 100-year storm.

Comment:
I would like to see the EIS at least explain why the city is not going to EPA now to say other alternatives aren't going to meet the 2014 deadline. It seems strange that the deadline must be met and won't even consider discussing the deadline.

Response:
To the contrary, the City has held discussions with the EPA regarding their current efforts to evaluate the gravity tunnel alternative.

Comment:
I would like to see close detail of the land options so we can see what streets will be impacted. As much detail of the land routes as possible.

Response:
The Draft EIS will include a discussion of the various land routes that were considered for the supplemental force main.

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

THE BAY [illegible] BEHIND A [illegible] WALL [illegible] / STAGE TO [illegible] & [illegible] AND [illegible] IN [illegible] OF THE STORMS 1/1.4 BILLION [illegible]. ARE THE GRASSROOTS INSTITUTE OF HAWAII FOR [illegible]

WE DO NOT WANT TO BE [illegible] THE BAY

AIKAHI GARDENS RESIDENTS HAVE ALMOST DAILY ODOR ISSUES – WE'D LIKE WHICHEVER SOLUTION IS CHOSEN TO CORRECT THIS; IF IT WILL NOT ALREADY HAVE BEEN CORRECTED. WHATEVER HAPPENS, THE ODOR PROBLEM CANNOT INCREASE!

(include additional sheets as necessary)

PLEASE PRINT: Name: IAN BEGGS Phone: 726 6823

Organization:

Address: 112 PUWA PL #1
KAILUA HI 96734

Email: IAN.G.BEGGS@GMAIL.COM

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

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7801-01
January 6, 2011

Mr. Ian Beggs
112 Puwa Place #1
Kailua, HI 96734

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Mr. Beggs:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). We offer the following responses to your comments:

1. We acknowledge your support for the gravity tunnel alternative as discussed at the meeting. It should be noted that the gravity tunnel alternative does not require the temporary bypass force main under Kaneohe Bay.

2. We appreciate your concern regarding the generation of odors from the Kailua Regional Wastewater Treatment Plant (WWTP). The forthcoming Draft EIS will describe odor control for the proposed alternative facilities. It will also discuss the replacement of the headworks and the sludge dewatering buildings. Both of these existing facilities are significant sources of odors that will be addressed by the replacement facilities.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

(1) Given that Kaneohe Ranch continues to develop Kailua (like addition of a new Target Store would be a good example), is it the proposition of no or a reduction of growth in Koolaupoko realistic? Are we building an obsolete system? This should be take into consideration in the decision.

(2) What continued testing will assure no subterranean breaks in the force main?

(3) I would like to see the best choice for the long term given the highest priority.

(4) Given global climate change - expecting increased severity of storms, planning for 100yr storm seems bare minimum.

(include additional sheets as necessary)

PLEASE PRINT: Name: Mark Heckman Phone:
Organization:
Address: 424 Iana St
Kailua HI 96734
Email: mh heckman@hawaii.edu

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

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7801-01
January 6, 2011

Mr. Mark Heckman
424 Iana Street
Kailua, HI 96734

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Mr. Heckman:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). We offer the following responses to your comments:

1. As stated at the EIS Public Information/Scoping Meeting, the City's various Sustainable Community Plans and Development Plans and their respective population projections are the basis for City agencies to determine infrastructure needs. The Koolaupoko Sustainable Communities Plan does not project substantial growth for the service area of the Kailua Regional Wastewater Treatment Plant (WWTP). It should be noted that the Target store is considered a redevelopment of an existing use and would not necessarily increase wastewater flow within the entire service area.

2. The pressure in the force main will be constantly monitored. Any sudden drop in this pressure could be traced to a break in the force main. With the supplemental force main, should a break occur in either force main flow would be diverted to the other, thereby minimizing the risk of wastewater spillage until repair can be implemented.

3. The City is taking a three-prong approach to determining a preferred alternative. This includes the Preliminary Engineering Report, which evaluates the long term cost for each alternative; the EIS, which evaluates the environmental and social impacts of each alternative; and, the community outreach process, which evaluates community values relating to the alternatives. Upon determination of a preferred alternative, the City will hold discussions with the Environmental Protection Agency (EPA), the courts, and other parties involved with the Consent Decree.

4. While the 100-year storm was quoted as a rough estimate of the design storm, the actual design standard is much more complex and accounts for the time period over which a storm can occur. The relationship of storm events to global warming has not been determined such that the design storm standard can be justifiably modified at this time.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

I would like the EIS address:
① potential leakage of the Force Main under Kaneohe Bay. This is an ongoing concern for Kaneohe residents
② Potential impact on marine ecosystem. We already have a major problem with the porpoise dying off

(include additional sheets as necessary)

PLEASE PRINT: Name: Janine Tully Phone: 247-1796
Organization: Resident
Address:
Email: jtully001@hawaii.rr.com

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

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7801-01
January 6, 2011

Ms. Janine Tully
45-035 Ka Hanahou Place
Kaneohe, HI 97644

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Ms. Tully:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). We offer the following responses to your comments:

1. The design of the force main located within a grouted steel casing or grouted tunnel provides ample protection against leaks. Moreover, the location of the force main below the sea bed of Kaneohe Bay provides additional protection against damage by events on the surface or on the sea bed. Nevertheless, the pressure in the force main will be constantly monitored. Any sudden drop in this pressure could be traced to a break in the force main. Should damage occur to the force main, the City will have the ability to divert wastewater flows into the existing force main until repairs can be implemented.

2. The forthcoming Draft EIS will discuss how the force main alternative has been designed to minimize impacts on the marine ecosystem. The Draft EIS will discuss these impacts.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

I WOULD LIKE TO SEE AS MUCH DETAIL AS POSSIBLE IN THE FORM OF MAPS IN THE EIS.

(include additional sheets as necessary)

PLEASE PRINT: Name: RICH MCCREEDY Phone: 226-4633
Organization: KANEOHE RESIDENT
Address: 45-423 OHAHA ST
KANEOHE, HI 96744
Email: RICHMCCREEDY@HAWAII.RR.COM

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

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7801-01
January 6, 2011

Mr. Rich McCreedy
45-423 Ohaha Street
Kaneohe, HI 96744

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Mr. McCreedy:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). The forthcoming Draft EIS will include numerous maps and drawings of the proposed project alternatives.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

Look at other areas outside of under Kaneohe Bay to lay any more sewage pipes

Include our ocean resources re: fish and other sea creatures. We're very concerned about our bay and adding any more population.

(include additional sheets as necessary)

PLEASE PRINT: Name: Rocky Kaluhiwa Phone:
Organization: Koolaupoko HCC
Address:
Email: Makana pono@aol.com

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

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7801-01
January 6, 2011

Ms. Rocky Kaluhiwa
c/o Koolaupoko Hawaiian Civic Club
P.O. Box 664
Kaneohe, HI 96744

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Ms. Kaluhiwa:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). The forthcoming Draft EIS will include a discussion of land route alternatives considered for the force main alternative. The Draft EIS will also include an assessment of impacts on ocean resources in Kaneohe Bay associated with the force main alternative beneath Kaneohe Bay.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
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+operations

Detailed analysis + comparison is needed for both Alternatives. They should include costs for transmission + storage
1.– force main, equalization tanks, operation costs for Kaneohe pump station + equalization tanks and other operation costs
2.– tunnel, operation cost + other operation costs.

(include additional sheets as necessary)

PLEASE PRINT: Name:_____ Phone:_____
Organization:_____
Address:_____
Email:_____

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

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7801-01
January 6, 2011

Anonymous Commenter

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Sir/Madam:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). The forthcoming Draft EIS will include a table showing the estimated schedule and cost for the major components of the two primary alternatives. The Preliminary Engineering Report to the City, which is a independent study, will provide a long-term cost comparison of the two major alternatives.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

- Require a Project manager to be responsible for all pieces + parts of this project and supporting "projects". The Project manager should be responsible for cost, schedule, + quality and identify risks + assumptions. The PM should be a go-it person

- Require an impact of overflow on the fish ponds + bird sanctuary outside MCAS

- Require understanding of how the Kailua plant is going to handle too much flow during rainy season or other water injection with the force main option without the equalization tanks

- would like to see a project plan for each phase and an over all timeline for this project + supporting project

(include additional sheets as necessary)

PLEASE PRINT: Name: Barbara Sullivan Phone: 282-2735
Organization: Aikahi Gardens
Address: 191 Oko Street, Apt 2
Kailua, HI 96734
Email: Kailua_labs@yahoo.com

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

Understood

7801-01
January 6, 2011

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX 808-946-2253
www.wilsonokamoto.com

Ms. Barbara Sullivan
Aikahi Gardens
191 Oko Street, Apt. 2
Kailua, HI 96734

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Ms. Sullivan:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). We offer the following responses to your comments:

1. The City will assign a Project Manager to various phases of the project from design through construction.

2. Both alternatives will include provisions for capturing peak flows at the Kailua Regional Wastewater Treatment Plant (WWTP). Therefore, it is not anticipated that the wildlife habitats at the Nuupia Fish Pond Complex will be adversely affected.

3. Without the equalization facilities at the Kailua Regional WWTP, peak wet weather flows in excess of the plant capacity, though infrequent, could result in wastewater spillage. Typically these spills would be directed into the Mokapu ocean outfall.

4. The Draft EIS will discuss anticipated construction sequencing for the two primary alternatives. An estimated cost and schedule for the major components of the two primary alternatives will also be included.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

Comparison of cost and completion dates of Alternative 1 and Alternative 2 must include cost and completion dates of equalization facilities for Alternative 1.

EIS should also consider how surge will be handled under Alternative 1 during the decade between completion of tunnel and completion of equalization facilities.

(include additional sheets as necessary)

PLEASE PRINT: Name: Vicki Fay Phone: 282 0878
Organization:
Address: 46-090 Konohiki St #3413
Kaneohe 96744
Email: vfay1960@mac.com

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

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www.wilsonokamoto.com

7801-01
January 6, 2011

Ms. Vicki Fay
46-090 Konohiki Street #3413
Kaneohe, HI 96744

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Ms. Fay:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). We offer the following responses to your comments:

1. The Draft EIS will include estimated costs and schedules for Alternative 1 and 2, including the equalization facilities for Alternative 1.

2. In Alternative 1, between the time that the force main beneath Kaneohe Bay is completed and when the equalization facilities are constructed, there will be no additional measures to capture peak wet weather flows that exceed the capacity of the Kaneohe Wastewater Pre-Treatment Facility (WWPTF). It should be noted, however, that the large abandoned tank facilities that were part of the former Kaneohe Wastewater Treatment Plan are being used for wastewater storage. It is conceivable that wastewater spillage would occur at the Kaneohe WWPTF.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

EIS does not show new reef formation to 5' deep as per attached quick cut & paste. Graphics in talk show this reef.
Gravity feed has huge advantage of lessening odor problems on Kailua side by avoiding anaerobic conditions
Gravity feed has large safety margin by absorbing flow during equipment failure + maintenance. Pumps will fail – have failed. (tunnel under bay)
K-Bay is no place to try untested methods especially our lack of knowledge regarding difficulty of pulling pipe in option 1. We could end up with a series of cofferdams in prime recreational water.
Lift pump on Kailua side is much simpler solution to force pumps with need for additional reservoirs.
Statement indicates contractor will decide where pipe pulling stations will be put in the bay. Must include community review of plan.
Option 2 is superior. Much reduced risk.

(include additional sheets as necessary) (OVER)

PLEASE PRINT: Name: George Losey Phone: 2549289
Organization: UH – Retired
Address: 44-432 Kaneohe Bay Dr
Email: Losey@Hawaii.Edu

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

EIS should include:
Assess chance of lift pump vs. force pump failure and resulting impact
Odor abatement comparison for force main vs gravity feed
Method for contractor to get approval for pipe pulling stations in the bay for option 1
Compare 1 vs 2 on Kaneohe Bay Dr traffic for any improvement or maintenance of existing force main

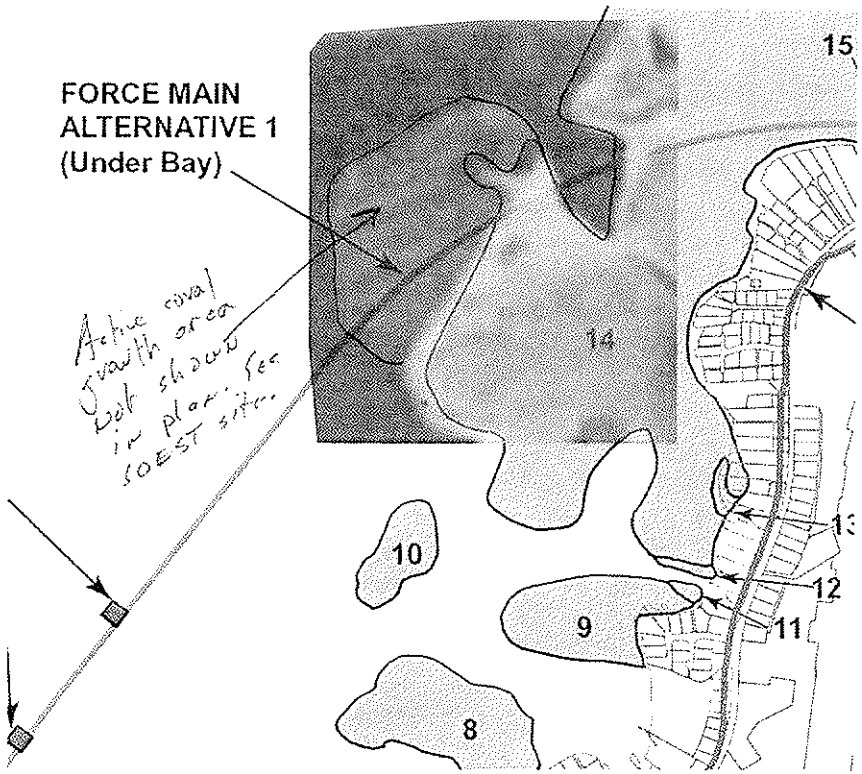
(Fold on dotted lines and seal with tape or staple)

Postage Required

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

(Fold on dotted lines and seal with tape or staple)

Some, not all, maps in statement fail to locate the reef, below.



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7801-01
January 6, 2011

Mr. George Losey
44-432 Kaneohe Bay Drive
Kailua, HI 96734

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Mr. Losey:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). We offer you the following responses in the order of your comments:

1. The map on which you identified the active coral growth area is from the State Office of Planning, Statewide GIS Program. We are uncertain as to the rationale for identifying or not identifying specific coral reef formations on the map. A Biological Survey of Marine Resources conducted for the Draft EIS, however, does identify this coral reef formation as a resource to be protected. No in water work will be permitted in this and other identified sensitive aquatic habitats.

2. We acknowledge your rational and support for the gravity tunnel alternative.

3. Since the publication of the EISPN, the City has revised the force main alternative under Kaneohe Bay to omit any planned staging of construction within the Bay. However, the Draft EIS will discuss potential contingency measures that may require work in the Bay.

4. In the event of a failure of the influent pump station (lift pump) in the gravity tunnel alternative, the tunnel itself will store the wastewater. In the force main alternative, failure of the pump station will require wastewater to be stored in the proposed equalization facilities. It should be noted that at the Kaneohe Wastewater Pre-Treatment Facility (WWPTF), the abandoned tanks formally used for the treatment plant are currently being used to store peak flows.

5. Odor abatement will be provided for both alternatives as well as for proposed improvements at Kailua Regional Wastewater Treatment Plant (WWTP), including the replacement of the headworks and sludge dewatering buildings.

6. The Draft EIS will include traffic assessments for both alternatives.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

OCT 04 2010

EM

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

We urge the City DOB & its consultants to seek modification of the settlement with the DOJ & EPA & other parties to take into account the possible savings to the taxpayers if the gravity tunnel can be used instead of the force main. If there are both capital construction cost savings and operations/maintenance/no need holding tanks then the gravity fed system is way more sustainable.

(include additional sheets as necessary)

PLEASE PRINT: Name: Linda Howl Phone: 497-8813

Organization:

Address: 44-116 Kalenakai Place
Kaneohe HI 96744

Email: lindamhowe@abinc.com

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

EIS Scoping Comments
If you want written response, include ret. add/email

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7801-01
January 6, 2011

Ms. Linda Howl
44-116 Kalenakai Place
Kaneohe, HI 96744

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Ms. Howl:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment). We acknowledge your support for the gravity tunnel alternative, as discussed at the meeting.

The City is taking a three-prong approach to determining a preferred alternative. This includes the Preliminary Engineering Report, which evaluates the long term cost for each alternative; the EIS, which evaluates the environmental and social impacts of each alternative; and, the community outreach process which evaluates community values relating to the alternatives. Upon a determination of a preferred alternative, the City will hold discussions with the Environmental Protection Agency (EPA), the courts, and other parties involved with the Consent Decree.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

RECEIVED
OCT 13 2010
WILSON OKAMOTO CORPORATION

SUBJECT: KANEOHE – KAILUA WASTEWATER CONVEYANCE AND TREATMENT FACILITIES PROJECT
EIS Public Information / Scoping Meeting
Tuesday, September 28, 2010

MY CONCERN IS THE AMOUNT OF NOISE THAT IS GENERATED AT THE KAILUA WWTF. THE EXTREAMLY LOUD HISSING FROM AIR COMPRESSORS, THE HIGH PITCHED FREQUENCIES AND WHINES FROM MOTORS/GENERATORS, THE BANGING, THE EMERGENCY BUZZERS WHICH CONTINUALLY GO OFF INDICATING TO ME THAT THIS FACILITY IS IN A CONTINUAL STATE OF EMERGENCY. NOT TO MENTION THE TRUCK TRAFFIC WITH THEIR AIR HORNS AND BACKUP BEEPERS. WHEN I COMPLAIN, I AM TOLD THAT THIS IS EITHER ROUTINE MAINTENCE OR AN EQUIP. FAILURE EG. SCRUBBER GONE DOWN. THIS HAS BEEN GOING ON NOW FOR TWENTY YEARS !!! I GUESS MY QUESTION IS "WHEN IS THE NOISE GOING TO STOP?" PLEASE INCLUDE IN YOUR ENVIRONMENTAL IMPACT STATEMENT (EIS) THAT THE NOISE FROM THIS FACILITY AND ANY OTHER HEALTH RELATED ISSUES, MEET ALL HEALTH REGULATIONS FOR A RESIDENTIAL NEIGHBORHOOD.

(include additional sheets as necessary)

PLEASE PRINT: Name: JIM CROCKETT Phone: 254-4963

Organization:

Address: 116 KANEOHE BAY DRIVE
KAILUA HAWAII 96734-1706

Email:

Please submit comments by Tuesday, October 12, 2010
or email kkwastewater@wilsonokamoto.com

WILSON OKAMOTO CORPORATION
PROJECTS | PLANNERS | CONSULTANTS

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7801-01
January 6, 2011

Mr. Jim Crockett
116 Kaneohe Bay Drive
Kailua, HI 96734-1706

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project
Environmental Impact Statement Public Information/Scoping Meeting

Dear Mr. Crockett:

Thank you for the comments you provided following the Environmental Impact Statement (EIS) Public Information/Scoping Meeting held on September 28, 2010 (see attachment).

The Kailua Regional Wastewater Treatment Plant (WWTP) is subject to the noise requirements of the State Department of Health, pursuant to Chapter 46, Title 11, *Community Noise Control*, Hawaii Administrative Rules. The rules limit noise levels by zoning districts. The Kailua Regional WWTP is regulated according to residential noise limits. The excessive noise levels that you mention may be related to ongoing construction activities at the plant. Construction activities may exceed the permissible noise standards if a permit is obtained. Such construction noise, however, must be confined to the hours of 7 a.m. to 6 p.m. on weekdays and 9 a.m. to 6 p.m. on Saturdays.

As discussed in the forthcoming Draft EIS, the proposed construction activities for both major alternatives and proposed improvements at the Kailua Regional WWTP are also subject to these rules.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EIS scoping process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Enclosures

Environmental Impact Statement Preparation Notice Comment and Response Letters

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF: CEPOH-EC-T

July 9, 2010

Civil Works Technical Branch

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

JUL 12 2010

Dear Mr. Matsukawa:

Thank you for the opportunity to review and comment on the Environmental Assessment/Environmental Impact Statement Preparation Notice (EA/EISPN) for the Kaneohe/Kailua Wastewater Conveyance and Treatment Facilities, Oahu (TMKs 4-4-8: 1; 4-4-11: 3, 81-83; 4-5-30: 1, 36 and 47; 4-2-15: 9; 4-2-17: 1, 16, 18 and 21; 4-4-12: 1, 2, 64 and 65; 4-5-31: 76; 4-5-32: 1; 4-5-38: 1; 4-5-100: 1-4 and 52; and, 4-5-101: 33-38).

The proper Flood Insurance Rate Maps were used for the correct flood hazard zone designations as discussed on page 3-13 (paragraph 3.3.4) of the EA; however, the incorrect dates are referenced. Please revise the FIRM Panel references to read as follows:

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, Community Panel Numbers 15003C0270G dated June 2, 2005 and 15003CO290F dated September 30, 2004.....

The documents have been forward to Mr. George Young, Chief, Regulatory Branch for review and comments. They will reply to you under separate cover (telephone: 438-9258).

Should you require additional information, please contact Ms. Jessie Dobinchick of my staff at (808) 438-8876.

Sincerely,

Michael F. Wong

Michael F. Wong, P.E.
Acting Chief, Civil Works Technical Branch

Copy Furnished:
Mr. Jack Pobuk, P.E.
City and County of Honolulu
Department of Environmental Services
1000 Uiu Ohia Street, Suite 308
Kapolei, Hawaii 96707

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7801-01
January 6, 2011

Mr. Michael F. Wong, P.E.
Department of the Army
U.S. Army Corps of Engineers
Honolulu District
Civil Works Technical Branch
Fort Shafter
Honolulu, Hawaii 96858

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Mr. Wong:

Thank you for your letter dated July 9, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We appreciate your confirmation of the flood hazard zone designations. We will cite the correct dates for the referenced FIRM panel numbers in the Draft Environmental Impact Statement (EIS).

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

United States Department of the Interior
U.S. GEOLOGICAL SURVEY
Pacific Islands Water Science Center
677 Ala Moana Blvd., Suite 415
Honolulu, Hawaii 96813
Phone: (808) 587-2400/Fax: (808) 587-2401

TAKE PRIDE IN AMERICA

July 9, 2010

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Environmental Assessment/Environmental Impact Statement Preparation Notice, Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities, Koolaupoko, Island of Oahu, Hawaii, Tax Map Keys: 4-4-08: 01, 4-4-11: 81; 4-5-30: 01, 36 and 47; 4-2-15: 09; 4-2-17: 01; 16, 18 and 21; 4-4-11: 03, 81, 82, and 83; 4-4-12: 01, 02, 64 and 65; 4-5-30:01 and 36; 4-5-31: 76; 4-5-32: 01; 4-5-38: 01; 4-5-100: 01, 02, 03, 04 and 52; and 4-5-101: 33, 34, 35, 36, 37 and 38

Thank you for forwarding the subject Environmental Assessment/Environmental Impact Statement Preparation Notice for review and comment by the staff of the U.S. Geological Survey Pacific Islands Water Science Center. We regret however, that due to prior commitments and lack of available staff, we are unable to review this document.

We appreciate the opportunity to participate in the review process.

Sincerely,

Stephen S. Anthony
Center Director

cc: Mr. Jack Pobuk, P.E., City and County of Honolulu Department of Environmental Services

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7801-01
January 6, 2011

Mr. Stephen S. Anthony, Center Director
United States Department of Interior
U.S. Geological Survey
Pacific Islands Water Science Center
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment/Environmental Impact Assessment Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Mr. Anthony:

Thank you for your letter dated July 9, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We acknowledge that your department was unable review this document due to prior commitments and lack of available staff.

Your letter, along with this response, will be reproduced in the forthcoming Draft Environmental Impact Statement (EIS). We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF:

July 21, 2010

Regulatory Branch

File Number POH-2010-0177

Wilson Okamoto Corporation
Attention: Mr. Earl Matsukawa
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
JUL 23 2010
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

We have received your request for the Department of the Army to review and comment on the Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN) for the proposed Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities, in Koolaupoko, Island of Oahu, Hawaii. We have assigned the project the reference number **POH-2010-0177**. Please cite the reference number in any future correspondence concerning this project. We completed our review of the submitted document pursuant to Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and Section 404 of the Clean Water Act (Section 404).

Section 10 requires that a Department of the Army (DA) permit be obtained from the U.S. Army Corps of Engineers (Corps) prior to undertaking any construction, dredging and other activities occurring **in, over, or <u>under</u> navigable waters of the U.S., including the upper limit of adjacent wetlands.** The line of jurisdiction extends to the Mean High Water Mark for tidal waters. Section 404 requires that a DA permit be obtained for the discharge (placement) of dredge and/or fill material into waters of the U.S., including wetlands. The line of jurisdiction extends to the Mean Higher High Water Mark for tidally influenced waters, the Ordinary High Water Mark for non-tidal waters and the approved delineated boundary for wetlands.

Based on the information provided, the project site abuts the Pacific Ocean, a navigable water subject to Corps jurisdiction. Additionally, as the Kaneohe and Kawa Streams discharge directly into Kaneohe Bay and eventually the Pacific Ocean, their downstream reaches are likely tidally-influenced waters of the U.S., subject to Corps jurisdiction. According to Chapter 3, Page 7 of the EA/EISPN, "the proposed tunnel route will traverse **beneath** the Kaneohe, Kawa and Keaalu Streams," therefore, Section 10 authorization may be required should activities occurring in, over or under these water bodies extend seaward of the Mean High Water Mark. It does not appear the Keaalu Stream is tidally influenced therefore Section 10 authorization should not be required for work **under** this water body. In addition, Chapter 3, Page 7 of the EA/EISPN also states, "the proposed force main corridor route will directly enter the substrata beneath Kaneohe Bay," a traditionally navigable water subject to Corps jurisdiction, requiring the need for Section 10 authorization. Be advised, the requirement for Section 10 authorization extends to activities

occurring in, over or **under** adjacent estuarine wetlands. In addition, work activity including those activities for dewatering and excavating purposes in tidally-influenced water bodies, including streams, requires authorization under Section 10. Additionally, should that work result in discharge of fill material into the water body, authorization under Section 404 may be required.

The EA/EISPN does not provide sufficient information to allow the Corps to determine if the project site encompasses additional unidentified waters of the U.S. or whether such waters are proposed for impact, which may require authorization under Section 10 and/or Section 404. When developing the Environmental Impact Statement (EIS), we recommend you conduct a thorough aquatic resource survey, describing any wetlands, drainage ditches, gulches, gullies, streams, etc., on-site, especially those that may be impacted by any of the proposed project components. In addition, include sufficient information concerning the scope of work, including the use of Best Management Practices, i.e. silt fences and sandbag berms within the vicinity and in close proximity to potentially regulated bodies of water.

Only the Corps of Engineers has the authority to determine if any of these aquatic features are or are not waters of the U.S., potentially subject to regulation under Section 10 and/or Section 404. As such, we encourage the applicant to submit a request for an approved jurisdictional determination (JD) for these water bodies. Your request to the Corps should include descriptions of aquatic features proposed for impact, including whether or not they are tidally influenced, flow duration of each feature and the flow path of each feature into navigable waters. For instance: "the unnamed ditch contains flow for two consecutive weeks annually and, from the project impact site, flows for 700 linear feet prior to discharge into X Stream. X Stream flows year-round and flows 1,200 feet prior to discharge into the Pacific Ocean. The lower 200 linear feet of X Stream is influence by the tide." For wetlands, you should submit a wetland delineation conducted in accordance with the Corps of Engineers 1987 Wetland Delineation Manual and the Hawai'i and Pacific Islands Regional Supplement. We recommend the applicant also provide a vicinity map, map of the water bodies and flow paths and on-site photographs so the Corps may prepare an approved JD, if necessary.

If any water bodies are determined to be waters of the U.S., the applicant must obtain authorization from the Corps prior to discharge of dredged or fill material into these water bodies. Fill material, permanent or temporary, may include, but is not limited to: rock, dirt, sand, sandbags, concrete, piping a water of the U.S. or diverting a water of the U.S. into a pipe. Dewatering effluent from dredging, including filtered and treated effluent, is also considered fill, requiring authorization under Section 404 prior to discharge in waters of the U.S. The applicant should contact the Corps to determine if any of the proposed work constitutes a "discharge of fill" and submit an application and associated drawings that meet our drawing recommendations found at *http://poh.usace.army.mil/EC-R/EC-R.htm*. The Corps will then review the application to ensure it complies with all necessary federal laws and regulations. Note that if the fill results in the loss of waters of the U.S. and/or associated functions, the applicant may be required to provide compensatory mitigation for any unavoidable impacts. A request for an approved JD can be submitted prior to, or concurrently with, an application for the proposed work.

Thank you for contacting us regarding this project and providing us with the opportunity to comment. Should you have any questions, please contact Ms. Jessie Pa'ahana at *808.438.9258* or via email at *Jessie.K.Paahana@usace.army.mil*. Please be advised you can provide comments on your experience with the Honolulu District Regulatory Branch by accessing our web-based customer survey form at *http://per2.nwp.usace.army.mil/survey.html*.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

Copy furnished:
City and County of Honolulu, Department of Environmental Services, Attention: Mr. Jack Pobuk, 1000 Ulu Ohia Street, Suite 308, Kapolei, Hawaii, 96707

WILSON OKAMOTO CORPORATION
Economic Planning Consultants
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7801-01
January 6, 2011

Mr. George P. Young, P.E.
Department of the Army
U.S. Army Corps of Engineers
Honolulu District
Regulatory Branch
Fort Shafter, Honolulu Hawaii 96858

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

File No. PHO-2010-0177

Attention: Ms. Jessie Pa'ahana

Dear Mr. Young:

Thank you for your letter dated July 21, 2010 and for availing your staff to meet with the project team on November 22, 2010 to discuss permit requirements for potential work in U.S. water. We also thank you for regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN).

Your preliminary determination regarding U.S. Army Corps jurisdiction over navigable waters which the project alternatives may traverse beneath is pertinent and the Draft Environmental Impact Statement (EIS) will include a description of these waters. Nevertheless, a precise determination will be requested in conjunction with any potential application for Department of the Army permits pursuant to either Section 10 or Section 404.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME LEINAALA FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:
EMD / WB

LUD-1 4 4 008 001-ID#453
Kaneohe-Kailua WW Conveyance

August 4, 2010

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza Suite 400
Honolulu, Hawaii 96826

RECEIVED
AUG 05 2010
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

Subject: Environmental Assessment / Environmental Impact Statement Preparation Notice
Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
95 Kaneohe Bay Drive, Kailua, Koolaupoko, Island of Oahu, Hawaii 96734
TMK (1) 4-4-008: 001; 4-4-011: 081, 4-5-030: 001, 036 & 047; 4-2-015: 009; 4-2-017: 001, 016, 018 and 021; 4-4-011: 003, 081, 082 and 083; 4-4-012: 001, 002, 064 and 065; 4-5-030: 001 and 036; 4-5-031: 076; 4-5-032: 001; 4-5-038: 001; 4-5-100: 001, 002, 003, 004 and 052; 4-5-101: 033, 034, 035, 036, 037 and 038

Thank you for allowing us the opportunity to review the subject documents and to comment on the environmental assessment / environmental impact statement preparation notice.

We are always satisfied with improvements being planned for our existing wastewater systems. Therefore, we concur with the proposed improvements for construction of the new force main to supplement an existing force main conveying pre-treated wastewater from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules.

Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at 586-4294.

Sincerely,

MARSHALL LUM, P.E., ACTING CHIEF
Wastewater Branch

c: DOH's Environmental Planning Office (EPO I-3245)
City & County of Honolulu, Dept. of Environmental Services

WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS · CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7801-01
January 6, 2011

Mr. Marshall Lum
State of Hawaii
Department of Health
Planning and Design Section
P.O. Box 3378
Honolulu, Hawaii 96801

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Ref. No.: EMD/WB LUD- 1 4 4 008 001-ID#453

Dear Mr. Lum:

Thank you for your letter dated August 4, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We appreciate your concurrence with the proposed improvements for supplementing the existing force main conveying pre-treated wastewater from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant (WWTP). All wastewater plans shall conform to applicable provisions of the Department of Health's Administrative Rules, chapter 11-62, "Wastewater Systems" and will be submitted to you for review.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

IN REPLY REFER TO:

STP 8.0181

August 5, 2010

RECEIVED
AUG 10 2010
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Environmental Assessment (EA)/Environmental Impact Statement
Preparation Notice (EISPN)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project, which proposes to construct a wastewater conveyance and treatment facilities from the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) to the Kailua Regional Wastewater Treatment Plant (WWTP). Two alternative wastewater conveyance and equalization facilities are propose, one of which will be constructed. Alternative 1 will traverse beneath the seafloor of Kaneohe Bay; and Alternative 2 will tunnel from the Kaneohe WWPTF to the Kailua Regional WWTP. Regardless of which conveyance and storage alternative is selected, a new headwork's facility and new dewatering facility are also being proposed at the Kailua Regional WWTP.

Given that there may be some locations that the subject project may cross a State highway Right-of-way, DOT's highways facilities (along H-3 and Mokapu Saddle Road) may be impacted. The DEA will need to address these impacts and identify mitigation measures.

The DOT Highways Division is concluding its review of the subject project for impacts to DOT highway facilities. Upon completion of this review, DOT will provide additional comments as necessary.

DOT appreciates the opportunity to provide comments. If there are any questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

Francis Paul Keeno

for BRENNON T. MORIOKA, Ph.D., P.E.

c: Jack Pobuk, P.E., City & County of Honolulu, Department of Environmental Services

---

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

MICHAEL D. FORMBY
INTERIM DIRECTOR

Deputy Directors
FRANCIS PAUL KEENO
JIRO A. SUMADA

IN REPLY REFER TO:

STP 8.0239

October 6, 2010

RECEIVED
OCT 13 2010
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Environmental Assessment (EA)/Environmental Impact Statement
Preparation Notice (EISPN)

The State Department of Transportation (DOT) previously commented on the SMA/ DEA for the subject project in its letter STP 8.0181 dated August 5, 2010 (attached). DOT now offers the following supplemental comments:

1. The facilities to be constructed within the confines of the Kaneohe and Kailua facilities will not impact the DOT highway facilities.
2. The two alternatives will not impact the DOT highway facilities under normal operation. However, appropriate coordination will be needed to mitigate any construction related impacts.
3. DOT is concerned that a rupture of the Alternative 1 force main within the vicinity of the Interstate H-3 and Kaheohe Bay Drive interchange may result in the undermining of some portion of the interchange structures. Appropriate provisions should be taken to prevent such an event.
4. Alternative 2 appears to be less susceptible to rupture through the access point at Mokapu Saddle Road. If it were to remain as a permanent access point, coordination with DOT Highways Division may be needed.

DOT appreciates the opportunity to provide comments. If there are any questions, including the need to meet with Highways Division staff, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Very truly yours,

Francis Paul Keeno

for MICHAEL D. FORMBY
Interim Director of Transportation

Attachment: STP ltr 8.0181 dtd 8/5/10

c : Jack Pobuk, C & C of Honolulu, Department of Environmental Services

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS
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Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
www.wilsonokamoto.com

7801-01
January 6, 2011

Mr. Glenn Okimoto, Acting Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Ref. No.: STP 8.0181 (August 5, 2010) and STP 8.0239 (October 6, 2010)

Attention: Mr. David Shimokawa

Dear Mr. Okimoto:

Thank you for your letters dated August 5, 2010 and October 6, 2010, respectively, regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement (EIS) Preparation Notice. We offer the following responses to your comments:

Letter Dated August 5, 2010:

The forthcoming Draft EIS will identify locations where the subject project alternatives may cross State highway rights-of-way and DOT's highway facilities. It will further discuss how these crossings will be constructed and how this may impact traffic along these facilities. Mitigation measures such as preparation of a traffic management plan during construction and restriction of construction times in these roadways will also be discussed.

Letter Dated October 6, 2010:

1. We appreciate your determination that the proposed project alternatives will not impact DOT highway facilities.

2. Upon determination of the alternative to be pursued, your department will be consulted to coordinate mitigation measures for potential construction related impacts.

3. Should any wastewater be released by damage to the force main in Alternative 1, the City will have the ability to immediately detect the problem and divert flows into the existing force main until repairs can be

implemented. While the force main is being repaired, any potential undermining can be investigated and appropriate measures taken to avoid damages to structures.

4. Should Alternative 2 (Gravity Tunnel) be pursued, the DOT Highways Division will be consulted to coordinate construction of the access shaft on the Board of Water Supply Reservoir site, which is adjacent to Mokapu Saddle Road.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 5, 2010

Wilson Okamoto Corporation
1907 South Beretania Street Suite 400
Honolulu, Hawaii 96826

RECEIVED
AUG 06 2010
WILSON OKAMOTO CORPORATION

Attention: Mr. Earl Matsukawa, AICP

Ladies and Gentlemen:

Subject: Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Division of State Parks, Land Division-Oahu District, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Historic Preservation will be submitting comments through a separate letter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Morris M. Atta
Acting Administrator

Cc: Department of Environmental Services

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
STATE PARKS
'10 JUL 12 A11:0
DEPT OF LAND & NATURAL RESOURC

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 6, 2010

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu District
__ Historic Preservation

RECEIVED
LAND DIVISION
2010 JUL 15 P 1:48
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: Charlene Unoki, Assistant Administrator Charlene
SUBJECT: Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
LOCATION: Island of Oahu
APPLICANT: Wilson Okamoto Corporation on behalf of City & County of Honolulu, Department of Environmental Services

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by August 5, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: [signature]
Date: 7/14/10

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 6, 2010

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division –Oahu District
-- Historic Preservation

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
LOCATION: Island of Oahu
APPLICANT: Wilson Okamoto Corporation on behalf of City & County of Honolulu, Department of Environmental Services

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by August 5, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

Comments:
The placement of wastewater related improvements across State owned lands requires a land disposition, inclusive of submerged lands.

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: T. Chee
Date: July 19, 2010

WILSON OKAMOTO CORPORATION

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7801-01
January 6, 2011

Mr. Russell Tsuji, Administrator
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Mr. Tsuji:

Thank you for your letter dated August 5, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We offer the following comment in response to the comments offered by the Land Division – Oahu District:

- We acknowledge that placement of wastewater related improvements across State owned lands, inclusive of submerged lands, requires a land disposition. Such disposition shall be sought, if required for the selected alternative.

- We further acknowledge that the Division of State Parks has no comments to offer.

Your letter, along with this response, will be reproduced in the forthcoming Draft Environmental Impact Statement (EIS). We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801-3378

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

In reply, please refer to
File

RECEIVED
AUG 10 2010
WILSON OKAMOTO CORPORATION

August 09, 2010

EM

TO: Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation

FROM: Russell S. Takata, Program Manager
Indoor and Radiological Health Branch

SUBJECT: Environmental Assessment/Environmental Impact Statement Preparation Notice
Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Our comments should be printed as follows:

"Project activities shall comply with the Administrative Rules of the Department of Health:

- Chapter 11-46 Community Noise Control.

Should there be any questions, please contact me at 586-4701.

c: Mr. Jack Pobuk, P.E., City and County of Honolulu

WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS · CONSULTANTS

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Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
www.wilsonokamoto.com

7801-01
January 6, 2011

Mr. Russell S. Takata, Program Manager
State of Hawaii
Department of Health
Indoor and Radiological Health Branch
P.O. Box 3378
Honolulu, Hawaii 96801

Subject: Draft Environmental Assessment/Environmental Impact Assessment Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Mr. Takata:

Thank you for your letter dated August 9, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). The Draft Environmental Impact Statement (EIS) will discuss compliance with the Department of Health's Administrative Rules, chapter 11-46, "Community Noise Control."

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KUSHELL Y. TSUJI
ACTING DEPUTY

LENORE N. OHYE
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCE ENFORCEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHO'OLAWE ISLAND RESERVE COMMISSION
LNRO
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

August ~~4~~ 24, 2010

EM

RECEIVED
AUG 2 6 2010
WILSON OKAMOTO CORPORATION

Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826
Attention: Mr. Earl Matsukawa, AICP

Subject: Environmental Assessment/Environmental Impact Statement Preparation Notice
Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Mr. Matsukawa,

The Division of Aquatic Resources (DAR) has reviewed the Environmental Impact Statement Preparation Notice (EISPN) for this project and would like to recommend alternative #2 (3 mile on land tunnel) be selected. This alternative will minimize the impacts to aquatic resources more so than alternative #1 ("Force Main No. 2" or the nine-foot diameter tunnel with the force main under Kaneohe Bay). If alternative #1 is selected and connection point(s) is/are required, DAR would like to provide comments on minimizing potential impacts to aquatic resources in Kaneohe Bay when the Draft Environmental Impact Statement is ready for review.

Thank you for the opportunity to comment on this EISPN.

Sincerely,

Francis Oishi, Program Manager
Division of Aquatic Resources

WILSON OKAMOTO CORPORATION
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1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
www.wilsonokamoto.com

7801-01
January 6, 2011

Mr. Francis Oishi, Program Manager
State of Hawaii
Department of Land and Natural Resources
Division of Aquatic Resources
1151 Punchbowl Street, Room 330
Honolulu, Hawaii 96801

Subject: Draft Environmental Assessment/Environmental Impact Assessment Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Mr. Oishi:

Thank you for your letter dated August 24, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We acknowledge your preference for Alternative #2 (sewer tunnel) due to potential impacts of Alternative #1 (supplemental force main) on aquatic resources in Kaneohe Bay. The Draft Environmental Impact Statement (EIS) will provide an assessment of potential impacts of both alternatives on aquatic resource in Kaneohe Bay.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

July 8, 2010

MUFI HANNEMANN, Mayor

RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
WILLIAM K. MAHOE
THERESIA C. McMURDO
ADAM C. WONG

JEOFFREY S. CUDIAMAT, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio

WAYNE M. HASHIRO, P.E.
Manager and Chief Engineer

DEAN A. NAKANO
Deputy Manager

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Your Letter Dated July 2, 2010 Requesting Comments on the Environmental Assessment/Environmental Impact Statement Preparation Notice for the Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities, TMK: 4-4-8:1; 4-4-11:81; 4-5-30:1,36,47; 4-2-15:9; 4-2-17:1,16,18,21; 4-4-11:3,81,82,83; 4-4-12:1,2,64,65; 4-5-30:1,36; 4-5-31:76; 4-5-32:1; 4-5-38:1; 4-5-100:1,2,3,4,52; 4-5-101:33,34,35,36,37,38

Thank you for the opportunity to comment on the proposed Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities project.

The construction drawings should be submitted for our review.

The construction schedule should be coordinated to minimize impact to the water system.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

PAUL S. KIKUCHI
Chief Financial Officer
Customer Care Division

cc: Mr. Jack Pobuck, Department of Environmental Services

Water for Life . . . Ka Wai Ola

WILSON OKAMOTO CORPORATION
ENGINEERS • PLANNERS • CONSULTANTS

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Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
www.wilsonokamoto.com

7801-01
January 6, 2011

Mr. Paul S. Kikuchi, Chief Financial Officer
City and County of Honolulu
Board of Water Supply
Customer Care Division
630 South King Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Attention: Mr. Robert Chun

Dear Mr. Kikuchi:

Thank you for your letter dated July 8, 2010 regarding to the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We acknowledge that the construction drawings will need to be submitted to BWS. Moreover, the construction contractor will be required to coordinate the construction schedule with BWS to minimize impacts on the water system.

Your letter, along with this response, will be reproduced in the forthcoming Draft Environmental Impact Statement (EIS). We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

HONOLULU FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

MUFI HANNEMANN
MAYOR

KENNETH G. SILVA
FIRE CHIEF

ROLLAND J. HARVEST
DEPUTY FIRE CHIEF

July 15, 2010

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
JUL 19 2010
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

Subject: Environmental Assessment/Environmental Impact Statement Preparation Notice
Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii
Tax Map Keys: 4-2-015: 009; 4-2-017: 001, 016, 018, and 021; 4-4-008: 001; 4-4-011: 003, 081, 082, and 083; 4-4-012: 001, 002, 064, and 065; 4-4-011: 081; 4-5-030: 001, 036, and 047; 4-5-031: 076; 4-5-032: 001; 4-5-038: 001; 4-5-100: 001, 002, 003, 004, and 052; and 4-5-101: 033, 034, 035, 036, 037, and 038

In response to your letter of July 2, 2010, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following be complied with:

1. Provide a fire apparatus access road for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction when any portion of the facility or any portion of an exterior wall of the first story of the building is located more than 150 feet (45 720 mm) from a fire apparatus access road as measured by an approved route around the exterior of the building or facility. (1997 Uniform Fire Code, Section 902.2.1.)

2. Provide a water supply, approved by the county, capable of supplying the required fire flow for fire protection to all premises upon which

facilities or buildings, or portions thereof, are hereafter constructed or moved into or within the county.

On-site fire hydrants and mains capable of supplying the required fire flow shall be provided when any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building. (1997 Uniform Fire Code, Section 903.2, as amended.)

3. Submit civil drawings to the HFD for review and approval.

Should you have any questions, please call Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/KN:jl

cc: Jack Pobuk, Department of Environmental Services

WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS · CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7801-01
January 6, 2011

Mr. Kenneth G. Silva, Chief
City and County of Honolulu
Honolulu Fire Department
636 South Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Attention: Battalion Chief Socrates Bratakos
Fire Prevention Bureau

Dear Chief Silva:

Thank you for your letter dated July 15, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). Upon selection of a preferred alternative for construction, design plans for that alternative will be prepared. As applicable, there plans will comply with HFD requirements pertaining to fire apparatus access roads and provision of water supply capable of supplying required flow for fire protection. The civil design drawings will be submitted to HFD for review.

Your letter, along with this response, will be reproduced in the forthcoming Draft Environmental Impact Statement (EIS). We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

KEITH HANNEMANN
MAYOR

LOUIS M. KEALOHA
CHIEF

DELBERT T. TATSUYAMA
RANDAL K. MACADANGDANG
DEPUTY CHIEFS

OUR REFERENCE DMK-DK

July 16, 2010

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
JUL 20 2010
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

This is in response to your letter of July 2, 2010, requesting comments on an Environmental Assessment/Environmental Impact Statement, Preparation Notice, for the Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities project in Koolaupoko.

This project should have no significant impact on the facilities and services of the Honolulu Police Department.

If there are any questions, please call Major Susan Ballard of District 4 at 247-2166.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
DAVE M. KAJIHIRO
Assistant Chief of Police
Support Services Bureau

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

Serving and Protecting With Aloha

WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS · ECONOMISTS
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Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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7801-01
January 6, 2011

Mr. Louis M. Kealoha, Chief
City and County of Honolulu
Police Department
801 South Beretania Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Ref. No: DMK-DK

Attention: Major Suzan Ballard, District 4

Dear Chief Kealoha:

Thank you for your letter dated July 16, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We appreciate your confirmation that the project should have no significant impact on the facilities and services of the Honolulu Police Department.

Your letter, along with this response, will be reproduced in the forthcoming Draft Environmental Impact Statement (EIS). We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 - Fax: (808) 768-4730 - Internet: www.honolulu.gov

KIRK W. CALDWELL
ACTING MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

SHARON ANN THOM
DEPUTY DIRECTOR

KENNETH TORU HAMAYASU P.E.
DEPUTY DIRECTOR

TP7/10-373791R

July 27, 2010

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
JUL 28 2010
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

Subject: Environmental Assessment/Environmental Impact Statement Preparation Notice Kaneohe-Kailua Wastewater Conveyance and Treatment Faculties
Koolaupoko, Island of Oahu, Hawaii

This responds to your request for consultation and comments on the Environmental Assessment/Environmental Impact Statement Preparation Notice (EA/EISPN) for the subject project.

The potential impacts of the project on public transit during construction, and proposed mitigation measures to be taken should be discussed and addressed in Section 3.8 Traffic. The section should provide public transit service information in the subject project area.

Additionally, a Street Usage Permit from our department is required for work that may temporarily close any street, traffic lane, or sidewalk. Please contact our Traffic Signals and Technology Division (TSTD) for further details at 768-8387.

Finally, prior to the start of the project, all affected Neighborhood Boards, residents, and businesses should be informed about the scope and duration of the project.

Thank you for the opportunity to review this matter. Should you have any further questions on the matter, you may contact Ms. Virginia Bisho of my staff at 768-5461.

Very truly yours,

WAYNE Y. YOSHIOKA
Director

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7801-01
January 6, 2011

Mr. Wayne Yoshioka, Director
City and County of Honolulu
Department of Transportation Services
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Ref No.: TP7/10-373791R

Attention: Ms. Virginia Bisho

Dear Mr. Yoshioka:

Thank you for your letter dated July 27, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We offer you the following responses in the order of your comments:

1. The Draft Environmental Impact Statement (EIS) will include a discussion on public transit service information and potential impacts on such service during construction, as well as potential mitigation measures.

2. We acknowledge that a Street Usage Permit from your department is required for work that may temporarily close any street, traffic lane, or sidewalk. It will be cited as an anticipated permit requirement.

3. Selected construction contractor will be required to inform affected Neighborhood Boards, residents, and businesses will be informed of any construction activities, including street closures, that may affect them.

Your letter, along with this response, will be reproduced and the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

MUFI HANNEMANN
MAYOR

CRAIG I. NISHIMURA, P.E.
DIRECTOR

COLLINS D. LAM, P.E.
DEPUTY DIRECTOR

August 3, 2010

EM

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street
Honolulu, Hawaii 96826

RECEIVED
AUG 05 2010
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

Subject: Environmental Assessment/ Environmental Impact Statement Preparation Notice
Kaneohe- Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Thank you for inviting us to review the Submittal for the Environmental Assessment/ Environmental Impact Statement Preparation Notice. The Department of Design and Construction does not have any comments to offer at this time.

Should you have any questions, please me at 768-8480.

Very truly yours,

Craig I. Nishimura, P.E.
Director

CN:pg(373844)

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7801-01
January 6, 2011

Mr. Collins D. Lam, P.E., Acting Director
City and County of Honolulu
Department of Design and Construction
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Mr. Lam:

Thank you for your letter dated August 3, 2010 indicating that you have no comments to offer regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN).

Your letter, along with this response, will be reproduced in the forthcoming Draft Environmental Impact Statement (EIS). We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honolulupd.org • CITY WEB SITE: www.honolulu.gov

KIRK W. CALDWELL
ACTING MAYOR

DAVID K. TANOUE
DIRECTOR

ROBERT M. SUMITOMO
DEPUTY DIRECTOR

10WWB046 (SG)
2010/ELOG-1376

August 13, 2010

EM

RECEIVED
AUG 17 2010
WILSON OKAMOTO CORPORATION

Wilson Okamoto Corporation
Attention: Mr. Earl Matsukawa, AICP
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Environmental Assessment/Environmental Impact Statement Preparation Notice
Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

This is in response to your letter of July 2, 2010, requesting comments for the proposed Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities. We have reviewed the EA/EIS Preparation Notice and have the following comments:

1. The Draft Environmental Impact Statement (DEIS) should include a discussion of relevant objectives and policies of the City's General Plan and Koolaupoko Sustainable Communities Plan.

2. The DEIS should also discuss the Public Infrastructure Map (PIM). In accordance with Section 4-8.3 Revised Ordinances of Hawaii (ROH), major improvements to municipal wastewater facilities (such as new sewage pump stations) are required to be shown on the City's PIM. The Department of Environmental Services (ENV) submitted an application to the Department of Planning and Permitting (DPP) in March of 2007 to revise the Koolaupoko PIM by adding a Sewage Treatment Plant/Modification (STP/M) symbol for improvements to the Kailua Regional Wastewater Treatment Plant (WWTP). The revision (2007/PIM-4) was approved by the City Council as Resolution 07-146 in June 2007. As such, the new influent pump station proposed in Alternative 2 and other improvements proposed for the Kailua Regional WWTP for this project will not require a revision to the Koolaupoko PIM because there is an existing STP/M symbol (PIM# 029).

   There is no PIM symbol for the Kaneohe Wastewater Pre-Treatment Facility (WWPTF). Therefore, if a new sewage pump station is to be constructed at the Kaneohe WWPTF, it will require a revision to the Koolaupoko PIM prior to the budgeting of land acquisition and/or construction funds in accordance with Section 4-8.1(c) and 4-8.3(16) ROH.

3. The DEIS should provide a site plan and cross section drawings that illustrate the number and location of the proposed equalization facilities for the Kaneohe WWPTF and the Kailua WWTP.

4. Special Management Area (SMA) and Shoreline Setback Requirements: The DEIS should include a section which describes the elements of the proposed project (each alternative) that will occur within the SMA and address their anticipated impact in the context of the SMA regulations, Chapter 25, ROH. Similarly, the DEIS should describe what activity will occur within the 40-foot shoreline setback area, and include a cross section exhibit which shows the project relative to the shoreline setback area. The DEIS also should discuss how the proposed project may impact the shoreline setback area.

5. Preface: This section of the DEIS should clarify what is expected by the EPA in its Stipulated Order of 2007. We suggest that some of the information discussed in Section 1.4.2 Regulatory Mandate, be presented in this section. A copy or excerpts of the Order should be attached as an appendix.

6. Section 2 – Alternative and Proposed Action: A very thorough discussion of the alternative analysis is necessary. The criteria/characteristics by which each of the alternatives was evaluated should be revealed. A matrix would be helpful to compare each alternative against their respective characteristics. There should be some empirical information, including costs, as well as a discussion of safety or reliability risks associated with each alternative and/or alignment. The DEIS should clearly describe how the preferred alignment was determined.

7. Section 2.4.2 Alternative 2 - Sewer Tunnel: The DEIS should address whether the construction of the sewer tunnel could create any potential rock fall or other geological hazards (ex., from vibration), and, if possible, provide mitigation measures.

8. Sections 3.3.2 Groundwater and 3.3.3 Coastal Waters: These sections must thoroughly discuss how ground water supplies and ocean waters would be protected should the conveyance of wastewater be compromised in either system (under bay force main or tunnel system). The mitigation and contingency plans for wastewater leaks or catastrophic failure should be described. The details of the construction of the mid-Kaneohe Bay connection points for the force main proposal should be discussed in the context of the potential coastal water impacts. We also believe that a very thorough discussion of the potential risks of the large volumes of wastewater which will remain below grade in the tunnel alternative must be provided.

9. Section 3.10 Infrastructure and Utilities, Impacts and Mitigation Measures: The reason cited for not anticipating any impacts to existing utilities appears contradictory, since some of the existing utilities noted are also below the ground surface.

10. Section 4.2 Permits and Approvals, City and County of Honolulu: The following permits should be included: a) Stockpiling, b) Dewatering, and c) Subdivision application to establish all necessary easements.

Should you have any questions, please contact Mr. Scott Gushi of the Wastewater Branch at 768-8207.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:dl
[789750]

cc: ENV

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www.wilsonokamoto.com

7801-01
January 6, 2011

Mr. David K. Tanoue, Director
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 3rd Floor
Honolulu Hawaii 96813

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Ref. No.: 10WWB046 (SG) 2010/ELOG-1376

Attention: Mr. Scott Gushi

Dear Mr. Tanoue:

Thank you for your letter dated August 13, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We offer the following responses in the order of your comments:

1. The Draft Environmental Impact Statement (EIS) will include a discussion of the objectives and policies the City's General Plan and Koolaupoko Sustainable Communities Plan that are relevant to the proposed alternative project.

2. Thank you for acknowledging that the Department of Environmental Services' (ENV) application to revise the Koolaupoko Public Infrastructure Map (PIM) was approved by the City Council in June 2007. Neither of the proposed project alternatives will require a new sewage pump station at the Kaneohe Wastewater Pre-Treatment Facility (WWPTF). Alternative 1 (Force Main No.2), if selected as the preferred alternative, will utilize the existing pump station which currently services the existing Force Main No. 1.

3. The Draft EIS will include a site plan and cross sectional drawings illustrating the location of the equalization facility proposed for the Kaneohe WWPTF and Kailua Regional Wastewater Treatment Plant (WWTP), respectively.

4. Special Management Area (SMA) and Shoreline Setback Requirements: The Draft EIS shall discuss and depict the portions of the project alternatives that will lie within the SMA and describe how those portions will cross and impact the 40-foot shoreline set back area.

5. Preface: Typically we reserve the preface for an explanation of the proposed project's requirements relative to Chapter 343, Hawaii Revised Statutes. The requirements of the 2007 Stipulated Order are discussed in Chapter 1, Background, including Section 1.4.2, Regulatory Mandates. We will provide a link to the projects' website where the Consent Decree and Stipulated Order.

6. Section 2 – Alternative and Proposed Action: The Draft EIS will discuss how the alternatives were considered and evaluated, and how each of the major alternatives was selected for further evaluation.

7. Section 2.4.2 Alternative 2 – Sewer Tunnel: The Draft EIS will discuss the potential impacts of constructing the gravity tunnel including noise and vibration. Vibration levels that could increase rockfall hazard would not be allowed.

8. Section 3.3.2 Groundwater and 3.3.3 Coastal Water: Alternative 1 (Force Main No.2) has been modified to exclude any required work within Kaneohe Bay. Work in Kaneohe bay will be limited to contingency situations that could potentially arise. Mitigation associated with these contingency situations will be described.

   Alternative 2 (Gravity Tunnel) has the potential for encountering ground water resources in fractured basal formations. Methods of sealing of these formations as the tunnel is being bored will be discussed.

9. Section 3.10 Infrastructure and Utilities, Impacts and Mitigation Measures: The alignments and depths of the proposed alternatives were selected to completely avoid impacts to underground utilities. The only potential conflict may be a section of Alternative 1 (Force Main No.2) along Kaneohe Bay Drive, from the H-3 interchange to the Kailua Regional WWTP. This portion will be constructed by open trench, auger boring, or micro tunneling. Potential impacts to existing utilities along this section will be discussed in the Draft EIS.

10. Section 4.2 Permits and Approvals, City and County of Honolulu: The Draft EIS will additionally list the following permits:
    - Stockpiling;
    - Dewatering; and,
    - Subdivision application

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

HOUSE OF REPRESENTATIVES
STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

August 4, 2010

Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826
ATTN: Earl Matsukawa, AICP

RECEIVED
AUG 06 2010
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

Thank you for your letter dated July 2, 2010 regarding the Kaneohe to Kailua Wastewater Facilities Plan, in which you outline the investigation of two alternative improvements to the wastewater conveyance system in the Kaneohe-Kailua wastewater service area as well as the attached Environmental Assessment/Environmental Impact Statement Preparation Notice (EISPN). In previous correspondence, I related my serious concerns about both of the proposed plans regarding the Kailua Regional Wastewater Treatment Plant (KWTP). After review of the EISPN, I still have my concerns about these options. I realize that both options call for improved mitigation measures for hydrogen sulfide emissions by KWTP, but without further information, I have doubts as to the effectiveness of these measures.

I also realize that one of these options is necessary to meet the Stipulated Order issued by the Environmental Protection Agency (EPA) in May 2007, and that time is of the essence to meet the 2014 deadline for compliance. However, I still feel that whichever option is pursued, the need to upgrade KWTP is necessary. An increase in the volume of wastewater transmitted to KWTP will simply exacerbate a long-standing problem in our community, absent mitigation measures.

If I understand the EISPN correctly, the tunnel alternative includes odor control at the drop shaft, on the Kaneohe side of the main. Sewage could then be pumped

into the KWTP by means of a new influent pump station, which would incorporate another means of odor control.

The force main alternative does not allow for excess stormwater being stored, necessitating an equalization facility of up to 7 million gallons on the Kaneohe side of the tunnel, and one of up to 3 million gallons on the KWTP side. Under both alternatives, there are odor emission controls being made to KWTP itself.

Given that further discussion of odor controls will be forthcoming in the draft EIS statement, my comments can only apply to what is presented in the EISPN. As the EISPN stands now, it would appear that the tunnel alternative presents the better option in terms of odor control, and would be a better option for the Kailua community.

However, as I stated in my previous letter, this does not represent support for the project. At this time, I cannot support the project without knowing more about the odor control systems for KWTP (forthcoming in the draft EIS).

I do look forward to learning more about the odor control systems envisioned for KWTP and I would appreciate if you could arrange a community briefing regarding the odor control measures and options so that members of the affected communities can be present.

Sincerely,

Cynthia Thielen

Representative Cynthia Thielen
Assistant Minority Leader
50th District (Kailua – Kaneohe Bay)

cc: Charles Prentiss, Kailua Neighborhood Board
Claudine M. Tomasa, Kailua Neighborhood Board
Ikaika Anderson, Honolulu City Council, 3rd District
Chiyome Fukino, Director, Department of Health
Lawrence Lau, Deputy Director for Environmental Health
Gay Kong, Principal, Aikahi Elementary School
Randy Scoville, Vice Principal, Aikahi Elementary School

Representative Cynthia Thielen 50th District (Kailua-Kaneohe Bay)
Phone: 808.586.6480 Fax: 808.586.6481 Email: repthielen@capitol.hawaii.gov

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7801-01
January 6, 2011

Ms. Cynthia Thielen, Assistant Minority Leader
50th District (Kailua – Kaneohe Bay)
State of Hawaii
415 South Beretania Street
Honolulu, Hawaii 96809

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Representative Thielen:

Thank you for your letter dated August 4, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We appreciate your concern regarding the generation of odors from both the Kaneohe Wastewater Pre-Treatment Facility (WWPTF) and the Kailua Regional Wastewater Treatment Plant (WWTP). The forthcoming Draft Environmental Impact Statement (EIS) will describe odor control for the proposed alternative facilities. It will also discuss replacement of the existing headworks and the sludge dewatering buildings. Both of these existing facilities are significant sources of odors that will be addressed by the replacement facilities. We also wish to clarify that, based on the Koolaupoko Sustainable Communities Plan, the wastewater flow generated by the resident population, businesses, and other developments within the service area to the Kailua Regional WWTP is not anticipated to increase.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

KO`OLAUPOKO HAWAIIAN CIVIC CLUB

October 5, 2010

Mr. Timothy E. Steinberger, P.E.
Director
Department of Environmental Services
City & County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, HI 96707

Re: Kane`ohe-Kailua Wastewater Conveyance and Treatment Facilities Project Core Working Group Participation Program
Kane`ohe and Kailua, Island of O`ahu, Hawai`i

Dear Mr. Steinberger:

Mahalo for including us in your consultation regarding the need to provide emergency backup support for wastewater disposal here in the Kane`ohe bay region to address a directive from the Environmental Protection Agency (EPA) for compliance with federal water quality requirements.

The Ko`olaupoko Hawaiian Civic Club, established in 1937, has a long history of advocating for the protection of our natural and cultural resources in this region. It is for this reason that we have taken very seriously the EPA's view toward helping improve the security of wastewater conveyance, treatment and disposal, and also toward the protection of resources here in Kane`ohe bay communities.

As a result of reviewing the materials provided by your consultant, Wilson Okamoto Corporation, and information gathered from several meetings of your project's "Core Working Group", the Ko`olaupoko Hawaiian Civic Club **strongly urges** the City & County of Honolulu to revisit a third alternative for compliance with the EPA's directive: routing the back-up sewer main along Mokapu Saddle Road. This alternative is our preferred alternative.

We have heard the arguments provided by your consultants regarding what they consider to be higher costs for the Mokapu Saddle Road alternative. It is difficult for us to believe that construction of the shorter tunnel and a force main along the saddle road would cost more than a pipe installed under Kane`ohe bay or through the ridge that separates the ahupua`a of Kane`ohe and Kailua. Have you considered the cost of potential environmental damage from your two preferred options? Is the risk worth the purported "lower cost options"? The Mokapu Saddle Road is our preferred alternative.

It is our view that both of your preferred options – Kane`ohe bay and the mountain tunnel – are more environmental destructive than the Saddle Road alternative. We are concerned that a pipeline under the bay poses potential threats to a priceless coral reef system and the ocean resources held within the bay; and that a pipeline through what you refer to as "Oneawa Hills" offers other risks to the stability of structures alongside both the Kane`ohe and Kailua sides of that ridge. Therefore, we reiterate: the Mokapu Saddle Road is our preferred alternative.

We are hopeful that -- between your staff engineers and estimators, those of your consultants, and the EPA -- you will find a cost-effective way to avoid the greater hazards to our natural resources by pursuing your two preferred options and imposing threats to the valuable resources of Kane`ohe bay and our mountain ridgeline and homes/structures built upon it.

Again, we appreciate your reaching out for our mana`o (comments). We hope that our recommendations will be taken to heart and that earnest efforts will be made to find a cost-effective approach to utilizing the Mokapu Saddle Road route for the new force main.

We also urge the EPA to intervene in this matter to protect our environmental assets, and to allow the additional time needed for installation of the force main along the Saddle Road route. If the EPA allows the City to pursue either of its two preferred alternatives, then we ask that a mitigation plan be developed and implemented before any construction begins.

Aloha and best wishes to you all in the work ahead.

Me kealoha pumehana,

Mahealani Cypher

MAHEALANI CYPHER
Ko`olaupoko Hawaiian Civic Club

cc: Wilson Okamoto Corporation
Environmental Protection Agency Region 9
Hawai`i Department of Health
Kane`ohe Neighborhood Board
Kahalu`u Neighborhood Board
Kailua Neighborhood Board
Councilmember J. Ikaika Anderson
Rep. Ken Ito
Rep. Pono Chong
Rep. Jessica Wooley
Sen. Jill Tokuda
Sen. Clayton Hee

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koolaupokohcc.org

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www.wilsonokamoto.com

7801-01
January 6, 2011

Ms. Mahealani Cypher
Koolaupoko Hawaiian Civic Club
P.O. Box 664
Kaneohe, HI 96744

Subject: Draft Environmental Assessment/Environmental Impact Statement Preparation Notice for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities
Koolaupoko, Island of Oahu, Hawaii

Dear Ms. Cypher:

Thank you for your letter dated October 5, 2010 regarding the subject Draft Environmental Assessment (EA)/Environmental Impact Statement Preparation Notice (EISPN). We acknowledge your preference for the alternative you refer to as the Mokapu Saddle Road. The Draft Environmental Impact Statement (EIS) will include a thorough discussion of the various land route alternatives considered and subsequently dismissed in favor of the two major alternatives addressed in the Draft EIS.

Your letter, along with this response, will be reproduced in the forthcoming Draft EIS. We appreciate your participation in the EISPN review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Jack Pobuk, P.E.
Department of Environmental Services

WILSON OKAMOTO
C O R P O R A T I O N

ENGINEERS | PLANNERS | CONSULTANTS

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