

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



March 1, 2013

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Deputy Manager and Chief Engineer

Ms. Loretta J. Fuddy, A.C.S.W., M.P.H., Director
Office of Environmental Quality Control
Department of Health
State of Hawaii
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Ms. Fuddy:

Subject: Final Environmental Assessment for Waimalu Wells I Rock Fall Mitigation
and Drainage Improvements, Aiea, Oahu, Hawaii,
TMK: 9-8-26:72, 9-8-45:36 & 37 and Various Plats and Parcels

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OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

The Honolulu Board of Water Supply (BWS) submits the Final Environmental Assessment and Finding of No Significant Impact (FEA-FONSI) for the Waimalu Wells I Rockfall Mitigation and Drainage Improvements situated at TMK 9-8-26:72, 9-8-45:36 & 37 and Various Plats and Parcels, in the Ewa District on the Island of Oahu for publication in the next available edition of the Environmental Notice.

The BWS has included copies of comments and responses received during the 30-day public comment period on the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI).

Enclosed is a completed OEQC Publication Form, two copies of the FEA-FONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of action in a text file by electronic mail to your office.

If you have any questions, please contact Michael Domion at 748-5743.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Enclosures
cc: Shimabukuro, Endo & Yoshizaki, Inc.

DRAFT
PUBLICATION FORM (JULY 2012 REVISION)

Project Name: Waimalu Wells I Rock Fall Mitigation and Drainage Improvements
Island: Oahu
District: Ewa
TMK: 9-8-26:72, 9-8-45:36 & 37 and Various Plats and Parcels
Permits: NPDES, Chapter 55 Water Pollution Control, Community Noise Control, Perform Work on State Highways Property, Building, Grading, Drain Connection, Subdivision for Easements, One-Time Review including Drainage Report

Proposing/Determination Agency: Honolulu Board of Water Supply
(Address, Contact Person, Telephone) 650 S. King Beretania Street
Honolulu, Hawaii 96843
Gregory Shiu, Phone: 748-5751
Consultant: Shimabukuro, Endo & Yoshizaki, Inc.
(Address, Contact Person, Telephone) 1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715
Howard K. Endo, Ph.D., P.E., Phone: 737-1875

Status (check one only):

- DEA-AFNSI** Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqc@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.
- FEA-FONSI** Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
- FEA-EISPN** Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqc@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.
- Act 172-12 EISPN** Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqc@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
- DEIS** The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
- FEIS** The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

___ Section 11-200-23

Determination

The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.

___ Section 11-200-27

Determination

The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

___ Withdrawal (explain)

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

The Honolulu Board of Water Supply (BWS) proposes drainage improvements and rock fall protection measures be undertaken along the steep cliff-like slopes of their Waimalu Wells I property. The BWS will provide drainage improvements to divert surface runoff from flowing onto the cliff-like slopes to mitigate erosion and flooding hazards and install a wire mesh drapery system on the cliff-like slopes to mitigate potential rock falls subject to approval from the adjacent property owners. Direct impacts include: (1) fugitive dust, exhaust emissions, and noise from construction equipment in the project vicinity and (2) visibility of wire mesh drapery and drain pipes. The contractor will be required to follow standard procedures to mitigate the short term construction impacts, such as restricting working hours, sprinkling, and providing tuning and maintenance of equipment. New vegetation will cover the wire mesh drapery and drain pipes from view. No adverse long-term impacts are anticipated from this project.

FINAL
ENVIRONMENTAL ASSESSMENT
FOR
WAIMALU WELLS I
ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS
AIEA, OAHU, HAWAII

**TAX MAP KEY: 9-8-26:72, 9-8-45:36 & 37 and
Various Plats & Parcels**

February 2013



Proposing Agency:
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

This environmental document was prepared pursuant to Chapter 343, Hawaii Revised Statutes.

Responsible Official

A handwritten signature in black ink, appearing to read "Ernest Y.W. Lau".

Date:

3/4/13

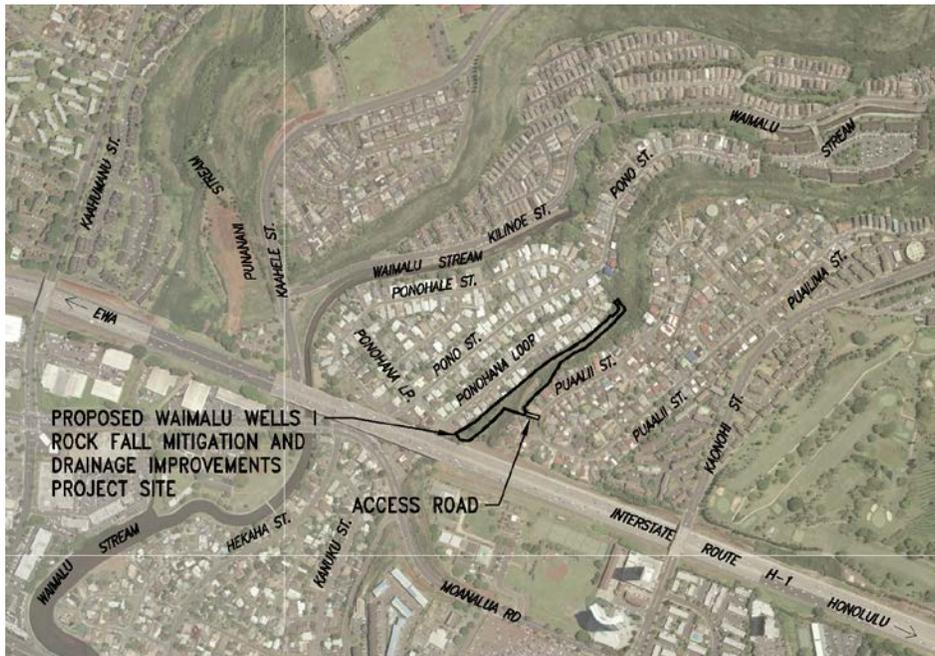
Ernest Y.W. Lau
Manager and Chief Engineer
Board of Water Supply
City & County of Honolulu

Prepared by:
Shimabukuro, Endo & Yoshizaki, Inc.



FINAL
ENVIRONMENTAL ASSESSMENT
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AIEA, OAHU, HAWAII

**TAX MAP KEY: 9-8-26:72, 9-8-45:36 & 37 and
Various Plats & Parcels**



This document is prepared pursuant to Chapter 343, HRS

PROPOSING AGENCY:
Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

PREPARED BY:
Shimabukuro, Endo & Yoshizaki, Inc.
SEY Engineers
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



February 2013

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CHAPTER 1 INTRODUCTION

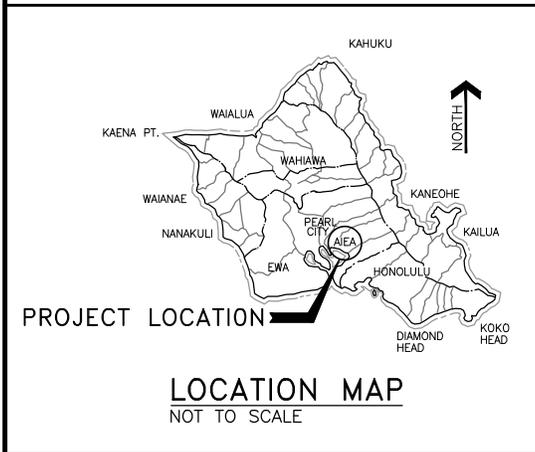
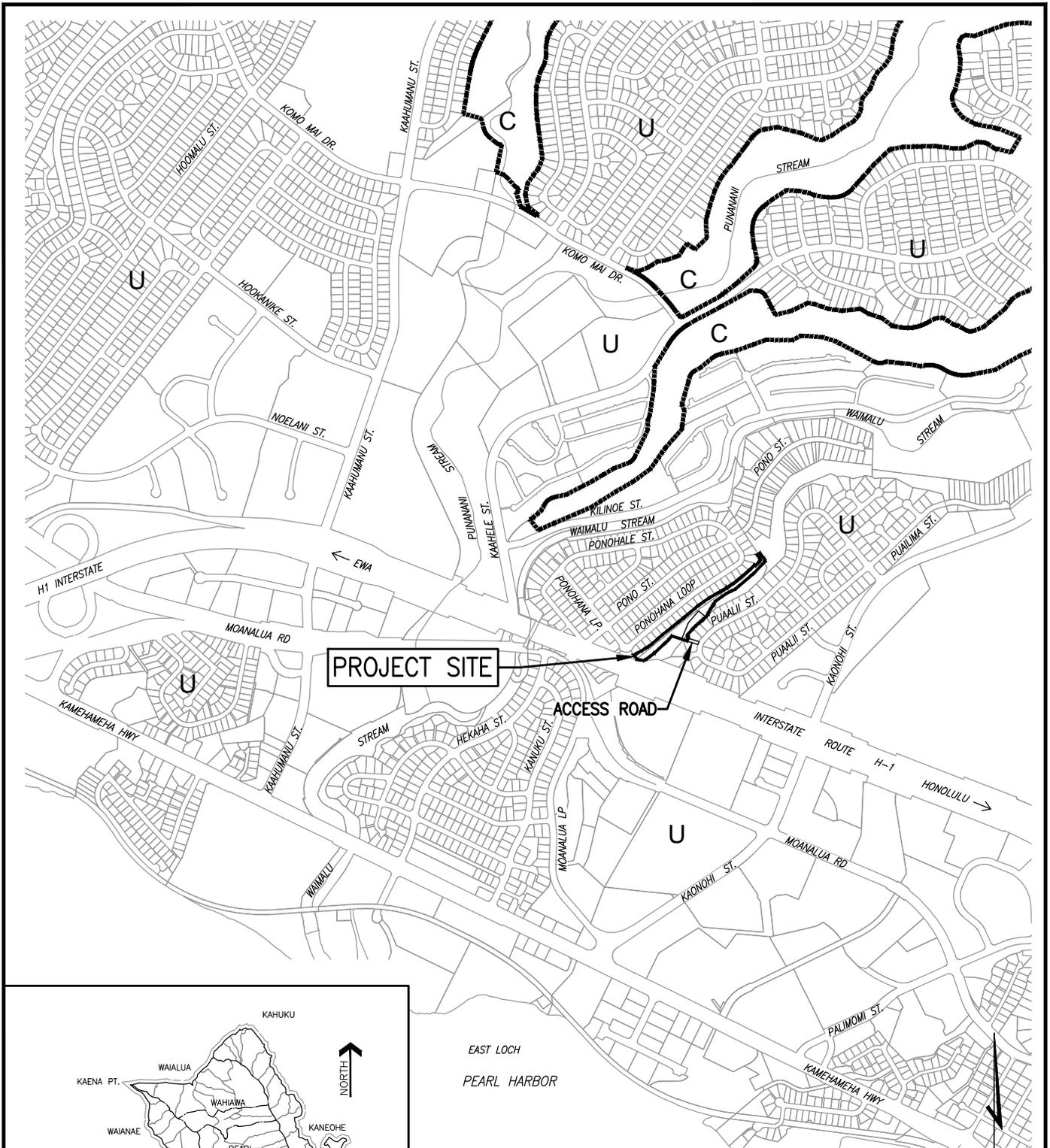
1.1 PURPOSE FOR ENVIRONMENTAL ASSESSMENT

The City and County of Honolulu (City) Board of Water Supply (BWS) has proposed rock fall protection and drainage improvement measures be undertaken along the cliff-like slopes of their Waimalu Wells I property with the construction of the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project. The project is located in Aiea, Oahu, Hawaii as shown on **Figure 1-1**.

The Waimalu Wells I site is perched on the southeastern slope of lower Waimalu Gulch and north of Interstate Route H-1. The site slopes from steep cliff-like face on the northwest from adjacent residential lots on Ponohana Loop across the BWS property boundary to gentler inclinations on the southeast side of the site. See **Figure 2-1**.

The steep cliff-like slopes have experienced rock falls over the years typically during or after heavy storms. Several residents have called or written the BWS to complain about rocks falling off the cliff slopes onto their properties. Loose rocks ranging from less than 3 inches to more than 3 feet have rolled down the slopes onto their properties. One resident has complained that concentrated storm runoff from BWS property has flowed down the cliff slopes onto his property during heavy rains. These streams of runoff have caused flooding and deposition of sediment and rocks in the backyard of his property. The erosion caused by the streams also exposed more potential loose rocks on the cliff slopes.

In 2005 the BWS completed a temporary emergency rock removal project of the cliff-like slopes to mitigate potential rock falls. As a long-term solution to the slope erosion and potential rock fall hazards, the BWS proposes the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project. For the first phase of the project, the BWS proposes to provide drainage improvements to divert surface runoff from flowing onto the cliff-like slopes to mitigate erosion and flooding hazards, as promised to the adjacent property owners and shown on **Figure 2-2**. Most of the drainage improvements will be located in BWS property, except for portions of 12" and 18" drain pipes connecting to an existing concrete ditch in parcels TMK 9-8-27:2 and 3 and TMK 9-8-26:65 and a portion of new concrete ditch located in parcel TMK 9-8-65:59. Easements and approvals to locate the drain pipes and concrete ditch in these parcels will be obtained from the owners. As part of the drainage improvements, erosion control grouted riprap and retaining wall with chain link fence will be provided at the Waimalu Wells I pump building site and a cluster of loose boulders on BWS property will be stabilized by grouting them in place.



VICINITY MAP

SCALE: 1" = 100'

STATE LAND USE:
 U - URBAN
 C - CONSERVATION

TRUE NORTH
 SCALE: 1" = 100'

PREPARED FOR:
 BOARD OF WATER SUPPLY
 CITY AND COUNTY OF
 HONOLULU

SEI Shimabukuro, Endo
 & Yoshizaki, Inc.
 Civil & Structural Engineers

WAIMALU WELLS I ROCK FALL MITIGATION
 AND DRAINAGE IMPROVEMENTS
 ENVIROMENTAL ASSESMENT
LOCATION & VICINITY MAPS

FIGURE
1 - 1

For the second phase of the project, the BWS proposes to install a wire mesh drapery system on the cliff-like slopes in the future at appropriate locations as shown on **Figure 2-2**. Since the cliff-like slopes are located in adjacent residential lots as well as BWS property, this proposed action will install the wire mesh drapery system in the adjacent lots subject to approval from the owners. Easements will not be obtained from the owners. Various issues remain unresolved. These include obtaining permission from private property owners to construct improvements on their properties and the propriety of spending public funds for private property improvements, along with approaching private property owners to share in the costs of construction and maintenance of the wire mesh drapery system.

This Final Environmental Assessment (EA) was prepared to address the probable impacts on the surrounding environment resulting from the proposed action of constructing drainage improvements and future rock fall protection measures for the project. Environmental concerns, potential environmental impacts, and proposed mitigation measures related to the proposed work were addressed in accordance with Chapter 343, Environmental Impact Statements, HRS, and Title 11, Chapter 200, Department of Health Hawaii Administrative Rules.

The construction of the first phase of the project is scheduled to begin in September 2014 and is estimated to continue for 1 year. No construction schedule timetable has been established for the second phase of the project which is estimated to continue for 1.5 years.

After review of the Draft EA was completed by various government agencies, other interested organizations and individuals, and following a formal 30-day comment period, the proposing and approving agency, the BWS, prepared this Final EA. The BWS has concluded that the project will mitigate slope erosion, flooding and potential rock falls and will have no significant impact on the environment. The BWS has determined a **Finding of No Significant Impact**.

1.2 SUMMARY OF EA INFORMATION

Project Name: Waimalu Wells I Rock Fall Mitigation and Drainage Improvements

Applicant: Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843
Contact: Mr. Gregory Shiu, Project Manager

Agency's Consultant: Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816
Contact: Howard K. Endo, Ph.D., P.E.

Approving Agency:	Board of Water Supply, City & County of Honolulu	
Project Description:	Construct drainage improvements and provide future rock fall protection measures	
Project Location:	Waimalu in Aiea on the island of Oahu at 98-339 Puaalii Street.	
Existing Use:	The BWS owns, operates, and maintains the Waimalu Wells I which serves their Waimalu 217' system. Pumping at the site ceased in January 1990 due to chloride concentrations of 220 to 230 ppm.	
Land Ownership:	City and County of Honolulu Board of Water Supply and various adjacent property owners	
Tax Map Keys:	Waimalu Wells I:	9-8-26:72 9-8-45:36 & 37
	Adjacent Properties:	9-8-26:65 9-8-27:2 through 12 9-8-28:1 through 13 9-8-45:34 through 41 9-8-65:59
Required Easements:	TMK 9-8-26:65 TMK 9-8-27:2	Department of Transportation, State of Hawaii
	TMK 9-8-27:3	Ms. Jane Okazaki
	TMK 9-8-65:59	Jin Young Kim and Tae Seon Kim
Land Area:	Waimalu Wells I parcels are 142,580 square feet	
State Land Use:	Urban	
Primary Urban Center Development Plan Land Use:	Lower-Density Residential	
City Zoning District:	R-5 Residential	
Special Designation Districts:	None	
Estimated Construction Cost:	\$4,700,000	
Anticipated Determination:	Finding of No Significant Impact	
Parties Consulted:	See Chapter 6 Agencies and Public Consultation	

CHAPTER 2 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND VICINITY

The Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project site is located on the southern side of the Island of Oahu north of Pearl Harbor in Waimalu Gulch in Aiea. See **Figure 1-1**. The project site is on the southeastern slope of lower Waimalu Gulch north of Interstate Route H-1 between firmly established suburban residential communities of Waimalu Garden Tract and Waimalu Unit 1 clustered within the gulch and on the ridge top, respectively.

Moanalua Road is a City highway located south of Interstate Route H-1 and runs from Aiea on the east to Pearl City on the west. It provides access to the project site from Kaonohi Street and Puaalii Street from the east and from Pono Street and Ponohana Loop from the west.

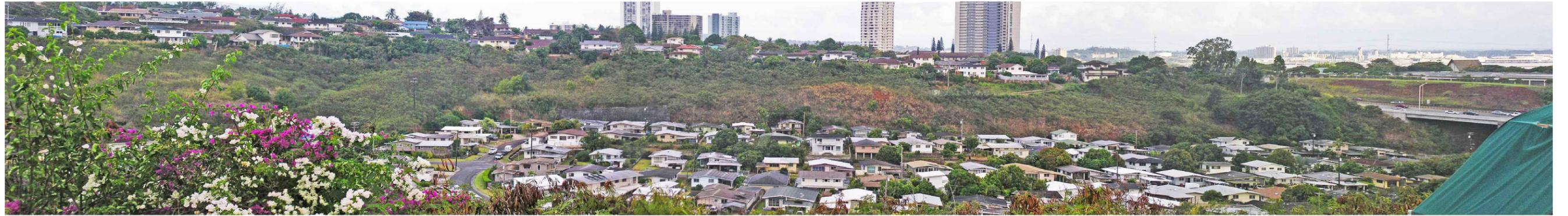
The project site consists of properties owned by 29 owners. See **Figure 2-1**. Three parcels TMK: 9-8-26:72 and TMK: 9-8-45:36 and 37 are owned by the Board of Water Supply, City & County of Honolulu. Parcels TMK: 9-8-26:65 and TMK: 9-8-27:2 are owned by the Department of Transportation, State of Hawaii; and parcel TMK: 9-8-65:59 was owned by Cobourn Enterprises, Inc. during the EA pre-assessment and EA preparation process. The parcel is presently owned by Jin Young Kim and Tae Seon Kim. Twenty-three other parcels, TMK: 9-8-27:3 through 12 and TMK: 9-8-28:1 through 13, are owned by various owners.

2.2 EXISTING SITE CONDITIONS

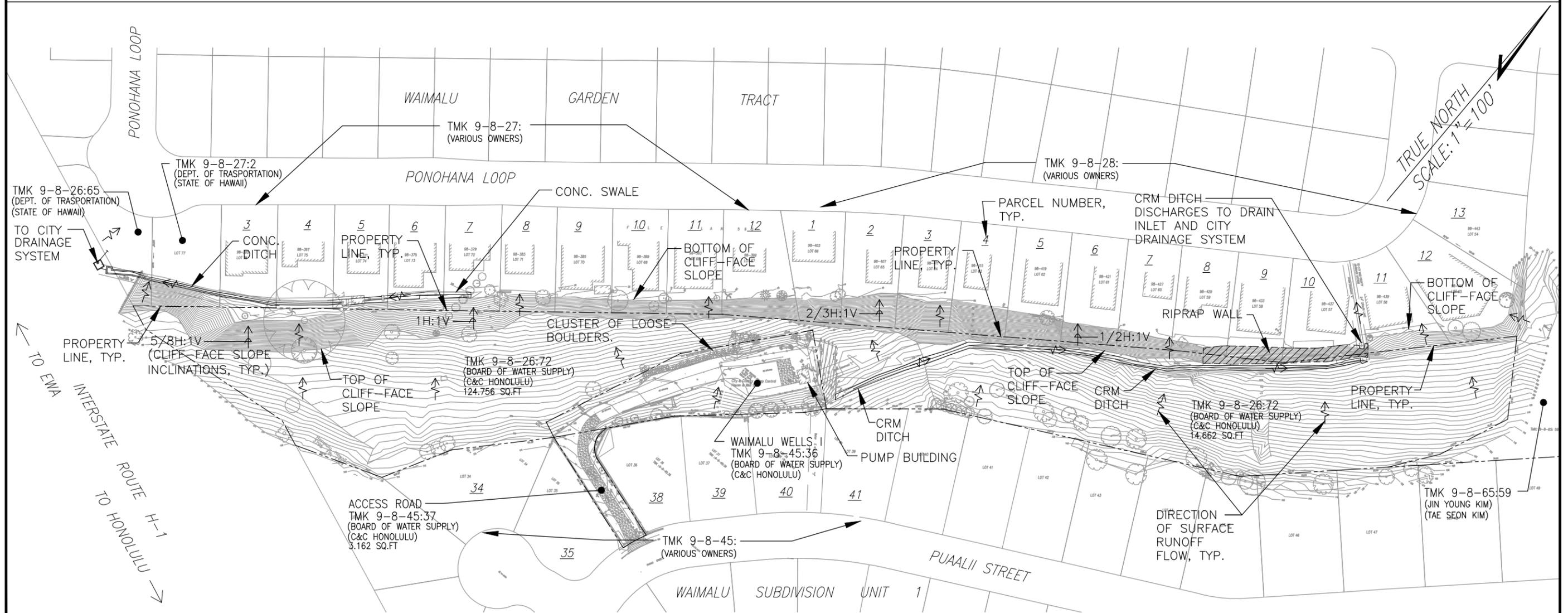
2.2.1 Topography

Topographic surveys were performed by Towill, Shigeoka, and Associates, Inc. in November 2002 for parcels TMK: 9-8-45:36 and 37 and in December 2003 for parcel TMK 9-8-26:72. Existing conditions and topographic features are shown on **Figure 2-1**.

The site slopes from steep cliff-like face on the northwest from adjacent residential lots on Ponohana Loop with inclinations of approximately 1/2 horizontal distance to 1 vertical distance (1/2H:1V) across the BWS property boundary to gentler inclinations between 3-1/2H:1V and 4H:1V further southeast of the site. The site is approximately 1,350 feet long and 170 feet wide and varies in elevation at the bottom of cliff slopes from elevation 24 feet at the southwest end to elevation 55 feet at the northeast end. The high point of the project area is at the Waimalu Wells I pump building site with an elevation of 120 feet. The cliff-like slopes vary in height from less than 20 feet to more than 60 feet.



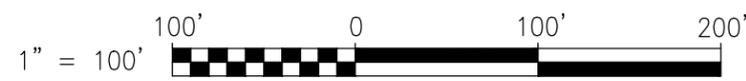
EAST PANORAMIC VIEW



EXISTING CONDITIONS

SCALE: 1"=100'

GRAPHIC SCALE:



PREPARED FOR: BOARD OF WATER SUPPLY CITY AND COUNTY OF HONOLULU		WAIMALU WELLS I ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS ENVIRONMENTAL ASSESSMENT EXISTING CONDITIONS AND EAST PANORAMIC VIEW	FIGURE 2-1
--------------------------------------------------------------------------	--	------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------

The steep cliff-like slopes have experienced rock falls over the years typically during or after heavy storms. Several residents have called or written the BWS to complain about the safety hazards with boulders and rocks falling off the cliff-like slopes onto their properties. Loose rocks ranging from less than 3 inches to more than 3 feet have rolled down the cliff-like slopes to their properties. A few residents have erected makeshift barriers of rock, chain link and wood fences.

2.2.2 Geology

A geological reconnaissance of the Waimalu Wells I site was performed by MACTEC Engineering & Consulting, Inc. (MACTEC) in December 2003 and January 2004. The results of the geological reconnaissance were summarized in a report prepared by MACTEC and are discussed in **Chapter 4 Affected Environment and Environmental Consequences** of this Final EA.

According to the MACTEC report, homeowner complaints and field investigations indicate that rainfall events consistently contribute to falling rocks. Several lots have experienced deposition of 6 to 12 inches of debris that had not been present the previous day and which had fallen during minor rainfall events overnight. Runoff is exacerbating much of the differential erosion problems, but diversion of runoff water from the slopes above will only partially reduce the erosion issues as the soils on the slopes become easily saturated. At least one area of the cement rubble masonry (CRM) ditch at the top of the cliff-like slopes was being undercut by erosion of soil and may become vulnerable in the near future. Several locations elsewhere showed incipient development of erosion drainage channels that may become future rock fall prone areas.

Several large boulders on the lower portions of the slopes above the cliff-like slopes were observed by MACTEC in January 2004. These boulders were close to the slopes edge and could topple over the edge if there is additional soil movement or if stabilizing vegetation fails. These and other loose boulders above and on the cliff-like slopes were removed by the BWS in 2005 by an emergency rock removal project. Little of the area above the existing CRM ditch appears to be of concern and appears mostly stable according to the MACTEC report. However, steep areas immediately below the BWS Waimalu Wells I pump building site and above the largest cliff-like slope exposure without runoff drainage diversion may be prone to long-term erosion and create rock fall potential.

2.2.3 Surface Drainage

Surface water runoff from the BWS site generally sheet flows down the existing ground slopes in a northwesterly direction as shown on **Figure 2-1**. Runoff from the north portion of the Waimalu Wells I site is diverted to an existing CRM ditch and discharges to a City drain inlet between parcels TMK 9-8-28:10 and 11.

The remaining runoff from the Waimalu Wells I site and south without runoff drainage diversion generally sheet flows to and down the cliff-like slopes as it has prior to construction of the Waimalu Garden Tract subdivision and discharges to the backyard of the adjacent lots. On parcels TMK 9-8-27:2 through 7, the slope runoff discharges to an existing City concrete ditch and swale near the toe of the slope. The concrete ditch discharges to the City drainage system. There are no drainage systems near the toe of slope for the remaining parcels and the slope runoff either sheet flows across the lots and discharges to the street gutter on Ponohana Loop or on some parcels, the runoff ponds and either percolates into the ground or evaporates. According to several residents on parcels without drainage systems near the toe of the slope, the slope runoff from BWS property has caused flooding and deposition of rocks and sediments in their back yards during heavy downpour on several occasions.

A field investigation was performed by MACTEC to assess the existing drainage systems. According to the MACTEC report, the existing CRM ditch at the top of the cliff-like slope appears to be in good condition. Undercutting of the underlying soils below the CRM ditch was observed at several locations. The undercut areas were likely caused by runoff flowing under the CRM ditch. Several erosion gullies were observed on the slopes including a few near or on the cliff-like slopes. According to several residents, the erosion gullies appear to channel concentrated storm runoff down the cliff-like slopes causing erosions of the slope faces and exposing more cobbles and boulders. At the time of the field investigation, sections of the existing concrete ditch at the toe of the cliff-like slopes on several of the lots were partially filled with debris, sediments, and rock fragments.

A portion of the runoff from the Waimalu Wells I pump building site discharges to a riprap channel across the cliff-like slope and onto parcel TMK 9-8-28:1. At the time of the field investigation, the riprap channel appeared to be in good condition.

2.3 PROJECT NEEDS AND OBJECTIVES

MACTEC's field investigation indicated that several erosion gullies exist on the slope surfaces and near or close to top of the cliff-like slopes of the Waimalu Wells I site. In addition, several erosion gullies are developing near the top of the cliff-like slopes. Surface water runoff from the BWS site will cause more erosion gullies to develop, especially on the cliff-like slopes without runoff drainage diversion, aggravate existing slope erosion, and erode supports around boulders resulting in potential rock fall. To reduce slope erosion and rock fall potential on the cliff-like slopes and to reduce flooding and deposition of rocks and sediments in the adjacent residential properties, surface runoff from the BWS site should be diverted before it flows down the cliff-like slopes and conveyed to the existing drainage systems near the toe of the cliff-like slopes. In addition, debris or sediment in the existing drainage systems should be removed, damaged sections of the drainage systems should be repaired, and sections of the drainage systems should be extended to intercept surface runoff from the BWS site.

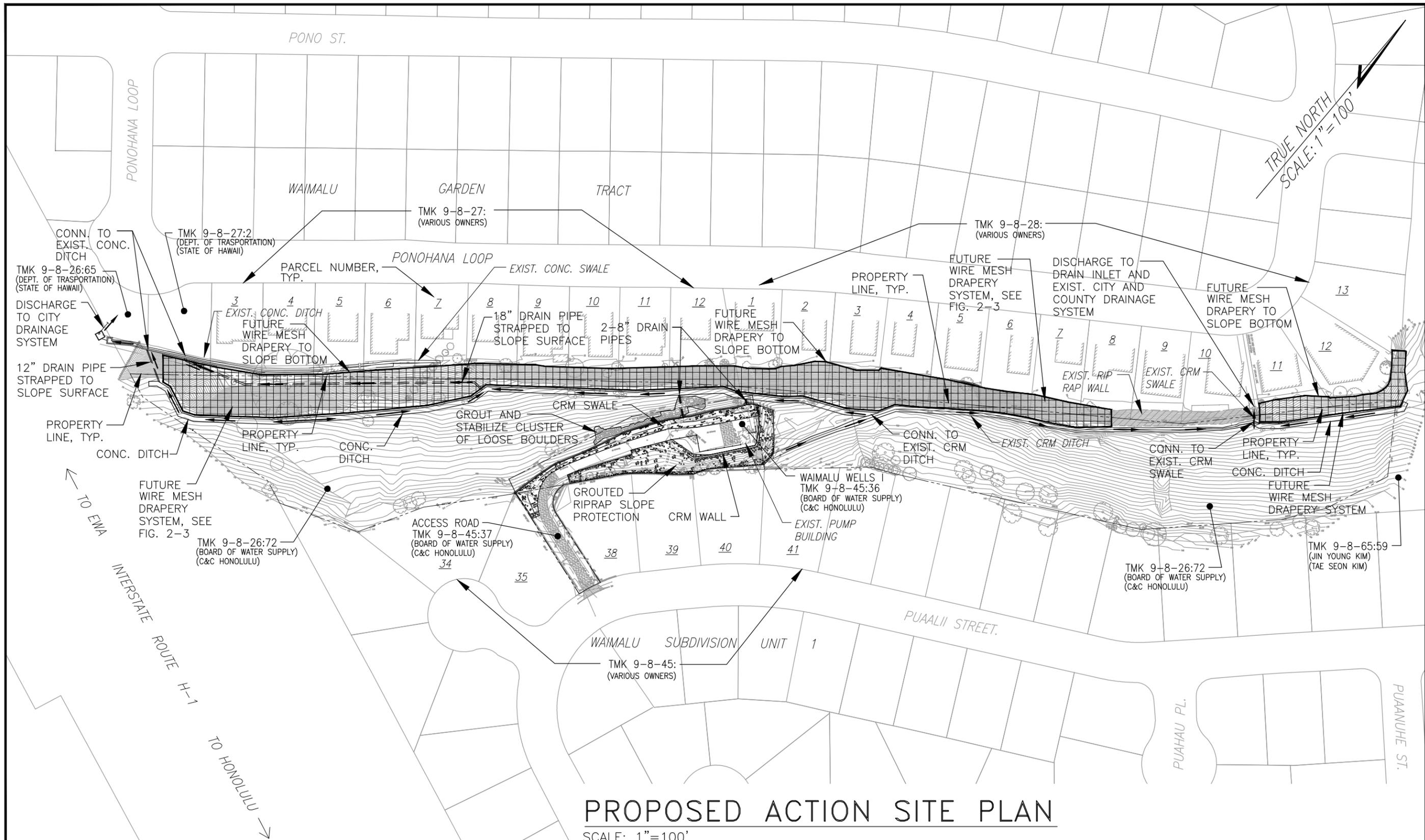
Portions of Waimalu Wells I site with the cliff-like slopes are underlain by basalt formation with moderate to severe differential weathering and soil-filled joints which have high rock fall potential according to the MACTEC report. Their geological reconnaissance indicated that areas with moderate to severe differential weathering are typically located in the upper portion of the cliff-like slope within BWS property. To reduce rock fall potential onto the adjacent residential properties, rocks with high potential to break loose and fall should be removed and rock fall protection measures installed. Rock fall protection measures may include installing catch fence near the toe of the slope, draping the cliff-like slope with wire mesh drapery or cable net drapery, or installing other slope surface protection.

The BWS has determined that actions must be taken to minimize flooding and deposition of rocks and sediment and reduce potential of rock falls onto the adjacent residential properties. This has resulted in the drainage improvements and rock fall mitigation proposed for the Waimalu Wells I site. In 2005 the BWS completed a temporary emergency rock removal project to mitigate potential rock falls. To further mitigate potential rock fall hazards, the BWS proposes the Waimalu Wells I Rockfall Mitigation and Drainage Improvements project as a long term solution. This project will provide drainage improvements and ultimately install a wire mesh drapery system on the cliff-like slopes at appropriate locations as shown on **Figure 2-2**. Since the cliff-like slopes and portions of the existing drainage systems are located in adjacent residential properties as well as BWS property, easements to install portions of the drainage improvements, and approval/permission to install the wire mesh drapery system in the adjacent properties will be required from the owners. The proposed action will improve the environmental quality and the health and safety of the adjacent properties and the surrounding areas. The project needs to be implemented as soon as possible.

2.4 DESCRIPTION OF PROJECT

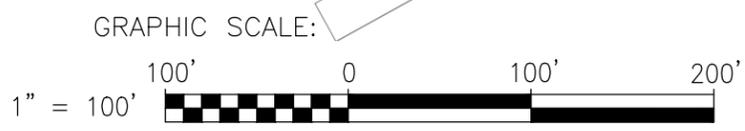
2.4.1 Drainage Improvements

To reduce the potential of runoff and erosion at the cliff-like slopes and the flooding hazard, BWS proposed action will construct new drainage improvements consisting of concrete ditches and drain pipes for the first phase of the project as shown on **Figure 2-2**. Approximately 1,100 linear feet of concrete ditches, about 330 linear feet of 18" pipe and about 140 linear feet of 8" and 12 pipes installed above ground strapped to the cliff-like slopes, and repair and upgrade the existing drainage systems will be provided. Most of the drainage improvements will be located in BWS property, except for portion of 12" and 18" drain pipes connecting to an existing concrete ditch in parcels TMK 9-8-27:2 and 3 and TMK 9-8-26:65 and a portion of new concrete ditch located in parcel TMK 9-8-65:59. Easements and approvals to locate the drain pipes and concrete ditch in these parcels will be obtained from the owners.



PROPOSED ACTION SITE PLAN

SCALE: 1"=100'



PREPARED FOR: BOARD OF WATER SUPPLY CITY AND COUNTY OF HONOLULU		WAIMALU WELLS I ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS ENVIRONMENTAL ASSESMENT PROPOSED ACTION SITE PLAN	FIGURE 2-2
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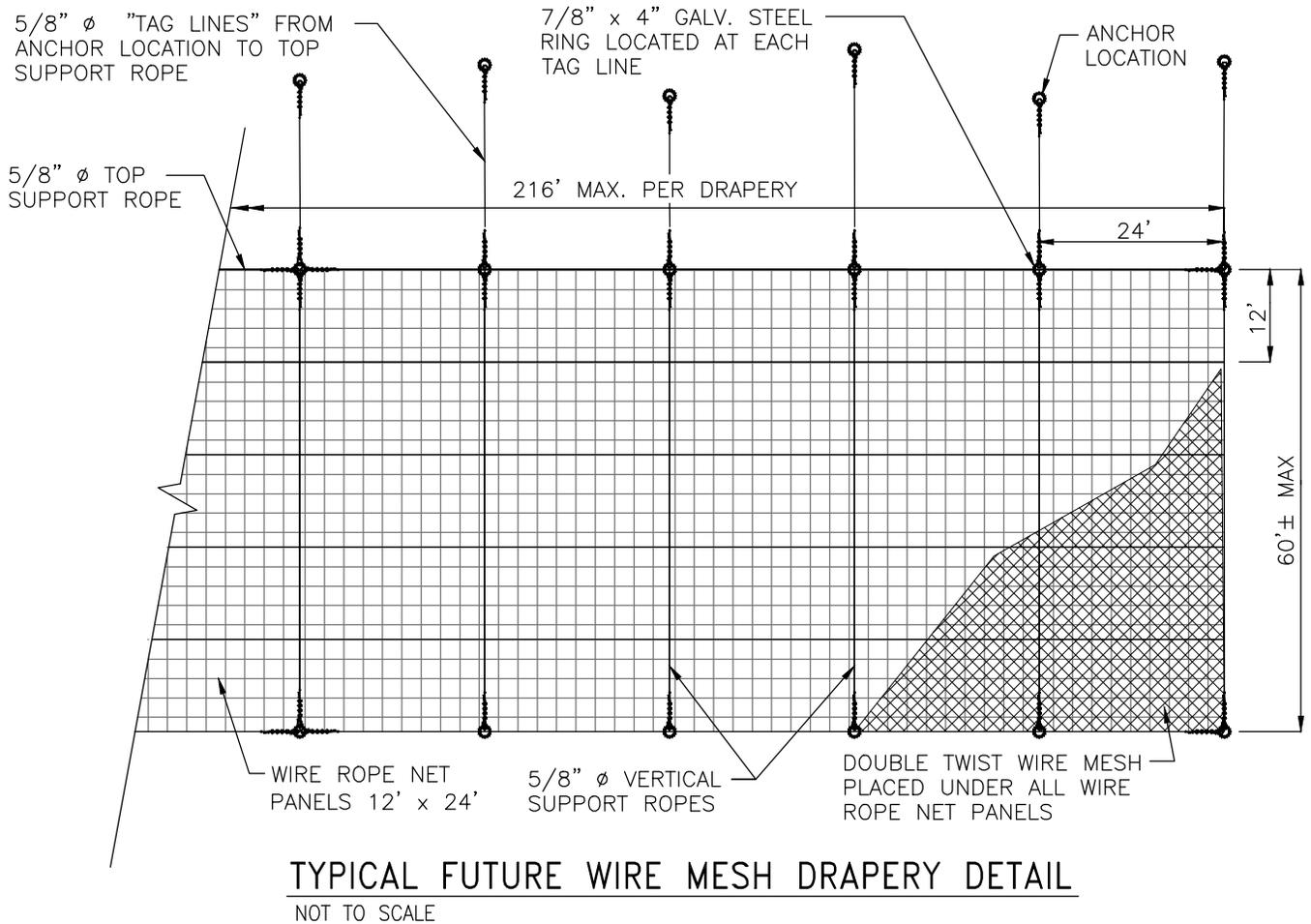
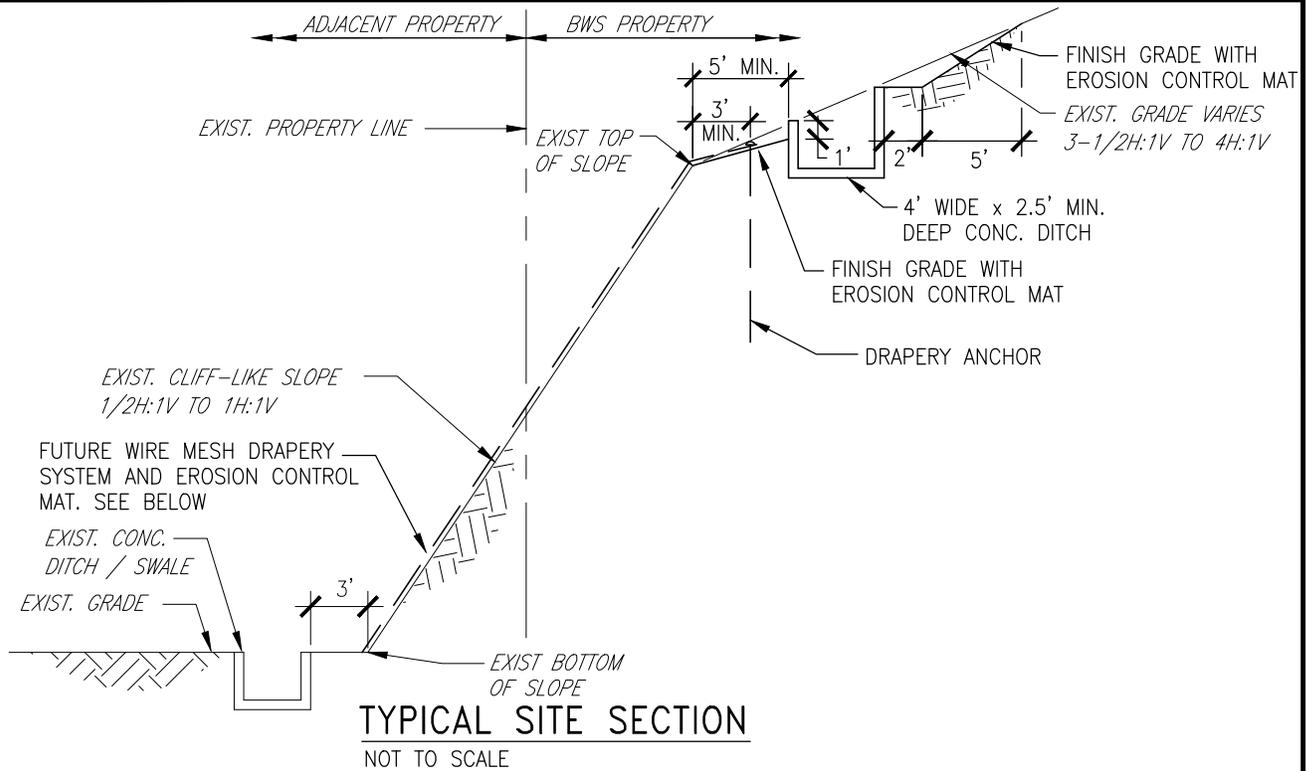
The drainage improvements will conform to the requirements of the City Storm Drainage Standards and be designed for a recurrence interval of 50 years although 10 years is the standard. The potential for flooding exists should a storm of greater recurrence interval occur.

The new concrete ditches will be located 5 feet minimum from the top of the cliff-like slope on BWS property and together with the existing CRM ditch will divert runoff from approximately 80 percent of the BWS site to the existing City drainage systems near the toe of the cliff-like slopes in the adjacent parcels. This should reduce runoff and erosion of the cliff-like slopes. The existing drainage systems connect to the City drainage systems on Ponohana Loop. Accumulated debris and sediment in the existing City concrete ditch and swale near the toe of the slope will be removed and damaged ditch and swale sections will be repaired.

Concrete ditch will be 4 feet wide by 2.5 to 3.5 feet deep, with a minimum ditch slope of 0.5 percent. The ditch section will be 6 inches thick and reinforced with No. 4 rebars spaced at 12 inches on-center, both ways. Erosion control mats will be provided on both sides of the graded area adjacent to the ditch. As part of the drainage improvements, erosion control grouted riprap and retaining wall with chain link fence will be provided at the pump building site and existing cluster of loose boulders on BWS property will be stabilized by grouting them in place. The drainage improvements should reduce erosion and prevent flooding and deposition of rocks and sediments on the adjacent properties.

2.4.2 Rock Fall Mitigation

To reduce the potential of rock fall hazard, the BWS proposed action will in the future cover the cliff-like slopes on BWS property and adjacent parcels TMK 9-8-27:02 through 12 and TMK 9-8-28:01 through 08 and 11 through 13 with approximately 8,330 square yards of wire mesh drapery for the second phase of the project as shown on **Figures 2-2** and **2-3**. Wire mesh drapery will not be installed on the slopes of parcels TMK 9-8-28: portion of 8, 9, and 10 since an existing riprap wall adequately stabilizes the cliff-like slopes from rock fall. The wire mesh drapery will extend from the top of the cliff-like slopes to the bottom of the slopes and will be setback 3 feet from existing concrete ditches and swales to allow for maintenance. Existing loose rocks, trees, shrubs, and vegetation will be removed and the cleared cliff-like slopes will be covered with erosion control mats. The wire mesh drapery will be placed over the erosion control mat and should deter rocks from the cliff-like slopes from falling onto the adjacent properties. Permission to install the wire mesh drapery will be obtained from the adjacent property owners. Easements will not be obtained for the wire mesh drapery installation. The wire mesh drapery will be maintained by the BWS.



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CITY AND COUNTY OF
HONOLULU

JA Shimabukuro, Endo
& Yoshizaki, Inc.
Civil & Structural Engineers

WAIMALU WELLS I ROCK FALL MITIGATION
AND DRAINAGE IMPROVEMENTS
ENVIRONMENTAL ASSESSMENT
**TYPICAL SITE SECTION
& FUTURE DRAPERY DETAIL**

FIGURE
2-3

2.4.3 Development Schedule and Estimated Costs

Construction of the first phase of Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project should commence in September 2014 and should be completed within 1 year. Thus, the improvements should be completed by September 2015. No construction timetable has been established for the second phase of the project which should be completed within 1.5 years.

The preliminary estimated construction cost for the project is in the order of \$4,500,000. Funding for the drainage improvements is in place for FY14 by the BWS. The estimated cost for the various improvements are listed below:

Compact disk of the project construction contract documents will be prepared by the BWS and be available to the public at the BWS when they are completed.

1. Drainage improvements	\$730,000
2. Grout cluster of loose boulders	\$135,000
3. Grouted riprap and improvements at pump building site	\$730,000
4. Future wire mesh drapery and preparation	\$2,810,000
5. Miscellaneous items	\$210,000
Total preliminary construction cost	\$4,615,000

SAY \$4,700,000

2.5 LIST OF REQUIRED PERMITS/APPROVALS

There are no discretionary land use approvals required from the State or City such as a zone change, State land use district boundary amendment, or special designation districts use permit for the improvements proposed under this project.

The following permits/approvals will likely be required for implementing the various improvements:

Federal Permits/Approvals

None

State of Hawaii Permits/Approvals

1. National Pollutant Discharge Elimination System (NPDES) Permit.
2. Chapter 55, Water Pollution Control, HAR, Title 11, State Department of Health, for discharges of storm water associated with construction.

3. Community Noise Control Permit.
4. Permission and/or Permit from State Highways Right-of-Way Property Management Section to perform work on State Property.

City & County of Honolulu Permits/Approvals

1. Building Permit.
2. Grading Permit.
3. Drain Connection License.
4. Subdivision Approval for drain easements.
5. One-Time-Review of construction plans, including drainage report.

CHAPTER 3 ALTERNATIVES CONSIDERED

3.1 ALTERNATIVE ROCK FALL MITIGATION MEASURES

Rockfall mitigation measures include stabilization techniques and/or protection methods. Stabilization techniques generally involve reducing the driving forces that contribute to rock falls and/or increasing the resisting forces associated with rock fall failure. Protection methods generally involve preventing rock fall from reaching protected areas.

3.1.1 Stabilization Techniques

Stabilization can be achieved by excavating and grading to flatten the unstable area to a stable slope. Other stabilization techniques include scaling to remove loose or unstable rocks, reducing surface water runoff, and installing support systems. Support systems include shotcrete, rock bolts, dowels, anchors, retaining walls, and cable lashings.

Scaling is an effective way to remove overhanging, protruding, or unstable rocks. Manual or hand scaling is performed from ropes or a facility mounted on a telescoping boom vehicle or crane with prybars, hydraulic splitters or jacks, small-scale explosives, or chemical expanders. Mechanical scaling is performed by dragging a track across the slope with a boom crane and is generally a quicker method, but final hand scaling for remnant loose or unstable rocks is still required. Chemical expanders can be used to break large rocks that would not be practical to remove by manual or mechanical scaling and small scale explosives by drilling holes and filling the drilled holes with an inorganic lime chemical compound. The chemical reaction causes slow but continuous expansion until the rocks break.

Shotcrete is used primarily to reduce weathering, spalling of a rock surface, and to hold the surfaces of rock slopes. Shotcrete consists of mortar and aggregate mixtures placed onto a rock surface by air jetting in a 2- to 3-inch layer. Slope drainage is essential where shotcrete is applied and is typically provided by installing drain holes to reduce water pressures behind the shotcrete. Although welded fabrics can be used to reinforce shotcrete applications on weathered rock, soil, or across faults, and the wire fabrics can be tied to grouted steel anchors to stabilize weathered surface, poor bonding of the shotcrete would be expected for the weathered rock/soil slope surfaces encountered at the Waimalu Wells I project site. The poorly bonded shotcrete will spall or weather more rapidly and cause future maintenance problems.

Rocks, bolts, dowels, and anchors are generally used to reinforce a rock mass and increase the shear strength along the discontinuity to reduce rockfall potential. Cable lashings involve tying or wrapping unstable rock mass with individual cable strands anchored into competent rock on the sides of the unstable rock mass. Rock bolts,

dowels, anchors and cable lashings will generally be unsuitable for the weathered rock/soil conditions encountered at the Waimalu Wells I project site.

Retaining walls such as concrete, cement rubble masonry, riprap, reinforced earth, or gabions are generally used to prevent large blocks from falling, to increase resistance against movement, and to reduce spalling of rock surfaces.

3.1.2 Protection Methods

Protection methods differ from rock stabilization techniques in that these methods do not prevent rock falls but would prevent fallen rocks from reaching protected areas. Protection methods include wire mesh or cable net drapery, catch fences, catch ditches, and rock fall barriers and walls.

Wire mesh is a versatile and economical method to prevent rocks from reaching protected areas. The mesh is typically made of galvanized wire, PVC-coated, about 0.15 inch in diameter, and with mesh openings measuring about 3.25 x 4.5 inch. Rock fall mesh is double-twisted, as opposed to one twist for normal chain link fence which reduces stretching. The mesh is draped over the slopes from anchored cables at the top of the slope. The mesh may or may not be anchored to the slope surfaces. Anchoring the mesh on the slope surfaces hold the rocks in place and reduces rock removal at the base. Where the mesh is anchored to the slope surfaces, the mesh must be strong enough to hold any loose rocks that may unravel and become loose. Leaving the mesh loosely draped over the slope surfaces allows loose rocks to ravel down the slope inside the mesh at the base. Wire mesh is generally suitable for application where the rock mass is well fractured, the loose rocks are not larger than 2 feet, and the slope has a reasonably uniform face with limited protrusions.

Where the size of loose rocks exceed 2 feet, cable net drapery would be more suitable. Cable net drapery consists of individual wire rope nets back with double twisted hexagonal wire mesh. Similar to wire mesh, the cable net drapery is laid on the slope and secured at the top with anchors and attached to a wire rope support. The anchors and the wire rope supporting the system are typically larger in size and strength than wire mesh drapery.

Catch fence may be installed near the toe of slope or on the slope to prevent falling rocks from reaching protected areas. The mesh is typically galvanized steel with a nominal diameter of 0.12 inch and a minimum tensile strength of 60,000 pounds per square inch. Maximum mesh size is typically 4-3/4 inches with triple twist and hexagonal shape. Line posts are generally 4-inch galvanized steel pipe. Anchor spring assemblies are typically installed at ends of fence.

A catch ditch may be used in conjunction with a catch fence. A catch ditch fronting a catch fence would reduce boulder impact forces on the fence. A catch ditch installed near the toe of slope would intercept fallen rocks from traveling to protected areas.

Catch ditch geometry is dependent on the height and inclination of slopes, estimated rockfall trajectory, and locations of the ditch.

Rock fall barriers and walls are provided to stop fallen rocks from encroaching into protected areas. Typical barrier and wall installations include gabion basket walls, concrete block walls, gravity walls, and Jersey barriers.

3.2 ALTERNATIVES FOR PROJECT

Four alternatives in addition to the proposed action selected for the project and discussed in **Chapter 2 Project Description** were considered as possible solutions to mitigate rock fall potential in the adjacent properties. Three of the alternatives include drainage improvements and two of the alternatives include some scaling of loose rocks on the existing cliff-like slopes. All of the alternatives and the proposed action excluded work on the area above the cliff-like slopes which has a slope inclination of about 3-1/2H:1V to 4H:1V. According to the MACTEC geological reconnaissance report, rocks and boulders in the area above the cliff-like slopes in BWS property were visible and were generally stable. Thus, scaling and rock fall mitigation measures are not required and were not considered for the generally stable slope areas above the cliff-like slopes.

All of the alternatives and the proposed action also excluded barrier walls, catch fences and/or catch ditches at the bottom of the cliff-like slopes since they encroach in the backyards of the adjacent properties and the property owners would lose use of most of their existing backyards. Barrier walls, catch fences and/or catch ditches at the bottom of the cliff-like slopes would have a significantly less aesthetically pleasing appearance to the property owners when compared with the wire mesh drapery of the proposed action. In the long-term, vegetation is expected to cover the slopes and the drapery would not be visible. Thus, barrier walls, catch fences and/or catch ditches were not considered for rock fall mitigation measures at the bottom of the cliff-like slopes.

Emergency loose rock removal by scaling the cliff-like slopes was completed by the BWS in 2005. The four alternatives to the proposed action are discussed in the following paragraphs.

3.2.1 Alternative 1 No Action

Alternative I proposes no action to be taken to mitigate the potential for flooding and rock falls. No action would leave the existing site conditions as is and continue to expose the adjacent property owners to flooding and rock fall hazards. No drainage improvements and rock fall mitigation measures would be implemented and the risk to safety and property of the adjacent property owners from flooding and rock fall would remain. Alternative 1 No Action is not acceptable and does not merit consideration.

3.2.2 Alternative 2 Scaling and Catch Fences

Alternative 2 consists of scaling to remove loose rocks on the cliff-like slope surfaces, installing approximately 1,300 linear feet of catch fences along the BWS property line, and providing new drainage improvements. See **Figure 3-1**. Wire mesh drapery will not be provided. The new drainage improvements and erosion control measures at the pump building site would be similar to that discussed for the proposed action in **Chapter 2** to divert surface runoff from approximately 80 percent of the BWS site to the existing City drainage systems near the toe of the cliff-like slopes in adjacent properties. Accumulated debris and sediment in the existing concrete ditch and swale near the toe of slope would be removed and damaged ditch and swale sections repaired.

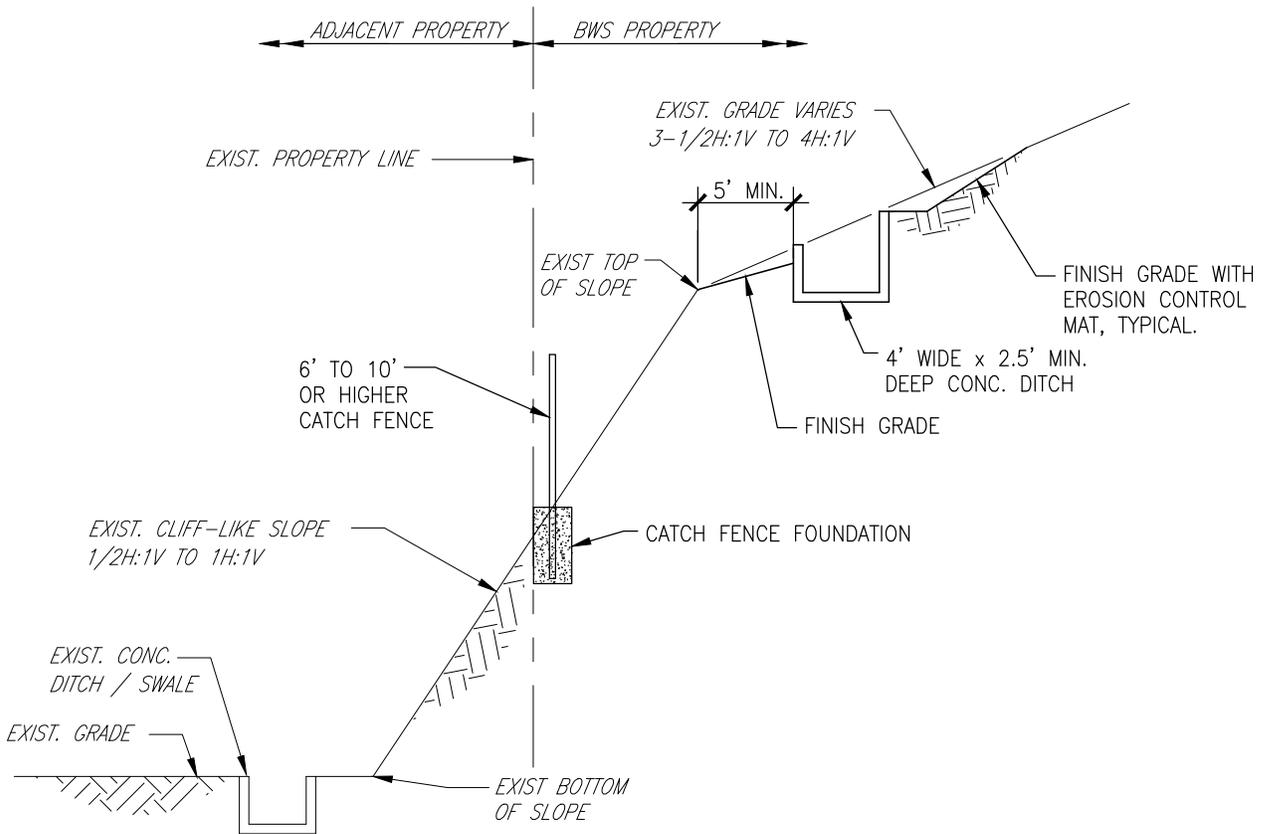
Catch fences would be installed along the cliff-like slopes on the BWS property line. The fences would prevent loose rocks from the BWS site from falling down the slopes onto adjacent properties. The fence height would vary from a minimum of 6 to about 10 feet or higher as necessary to retain loose rocks from jumping the fence. This alternative does not address rock fall concerns beyond BWS property line and is presented as an alternative in the event the adjacent property owners do not grant approval for the proposed action to install the wire mesh drapery on the cliff-like slopes of their properties or if installing rock fall mitigation measures on adjacent private properties would become a liability to BWS.

The preliminary estimated construction cost for Alternative 2 is in the order of \$3,100,000 and estimated time of construction is 15 months. Alternative 2 merits consideration only if adjacent property owners do not grant approval for the proposed action to install wire mesh drapery on the cliff-like slopes of their properties.

3.2.3 Alternative 3 Regrading Cliff-Like Slopes

Alternative 3 consists of regrading the cliff-like slopes to a lesser inclination to stabilize the slopes and facilitate installation of erosion control measures on flatter slopes. See **Figure 3-2**. The lesser inclination will increase overall stability of the slopes and reduce rock fall potential. This alternative will include regrading the cliff-like slopes to slope inclinations ranging from 1.05H:1V to 1.4H:1V, installing erosion control measures on the regraded slopes, and providing new drainage systems.

Drainage improvements and erosion control measures at the pump building site would be similar to that discussed for the proposed action in **Chapter 2** and will also include removal of accumulated debris and sediment in the existing concrete ditch and swale and repairing damaged ditch and swale sections. Alternative 3 does not include scaling loose rocks on the existing cliff-like slopes. Loose rocks exposed on finished slope surfaces would be excavated and removed with the regrading operations.



ALTERNATIVE 2 TYPICAL SITE SECTION

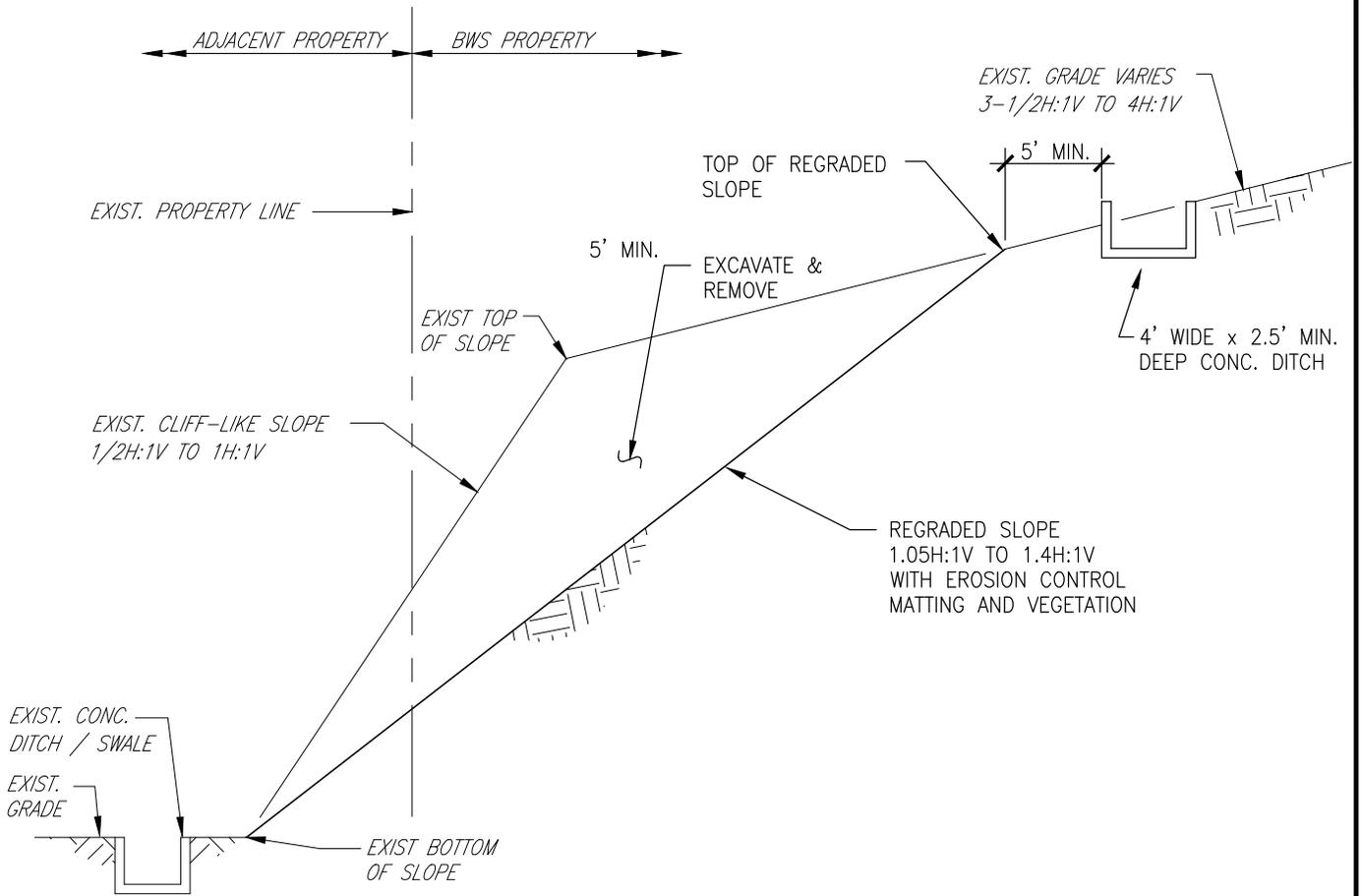
NOT TO SCALE

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CITY AND COUNTY OF
HONOLULU



WAIMALU WELLS 1 ROCK FALL MITIGATION
AND DRAINAGE IMPROVEMENTS
ALTERNATIVE 2
TYPICAL SITE SECTION

FIGURE
3-1



ALTERNATIVE 3 TYPICAL SITE SECTION
NOT TO SCALE

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CITY AND COUNTY OF
HONOLULU

J&E Shimabukuro, Endo
& Yoshizaki, Inc.
Civil & Structural Engineers

WAIMALU WELLS I ROCK FALL MITIGATION
AND DRAINAGE IMPROVEMENTS
ALTERNATIVE 3
TYPICAL SITE SECTION

FIGURE
3-2

Erosion controls would consist of permanent erosion control matting and deep-rooted shrubs for all slope surfaces except on the slope surfaces on parcels TMK 8-9-27:12 and portion of 11 and on TMK 8-9-28:1 and portion of 8. The slopes on these parcels incline about 0.5H:1V and would be too steep to allow installation of permanent erosion control mats and vegetation. Regrading to flatten the steep slopes would not be feasible due to existing terrain conditions. Erosion controls on the slope surfaces for these parcels would consist of installing riprap walls.

Permanent erosion control matting would consist of either 100 percent polypropylene synthetic component netting or a composite of polypropylene synthetic and natural coconut netting. Locally available products include the P300 and C350 manufactured by North American Green. The permanent erosion control turf reinforcement matting would reduce soil erosion during the vegetation establishment period, particularly on the steeper slope, and would also serve as secondary “long-term” erosion protection. The slope would be landscaped with deep-rooted, drought-tolerant vegetation and a temporary lawn sprinkler system would be provided to help the vegetation to establish. No permanent sprinkler system is planned for this alternative.

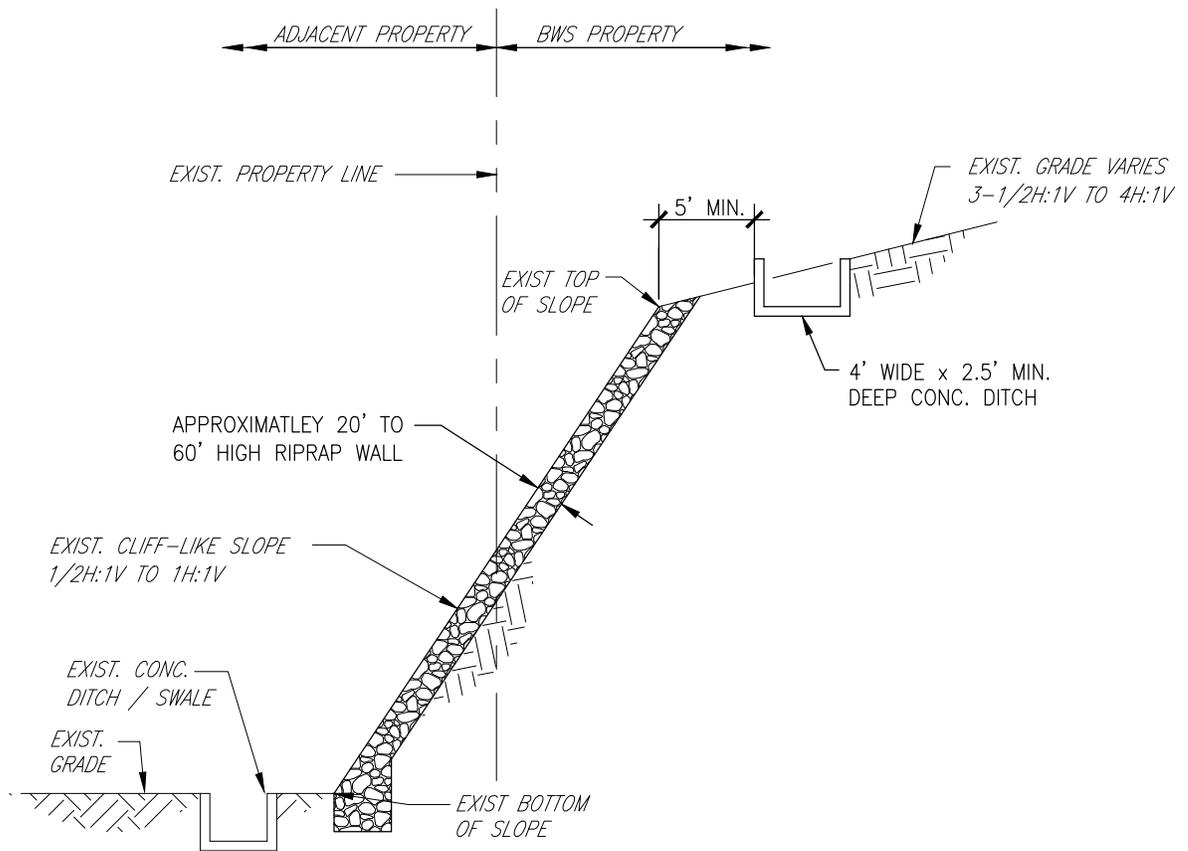
Alternative 3 includes about 16,500 square yards of clearing and grubbing, approximately 180 linear feet of riprap wall, permanent erosion control matting, vegetation, and drainage improvements. Regrading to flatten existing cliff-like slopes would involve about 40,000 cubic yards of excavation and removal. Vegetation would include a temporary irrigation system for vegetation establishment during the maintenance period.

The preliminary estimated construction cost for Alternative 3 is in the order of \$5,700,000 and the estimated time of construction is 30 months. Alternative 3 is more expensive than the proposed action discussed in **Chapter 2**.

3.2.4 Alternative 4 Riprap Wall on Cliff-Like Slopes

Alternative 4 consists of scaling loose rocks on the cliff-like slopes, installing riprap wall on the cliff-like slopes, and providing new drainage improvements. See **Figure 3-3**. Loose rocks on the cliff-like slope surfaces would be removed during excavation of the slope surfaces for the riprap wall construction. Drainage improvements and erosion control measures at the pump building site would be similar to that discussed for the proposed action in **Chapter 2** and would also include removal of accumulated debris and sediment in the existing concrete ditch and swale and repairing damaged ditch and swale sections.

The riprap wall would be installed from the toe to the top of the cliff-like slopes. Height of the riprap wall would range from less than 20 feet on parcel TMK 9-8-28:12 to more than 60 feet on parcel TMK 9-8-28:3, and wall inclination would vary from 0.5H:1V to 1H:1V. The riprap wall would be provided with weep holes spaced at approximately 8 feet on-center to reduce water pressure behind the walls.



ALTERNATIVE 4 TYPICAL SITE SECTION
 NOT TO SCALE

PREPARED FOR: BOARD OF WATER SUPPLY CITY AND COUNTY OF HONOLULU	 Shimabukuro, Endo & Yoshizaki, Inc. Civil & Structural Engineers	WAIMALU WELLS I ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS ALTERNATIVE 4 TYPICAL SITE SECTION	FIGURE 3-3
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Alternative 4 includes about 7,500 square yards of clearing and grubbing, about 1,200 linear feet of riprap wall, rock scaling, and drainage improvements. The preliminary estimated construction cost for Alternative 4 is in the order of \$6,900,000 and the estimated time of construction is 36 months. Alternative 4 is the most expensive of all the alternatives.

3.3 ALTERNATIVES ASSESSMENT

3.3.1 Discussion

Alternatives 2, 3, and 4 and the proposed action would help to reduce rock fall potential although the degree of rock fall protection and maintenance needs would vary from alternative to alternative. The drainage improvements of the alternatives and the proposed action would reduce surface water runoff to the cliff-like slopes and thereby reduces erosion, rock fall and flooding potential.

The catch fence along BWS property line of Alternative 2 Scaling and Catch Fences would prevent loose rocks on BWS slopes from rolling onto the adjacent properties below. This alternative does not mitigate rock fall potential of the cliff-like slopes in adjacent properties. Although scaling to remove loose rocks would be performed on the entire cliff-like slopes, the scaling operations only reduce the potential of rock fall under short-term conditions. Future erosion and weathering of the slope surfaces and disintegration of the slope materials may cause rock fall under long-term conditions. Post-construction maintenance would involve periodic removal of accumulated loose rocks at the base of the catch fence and repair of damaged fence, as needed. Long-term maintenance may also include replacement of the catch fence.

Alternative 2 is the only alternative that allows the entire rock fall mitigation construction to be performed on BWS property. Post-construction maintenance can also be performed from BWS property without the need to enter adjacent private properties. Alternative 2 would be the only alternative should the adjacent property owners refuse permission to install rock fall mitigation measures on their properties as discussed for the proposed action and for Alternatives 3 and 4 and for their future maintenance.

Although the initial construction cost, noise, traffic and environmental impacts, and construction difficulties are lesser for Alternative 2 than the other alternatives, this alternative does not mitigate rock falls beyond BWS property. Thus, Alternative 2 is less desirable than the proposed action and Alternatives 3 and 4. On this basis Alternative 2 Scaling and Catch Fences does not merit consideration. The preliminary estimated construction cost for Alternative 2 is \$3,100,000 and is less than the proposed action and the least of the alternatives. The estimated time of construction is 15 months.

Alternative 3 Regrading Cliff-Like Slopes includes excavation to flatten the existing cliff-like slopes to inclination ranging from 1.05H:1V to 1.4H:1V, riprap wall on certain properties, installation of permanent erosion mattings, and vegetation of the regraded slopes. This alternative reduces rock fall potential by decreasing slope inclination and by erosion control of vegetation root systems, but does not provide the same level of rock fall protection as the proposed action and Alternative 4 Riprap Wall on Cliff-Like Slopes. Alternative 3 involves extensive excavation and offsite disposal of rock and soil mixtures from slope excavation, is more costly than Alternative 2 and would generate considerably more noise, traffic, and environmental impacts during construction than the other alternatives. Post-construction maintenance would involve periodic trimming and fertilizing the vegetation as needed. Permission to enter adjacent private properties would be required for construction and for post-construction maintenance. Construction cost, noise, traffic, and environmental impacts, construction difficulty, lesser rock fall protection, and relatively heavy post-construction maintenance make Alternative 3 less desirable than the proposed action and Alternative 4. On this basis, Alternative 3 Regrading Cliff-Like Slopes does not merit consideration. The preliminary estimated construction cost for Alternative 3 is \$5,700,000 and is higher than the proposed action. The estimate time of construction is 30 months.

Alternative 4 Riprap Wall on Cliff-Like Slopes involves installation of riprap wall on the cliff-like slopes and is the only alternative that merits consideration. The riprap wall will provide the best rock fall protection of the alternatives since the cliff-like slopes will be covered with a grouted rock surface which will prevent erosion and reduce the potential of rock falls. This alternative would require clearing and grubbing of existing vegetation and trees and minor regrading of the cliff-like slopes to allow for construction of the walls. Alternative 4 will generate noise, traffic and environmental impacts during construction. The riprap walls would have an aesthetically pleasing appearance and post-construction maintenance would be minimal with occasional inspection of riprap wall and where necessary, repairing or patching cracks or other damages. Permission to enter adjacent private properties would be required for construction and for post-construction maintenance. The preliminary estimated construction cost for Alternative 4 is \$6,900,000 and is higher than the proposed action and the most expensive of the alternatives. The estimated time of construction is 36 months.

3.3.2 Conclusion

The proposed action discussed in **Chapter 2** involves installation of wire mesh drapery on the cliff-like slopes to mitigate rock fall potential of the cliff-like slopes. This will require clearing and grubbing of existing vegetation and trees to allow installation of the drapery. The wire mesh drapery would not be as aesthetically attractive as the vegetation on the regraded surface of Alternative 3 or the riprap wall of Alternative 4. However, in time new vegetation will cover the wire mesh drapery from view. Post-construction maintenance would involve periodic checking of the wire mesh drapery and repair as needed, and removal and disposal of fallen rocks at

the base of the drapery. Long-term maintenance may also include replacement of the drapery. Permission to enter adjacent private properties would be required for the drapery installation and for post-construction maintenance. The preliminary estimated construction cost for the proposed action is \$4,700,000 and the estimated construction time is 24 months.

Post-construction maintenance would be required for the new and existing drainage systems of the proposed action and all the alternatives. Maintenance would involve periodic inspection and where applicable, repair of eroded areas and around the ditches, patching cracks, and clearing accumulated debris in the ditches.

Alternative 4 Riprap Wall on Cliff-Like Slopes would require the least post-construction maintenance. Maintenance would involve periodic inspection of grouted riprap wall and, where necessary, repairing or patching cracks or other damages. Alternative 4 would also provide better slope protection than the proposed action since the riprap wall will prevent erosion and weathering of the cliff-like slopes which will reduce the potential of rock falls. This alternative would be the preferred choice because of excellent rock fall protection and low post-construction maintenance. However, Alternative 4 preliminary estimated construction cost of \$6,900,000 is the most expensive of all the alternatives and much higher than the \$4,700,000 estimated for the proposed action.

The BWS selected the proposed action discussed in Chapter 2 for the project on the basis of life cycle cost analysis, construction schedule, and impact to the adjacent property owners and community. From the life cycle cost analysis, Alternative 4 has the highest life cycle cost and the longest construction duration. Construction noise and traffic will impact the adjacent property owners and community longer than the proposed action and Alternatives 2 and 3.

CHAPTER 4

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing surrounding environment, provides an assessment of potential construction and operational environmental impacts and proposes mitigative measures to adverse impacts associated with the construction and operation of the proposed project.

4.1 PHYSICAL ENVIRONMENT

This section describes the existing physical environment present in the vicinity of the project site.

4.1.1 Climate

The climate of the State of Hawaii is relatively moderate throughout the island chain. Oahu's temperatures have small seasonal variations of 7 degrees between the warmest months (August and September) and the coolest months (February and March) and about 12 degrees between day and night. The project site in Aiea is usually dry with occasional showers with temperatures ranging from 65 degrees to 85 degrees Fahrenheit throughout the year. Mean annual rainfall in the project vicinity is between 40 and 60 inches per year.

Winds are predominantly "trade winds" from the east-northeast except for occasional periods when "Kona" storms may generate strong winds from the south or when the trade winds are weak and land breeze to sea breeze circulations develop. Wind speeds vary between about 5 and 15 miles per hour providing relatively good breezes. The proposed project will have no short-term or long-term impact on the climate at the project site and surrounding areas.

4.1.2 Topography, Geology and Soils

4.1.2.1 Topography

Topographic surveys were performed by Towill, Shigeoka, and Associates in November 2002 for parcels TMK 9-8-45:36 and 37 and in December 2003 for parcel TMK 9-8-26:72. Existing conditions and topographic features are shown on **Figure 2-1**.

The site slopes from steep cliff-like face on the northwest from adjacent residential lots of Waimalu Garden Tract on Ponohana Loop with inclinations of approximately 1/2H:1V across the BWS property boundary to gentler inclinations between 3-1/2H:1V and 4H:1V further southeast of the site. The site is approximately 1,350 feet long and 170 feet wide and varies in elevation at the bottom of cliff slopes from elevation 24 feet at the southwest end to elevation 55 feet at the northeast end. The

high point of the project area is at the Waimalu Wells I pump building site adjacent to the Waimalu Subdivision Unit 1 with an elevation of 120 feet. The cliff-like slopes vary in height from less than 20 feet to more than 60 feet.

The steep cliff-like slopes have experienced rock falls over the years typically during or after heavy storms. Several residents along Ponohana Loop have called or written the BWS to complain about the safety hazards with boulders and rocks falling off the cliff-like slopes onto their properties. Loose rocks ranging from less than 3-inches to more than 3-feet have rolled down the cliff-like slopes to their properties. A few residents have erected makeshift barriers of rock, chain link and wood fences.

4.1.2.2 Geology and Soils

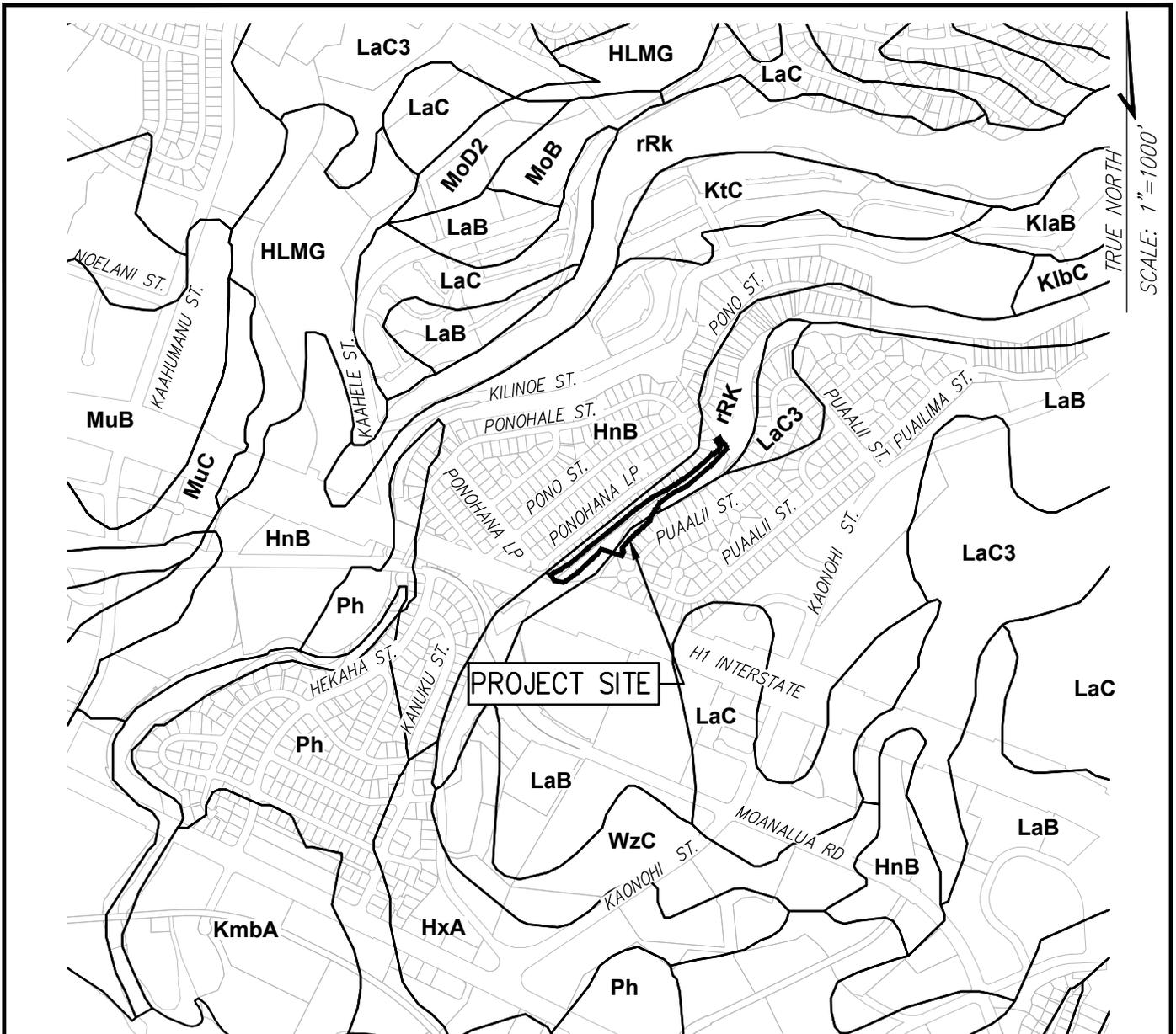
A geological reconnaissance of the Waimalu Wells 1 site was performed by MACTEC Engineering & Consulting, Inc. (MACTEC) in December 2003 and January 2004. The project site consists of properties owned by 29 owners. See **Figure 2-1**. BWS owns three parcels TMK 9-8-26:72 and TMK 9-8-45:36 and 37. Parcels TMK 9-8-26:65 and TMK 9-8-27:2 are owned by the State of Hawaii Department of Transportation and TMK 9-8-65:59 is owned by Cobourn Enterprises, Inc. Twenty-three other parcels, TMK 9-8-27:3 through 12 and TMK 9-8-28:1 through 13 are owned by various owners.

The soil within the project area is Rock Land (rRK) as designated by the U.S. Department of Agriculture (USDA) Soil Conservation Service. See **Figure 4-1**. The main characteristics of rRK are rocky outcrops of basalt and andesite and very shallow soil cover. Natural terrain is nearly level to very steep with a high shrink-swell potential.

Visual observations indicate that there appears to be several lava flows covering the site. Thus, it is very likely that the parent rock formation is alternating layers of pahoehoe and aa flows in any one area and throughout the site.

The following information on the site geology was taken from the geological reconnaissance report prepared by MACTEC.

The native material forming the steep cliff face and surrounding areas is typically massive, finely crystalline basalts. Exposed rock out crops indicate at least 5 to 7 separate lava flow events ranging from 1.5- to 6-feet thick. The interfaces between several beds are moderately to severely weathered, likely indicating an extensive period of time between depositional events, and providing a path for subsequent water infiltration and other decomposition accelerating processes. Mineral chemistry and textural composition of the rock varies, with ensuing differences in weathering and erosion rates. Layers of lesser competency or loose materials separate beds of competent materials that over time create over-steepening and undercutting. Still other layers, notably at the top of the cliff in most areas, are underlain by highly decomposed materials consisting of saprolite with cobbles or boulders surrounded by a weak soil matrix.



SOURCE: U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE.

LEGEND:

- HLMG** - Helemano silty clay, 30 to 90 percent slopes.
- HnB** - Hanalei silty clay, 2 to 6 percent slopes.
- HxA** - Honouliuli clay, 0 to 2 percent slopes.
- KlaB** - Kawaihapai stony clay loam, 2 to 6 percent slopes.
- KlaB** - Kawaihapai very stony clay loam, 0 to 15 percent slopes.
- KmbA** - Keaau clay, saline, 0 to 2 percent slopes.
- KtC** - Kokokahi clay, 6 to 12 percent slopes.
- LaB** - Lahaina silty clay, 3 to 7 percent slopes.
- LaC** - Lahaina silty clay, 7 to 15 percent slopes.

- LaC3** - Lahaina silty clay, 7 to 15 percent slopes. severely eroded
- MoB** - Manana silty clay loam, 2 to 6 percent slopes.
- MoD2** - Manana silty clay loam, 12 to 25 percent slopes.
- MuC** - Molokai silty clay loam, 7 to 15 percent slopes.
- Ph** - Pearl Harbor clay.
- rRK** - Rock land.
- WzC** - Waipahu silty clay, 6 to 12 percent slopes.

PREPARED FOR: BOARD OF WATER SUPPLY CITY AND COUNTY OF HONOLULU	 Shimabukuro, Endo & Yoshizaki, Inc. Civil & Structural Engineers	WAIMALU WELLS I ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS ENVIROMENTAL ASSESMENT SCS SOIL SURVEY	FIGURE 4-1
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The property bound between adjacent residential lots and BWS land ranges from the bottom to the top of the cliff face, usually bisecting the face at or above the midpoint. Most common boundary occurs near the structural change between the less stable materials, typically the uppermost section, and the more stable lower portion. Typically, the strata likely to produce rock fall appears to be on BWS land.

The removal of potentially unstable materials on BWS land will only enhance the short-term stability of the underlying strata and increase the overall local stability. In the long-term, the slope materials may continue to weather differentially or continue to erode, resulting in undercutting, factors that would contribute to rock fall.

Using the Rock Fall Hazard Rating System, MACTEC rated the entire slope area as the "Case 2" class. The Case 2 classification is generally for rock mass with erosion-like features. Differential erosion features range from occasional to major, with much higher percentage of the latter. Differences in erosion rates likewise range from moderate to extreme. Differential erosion appears to be by far the most dominant contributor to general instability and rock falls.

The rock is extensively jointed and fractured in random, undulating patterns, although these features are typically discontinuous and rarely extend further than 3 to 4 feet. Rock friction appears to be of minimal consequence as most material is macro-smooth/micro-rough, frequently with soil infilling, or minimal rock-to-rock contact. Sizes of rocks susceptible to exposure and fall are most commonly in the 8- to 12-inch range, although vulnerable boulders over 5 feet are present. Rock debris at the base of the slope is typically 6- to 12-inches. Unfractured debris most commonly appears to be in the 8- to 12-inch range, and appears to have originated from about 25- to 35-feet upon the cliff face slopes, or from the upper most 8- to 15-feet of the cliff face slopes. Removal of loose rocks or vulnerable materials in some areas may also destabilized limited or localized additional materials in the same areas.

Homeowner complaints and field investigations provide consistent evidence of falling rocks during rainfall events. Several lots reported 6- to 12-inches of debris that had not been present the previous day, and had fallen during minor precipitation events overnight. Runoff is exacerbating much of the differential erosion problems, but diversion of runoff water from the slopes above will only partially reduce the erosion issues as the soils on the slopes become easily saturated. At least one area of an existing concrete ditch at the top of the cliff is being undercut by erosion of soil and may become vulnerable in the near future. Several locations elsewhere showed incipience of drainage channel erosion that may become future rock fall prone areas. Property owners adjacent to the lower bank of the slope also have reported potential walking or trampling in of the existing ground near the back of their properties. The stability of property owner's fences or walls is subject to this erosion problem.

Several large boulders on the lower portions of the slopes above the cliff face slopes were observed by MACTEC in January 2004. These boulders were close to the

edge and could topple over if there is additional soil movement or if stabilizing vegetation fails. These and other loose boulders above and on the cliff face slopes were removed by the BWS in 2005 by an emergency rock removal project. Little of the area above the existing concrete drainage diversion appears to be of concern, and appears mostly stable. However, steep areas immediately below the BWS pump building site and above the largest cliff exposure may be prone to long-term erosion and create rock fall potential.

Adjacent property owners at Waimalu Subdivision Unit 1 on the southeastern side of the BWS property have filled into the BWS property. Some of the fill-slopes appear to be unstable and are slowly eroding. These fill-slopes created by adjacent property owners may be prone to long-term erosion.

4.1.2.3 Probable Impacts from Construction Activity and Mitigative Measures

BWS proposed action is discussed in **Chapter 2 Project Description** of this document. In summary, ultimately approximately 8,330 square yards of wire mesh drapery will cover the southeastern cliff-like slopes of lower Waimalu Gulch within BWS property and adjacent parcels of Waimalu Garden Tract to reduce the long-term potential rock fall hazard, and 1,100 linear feet of concrete ditches and 470 linear feet of 8-, 12- and 18-inch pipes will be provided for drainage improvements to reduce erosion and flooding hazard. See **Figure 2-2**. In addition, erosion control grouted riprap will be provided at the pump building site and cluster of loose boulders on BWS property will be grouted in place for stabilization. No work will be performed by BWS to stabilize eroding fill slopes of adjacent property owners of Waimalu Subdivision Unit 1 along the southeastern side in BWS property. These eroded slopes should not be disturbed by construction activities and will be restored if damaged by the project.

During the initial stages of construction, land disturbing activities including removal of existing loose rocks and clearing and grubbing of existing trees, shrubs and vegetation will be required for construction of drainage improvements and installation of the wire mesh drapery and anchor system. The short-term impact of these operations could cause other rocks or materials to become loose and pose a hazard. As much loose material will be removed as feasible and other rocks grouted in place to decrease the long-term hazard of rock fall. Existing drainage systems affected by construction activities will be maintained free of debris and soils to reduce potential of clogging.

Construction of the new concrete ditches at the top of the slopes will divert storm runoff from the cliff-like slopes and prevent erosion gullies from developing and accelerating undercutting of less competent soils thereby increasing rock fall hazard. Minor grading will be required for the concrete ditches that will be 4 feet wide by 2.5 to 3.5 feet deep. Existing ground on the upper side of the top of concrete ditch will be graded to match the top of ditch. On the lower side, existing ground will be graded about 12 inches below the top of concrete ditch. The graded areas will be

covered with erosion control mats. The use of drought-tolerant native indigenous species with the erosion control mats will be investigated. The short-term impact of this operation includes fugitive dust formation, odor, noise and temporary traffic disturbances of adjacent Puaalii Street. These impacts resulting from construction-related activities are not expected to have a significant impact on the surrounding environment.

Fugitive dust is expected because construction activities will involve grading, trenching and excavation. Mitigative measures to alleviate fugitive dust formation include the implementation of a watering program to minimize soil loss from fugitive dust particle emissions and the planting of vegetation as soon as practical on bare surfaces. Odor from construction vehicles and equipment should be short-term and minimal as discussed in **Subsection 4.1.5 Air Quality** of this document. Construction noise should not have a significant impact on noise sensitive resources such as schools and residences due to the limited construction activity occurring as discussed in **Subsection 4.1.6 Noise** of this document. Traffic disturbances on Puaalii Street will occur due to movement of construction vehicles and equipment but should be minimal and short term. A traffic control plan will not be required since no work will be performed in City streets as discussed in **Subsection 4.5.5 Transportation Facilities** of this document.

Best Management Practices (BMP) and erosion control plan will be incorporated into the construction plans to address the potential short-term impacts during construction and implemented by the Contractor. Necessary permits from the City will be obtained which will include the preparation of plans subject to City review and approval for implementation. Silt fence, sediment trap, erosion control mat, and periodic removal of silt in existing ditches will be implemented during construction. Similar post-construction measures will be implemented pending natural establishment of vegetation. In addition, construction activities will comply with pertinent Hawaii Administrative Rules of the State DOH such as Title 11, Chapter 46 (Community Noise Control), and Chapter 60 (Air Pollution Control). These measures will mitigate short-term impacts of construction activities on the surrounding environment.

The proposed wire mesh drapery and 8-, 12- and 18-inch drainpipes will have a long-term impact on the visual aesthetics of the southeastern slope of lower Waimalu Gulch. However, over time, the trees and shrubbery are expected to grow and cover the wire mesh drapery and parts of the drainpipes as discussed in **Subsection 4.1.7 Visual Resources** of this document. There will be no other long-term impact resulting from the construction and operation of this project.

4.1.3 Hydrogeological Resources

This section provides a description of the hydrogeologic resources on Oahu and the potential impacts associated with the construction of the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project.

4.1.3.1 Hydrogeological Resources

A regional aquifer-system analysis by Nichols, W.D, et. al., divided Oahu's groundwater resources into seven areas based on geologic or hydrologic characteristics. According to the analysis, Oahu's aquifers are possible due to the presence of low-permeable sedimentary deposits and caprock that confine freshwater from discharging into the ocean, thus, allowing the freshwater to build up to a greater thickness than would be possible in an unconfined setting. This confinement creates a freshwater lens that varies throughout each aquifer. Of the seven, the Waianae Volcanics and Koolau Basalts are the two largest aquifers.

The BWS Waimalu Wells 1 site is located in the Southern Oahu aquifer that receives groundwater from rainfall and underground water movement from the Schofield and Koolau rift zone aquifers. The water table in the vicinity of the project site is approximately 21 feet above mean-sea-level. The Waimalu Wells 1 pump station has the capability of pumping 330 gpm into the BWS Waimalu 217' system. However, in 1990, chloride levels rose to over 220 to 230 ppm. Consequently, the Waimalu Wells 1 pump station was closed and abandoned due to the non-potable quality of water being drawn and is no longer in operation as a source of water for BWS.

4.1.3.2 Probable Impacts and Mitigative Measures

The Waimalu Wells 1 site is no longer in service and does not provide potable water to the BWS water system or reservoirs. The well was abandoned and closed in 1990 due to the high chloride content of the drawn water. Construction of drainage improvements and rock fall mitigation measures over the ground surface of the Waimalu Wells I site for the proposed project will have no short-term or long-term adverse impact on the Southern Oahu aquifer.

4.1.4 Natural Hazards

This section addresses only those natural and urban-related hazards applicable to the Waimalu Wells I project site. Of the potential natural hazards, earthquakes, hurricane, and flood hazards are applicable. These natural hazards are addressed below. There are no other potential urban-related hazards applicable to the project site such as airport clear zones, nuisances, or hazardous waste issues associated with this project.

4.1.4.1 Earthquake Hazard

Earthquakes in the Hawaiian Islands are primarily associated with volcanic eruptions resulting from the inflation or shrinkage of magma reservoirs beneath which shift segments of the volcano. Oahu is periodically subject to episodes of seismic activity of varying intensity. Available historical data indicated that the number of major

earthquakes occurring on Oahu have generally been less and of lower magnitude compared with other islands such as Hawaii.

Although the possibility of earthquakes on Oahu has been lower than other islands, potential rock fall and rock fall hazards may result from an earthquake of sufficient magnitude. Earthquakes cannot be predicted with any degree of certainty or avoided and an earthquake of sufficient magnitude (greater than 5 on the Richter Scale) may cause instability of the cliff-like slopes and create rock falls. The construction of the wire mesh drapery in conjunction with grout-in-place methods will reduce this potential hazard. Mitigative measures to prevent failure of the wire mesh drapery and grout-in-place loose boulder locations will be established and a periodic monitoring program of the wire mesh drapery, anchor system and grout-in-place locations to identify problem areas caused by weathering will be implemented to repair these areas as soon as feasible prior to any failure. Proper maintenance and monitoring should reduce the potential rock fall during and after an earthquake.

4.1.4.2 Hurricane Hazard

A hurricane of significant strength and high winds passing close to the island of Oahu could cause damage to the Waimalu Wells I site and surrounding areas. The potential for damages to the project site would be no less than that for residences and buildings in other areas of Oahu. The wire mesh drapery, anchor system and grout-in-place locations will be exposed to the elements. To minimize the potential damage from high winds such as uplifting of the wire mesh drapery, the anchor system will be designed with 1-inch diameter galvanized steel rods embedded in concrete every 24-feet with an ultimate pullout capacity of 9 tons.

To minimize damage during a hurricane or high wind event, the drainage improvements will be designed and constructed in conformance to applicable City Building Code standards. The risk of potential damage from hurricane or high winds should not be more than for other existing facilities on the island of Oahu.

4.1.4.3 Flood Hazard

The project site and residential areas surrounding the project site fall within Flood Zone D of the 100-year flood hazard area as designated on the Flood Insurance Rate Map (FIRM) Community Panel Number 15001 0245 F (revised September 30, 2004), prepared by the Federal Emergency Management Agency. Flood Zone D is defined as areas where flood hazards are undetermined. The Flood Insurance Program does not have any regulations for developments within Flood Zone D. The project site is also outside of the tsunami inundation area.

During rain events, residents adjacent to the southeastern slope of lower Waimalu Gulch have complained to BWS about storm runoff creating erosion gullies that loosen rocks and other materials that eventually fall onto their properties. Concentrated runoff was reported to BWS at TMK 9-8-27:9 causing flooding and

deposition of sediment and rocks at the back of the property. The proposed concrete ditches located at the top of the slope will be designed to divert storm runoff into drainage pipes to reduce incipience of erosion gullies and undercutting of less competent soils. The ditch and pipes will be over designed for a recurrence interval of 50 years as a safety measure although 10 years is the standard and constructed in compliance with City Building Code and Storm Drainage Standards requirements for structures within Flood Zone D. A post-construction maintenance program will be implemented, which will require periodic inspection of the drainage system and where applicable, repair of eroded areas around the ditch, patching cracks and clearing accumulated debris in the ditch. Periodic inspection and maintenance will prevent overgrowth and clogging of the drainage system.

The drainage improvements at Waimalu Wells 1 site is expected to reduce runoff that flows down the slopes thus, reducing the flooding and rock fall hazard to the adjacent properties. Except for installation of erosion control mats on cleared slopes before installation of wire mesh drapery, there are no plans to address damages and erosions from previous storm runoffs. Removal of previous silt buildup at the base of the slope and the existing ditch at the base of the slope on adjacent properties will be included in this project. The use of retention and detention ponds was considered but is not feasible as sufficient land is not available within the project area.

4.1.5 Air Quality

The Department of Health, Clean Air Branch monitors ambient air quality through the Air Surveillance and Analysis Section of the State Laboratories Division to comply with the U.S. Environmental Protection Agency (EPA) national ambient air quality standards (NAAQS). In addition to NAAQS, Hawaii established a standard for hydrogen sulfide. There are nine (9) monitoring stations on Oahu, five (5) on Hawaii and Kauai and Maui each have one (1).

4.1.5.1 Air Quality

There are no point source emissions associated with the proposed project. Clearing, grubbing of trees and shrubs, and vehicular operations moving materials to and from the site could temporarily increase fugitive dust in the air as well as odor and exhaust from the construction equipment. Air quality will be in compliance with State and Federal requirements. The nearest monitoring station to the project site is located approximately 2.5 miles west in Pearl City, Oahu, atop of the Leeward Health Center at 860 Fourth Street, Pearl City. This monitoring site monitors PM₁₀, PM_{2.5} and PM_{2.5} speciation as part of EPA's particulate matter speciation monitoring program.

Due to the effects of the trade winds and lack of stationary point source pollutants, the air quality is generally good. The 2008 Annual Summary of Hawaii Air Quality Data also states that Hawaii's air is one of the best in the nation, and criteria pollutant levels remain well below state and federal standards.

4.1.5.2 Probable Impacts and Mitigative Measures

Short-term effects during construction include fugitive dust generation during clearing, grubbing, exhaust and odor emissions from vehicles and construction equipment. The construction contractor will be required to comply with Hawaii Administrative Rules (HAR) Title 11, DOH Chapter 60.1 Air Pollution Control that contains restrictions on visible emissions from motor vehicles and fugitive dust generators. The construction manager will be required to inspect the mitigative measures taken by the contractor to maintain proper performance. These impacts should not result in a significant impact or exceed State and Federal ambient air quality standards. The use of approved erosion control plans and mitigative methods such as water sprinkling whenever feasible will reduce potentially adverse air quality impacts.

The contractor will be required to keep all construction equipment and vehicles properly tuned and maintained and to reduce unnecessary idle time to minimize air quality impacts. Odor and exhaust from vehicles and construction equipment will have minimal impact on residences surrounding the project site and will not significantly affect the ambient air quality since construction activities will be limited to the area being worked on at any one time. In compliance with government regulations, construction activities will be temporary and short-term and is not anticipated to have long-term adverse effects.

4.1.6 Noise

4.1.6.1 Noise

The project site is situated within the City R-5 residential district and is immediately north of Interstate Route H-1. Under the State DOH Community Noise Control regulations (Title 11, Chapter 46, HAR), the maximum permissible sound levels for construction activities is 55 dBA during daytime (7:00 a.m. to 10:00 p.m.) hours and 45 dBA during nighttime hours (10:00 p.m. to 7:00 a.m.). These levels may not be exceeded at or beyond the property line for more than 10 percent of any continuous 20-minute period.

Noise from construction activities, vehicles and equipment will impact residences near the project site. Due to the proximity to Interstate Route H-1, noise generated during the construction period will not significantly increase the ambient noise level and will only be short-term. The proposed project is not anticipated to have long-term adverse impacts. No nighttime work is anticipated.

4.1.6.2 Probable Impacts and Mitigative Measures

Noise impacts from construction activities, vehicles and equipment will be mitigated by requiring the contractor to consult with residences to set up a schedule that will minimize noise impacts. Pearl Ridge Elementary School is located immediately

south of the project site on the makai side of Interstate Route H-1. Noise generated from construction activities is not anticipated to increase ambient noise levels on the campus grounds of the elementary school.

The contractor will be required to apply current techniques and methods of sound attenuation and abatement such as installing noise-reducing mufflers to construction equipment, machines, on-site vehicles and devices requiring exhaust of gas or air. Proper maintenance of construction machines and vehicles will be performed to reduce unnecessary noise. The contractor will be required to obtain a Community Noise Control Permit from the DOH and observe and comply with HAR Title 11, DOH, Chapter 46 Community Noise Control to protect the public from the effects of noise from construction activities. Restrictions on noise levels and operational hours of the noisiest equipment will minimize the impacts unto the surrounding communities. Conditions of the Noise Permit shall be enforced and violators penalized by the Director of DOH. Nighttime work is not anticipated for the project.

Specific Community Noise Control Permit restrictions for construction activities are:

1. No permit shall allow construction activities creating excessive noise before 7:00 a.m. and after 6:00 p.m. of the same day.
2. No permit shall allow construction activities that create excessive noise before 9:00 a.m. and after 6:00 p.m. on Sundays.
3. No permit shall allow construction activities that exceed the allowable noise levels on Sundays and on holidays.

Construction activities will generally be limited to regular workday hours (8:30 a.m. to 3:30 p.m., Monday through Friday). Construction activities of the project shall be in compliance with the requirements of the Community Noise Control Permit and are not expected to result in a significant noise impact on the surrounding environment.

4.1.7 Visual Resources

The existing landscape along the southeastern slope of the lower Waimalu Gulch is predominantly vegetation, trees, shrubs and rocky outcrops. The valley floor is filled with residential homes setback from the bottom of the cliff-like slopes.

Short-term visual impacts during construction include minor grading and the clearing and grubbing of existing vegetation and trees to allow the installation of drainage improvements, erosion mats, wire mesh drapery, and anchor system. The mats will minimize any future erosion. The initial appearance of minor graded areas and the wire mesh drapery would not be aesthetically attractive but in a year, vegetation should return covering about 95 percent of the wire mesh drapery. Trees, shrubbery, and vegetation are expected to grow naturally and stabilize the hill slope over time. The possibility of introducing drought-tolerant native or indigenous

species to the mesh-draped areas will be investigated. There will be no long-term adverse impact of the wire mesh drapery.

The concrete ditches whose dimensions are 4 feet wide by 2.5 to 3.5 feet deep will traverse 1,100 linear feet at the top of the cliff-like slope with an 8-, 12- and 18-inch diversion pipe strapped to the surface slope. Anchors will be installed to hold these pipes to the surface. Vegetation is expected to grow above the concrete ditches and drain pipes and cover them in most areas. There will be no long-term adverse impact of the concrete ditches and drainage pipes on the surrounding environment.

4.2 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

4.2.1 Historical Assessment

Historical documents, maps and existing archaeological information pertaining to sites in the vicinity of the project were researched by Cultural Surveys Hawaii, Inc. (CSH) at the State Historic Preservation Division (SHPD) library, CSH library, and the University of Hawaii Hamilton Library. The Office of Hawaiian Affairs, Oahu Island Burial Council and members of other community organizations were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the study area and the surrounding vicinity. Information on Land Commission Awards was accessed through Waihona Aina Corporation's Mahele Data Base (www.waihona.com). The names for potential community contracts were also obtained from colleagues at CSH and from the researcher's familiarity with the families who live in the area.

Although the research suggested the possibility of historic properties (i.e., burial caves, historic agricultural remnants, railroad era remnants), no such properties were observed within the project area by a field survey conducted by CSH. Several natural rock outcrops were located within the project site but none were modified. No caves were present. The project site and surrounding areas were historically bulldozed and altered during past agricultural, transportation, and building activities and are now urbanized consisting primarily of roadways and homes. Additionally, trash, believed to be almost all modern in nature, was scattered throughout the project site.

No historic properties were observed nor are any believed to be present that would be affected by the proposed project. Because no historic properties were identified at the project site, a project-specific effect recommendation of "no historic properties affect" was suggested to be warranted. The archaeological assessment was accepted by the SHPD in their Chapter 6E-8 review letter of March 17, 2006.

4.2.2 Archaeological Assessment

CSH conducted an archaeological assessment of the project site, which included a literature research of archival sources, historic maps, Land Commission Awards and

previous archaeological reports to create a history of archaeological sites that may have been recorded within the project limits. In addition, a reconnaissance was conducted to identify surface features and assess the potential for impacts to such features.

The literature research provided abundant evidence of archaeological sites including agriculture, habitation, transportation/pathways, gathering and burial activities in the Aiea area. However, these findings are located on the valley floor or makai of the project site. During a reconnaissance, no caves were present within the project area and no subsurface testing was conducted. The reconnaissance found no archaeological features in the project site.

To minimize any impacts on the uncovering of potential archaeological deposits, human burials, or other archaeological significant features associated with this project, an archaeological monitoring plan will be developed during design in consultation with the SHPD. According to HRS Section 6E-46.6, HAR Chapter 13-300, should any significant cultural deposits or human skeletal remains be encountered, work shall stop in the immediate vicinity and the archaeological monitor will contact the SHPD. The following nine guidelines will be submitted for review prior to commencement of any ground-altering activities:

1. The kind of remains that are anticipated and where in the construction area the remains are likely to be found.
2. How the remains and deposits will be documented.
3. How the expected types of remains will be treated.
4. The archaeologist conducting the monitoring has the authority to halt the construction in the immediate area of the find in order to carry out the plan.
5. A coordination meeting between the archaeologist and construction crew is scheduled so that the construction team is aware of the plan.
6. Type of laboratory work on remains that are collected.
7. A schedule of report preparation.
8. Details concerning the archiving of any collections that are made.
9. An acceptable report documenting the findings of the monitoring activities shall be submitted to the SHPD for review following completion of the proposed undertaking.

By developing an acceptable archaeological monitoring plan approved by SHPD for implementation, the proposed project will have no adverse effect on significant archaeological sites, which may potentially be within the subsurface area of the project site.

4.2.3 Cultural Assessment

The project is not expected to adversely affect traditional native Hawaiian cultural practices or other ethnic group cultural practices. Traditional native Hawaiian cultural practices declined with the extensive land modification and urbanization of the Aiea area. As taro fields gave way to rice and sugar plantations and, eventually urbanization, the traditional way of life for native Hawaiians was no longer possible in Waimalu. CSH conducted a cultural survey and consulted with Hawaiian cultural organizations, government agencies and community members and found no on-going Hawaiian cultural practices, from either past or present specifically related to the project site.

Construction activities will result in temporary closure of the project site. However, this will not prevent access to adjacent residences. Trenching for the concrete ditches at the top of the cliff-like slopes will not likely encounter cultural deposits or possible burials during construction work. However, an archaeological monitoring plan will be developed in consultation with the SHPD to address mitigative measures to be implemented by the Contractor. With development of this monitoring plan, the project will have no significant adverse effect on historical and cultural sites. As a result, the project is not expected to have a significant impact on traditional native Hawaiian cultural practices or resources.

4.3 BIOLOGICAL ENVIRONMENT

Biological surveys of the project site were undertaken in April 2007 by AECOS, Inc. to serve as a basis for an environmental assessment of the proposed rockfall mitigation measures and drainage improvements. The purpose of the biological survey was to determine if any federally listed endangered, threatened, or proposed plants, birds, or mammals use resources at the project site. The surveys determined that no species of plants or animals were present at the project site that would require special consideration in planning or constructing the proposed improvements.

4.3.1 Botanical Resources

AECOS's survey recorded a total of 77 different species of plants growing at the project site. The dominant vegetation was Guinea grass and koa-haole, with a variety of other mesic to dryland plant species typical of lowland Oahu present. Some influence on the vegetation of escaped or cast off plants from properties adjacent to the project site was evident. Two common indigenous plants, sandalwood and popolo, defined as native to Hawaii but also found naturally

elsewhere in the Pacific Basin and coconut, considered an early Polynesian introduction to Hawaii were also growing at the site. The vast majority of species are alien plants that have become naturalized in this low elevation, urban/suburban environment of leeward Oahu.

Although the native sandalwood is a plant of botanical interest in this setting, it is not a plant species that has special status. None of the observed vegetation within the project site or surrounding areas are known to be Federal- or State-listed threatened or endangered, nor candidate threatened or endangered species. The project improvements are not expected to have a significant impact on botanical resources.

4.3.2 Avifauna and Fauna Resources

AECOS's findings of the mammalian survey were consistent with highly urbanized area surrounding the project site, and its location on Oahu. Although no rodents were detected during the course of this survey, it is likely that roof rats, Norway rats, European house mice and possibly Polynesian rats use resources within the project site. These commensal species are all but ubiquitous on the island of Oahu. All of these introduced rodents are deleterious to remaining native ecosystems and the native floral and faunal species that are dependant on them for their survival.

AECO's findings of the avian survey were consistent with the location and condition of the habitat present at the project site. All 14 avian species recorded during the course of this survey are considered to be alien to the Hawaiian Islands. No native avian species were recorded, and none were expected.

No Federal- or State-listed threatened or endangered or candidate threatened or endangered species are known to exist within the project site. No significant resources for endangered, threatened or candidate species are known to exist within the developed residential areas. Consequently, construction of project is expected to result in no significant impacts to important faunal populations or resources.

4.4 ECONOMIC, FISCAL AND SOCIAL FACTORS

This section discusses the project's probably impact on economic, fiscal and social factors. Due to the nature of improvements proposed for the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project, impacts will be associated with construction and social related issues.

4.4.1 Economic and Fiscal Factors

Construction of drainage improvements for the first phase of Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project is anticipated to commence in September 2014 and should be complete in 1 year. No construction timetable has been established for the covering of the cliff-like slopes with wire mesh drapery for the second phase of the project which should be completed in 1.5 years. The preliminary estimated construction cost for the project is approximately \$4,700,000.

The construction project will create construction jobs over the anticipated construction period.

Construction jobs will typically consist of on-site laborers, tradesmen, equipment operators, and supervisors among other positions. This work force will generate personal income for all workers involved. Personal income is defined as the wages paid to the direct construction workers or operational employees associated with a development. Direct construction jobs created will also stimulate indirect and induce employment within other industries on Oahu.

Fiscal impacts associated with this project will primarily involve slightly additional tax revenue generated to the State. Tax revenue sources for State government will be composed primarily of general excise taxes (GET) on development costs and construction materials, and corporate income tax. In addition, GET taxes on indirect and induced income spent stimulated by the spending of direct income will also contribute new revenues to the State. The approximately \$4,700,000 expended for the BWS Waimalu Wells Site 1 Rock Fall Mitigation and Drainage Improvements construction activities will therefore generate some increased tax revenue to the State.

Since City revenue is primarily limited to property tax revenues, there will be minimal changes to the City revenues. The improvements planned for the proposed project will contribute to property value of the surrounding areas. This increase is expected to be minimal. No changes to the property values or existing surrounding residences are anticipated from the construction of the project. The project will not generate any new in-migrant residents to the island of Oahu. Thus, there will not be any effect on State and County operational expenditures for public services.

4.4.2 Social Factors

The improvements planned for the project are not expected to change the existing resident population in Aiea, Oahu. There are no new residential units or visitor units associated with this project. Thus, the project should result in no in-migration of individuals to reside within the City. As a result, there should be no impact on the existing resident population.

Due to the nature of the proposed improvements, the project will alter the appearance of the southeastern cliff-like slopes of lower Waimalu Gulch but will not change the land uses of the project site and surrounding communities. The on ground wire mesh drapery will be installed over the cliff-like slopes to reduce the potential of rock fall hazard and the drainage improvements will prevent further erosion of the slopes. This project will not change the existing land uses in the surrounding area or have a significant impact on the urbanized land uses.

The project is a BWS initiated project that will take proactive measures to address and mitigate public safety concerns of citizens residing at toe of the cliff-like slopes.

The planning of the project incorporated these concerns to mitigate the potential of rock fall and flooding from the slope. The proposed project will improve the overall safety of citizens in proximity to the slope and will also reduce the existing potential rock fall and flooding hazards.

4.5 INFRASTRUCTURE FACILITIES

This section discusses the projects probable impacts on infrastructure facilities serving the project site and surrounding areas. Due to the nature of modifications proposed for the project, most of the impacts will be associated with short-term construction-related activities.

4.5.1 Water Facilities

Water service in the vicinity of the Waimalu Wells I project site is provided by BWS Waimalu 217N system, which is part of an integrated system of source wells, storage reservoirs and distribution lines. The rock fall mitigation and drainage improvements are located in BWS property except for the 12- and 18-inch drainpipes that connect to an existing concrete ditch in parcel TMK 9-8-27:2 owned by the State DOT and concrete ditch in parcel TMK 9-8-65:59 owned by Jin Young Kim and Tae Seon Kim. Easements and approvals to locate the drainpipes and concrete ditch in these parcels will be obtained from the owners.

The drainage improvements and rock fall mitigation are anticipated to have no adverse impacts on the existing Waimalu 217' system or Waimalu Wells I site. During design and construction of the proposed project, close coordination will be maintained with BWS to ensure that the water system will not be adversely impacted and that water service to adjacent areas will not be interrupted.

4.5.2 Wastewater Facilities

The proposed project is intended to improve collection and transport of storm runoff drainage from the BWS Waimalu Wells I site and reduce rock fall hazard at the southeastern region of lower Waimalu Gulch. A series of concrete ditches with diversion drainpipes and wire mesh drapery will be installed at the project site. The project will not require changes or alterations to nor have any impacts on the existing wastewater facilities at or adjacent to the project site.

4.5.3 Drainage Facilities

The existing City drainage system in the residential areas of the project generally follows roadway alignments and flows to Waimalu Stream and to Pearl Harbor. In the vicinity of the project site, the proposed concrete drainage ditches will collect and divert storm runoff into drainpipes bypassing the slopes and connect to the existing City drainage system. The drainage improvements will be over-designed in accordance with the City Storm Drainage Standards for a recurrence interval of 50

years as a safety measure although 10 years is the standard. The potential for flooding exists should a storm of greater recurrence interval occur. However, the BWS does not have any knowledge of area-wide flooding in the project area resulting from runoff from the BWS property. The drainage improvements will likely generate a total estimated discharge increase of about 10 cubic feet per second (cfs) to the existing drainage system at Waimalu Stream. The existing City drainage system will be able to accommodate the additional storm runoff.

A drainage report will be prepared as required by the City Department of Planning and Permitting (DPP) and provided to the State DOT Highways Division (HDOT) and State Department of Education (DOE) upon completion and acceptance. Construction plans will be coordinated with the City and the HDOT (Brian Tyau). This improved drainage system will reduce the storm runoff flowing down the slopes that create erosion gullies and undercut stabilizing materials around boulders. Consequently, the potential of flooding, erosion, and rock fall hazards will be reduced.

The improved drainage system will connect to the City's storm drainage system and preliminary hydraulic analysis indicates it will have no adverse impact on the existing system and no impact on the Pearl Ridge Elementary School located directly makai of Interstate Route H-1 and the project site. The project site will not require any improvements other than the connection of the drainpipes to the existing City system.

4.5.4 Solid Waste Facilities

The City Department of Environmental Services provides solid waste collection in the surrounding residential areas of the project site. Solid waste is transported to the Campbell Industrial Park H-Power energy recovery incinerator and the City's Waimanalo Sanitary Landfill.

The project will generate some solid waste typical from the clearing, and construction activities of the project. Construction-related solid wastes generated will have only a short-term impact and the Contractor will be required to properly dispose of all debris generated from construction in conformance with City and State regulations.

4.5.5 Transportation Facilities

City streets adjacent to the Waimalu Wells I site experience heavier traffic volumes during peak travel periods such as weekday mornings and afternoons. Low traffic volumes generally occur in the area during the non-peak hours. Traffic will increase within the immediate vicinity of the project site since access to the Waimalu Wells I site will be from Puaalii Street. Interstate Route H-1 is not anticipated to experience an increase in traffic flow.

Traffic on Puaalii Street adjacent to the project site will be impacted on the short-term by construction activities and the movement of construction vehicles and equipment. However, Puaalii Street will not require lane closures and street parking restrictions since no work will be performed on the street. Traffic control plans will not be required for the project.

To mitigate short-term construction traffic impacts, the construction contractor shall provide appropriate prior project notifications to the Aiea Neighborhood Board (NB) 20 as well as community residents, businesses, emergency personnel, bus personnel, etc., and keep them apprised of details and the nature of work, construction schedule, expected length of time of inconveniences, any restrictions which may be imposed to complete the work, the impacts the project may have on the adjacent local street network areas, and the Contractor's phone number to be called to report traffic concerns. Consideration will be given by the construction contractor to staggering construction work hours around peak traffic periods to minimize the traffic impacts to the surrounding area.

Construction of the proposed project will have temporary and short-term impacts to traffic in the immediate areas surrounding the access road to the project site and Puaalii Street due to the movement of slow-moving, heavy construction vehicles and equipment. Completion of the proposed project is not expected to generate long-term traffic impacts.

4.6 PUBLIC FACILITIES AND UTILITIES

This section discusses the projects probably impact on public facilities and utilities serving the project site and surrounding area. Due to the nature of improvements proposed for the project, impacts will primarily be temporary and associated with construction-related activities.

4.6.1 Electrical and Communication Facilities

Construction of the project is not expected to have significant impact on Hawaiian Electric Company (HECO) existing electrical facilities and its ability to provide electricity. HECO has existing facilities within the project site and BWS will permit HECO continued access for operation and maintenance purposes as covered by existing easements. There will be no conflict with existing HECO facilities including an overhead line during construction. Appropriate and timely coordination will be conducted by BWS during the plans preparation and construction phases through HECO's Engineering Department. The BWS will forward the pre-final construction plans to HECO for review.

In addition, Hawaiian Telcom's existing telecommunication facilities and Oceanic Time Warner Cable's existing cable television facilities will not be affected by this project. Appropriate coordination with these utility companies will be conducted

during the plans preparation and construction phases to minimize disruptions to their services or activities.

4.6.2 Educational Facilities

Pearl Ridge Elementary School is located directly south of the project site on the makai side of Interstate Route H-1. Storm runoff from the project site drainage improvements is estimated to increase by 10 cfs and will be collected on site and conveyed to existing City drainage system that will convey the runoff to Waimalu Stream. The drainage improvements will be designed in accordance with the City Storm Drainage Standards and will not impact the school during extreme inclement weather. A potential impact on Pearl Ridge Elementary would be associated with short-term construction noise. However, since the school is partitioned by Interstate Route H-1 from the project site, the construction noise is not anticipated to increase the ambient noise existing at the school campus.

4.6.3 Police and Fire Protection Facilities

Construction of the project is expected to have only minimal and minor short-term impact on the police and fire department operations. However, such impacts are not expected to affect the mobility to provide adequate protection services to the Aiea community.

There is the possibility of some complaints to the Honolulu Police Department (HPD) from residents over dust and noise from construction activities. However, the Contractor will be required to comply with applicable regulations and permit conditions governing construction activities to minimize disruptions to nearby residents. Best management practices will also be implemented to minimize dust, erosion, and other nuisances from short-term construction activities. The project will have minimal impact on the mobility of HPD to provide protective services in the project area.

Fire apparatus access will be provided throughout the construction site for all phases of this project. Access to fire hydrants will be maintained. The Fire Communication Center at 523-4411 will be notified by the contractor of any interruption to the existing fire hydrant system during construction activities. The project will have minimal impact on the Honolulu Fire Department (HFD) operations or mobility to provide protective services. In addition, appropriate coordination will be performed during the design of this project, which will include submitting construction plans of the wire mesh drapery and concrete drainage ditches and drainpipes for HPD review.

4.6.4 Public Facilities

Public facilities located in the vicinity of the project site include the Pearl Ridge Shopping Center, Pearl Ridge Elementary School and Community Park and the Newtown Golf Driving Range.

Construction activities associated with this project are not expected to result in a significant impact on these public facilities nor severely disrupt existing public activities from occurring. Construction will not involve the use of these facilities or impede existing activities conducted there. Design of the project will include developing appropriate erosion control plans and BMP to minimize silt from construction and debris falling onto adjacent properties. Such plans developed will be reviewed and approved by appropriate government agencies. Therefore, implementation of such plans will provide sufficient measure to minimize impacts on these public facilities.

4.6.5 Healthcare Facilities

The Kapiolani Hospital at Pali Momi located near Pearl Ridge Shopping Center is approximately 1.0-miles from the project site. Construction activity required for the project is not anticipated to have adverse effects on the operations or mobility of the hospital to provide medical services. Consequently, short-term construction activities associated with the project will have no impact on healthcare facilities or activities.

CHAPTER 5 CONFORMANCE WITH PLANS AND POLICIES

This chapter discusses the project's conformance with the State Land Use District regulations and pertinent objectives and policies of the City's General Plan, City's Development Plan Land Use, and City Zoning Districts.

5.1 STATE LAND USE DISTRICT

The Waimalu Wells I parcels and surrounding residential areas are classified as Urban on the State's Land Use District Boundary Map. See **Figure 1-1**. Urban District permits activities or uses as provided by ordinances or regulations of the county within which the Urban District is situated. Thus, the Waimalu Wells I parcels and the surrounding residential areas are regulated by the ordinances and regulations of the City.

5.2 CITY GENERAL PLAN

This project will conform to and be consistent with applicable objectives and policies described under the City's General Plan. The City's General Plan is a statement of long-range, social, economic, environmental, and design objectives for the general welfare and prosperity of the people of Oahu. It includes statements of both broad policies that facilitate the attainment of the objectives of the General Plan and controls and distributes anticipated population growth to avoid social, economic, and environmental disruptions and to allow people to live and work in harmony. Safe, efficient, and environmentally sensitive water system facilities must be provided to meet the needs of the people of Oahu. The General Plan requires that such need be met with careful consideration of the social, economic, and environmental consequences.

The Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project will carefully consider social, economic, and environmental consequences and will be in compliance with statements and policies in the City's General Plan. The project will be consistent with the objectives and policies of the General Plan.

5.3 PRIMARY URBAN CENTER DEVELOPMENT PLAN

The Waimalu Wells I parcels and the surrounding residential properties fall under the City's Primary Urban Center Development Plan. The BWS parcels and surrounding areas are identified as Lower-Density Residential under the Plan's Land Use Map PUC-West. The Land Use Map PUC-West presents a vision for future development in this area consisting of policies, guidelines, and conceptual schemes that will serve as a policy guide for more detailed zoning districts, maps and regulations.

The Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project will be consistent with applicable policies and objectives of the Land Use Map PUC-West.

5.4 CITY ZONING DISTRICTS

The Waimalu Wells I parcels along with the surrounding residential properties are zoned R-5 Residential according to the City's zoning district maps which is in conformance with the PUC-West Development Plan. The City Land Use Ordinance (LUO) permits the use of this zoned lands for public facilities such as water wells and pump station. The proposed action will be in compliance with the policies and objectives of the City Zoning Districts regulations.

5.5 SPECIAL DESIGNATION DISTRICTS

A review of the City's special designation districts maps for the Waimalu Wells I parcels and immediate surrounding area determined that they are outside of the flood hazard district, special districts and special management areas (SMA). As a result, the Waimalu Wells I rock fall mitigation and drainage improvements are not subject to regulatory procedures, permit requirements, and review under the City's LUO and SMA regulations described in Chapter 25 of the Revised Ordinances of Honolulu.

CHAPTER 6 AGENCIES AND PUBLIC CONSULTATION

6.1 PRE-ASSESSMENT CONSULTATION

Prior to preparing the Draft EA, pre-assessment consultation with various State and County government agencies, community organizations, and property owners adjacent to the project site was conducted to obtain their comments and concerns associated with the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project. Letters providing project information along with a schematic plan were sent for their review. Copies of response letters were received from parties marked below with a check mark (✓) and are included in **Appendix A**. The City Department of Parks and Recreation had no comments and requested that they be removed from balance of the EA process. Comments received were incorporated into the Draft EA as appropriate.

State of Hawaii Agencies

- Department of Education ✓
- Department of Health
- Department of Land and Natural Resources, Division of Aquatic Resources
- Department of Land and Natural Resources, Historic Preservation Division
- Department of Land and Natural Resources, Land Division ✓
- Land Use Commission, Dept. of Business, Economic Development & Tourism ✓
- Department of Transportation ✓
- Office of Hawaii Affairs ✓
- Hawaii Public Housing Authority ✓

City and County of Honolulu Agencies

- Department of Design and Construction
- Department of Environmental Services
- Department of Facility Maintenance ✓
- Department of Parks and Recreation ✓
- Department of Planning and Permitting, Site Development Division ✓
- Department of Planning and Permitting, Land Use Permits Division
- Department of Transportation Services ✓
- Fire Department ✓
- Police Department ✓

Community Organizations

- Aiea Neighborhood Board No. 20

Property Owners on or Adjacent to the Project Site

- 98-359 and 98-361 Ponohana Loop c/o Department of Transportation, Highways Division
- 98-365 Ponohana Loop
- 98-367 Ponohana Loop
- 98-371 Ponohana Loop
- 98-375 Ponohana Loop
- 98-379 Ponohana Loop
- 98-383 Ponohana Loop
- 98-385 Ponohana Loop ✓
- 98-389 Ponohana Loop
- 98-393 Ponohana Loop
- 98-399 Ponohana Loop
- 98-403 Ponohana Loop
- 98-407 Ponohana Loop
- 98-411 Ponohana Loop
- 98-415 Ponohana Loop
- 98-419 Ponohana Loop
- 98-421 Ponohana Loop
- 98-427 Ponohana Loop
- 98-429 Ponohana Loop
- 98-433 Ponohana Loop
- 98-437 Ponohana Loop
- 98-439 Ponohana Loop
- 98-441 Ponohana Loop
- 98-443 Ponohana Loop
- 98-323 Puaalii Street
- 98-327 Puaalii Street ✓
- 98-335 Puaalii Street
- 98-341 Puaalii Street
- 98-342 Puahoku Place ✓
- 98-346 Puahoku Place
- 98-433 Pono Street c/o Cobourn Enterprises

6.2 DRAFT EA COMMENTS

Prior to preparing the Final EA, copies of the Draft EA were sent to various State and County government agencies and community organizations to obtain their review, comments, and concerns associated with Waimalu Wells I Rockfall Mitigation and Drainage Improvements project. Letters were sent to property owners adjacent to the project site contacted during the pre-assessment consultation informing them that the Draft EA was available at the Aiea Public Library for their review and comment. Comment response letters were received

Property Owners on or Adjacent to the Project Site

- 98-359 and 98-361 Ponohana Loop c/o Department of Transportation, Highways Division
- 98-365 Ponohana Loop
- 98-367 Ponohana Loop
- 98-371 Ponohana Loop
- 98-375 Ponohana Loop
- 98-379 Ponohana Loop
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- 98-411 Ponohana Loop
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from parties marked below with a check mark (✓) and copies of the letters and BWS responses are included in **Appendix B**. Only one resident adjacent to the project site responded to the letters. All comments received were incorporated into the Final EA as appropriate.

State of Hawaii Agencies

- Department of Education ✓
- Department of Health
- Office of Environmental Quality Control
- Department of Land and Natural Resources
- Department of Land and Natural Resources, Historic Preservation Division
- Department of Business, Economic Development & Tourism
- Land Use Commission, Department of Business, Economic Development & Tourism ✓
- Department of Transportation, Highways Division
- Office of Hawaiian Affairs ✓
- Aiea Public Library
- Representative Blake K. Oshiro
- Senator Donna Mercado Kim

City and County of Honolulu Agencies

- Department of Design and Construction ✓
- Department of Environmental Services
- Department of Facility Maintenance ✓
- Department of Planning and Permitting ✓
- Department of Transportation Services ✓
- Fire Department ✓
- Police Department
- Council Member Gary H. Okino

Community Organizations/Businesses

- Aiea Neighborhood Board No. 20
- The Gas Company ✓
- Hawaiian Electric Co. ✓
- Hawaiian Telcom ✓
- Oceanic Time Warner Cable

Property Owners on or Adjacent to the Project Site

- 98-359 and 98-361 Ponohana Loop c/o Department of Transportation, Highways Division

- 98-365 Ponohana Loop
- 98-367 Ponohana Loop
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- 98-346 Puahoku Place
- 98-433 Pono Street c/o Cobourn Enterprises

CHAPTER 7 FINDINGS AND ANTICIPATED DETERMINATION

To determine whether a proposed action may have a significant effect on the environment, the Approving Agency needs to consider every phase of the action, the expected primary and secondary consequences, cumulative effect, and the short- and long-term effects. The Approving Agency's review and evaluation of the proposed actions effect on the environment will result in a determination whether: 1) the action will have a significant effect on the environment, and an Environmental Impact Statement Preparation Notice should be issued, or 2) the action will not have a significant effect warranting a Finding of No Significant Impact.

This chapter discusses the findings of the environmental assessment conducted of the proposed Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project, in relation to the 13 Significance Criteria prescribed under the State Department of Health's Administrative Rules Title 11, Chapter 200. The purpose of this assessment is to consider the "significance" of potential environmental effects which includes the sum of effects on the quality of the environment along with the overall and cumulative effects. The findings are discussed below for each criterion.

7.1 FINDINGS

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*

The proposed project will not result in the irrevocable commitment to loss or destruction of any natural or cultural resource. As discussed in **Chapter 4 Affected Environment and Environmental Consequences** of this document, the proposed improvements are intended to reduce the potential of erosion, flooding and the deposition of rocks and sediments onto the backyards of adjacent residential properties and rock falls during or after heavy rains or severe storms. Such improvements will occur on already urbanized areas which include areas altered by past agricultural activities. Thus, there will be no destruction or loss of any significant, endangered, or threatened botanical, faunal, geological, or other natural resource.

There are no known cultural resource nor traditional native Hawaiian or other ethnic groups cultural practices occurring at the Waimalu Wells I site and adjacent properties. Consequently, the proposed improvements are not expected to have any impact on cultural resource or traditional cultural practices.

In terms of archaeological and historic resources, the archaeological assessment by Cultural Surveys Hawaii, Inc. indicated that "no historic properties were observed nor are any believed to be present" at the project

site. Because no historic properties were identified, a project-specific effect recommendation of “no historic properties affected,” was warranted. In the unlikely event of any significant discoveries during the course of the project’s construction, all work in the immediate area will cease and the State Historic Preservation Division will be notified promptly.

The proposed project will have no adverse effect on archaeological or historic resource and on traditional native Hawaiian cultural practices or resource which may potentially be within the project site.

2. *Curtails the range of beneficial uses of the environment.*

The proposed project will not curtail the range of beneficial uses of the surrounding environment. The existing residential parcels have been developed over 35 years ago. The proposed project will not change the existing residential use of such parcels. Existing surrounding residential use will remain as existing. The proposed improvements to the existing Waimalu Wells I site and adjacent properties will not limit or significantly impact these uses or the surrounding environment.

3. *Conflicts with the State’s long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*

The proposed project will not conflict with the State’s long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders. This Final EA addresses the probable environmental impacts associated with the project’s drainage improvements and rock fall mitigation which will be primarily associated with short-term construction activities. The project will be consistent in conserving natural resources in the area and in enhancing the long-term quality of life for residents adjacent and surrounding the project site by reducing the potential of erosion, flooding and rock falls

4. *Substantially affects the economic or social welfare of the community or State.*

As discussed under **Chapter 4** of this document, the proposed project will not have any significant negative impacts on the economic structure of the Aiea area or the social welfare of the Waimalu community. The project will create a short-term minor economic benefit generating construction jobs and personal income. The proposed project is limited to the Waimalu Wells I site and adjacent properties. As a result, there will be no negative impact or change to the overall character of the Waimalu community or the State.

5. *Substantially affects public health.*

The proposed project is not expected to substantially affect public health since it will involve drainage improvements and rock fall mitigation measures which will improve public health and safety by minimizing potential of erosion, flooding, deposition of rocks and sediment on adjacent properties and rock falls.

6. *Involves substantial secondary impacts, such as population changes or effects on public facilities.*

The project will not have any secondary impacts on the social environment or infrastructure and public facilities. The proposed project strictly involves drainage improvements and rock fall mitigation. There will not be any elements of the project contributing to in-migration of residents or additional visitors to the island. The proposed project will not impact other existing infrastructure facilities or public facilities in the immediate area.

7. *Involves a substantial degradation of environmental quality.*

The proposed project will not involve a substantial degradation to the quality of the surrounding environment. The drainage improvements and rock fall mitigation construction activities will be performed on already urbanized areas, and necessary measures will be implemented during construction to minimize erosion and other short-term impacts. Installation of wire mesh drapery on the cliff-like slopes and concrete ditches and drain pipes will require clearing and grubbing of existing vegetation and trees to allow installation of the drapery, concrete ditches, and drain pipes. The wire mesh drapery and drain pipes would not be aesthetically attractive in the short-term. However, in time new vegetation will cover the wire mesh drapery and drain pipes from view. As a result, the project will improve the environmental quality of the existing cliff-like slopes of the lower southeast Waimalu Gulch.

8. *Is individually limited, but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.*

This proposed project only involves rock fall mitigation and drainage improvements as described in **Chapter 2 Project Description** of this document. Impacts associated with the project were addressed in **Chapter 4** of this document and are mainly associated with construction activities which are temporary and short-term. Thus, the cumulative impacts of the proposed project were considered in assessing environmental impacts, and it was determined that the project will not have a significant effect on the environment. This project does not involve the commitment for larger actions since it is only intended to provide a safer environment from erosion, flooding and rock falls for the residents adjacent to the cliff-like slopes.

9. *Substantially affects a rare, threatened, or endangered species, or its habitat.*

There are no known rare, endangered or threatened botanical resources on the proposed project site, or faunal and avifaunal species inhabiting the area which may be affected by construction activities or the existence of the proposed improvements. Necessary control measures and best management practices will be implemented to minimize runoff and other potential short-term impacts associated with construction activity. Thus, the proposed drainage improvements and rock fall mitigation are not expected to substantially affect rare, threatened, or endangered species or potential habitat for such species.

10. *Detrimentially affects air or water quality or ambient noise levels.*

The proposed project will not have a detrimentally significant impact on air or water quality, or ambient noise levels. Impacts associated with these factors will be limited to short-term construction activities. However, such impacts are expected to be minor due to the relatively minimal amount of grading and excavation proposed. To further minimize impacts, construction activities will be subject to applicable State and City regulations as discussed under **Chapter 4** of this document.

11. *Affects or likely to suffer damage by being located in an environmentally sensitive area such as flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.*

The proposed project sites is not located within environmentally sensitive area such as a flood plain, tsunami zone, beach, estuary, fresh water or coastal waters. Consequently, the project will not be affected by such hazards or impact such environmentally sensitive areas. However, the project site is located within an area sensitive to erosion and geological hazards. As discussed under **Chapter 4** of this document, the cliff-like slopes have experienced rock falls, erosion, flooding and deposition of rocks and sediments over the years during or after heavy storms. The proposed project's drainage improvement and rock fall mitigation and will help to mitigate erosion of the cliff-like slopes and the occurrence of rock falls, flooding and deposition of rock and sediments on the back yards of the adjacent residential properties. The project site is also located within Zone D, areas in which flood hazards are undetermined and are not regulated by the Federal Insurance Program, as discussed under **Chapter 4** of this document. Since the improvements are expected to be designed and constructed in compliance with the City Standards and practices and Building Code requirements for improvements within flood Zone D, they should not

suffer damage from such natural hazards as compared to existing residences in the area. The proposed project will improve existing conditions and will not suffer damage from erosion and geological hazards by being located in such environmentally sensitive area.

12. *Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.*

The proposed project will not affect scenic vistas or viewplanes since they are located in an area that has not been identified by the State and the City as a visual resource. The Waimalu Wells I site and adjacent properties are owned by the BWS and various owners, and the proposed project improvements on the cliff-like slopes will not impact scenic views.

13. *Requires substantial energy consumption.*

The proposed project will not require substantial energy consumption or any increase in existing electrical distribution facilities and power generating sources.

7.2 ANTICIPATED DETERMINATION

Based upon the discussions of the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project affect on the environment in relation to the 13 Significance Criteria, it is determined that the improvements planned under this project will not have a significant impact on the surrounding environment and does not warrant the issuance of an Environmental Impact Statement Preparation Notice.

A Finding of No Significant Impact (FONSI) determination is warranted for the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project based upon the information provided in this Final EA.

CHAPTER 8 REFERENCES

AECOS, Inc. 2007. *Biological Survey in Support of an Environmental Assessment for Drainage Improvements and Rockfall Mitigation at Waimalu Wells I Site. Aiea, Oahu, Hawaii.* Kaneohe, Hawaii.

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Cultural Surveys Hawaii, Inc. 2006. *Archaeological Assessment for the Board of Water Supply Waimalu Wells I Emergency Boulder Removal Project, Waimalu Ahupuaa, Ewa District, Oahu.* Kailua, Hawaii.

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Macdonald, Gordon A., Abbott, Agatin T., and Peterson, Frank L. 1983. *Volcanoes in the Sea, the Geology of Hawaii.* Second Edition. University of Hawaii Press. Honolulu, Hawaii.

Nichols, W.D., Shad, P.J., and Hunt, C.D., Jr. 1996. *Summary of the Oahu, Hawaii, Regional Aquifer-System Analysis: U.S. Geological Survey Professional Paper 1412-A, 61 p.* United States Geological Survey, Reston, Virginia.

Soil Conservation Service (SCS). 1972. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Department of Agriculture. In cooperation with the University of Hawaii, Agricultural Experiment Station. Washington, D.C.

State of Hawaii, Department of Health, Noise, Radiation and IAQ Branch. *Community Noise Control.* Chapter 11-46, Hawaii Administrative Rules.

State of Hawaii, Department of Health. *Ambient Air Quality Standards.* Chapter 11-59, Hawaii Administrative Rules.

State of Hawaii Department of Health. *Air Pollution Control.* Chapter 11-60.1, Hawaii Administrative Rules.

State of Hawaii Department of Health. *Water Quality Standards*. Chapter 11-54, Hawaii Administrative Rules.

State of Hawaii Department of Health. *Solid Waste Management Control*. Chapter 11-58, Hawaii Administrative Rules.

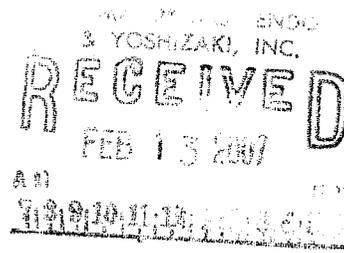
U.S. Federal Emergency Management Agency (FEMA). *Flood Insurance Rate Maps*, Panel Number 150001 0245 F.

APPENDIX A

PRE-ASSESSMENT AGENCIES AND PUBLIC CONSULTATION RESPONSES



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804



OFFICE OF THE SUPERINTENDENT

February 9, 2007

Mr. Howard K. Endo, President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawai'i 96816-3715

Dear Mr. Endo:

Subject: Pre-Consultation for Waimalu Wells I Rock Fall Mitigation
and Drainage Improvements Project.

The Department of Education (DOE) has reviewed your letter outlining a project to prevent rock falls and improve drainage along Waimalu Gulch.

The DOE is concerned that any work on the site might possibly affect Pearl Ridge Elementary School which is located directly makai of the H-1 Freeway and your proposed project site. We are interested in the adequacy of your plans for drainage, and the impact of your project in situations of extreme rain and run-off, or clogged drains.

If you have any questions, please call Heidi Meeker of the Facilities Development Branch at 733-4862.

Very truly yours,

A handwritten signature in cursive script that reads "Patricia Hamamoto".

Patricia Hamamoto
Superintendent

PH:jmb

c: Randolph Moore, Acting Assistant Superintendent, OBS
Duane Kashiwai, Public Works Administrator, FDB
Alfred B. Navares, CAS, Aiea/Moanalua/Radford Complex Areas

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 15, 2007

Howard K. Endo, Ph.D., P.E., President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue Room 309
Honolulu, Hawaii 96816

Dear Mr. Endo:

Subject: Proposed Waimalu Wells I Rock Fall Mitigation and Drainage
Improvements Project, Ewa, Oahu, Tax Map Key: (1) 9-8-45:36

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 Engineering Division, Division of Water Resource Management, Office of Conservation & Coastal Lands, Land Division-Oahu, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji
Administrator

Cc: Central Files
Molokai Properties Limited
OEQC
County of Maui

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

SHIMABUKURO, ENDO
& YOSHIZAKI, INC.

RECEIVED
FEB 22 2007

1126 12TH AVENUE ROOM 309
HONOLULU, HAWAII 96816

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

February 2, 2007

MEMORANDUM

TO: **DLNR Agencies:**
 Div. of Aquatic Resources
 Div. of Boating & Ocean Recreation
 Engineering Division
 Div. of Forestry & Wildlife
 Div. of State Parks
 Div. of Water Resource Management
 Office of Conservation & Coastal Lands
 Land Division – Oahu District

FROM: Russell Y. Tsuji

SUBJECT: Pre-Assessment Consultation Letter for Proposed Waimalu Wells I Rock Fall Mitigation and Drainage Improvements Project

LOCATION: Ewa, Oahu, TMK: (1) 9-8-045:36

APPLICANT: Shimabukuro, Endo & Yoshizaki, Inc. on behalf of Honolulu Board of Water Supply

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 13, 2007.

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:
Date: 2/9/07

RECEIVED
LAND DIVISION
2007 FEB -9 P 2:51
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE OF HAWAII

**DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION**

LA/RYT

**Ref.: PreAssessWaimaluWellsRock
Oahu.540**

COMMENTS

- () We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ____.
- (X) **Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone D. The Flood Insurance Program does not have any regulations for development within Flood Zone D.**
- () Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ____.
- () Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

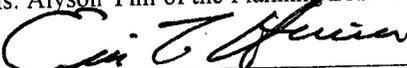
Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- () Mr. Robert Sumimoto at (808) 523-4254 or Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.
 - () Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
 - () Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
 - () Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.
- () The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
 - () The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

- () Additional Comments: _____

- () Other: _____

Should you have any questions, please call Ms. Alyson Yim of the Planning Branch at 587-0259

Signed: 
ERIC T. HIRANO, CHIEF ENGINEER

Date: 2/9/07

LINDA LINGLE
GOVERNOR OF HAWAII



RECEIVED

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

07 FEB 5 P1:31

February 2, 2007

MEMORANDUM

From:

- TO: DLNR Agencies:
- Div. of Aquatic Resources
 - Div. of Boating & Ocean Recreation
 - Engineering Division
 - Div. of Forestry & Wildlife
 - Div. of State Parks
 - Div. of Water Resource Management
 - Office of Conservation & Coastal Lands
 - Land Division – Oahu District

RECEIVED
LAND DIVISION
2007 FEB -9 A 8:45

To:

FROM: Russell Y. Tsuji *[Signature]*

SUBJECT: Pre-Assessment Consultation Letter for Proposed Waimalu Wells I Rock Fall Mitigation and Drainage Improvements Project

LOCATION: Ewa, Oahu, TMK: (1) 9-8-045:36

APPLICANT: Shimabukuro, Endo & Yoshizaki, Inc. on behalf of Honolulu Board of Water Supply

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 13, 2007.

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: 2/8/07

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER YOUNG
CHIEF
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
ROBERT K. MASUDA
DEPUTY DIRECTOR
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

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OFFICE OF CONSERVATION
AND COASTAL LANDS
2007 FEB -5 A 10:30
DEPT. OF LAND AND
NATURAL RESOURCES
STATE OF HAWAII

February 2, 2007

MEMORANDUM

TO: DLNR Agencies:
 Div. of Aquatic Resources
 Div. of Boating & Ocean Recreation
 Engineering Division
 Div. of Forestry & Wildlife
 Div. of State Parks
 Div. of Water Resource Management
 Office of Conservation & Coastal Lands
 Land Division – Oahu District

RECEIVED
LAND DIVISION
2007 FEB -5 P 1:38

FROM: Russell Y. Tsuji
SUBJECT: Pre-Assessment Consultation Letter for Proposed Waimalu Wells I Rock Fall Mitigation and Drainage Improvements Project
LOCATION: Ewa, Oahu, TMK: (1) 9-8-045:36
APPLICANT: Shimabukuro, Endo & Yoshizaki, Inc. on behalf of Honolulu Board of Water Supply

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 13, 2007.

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: 2-5-07

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATEPARKS

February 2, 2007

MEMORANDUM

TO: **DLNR Agencies:**
___ Div. of Aquatic Resources
___ Div. of Boating & Ocean Recreation
x Engineering Division
___ Div. of Forestry & Wildlife
___ Div. of State Parks
x Div. of Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu District

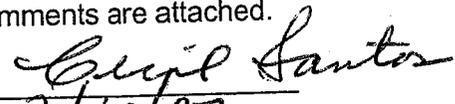
FROM: Russell Y. Tsuji 
SUBJECT: Pre-Assessment Consultation Letter for Proposed Waimalu Wells I Rock Fall Mitigation and Drainage Improvements Project
LOCATION: Ewa, Oahu, TMK: (1) 9-8-045:36
APPLICANT: Shimabukuro, Endo & Yoshizaki, Inc. on behalf of Honolulu Board of Water Supply

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 13, 2007.

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: 

Date: 2/6/07
u

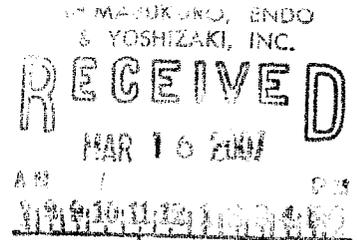


STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

LAND USE COMMISSION

P.O. Box 2359
Honolulu, Hawaii 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

March 12, 2007



Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715

Dear Mr. Endo:

Subject: Environmental Assessment (EA) for the Waimalu Wells I Rock Fall Mitigation
and Drainage Improvements Project
Aiea, Oahu

We apologize for the delay in responding to your request for pre-assessment comments.

We are in receipt of your letter dated January 29, 2007, requesting our comments during the pre-assessment consultation period for the EA. We have reviewed the Vicinity Map and find that the project site is designated within the State Land Use Urban District. We suggest that the EA include a map showing the project site in relation to the State land use districts.

We have no further comments to offer at this time. Thank you for the opportunity to comment on the subject project.

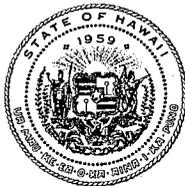
Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 587-3822.

Sincerely,


ANTHONY J. H. CHING
Executive Officer

c: Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BARRY FUKUNAGA
INTERIM DIRECTOR

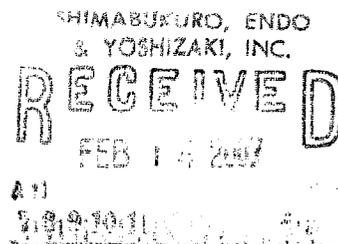
Deputy Directors
FRANCIS PAUL KEENO
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.2402

February 6, 2007

Mr. Howard K. Endo, Ph.D., PE
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Mr. Endo:

Subject: Waimalu Wells I Rock Fall Mitigation and Drainage Improvements
Environmental Assessment Preparation
Board of Water Supply, City and County of Honolulu

Thank you for your letter of January 29, 2007, notifying us of the forthcoming environmental report on the subject proposed project.

It appears the project may have an impact on our lands associated with or near the right-of-way of the H-1 Freeway.

Your letter (with accompanying maps) has been forwarded to our Highways Division for further evaluation. The Highways Division will provide follow-up communication and coordination with your firm and, when needed, with the City's Board of Water Supply, after the appropriate highway staff have reviewed the project proposal.

We appreciate the courtesy of your notification and for the opportunity to provide comments.

Very truly yours,


BARRY FUKUNAGA
Interim Director of Transportation

LINDA LINGLE
GOVERNOR



BARRY FUKUNAGA
INTERIM DIRECTOR

Deputy Directors
FRANCIS PAUL KEENO
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

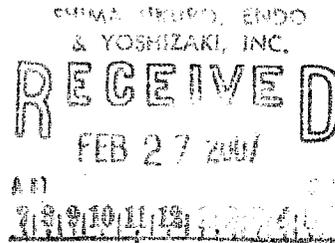
**STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
OAHU DISTRICT
727 KAKOI STREET
HONOLULU, HAWAII 96819-2017**

IN REPLY REFER TO:

HWY-O
2.07-0232

February 23, 2007

Mr. Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Dr. Endo:

Subject: Waimalu Wells I Rock Fall Mitigation and Drainage Improvements Project

Thank you for your letter dated January 29, 2007, regarding the environmental assessment for the above referenced project.

Our comments and recommendations are as follows:

- 1) The schematic site plan shows a connection to the existing concrete ditch along the boundary with the State of Hawaii, Department of Transportation, Highways Division (HDOT) property as well as a discharge to the existing storm drain inlet structure located on State property. This storm drain inlet is probably part of the State MS4 storm drain system. Please be advised that the following permits need to be obtained from the Highways Division:
 - a) Connection Permit if you will be connecting to the State storm drain system. (Obtain at the Highways Division District Office).
 - b) Permission and/or permit must be obtained from the Highways Right-of-Way Property Management Section to perform work on State property.
- 2) Verify who owns the existing concrete ditch and drainage structure.

Mr. Howard K. Endo, Ph.D., P.E.
Page 2
February 23, 2007

HWY-O
2.07-0232

- 3) Provide drainage report.
- 4) Coordination with Brian Tyau of our HDOT Traffic Branch is required (692-7693).

If you have any questions, please contact Mr. Ken Teutsch, 831-6703.

Sincerely,

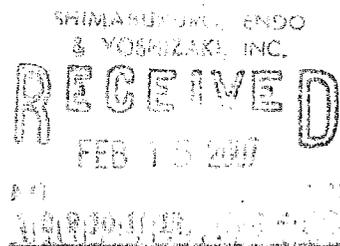


Pratt M. Kinimaka
Oahu District Engineer

c: HDOT, HWY-T (Brian Tyau)



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813



HRD06/2882

February 12, 2007

Howard K. Endo
Shimabukuro, Endo & Yoshizaki
1126 12th Ave, Room 309
Honolulu, HI 96816-3715

RE: Pre-Environmental Assessment Request for Comment Regarding the Proposed Waimalu Wells I Rock Fall Mitigation and Drainage Improvements Project, Waimalu, O'ahu.

Dear Mr. Endo,

The Office of Hawaiian Affairs (OHA) is in receipt of your January 30, 2007 submission and offers the following comments:

Please contact Adam Johnson, O'ahu Archaeologist for the State Historic Preservation Division, to inquire about historic preservation compliance in support of the proposed project. The applicant is responsible for ensuring that conference of preservation issues is coordinated with SHPD pursuant to Chapter 6E of the Hawaii Revised Statutes. OHA looks forward to reviewing the Draft Environmental Assessment when completed. Thank you for your correspondence.

OHA asks that, in accordance with Section 6E-46.6, Hawaii Revised Statutes and Chapter 13-300, Hawaii Administrative Rules, if the project moves forward, and if any significant cultural deposits or human skeletal remains are encountered, work shall stop in the immediate vicinity and the State Historic Preservation Division (SHPD/DLNR) shall be contacted.

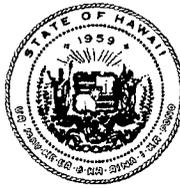
Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jesse Yorck, Native Rights Policy Advocate, at (808) 594-0239 or jessey@oha.org.

Aloha,

A handwritten signature in black ink, appearing to read "Clyde W. Nāmu'o".

Clyde W. Nāmu'o
Administrator

LINDA LINGLE
GOVERNOR



PATTI Y. MIYAMOTO
INTERIM EXECUTIVE DIRECTOR

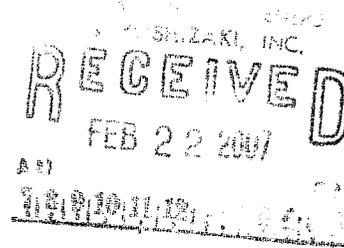
STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
HAWAII PUBLIC HOUSING AUTHORITY
1002 NORTH SCHOOL STREET
POST OFFICE BOX 17907
Honolulu, Hawaii 96817
FAX: (808) 832-6030

PAMELA Y. DODSON
EXECUTIVE ASSISTANT
IN REPLY PLEASE REFER TO:

07:CMS/0020

February 20, 2007

Mr. Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Mr. Endo:

Re: Waimalu Wells I Rock Fall Mitigation and Drainage Improvements

We have no pre-assessment comments on the above environmental assessment for the subject project.

Thank you for the opportunity to comment.

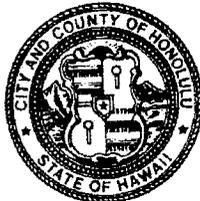
Sincerely,

PATTI Y. MIYAMOTO
Interim Executive Director

DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 692-5054 • Fax: (808) 692-5857
Website: www.honolulu.gov

MUFI HANNEMANN
MAYOR



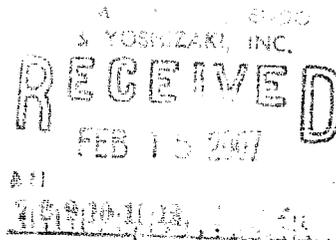
LAVERNE HIGA, P.E.
DIRECTOR AND CHIEF ENGINEER

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 07-133

February 14, 2007

Mr. Howard K. Endo, Ph.D, P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Mr. Endo:

Thank you for giving us the opportunity to offer pre-assessment comments regarding your Rock Fall Mitigation and Drainage Improvements Project.

We have concerns regarding the existing concrete swale on TMK: 9-8-027 and the concentrated flows that are proposed to flow into that swale i.e. can the swale handle the concentrated flows, will the swale be over topped and/or damaged by the concentrated flows, will the proposed wire mesh drapery interfere with maintenance of the swale? We also have concerns regarding the proposed connection to the existing drain on TMK: 9-8-028, can the drain accommodate the concentrated/additional run-off?

Should you have any questions, please call Larry Leopardi, Chief of the Division of Road Maintenance, at 484-7600.

Sincerely,

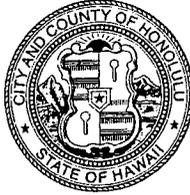
A handwritten signature in cursive script that reads "Laverne Higa".

Laverne Higa, P.E.
Director and Chief Engineer

LH:sm

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

KAPOLEI HALE • 1000 ULUOHIA STREET, SUITE 309 • KAPOLEI, HAWAII 96707
TELEPHONE: (808) 692-5561 • FAX: (808) 692-5131 • INTERNET: www.honolulu.gov



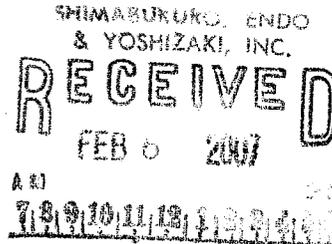
MUFI HANNEMANN
MAYOR

LESTER K.C. CHANG
DIRECTOR

DANA TAKAHARA-DIAS
DEPUTY DIRECTOR

February 5, 2007

Mr. Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Mr. Endo:

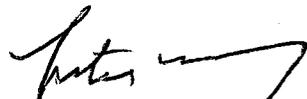
Subject: Environmental Assessment-Pre-Assessment Comment
Honolulu Board of Water Supply Waimalu Wells 1 Rock Fall
Mitigation and Drainage Improvement Project

Thank you for the opportunity to comment at the Pre-Assessment stage of the environmental review state of the Waimalu Wells 1 Rock Fall Mitigation and Drainage Improvement project.

The Department of Parks and Recreation has no comments and as the proposed project will not impact any of our programs or facilities you are invited to remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 692-5454.

Sincerely,

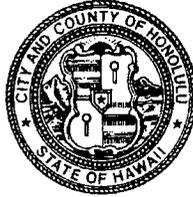

LESTER K. C. CHANG
Director

LKCC:mk
(193039)

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4432 • FAX: (808) 527-6743
DEPT. WEB SITE: www.honoluluodpp.org • CITY WEB SITE: www.honolulu.gov

MUFI HANNEMANN
MAYOR



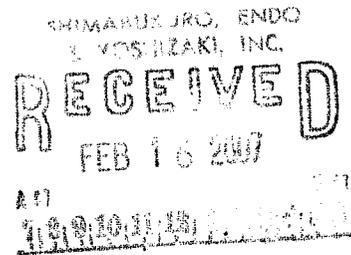
HENRY ENG, FAICP
DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

2007/ELOG-286(df)

February 14, 2007

Dr. Howard K. Endo, Ph.D., P.E.
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Dr. Endo:

Subject: Draft Environmental Assessment (EA) Preparation Notice for Waimalu Wells I Rock Fall Mitigation and Drainage Improvements, Waimalu, TMK: 9-8-026: 072

This is in response to your January 29, 2007 letter, regarding the subject project. Please incorporate our department's comments into the Draft EA:

Civil Engineering Branch:

1. The project will require the following permits/approvals: a) drain connection license; b) subdivision approval to create easements within TMK: 9-8-027:002 and 9-8-065:059 for the proposed drain lines and concrete ditch; and c) One-Time-Review of the construction plans. A drainage report shall be included with the submittal of the construction plans.
2. Will the project involve any grading work?
3. Who will be responsible for maintaining the wire mesh drapery system within the adjacent lots? Are easements required?

If there are any questions, please contact Mr. Don Fujii of the Site Development Division at 523-4212.

Dr. Howard K. Endo, Ph.D., P.E.
February 14, 2007
Page 2

Planning Division:

1. The Draft should address the project's consistency with the City's General Plan and Primary Urban Center Development Plan.

If there are any questions, please contact Mr. Randolph Hara of the Planning Division at 523-4483.

Very truly yours,



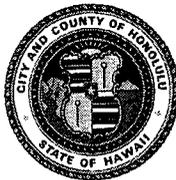
Henry Eng, FAICP, Director
Department of Planning and Permitting

HE:ky
[514939]
cc: Planning Division

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 523-4730 • Internet: www.honolulu.gov

MUFI HANNEMANN
MAYOR



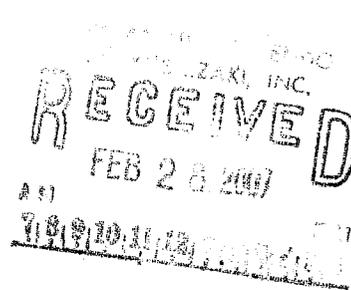
MELVIN N. KAKU
DIRECTOR

RICHARD F. TORRES
DEPUTY DIRECTOR

TP1/07-193214R

February 21, 2007

Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Dr. Endo:

Subject: Waimalu Wells I Rock Fall Mitigation and Drainage
Improvements Project

Thank you for your January 29, 2007 letter, requesting our pre-assessment comments on the subject project. The following comments are provided for your consideration as you prepare the draft environmental assessment (EA):

1. The draft EA should discuss the short-term construction phase traffic impacts that the project may have on the surrounding City streets and proposed mitigation measures.
2. Appropriate project notification should be provided to the area neighborhood board, as well as community residents, businesses, emergency personnel, bus personnel, etc. They should be kept apprised of the details of the proposed project and the impacts the project may have on the adjoining local street network area.

We look forward to reviewing the draft EA. Should you have any questions regarding these comments, please contact Ms. Faith Miyamoto of the Transportation Planning Division at 768-8350.

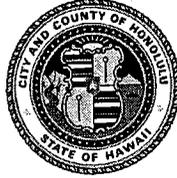
Sincerely,


MELVIN N. KAKU
Director

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

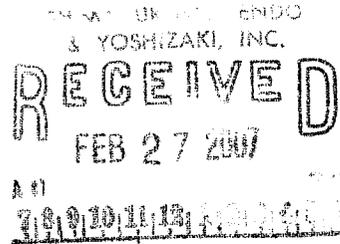


KENNETH G. SILVA
FIRE CHIEF

ALVIN K. TOMITA
DEPUTY FIRE CHIEF

February 20, 2007

Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Dr. Endo:

Subject: Environmental Assessment
Waimalu Wells I Rock Fall Mitigation and Drainage Improvements
Aiea, Oahu, Hawaii

In response to your letter dated January 29, 2007, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material you provided and has no objections to the project.

However, the HFD requires that the following be complied with for the duration of the project:

1. Maintain fire apparatus access throughout the construction site.
2. Maintain access to fire hydrants. Notify the Fire Communication Center at 523-4411 regarding any interruption of the existing fire hydrant system.

In addition, please note that our new address is:

Honolulu Fire Department
636 South Street
Honolulu, Hawaii 96813-5007

Should you have any questions, please call Battalion Chief Lloyd Rogers of our Fire Prevention Bureau at 723-7151.

Sincerely,

A handwritten signature in cursive script, appearing to read "Kenneth G. Silva".

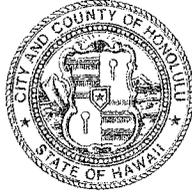
KENNETH G. SILVA
Fire Chief

KGS/SK:bh

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

301 SOUTH BERETANIA STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 • INTERNET: www.honolulu.org

MUFI HANNEMANN
MAYOR



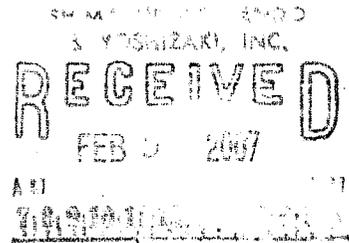
BOISSE P. CORREA
CHIEF

GLEN R. KAJIYAMA
PAUL D. PUTZULU
DEPUTY CHIEFS

OUR REFERENCE BS-DK

February 1, 2007

Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715



Dear Mr. Endo:

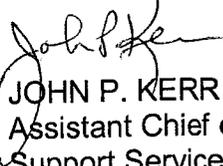
This is in response to your letter of January 29, 2007, requesting comments on a proposed environmental assessment for the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project in Aiea.

This project should have no significant impact on the facilities or operations of the Honolulu Police Department.

If there are any questions, please call Major Debora Tandal of District 3 at 455-9055 or Mr. Brandon Stone of the Executive Office at 529-3644.

Sincerely,

BOISSE P. CORREA
Chief of Police

By 
JOHN P. KERR
Assistant Chief of Police
Support Services Bureau

SHIMABUKURO, ENDO
& YOSHIZAKI, INC.
RECEIVED
FEB 13 2007
A 11
110104110110000

Haruyuki Kawasaki
98-385 Ponohana Loop
Aiea, Hawaii 96701

February 10, 2007

Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue
Honolulu, Hawaii 96816-3715

Dear Mr. Shimabukuro,

This letter is in response to your letter dated January 29, 2007 regarding the environmental assessment (EA) that your firm is preparing on behalf of the Board of Water Supply for the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project.

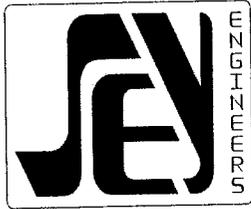
Thank you for allowing me to provide my comments on this EA. I would appreciate it if the following could be addressed in the EA:

- (1) What storm intensity is the project being designed for? What are the potential environmental impacts from this design should we encounter a storm with a higher intensity than designed?
- (2) What mitigation measures are being considered to minimize run-off and erosion between the new swale and our property lines?
- (3) What mitigation measures are being considered to minimize the unsightliness of the wire mesh and the 18" drain pipe?
- (4) What mitigation measures are being considered to address previous water flows, damages and erosion to the hillside?
- (5) What mitigation measures are being considered to address the previous silt build up on our properties?

Thank you again for allowing me to provide my concerns. Please send me a copy of the draft and final environmental assessments as well as the drawings, specifications, and design analysis for the construction. I would really appreciate the opportunity to review and comment on those as well.

Sincerely,

Haruyuki Kawasaki
Haruyuki Kawasaki



SHIMABUKURO, ENDO & YOSHIZAKI, INC.

Civil, Environmental & Structural Engineers

1126 12th Avenue, Room 309

Honolulu, Hawaii 96816-3715

Ph.: (808) 737-1875 Fax: (808) 734-5516

E-Mail: seyeng@lava.net

CONVERSATION CONFIRMER

BY: W.K. Endo

DATE: 2/12/07 TIME: 10:45 AM

PROJECT: Waimalu Wells I EA JOB NO:

- TELEPHONE CALL CONVERSATION WITH: Lawrence Pescara
 OFFICE MEETING Owner 98-327 Pualii Street, Aiea, Hawaii
 OTHER TMK: 9-8-45-40 (Above Pump Building)

SUBJECT: Waimalu Wells I EA

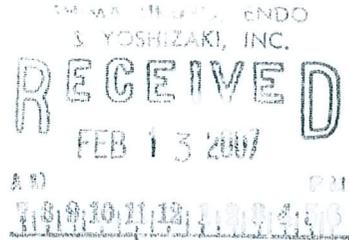
1. Mr. Pescara is owner of property and lives in Nahast, Massachusetts.
2. He is very much in favor of project since it will help erosion taking place between BWS and his property.
3. He says small wall in BWS property is crumbling and riprap should extend to property line, if possible.

ACTION: Notify BWS

DISTRIBUTION: File
BWS

2/11/2007

To: **Shimabukuro, Endo & Yoshizaki, Inc.**
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715
Ph: 737-1875



Atten: **Mr. Howard Endo**

Dear Mr. Endo,

Thank you for the information and the opportunity to provide feedback on the proposed project.

On behalf of my mother, Eleanor Kim, we are in support of the proposed project, as it will certainly benefit the surrounding area. However, one of the things I am concerned about is dust control. I'm sure at least the standard dust control measures will be required of the Contractor, but I hope will be enforced by a CM that I assume will be overseeing the project. I am also concerned about the potential walking (or trampling) in, and around an area just outside of our property line. Please see attached photos, and area where I marked on your plan provided. I realize that the area is not our property, but disturbing this already sensitive and slowly eroding area, could start undermining that portion of our property.

This brings me to my question. Is there a chance that the BWS can take a look at the area of my concern, and possibly consider installing some sort of slope protection here also? Being it is still within the BWS property and the potential for more sediment to slide down from this location is high.

Your response will be greatly appreciated.

Wk: 524-3771

Hm: 487-7458

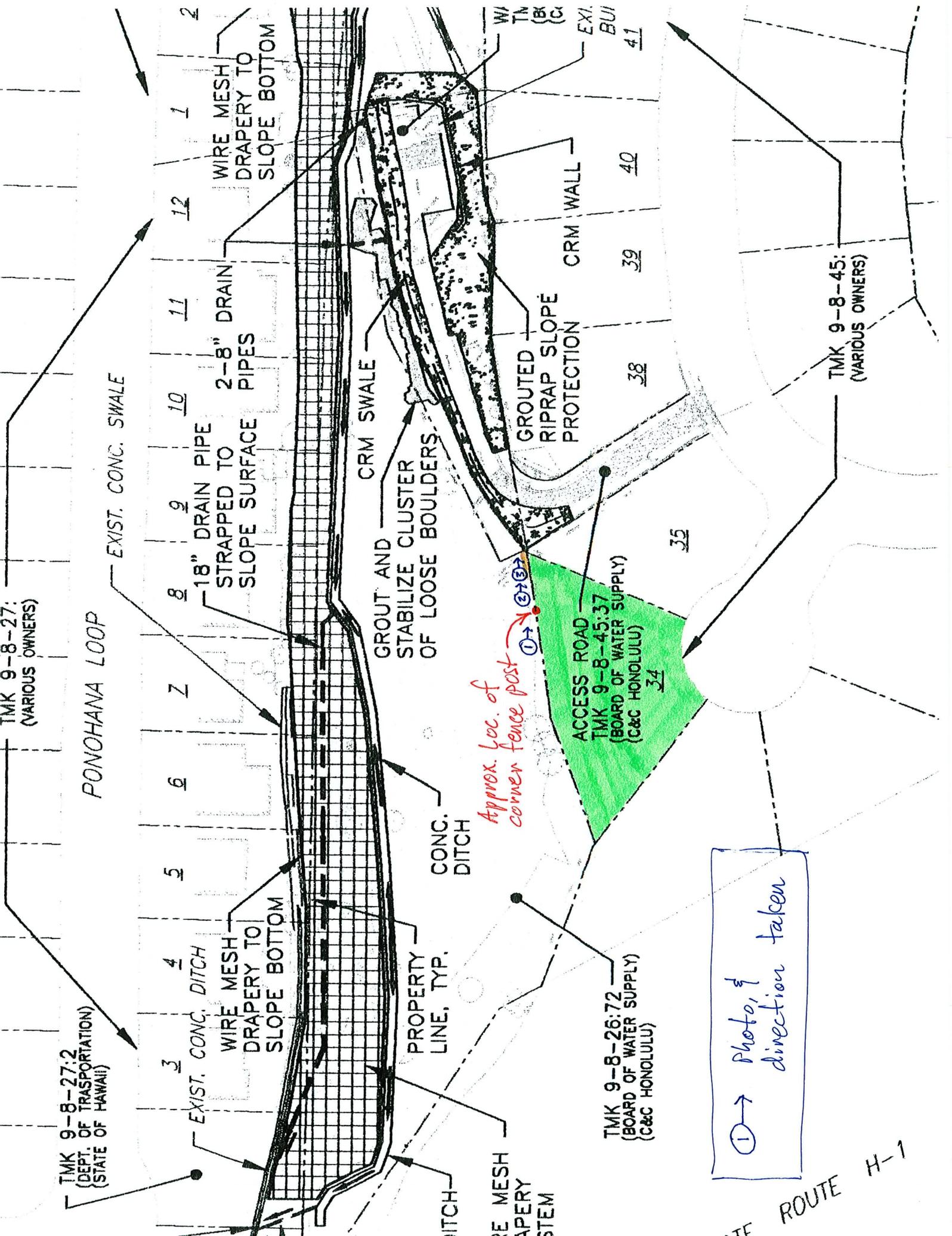
E-mail: ckim@hawaiiipacificengineers.com

Thank you,

Craig D. Kim (Co-Property Owner)
98-342 Puahoku Place

Eleanor L. Kim (Co-Property Owner)
98-340 Puahoku Place

P.S. There are two homes on this one TMK with two separate addresses.



TMK 9-8-27:
(VARIOUS OWNERS)

TMK 9-8-27:2
(DEPT. OF TRANSPORTATION)
(STATE OF HAWAII)

PONOEHANA LOOP

EXIST. CONC. SWALE

3

4

6

Z

8

10

11

12

1

2

EXIST. CONC. DITCH

WIRE MESH
DRAPERY TO
SLOPE BOTTOM

18" DRAIN PIPE
STRAPPED TO
SLOPE SURFACE

WIRE MESH
DRAPERY TO
SLOPE BOTTOM

CRM SWALE

GROUT AND
STABILIZE CLUSTER
OF LOOSE BOULDERS

CONC.
DITCH

PROPERTY
LINE, TYP.

DITCH
WIRE MESH
DRAPERY
SYSTEM

*Approx. loc. of
corner fence post*

TMK 9-8-26:72
(BOARD OF WATER SUPPLY)
(C&C HONOLULU)

ACCESS ROAD
TMK 9-8-45:37
(BOARD OF WATER SUPPLY)
(C&C HONOLULU)

GROUTED
RIPRAP PROTECTION

CRM WALL

TMK 9-8-26:72
(BOARD OF WATER SUPPLY)
(C&C HONOLULU)

34

38

39

40

41

35

TMK 9-8-45:
(VARIOUS OWNERS)

1 → Photo, direction taken

ROUTE H-1

← BWS Prop. * PE Our Property →



corner fence post

Photo 1



Exposing fence post footing

Photo 2

Photo 1 area not too bad.
Photo 2 area getting worse as
you approach photo 3 area.



Photo 3

Orange highlight
marked on plan ↴



About 20-30 feet of very
badly eroded area along PL.
High potential for a lot more
over the years.

This is the area that I
hope any walking through can
be avoided. or around

APPENDIX B

DRAFT EA AGENCIES AND PUBLIC COMMENTS

LINDA LINGLE
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF EDUCATION

P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

December 26, 2007

Mr. Gregory Shiu
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Shiu:

SUBJECT: Draft Environmental Assessment (DEA) for
Waimalu Wells I Rock Fall Mitigation and Drainage Improvements
TMK 9-8-26-72, 9-8-45-36 & 37 and Various Adjacent Plats and
Parcels, Aiea, Hawaii

The Department of Education (DOE) has reviewed the Draft Environmental Assessment (DEA) for the Waimalu Wells I Rock Fall Mitigation and Drainage Improvements.

The DOE expressed our concerns about potential drainage impacts to Pearl Ridge Elementary School in our pre-consultation response letter of February 9, 2007. We remain concerned that the conveyance of additional runoff into Waimalu Stream may cause the carrying capacity of Waimalu Gulch, which passes adjacent to Pearl Ridge Elementary School, to be exceeded during periods of extreme rainfall. Please clarify how much more water will be conveyed into Waimalu Stream due to this project.

We would like to be able to review the drainage report, including the preliminary hydraulic analysis for this project. Please send us a copy of this report prior to the completion of the Final Environmental Assessment.

Should you have any questions, please call George Casen of the Facilities Development Branch at 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:jmb

cc: Randolph Moore, Assistant Superintendent, OSFSS
Duane Kashiwai, Public Works Administrator, FDB
Teri Ushijima, Ed.D., CAS, Aiea/Moanalua/Radford Complex Area
Howard K. Endo, Ph.D., P.E., Shimabukuro, Endo & Yoshizaki, Inc.
Office of Environmental Quality Control

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



April 21, 2008

Ms. Patricia Hamamoto, Superintendent
Department of Education
State of Hawaii
P. O. Box 2360
Honolulu, Hawaii 96804

Dear Ms. Hamamoto:

Subject: Draft Environmental Assessment (DEA) for Waimalu Wells I Rock Fall
Mitigation and Drainage Improvements, TMK-9-8-26-072, 9-8-45-036 and 027
and Various Adjacent Plats and Parcels, Aiea, Oahu, Hawaii

Thank you for reviewing the DEA for our proposed project. We acknowledge receipt of your comments and provide the following responses:

1. Our consultant determined that this improvement project will generate a total discharge increase of 10 cubic feet per second to the existing drainage system within the project area, based on a 50-year design storm.
2. A drainage report will be prepared by our consultant as required by the City Department of Planning and Permitting. A copy will be provided to your office upon completion and acceptance.

Thank you for participating in the environmental review process.

If you have any questions, please contact Jason Takaki at 748-5740.

Very truly yours,

HOWARD H. TANAKA, Head
Capital Projects Division - Engineering Branch

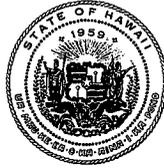
cc: Mr. Howard K. Endo (SEY Engineers)

PATRICIA HAMAMOTO
SUPERINTENDENT

BWS-ENGINEERING

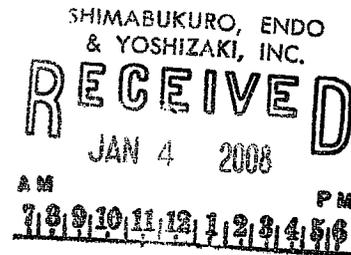
2008 JAN -8 A 8:43

MUFU HANNEIMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
ALLY J. PARK
ROBERT K. CUNDIFF
MARC C. TILKER
CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio
CLIFFORD B. LUM
Manager and Chief Engineer
DEAN A. MAKANO
Deputy Manager and Chief Engineer



STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
P.O. Box 2359
Honolulu, Hawaii 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

December 24, 2007



Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715

Dear Mr. Endo:

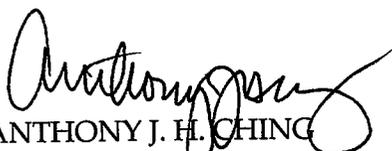
Subject: Draft Environmental Assessment (DEA) for Waimalu Wells I Rock Fall
Mitigation and Drainage Improvements
TMK: 9-8-26: 72, 9-8-45: 36 & 37 and Various Adjacent Plats & Parcels, Aiea,
Hawaii

We have reviewed the above subject DEA which you provided to us for comments.

Pursuant to HRS §205-3.1 and given the location, scope, and nature of the proposed activity, the State Land Use Commission defers to the judgment of the City and County of Honolulu in this matter. We have no further comments to offer at this time.

Thank you for the opportunity to comment on the subject project. Please feel free to contact me at 587-3822 should you require clarification or any further assistance.

Sincerely,


ANTHONY J. H. CHING
Executive Officer



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

HRD07/2882B
BWS ENGINEERING
2008 JAN -8 A 8:31

December 31, 2007

Gregory Shiu
Board of Water Supply
630 South Beretania St., Suite 702
Honolulu, Hawaii 96813

RE: **Draft Environmental Assessment (DEA), Waimalu Wells I
Rock Fall Mitigation and Drainage Improvements, 'Aiea,
O'ahu, TMKs: 9-8-26:72, 9-8-45: 36 and 37.**

Dear Mr. Shiu,

The Office of Hawaiian Affairs (OHA) is in receipt of the above referenced request for comments concerning a DEA for Waimalu Well I rock fall mitigation and drainage improvements in 'Aiea on O'ahu. We have the following comments:

OHA appreciates that the applicant has conducted an archeological assessment of the project site. We are concerned because, as the applicant mentions on page 4-12 of the DEA, the project area generally is known to have an abundance of archeological and cultural sites. However, OHA relies on the reconnaissance conducted by the applicant which found no features in the project site.

OHA is further relieved by the assurances given in the DEA that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during ground disturbance, work will cease, and the appropriate agencies will be contacted pursuant to applicable law. OHA also appreciates the nine guidelines listed on page 4-13 of the DEA that will be submitted prior to commencement of any ground-altering activities.

Gregory Shiu
Board of Water Supply
December 31, 2007
Page 2

Generally, OHA wishes to see stormwater as a resource to be captured and conserved rather than a nuisance to be channeled and drained away. As stormwater travels down a drainage system, it accumulates industrial waste, pesticides, oils, and chemicals. These pollutants quickly settle into the nearshore sediments and are re-suspended into the water column when disturbed.

Persistent organic pollutants (POPs) are organic compounds that linger in the environment, travel through the food web, and pose risks to human health and the environment. Organic hydrocarbons, including petroleum products, are examples of POPs. POPs are most commonly introduced to marine systems via discharged sewage and stormwater effluent, terrestrial runoff, and oil spills. POPs can also bioaccumulate in the nearshore species that inhabit these areas.

Therefore, OHA recommends the use of a stormwater management system that would filter these and other pollutants out and slow the amount of sediments entering our waters. The following four water management methods and erosion control structures are used by the Food and Agriculture Organization of the United Nations¹:

- runoff harvesting (catching runoff for supplementary irrigation);
- total absorption or infiltration;
- runoff diversion (redirecting excess water);
- runoff spreading (distribution of runoff energy).

OHA recommends using retention and detention ponds where possible. Retention ponds are basins that catch runoff from higher elevation areas. A detention pond detains water during rainy periods. They are designed to help control runoff and limit flooding during high water times. A detention pond will hold water for a short period of time and slowly releases it. A retention pond will typically have an overflow pipe so it doesn't get too high, but there is typically water in it at all times.

¹ See <http://www.fao.org/docrep/T1765E/t1765e0n.htm>

If retention ponds are used, they should be shallow with slow sloping bottoms. The slow sloping sides are needed for safety if people happen to fall in. A surrounding area around the pond will provide adequate area for water storage when heavy rains are present. Often times, retention and detention ponds will be installed near each other in a row. The water will get held up in the detention pond and slowly drain into the retention pond. The detention pond will help eliminate flooding and the retention will hold the remaining water. The use of permeable paving materials can also retain some of the rain that falls and catch basins can capture and help to slow the runoff thereby reducing turbidity and sediment runoff.

Retention and detention ponds also serve to remove pollutants, such as POPs and trash. Since retention and detention ponds are the drainage basin for an area, pollutants, trash and debris are washed into these areas often after heavy rains or wind rather than entering the nearshore environment.

This is important for example, as seen in 2001, in the *Marine Pollution Bulletin*, which reported the results of a survey in the Pacific Ocean which found an astounding six pounds of plastic floating for every pound of naturally occurring zooplankton. A recent analysis of the same area has found a 40 to 1 ratio of plastic to plankton. A piece of plastic found in an albatross stomach in 2005 bore a serial number that was traced to a World War II seaplane shot down in 1944. Computer models re-creating the object's odyssey showed it spent a decade in a gyre known as the Western Garbage Patch, just south of Japan, and then drifted 6,000 miles to the Eastern Garbage Patch off the West Coast of the U.S., where it spun in circles for the next 50 years. Because plastic photodegrades, it constantly breaks into smaller pieces, eventually becoming individual molecules and all the while absorbing POPs as it degrades and enters the food chain.²

Retention and detention ponds can help to capture these types of pollutants. Similarly, allowing "thick" vegetation or "buffer strips" to grow where possible will filter and slow runoff and soak up pollutants. Trees, shrubs, and groundcover absorb up to fourteen times more rainwater than a grass

² Some plastics have been found to contain concentrations of these pollutants 1 million times greater than the levels found in surrounding water. On Midway Atoll, 40% of albatross chicks die, their bellies full of trash, and on Kamilo Beach, on the Big Island, plastic pieces create a new "sand" more than a foot deep.

lawn and they don't require fertilizer.³ OHA would like to suggest that the project area be landscaped with this type of groundcover that is comprised of drought tolerant native or indigenous species. Any invasive species should also be removed. Doing so would not only serve as practical water-saving landscaping practices and pollution filters, but also serve to further the traditional Hawaiian concept of mālama 'āina and create a more Hawaiian sense of place.

Thank you for the opportunity to comment. If you have any further questions or concerns, please contact Grant Arnold at (808) 594-0263 or granta@oha.org.

Sincerely,



Clyde W. Nāmu'o
Administrator

³ See Maryland's Stormwater Management Program at: <http://www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/index.asp>

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



February 28, 2008

MUFI HANNEMANN, Mayor

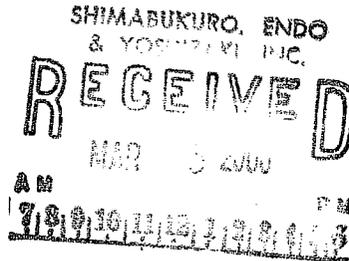
RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
ALLY J. PARK
ROBERT K. CUNDIFF
MARC C. TILKER

CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio

CLIFFORD P. LUM
Manager and Chief Engineer

DEAN A. NAKANO
Deputy Manager and Chief Engineer

Mr. Clyde W. Namuo, Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813



Dear Mr. Namuo:

Subject: Draft Environmental Assessment for Waimalu Wells I Rock Fall Mitigation and Drainage Improvements, TMK:9-8-26:072, 9-8-45:036 and 027, and Various Adjacent Plats and Parcels, Aiea, Oahu, Hawaii

Thank you for reviewing the Draft Environmental Assessment for our proposed project.

We acknowledge receipt of your comments and provide the following response to your concerns:

1. The use of retention and detention ponds is not feasible for this project as sufficient land is not available within the project area.
2. Existing trees, shrubs and vegetation will be removed from the cliff-like slopes during the construction of the mesh drapery phase of the mitigation project. As suggested, we will investigate the possibility of introducing drought-tolerant native or indigenous species to the mesh-draped areas.

Thank you for participating in the environmental review process.

If you have any questions, please contact Jason Takaki at 748-5740.

Very truly yours,


HOWARD H. TANAKA, Head
Capital Projects Division – Engineering Branch

cc: SEY Engineers (Howard K. Endo)

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 768-8480 FAX: (808) 523-4567
WEB SITE ADDRESS: www.cc.honolulu.hi.us



MUFI HANNEMANN
MAYOR

EUGENE C. LEE, P.E.
DIRECTOR
CRAIG I. NISHIMURA
DEPUTY DIRECTOR
COP 07-242249

December 31, 2007

SHIMABUKURO, ENDO
& YOSHIZAKI, INC.
RECEIVED
JAN 2 2008
10:11:18 AM
1/2/08 10:11:18 AM

Mr. Clifford P. Lum, P.E.
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Attention: Gregory Shiu

Dear Mr. Lum:

Subject: Draft Environmental Assessment (DEA) for Waimalu Wells 1
Rock Fall Mitigation and Drainage Improvements, TMK: 9-8-26: 72:
9-8-45: 36 and 37 and Various Plats and Parcels

We have reviewed the DEA and have the following comments:

In order to enhance the geological description, we recommend identifying the parent rock formation as being either a Pahoehoe or an A'A flow and presenting panoramic photographs of the rock slope.

When available, we would like to receive a copy of the final report for our files. If there are any questions, please contact Michael Yamasaki at 768-8824.

Very truly yours,

Eugene C. Lee, P.E.
Director

GS:dk
c: OEQC
Shimabukuro, Endo & Yoshizaki, Inc. (Attention: Howard K. Endo)

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



February 20, 2008

MUFI HANNEMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
ALLY J. PARK
ROBERT K. CUNDIFF
MARC C. TILKER
CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio
CLIFFORD P. LUM
Manager and Chief Engineer
DEAN A. NAKANO
Deputy Manager and Chief Engineer

TO: MR. EUGENE C. LEE, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM: HOWARD H. TANAKA, HEAD
CAPITAL PROJECTS DIVISION - ENGINEERING BRANCH

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIMALU WELLS 1
ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS,
TMK-9-8-26:072, 9-8-45:036 AND 027, AND VARIOUS ADJACENT PLATS
AND PARCELS, AIEA, OAHU, HAWAII

Thank you for reviewing the Draft Environmental Assessment (EA) for our proposed project.

We acknowledge receipt of your comments. The Board of Water Supply will incorporate your concerns in the final document as follows:

1. The parent rock formation will be identified in the Final EA. Visual observations indicate that there appear to be several lava flows covering the site. Thus, it is very likely that the parent rock formation is alternating layers of Pahoehoe and A'A flows.
2. A panoramic photograph of the rock slope at the project site will be added to the front cover of the Final EA.

As requested, a copy of the Final EA will be transmitted to your office for your files when completed.

Thank you for participating in the environmental review process.

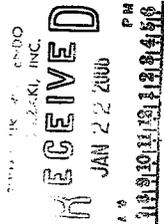
If you have any questions, please contact Jason Takaki at 748-5740.

cc: Mr. Howard K. Endo (SEY Engineers)

DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU
1000 Uluohia Street, Suite 215, Kapaeha, Hawaii, 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov



MUFI HANNEMANN
MAYOR



CRAIG I. NISHIMURA, P.E.
ACTING DIRECTOR AND CHIEF ENGINEER
GEORGE "TESOKI" MIYAMOTO
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 08-41

January 17, 2008

MEMORANDUM

TO: CLIFFORD P. LUM, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTENTION: GREGORY SHIU

FROM: CRAIG I. NISHIMURA, P.E.
ACTING DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF FACILITY MAINTENANCE

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA)
WAIMALU WELLS I ROCK FALL MITIGATION AND DRAINAGE
IMPROVEMENTS

Thank you for the opportunity to review and comment on the DEA dated December 2007 for Waimalu Wells I Rock Fall Mitigation and Drainage Improvements project.

It is our understanding that the existing City drainage system will be analyzed to determine if there is adequate capacity to accept the additional storm water run-off from the proposed drainage improvements. Also, the future wire mesh drapery slope protection will not adversely affect the maintenance of existing and proposed drainage swales.

Should you have any questions, please call Charles Pignataro of the Division of Road Maintenance, at 768-3697.

c: Office of Environmental Quality Control
Shimabukuro, Endo & Yoshizaki, Inc. - (Attention: Howard K. Endo)

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



February 20, 2008

MUFI HANNEMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
ALLY J. PARK
ROBERT K. CUNDIFF
MARC C. TILKER

CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio
CLIFFORD P. LUM
Manager and Chief Engineer
DEAN A. NAKANO
Deputy Manager and Chief Engineer

TO: MR. CRAIG I. NISHIMURA, ACTING DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF FACILITY MAINTENANCE

FROM: HOWARD H. TANAKA, HEAD
CAPITAL PROJECTS DIVISION - ENGINEERING BRANCH

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIMALU WELLS I
ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS,
TMK 9-8-26-072, 9-8-45-036 AND 027 AND VARIOUS ADJACENT PLATS
AND PARCELS, AIEA, OAHU, HAWAII

Thank you for reviewing the Draft Environmental Assessment (DEA) for our proposed project.

We acknowledge receipt of your comments and provide the following response to your concerns:

1. As discussed in Subsection 4.5.3 of the DEA, the proposed drainage improvements will be designed in accordance with the City Storm Drainage Standards. The existing City drainage system will be analyzed to determine if there is sufficient capacity to accommodate the additional storm runoff from the proposed drainage improvements. Preliminary hydraulic analysis indicates the proposed drainage improvements will have no adverse impact on the City drainage system. A drainage report will be provided to the City when completed.
2. As discussed in Subsection 2.4.2 of the DEA, the wire mesh drapery will extend from the top of the cliff-like slopes to the bottom of the slopes and will be set back 3 feet from the existing concrete ditches and swales to allow for maintenance.

Thank you for participating in the environmental review process.

If you have any questions, please contact Jason Takaki at 748-5740.

cc: Mr. Howard K. Endo (SEY Engineers)

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) 527-6743
DEPT. WEB SITE: www.honolulu.gov • CITY WEB SITE: www.honolulu.gov



MUFI HANNEMANN
MAYOR

HENRY ENG, FAICP
DIRECTOR
DAVID K. TANOUE
DEPUTY DIRECTOR

January 2, 2008

2007/ELOG-3498 (df)

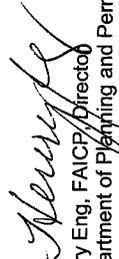
Mr. Clifford P. Lum
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96813

Attention: Mr. Gregory Shiu
Dear Mr. Lum:

Subject: December 2007 Draft Environmental Assessment (DEA) for Waimalu
Wells I Rock Fall Mitigation and Drainage Improvements, Waimalu,
TMK: 9-8-026: 072, 9-8-045: 036 and 037, and Various Adjacent
Plats and Parcels

After reviewing the subject document, our department has no comments to offer.
If there are any questions, please contact Mr. Don Fujii of the Site Development Division
at 768-8107.

Very truly yours,


Henry Eng, FAICP, Director
Department of Planning and Permitting

HE:ky
[588160]

cc: OEQC
√SEY (Attention: Dr. Howard K. Endo)
Planning Division (Attention: Mr. Randy Hara)



BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



January 15, 2008

MUFI HANNEMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
LARRY PARK
ROBERT G. LINDIFF
MARC C. TILKER
CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio
CLIFFORD P. LUM
Manager and Chief Engineer
DEAN A. NAKANO
Deputy Manager and Chief Engineer

TO: MR. HENRY ENG, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

ATTENTION: MR. DON FUJII, SITE DEVELOPMENT DIVISION

FROM: HOWARD H. TANAKA, HEAD
CAPITAL PROJECTS DIVISION - ENGINEERING BRANCH

SUBJECT: YOUR LETTER DATED JANUARY 2, 2008, REGARDING THE
DECEMBER 2007 DRAFT ENVIRONMENTAL ASSESSMENT (DEA)
FOR WAIMALU WELLS I ROCK FALL MITIGATION AND DRAINAGE
IMPROVEMENTS, WAIMALU, TMK:9-8-026:072, 9-8-045:036 AND 037,
AND VARIOUS ADJACENT PLATS AND PARCELS

Thank you for reviewing the DEA for our proposed project.

We acknowledge receipt of your letter and that your Department has no comments to offer.

Thank you for participating in the environmental review process.

If you have any questions, please contact Jason Takaki at 748-5740.

cc: SEY Engineers, Howard K. Endo

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
 650 SOUTH KING STREET, 3RD FLOOR
 HONOLULU, HAWAII 96813
 Phone: (808) 768-8350 • Fax: (808) 523-4730 • Internet: www.honolulu.gov



MUFI HANNEMANN
 MAYOR

WAYNE Y. YOSHIOKA
 DIRECTOR

RICHARD F. TORRES
 DEPUTY DIRECTOR

January 30, 2008

TP12/07-240697R

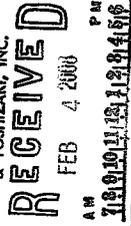
MEMORANDUM

TO: CLIFFORD P. LUM, MANAGER AND CHIEF ENGINEER
 BOARD OF WATER SUPPLY

ATTN: GREGORY SHIU

FROM: WAYNE Y. YOSHIOKA, DIRECTOR

SUBJECT: WAIMALU WELLS I ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS



Thank you for the December 12, 2007 letter from Shimabukuro, Endo & Yoshizaki, Inc., requesting our review of and comments on the draft environmental assessment for the subject project.

The only comment that we have is that consideration should be given to staggering construction work hours around peak traffic periods to minimize the traffic impacts to the surrounding area.

Should you have any questions regarding this matter, please contact Ms. Faith Miyamoto at 768-8350.

Wayne Y. Yoshioka
 WAYNE Y. YOSHIOKA

cc: Office of Environmental Quality Control

✓ Dr. Howard K. Endo
 Shimabukuro, Endo & Yoshizaki, Inc.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
 630 SOUTH BERETANIA STREET
 HONOLULU, HI 96843



February 20, 2008

MUFI HANNEMANN, Mayor
 RANDALL Y. S. CHUNG, Chairman
 SAMUEL T. HATA
 ALLY J. PARK
 STEPHEN C. MADOFF
 MARC C. TILNER

CRAIG I. NISHIMURA, Ex-Officio
 BRENNONT. MORIOKA, Ex-Officio
 CLIFFORD P. LUM
 Manager and Chief Engineer
 DEAN A. MAKANO
 Deputy Manager and Chief Engineer

TO: MR. WAYNE Y. YOSHIOKA, DIRECTOR
 DEPARTMENT OF TRANSPORTATION SERVICES

FROM: HOWARD H. TANAKA, HEAD
 CAPITAL PROJECTS DIVISION - ENGINEERING BRANCH

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIMALU WELLS I
 ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS,
 TMK: 9-8-26-072, 9-8-45-036 AND 027, AND VARIOUS ADJACENT PLATS
 AND PARCELS, AIEA, OAHU, HAWAII

Thank you for reviewing the Draft Environmental Assessment for our proposed project. We acknowledge receipt of your comments and will consider staggering construction work hours around peak traffic periods to minimize the traffic impacts to the surrounding areas.

Thank you for participating in the environmental review process. If you have any questions, please contact Jason Takaki at 748-5740.

cc: ✓ Mr. Howard K. Endo (SEY Engineers)

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

RECEIVED
JAN 22 2008
11:19:46 AM

KENNETH G. SILVA
FIRE CHIEF
ALVIN K. TOMITA
DEPUTY FIRE CHIEF

January 14, 2008

TO: CLIFFORD P. LUM, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTN: GREGORY SHIU, PROJECT ENGINEER

FROM: KENNETH G. SILVA, FIRE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
WAIMALU WELLS I ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS
TAX MAP KEYS: 9-8-026: 072; 9-8-045: 036 AND 037; AND
VARIOUS ADJACENT PLATS AND PARCELS

In response to a letter from Dr. Howard Endo of Shimabukuro, Endo & Yoshizaki, Inc. dated December 12, 2007, regarding the above-mentioned subject, the Honolulu Fire Department reviewed the materials provided and requires that the following be compiled with for the duration of the project:

1. Maintain fire apparatus access throughout the construction site.
2. Maintain access to fire hydrants. Please notify the Fire Communication Center at 523-4411 regarding any interruption of the existing fire hydrant system.

Should you have any questions, please call Acting Battalion Chief William H. Melemai III of our Fire Prevention Bureau at 723-7151.

William H. Melemai III
KENNETH G. SILVA
Fire Chief

KGS/SK:bh

cc: Office of Environmental Quality Control
Howard K. Endo, Ph.D., P.E., Shimabukuro, Endo & Yoshizaki, Inc. ✓

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



February 20, 2008

MUFI HANNEMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
ALLY J. PARK
ROBERT K. CUNDIFF
MARC C. TILNER

CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio
CLIFFORD P. LUM
Manager and Chief Engineer
DEAN A. NAKANO
Deputy Manager and Chief Engineer

TO: MR. KENNETH G. SILVA, FIRE CHIEF
HONOLULU FIRE DEPARTMENT

FROM: HOWARD H. TANAKA, HEAD OF
CAPITAL PROJECTS DIVISION, ENGINEERING BRANCH

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIMALU WELLS I
ROCK FALL MITIGATION AND DRAINAGE IMPROVEMENTS,
TMK:9-8-26:072, 9-8-45:036 AND 027, AND VARIOUS ADJACENT PLATS
AND PARCELS, AIEA, OAHU, HAWAII

Thank you for reviewing the Draft Environmental Assessment (DEA) for our proposed project.

We acknowledge receipt of your comments and your Department's requirements throughout the duration of the project. The following is included in Subsection 4.6.3 of the DEA:

1. Fire apparatus access will be provided throughout the construction site for all phases of the project.
2. Access to fire hydrants will be maintained. The Fire Communication Center (523-4411) will be notified by the Contractor of any interruption to the existing fire system during construction activities.

Thank you for participating in the environmental review process.

If you have any questions, please contact Jason Takaki at 748-5740.

cc: ✓ Mr. Howard K. Endo (SEY Engineers)



December 13, 2007

Mr. Howard K. Endo, Ph.D., P.E.
President
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3715

Dear Mr. Endo:

Subject: Draft Environmental Assessment (DEA) for
Waimalu Wells I Rock Fall Mitigation and
Drainage Improvements
Plan Review and Comment

Based on our review of the Draft Environmental Assessment provided, it has been determined that the area is currently clear of utility gas facilities.

Thank you for the opportunity to comment on the DEA Notice. Should there be any questions, or if additional information is desired, please feel free to contact Kekoa Ramos at 594-5008.

Sincerely,

The Gas Company, LLC

Charles E. Calvet, P.E.
Manager, Engineering

CFC:ks
07-215

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

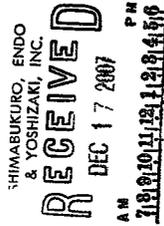


January 14, 2008

MUFU HANNEMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
ALLY J. PARK
ROBERT K. CUNDIFF
MARC C. TILNER

CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio
CLIFFORD P. LUJIK
Manager and Chief Engineer
DEAN A. NAKANO
Deputy Manager and Chief Engineer

P.O. Box 3000
Honolulu, Hawaii 96802-3000



Mr. Charles E. Calvet
The Gas Company
P.O. Box 3000
Honolulu, Hawaii 96802-3000

Dear Mr. Calvet:

Subject: Your Letter Dated December 13, 2007 Regarding the Draft Environmental Assessment (DEA) for Waimalu Wells I Rock Fall Mitigation and Drainage Improvements

Thank you for reviewing the DEA for our proposed project.

We acknowledge receipt of your comments and that you have determined that the area is currently clear of utility gas facilities.

Thank you for participating in the environmental review process.

If you have any questions, please contact Jason Takaki at 748-5740.

Very truly yours,

HOWARD H. TANAKA, Head
Capital Projects Division – Engineering Branch

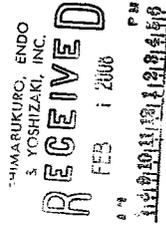
cc: Howard K. Endo, SEY Engineers

EIS

January 30, 2008



Mr. Gregory Shiu
January 30, 2008
Page Two



Mr. Gregory Shiu
Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843

Our point of contact for this project, is Paul Nakagawa (543-7062). I suggest dealing directly with him to coordinate HECO's continuing input in this project.

Sincerely,

Kirk S. Tomita
Senior Environmental Scientist

Dear Mr. Shiu:

**Re: DEA - Waimau Wells I Rock Fall
Mitigation & Drainage Improvements
Aiea, Oahu**

cc: OEQC
Dr. Howard K. Endo
P. Nakagawa

Thank you for the opportunity to comment on the DEA of the above-referenced project. Hawaiian Electric Company, Inc. (HECO) has no objections at this time. The following comments were received from our Construction & Maintenance Department:

- (1) HECO has existing facilities within the subject parcel, and will require continued access for operation and maintenance purposes, as covered by existing easements.
- (2) Paragraph 4.6.1 - Electrical and Communication Facilities (p. 4-169). The DEA states, "Construction of the project is not expected to have significant impact on Hawaiian Electric Company's existing electrical facilities and its ability to provide electricity." Comparison of the DEA's exhibits to HECO's facility drawings indicates that there may be a conflict with an existing overhead line during construction. Appropriate and timely coordination should be conducted through HECO's Engineering Department.

We appreciate your efforts to keep us apprised of the planning process. As the project plans progress, please continue to keep us informed. We will be better able to evaluate any effects on our system facilities further along in the project's development. We request that development plans show all affected HECO facilities and address any conflicts between the proposed plans and HECO's existing facilities. Please forward the pre-final development plans to HECO for review.

Should it become necessary to relocate HECO's facilities, please submit a request in writing and we will work with you so that construction of the project may proceed as smoothly as possible. A brief description and environmental analysis of any requirements for relocation or new facilities should be included in the DEA. Please note that there may be costs associated with any relocation or addition of facilities, including negotiation of easements that may be required as a result, and that such costs may be borne by the requestor. Because any redesign or relocation of HECO's facilities may cause lengthy delays, upon determination that HECO facilities will need to be relocated or built, HECO should be notified immediately in order to minimize any delays in or impacts on the project schedule.



BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERTANIA STREET
HONOLULU, HI 96843



February 20, 2008

MUFI HANNEMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
SAMUELE T. HATA
SUSAN K. KANE
ROBERT K. CLINDIFF
MARC C. TLKER
CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio
CLIFFORD P. LUM
Manager and Chief Engineer
DEAN A. NAKANO
Deputy Manager and Chief Engineer

Mr. Kirk S. Tomita
February 20, 2008
Page 2

Mr. Kirk S. Tomita
Senior Environmental Scientist
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Tomita:

Subject: Draft Environmental Assessment for Waimalu Wells I Rock Fall
Mitigation and Drainage Improvements, TMK:9-8-26:072, 9-8-45:036 & 027
and Various Adjacent Plats & Parcels, Aiea, Oahu, Hawaii

Thank you for reviewing the Draft Environmental Assessment (DEA) for our proposed project. We acknowledge receipt of your comments and that Hawaiian Electric Company, Inc. (HECO) has no objections at this time.

We have the following comments to your concerns:

1. HECO has existing facilities within the subject parcel, and the Board of Water Supply (BWS) will permit HECO continued access for operation and maintenance purposes as covered by existing easements.
2. Comparison of the DEA's exhibits to HECO's facility drawings indicated that there may be conflict with an existing overhead line during construction. Appropriate and timely coordination will be conducted by BWS during the plans preparation and construction phases through HECO's Engineering Department.
3. As the project plans preparation progresses, BWS will continue to keep HECO informed so that HECO may better evaluate any effects on HECO's system facilities further along in the project's development. The development plans will show all affected HECO facilities and address any conflicts between the proposed plans and HECO's existing facilities. The BWS will forward the pre-final development plans for HECO review.

4. BWS anticipates no relocation of HECO's facilities for the project. Should it become necessary to relocate HECO's facilities, a request will be submitted in writing and BWS will work with HECO so that construction of the project may proceed as smoothly as possible. BWS understands that there may be costs associated with any relocation or addition of facilities, including negotiation of easement that may be required as a result, and that such costs may be borne by the requestor. Because any redesign or relocation of HECO's facilities may cause lengthy delays, upon determination that HECO facilities will need to be relocated or built, HECO will be notified immediately in order to minimize any delays in or impacts on the project schedule.

Thank you for participating in the environmental review process.

If you have any questions, please contact Jason Takaki at 748-5740.

Very truly yours,

HOWARD H. TANAKA, Head
Capital Projects Division - Engineering Branch

cc: Mr. Howard K. Endo (SEY Engineers)

Hawaiian Telcom

January 3, 2008

Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843
Attention: Mr. Gregory Shiu

Dear Mr. Shiu:

Subject: Draft Environmental Assessment (DEA) for Waimalu Wells I Rock Fall Mitigation and Drainage Improvements Aiea, Hawaii

Thank you for the opportunity to review and comment on the subject project. Hawaiian Telcom has no comments as the proposed project will not have any impact on our facilities or operations.

If you have any questions or require assistance in the future on this project, please call Tuan Nguyen at 546-4414.

Sincerely,



Sonny Perreira
Manager
Outside Plant Engineering

Cc: Office of Environmental Quality Control
Howard K. Endo (SEY Engineers)

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



January 15, 2008

MUFIHANNEMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
FRANK J. HIRATA
ROBERT K. GUNDIFF
MARC C. TLXER
CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MIRONOVA, Ex-Officio
CLIFFORD P. LUM
Manager and Chief Engineer
DEAN A. MAKANO
Deputy Manager and Chief Engineer

Mr. Sonny Perreira
Hawaiian Telcom
P. O. Box 2200
Honolulu, Hawaii 96841

Dear Mr. Perreira:

Subject: Your Letter Dated January 3, 2008, Regarding the Draft Environmental Assessment (DEA) for Waimalu Wells I Rock Mitigation and Drainage Improvements

Thank you for reviewing the DEA for our proposed project.

We acknowledge receipt of your comments and that you have determined that our proposed project will not have any impact on your facilities or operations.

Thank you for participating in the environmental review process.

If you have any questions, please contact Jason Takaki at 748-5740.

Very truly yours,



HOWARD H. TANAKA, Head
Capital Projects Division - Engineering Branch

cc: SEY Engineers, Howard K. Endo

SHIMABUKURO, ENDO
& YOSHIZAKI, INC.
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JAN 15 2008
P.M.
1:13:44 PM
1/15/08

Haruyuki Kawasaki
98-385 Ponošana Loop
Aiea, Hawaii 96701

January 13, 2008

Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue
Honolulu, Hawaii 96816-3715

Dear Mr. Endo,

This letter is in response to the Draft Environmental Assessment for Waimalu Wells 1, Rockfall Mitigation and Drainage Improvements, Aiea, Oahu, Hawaii dated December 15, 2007.

Thank you for allowing me to provide my comments on the draft environmental assessment (EA). My comments are as follows:

1. In the preferred alternative, the EA assumes that the wire mesh will be unsightly for the short term because it will eventually be covered with vegetation. The EA does not define what short term is nor does it identify how much of the wire mesh will eventually be covered by vegetation. The EA also does not offer mitigation to permanently address erosion or previous damage (caused by BWS property) on the hillside. The BWS should address and mitigate the unsightliness and erosion problems. To do this, one option is to vegetate the hillside, similar to the vegetation shown in Alternative 3. Another option is to implement Alternative 4.
2. The EA indicates that the potential for flooding exists for a storm of greater recurrence interval of 50 years. However, it does not provide historic information on previous storms nor does it address the impacts should a storm of larger magnitude hit. The BWS should design for a recurrence interval of 100 years.
3. Additional mitigation measures should be added to ensure excessive runoff does not occur due to a clogged ditch. Periodic maintenance alone will not prevent this from occurring, especially if the maintenance is infrequent and if vegetation is allowed to grow right up to the ditch.
4. Additional mitigation measures should be added to ensure erosion does not occur from the 5 foot area between the ditch and the edge of the slope. It will be difficult for BWS personnel to maintain the edge of the slope.
5. One possible solution to comments 2, 3 & 4 above would be to add rip rap on one or both sides of the ditch and make the ditch wall (on the lower side of the hill) higher. This will increase the volume of the ditch before it overflows and will

offer a secondary path for the water flow should the ditch get clogged. The rip rap on the sides of the ditch will minimize vegetation from entering the ditch and will control erosion between the ditch and the top of the slope. If rip rap will be a problem for the preferred alternative, the erosion control mat should be placed up to the edge of the concrete ditch. See the attached sketches.

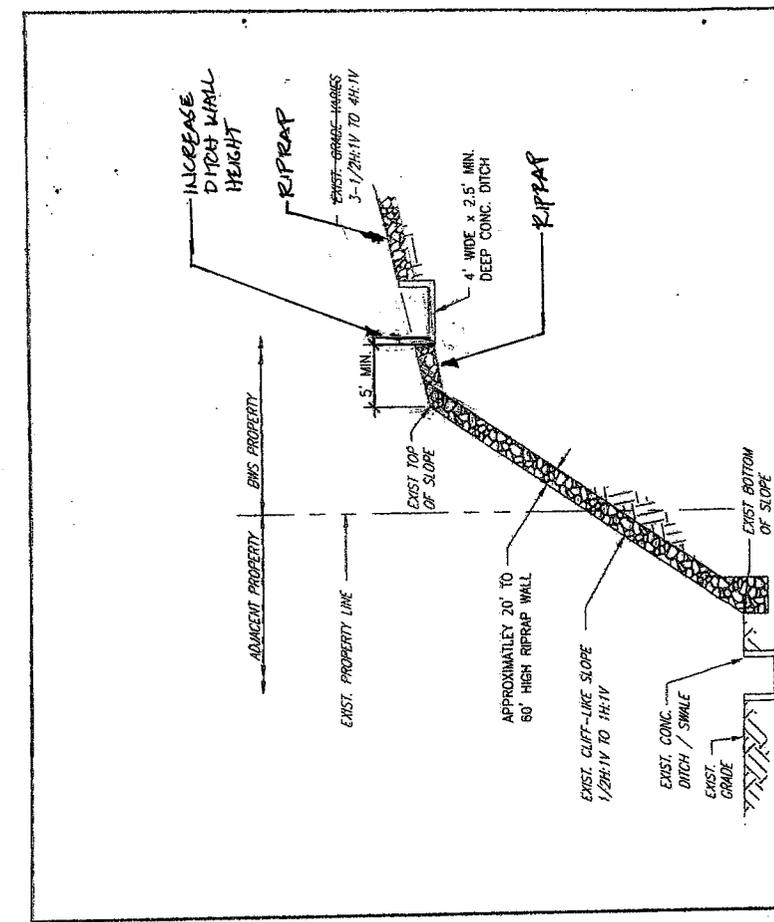
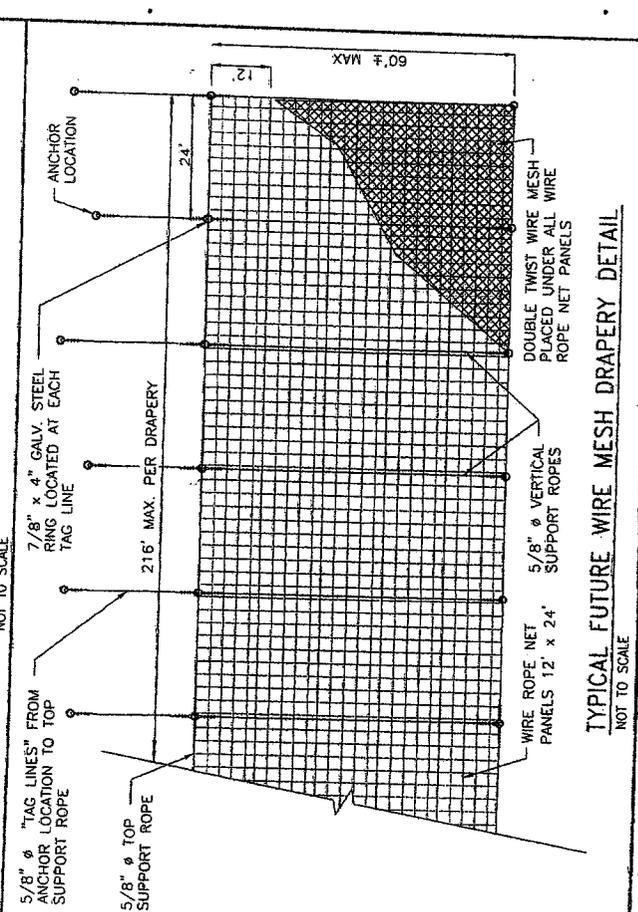
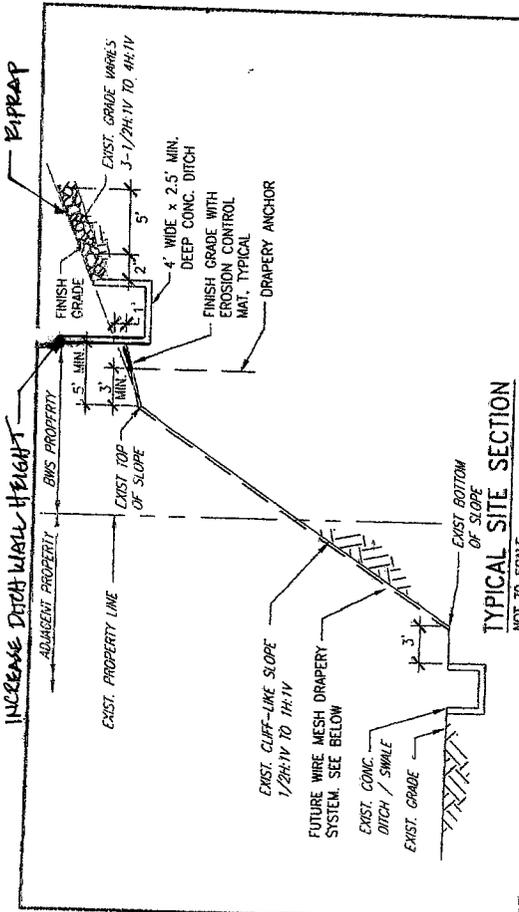
6. The BWS should seriously consider implementing Alternate 4 instead of the preferred alternative. With lower maintenance and replacement costs, an economic analysis may show alternative 4 to be a better value. It will also be a better environmental solution.
7. The BWS should include mitigation measures to rectify past damages caused by sediment build up at the base of the hillside. The studies identified in the EA undeniably show that sediment has been washing from BWS properties down the hillside. The EA should then assess the environmental impacts of the proposed corrective measures.
8. Adequate measures should be taken to prevent silt from flowing into the ditch during and after construction.

Without properly addressing these issues, I do not think the BWS should issue a Finding of no Significant Impact. There are significant environmental concerns with the project as described in the EA.

Thank you again for allowing me to provide my concerns. As previously requested in my letter dated February 10, 2007, please send me a copy of the draft and final environmental assessments as well as the drawings, specifications, and design analysis for the construction. I am not only a concerned citizen but also an affected party. Requiring the entire community to review one copy of the environmental assessment (EA) at the Aiea Library is not sufficient distribution for an EA.

Sincerely,

Haruyuki Kawasaki
Haruyuki Kawasaki



ALTERNATIVE 4 TYPICAL SITE SECTION
NOT TO SCALE

PREPARED FOR:
BOARD OF WATER SUPPLY
CITY AND COUNTY OF
HONOLULU

Shimabukuro, Endo
& Toshizaki, Inc.
Civil & Structural Engineers

WAIMALU WELLS 1 ROCK FALL MITIGATION
AND DRAINAGE IMPROVEMENTS
ALTERNATIVE 4
TYPICAL SITE SECTION

FIGURE
3-3

TYPICAL SITE SECTION
NOT TO SCALE

TYPICAL FUTURE WIRE MESH DRAPERY DETAIL
NOT TO SCALE

PREPARED FOR:
BOARD OF WATER SUPPLY
CITY AND COUNTY OF
HONOLULU

Shimabukuro, Endo
& Toshizaki, Inc.
Civil & Structural Engineers

WAIMALU WELLS 1 ROCK FALL MITIGATION
AND DRAINAGE IMPROVEMENTS
AND ENVIRONMENTAL ASSESSMENT
TYPICAL SITE SECTION
& FUTURE DRAPERY DETAIL

FIGURE
2-3

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



November 8, 2010

PETER B. CARLISLE, MAYOR
RANDALL Y. S. CHUNG, Chairman
ANTHONY R. GUERRERO, JR.
WILLIAM K. MAHOE
THERESA C. McMURDO
ADAM C. WONG
GEORGE 'KEOKI' MIYAMOTO, Ex-Officio
MICHAEL D. FORNIBY, Ex-Officio
WAYNE M. HASHIRO, P.E.
Manager and Chief Engineer
DEAN A. NAKANO
Deputy Manager

Mr. Haruyuki Kawasaki
November 8, 2010
Page 2

Mr. Haruyuki Kawasaki
98-385 Ponošana Loop
Aiea, Hawaii 96701

Dear Mr. Kawasaki:

Subject: Draft Environmental Assessment (DEA) for Waimalu Wells I Rock Fall Mitigation and Drainage Improvements; TMK:9-8-26:072, 9-8-45:036 and 027 and Various Adjacent Plats and Parcels, Aiea, Oahu, Hawaii.

Thank you for reviewing the DEA for our proposed project. We acknowledge receipt of your comments and provide the following response to your concerns:

1. "In the preferred alternative, the EA assumes that the wire mesh will be unsightly for the short term because it will eventually be covered with vegetation. The EA does not define what short term is nor does it identify how much of the wire mesh will eventually be covered by vegetation. The EA also does not offer mitigation to permanently address erosion or previous damage caused by the Board of Water Supply (BWS) property on the hillside. The BWS should address and mitigate the unsightliness and erosion problems. To do this, one option is to vegetate the hillside, similar to the vegetation shown in Alternative 3. Another option is to implement Alternative 4."
"Short term" could take several months to one or two years. When vegetation is fully established, the wire mesh is expected to be covered by vegetation. Construction plans call for the installation of erosion control mats after clearing the existing hill slope. The mats will minimize any future erosion. Trees and shrubbery are expected to grow naturally and stabilize the hill slope over time.
2. "The EA indicated that the potential for flooding exists for a storm of greater recurrence interval of 50 years. However, it does not provide historic information on previous storms nor does it address the impacts should a storm of larger magnitude hit. The BWS should design for a recurrence interval of 100 years."

The BWS does not have any knowledge of area-wide flooding in the project area resulting from runoff from the BWS property. The new improvements will likely result in a slight increase of runoff quantity, but are not expected to cause flooding. The design for a recurrence interval of 100 years is for drainage areas greater than 100 acres and all streams, and it is not applicable to this project. The requirement under City and County of Honolulu Rules Relating to Storm Drainage Standards for areas of 100 acres or less is 10 years. The BWS used the recurrence interval of 50 years as a safety measure.

3. "Additional mitigation measures should be addressed to ensure excessive runoff does not occur due to a clogged ditch. Periodic maintenance alone will not prevent this from occurring, especially if the maintenance is infrequent and if vegetation is allowed to grow right up to the ditch."

The new ditch near the top of the slope is over-designed to accommodate the runoff. The BWS will perform periodic inspection and maintenance to prevent any over-growth and clogging of the ditch.

4. "Additional mitigation measures should be added to ensure erosion does not occur from the 5-foot area between the ditch and the edge of the slope. It will be difficult for BWS personnel to maintain the edge of the slope."

The BWS will extend the erosion control mat to cover the 5-foot area between the ditch and the edge of the slope. The growth of the natural vegetation will stabilize the 5-foot area over time.

5. "One possible solution to comments 2, 3, and 4 above would be to add riprap on one or both sides of the ditch and make the ditch wall (on the lower side of the hill) higher. This will increase the volume of the ditch before it overflows and will offer a secondary path for the water flow should the ditch get clogged. The riprap on the sides of the ditch will minimize vegetation from entering the ditch and will control erosion between the ditch and the top of the slope. If riprap will be a problem for the preferred alternative, the erosion mat should be placed up to the edge of the concrete ditch. See the attached sketches."

The new ditch has been over-designed and can accommodate a higher capacity, reducing the likelihood of an overflow. The BWS will extend the erosion control mats up to the edge of the ditch. The growth of natural vegetation will stabilize the hill slope over time.

6. "The BWS should seriously consider implementing Alternative 4 instead of the preferred alternative. With lower maintenance and replacement costs, an economic analysis may show alternative 4 to be a better value. It will also be a better environmental solution."

The BWS selection of the preferred alternative was based on the Life Cycle Cost Analysis, construction schedule, and the impact to the community for the alternatives. From the Life Cycle Cost Analysis, alternative 4 has the highest life cycle cost and is not a better value among the alternatives. Alternative 4 also has the longest construction duration and the construction noise and traffic will impact the community longer than Alternatives 1 through 3.

7. "The BWS should include mitigation to rectify past damages caused by sediment buildup at the base of the hillside. The studies identified in the EA undeniably show that sediment has been washing from the BWS properties down the hillside. The EA should assess the environmental impacts of the proposed corrective measures."

The BWS respectfully disputes your interpretation of the EA. In addition, please be advised that the BWS denies any allegation that it is responsible for any alleged damage resulting from sediment buildup or any other alleged cause. With that said, we would point out that the current scope includes the removal of sediment accumulated in the existing ditch at the base of the slope, and the BWS will remove the sediment buildup at the base of the slope. The primary purpose of this EA is to assess the environmental impacts of the proposed corrective measures.

8. "Adequate measures should be taken to prevent silt from flowing into the ditch during and after construction."

The contractor will implement Best Management Practices to install a silt fence, sediment trap, and an erosion control mat during construction. The contractor will periodically remove any silt to prevent any buildup in the ditch. The BWS will perform periodic inspection and maintenance to prevent silt and sediment buildup at the ditch after construction.

As requested, we will provide a copy of the final environmental assessment, construction plans and specifications when available.

Thank you for participating in the environmental review process.

If you have any questions, please contact Michael Domion at 748-5740.

Sincerely,



WAYNE M. HASHIRO, P.E.
Manager and Chief Engineer

Enclosure

cc: ✓Howard K. Endo (SEY Engineers)