FILE COPY

ALAN M. ARAKAWA
Mayor

DAVID C. GOODE
Director

ROWENA M. DAGDAG-ANDAYA
Deputy Director

Telephone: (808) 270-7745
Fax: (808) 270-7975

GLEN A. UENO, P.E., P.L.S.
Development Services Administration

CARY YAMASHITA, P.E.
Engineering Division

LESLI L. OTANI, P.E., L.S.
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

February 16, 2017

MAR 08 2017

RECEIVED
'17 FEB 23 P2:54
OFC. OF ENVIRONMENTAL QUALITY CONTROL

Mr. Scott Glenn, Director
State of Hawaii
Department of Health
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Mr. Glenn:

With this letter, the County of Maui, Department of Public Works, hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFNSI) for the Proposed Napili Culvert Replacement Project situated at TMK (2)4-3-001:003(por.), (2)4-3-002:023(por.), and County Right-of-Way, in the Lahaina District on the island of Maui for publication in the next available edition of the Environmental Notice.

Enclosed is a completed OEQC Publication Form, one (1) copy of the DEA-AFONSI, 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 the action in a text file by electronic mail to your office.

If there are any questions, please contact Mr. John Smith of the Engineering Division of the Department of Public Works at (808) 270-5541.

Sincerely,

DAVID C. GOODE
Director of Public Works

DCG/JS (ED17-118)

Enclosures

cc: John Smith, Department of Public Works (w/one copy)
Mike Silva, Fukumoto Engineering (w/one copy)
Gwendolyn Rivera, Munekiyo Hiraga

s:\eng\projects\02 cip\2015\15-19 napili 4-5 culvert replacement\b correspondence\oeqc fonsiltr.dea-rev021617.doc

17:373

AGENCY
PUBLICATION FORM

Project Name:	Proposed Napili Culverts Replacement
Project Short Name:	Proposed Napili Culverts Replacement
HRS §343-5 Trigger(s):	Use of County Lands and County Funds
Island(s):	Maui
Judicial District(s):	Lahaina
TMK(s):	(2)4-3-001:003, (2)4-3-002:023, County Right-of-Way
Permit(s)/Approval(s):	Special Management Area Exemption or Minor Permit
Proposing/Determining Agency:	County of Maui, Department of Public Works
Contact Name, Email, Telephone, Address	John Smith Phone: 270-5541 Email: John.Smith@co.maui.hi.us 200 South High Street, 4th Floor Wailuku, Hawai'i 96793
Accepting Authority:	(for EIS submittals only)
Contact Name, Email, Telephone, Address	
Consultant:	Munekiyo Hiraga
Contact Name, Email, Telephone, Address	Gwendolyn Rivera Email: planning@munekiyohiraga.com Phone: (808) 244-2015 305 High Street, Suite 104 Wailuku, Hawai'i 96793

Status (select one)	**Submittal Requirements**
_X_ DEA-AFNSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
____ FEA-FONSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the proposing agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.

____ FEIS Acceptance Determination	The accepting authority simultaneously transmits to both the OEQC and the proposing agency a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
FEIS Statutory Acceptance	Timely statutory acceptance of the FEIS under Section 343-5(c), HRS, is not applicable to agency actions.
____ Supplemental EIS 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 or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____ Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
____ Other	Contact the OEQC if your action is not one of the above items.

Project Summary
Provide a description of the proposed action and purpose and need in 200 words or less.

The County of Maui, Department of Public Works (DPW) proposes a drainage replacement project in Nāpili to address the erosion and deterioration of two (2) existing 90-inch by 40-inch box culverts located under Lower Honoapi'ilani Road between Nāpili Place and Hui Drive. The proposed project involves removal of the existing box culverts and replacement with two (2) new 8-foot by 5-foot precast box drainage culverts. The proposed work will also include installation of associated inlet and outlet structures; open concrete mat material (Armor Flex or approved equal) within a portion of the mauka (south) drainageway; ungrouted riprap on the makai (north) side of the drainageway; and a retaining wall along the adjacent property to the west of the drainageway. The existing channel will be regraded to reduce erosion and improve water quality downstream of the proposed replacement culverts. Native planting material will be incorporated into the vegetated portions of the project. The project will incorporate sidewalk and roadway improvements, including widening a portion of Lower Honoapi'ilani Road in the project area from 22 feet to 38 feet. Additionally, the project will entail removal and replacement of a Department of Water Supply (DWS) water line and Department of Environmental Management (DEM) sewer force mains.

Draft Environmental Assessment

PROPOSED NĀPILI CULVERTS REPLACEMENT PROJECT

(TMK (2)4-3-001:003 (por.), (2)4-3-002:023 (por.) and County Right-of-Way (Job No. 15-19))

Prepared for:

County of Maui,
Department of Public Works

Approving Agency:

County of Maui,
Department of Public Works

February 2017

Copyright © 2017,
by Munekiyo Hiraga

Draft Environmental Assessment

PROPOSED NĀPILI CULVERTS REPLACEMENT PROJECT

(TMK (2)4-3-001:003 (por.), (2)4-3-002:023 (por.) and County Right-of-Way (Job No. 15-19))

Prepared for:

County of Maui,
Department of Public Works

Approving Agency:

County of Maui,
Department of Public Works

February 2017

Copyright © 2017,
by Munekiyo Hiraga

MUNEKIYO HIRAGA

CONTENTS

List of Figures

List of Appendices

List of Acronyms

AFONSI	Anticipated Finding of No Significant Impact
ALISH	Agricultural Lands of Importance to the State of Hawai'i
AMSL	Above Mean Sea Level
BMPs	Best Management Practices
cf	Cubic Feet
cfs	Cubic Feet Per Second
CRM	Cement Rubble Masonry
CZM	Coastal Zone Management
DA	Department of Army
DEM	Department of Environmental Management
DOE	Department of Education
DOH	Department of Health
DPW	Department of Public Works
DWS	Department of Water Supply
EA	Environmental Assessment
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
HAR	Hawai'i Administrative Rules
HRS	Hawai'i Revised Statutes
km	kilometer
LCA	Land Commission Award
LCC	Lahaina Civic Center
LSB	Land Study Bureau
LWRF	Lāhainā Wastewater Reclamation Facility
MECO	Maui Electric Company, Ltd.
MG	Million Gallons
mgd	Million Gallons per Day
MIP	Maui Island Plan
MLP	Maui Land and Pineapple Company, Inc.
NPDES	National Pollutant Discharge Elimination System
OHWM	Ordinary High Water Mark
rRS	Rough Broken and Stony land
RGB	Rural Growth Boundary
ROW	Right-of-Way
SCAP	Stream Channel Alteration Permit
SCS	Scientific Consultant Services, Inc.
SHPD	State Historic Preservation Division
SMA	Special Management Area
SRB	Small Town Boundary
TMK	Tax Map Key
UGB	Urban Growth Boundary
UH-MC	University of Hawai'i – Maui College
USDA	U. S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Executive Summary

Project Name:	Proposed Nāpili Culverts Replacement Project
Type of Document:	Draft Environmental Assessment
Legal Authority:	Chapter 343, Hawai'i Revised Statutes (HRS)
Chapter 343, HRS "Trigger":	Use of County funds and County roadway
Agency Determination	Anticipated Finding of No Significant Impact (AFONSI)
Location:	Island of Maui Nāpili TMK No.: (2)4-3-001:003 (por.), (2)4-3-002:023 (por.), and County Right-of-Way
Applicant:	County of Maui Department of Public Works 200 South High Street, 4th Floor Wailuku, Hawai'i 96793 Contact: John Smith Phone: (808) 270-5541
Proposing and Determining Agency:	County of Maui Department of Public Works 200 South High Street, 4th Floor Wailuku, Hawai'i 96793 Contact: David Goode Phone: (808) 270-7845
Consultant:	Munekiyo Hiraga 305 High Street, Suite 104 Wailuku, Hawai'i 96793 Contact: Cheryl K. Okuma, Senior Associate Phone: (808) 244-2015
Project Summary:	The proposed project area contains an existing culvert that is located along Lower Honoapi'ilani Road and is located between the intersections of Nāpili Place/Lower Honoapi'ilani Road and Hui Drive/Lower Honoapi'ilani Road. The proposed project involves

work in the culvert area and small areas above and below Honoapi'ilani Road that totals less than an acre in size. The proposed project involves the removal of the existing two (2) 90-inch by 40-inch box culverts and replacement with two (2) new 8-foot wide by 5-foot high precast box drainage culverts that will pass under Lower Honoapi'ilani Road. Additionally, the proposed work includes replacement of guardrails and a 6-foot high chain link fence, installation of open concrete mat material (Armor Flex or approved equal) within a mauka (south) portion of the drainageway, ungrouted rip rap on the makai (north) portion of the drainageway, and road improvements, such as increasing a portion of the road width from approximately 22 feet to 38 feet, extending the existing sidewalk on the makai side of Lower Honoapi'ilani Highway in the vicinity of the culvert crossing, and installation of curb and gutter, drainline, and new drainage catch basin on the northwest side of the road. A new retaining wall approximately three (3) feet high and 20 feet long is proposed along the east boundary of the drainageway on the makai portion. Excavation work will extend 15 to 20 feet down to the new culvert. The area of grading for the project is contained within an area that is approximately 0.66 acre. Native plantings will be incorporated into the vegetated portions of the project.

There is an existing County of Maui, Department of Water Supply (DWS) waterline that is located in the vicinity of the proposed improvements. The proposed project will also involve the replacement and relocation of said waterline in coordination with DWS. The existing Department of Environmental Management (DEM) 14-inch force main in the right-of-way (ROW) will be removed, as two (2) replacement sewer force mains will be installed by DEM. The proposed project will involve removal and replacement of the two (2) sewer force mains. One (1) overhead utility pole on the north side of the project area will be moved to a location in the near vicinity and this activity will be coordinated with Maui Electric Company, Ltd. Proposed work that affects utilities will be coordinated with the appropriate agencies (e.g., DWS, DEM, Maui Electric Company, Ltd.) and Department of Public Works (DPW).

The proposed project will affect Tax Map Keys (TMK): (2)4-3-001:003 (por.) (Parcel 3); (2)4-3-002:023 (por.)

(Parcel 23), and 40-foot County ROW. Parcel 3 and Parcel 23 are owned by the State of Hawai'i and Parcel 3 is under the control and management of the DPW by Executive Order 3277 from the State. The 40-foot County ROW is under the jurisdiction of DPW.

The State Land Use District designation for Parcel 3 is "Agricultural", for Parcel 23 is "Urban", and County ROW is "Urban" and "Agricultural". The Community Plan designation for Parcel 3 is "Park" and for Parcel 23 is "Open Space", and County ROW is "Multi-Family Residential". The Maui County zoning for Parcel 3 is "Agricultural", Parcel 23 is zoned "Nāpili Bay Civic Improvement" district, and County ROW is zoned "Interim" district. The proposed improvements are a permitted use in all zoning districts.

PROJECT OVERVIEW

I. PROJECT OVERVIEW

A. PROPERTY LOCATION, EXISTING USE, AND LAND OWNERSHIP

The County of Maui, Department of Public Works (DPW) proposes a drainage replacement project in Nāpili in order to address the erosion on the makai (west) side of an existing culvert. Access to the site will be provided via Lower Honoapi'ilani Highway. See **Figure 1** and **Figure 2**. Lower Honoapi'ilani Road is a two-lane coastal roadway under the jurisdiction of the County of Maui and has a variable right-of-way (ROW) ranging from 40 feet to 60 feet. Extending approximately 5.0 miles, Lower Honoapi'ilani Road begins at its intersection with Honoapi'ilani Highway, makai of the County's Lāhainā Wastewater Reclamation Facility, and proceeds in a northerly direction to its terminus within the Kapalua Resort.

The proposed project will affect Tax Map Key (TMK): (2)4-3-001:003 (por.) (Parcel 3); (2)4-3-002:023 (por.) (Parcel 23), and 40-foot County ROW. Parcel 3 and Parcel 23 are owned by the State of Hawai'i. Parcel 3 is under the control and management of DPW by Executive Order from the State. The State Land Use District designation for Parcel 3 is "Agricultural", for Parcel 23 is "Urban", and County ROW is "Urban" and "Agricultural". The Community Plan designation for Parcel 3 is "Park", for Parcel 23 is "Open Space", and for the County ROW is "Multi-Family Residential". The Maui County zoning for Parcel 3 is "Agricultural", for Parcel 23 the zoning is "Nāpili Bay Civic Improvement" district, and County ROW is zoned "Interim" district.

The project area upstream of the culvert includes a grassy lot with a narrow drainageway located below the existing Nāpili 4/5 Drainage Basin Structure No. 2 which is located 200 feet mauka of Lower Honoapi'ilani Road. The basin includes an 18.5-foot high by 262-foot earth embankment dam, a 13.5-foot wide concrete crest on top of the dam and 12-inch outlet drain through the dam. The drainage basin was designed as a sediment settling basin. See **Appendix "A"**, Drainage Report. The project area within Lower Honoapi'ilani Road includes a paved roadway and a sidewalk on the northeast side of the culvert. Concrete walls extend above the pavement from the inlet and outlet sides of the culvert. The walls provide 22 feet of travel lane across the top of the culvert. Elevations along the roadway are relatively flat and range from 28 feet above mean sea level (AMSL) to 32 feet AMSL. See **Figure 3** and refer to **Appendix "A"**.

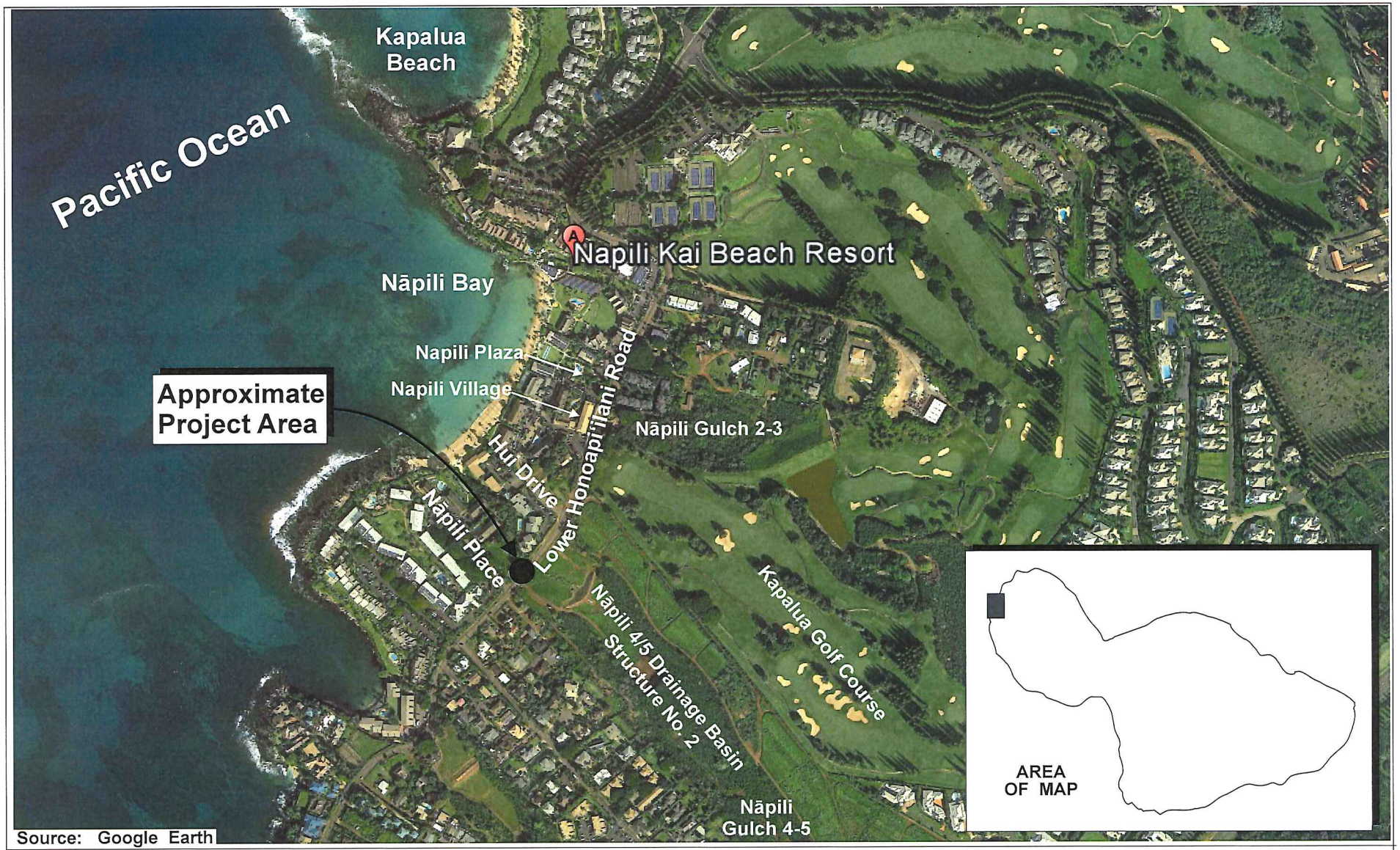


Figure 1

Nāpili Culverts Replacement Project

Regional Location Map

NOT TO SCALE

MUNEKIYO HIRAGA

Prepared for: County of Maui, Department of Public Works

FE\DPW Napili Culvert\Applications\Figures\Regional Location.DEA

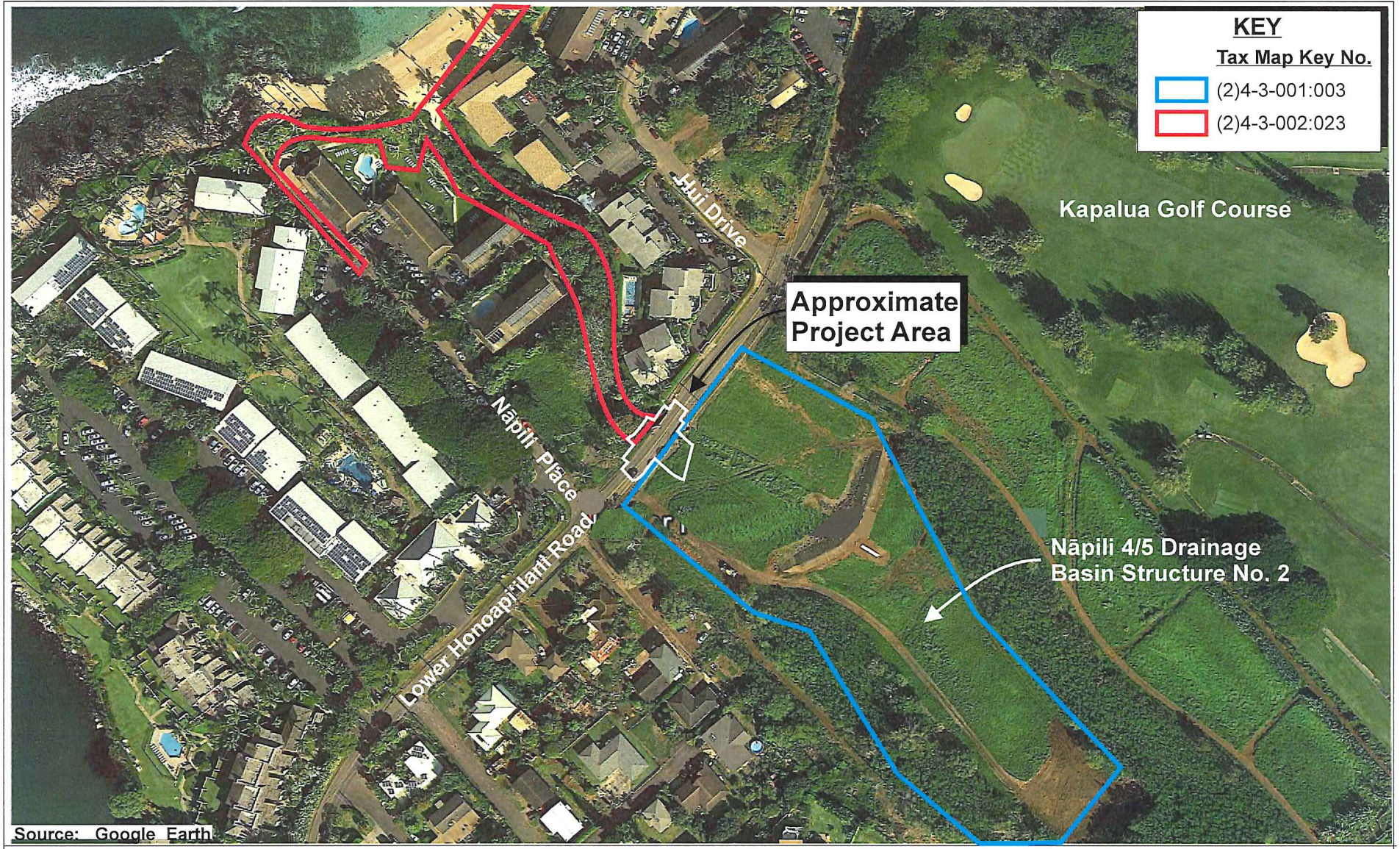


Figure 2

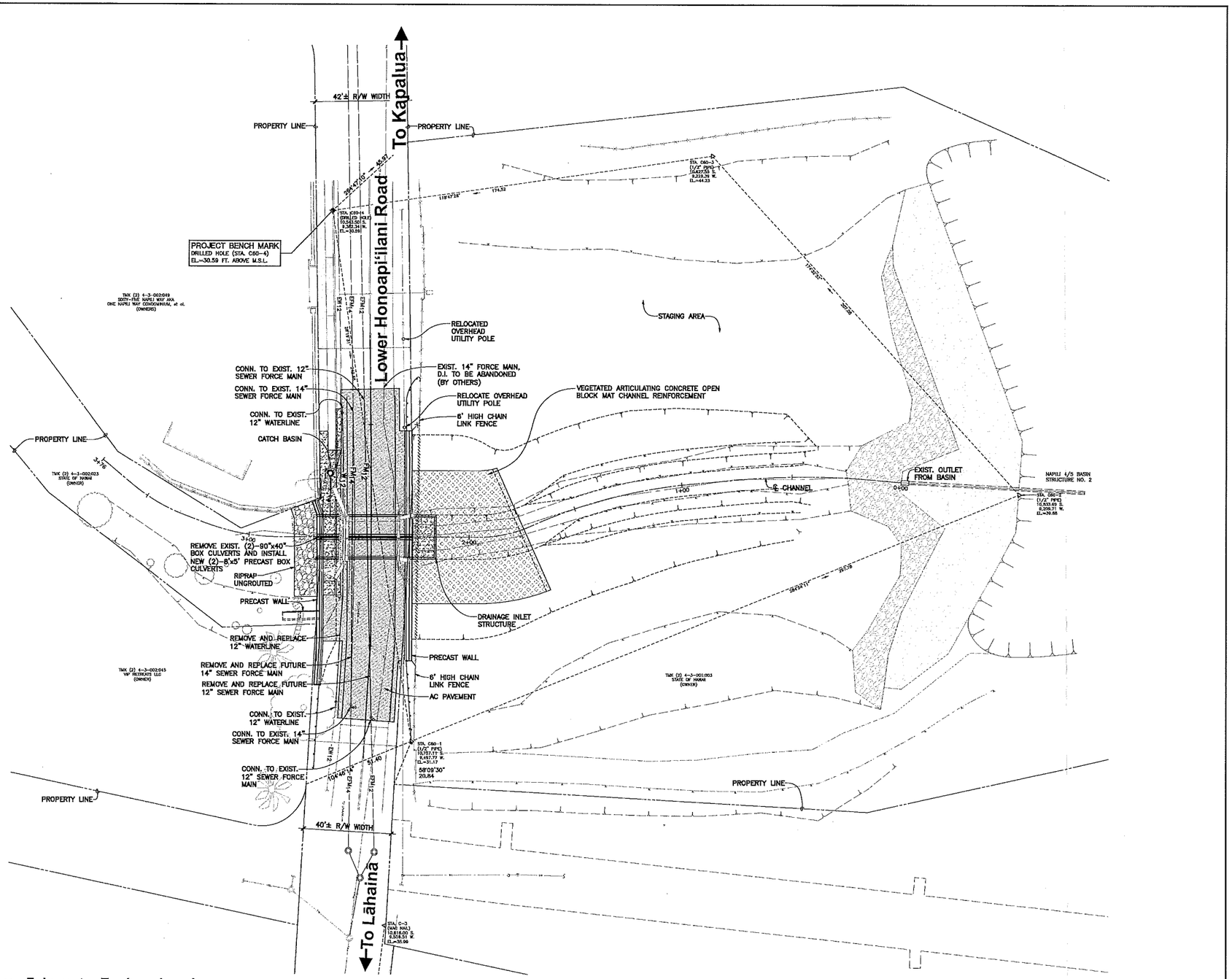
Nāpili Culverts Replacement Project
Site Location Map

NOT TO SCALE

MUNEKIYO HIRAGA

Prepared for: County of Maui, Department of Public Works

FE\DPW Napili Culvert\Applications\Figures\Site Location Map.DEA



Source: Fukumoto Engineering, Inc.

Figure 3

Nāpili Culverts Replacement Project
Site Plan

NOT TO SCALE

Prepared for: County of Maui, Department of Public Works

MUNEKIYO HIRAGA

FE\DPW Napili Culvert\Applications\Figures\Site Plan.DEA

The proposed project area contains two (2) existing 90-inch by 40-inch box culverts that are located under Lower Honoapi'ilani Road and is located between the intersections of Nāpili Place/Lower Honoapi'ilani Road and Hui Drive/Lower Honoapi'ilani Road. The proposed project involves work in the culvert area, small areas above and below Lower Honoapi'ilani Road that totals less than an acre in size, and water, and sewer utility improvements. Refer to **Figure 2** and **Figure 3**.

The project area downstream includes the drainageway, a vertical-face retaining wall to the northeast, and a vegetated slope to the southwest. The invert at the culvert outlet is about 24 feet AMSL. Stormwater drops vertically about 16 feet to an elevation of 8 feet AMSL which causes scouring and erosion at the bottom of the drainageway. Refer to **Appendix "A"**.

The proposed culvert replacement project runs along and under Lower Honoapi'ilani Road between Hui Drive and Nāpili Place.

The project area is located within the County of Maui's Special Management Area (SMA). A SMA Assessment application for an exemption or Minor Permit will be submitted to the County of Maui, Department of Planning for the drainage system replacement improvements. As the proposed project also involves activities within a drainageway, a U.S. Army Corps of Engineers Department of Army (DA) Nationwide Permit, State of Hawai'i Department of Health (DOH) Section 401 Water Quality Certification, and State of Hawai'i Department of Land and Natural Resources Stream Channel Alteration Permit (SCAP) permits and approvals will also need to be obtained prior to construction. As a DA Permit may be involved for the proposed project, Section 106 consultation will be conducted as per the National Historic Preservation Act.

B. PROJECT NEED

The DPW proposes a drainage culverts replacement project in Nāpili (West Maui) in order to address the erosion on the makai (west) side of the existing culverts. There is evidence of undermining of the embankment and channel erosion on the makai side of the culverts. As such, DPW has determined that the culverts and associated headwalls downstream of the culverts are in a deteriorated condition and nearing the end of useful life.

C. PROPOSED ACTION

The proposed project involves the removal of the existing two (2) 90-inch by 40-inch box culverts and replacement with two (2) new 8-foot by 5-foot precast box drainage culverts that will pass under Lower Honoapi'ilani Road with associated inlet and outlet structures, and regrading the area upstream and downstream of the culvert. Additionally, the proposed work includes replacement of guardrails and a 6-foot high chain link fence,

installation of open concrete mat material (Armor Flex or approved equal) within a portion of the mauka (south) drainageway, ungrouted rip rap on the makai (north) side of the drainageway, and installation of a retaining wall along the adjacent property to the west of the drainageway. The Armor Flex (or approved equal) material is proposed for an area approximately 3,000 square feet in size. The proposed retaining wall will be approximately three (3) feet high and approximately 20 feet long. Project improvements also involve extending the existing sidewalk on the makai side of Lower Honoapi'ilani Highway in the vicinity of the culvert crossing. Road improvements include increasing a portion of the road width from approximately 22 feet to 38 feet, installation of asphalt pavement, shoulder widening, sidewalk, fall protection railing, vehicle barriers, curb and gutter, drainage catch basin, 18-inch drainline connection and reinstallation of water and wastewater lines that cross above the new culvert. Excavation work will extend 15 to 20 feet down to the new culvert. The area of grading for the project is contained within an area that is approximately 0.66 acre. The existing channel from the drainage basin to the new culvert will be regraded to increase capacity of the improvements to accommodate peak discharge rates of the design storm. Native planting material will be incorporated into the vegetated portions of the project.

There is an existing County of Maui, Department of Water Supply (DWS) waterline that is located in the vicinity of the proposed improvements. The proposed project will also involve the replacement and relocation of said waterline in coordination with DWS. The existing Department of Environmental Management (DEM) 14-inch sewer force main in the ROW will be removed, as two (2) replacement sewer force mains will be installed by DEM. The proposed project will now be removing and replacing the two (2) sewer force mains installed by DEM. Proposed work that affects utilities will be coordinated with the appropriate agencies (e.g. DWS, DEM, Maui Electric Company, Ltd.) and DPW. One (1) overhead utility pole on the north side of the project area will be moved to a location in the near vicinity and this activity will be coordinated with Maui Electric Company, Ltd.

Preliminary development plans for the proposed culverts replacement project, including the traffic control plan during construction, are provided in **Appendix "B"**, Sheet C-8 of this EA document.

D. PROJECT COSTS AND IMPLEMENTATION

The cost of the proposed project is estimated to be $3,210,800.00. Construction of the project would begin upon receipt of all permits and approvals and take approximately six (6) to nine (9) months to complete.

E. CHAPTER 343, HAWAI'I REVISED STATUTES (HRS) REQUIREMENTS

As the proposed improvements will be funded by the County of Maui and involves the work within the County's Lower Honoapi'ilani Road, a Hawai'i Revised Statutes (HRS)

Chapter 343 Environmental Assessment review is triggered. The DPW has determined that environmental disclosure pursuant to Chapter 343, HRS is appropriate to facilitate public and agency input to the project proposal. Therefore, this Environmental Assessment (EA) is being prepared pursuant to Title 11, Chapter 200, Environmental Impact Statement Rules, Hawai'i Administrative Rules (HAR), to evaluate the proposed project's technical characteristics, environmental and socio-economic impacts, and alternatives, as well as to advance findings relative to the significance of the project's potential impacts and proposed mitigation measures. The Proposing and Determining Agency for the EA is the DPW.

DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

II

II. DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

A. PHYSICAL SETTING

1. Surrounding Land Uses

a. Existing Conditions

Lower Honoapi'ilani Road runs along the coast from Kā'anapali to Kapalua. The West Maui region is known for its resort destinations as well as agricultural lands. Lāhainā Town, once the capitol of Hawai'i and a portion now designated as a National Historic Landmark District, is located south of the project corridor. A number of internationally recognized hotels and golf courses are located in the resort regions of Kā'anapali and Kapalua.

The proposed Nāpili Drainage Culverts Replacement project is located along Lower Honoapi'ilani Road within the Nāpili Gulch. The project area is located within a resort and residential West Maui community which is downstream of a flood control retention basin that drains into Nāpili Bay. The project area contains the existing culverts along Lower Honoapi'ilani Road and small areas above and below the road that total less than an acre. The project area is located approximately 800 feet from the ocean at elevations ranging from 8 feet to 32 feet above sea level. Refer to **Appendix "B"**. The Kapalua Golf Course lies to the northeast of the project area. To the north of the project site is Nāpili Bay and beyond is Kapalua Beach. Nearby and southwestward of the project area on the coastal strip are resorts, condominiums, residences, and commercial establishments (Nāpili Village and Nāpili Plaza).

b. Potential Impacts and Mitigation Measures

The proposed project involves the removal of the two (2) existing 90-inch by 40-inch box culverts and replacement with two (2) new 8-foot by 5-foot pre-cast drainage culverts and related improvements. The construction of the proposed improvements will improve the existing Department of Public Works (DPW) drainage system in the area by replacing existing culverts which have been determined to be nearing the term of use as well as associated improvements related to the culvert replacement.

As such, significant adverse impacts to surrounding land uses are not anticipated as a result of the proposed work.

2. Climate

a. Existing Conditions

Like most areas of Hawai'i, Lāhainā's climate is relatively uniform year-round. Lāhainā's tropical latitude, its position relative to storm tracts and the Pacific anticyclone, and the surrounding ocean combine to produce this stable climate. Variation in climate among different regions on Maui is largely left to local terrain.

Daily temperatures in Lāhainā range between an average low of 69 degrees and a high 82 degrees Fahrenheit. Temperature data collected at the Kapalua-West Maui Airport station show that on average December is the coolest month with an average temperature of 72.7 degrees and September as the warmest month at 80.6 degrees (County of Maui, Office of Economic Development, 2014).

Rainfall in Lāhainā is highly seasonal, with most precipitation occurring between December and January when winter storms hit the area. Situated on the leeward side of the West Maui Mountains, this region receives most of its rainfall in late afternoon and early evening, after sea breezes take moisture upslope during the day. Precipitation data collected at the Kapalua-West Maui Airport station show that, on average, January is the wettest month with 3.15 inches of precipitation, while June is the driest with just 0.08 inch (County of Maui, Office of Economic Development, 2014).

b. Potential Impacts and Mitigation Measures

The proposed project is limited to construction of a replacement drainage culvert system which involves two (2) new pre-cast box culverts that will pass under Lower Honoapi'ilani Road, replacement of guardrails, a new 6-foot high chainlink fence, installation of open concrete mat material (Armor Flex or approved equal) with a portion of the mauka (south) drainageway, ungrouted rip rap on the makai (north) side of the drainageway, and installation of a retaining wall along the adjacent property to the west of the drainageway. The Armor Flex (or approved equal) material is proposed for an area approximately 3,000 square feet in size. The proposed retaining wall will be approximately three (3) feet high and approximately 20 feet long. Project improvements also involve extending the existing sidewalk in the vicinity of the culvert crossing and

road improvements including asphalt pavement, shoulder widening, sidewalk, fall protection railing, vehicle barriers, curb and gutter, drainage catch basin, drainline, and reinstallation of water and wastewater lines. As such, significant adverse impacts to climatic conditions are not anticipated as a result of the proposed project.

3. Agricultural Lands

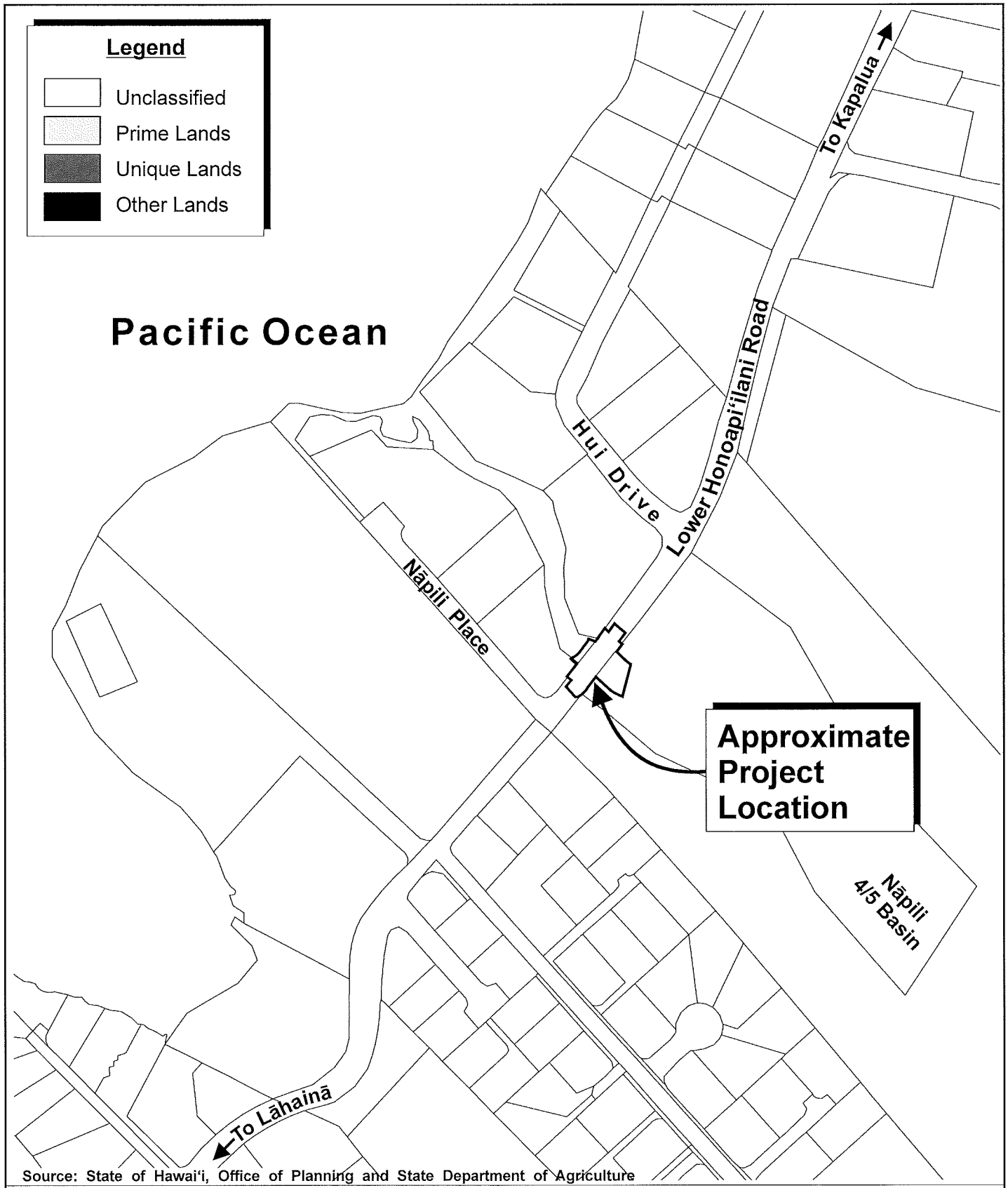
a. Existing Conditions

In 1977, the State of Hawai'i, Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawai'i (ALISH), based primarily, though not exclusively, on soil characteristics of the underlying land. The three (3) classes of ALISH lands are "Prime", "Unique", and "Other Important" agricultural land, with the remaining non-classified lands termed "Unclassified". When utilized with modern farming methods, "Prime" agricultural lands have soil quality, growing season, and moisture supply needed to produce sustained crop yields economically; while "Unique" agricultural lands contain a combination of soil quality, growing season, and moisture supply to produce sustained yields of a specific crop. "Other Important" agricultural lands include those important agricultural lands that have not been rated as "Prime" or "Unique".

The project site is located on lands that are designated as "unclassified" by the ALISH map. See **Figure 4**.

Additionally, the University of Hawai'i, Land Study Bureau (LSB) developed the Overall Productivity Rating, which classified soils according to five (5) levels, with "A" representing the class of highest productivity soils and "E" representing the lowest. The LSB classification lands underlying the proposed project site is "E", representing the lowest productivity soils. See **Figure 5**.

The project site was previously developed and contains existing culverts proposed for removal and replacement within the Nāpili Gulch, as well as small portions of areas makai (north) and mauka (south) of Lower Honoapi'ilani Road. The project site and immediate surrounding areas makai of the road were previously disturbed with no active agricultural activities. Mauka (east) of the road will be affected by the proposed project to a limited extent and confined to a small area.



Source: State of Hawai'i, Office of Planning and State Department of Agriculture

Figure 4 Nāpili Culverts Replacement Project

Agricultural Lands of Importance to the State of Hawai'i Map

0 125 Feet
62.5 250

Prepared for: County of Maui, Department of Public Works

MUNEKIYO HIRAGA

FE/DPW Napili Culvert/Applications/Figures/ALISH Map.DEA

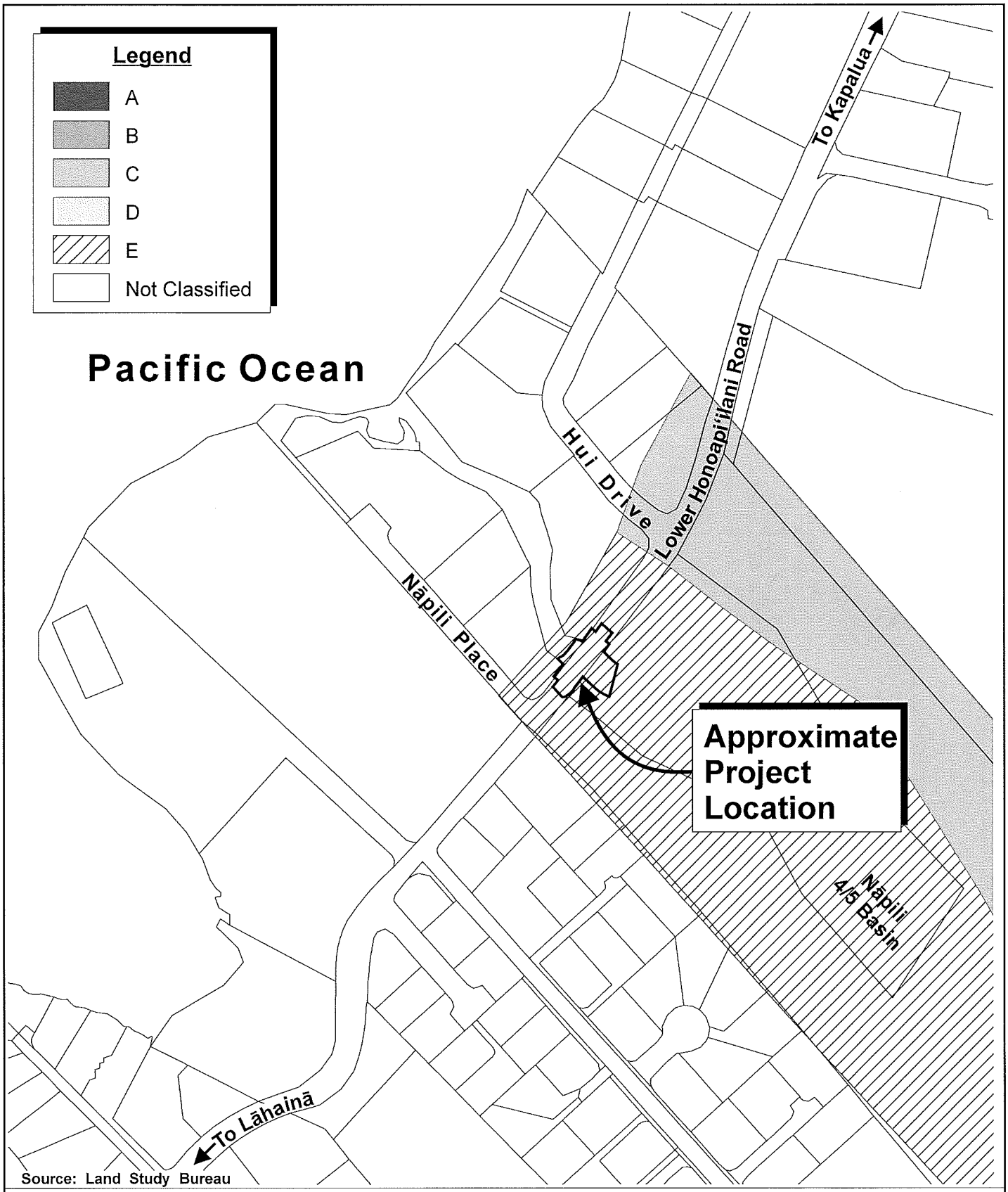


Figure 5 Nāpili Culverts Replacement Project

Land Study Bureau Map

0 125 Feet

62.5 250

Prepared for: County of Maui, Department of Public Works

MUNEKIYO HIRAGA

FE/DPW Napili Culvert/Applications/Figures/LSB Map.DEA

b. Potential Impacts and Mitigation Measures

The project area, which is less than an acre, was previously disturbed for the existing culverts and road infrastructure and is located in an area with the lowest productivity rating for soils per the LSB. As such, significant adverse impacts to agricultural productivity are not anticipated as a result of the proposed project.

4. Topography and Soils Characteristics

a. Existing Conditions

Elevations in the project area along the roadway are relatively flat and range from 28 feet above mean sea level (AMSL) to 32 feet AMSL.

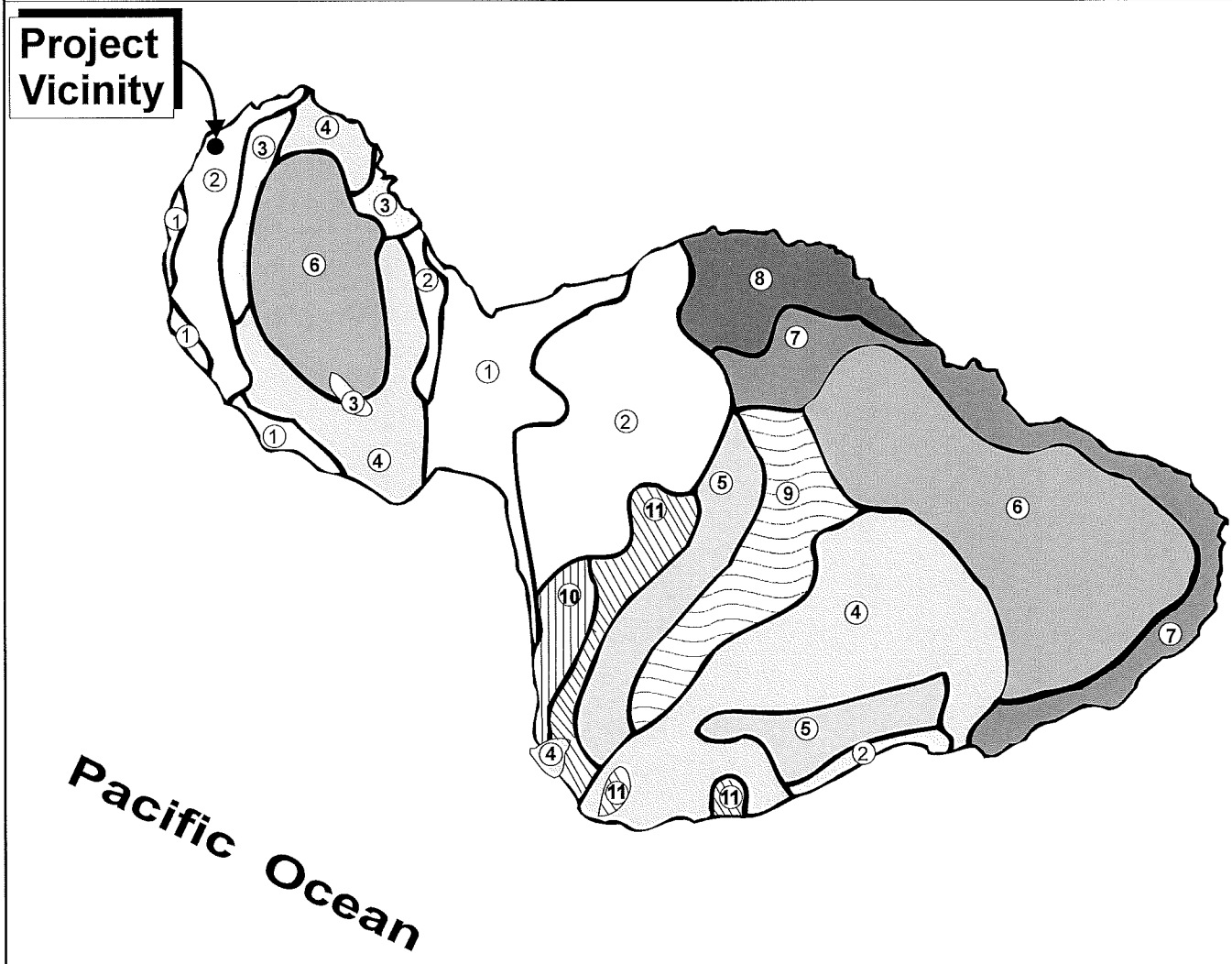
The project area upstream of the culvert includes a grassy lot with a narrow drainageway located below the existing Nāpili 4/5 Basin Structure No. 2. Elevations range from about 32 feet AMSL to 25 feet AMSL. The project area downstream includes the drainageway, a vertical-face retaining wall to the northeast, and a vegetated slope to the southwest. The invert at the culvert outlet is about 24 feet AMSL. Refer to **Appendix "B"**, Preliminary Project Plans. Stormwater drops vertically about 16 feet to an elevation of eight (8) feet AMSL which causes scouring and erosion at the bottom of the drainageway. Elevations along the vegetated slope to the southwest range from about 14 feet AMSL to 26 feet AMSL. Refer to **Appendix "A"** and **Appendix "B"**.

The project site consists of soils within the Waiakoa-Keahua-Molokai association, which is found on low uplands and is characterized by moderately deep and deep, nearly level to moderately steep, well-drained soils that have a moderately fine textured subsoil (U.S. Department of Agriculture (USDA, 1972). See **Figure 6**. Underlying the project site is rough broken and stony (rRS) land which consists of very steep and stony gulches. Runoff is rapid and geologic erosion is active. Soil materials is less than 20 inches deep above saprolite or bedrock. See **Figure 7**.

This land type is used for pasture wildlife habitat and watershed. The dominant natural vegetation consists of lantana, koa haole, klu, feather finger grass, bermuda grass, and ilima (USDA, 1972).

LEGEND

- ① Pulehu-Ewa-Jaucas association
- ② Waiakoa-Keahua-Molokai association
- ③ Honolua-Olelo association
- ④ Rock land-Rough mountainous land association
- ⑤ Puu Pa-Kula-Pane association
- ⑥ Hydrandepts-Tropaquods association
- ⑦ Hana-Makaalae-Kailua association
- ⑧ Pauwela-Haiku association
- ⑨ Laumaia-Kaipoipoi-Olinda association
- ⑩ Keawakapu-Makena association
- ⑪ Kamaole-Oanapuka association



Map Source: USDA Soil Conservation Service

Figure 6 Nāpili Culverts Replacement Project
Soil Association Map

NOT TO SCALE

Prepared for: County of Maui, Department of Public Works

MUNEKIYO HIRAGA

FE\DPW Napili Culvert\Applications\Figures\Soil Association.DEA

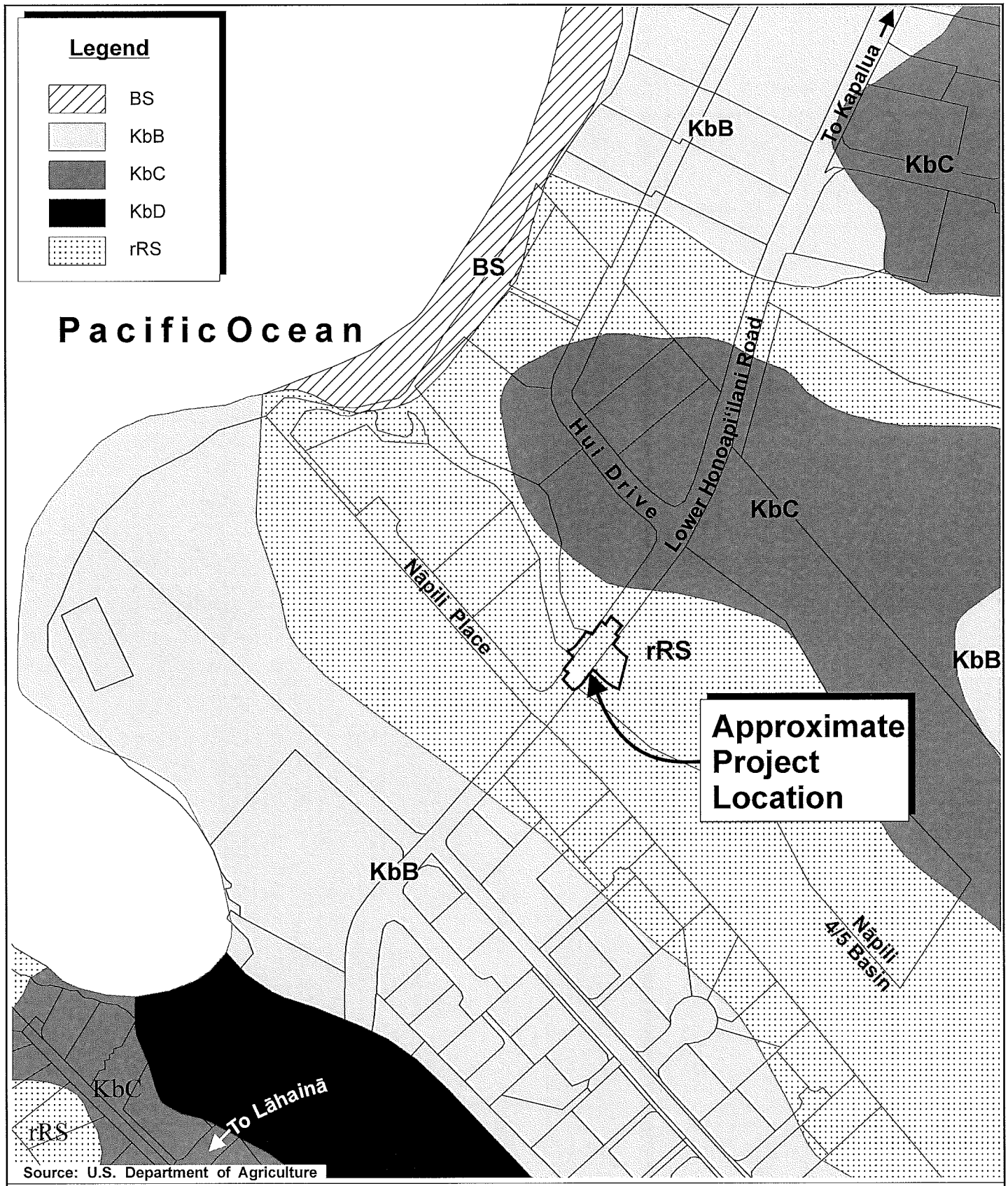


Figure 7 Nāpili Culverts Replacement Project

Soil Classification Map

0 125 Feet
62.5 250

Prepared for: County of Maui, Department of Public Works

MUNEKIYO HIRAGA

FE/DPW Napili Culvert/Applications/Figures/Soil Classification.DEA

b. Potential Impacts and Mitigation Measures

Due to the potential erosion undermining the existing culvert structure, DPW has determined that there is a need to replace the existing culverts with a new culvert system.

The proposed culvert replacements and related improvements project will be developed within a previously graded area for the existing culvert system and road infrastructure. Significant adverse impacts to underlying soil conditions and topography are not anticipated from the proposed project.

During the construction phase, temporary erosion control measures will be implemented to minimize soil loss and erosion hazards. Best Management Practices (BMPs) that may be utilized include silt fences, dust fences, inlet protection, stabilized construction entrances and truck wash-down areas. Periodic spraying of loose soils will also be implemented for dust control. Temporary drainage measures, such as, but not limited to, temporary drainline bypass and permeable berm ditch guards will be implemented to control erosion, prevent adverse impact to downstream properties, and return water to the natural drainage course to minimize sedimentation or other pollution to the maximum extent practicable. Disturbed areas that will not be re-disturbed for 21 days or more will be stabilized (grassed or graveled). Control measures shall be in accordance with an approved erosion control plan. Refer to **Appendix "B"**, Sheet C-3 and Sheet C-4.

Upon completion of construction, adverse impacts to topography or soil characteristics are not anticipated.

5. Flood and Tsunami Hazards

a. Existing Conditions

The project site is located near the western base of the West Maui Mountains and north of the Lāhainā and Honokōwai communities. The existing drainage basin above the project site includes an 18.5-foot high by 262-foot long earthen embankment dam, a 13.5-foot wide concrete crest on top of the dam, and a 12-inch outlet drainline through the dam. The bottom of the 12-inch outlet drainline is set approximately six (6) feet above the bottom of the basin. The total storage volume of the basin is roughly 1,080,000 cubic feet (cf) or 24.8 acre-feet. Refer to **Appendix "A"**. The area that drains into the site is 553 acres with a peak flow of

743 cubic feet per second (cfs) from a 100-year design storm. The existing drainage basin was designed as a sediment settling basin, and only reduces the peak flow of 100-year design storm to 734 cfs.

Storm runoff passes under Lower Honoapi'ilani Road through two (2) 90-inch by 40-inch box culverts. Allowing for one (1)-foot of freeboard (maximum stormwater height to the top of the road surface), the existing culverts are capable of conveying approximately 250 cfs. After passing through the culverts, storm runoff travels through a gulch to the ocean. The Nāpili Bay and Beach Foundation condominium managers have informed Fukumoto Engineering, Inc., DPW's consultant for the project, that heavy flooding overtops the dam, exceeds the capacity of the culvert at Lower Honoapi'ilani Road, and erodes the gulch downstream about every two (2) years. Refer to **Appendix "A"**.

As indicated by the Flood Insurance Rate Map for the County of Maui, the project site is located within Zone AE. The Zone AE designation corresponds to areas of high flooding risk and provides for base flood elevations of 21 feet to 32 feet. A Flood Development Permit will be obtained from the Department of Planning prior to project construction, as applicable. See **Figure 8**.

The project site is located approximately 800 feet from the coast and is within the tsunami inundation zone. See **Figure 9**.

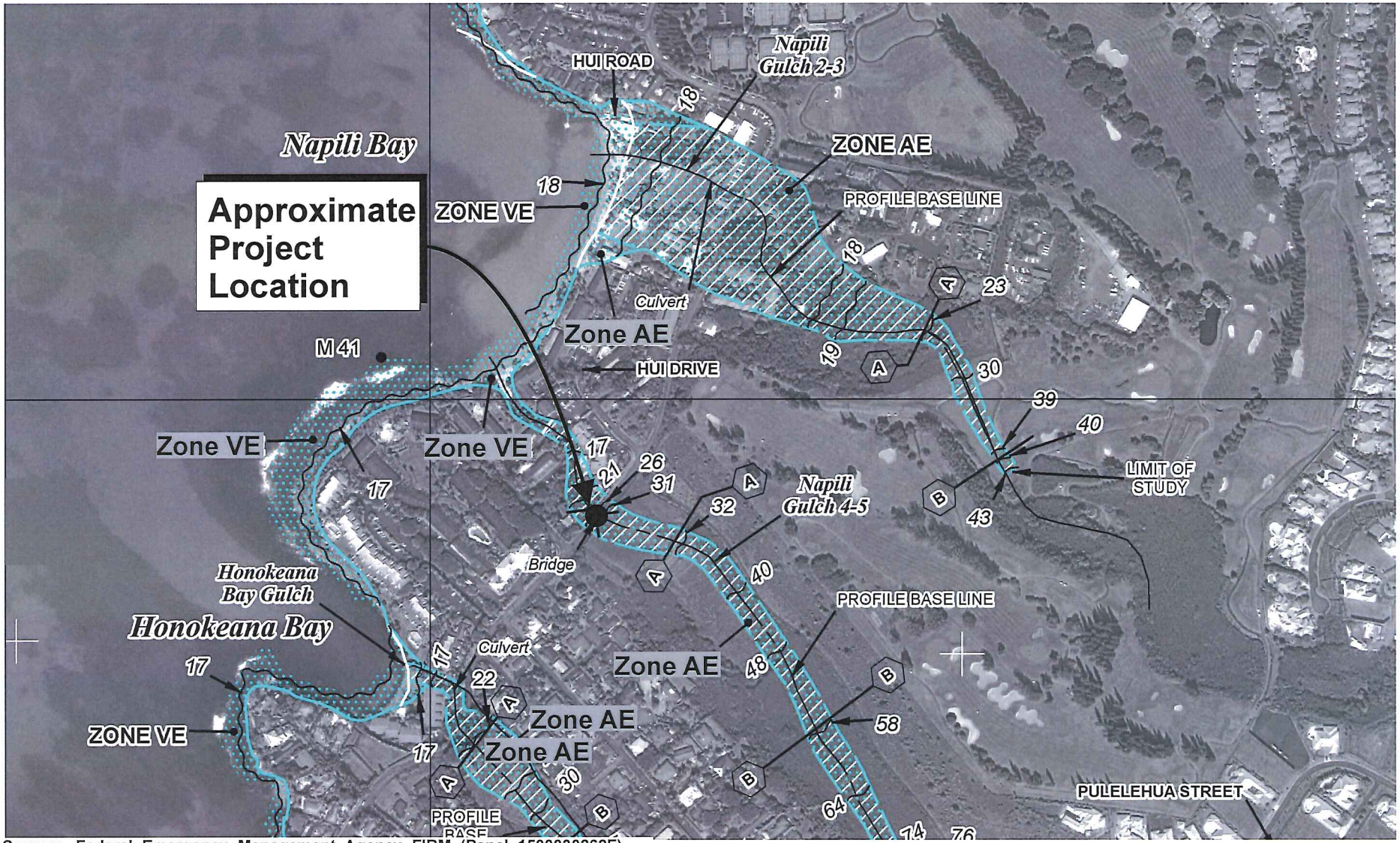
b. Potential Impacts and Mitigation Measures

The proposed project is intended to be beneficial as it will provide a reliable drainage culvert system in the area to manage stormwater and avoid adverse impact (e.g., flooding) to the community during peak wet weather events. As such, there are no anticipated adverse effects to the proposed project from flooding or tsunami related events. The proposed improvements will keep the floodway in the vicinity of the project area free and clear of encroachments. Refer to **Appendix "A"**.

6. Streams and Wetlands

a. Existing Conditions

AECOS, Inc. conducted fieldwork in December 2015 to delineate the ordinary high water mark (OHWM) and conduct a water quality survey in Nāpili Gulch in the vicinity of the project area. The Nāpili Gulch is a fluvial feature on the leeward side of West Maui Mountains that extends from an elevation around 1,400 feet above sea level to Nāpili Bay. The lower



Source: Federal Emergency Management Agency FIRM (Panel 1500030262F)

Figure 8

Nāpili Culverts Replacement Project

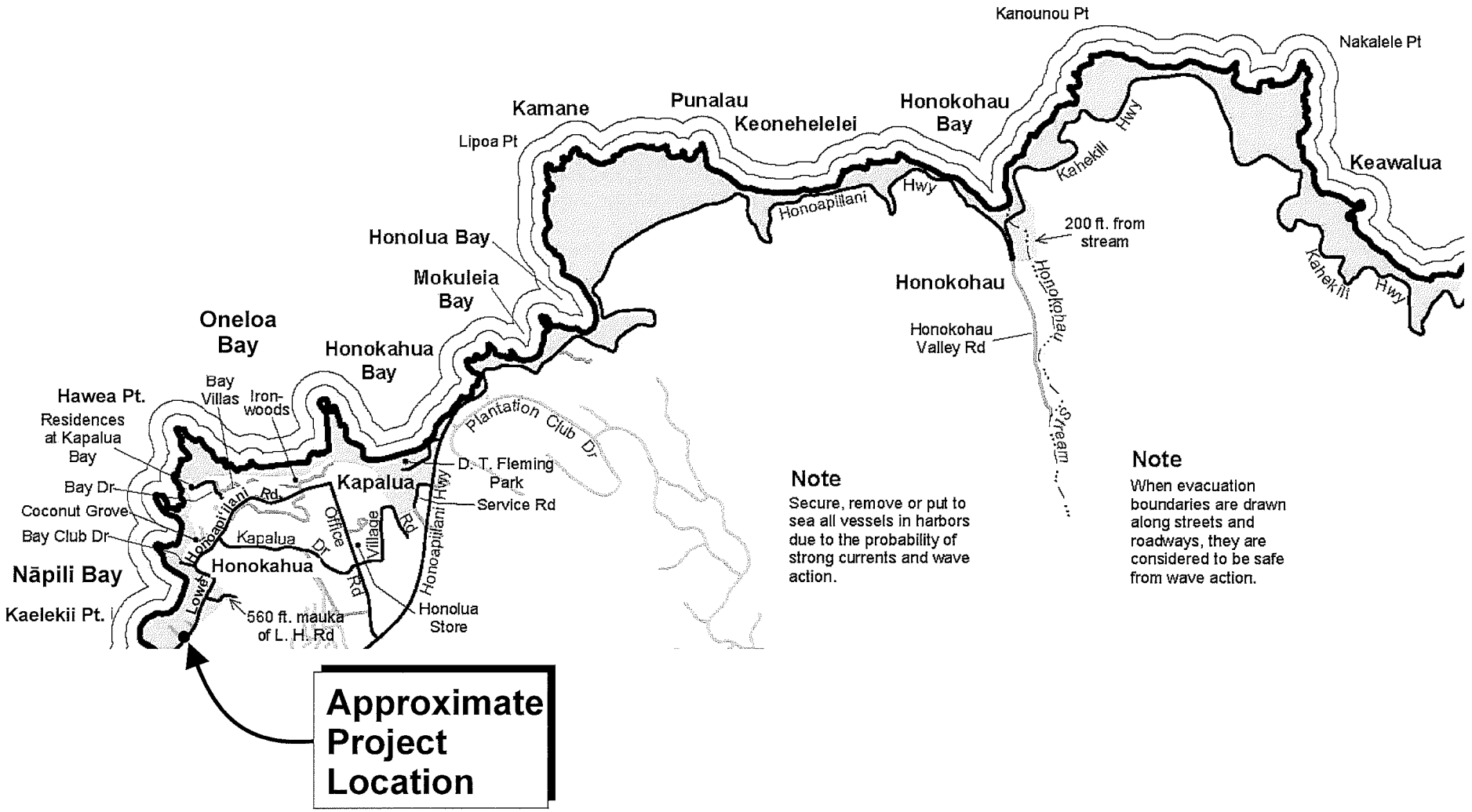
Flood Insurance Rate Map

NOT TO SCALE

MUNEKIYO HIRAGA

Prepared for: County of Maui, Department of Public Works

FE\DPW Napili Culvert\Applications\Figures\FIRM



Source: Pacific Disaster Center

Figure 9

Nāpili Culverts Replacement Project

Tsunami Evacuation Map

NOT TO SCALE

MUNEKIYO HIRAGA

Prepared for: County of Maui, Department of Public Works

FE\DPW Napili Culvert\Applications\Figures\Tsunami Evacuation

segment of Nāpili Gulch is referred to as Nāpili 4/5 Gulch and the Nāpili Bay and Beach Foundation has named the stream segment within the project area "Nāpili Kahawai". See **Appendix "C"**.

Several desilting basins are located throughout the West Maui watersheds and most of these were constructed during the sugar and pineapple era to reduce the amount of eroded sediment from agricultural fields from reaching the nearshore. A desilting basin with an outlet valve is located in Nāpili 4/5 Gulch upstream of the project area. The Nāpili Bay and Beach Foundation previously reported that prior to the installation of the outlet valve for the Nāpili 4/5 basin, it overflowed during a storm in January 2011 and sediment-laden runoff reached Nāpili Bay. The outlet of Nāpili Gulch at the shore is usually blocked by a wide deposit of sand forming a muliwai (brackish water pond or estuary) extending inland from the beach approximately 82 feet. Refer to **Appendix "C"**.

The proposed activity involves work in Nāpili 4/5 Gulch on the mauka and makai side of Lower Honoapi'ilani Highway. DPW has determined that the existing culverts in the gulch area are in a deteriorated condition and as previously discussed, there is concern of erosion below the existing culverts and walls during heavy rains.

b. <u>Potential Impacts and Mitigation Measures</u>

The water quality survey conducted by AECOS, Inc. determined the generally poor water quality conditions exist at the outlet of the Nāpili Gulch, though it is not an unusual situation for muliwai. The survey report noted that the coastal waters of Nāpili Gulch are identified on the list of impaired waters in Hawai'i prepared under the Clean Water Act and concluded that the project is not anticipated to adversely affect the already poor water quality in the muliwai of Nāpili Gulch or in the nearshore waters of the Nāpili Bay. The report noted that unless a large storm occurs during construction, all work should be able to be completed in a dry setting. As recommended by the water quality report, a BMP plan and monitoring and assessment plan will be designed and implemented for the project to minimize the potential for adverse impacts. Refer to **Appendix "C"**.

As the proposed project involves work in the Nāpili Gulch, there is consultation with the U.S. Army Corps of Engineers regarding any requirement for a Department of Army (DA) Nationwide Permit. Additionally, a State 401 Water Quality Certification approval and State

Stream Channel Alteration Permit (SCAP) will be obtained prior to construction as may be applicable. BMPs will also be included during project construction. Refer to **Appendix "B"**, Sheet C-3 and Sheet C-4.

7. Flora and Fauna

a. Existing Conditions

The Flora and Fauna Survey prepared by Robert Hobdy noted vegetation in the project area is dominated by just one (1) non-native grass, Guinea grass (*Megathyrsus maximus*). Most of the area is maintained in a closely mowed condition. More diversity is found within the stream channel above and below the existing culvert. See **Appendix "D"**.

b. Potential Impacts and Mitigation Measures

In October 2015, Robert Hobdy conducted a walk-through flora and fauna survey of the project area. The fauna survey included field observations with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities, and locations as well as observations of trails, tracks, scat, and signs of feeding. In addition, an evening visit was made in the area to record crepuscular activities and vocalizations for any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area. Refer to **Appendix "C"**.

Flora

A total of 61 plant species were recorded during the course of the survey. Of these, nine (9) were native species and the remaining 52 were non-native agricultural or roadside weeds. The nine (9) native species included ʻuhaloa (*Waltheria indica*), ʻōhiʻa (*Metrosideros polymorpha*), ʻākia (*Wikstroemia uva- ursi*), (*Achyranthes splendens var. splendens*) no common name, ʻohelo kai (*Lycium sandwicense*), ʻaʻaliʻi (*Dodonaea viscosa*), wiliwili (*Erythrina sandwicensis*), alaheʻe (*Psydrax odorata*) and akoko (*Euphorbia celastroides var. amplectens*). Only the ʻuhaloa was found growing naturally in the project area. The other eight (8) native species were small plants that had been planted in a small area below the culvert on the south bank of Nāpili Gulch within the project area. The survey found that none of these native plants are threatened or endangered species.

The survey found the project area is largely overrun with non-native grasses and a few shrubs. The few native plant species that do occur are all widespread in Hawaiʻi. No endangered or threatened species were

found and none of the native species found are candidates for such status (USFWS, 2015). This disturbed environment did not include any special habitats for native plant species or ecosystems.

Mammals

One (1) non-native mammal, the domestic dog (*Canis familiaris*) was observed in the project area during two (2) site visits. While not seen, one would expect to also find other non-native mammals such as the domestic cat (*Felis catus*), mongoose (*Herpestes auropunctatus*), rats (*Rattus spp.*), and mice (*Mus domesticus*) in this habitat.

A special effort was made to look for the Endangered ope'ape'a or Hawaiian hoary bat by making an evening survey in the project area. When present in an area, these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed visually or by use of a bat detecting device.

Birds

Birdlife was modest in both species diversity and in total numbers in this dry habitat. Four (4) species of non-native birds were seen during two (2) site visits. Two (2) species were common throughout the project area, the zebra dove (*Geopelia striata*), and the common myna (*Acridotheres tristis*). Uncommon species include the spotted dove (*Streptopelia chinensis*) and house finch (*Carpodacus mexicanus*). No native birds were seen.

Insects

A good variety of insects were recorded during two (2) site visits. A total of 12 species were recorded in seven (7) insect orders. Just one (1) specie was of common occurrence, the beet webworm moth (*Spoladea recurvalis*). Three (3) species were uncommon, the seven-spot lady beetle (*Coccinella septempuncta brucki*), Leucaena psyllid (*Heteropsylla cubana*) and the sleepy yellow butterfly (*Eurema niccipe*). Eight (8) species observed were uncommon.

Just one (1) native insect specie was found, the green darner (*Anax junius*) which is an indigenous dragonfly that is widespread in Hawai'i as well as in North America. The survey found it is of no special conservation concern.

Mollusks

Just two (2) non-native snails were recorded in the project area, the giant African snail (*Achatina fulica*) and the rosy cannibal snail (*Euglandina rosea*). No native snails were observed.

Summary

No endangered animal species were found on this property during the course of this survey, nor were any found that are candidates for such status. The survey did note that certain protected species that, while not present, may occur in the project area at other times of the year that need to be addressed. Refer to **Appendix "C"**.

While no endangered bats were detected during the evening survey, the ʻopeʻapeʻa is known to be widespread in many habitats in West Maui. These bats are highly mobile and appear to migrate around in response to flushes in insect activity wherever it may occur. There is likelihood that these bats utilize some habitats on the property during the year. These bats roost in trees and also rear their young in trees during the summer months. However, since there are no trees in the project area, any potential for disturbance for bats was determined by the survey to not be an issue.

Additionally, there are two (2) native seabirds, the Endangered Hawaiian petrel (*Pterodroma sandwichensis*) and the Threatened Newell shearwater (*Puffinus newelli*), that may fly over these lowlands on the way to their burrows high in the mountains. These seabirds, especially the fledglings, are attracted to bright lights in the evenings and early dawn hours and can become disoriented and crash. They are then vulnerable to injury, vehicle strikes, and predators. It was recommended by the Flora and Fauna Survey that any significant outdoor lighting associated with this project be shielded to direct the light downward to minimize disorientation of these protected seabirds. The drainage project does not involve lighting and construction is anticipated to occur during the day.

The survey determined that the proposed project is not expected to result in any significant adverse impacts on biological resources in this part of West Maui. Refer to **Appendix "C"**.

8. Archaeological Resources

a. Existing Conditions

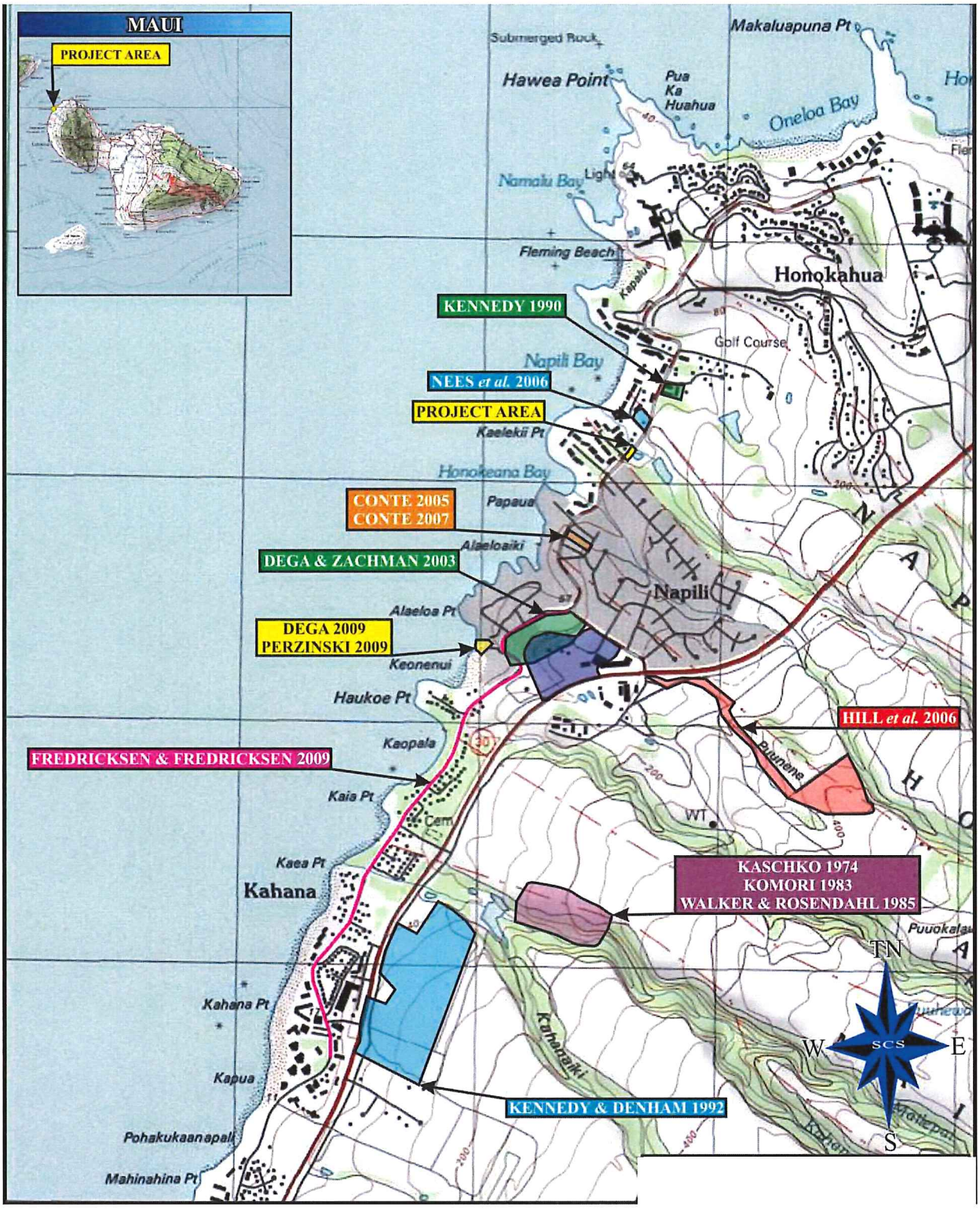
There have been prior surveys of previous archaeological projects in and around the current project area as shown on **Figure 10**. Scientific Consultant Services, Inc. (SCS) reviewed these studies conducted in the area. See **Appendix "E"**.

SCS found that the first archaeological survey done in the project area was conducted by Winslow Walker in 1930, under the auspices of the Bishop Museum. Walker (1931) focused on monumental sites, mostly coastal heiau, during his early survey of Maui. Walker (1931) noted four (4) sites in the general vicinity project area: a destroyed unnamed heiau at Kahana point (State Site 50-50-01-12), an unnamed heiau that was washed away at Mailepai Point (State Site 50-50-01-13), and the destroyed Hihiho Heiau, which was located along a country road near Kalaeoka'ea Point (State Site 50-50-01-14). Another unnamed heiau was located on the bluff between 'Alaeloa Point and Papaua Point (State Site 50-50-01-15) (Walker 1931).

A number of archaeological investigations have been conducted over the years in the Nāpili area, Lāhainā District, island of Maui, resulting in the documentation of both pre-Contact and Historic Period deposits and are summarized in this section. Refer to **Figure 10**. The majority of these cultural deposits were identified as human burials, habitation plots, and refuse pits. Classes of artifacts and midden found in association with these features included coral abraders, basalt flakes, volcanic glass debitage, and marine shell debris.

Kennedy (1990) conducted an archaeological inventory survey of TMK: (2)4-3-002:068 and 069, located at Nāpili, Lāhainā District, island of Maui. No historic properties were identified.

CRM Solutions Hawaii, Inc. (Conte 2005) conducted an archaeological inventory survey of 0.779 acre of land located at 5190 Lower Honoapi'ilani Road Mailepai Ahupua'a, Lāhainā District, Maui Island (TMK: (2)4-3-003:043). No historic properties were identified. Subsequently, CRM Solutions Hawaii, Inc. (Conte 2007) conducted a program of archaeological monitoring during off-site construction related to TMK: (2)4-3-003:043, Mailepai Ahupua'a, Lāhainā District, Maui Island. No historic properties were identified.



Source: Scientific Consultant Services Inc.

Figure 10 Nāpili Culverts Replacement Project

Previous Archaeological Studies Location Map

0 500 250 1000 Meters

Prepared for: County of Maui, Department of Public Works

MUNEKIYO HIRAGA

FE/DPW Napili Culvert/Applications/Figures/Previous Archaeological Studies Location Map.DEA

Pacific Consulting Services, Inc. (Nees et al. 2006) conducted an archaeological inventory survey-level investigation of two (2) adjacent lots in Nāpili, Nāpili 4-5 Ahupua'a, Lāhainā (formerly Ka'anapali) District, Maui. No historic properties were identified.

Subsequently, CRM Solutions Hawai'i, Inc. (Conte 2007) conducted a program of archaeological monitoring during off-site construction related to TMK: (2)4-3-003:043 (Mailepai Hui Land Lots 51-C-4-A, B, and C), Lāhainā District, Maui Island. No historic properties were identified. Refer to **Appendix "E".**

b. <u>Potential Impacts and Mitigation Measures</u>

SCS determined that based on the findings of previous archaeological studies conducted in the vicinity, the current project area has the potential for yielding intact or previously disturbed cultural materials including, human skeletal remains; pre-Contact Traditional-type, and Plantation Era cultural deposits in subsurface context. As such, a program of Archaeological Monitoring will be conducted of the current project area in order to identify, document, and record any historic properties inadvertently identified, and to provide appropriate mitigation methods, as necessary.

Based on all available background information (i.e., project area location, history, and archaeology), expected findings of this Archaeological Monitoring program include the following:

1. There is a low probability of the inadvertent finding of intact or previously disturbed traditional Native Hawaiian burials.

2. There is a low to moderate probability of finding subsurface evidence of traditional Native Hawaiian activities including: hearths, postholes, midden deposits, and other occupation debris (e.g., stone tool waste, discarded fishing gear).

3. There is a moderate to high probability of finding subsurface evidence of encountering Historic Plantation Era cultural materials associated with agricultural and habitation activities.

An Archaeological Monitoring Plan has been prepared for the project and was submitted to the State Historic Preservation Division (SHPD) for acceptance. The Archaeological Monitoring Plan includes having an archaeological monitor present during subsurface earth moving activities within the project area. In addition, should inadvertent archaeological finds become encountered during construction, work will be halted in the

immediate vicinity of the find and appropriate mitigation protocols implemented in coordination with SHPD. Refer to **Appendix "E"**. SHPD accepted the Monitoring Plan for the project on December 24, 2015. See **Appendix "E-1"**.

Should a Section 404 DA Nationwide Permit be required for the project, consultation will be conducted in accordance with Section 106 of the National Historic Preservation Act of 1966.

9. Cultural Resources

a. Existing Conditions

SCS provided a historical and cultural background for the area in their Archaeological Monitoring Plan. Refer to **Appendix "E"**.

Past Political Boundaries

Traditionally, the division of Maui's lands into districts (*moku*) and sub-districts (*ahupua'a*) was performed by a *kahuna* (priest, expert) named Kalaiha'ōhia, during the time of the *ali'i* Kaka'alaneo (Beckwith 1940). Land was considered the property of the king or *ali'i 'ai moku* (the *ali'i* who eats the island/district), which he held in trust for the gods. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka'āinana* (commoners) worked the individual plots of land. Refer to **Appendix "E"**.

The project area is located in the moku of Kā'anapali and *ahupua'a* of Nāpili, which translated literally means "the joinings or *pili* grass" (Pukui *et al.*:163). Refer to **Appendix "E"**.

Traditional Settlement Patterns

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Traditionally, there were primarily two (2) types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo (Colocasia esculenta)* agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*) and mai'a (banana, *Musa sp.*), were also grown and, where appropriate, such crops as *'uala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional

times on all the Hawaiian Islands (Kirch and Sahlins 1992; Kirch 1985). Refer to **Appendix "E"**.

A general settlement model based on archaeological evidence includes coastal marine foraging and fishing with more upland agricultural pursuits. In typical native Hawaiian fashion, dating at least from the later pre-Contact period (if not earlier), people would have moved between the coast and the upland agricultural fields, exploiting the full range of resources available within their *ahupua'a*. Semi-permanent and permanent habitation probably occurred in both coastal and upland settings. Refer to **Appendix "E"**.

Early archaeological surveys identified seven (7) religious shrines (*heiau*) from Mahinahina to Honokōhau Ahupua'a (Thrum 1909; Walker 1931). No *heiau* were documented in the project area (Nāpili Ahupua'a), nor in the adjacent (to the southwest) Honokeana Ahupua'a. The closest *heiau* reported by past surveys was located in the adjacent (to the east) Honokahua Ahupua'a (Kahauiki Heiau), just over 1.0 km northeast of the project area. A *heiau* indicated the presence of political power and the appropriate population to support it. Refer to **Appendix "E".**

Traditionally, trails extended from the coast to the mountains, linking the two (2) for both economic and social reasons. Kā'anapali District is noted for an *alaloa* (a path or trail) that reportedly encircled the entire island. Traditional accounts attribute the construction of this trail to the *ali'i* Pi'ilani in the early 1500s. Following the death of Pi'ilani, the construction of the trail was completed by Kiha-a-Pi'ilani, son of Pi'ilani (Ashdown 1970). Refer to **Appendix "E"**.

Early Historic

The traditional district of Kā'anapali, where the project area is located, consisted of five (5) major stream valleys (Honokōwai, Kahana, Honokahua, Honolua, and Honokōhau), all of which were extensively terraced for wet taro *(lo'i)* in early historic and later times. Sweet potatoes were reportedly grown between Honokōhau and Kahakuloa Ahupua'a, presumably on lower kula lands and, south of the project area, Kahana Ahupua'a was known as a place of salt gathering for the people of Lāhainā (Sterling 1998). Refer to **Appendix "E"**.

The Māhele

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on Western law. While it is a

After living for nearly 48 years in the Honolua area, he moved to Upcountry (Pukalani) where he has been for the last 13 years.

Mr. Nohara's paternal grandfather moved from Lāhainā to Honolua around 1921 to work in the pineapple fields. His maternal side of the family relocated to Honolua from Hai'ku. It was in Honolua where Mr. Nohara's parents met and married and raised four (4) children.

Mr. Nohara served on the board of the State of Hawai'i, Soil and Water Conservation District per Hawai'i Revised Statutes, Chapter 180 for approximately 29 years. During that time, he became very familiar with the drainage system and issues regarding Nāpili Gulch 4/5. He explained that mauka of the project area is an existing sediment retention basin. The basin design allows the release of stormwater and when the runoff reaches a certain level, it meanders to the beach towards Nāpili Bay where there is a sand bar. The intent of the existing basin is to protect downstream property and capture sediment during stormwater runoff.

Mr. Nohara explained that the existing box culvert is undersized to handle stormwater flow and is not well designed. During peak wet weather events, the runoff over tops Lower Honoapi'ilani Road and the stormwater drops into the downstream channel, scouring and undermining the structure. He recalled that during storm events, runoff would impact the properties to the north (One Nāpili Way) as the land slopes to the north. To protect the properties, One Nāpili Way installed retaining walls in this area. Mr. Nohara recalled that this issue of flooding and the undersized culvert system came to the attention of the Soil and Water Conservation District Board approximately 15 years ago. During that time, the County of Maui was requested to replace this undersized culvert system with a new culvert system which has the capacity to handle stormwater runoff.

Mr. Nohara spoke of the channel below the existing culvert system and noted that the entities in Nāpili Bay formed a partnership (Nāpili Bay and Beach Foundation). Due to concerns about the channel, the Nāpili Bay and Beach Foundation obtained grant monies and he believed an engineer has been hired and that native Hawaiian plants have been planted in the gulch.

Mr. Nohara expressed that the proposed project is needed to address the issue of overtopping of the Lower Honoapi'ilani Roadway during major storm events and wanted the engineering design for a new culvert system sized to have the capacity to handle stormwater in the area. He is not aware of any cultural practices on or in the vicinity of the project area and

After living for nearly 48 years in the Honolua area, he moved to Upcountry (Pukalani) where he has been for the last 13 years.

Mr. Nohara's paternal grandfather moved from Lāhainā to Honolua around 1921 to work in the pineapple fields. His maternal side of the family relocated to Honolua from Hai'ku. It was in Honolua where Mr. Nohara's parents met and married and raised four (4) children.

Mr. Nohara served on the board of the State of Hawai'i, Soil and Water Conservation District per Hawai'i Revised Statutes, Chapter 180 for approximately 29 years. During that time, he became very familiar with the drainage system and issues regarding Nāpili Gulch 4/5. He explained that mauka of the project area is an existing sediment retention basin. The basin design allows the release of stormwater and when the runoff reaches a certain level, it meanders to the beach towards Nāpili Bay where there is a sand bar. The intent of the existing basin is to protect downstream property and capture sediment during stormwater runoff.

Mr. Nohara explained that the existing box culvert is undersized to handle stormwater flow and is not well designed. During peak wet weather events, the runoff over tops Lower Honoapi'ilani Road and the stormwater drops into the downstream channel, scouring and undermining the structure. He recalled that during storm events, runoff would impact the properties to the north (One Nāpili Way) as the land slopes to the north. To protect the properties, One Nāpili Way installed retaining walls in this area. Mr. Nohara recalled that this issue of flooding and the undersized culvert system came to the attention of the Soil and Water Conservation District Board approximately 15 years ago. During that time, the County of Maui was requested to replace this undersized culvert system with a new culvert system which has the capacity to handle stormwater runoff.

Mr. Nohara spoke of the channel below the existing culvert system and noted that the entities in Nāpili Bay formed a partnership (Nāpili Bay and Beach Foundation). Due to concerns about the channel, the Nāpili Bay and Beach Foundation obtained grant monies and he believed an engineer has been hired and that native Hawaiian plants have been planted in the gulch.

Mr. Nohara expressed that the proposed project is needed to address the issue of overtopping of the Lower Honoapi'ilani Roadway during major storm events and wanted the engineering design for a new culvert system sized to have the capacity to handle stormwater in the area. He is not aware of any cultural practices on or in the vicinity of the project area and

noted that beach access is from Nāpili Place and other roadways that are outside of the project area. Maui Land and Pineapple Company, Inc. (MLP) Field 30 (former State Land) to the north of the project site contains a walking path, heading mauka. Mr. Nohara felt that the County of Maui, DPW should communicate with the Nāpili Bay and Beach Foundation regarding the proposed project and its potential effect on the Foundation's gulch project and that there should be outreach to the One Nāpili Bay Association regarding the project.

Tim Medeiros

Mr. Medeiros, who is part Hawaiian, has spent most of his life on Maui. On his father's side, the family is extensive and many family members continue to reside in the Nāpili area. His grandfather gave his land in the Lāhainā area to Mr. Medeiros' parents when they married, and this is where Mr. Medeiros was born and grew up. Mr. Medeiros retired in 2006 from the County of Maui, Department of Public Works after over 35 years of service and continues to reside in the Lāhainā area where he keeps busy working on his properties.

Mr. Medeiros spoke about his maternal grandparents who were born and resided in Nāpili, in an area across from Nāpili Kai. His grandmother had received land from the Queen, which was subsequently subdivided into lots and distributed to various family members. The area contains a family graveyard which is still active today. He spoke of the days that D.T. Fleming would visit his grandparents to help them by lending money to pay their taxes or work the land. Over time, land was given by his grandparents to D.T. Fleming. In those days, the land was cultivated for pineapple, mangoes, and watermelon. Nāpili Kai used to be a mango orchard owned by the Amarals, with D.T. Fleming's property nearby, as well as Mr. Medeiros' family properties. The area was undeveloped and contained kiawe. Maui Land & Pineapple Company owned the surrounding land around the family properties. Mr. Medeiros recalled that his grandmother drove cattle to Kahului from Nāpili on horseback for D.T. Fleming.

Mr. Medeiros reminisced about going to the Nāpili Bay Beach in the past. He liked the area as it was good for fishing all the way up to Nāpili Point. He spoke of his grandmother "running the Akule gang" and explained how she would catch fish to bring them into the Bay. Folks from the markets would go to the Bay to pick their fish. The remaining fish would be released to the sea. Also, he recalled it being a good area for catching tako (octopus). Mr. Medeiros expressed that today, the bay area does

not offer the good fishing he recalled from the past. Today, as he passes the project area he sees many cars parked on both sides of Lower Honoapi'ilani Road and believed that these are residents and visitors who frequent the beach area. He expressed concern about traffic in the area and commented that there is no parking in the area. Mr. Medeiros wanted to know what the traffic plan would be during project construction.

Mr. Medeiros noted that the existing culvert is small and he recalled in the mid-1960's when there was a golf course development mauka of Lower Honoapi'ilani Road, a rainfall event caused flooding, runoff came through the family property, wiped out and destroyed Nāpili Kai. He recalled that his mother's car was swept away by the flood waters. He described how he obtained equipment to remove the car from a stone wall at Nāpili Kai.

He recalled that a number of years ago, Nāpili Kai and the State of Hawai'i, Soil and Water Conservation District contacted him regarding the installation of a culvert. At the time he expressed concerns and requested that there be other options to address flood impacts. He expressed that before the development occurred in the area, the existing waterways were blocked from carrying stormwater.

For the proposed project, Mr. Medeiros felt that if the replacement culvert protects the area from flood impacts, it is a good thing. He did not have cultural concerns and had not heard of any traditional uses or practices on or in the vicinity of the project area.

Based on the cultural impact assessment interviews, significant adverse impacts to cultural or traditional resources are not anticipated from the proposed project.

10. Air Quality

a. Existing Conditions

There are no point sources of airborne emissions in the immediate vicinity of the project site. Although minimal, airborne pollutants are largely attributable to vehicular exhaust from traffic along Lower Honoapi'ilani Road and nearby roadways. Windblown dust from fallow fields is another source of indirect emissions in the region. These sources, however, are intermittent and prevailing winds quickly disperse the particulates generated by these temporary sources. Overall, the air quality in the region is considered good.

b. Potential Impacts and Mitigation Measures

In the short term, construction related activities for the proposed project will be the primary source of airborne pollutants affecting the surrounding area. Site work involving clearing, grubbing, and grading operations will generate fugitive dust. Appropriate BMPs, such as frequent watering of exposed surfaces and regular maintenance of construction equipment, will be utilized to minimize air quality impacts associated with project construction. Refer to **Appendix "B"**, Sheet C-3 and Sheet C-4.

The proposed culvert replacement project is not an action which will generate significant adverse long-term air quality impacts.

11. Noise

a. Existing Conditions

There are no fixed noise generators in the vicinity of the project site. Existing background noise levels are primarily attributable to vehicular traffic along Lower Honoapi'ilani Road and aircraft noise from the Kapalua Airport operations.

b. Potential Impacts and Mitigation Measures

Ambient noise conditions may be temporarily affected by construction activities. Heavy construction machinery, such as backhoes, dump trucks, front-end loaders, paving equipment, and material-transport vehicles are anticipated to be the dominant noise-generating sources during the construction period of the proposed improvements. Sound attenuating construction equipment will be used where practicable and necessary, to mitigate noise impacts caused by construction. Night-time construction activity is not anticipated for the proposed project. A State of Hawai'i, Department of Health Noise Permit will be obtained for the project as may be applicable. Once completed, the proposed project itself is not anticipated to significantly adversely impact noise conditions as the scope involves repairs to an existing drainage culvert and related improvements.

12. Scenic and Open Space Resources

a. Existing Conditions

Lower Honoapi'ilani Road is a two-lane coastal roadway that services West Maui. The West Maui Mountains are visible to the east while the Pacific Ocean is visible to the west. Lower Honoapi'ilani Road to the west, northward and southward of the project area is bordered by resorts, condominiums, residences, and commercial establishments. The Kapalua Plantation Golf Course is located north of the project area on the mauka side of Lower Honoapi'ilani Road. The project area is not part of a scenic corridor.

b. Potential Impacts and Mitigation Measures

The proposed culvert replacements and associated improvements are not anticipated to adversely affect the visual character along the Lower Honoapi'ilani Road. As the proposed project is low-profile, mauka and makai views will not be significantly adversely impacted. Open space resources will also not be impacted by the proposed project.

13. Beach and Mountain Access

a. Existing Conditions

The project site involves work in a drainage channel, in the right-of-way (ROW) and under Lower Honoapi'ilani Road and on small portions of public property mauka and makai of the road is located approximately 800 feet from the nearest beach and approximately a half mile from the foot of the West Maui Mountains. Cultural impact assessments conducted for the proposed project concluded that there are no activities related to gathering, access, or other customary activities occurring in the project vicinity.

b. Potential Impacts and Mitigation Measures

There are no traditional access corridors identified in close proximity to the proposed project area. Accordingly, there are no anticipated adverse impacts to beach and mountain access from the proposed project.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Population and Demography

a. Existing Conditions

The proposed improvements at Lower Honoapi'ilani Road are located in Nāpili, Lāhainā, Maui, within the West Maui Community Plan region.

The County of Maui, specifically the Island of Maui and the West Maui region has exhibited relatively strong growth over the past decade. The population in Maui County in 2010 was 154,834, a 21 percent increase over the resident population in 2000 (U.S. Census Bureau, 2000 and 2010). The population of the Maui County is projected to increase to approximately 174,450 by 2020 and 199,550 by 2030 (County of Maui, Planning Department, June 2006).

The population in West Maui increased from 17,967 in 2000 to about 22,200 in 2010 (U.S. Census Bureau, 2000 and 2010). Projections of the resident population for West Maui for the years 2020 and 2030 are 25,096 and 28,903, respectively (County of Maui, Planning Department, June 2006).

b. Potential Impacts and Mitigation Measures

The proposed project is a culvert replacement project that will improve the drainage system in the area to manage stormwater during wet weather events and is not a direct population generator. As such, it is not anticipated to have significant adverse impacts on population or demographic trends of the West Maui region.

2. Economy

a. Existing Conditions

The non-seasonally adjusted unemployment rate in December 2016 for Maui County stood at 2.7 percent which is a decrease of 0.4 percent from 3.1 percent in December 2015. The non-seasonally adjusted unemployment rate for the State as a whole was 2.6 percent, which is a 0.3 percent decrease from 2.9 percent in December 2015 (State Department of Labor and Industrial Relations, February 2017).

b. Potential Impacts and Mitigation Measures

On a short-term basis, the project will support construction and construction-related employment. The project is not anticipated to have significant adverse impacts on labor conditions due to the nature of the proposed improvements.

C. PUBLIC SERVICES

1. Police and Fire Protection

a. Existing Conditions

The project site is within the service area of the Maui Police Department's District IV Lāhainā patrol district which services the West Maui region. The Lāhainā Police Station is located in the Lāhainā Civic Center (LCC) complex approximately five (5) miles south of the project site. The Lāhainā patrol district includes management level officers, field police officers, and additional personnel, consisting of public safety aides and administrative support staff (Maui Police Department Annual Report 2013 website, 2016).

Fire prevention, suppression, and protection services for the West Maui region are provided by the County Department of Fire and Public Safety's Lāhainā and Nāpili Fire Stations. The Lāhainā Fire Station is located approximately five (5) miles south of the project site at the LCC while the Nāpili Fire Station is located less than one (1) mile to the north. The Lāhainā Fire Station includes one (1) engine company, one (1) ladder company, and one (1) tanker, and is staffed by 33 full-time personnel who are on duty daily. The station is also equipped with a boat for ocean rescues. The Nāpili Fire Station consists of one (1) engine company with 15 full-time firefighting personnel. There are five (5) personnel on duty daily (2014-2015 Annual Report Department of Fire and Public Safety). All firefighting personnel are first-responder trained to provide emergency medical care.

b. Potential Impacts and Mitigation Measures

The proposed action is limited to the replacement of the existing culverts and associated improvements. During the construction phase, Lower Honoapi'ilani Road at the project area will be closed. Detour routes during the road closure will be provided in accordance with the traffic plan for the project. Refer to **Appendix "B"**, Sheet C-8. These detour routes will be available for police and fire services to ensure that emergency

responders have access to the areas surrounding the project site. DPW will instruct the project contractor that for any prolonged period of time (four (4) hours of more) when the water supply for fire protection in the area is disconnected, there will be notification to the Nāpili Fire Station. A temporary bypass waterline will be installed to eliminate the long-term shut down of water for protection in the project area.

From a long-term perspective, the proposed project is not anticipated to affect the capabilities of police and fire services. The existing operational limits of police and fire services will not be extended or affected by implementation of the proposed project.

2. Medical Services

a. Existing Conditions

Maui Memorial Medical Center serves as the island's only major medical facility. Located in Wailuku, approximately 29.0 miles southeast of Lāhainā, the 214-bed facility provides general, acute, and emergency care services for the island's residents and visitors. (Maui County Data Book, 2014) In addition, the Kaiser Permanente Medical Clinic, West Maui Healthcare Center, Maui Medical Group, Lāhainā Physicians, and other private medical and dental offices provide health care services for the region's residents and visitors.

b. Potential Impacts and Mitigation Measures

The proposed project will not adversely affect medical services in the area. During project construction, detour routes will be available to emergency responders to ensure they have access to the areas surrounding the project site.

3. Solid Waste

a. Existing Conditions

Residential refuse collection is provided by the County's Department of Environmental Management, Solid Waste Division. Private refuse collectors provide solid waste disposal services for commercial and institutional accounts. With the exception of the Hāna region, residential and commercial solid waste from throughout the island is transported to the Central Maui Landfill at Pu'unēnē, about 35 miles to the southeast of the project site. The Central Maui Landfill has been determined to have available capacity sufficient for meeting current and projected waste

disposal needs in the County up to the year 2026 (Integrated Solid Waste Management Plan, 2009).

A refuse transfer station located at Olowalu, approximately 16 miles south of the project site, accepts household and green wastes, as well as used oil for transport to the Central Maui Landfill in Pu'unēnē. The disposal of commercial refuse is not permitted at the Olowalu transfer station.

b. Potential Impacts and Mitigation Measures

Solid waste management protocols will be developed for the disposal of materials resulting from the demolition and construction activities for the proposed project. Upon completion of construction, the culvert system will undergo periodic maintenance and cleaning, particularly as a result of storm events and any solid waste collected will be disposed of at an approved disposal site. As such, the project is not anticipated to adversely impact the County's solid waste collection and disposal capabilities and capacities.

4. Recreational Resources and Schools

a. Existing Conditions

West Maui has numerous recreational facilities offering diverse opportunities for the region's residents. These facilities include several County and State parks and beach parks in West Maui. Approximately one-third of the County parks are situated along the shoreline and offer excellent swimming, diving, and snorkeling areas. In addition, the resort areas of Kā'anapali and Kapalua operate world-class golf courses available for public use.

Recreational facilities in Lāhainā Town include the Lāhainā Aquatic Center, the West Maui Youth Center, the Lāhainā Recreation Center, and the LCC. The Lāhainā Aquatic Center contains an olympic-size swimming pool and a children's wading pool. The 15-acre Wainee Park expansion includes fields and is located adjacent to the West Maui Youth Center which has a building for youth activities, as well as an outdoor playground and a basketball court. The Lāhainā Recreation Center includes baseball fields and playfields for soccer and football. The LCC includes a gymnasium, amphitheater and tennis courts complex.

Additionally, the ocean waters and well-developed reef system along the Lāhainā, Kā'anapali, and Nāpili coastline offer many recreational

opportunities for residents and visitors. Many tourism-based businesses also rely on the ocean and reef system for their operation.

Fishing by shore casting and netting is practiced in the ocean waters near Lāhainā Town, Kā'anapali Beach, Hanakaōō Point and Honokōwai Point. Edible seaweed collecting, octopus fishing and spearfishing occur on the adjacent reef flat fronting Kā'anapali. During periods of wave activity, the area is a good location for surfing. The coastal waters in the vicinity of the Kahana Stream mouth are utilized for fishing, swimming, and diving.

The West Maui region is served by four (4) public schools (Lahainaluna High School, Lāhainā Intermediate School, Princess Nahienaena Elementary School, and Kamehameha III Elementary School) operated by the State of Hawai'i, Department of Education (DOE) and two (2) smaller private schools (Sacred Hearts School and Maui Preparatory Academy). All four (4) of the public schools are located within Lāhainā town, three (3) of which are located along Lahainaluna Road, mauka of Honoapi'ilani Highway. The enrollments in the four (4) schools have grown in concert with the growth of residential development in the area.

The University of Hawai'i - Maui College (UH-MC), which is located in Kahului, is a branch of the University of Hawai'i system. In addition, there is a UH-MC-Lāhainā Education Center that provides higher education opportunities in West Maui. UH-MC is the primary higher education institution serving Maui.

b. Potential Impacts and Mitigation Measures

The proposed project is not expected to have significant adverse impact to public recreational opportunities and no impact to educational facilities in the area. This project is viewed as a benefit for the community as it is intended to provide a reliable County drainage system to serve the area during wet weather events. As such, no significant adverse impacts to recreational opportunities or educational resources are anticipated.

D. INFRASTRUCTURE

1. Roadways

a. Existing Conditions

Access to the Lāhainā region is provided by Honoapi'ilani Highway from Central (Wailuku/Kahului) and South (Kīhei/Wailea) Maui. Extending from Wailuku to Kapalua, it is the only State highway serving the West

Maui region. With the exception of a four-lane segment through Lāhainā Town to Lower Honoapi'ilani Road, the typical highway section consists of two (2) lanes bordered by paved shoulders which also function as bike routes.

Lower Honoapi'ilani Road is a two-lane County roadway with a variable ROW that ranges from 40 to 60 feet. This roadway begins at its intersection with Honoapi'ilani Highway opposite the County's Lāhainā Wastewater Reclamation Facility and proceeds in a northerly direction to its terminus in the Kapalua Resort (at the entrance driveway for public beach access and parking for Kapalua Bay). The portion of Lower Honoapi'ilani Road within the Kapalua Resort is privately owned and maintained by Kapalua Land Company and terminates at its intersection with Office Road.

b. Potential Impacts and Mitigation Measures

The proposed project will address existing structural deficiencies of the existing culverts by providing new replacement culverts and road improvements including asphalt pavement, to widen a portion of Lower Honoapi'ilani Road from approximately 22 feet to 38 feet, shoulder widening, sidewalk, fall protection railing, vehicle barriers, curb and gutter, drainage catch basin, drainline and reinstallation of water and wastewater lines that cross above the new culverts. Refer to **Appendix "A"**. The proposed project will improve the reliability of the drainage system to handle wet weather flows at this location.

During the construction phase, Lower Honoapi'ilani Road in the vicinity of the proposed project will be closed. Detour routes during the road closure will be provided as indicated in the traffic plan for the project. A construction traffic control plan is provided in **Appendix "B"**, Sheet C-8 of this EA document. As may be necessary for the project, a permit from State of Hawai'i, Department of Transportation Highways Division, Maui District Office will be obtained in the event oversized and/or overweight materials and equipment would need to be transported on State highway facilities.

2. Water

a. Existing Conditions

The West Maui region is served by the County's Department of Water Supply (DWS) domestic water system. The County water system services the coastal areas from Launiupoko to Kā'anapali and from

Honokōwai to Nāpili. The County's system includes two (2) surface and nine (9) groundwater sources.

The sources of water for Lāhainā are four (4) deepwells located above Alaeloa and referred to as Nāpili Wells 1, 2, and 3, and Honokōhau Well A. These wells are supplemented by water treatment plants above Honokōwai and Lahainaluna High School that draw surface water from the Honolua Ditch and Kanahā Valley. Several miles of 12- and 16-inch lines located in Lower Honoapi'ilani Road and two (2) in-line booster stations convey water from these sources to consumers in Lāhainā. Storage is provided by a 1.5 million gallon (MG) storage tank above Wahikuli and a 1.0 MG tank on Lahainaluna Road.

In addition to the County system, the West Maui region is served by private water systems, including systems operated by Hawai'i Water Service, which services the Kā'anapali Resort, and the Kapalua Water Company, which provides service to the Kapalua Resort.

Water infrastructure in the vicinity of the project includes a 12-inch waterline and a 14-inch force main.

b. Potential Impacts and Mitigation Measures

The project will require the removal and relocation of a 12-inch waterline that is located in the vicinity of the project. The relocation of this feature is necessary to move it outside of the affected project area. Refer to **Appendix "A"** and **Appendix "B"**. The relocation of the waterline will be coordinated with the County's DWS. Upon completion of construction, adverse impacts to water services and facilities in the region are not anticipated. The relocated waterline will be constructed prior to the removal of existing line to minimize disruptions in water service.

3. Wastewater

a. Existing Conditions

The County Department of Environmental Management's (DEM) Wastewater Reclamation Division provides sanitary sewer service for the West Maui region.

Wastewater from the region is treated at the County's Lāhainā Wastewater Reclamation Facility (LWRF). The LWRF's potential total treatment capacity is 9.0 million gallons per day (mgd), with 6.0 mgd for secondary treatment and 3.0 mgd for R-1 treatment. Presently, the

facility treats about 5.4 mgd of wastewater. About 1.2 mgd of the R-1 treated effluent is used to irrigate the Royal Kā'anapali golf courses, the landscaped areas along Honoapi'ilani Highway, and the landscaped median of Kā'anapali Parkway. The remaining treated effluent (4.2 mgd) is disposed into four (4) injection wells located within the facility. Under the conditions of its Environmental Protection Agency (EPA) permit, the County is allowed to dispose a maximum flow of 6.7 mgd into the injection wells.

County wastewater system improvements in the vicinity of the project area include a sewer force main located along Lower Honoapi'ilani Road.

b. Potential Impacts and Mitigation Measures

The existing 14-inch force main in the ROW will be removed and two (2) replacement force mains will be installed by DEM. The proposed project will be removing and replacing the two (2) sewer force mains installed by DEM. Refer to **Appendix "A"** and **Appendix "B"**. The replacement of the sewer force mains will be coordinated with the County DEM's Wastewater Reclamation Division. The replacement sewerlines will be constructed prior to the removal of the existing line to minimize disruption of service in the area. As such, the project is not anticipated to have significant adverse impact to wastewater infrastructure.

4. Drainage

a. Existing Conditions

The project area upstream of the culvert includes a grassy lot with a narrow drainageway located below Nāpili 4/5 Basin Structure No. 2. Elevations range from about 32 feet AMSL to 25 feet AMSL.

The project area within Lower Honoapi'ilani Road includes a paved roadway, and a sidewalk on the northwesterly side of the culvert. Concrete walls extend above the pavement from the inlet and outlet sides of the culvert. The walls provide 22 feet of travel lane across the top of the culvert. Elevations in the project area along the roadway are relatively flat and range from 28 feet AMSL to 32 feet AMSL.

The project area downstream includes the drainageway, a vertical-face retaining wall to the northeast, and a vegetated slope to the southwest. The invert at the culvert outlet is about 24 feet AMSL. Stormwater drops vertically about 16 feet to an elevation of eight (8) feet AMSL which causes scouring and erosion at the bottom of the drainageway. There is

a concern of potential erosion below the culverts and walls that would undermine the existing structures. Elevations along the vegetated slope to the southwest range from about 14 feet AMSL to 26 feet AMSL.

The existing Nāpili 4/5 Drainage Basin Structure No. 2 drainage basin above the project site includes an 18.5-foot high by 262-foot long earthen embankment dam, a 13.5-foot wide concrete crest on top of the dam, and a 12-inch outlet drainline through the dam. The bottom of the 12-inch outlet drainline is set approximately six (6) feet about the bottom of the basin. The total storage volume of the basin is roughly 1,080,000 cf or 24.8 acre-feet. The area that drains into the site is 553 acres with a peak flow of 743 cfs from a 100-year design storm. The drainage basin was designed as sediment settling basins, and only reduces the peak flow of 100-year design storm to 734 cfs.

Storm runoff passes under Lower Honoapi'ilani Road through two (2) existing 90-inch by 40-inch box culverts. Allowing for one (1) foot of freeboard (maximum stormwater height to the top of the road surface), the culverts are capable of conveying approximately 250 cfs. After passing through the culverts, storm runoff travels through a gulch to the ocean. The Nāpili Bay and Beach Foundation condominium managers informed the design consultant that heavy flooding overtops the dam and exceeds the capacity of the existing culvert at Lower Honoapi'ilani Road, and erodes the gulch downstream about every two (2) years. Refer to **Appendix "A"**.

b. <u>Potential Impacts and Mitigation Measures</u>

All grading improvements are over 50 feet away from the toe of the embankment dam of the drainage basin. The drainage channel between the basin and culvert will be regraded to increase capacity to handle peak wet weather flows. The slope of the channel centerline will be increased to lessen the elevation difference at the downstream channel. A channel liner will be installed to address the increased velocity of stormwater.

The existing culverts will be replaced with two (2) new 8-foot wide by 5-foot tall pre-cast box culverts. The culverts will be lowered to eliminate the existing elevation drop at the outlet. Lowering the culverts will also allow adequate height at the culvert entrance measured from the invert to the roadway elevation. Sufficient freeboard is included in this height.

A drainage catch basin will be installed on the northwesterly side of the roadway that has a curb and gutter. An 18-inch drainline will connect the catch basin to the box culvert.

Based on consultation with the Army Corps of Engineers, an open concrete mat material will be installed in the drainageway on the mauka (south) portion. Additionally, a drainage inlet structure will be installed in the mauka portion of the drainageway. Refer to **Appendix "B"**. Ungrouted rip rap will be also installed in a makai (north) portion of the drainageway.

Drainage design and improvements will conform to the "Rules for the Design of Storm Drainage Facilities in the County of Maui". The rules will be applied to the sizing of drainlines, channels, and culverts. Based on the County rules, the drainage system will be designed to handle a storm with a recurrence interval of 100 years since the drainage area is greater than 100 acres.

It is noted that the Nāpili Bay and Beach Foundation has planted native Hawaiian plants in Nāpili Gulch downstream of the project area which will absorb pollution and reduce sediment erosion during storm events.

The project includes erosion control and BMP measures in accordance with a plan that will be approved by the Department of Public Works. Refer to **Appendix "B"**, Sheets C-3 and C-4. Some examples of erosion control measures for the project include minimizing time of construction, retaining existing ground cover until the latest date to complete construction, dust control, use of temporary gravel aprons to prevent tracking of sediments onto the street, use of temporary permeable berm ditch guards when needed, and constructing the permanent drainage features as early as possible. Site specific erosion control measures include installation of silt fences and grated drain inlet filter, with weekly inspection and removal of sediment after storm events. Examples of BMPs to be implemented for the project also include retention of natural vegetation where feasible, use of sediment basins, sediment traps, silt fences, sand bags and vegetated filter strips, as well as including vegetating cut and fill of slopes after grading work is completed and maintaining these measures until grass and vegetation are established in the area. Refer to **Appendix "B"**, Sheets C-3 and C-4.

The project will include some measures recommended by the U.S. Fish and Wildlife Service, such as use of silt containment devices, no project related stockpiling in waters or beach habitats, and curtailing work during inclement weather.

As recommended by the County of Maui, Department of Water Supply, staging and storage of construction material shall not occur on the beach,

erosion control barriers will be properly maintained and installed, and construction debris and sediment will be removed from the construction site each day.

Significant adverse effects on the adjacent or downstream properties are not anticipated from this project as the proposed drainage improvement will be designed to accommodate peak discharge rates.

The proposed project is expected to be beneficial for the community in the region as it is intended to provide a reliable drainage culverts system. Refer to **Appendix "A"**.

5. Electricity, Telephone Systems, and Cable Television Services

a. Existing Conditions

Electrical, telephone, and cable television services for the West Maui region are provided by Maui Electric Company, Ltd. (MECO), Hawaiian Telcom, and Oceanic Time Warner Cable Company, respectively. Overhead utility lines are located on the mauka (east) side of Lower Honoapi'ilani Road in the vicinity of the project area.

b. Potential Impacts and Mitigation Measures

The proposed project includes the relocation of one (1) existing overhead utility pole located on the north side of Lower Honoapi'ilani Road. The utility pole will be moved to a location in the near vicinity and outside of the project area. There will be coordination with MECO, Hawaiian Telcom, Oceanic Time Warner Cable Company, and DPW regarding project implementation. The project is limited to drainage culvert replacement and associated improvements and is not anticipated to have an adverse impact on existing electrical, telephone, or cable television systems, nor is it expected to extend existing service area limits.

E. CUMULATIVE AND SECONDARY IMPACTS

Cumulative impacts are defined by Title 11, Chapter 200, Hawai'i Administrative Rules (HAR), Environmental Impact Statement Rules as:

> *...the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from*

individually minor but collectively significant actions taking place over a period of time.

A "secondary impact" or "indirect effect" from the proposed action are defined by Title 11, Chapter 200, HAR as

> *...effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.*

In this case, the context for analyzing secondary and cumulative impacts is defined by the time horizon within which "reasonably foreseeable" conditions may occur. From a local planning standpoint, the future context for stormwater drainage system improvements and development is established by the Maui County General Plan (General Plan). The General Plan defines parameters for growth. The document plans for the horizon year 2030 and "reasonably foreseeable" conditions may be considered within this future context.

The Maui County General Plan, as set forth in Chapter 2.80.B of the Maui County Code, provides for the update of the County General Plan. The General Plan is a long-term, comprehensive blueprint for the physical, economic, environmental development and cultural identity of the County through 2030. The components of the General Plan include the following:

- The Countywide Policy Plan provides broad policies and objectives which portrays the desired direction of the County's future. It includes a countywide vision, statement of core principles, and objectives and policies for population, land use, the environment, the economy, and housing.

- The Maui Island Plan (MIP) provides a land use strategy and natural hazard strategy to protect life and property, an implementation strategy, and milestone measurements. An essential element of the MIP is a Managed and Directed Growth Plan which identifies existing and future land use patterns and determines planned growth.

- The nine (9) Community Plans provide implementing actions based on consistency with the Countywide Policy Plan and MIP's vision, goals, objectives, and policies.

A discussion of how the proposed project is consistent with specific goals, objectives, and policies of the Countywide Policy Plan, Maui Island Plan, and West Maui Community Plan are presented in Chapter III of this EA document.

Whereas the Countywide Policy Plan covers planning goals and objectives at the broadest levels, and the regional Community Plans consider specific regional needs and

opportunities, the MIP may be viewed as a parallel plan, as it address functional elements of the General Plan, and islandwide growth parameters.

The MIP is used by the County Council, Maui Planning Commission, County administration and the community as a policy foundation for day-to-day decision making by doing the following:

- Providing direction for the development of future policies and regulations (for example, zoning and other ordinances, guidelines and area-specific plans that describe what kind of development can occur where);

- Providing policies to help determine the appropriateness of development proposals; and

- Assigning resource for capital investments and programmatic initiatives.

The Directed Growth Plan, which is a key element of the MIP, provides a framework for managing outcomes of growth based on analysis of natural hazards, sensitive lands, cultural resources, scenic corridors, and related environmental and human community parameters. An important component of the Directed Growth Plan are maps that delineate urban and rural growth areas. Referred to as Urban and Rural Growth Boundaries, these maps set the boundaries for the physical limits of development. In so doing, the Directed Growth Plan seeks to manage the use of non-urban and non-rural resources important in sustaining the island to the year 2030.

The assessment of cumulative and secondary impacts is undertaken in the context of planned growth recommended by the General Plan, particularly the MIP and its Urban Growth boundary maps. The proposed urban growth boundaries provide the basis for acknowledging that the proposed project will facilitate implementation of the General Plan, as mandated by County Charter. Future public infrastructure currently envisioned by the General Plan within the project area represents the "reasonably foreseeable" future for considering projects such as this culverts replacement and related improvements project to protect the community during storm events.

In summary, the proposed project is being planned in consideration of the long-term infrastructural requirements necessary to protect the community and is not a population generator. The proposed project is not anticipated to have a significant adverse impact on the physical environment and is not anticipated to result in significant adverse secondary or cumulative impacts.

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

III

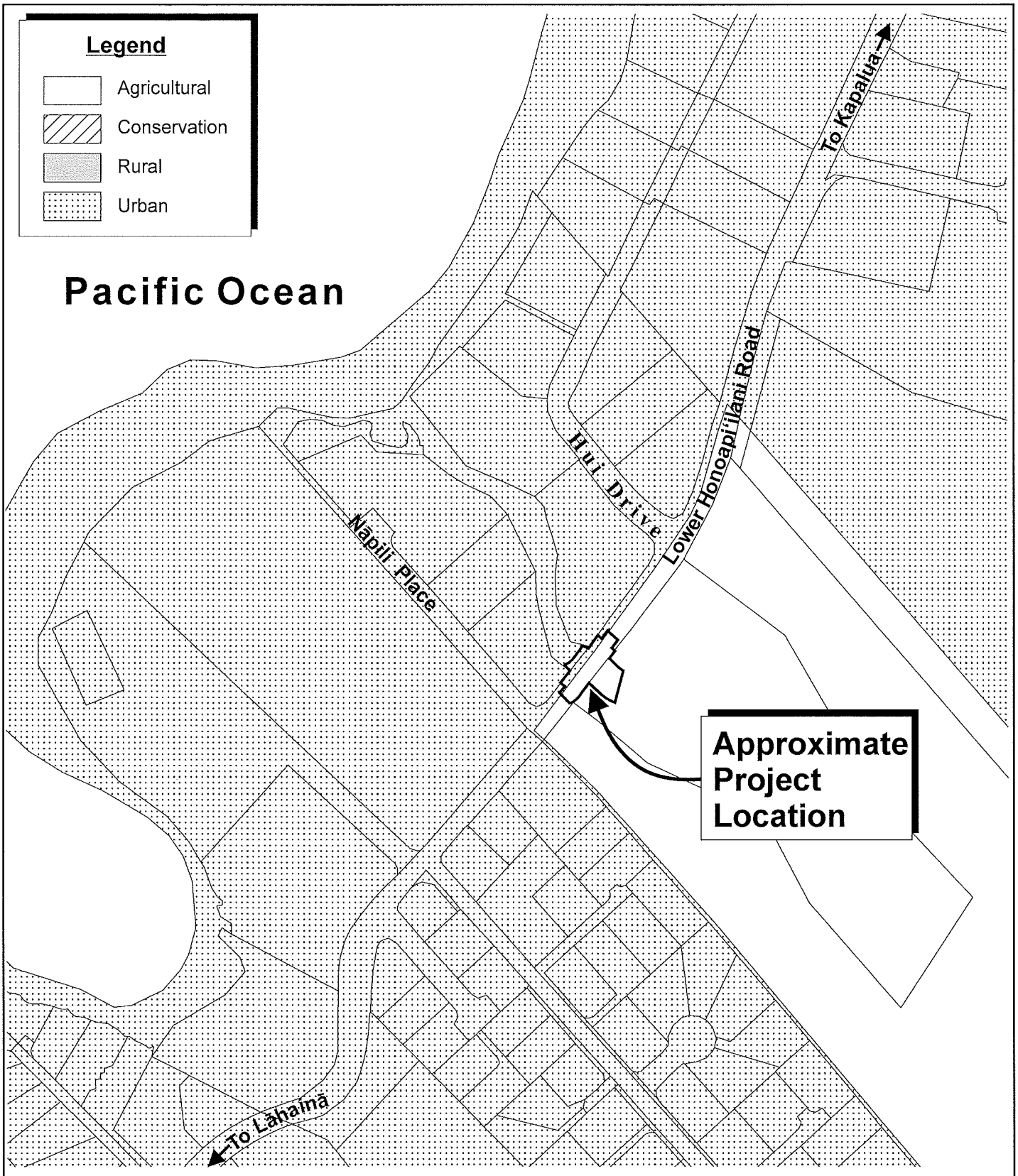
III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE DISTRICTS

Pursuant to Chapter 205, Hawai'i Revised Statutes (HRS), all lands in the State have been placed into one (1) of four (4) land use districts by the State Land Use Commission. These land use districts have been designated "Urban", "Rural", "Agricultural", and "Conservation". The proposed project will affect TMK (2)4-3-001:003 (por.) (Parcel 3); (2)4-3-002:023 (por.) (Parcel 23); and the County ROW. The State Land Use District designation for Parcel 3 is "Agricultural", for Parcel 23 is "Urban", and County ROW is "Urban" and "Agricultural". Public drainage culvert projects, including associated structures such as sidewalks, asphalt pavement, railings, vehicle barrier, curb and gutter, drainage catch basin and drainline, are permitted uses within the State "Agricultural" and "Urban" districts. See **Figure 11**.

B. CHAPTER 226, HRS, HAWAI'I STATE PLAN

Chapter 226, HRS, also known as the Hawai'i State Plan, is a long-range comprehensive plan which serves as a guide for the future long-term development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The Plan consists of three (3) parts. Part I includes the Overall Theme, Goals, Objectives, and Policies; Part II includes Planning, Coordination, and Implementation; and Part III establishes Priority Guidelines. Inasmuch as Part II of the State Plan covers its administrative structure and implementation process, discussion of the proposed project's applicability to Part II is not appropriate. Below is an analysis of the project's applicability to Part I and Part III of the Hawai'i State Plan.



Source: State of Hawaii, Land Use Commission

Figure 11 Nāpili Culverts Replacement Project
State Land Use District Map

0 125 Feet
62.5 250

Prepared for: County of Maui, Department of Public Works

MUNEKIYO HIRAGA

FE\DPW Napili Culvert\Applications\Figures\SLUD Map.DEA

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
HRS 226-1: Findings and Purpose			
HRS 226-2: Definitions			
HRS 226-3: Overall Theme			
HRS 226-4: State Goals. In order to guarantee, for the present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self determination, it shall be the goal of the State to achieve: (1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations. (2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people. (3) Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.			
Analysis: *The proposed project improvements are relative to replacing aging drainage infrastructure, and would serve to provide area residents with the security and reliability of said infrastructure*			
Chapter 226-5 Objective and Policies for Population			
Objective: It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic and social objectives contained in this chapter.			
Policies:			
(1) Manage population growth statewide in a manner that provides increased opportunities for Hawaii's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.			✓
(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.	✓		
(3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.			✓
(4) Encourage research activities and public awareness programs to foster an understanding of Hawaii's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawaii's population.			✓
(5) Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.			✓
(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.			✓
(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
Analysis: *While the purpose of the proposed project is to replace aging drainage infrastructure, there will be support of the local economy through the construction employment opportunities as well as the purchase of goods and services related to the construction.*			
Chapter 226-6 Objectives and policies for the economy – – in general			
Objectives: Planning for the State's economy in general shall be directed toward achievement of the following objectives:			
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			✓
(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.			✓
Policies:			
(1) Promote and encourage entrepreneurship within Hawaii by residents and nonresidents of the State.			✓
(2) Expand Hawaii's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.			✓
(3) Promote Hawaii as an attractive market for environmentally and socially sound investment activities that benefit Hawaii's people.			✓
(4) Transform and maintain Hawaii as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.			✓
(5) Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawaii.			✓
(6) Seek broader outlets for new or expanded Hawaii business investments.			✓
(7) Expand existing markets and penetrate new markets for Hawaii's products and services.			✓
(8) Assure that the basic economic needs of Hawaii's people are maintained in the event of disruptions in overseas transportation.			✓
(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.	✓		
(10) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawaii's small scale producers, manufacturers, and distributors.			✓
(11) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.	✓		
(12) Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawaii.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(13) Foster greater cooperation and coordination between the government and private sectors in developing Hawaii's employment and economic growth opportunities.			✓
(14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.			✓
(15) Maintain acceptable working conditions and standards for Hawaii's workers.	✓		
(16) Provide equal employment opportunities for all segments of Hawaii's population through affirmative action and nondiscrimination measures.			✓
(17) Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			✓
(18) Encourage businesses that have favorable financial multiplier effects within Hawaii's economy, particularly with respect to emerging industries in science and technology.			✓
(19) Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.			✓
(20) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new or innovative potential growth industries in particular.			✓
(21) Foster a business climate in Hawaii--including attitudes, tax and regulatory policies, and financial and technical assistance programs--that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.			✓
Analysis: *As previously noted, the proposed project improvements will provide support of the local economy through the construction employment and the purchase of goods and services related to the construction. Further, the County of Maui DPW is ensuring the drainage infrastructure in the area is functional for the area.*			
Chapter 226-7 Objectives and policies for the economy – – agriculture.			
Objectives: Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:			
(1) Viability of Hawaii's sugar and pineapple industries.			✓
(2) Growth and development of diversified agriculture throughout the State.			✓
(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.			✓
Policies:			
(1) Establish a clear direction for Hawaii's agriculture through stakeholder commitment and advocacy.			✓
(2) Encourage agriculture by making the best use of natural resources.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies **Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable**	**S**	**N/S**	**N/A**
(3) Provide the governor and the legislature with information and options needed for prudent decision-making for the development of agriculture.			✓
(4) Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.			✓
(5) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawaii's economy.			✓
(6) Seek the enactment and retention of federal and state legislation that benefits Hawaii's agricultural industries.			✓
(7) Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawaii's food producers and consumers in the State, nation, and world.			✓
(8) Support research and development activities that strengthen economic productivity in agriculture, stimulate greater efficiency, and enhance the development of new products and agricultural by-products.			✓
(9) Enhance agricultural growth by providing public incentives and encouraging private initiatives.			✓
(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			✓
(11) Increase the attractiveness and opportunities for an agricultural education and livelihood.			✓
(12) In addition to the State's priority on food, expand Hawaii's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.			✓
(13) Promote economically competitive activities that increase Hawaii's agricultural self-sufficiency, including the increased purchase and use of Hawaii-grown food and food products by residents, businesses, and governmental bodies as defined under section 103D-104.			✓
(14) Promote and assist in the establishment of sound financial programs for diversified agriculture.			✓
(15) Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			✓
(16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.			✓
(17) Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko i'a, māla, and irrigated lo'i, and growth of traditional Hawaiian crops, such as kalo, 'uala, and 'ulu.			✓
(18) Increase and develop small-scale farms.			✓
Analysis: *As the proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objectives and policies relative to agriculture are not applicable.*			

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
Chapter 226-8 Objective and policies for the economy – – visitor industry.			
Objectives: Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaii's economy.			
Policies:			
(1) Support and assist in the promotion of Hawaii's visitor attractions and facilities.			✓
(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people.			✓
(3) Improve the quality of existing visitor destination areas by utilizing Hawaii's strengths in science and technology.			✓
(4) Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.			✓
(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawaii's people.			✓
(6) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.			✓
(7) Foster a recognition of the contribution of the visitor industry to Hawaii's economy and the need to perpetuate the aloha spirit.			✓
(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values.			✓
Analysis: *The proposed improvements are relative to maintaining existing County of Maui drainage infrastructure and as such, are not applicable to the objective and policies for the visitor industry.*			
Chapter 226-9 Objective and policies for the economy – – federal expenditures.			
Objective: Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawaii's economy.			
Policies:			
(1) Encourage the sustained flow of federal expenditures in Hawaii that generates long-term government civilian employment;			✓
(2) Promote Hawaii's supportive role in national defense, in a manner consistent with Hawaii's social, environmental, and cultural goals by building upon dual-use and defense applications to develop thriving ocean engineering, aerospace research and development, and related dual-use technology sectors in Hawaii's economy;			✓
(3) Promote the development of federally supported activities in Hawaii that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment;			✓
(4) Increase opportunities for entry and advancement of Hawaii's people into federal government service;			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(5) Promote federal use of local commodities, services, and facilities available in Hawaii;			✓
(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaii; and			✓
(7) Pursue the return of federally controlled lands in Hawaii that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.			✓
Analysis: *The County of Maui DPW will not be utilizing Federal funds for the project, and as such, the objective and policies for federal expenditures is not applicable to the proposed project.*			
Chapter 226-10 Objective and policies for the economy – – potential growth and innovative activities.			
Objective: Planning for the State's economy with regard to potential growth and innovative activities shall be directed towards achievement of the objective of development and expansion of potential growth and innovative activities that serve to increase and diversify Hawaii's economic base.			
Policies:			
(1) Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawaii's economy, including but not limited to diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors;			✓
(2) Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawaii through the export of services or products or substitution of imported services or products;			✓
(3) Encourage entrepreneurship in innovative activity by academic researchers and instructors who may not have the background, skill, or initial inclination to commercially exploit their discoveries or achievements;			✓
(4) Recognize that innovative activity is not exclusively dependent upon individuals with advanced formal education, but that many self-taught, motivated individuals are able, willing, sufficiently knowledgeable, and equipped with the attitude necessary to undertake innovative activity;			✓
(5) Increase the opportunities for investors in innovative activity and talent engaged in innovative activity to personally meet and interact at cultural, art, entertainment, culinary, athletic, or visitor-oriented events without a business focus;			✓
(6) Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people;			✓
(7) Enhance and promote Hawaii's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts;			✓
(8) Accelerate research and development of new energy-related industries based on wind, solar, ocean, underground resources, and solid waste;			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(9) Promote Hawaii's geographic, environmental, social, and technological advantages to attract new or innovative economic activities into the State;			✓
(10) Provide public incentives and encourage private initiative to attract new or innovative industries that best support Hawaii's social, economic, physical, and environmental objectives;			✓
(11) Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research;			✓
(12) Develop, promote, and support research and educational and training programs that will enhance Hawaii's ability to attract and develop economic activities of benefit to Hawaii;			✓
(13) Foster a broader public recognition and understanding of the potential benefits of new or innovative growth-oriented industry in Hawaii;			✓
(14) Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawaii's social, economic, physical, and environmental objectives;			✓
(15) Increase research and development of businesses and services in the telecommunications and information industries;			✓
(16) Foster the research and development of nonfossil fuel and energy efficient modes of transportation; and			✓
(17) Recognize and promote health care and health care information technology as growth industries.			✓
Analysis: *As the proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objective and policies relative to potential growth and innovative activities are not applicable.*			
Chapter 226-10.5 Objectives and policies for the economy – – information industry.			
Objective: Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawaii as a leader in broadband and wireless communications and applications in the Pacific Region.			
Policies:			
(1) Promote efforts to attain the highest speeds of electronic and wireless communication within Hawaii and between Hawaii and the world, and make high speed communication available to all residents and businesses in Hawaii;			✓
(2) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawaii to accommodate future growth and innovation in Hawaii's economy;			✓
(3) Facilitate the development of new or innovative business and service ventures in the information industry which will provide employment opportunities for the people of Hawaii;			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(4) Encourage mainland- and foreign-based companies of all sizes, whether information technology-focused or not, to allow their principals, employees, or contractors to live in and work from Hawaii, using technology to communicate with their headquarters, offices, or customers located out-of-state;			✓
(5) Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry;			✓
(6) Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people;			✓
(7) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the information industry;			✓
(8) Foster a recognition of the contribution of the information industry to Hawaii's economy; and			✓
(9) Assist in the promotion of Hawaii as a broker, creator, and processor of information in the Pacific.			✓
Analysis: *The proposed improvements are relative to maintaining existing County of Maui drainage infrastructure and as such, are not applicable to the objective and policies for the economy relative to the information industry.*			
Chapter 226-11 Objectives and policies for the physical environment – – land based, shoreline, and marine resources.			
Objectives: Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:			
(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.	✓		
(2) Effective protection of Hawaii's unique and fragile environmental resources.	✓		
Policies:			
(1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.	✓		
(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.	✓		
(3) Take into account the physical attributes of areas when planning and designing activities and facilities.	✓		
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.	✓		
(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.			✓
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.			✓
(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(8) Pursue compatible relationships among activities, facilities, and natural resources.			✓
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.			✓
Analysis: *Best Management Practices (BMPs) will be incorporated into the project construction to mitigate potential impacts during construction. Also, with the proposed project improvements, low impact considerations were incorporated into the project design including the use of open vegetated channels and the open concrete mat material.*			
Chapter 226-12 Objective and policies for the physical environment – – scenic, natural beauty, and historic resources.			
Objective: Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.			
Policies:			
(1) Promote the preservation and restoration of significant natural and historic resources.			✓
(2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.			✓
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.			✓
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.			✓
(5) Encourage the design of developments and activities that complement the natural beauty of the islands.			✓
Analysis: *As the proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objective and policies relative to physical environment relative to scenic, natural beauty and historic resources are not applicable.*			
Chapter 226-13 Objectives and policies for the physical environment – – land, air, and water quality.			
Objectives: Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives.			
(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.	✓		
(2) Greater public awareness and appreciation of Hawaii's environmental resources.			✓
Policies:			
(1) Foster educational activities that promote a better understanding of Hawaii's limited environmental resources.			✓
(2) Promote the proper management of Hawaii's land and water resources.	✓		

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.	✓		
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.			✓
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	✓		
(6) Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.	✓		
(7) Encourage urban developments in close proximity to existing services and facilities.			✓
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.			✓
Analysis: *As previously noted, BMPs will be incorporated into the project construction to mitigate potential impacts during construction. Also, with the improvements proposed for the project, low impact considerations were incorporated into the project design including the use of open vegetated channels and the open concrete mat material. Further, upon completion of the project improvements, the drainage system in the area will be improved.*			
Chapter 226-14 Objective and policies for facility systems – – in general.			
Objective: Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.			
Policies:			
(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.	✓		
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.			✓
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.			✓
(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.			✓
Analysis: *The proposed project improvements are relative to replacing aging drainage infrastructure, and would serve to provide security and reliability of the drainage infrastructure.*			
Chapter 226-15 Objectives and policies for facility systems – – solid and liquid waste.			
Objectives: Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:			
(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.			✓
Policies:			
(1) Encourage the adequate development of sewerage facilities that complement planned growth.			✓
(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.			✓
(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.			✓
Analysis: *As the proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objectives and policies relative to facility systems – liquid and solid wastes are not applicable.*			
Chapter 226-16 Objective and policies for facility systems – – water.			
Objective: Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.			
Policies:			
(1) Coordinate development of land use activities with existing and potential water supply.			✓
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.			✓
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.			✓
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.			✓
(5) Support water supply services to areas experiencing critical water problems.			✓
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.			✓
Analysis: *The proposed improvements are relative to maintaining existing County of Maui drainage infrastructure and as such, are not applicable to the objective and policies for facility systems -- water.*			
Chapter 226-17 Objectives and policies for facility systems – – transportation.			
Objectives: Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:			
(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.			✓
(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
Policies:			
(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;			✓
(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;			✓
(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;			✓
(4) Provide for improved accessibility to shipping, docking, and storage facilities;			✓
(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;			✓
(6) Encourage transportation systems that serve to accommodate present and future development needs of communities;			✓
(7) Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods;			✓
(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;			✓
(9) Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;			✓
(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment;			✓
(11) Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;			✓
(12) Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and			✓
(13) Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.			✓
Analysis: *The proposed improvements are relative to maintaining existing County of Maui drainage infrastructure and as such, are not applicable to the objectives and policies for facility systems – transportation.*			
Chapter 226-18 Objectives and policies for facility systems – – energy.			
Objectives: Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:			
(1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;			✓
(2) Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawaii's dependence on imported fuels for electrical generation and ground transportation.			✓
(3) Greater diversification of energy generation in the face of threats to Hawaii's energy supplies and systems;			✓
(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(5) Utility models that make the social and financial interests of Hawaii's utility customers a priority.			✓
(b) To achieve the energy objectives, it shall be the policy of this State to ensure the short- and long-term provision of adequate, reasonably prices, and dependable energy services to accommodate demand.			✓
Policies:			
(1) Support research and development as well as promote the use of renewable energy sources;			✓
(2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;			✓
(3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;			✓
(4) Promote all cost-effective conservation of power and fuel supplies through measures, including:			✓
(A) Development of cost-effective demand-side management programs;			✓
(B) Education;			✓
(C) Adoption of energy-efficient practices and technologies; and			✓
(D) Increasing energy efficiency and decreasing energy use in public infrastructure			✓
(5) Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems uses the least-cost energy supply option and maximizes efficient technologies; and			✓
(6) Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies;			✓
(7) Promote alternate fuels and transportation energy efficiency;			✓
(8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications;			✓
(9) Support actions that reduce, avoid, or sequester Hawaii's greenhouse gas emissions through agriculture and forestry initiatives;			✓
(10) Provide priority handling and processing for all state and county permits required for renewable energy projects;			✓
(11) Ensure that liquefied natural gas is used only as a cost-effective transitional, limited-term replacement of petroleum for electricity generation and does not impede the development and use of other cost-effective renewable energy sources; and			✓
(12) Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawaii.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
Analysis: *As the proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objectives and policies relative to facility systems – energy, are not applicable.*			
Chapter 226-18.5 Objectives and policies for facility systems – – telecommunications.			
Objectives: (a) Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people. (b) To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand.			
Policies:			
(1) Facilitate research and development of telecommunications systems and resources;			✓
(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;			✓
(3) Promote efficient management and use of existing telecommunications systems and services; and			✓
(4) Facilitate the development of education and training of telecommunications personnel.			✓
Analysis: *The proposed improvements are relative to maintaining existing County of Maui drainage infrastructure and as such, are not applicable to the objectives and policies for facility systems – telecommunications.*			
Chapter 226-19 Objectives and policies for socio-cultural advancement – – housing.			
Objectives: Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			
(1) Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-, low- and moderate-income segments of Hawaii's population.			✓
(2) The orderly development of residential areas sensitive to community needs and other land uses.			✓
(3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawaii's people.			✓
Policies:			
(1) Effectively accommodate the housing needs of Hawaii's people.			
(2) Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.			✓
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.			✓
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.			✓
(6) Facilitate the use of available vacant, developable, and underutilized urban lands for housing.			✓
(7) Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the culture and values of the community.			✓
(8) Promote research and development of methods to reduce the cost of housing construction in Hawaii.			✓
Analysis: *As the proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objectives and policies relative to socio-cultural advancement – housing, are not applicable.*			
Chapter 226-20 Objectives and policies for socio-cultural advancement – – health.			
Objectives: Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:			
(1) Fulfillment of basic individual health needs of the general public.			✓
(2) Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.	✓		
(3) Elimination of health disparities by identifying and addressing social determinants of health.			✓
Policies:			
(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.			✓
(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.			✓
(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.			✓
(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.			✓
(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.			✓
(6) Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(7) Prioritize programs, services, interventions, and activities that address identified social determinants of health to improve native Hawaiian health and well-being consistent with the United States Congress' declaration of policy as codified in title 42 United States Code section 11702, and to reduce health disparities of disproportionately affected demographics, including native Hawaiians, other Pacific Islanders, and Filipinos. The prioritization of affected demographic groups other than native Hawaiians may be reviewed every ten years and revised based on the best available epidemiological and public health data.			✓
Analysis: *The proposed project improvements are relative to replacing aging drainage infrastructure, and would serve to provide area residents with the security and reliability of said infrastructure.*			
Chapter 226-21 Objectives and policies for Socio-cultural advancement – – education.			
Objective: Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.			
Policies:			
(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.			✓
(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.			✓
(3) Provide appropriate educational opportunities for groups with special needs.			✓
(4) Promote educational programs which enhance understanding of Hawaii's cultural heritage.			✓
(5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.			✓
(6) Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.			✓
(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.			✓
(8) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.			✓
(9) Support research programs and activities that enhance the education programs of the State.			✓
Analysis: *The proposed improvements are relative to maintaining existing County of Maui drainage infrastructure and as such, are not applicable to the objective and policies relative to socio-cultural advancement--education.*			

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
Chapter 226-22 Objective and policies for socio-cultural advancement – – social services.			
Objective: Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.			
Policies:			
(1) Assist individuals, especially those in need of attaining a minimally adequate standard of living and those confronted by social and economic hardship conditions, through social services and activities within the State's fiscal capacities.			✓
(2) Promote coordination and integrative approaches among public and private agencies and programs to jointly address social problems that will enable individuals, families, and groups to deal effectively with social problems and to enhance their participation in society.			✓
(3) Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawaii's communities.			✓
(4) Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.			✓
(5) Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.			✓
(6) Promote programs which assist people in need of family planning services to enable them to meet their needs.			✓
Analysis: *The proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objective and policies relative to socio-cultural advancement—social services, are not applicable.*			
Chapter 226-23 Objective and policies for socio-cultural advancement – – leisure.			
Objective: Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.			
Policies:			
(1) Foster and preserve Hawaii's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			✓
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.			✓
(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.			✓
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.			✓
(5) Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.			✓
(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawaii's people.			✓
(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			✓
(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawaii's population to participate in the creative arts.			✓
(10) Assure adequate access to significant natural and cultural resources in public ownership.			✓
Analysis: *The proposed improvements are relative to maintaining existing County of Maui drainage infrastructure and as such, are not applicable to the objective and policies relative to socio-cultural advancement--leisure.*			
Chapter 226-24 Objective and policies for socio-cultural advancement – – individual rights and personal well-being.			
Objective: Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations.			
Policies:			
(1) Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.			✓
(2) Uphold and protect the national and state constitutional rights of every individual.			✓
(3) Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.			✓
(4) Ensure equal opportunities for individual participation in society.			✓
Analysis: *The proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objective and policies relative to socio-cultural advancement—individual rights and personal well-being, are not applicable.*			
Chapter 226-25 Objective and policies for socio-cultural advancement – – culture.			
Objective: Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaii's people.			
Policies:			
(1) Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritages and the history of Hawaii.			✓
(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawaii's people and which are sensitive and responsive to family and community needs.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawaii.			✓
(4) Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawaii's people and visitors.			✓
Analysis: *The proposed improvements are relative to maintaining existing County of Maui drainage infrastructure and as such, are not applicable to the objective and policies relative to socio-cultural advancement—culture.*			
Chapter 226-26 Objectives and policies for socio-cultural advancement – – public safety.			
Objective: Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:			
(1) Assurance of public safety and adequate protection of life and property for all people.	✓		
(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.	✓		
(3) Promotion of a sense of community responsibility for the welfare and safety of Hawaii's people.			✓
Policies:			
(1) Ensure that public safety programs are effective and responsive to community needs.			✓
(2) Encourage increased community awareness and participation in public safety programs.			✓
Policies:			
(1) Support criminal justice programs aimed at preventing and curtailing criminal activities.			✓
(2) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.			✓
(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.			✓
Policies:			
(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.			✓
(2) Enhance the coordination between emergency management programs throughout the State.			✓
Analysis: *The proposed project improvements are relative to replacing aging drainage infrastructure, and would serve to provide area residents with the security and reliability of said infrastructure.*			

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
Chapter 226-27 Objectives and policies for socio-cultural advancement – – government.			
Objectives: Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:			
(1) Efficient, effective, and responsive government services at all levels in the State.			✓
(2) Fiscal integrity, responsibility, and efficiency in the state government and county governments.			✓
Policies:			
(1) Provide for necessary public goods and services not assumed by the private sector.			✓
(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.			✓
(3) Minimize the size of government to that necessary to be effective.			✓
(4) Stimulate the responsibility in citizens to productively participate in government for a better Hawaii.			✓
(5) Assure that government attitudes, actions, and services are sensitive to community needs and concerns.			✓
(6) Provide for a balanced fiscal budget.			✓
(7) Improve the fiscal budgeting and management system of the State.			✓
(8) Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.			✓
Analysis: *As the proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure, the objectives and policies relative to socio-cultural advancement – government are not applicable.*			

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
Chapter 226-101: Purpose. The purpose of this part is to establish overall priority guidelines to address areas of statewide concern.			
Chapter 226-102: Overall direction. The State shall strive to improve the quality of life for Hawaii's present and future population through the pursuit of desirable courses of action in seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.			
Chapter 226-103: Economic priority guidelines.			
(a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy:			
(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.			✓
(A) Encourage investments which:			✓

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(i) Reflect long term commitments to the State;			✓
(ii) Rely on economic linkages within the local economy;			✓
(iii) Diversify the economy;			✓
(iv) Reinvest in the local economy;			✓
(v) Are sensitive to community needs and priorities; and			✓
(vi) Demonstrate a commitment to provide management opportunities to Hawaii residents; and			✓
(B) Encourage investments in innovative activities that have a nexus to the State, such as:			✓
(i) Present or former residents acting as entrepreneurs or			✓
(ii) Academic support from an institution of higher education in Hawaii;			✓
(iii) Investment interest from Hawaii residents;			✓
(iv) Resources unique to Hawaii that are required for innovative activity; and			✓
(v) Complementary or supportive industries or government programs or projects.			✓
(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.			✓
(3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.			✓
(4) Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			✓
(5) Streamline the processes for building and development permit and review, and telecommunication infrastructure installation approval and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where scientific evidence indicates that public health, safety and welfare would not be adversely affected.			✓
(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawaii's small-scale producers, manufacturers, and distributors.			✓
(7) Continue to seek legislation to protect Hawaii from transportation interruptions between Hawaii and the continental United States.			✓
(8) Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:			✓
(A) An industry that can take advantage of Hawaii's unique location and available physical and human resources.			✓
(B) A clean industry that would have minimal adverse effects on Hawaii's environment.			✓
(C) An industry that is willing to hire and train Hawaii's people to meet the industry's labor needs at all levels of employment.			✓
(D) An industry that would provide reasonable income and steady employment.			✓
(9) Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawaii business.			✓
(10) Enhance the quality of Hawaii's labor force and develop and maintain career opportunities for Hawaii's people through the following actions:			✓

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(A) Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.			✓
(B) Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.			✓
(C) Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.			✓
(D) Promote career opportunities in all industries for Hawaii's people by encouraging firms doing business in the State to hire residents.			✓
(E) Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on- the-job training opportunities.			✓
(F) Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.			✓
(b) Priority guidelines to promote the economic health and quality of the visitor industry:			
(1) Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawaii's residents and visitors.			✓
(2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.			✓
(3) Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.			✓
(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaii's significant natural, scenic, historic, and cultural resources.			✓
(5) Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions.			✓
(6) Support and coordinate tourism promotion abroad to enhance Hawaii's share of existing and potential visitor markets.			✓
(7) Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			✓
(8) Support law enforcement activities that provide a safer environment for both visitors and residents alike.			✓
(9) Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.			✓
(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:			
(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			✓
(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawaii.			✓
(3) Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			✓

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:			
(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.			✓
(2) Assist in providing adequate, reasonably priced water for agricultural activities.			✓
(3) Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.			✓
(4) Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing			✓
(5) Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawaii's agricultural community.			✓
(6) Seek favorable freight rates for Hawaii's agricultural products from interisland and overseas transportation operators.			✓
(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.			✓
(8) Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and			✓
(9) Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			✓
(10) Support the continuation of land currently in use for diversified			✓
(11) Encourage residents and visitors to support Hawaii's farmers by purchasing locally grown food and food products.			✓
(e) Priority guidelines for water use and development:			
(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.			✓
(2) Encourage the improvement of irrigation technology and promote the use of nonpotable water for agricultural and landscaping purposes.			✓
(3) Increase the support for research and development of economically feasible alternative water sources.			✓
(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.			✓
(f) Priority guidelines for energy use and development:			
(1) Encourage the development, demonstration, and commercialization of renewable energy sources.			✓
(2) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.			✓
(3) Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.			✓
(4) Encourage the development and use of energy conserving and cost-efficient transportation systems.			✓

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(g) Priority guidelines to promote the development of the information industry:			
(1) Establish an information network, with an emphasis on broadband and wireless infrastructure and capability, that will serve as the foundation of and catalyst for overall economic growth and diversification in Hawaii.			✓
(2) Encourage the development of services such as financial data processing, a products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.			✓
(3) Encourage the development of small businesses in the information field such as software development; the development of new information systems, peripherals, and applications; data conversion and data entry services; and home or cottage services such as computer programming, secretarial, and accounting services.			✓
(4) Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.			✓
(5) Encourage research activities, including legal research in the information and telecommunications fields.			✓
(6) Support promotional activities to market Hawaii's information industry services.			✓
(7) Encourage the location or co-location of telecommunication or wireless information relay facilities in the community, including public areas, where scientific evidence indicates that the public health, safety, and welfare would not be adversely affected.			✓
Analysis: *The purpose of the proposed project is to replace aging County of Maui drainage infrastructure. The proposed project is not in conflict with the economic priority guidelines for the State.*			
Chapter 226-104: Population growth and land resources priority guidelines.			
(a) Priority guidelines to effect desired statewide growth and distribution:			
(1) Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawaii's people.			✓
(2) Manage a growth rate for Hawaii's economy that will parallel future employment needs for Hawaii's people.			✓
(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.			✓
(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.			✓
(5) Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.			✓
(6) Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.			✓
(7) Support the development of high technology parks on the neighbor islands.			✓

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(b) Priority guidelines for regional growth distribution and land resource utilization:			
(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.			✓
(2) Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.			✓
(3) Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.			✓
(4) Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.			✓
(5) In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.			✓
(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.			✓
(7) Pursue rehabilitation of appropriate urban areas.			✓
(8) Support the redevelopment of Kakaako into a viable residential, industrial, and commercial community.			✓
(9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.			✓
(10) Identify critical environmental areas in Hawaii to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.			✓
(11) Identify all areas where priority should be given to preserving rural character and lifestyle.			✓
(12) Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.			✓
(13) Protect and enhance Hawaii's shoreline, open spaces, and scenic resources.	✓		
Analysis: *The purpose of the proposed project is to replace aging County of Maui drainage infrastructure. BMP will be incorporated into the project construction to mitigate potential impacts during construction. Also, with the proposed project improvements, low impact considerations were incorporated into the project design including the use of open vegetated channels and the open concrete mat material. The proposed project is not in conflict with the population growth and land resources priority guidelines for the State.*			

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
Chapter 226-105: Crime and criminal justice.			
Priority guidelines in the area of crime and criminal justice:			
(1) Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			✓
(2) Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.			✓
(3) Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			✓
(4) Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.			✓
(5) Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			✓
(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.			✓
Analysis: *The proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure. The proposed project is not applicable to, nor in conflict with, the crime and criminal justice priority guidelines for the State.*			
Chapter 226-106: Affordable housing.			
Priority guidelines for the provision of affordable housing:			
(1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.			✓
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.			✓
(3) Improve information and analysis relative to land availability and suitability for housing.			✓
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low- and moderate-income households, gap-group households, and residents with special needs.			✓
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawaii's people for the purchase of initial owner-occupied housing.			✓
(6) Encourage public and private sector cooperation in the development of rental housing alternatives.			✓
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.			✓
(8) Give higher priority to the provision of quality housing that is affordable for Hawaii's residents and less priority to development of housing intended primarily for individuals outside of Hawaii.			✓
Analysis: *The proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure. The proposed project is not applicable to, nor in conflict with, the affordable housing priority guidelines for the State.*			

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
Chapter 226-107: Quality education.			
Priority guidelines to promote quality education:			
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;			✓
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;			✓
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education work force;			✓
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision making responsibilities;			✓
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:			✓
(A) The electronic exchange of information;			✓
(B) Statewide electronic mail; and			✓
(C) Access to the Internet.			✓
(6) Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;			✓
(7) Pursue the establishment of Hawaii's public and private universities and colleges as research and training centers of the Pacific;			✓
(8) Develop resources and programs for early childhood education;			✓
(9) Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and			✓
(10) Strengthen and expand educational programs and services for students with special needs.			✓
Analysis: *The proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure. The proposed project is not applicable to, nor in conflict with, the quality education priority guidelines for the State.*			
CHAPTER 226-108: Sustainability			
Priority guidelines and principles to promote sustainability shall include:			
(1) Encouraging balanced economic, social, community, and environmental priorities;			✓
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;			✓
(3) Promoting a diversified and dynamic economy;			✓
(4) Encouraging respect for the host culture;			✓
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations;			✓
(6) Considering the principles of the ahupuaa system; and			✓
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawaii.			✓
Analysis: *The proposed improvements are related to replacement and maintenance for existing County of Maui drainage infrastructure. The proposed project is not applicable to, nor in conflict with, the sustainability priority guidelines for the State.*			

C. WEST MAUI RIDGE TO REEF WATERSHED (DRAFT) STUDIES

Currently, the West Maui Watershed Plan is being developed in multiple phases under Section 729 of the Water Resources Development Act of 1989, with the U.S. Army Corps of Engineers and the State of Hawai'i Department of Land and Natural Resources (DLNR) as co-sponsors of the plan. Draft reports for the West Maui Watershed Plan are publicly available, however as draft documents, are subject to change. This discussion is provided for additional background and resource information.

The planning process for the watershed plan involves the efforts of Federal and State agencies with representation by the West Maui Ridge 2 Reef Working Group (WMR2RWG) for the West Maui Ridge to Reef (West Maui R2R) Initiative. The Maui representation is comprised of two (2) groups, the WMR2RWG and the Hui. Members of the WMR2RWG include representatives from the large landowners, tourism sector, agricultural sector, Native Hawaiian community, Non-Governmental Organizations (NGO), Maui County, and DLNR Division of Aquatic Resources (DAR) Maui office, which chairs the group. The Hui is a loosely affiliated group of community and NGO representatives and includes Coral Reef Alliance, Maui Nui Marine Resources Council, and the Surfrider Foundation, The Nature Conservancy, University of Hawai'i and others. Collectively, this multi-phased process is referred to as the West Maui Ridge to Reef (West Maui R2R) Initiative. The West Maui watershed includes 24,000 acres from Ka'anapali to Honolua and the proposed project is within the area identified by the West Maui R2R initiative as the Kahana watershed area. (West Maui Watershed Plan: Kahana, Honokahua and Honolua Watersheds Characterization Report-Public Review Draft March 2015).

A draft Characterization Report prepared for the Kahana, Honokahua, and Honolua Watershed area evaluated watershed processes, land use and activities (non-point pollutants) and impacts on nearshore and coral reef ecosystems. A draft Watershed Strategies and Implementation Report was also prepared for these three (3) watershed areas and provided management practices to reduce pollutants and improve water quality. The preparation of these reports and efforts is ongoing.

The objectives of the overall West Maui Watershed Plan are to:

- Reduce land-based sources of pollution impacts to Maui's coral reefs through the Year 2065 to reduce further decline of the coral ecosystem.

- Empower the West Maui community to steward the terrestrial and coral resources and drive good decision-making that benefits the resources and the community over the next 50 years.

The makai coastline of the Kahana, Honokahau, and Honolua study area extends from Kahana Beach up to Lipoa Point. The study area extends mauka into the West Maui

Mountains and includes the communities of Kahana, Nāpili, and Kapalua. The entire study area for the West Maui Watershed Study extends out to the outer reef but the focus of the draft report is on the upland and freshwater contributors of land based pollution impacts to the nearshore.

The Kahana Watershed covers 5,863 acres and is approximately seven (7) miles long by two (2) miles wide. The highest point of the Kahana Watershed is 4,468 feet elevation. The western boundary is formed by approximately 5 miles of coastline, stretching from Kahana Beach (near the Kapalua Airport) to Makāluapuna Point. The developed area along the coast includes the residential communities and resorts of Kahana, Nāpili, and Kapalua. Additional named drainages and streams include Kahana Iki Gulch, Pulepule Gulch, and Mailepai Stream, which all merge into Kahana Stream in its lower reach. North of Kahana Stream are the gulches and watersheds of Ka'ōpala, Honokeana and Nāpili, including both Nāpili 4/5 and Nāpili 2/3.

In response to algal blooms and large pulses of sediment laden stream and gulch flows that occurred in ocean waters in the late 1980s and early 1990s, government agencies and landowners (primarily Maui Land & Pineapple) constructed dams and desilting basins. Five (5) desilting basins were designed by Natural Resource Conservation Service with Public Law 83-566 funding. Kahana, Ka'ōpala, and Honokeana basins are mauka of Honoapi'ilani Highway and Nāpili 4/5 and Nāpili 2/3 are makai of the highway. All basins were constructed within the channel of streams and gulches. The process began in 1976 with U.S. Soil Conservation Service development of the Honolua Watershed Study covering the Kahana Watershed area. The study assessed the potential environmental impacts of desilting basins and floodwater diversion to *"reduce annual floodwater, erosion, and sediment damages; improve the quality of coastal waters; reduce damage to marine habitat; improve social and economic conditions; and reduce risk of loss of life"*. The basins and channels were primarily designed to reduce sediments from runoff from pineapple fields. While the dams and associated desilting basins were primarily designed to capture sediments carried in runoff, the structures capture some runoff from flood events, thereby providing some flood control. The basins are intended to detain water and allow suspended sediments to settle out before the water reached the ocean. Some basin designs included a mechanism for adjusting the water height behind the dam before flowing over a spillway to the ocean. Each basin also had an emergency spillway to prevent a build-up of water behind the dam that might pose a threat to people and property (West Maui Watershed Plan: Kahana, Honokahua and Honolua Watersheds Characterization Report-Public Review Draft, March 2015).

Upstream of the proposed culvert replacement improvements project is the Napili 4/5 desilting basin which was constructed in 1985 and is regulated under DLNR's Dam Safety Program. The Nāpili Bay and Beach Foundation recommended the installation of a valve retrofit to increase the functionality of the desilting basin, as well as excavating the basin to increase its capacity. With that installation, during small storm events, a

longer retention time occurs to allow more sediment to settle and prevents its discharge into the ocean and during larger storm events. In 2013, the County of Maui removed 188 cubic yards of sediment from the basin (West Maui Watershed Plan: Kahana, Honokahua and Honolua Watersheds Characterization Report-Public Review Draft, March 2015).

Based on an assessment of approximately seven (7) years of data, within the three (3) watersheds, Kahana Stream is listed as impaired, as are the coastal waters at six (6) locations off Kahana Watershed (Kahana Village, Kahana Cove, Ka'ōpala Bay, Kahana Sunset, Nāpili Bay and Kapalua [Flemings Beach South]). In addition, the entire nearshore waters to 60 feet are also listed as impaired. Nāpili Place provides public access to Nāpili Bay and is frequently lined with cars. The road shoulders are eroding and sediments and pollutants from vehicles are transported directly into the ocean at the south end of Nāpili Bay (West Maui Watershed Plan: Kahana, Honokahua and Honolua Watersheds Characterization Report-Public Review Draft, March 2015).

The draft Watershed Strategies and Implementation Report includes some possible management measure to prevent and limit pollutant sources in the urban area (West Maui Water Shed Plan: Kahana, Honokahua and Honolua Watersheds Strategies and Implementation Report (Public Review Draft November 2015). As discussed in this EA, the proposed project includes an Erosion Control Best Management Plan to mitigate the potential for sediments to reach the nearshore areas. Refer to **Appendix "B"**, Sheet C-3 and Sheet C-4. Examples of management measures to be implemented for the proposed culvert replacement project include vegetated filter strip to slow runoff and filter out sediments; use of temporary gravel apron (approximately 50 feet long by 30 feet wide) to prevent tracking of sediments onto the road, sodding or planting immediately after completion of grading, install silt fence and remove sediments when it reaches eight (8) inches in height; install grated inlet filter and maintain devices by removing sediment after each storm event. Further, the Nāpili Culverts replacement project would be in consonance with the objective of the West Maui Watershed Plan.

The proposed culvert replacement project includes best management practices to avoid and minimize potential impacts from sediment on nearshore waters.

D. GENERAL PLAN OF THE COUNTY OF MAUI

As indicated by the Maui County Charter, the purpose of the general plan shall be to:

> *... indicate desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns and*

characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density; land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development.

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan. The Countywide Policy Plan was adopted as Ordinance No. 3732 on March 24, 2010.

With regard to the Countywide Policy Plan, Section 2.80B.030 of the Maui County Code states the following:

The countywide policy plan shall provide broad policies and objectives which portray the desired direction of the County's future. The countywide policy plan shall include:

1. *A vision for the County;*
2. *A statement of core themes or principles for the County; and*
3. *A list of countywide objectives and policies for population, land use, the environment, the economy, and housing.*

Core principles set forth in the Countywide Policy Plan are listed as follows:

1. *Excellence in the stewardship of the natural environment and cultural resources;*
2. *Compassion for and understanding of others;*
3. *Respect for diversity;*
4. *Engagement and empowerment of Maui County residents;*
5. *Honor for all cultural traditions and histories;*
6. *Consideration of the contributions of past generations as well as the needs of future generations,*
7. *Commitment to self-sufficiency;*
8. *Wisdom and balance in decision making;*

9. *Thoughtful, island appropriate innovation; and*

10. *Nurturance of the health and well-being of our families and our communities.*

Congruent with these core principles, the Countywide Policy Plan identifies goals objectives, policies and implementing actions for pertinent functional planning categories, which are identified as follows:

1. *Natural environment*

2. *Local cultures and traditions*

3. *Education*

4. *Social and healthcare services*

5. *Housing opportunities for residents*

6. *Local economy*

7. *Parks and public facilities*

8. *Transportation options*

9. *Physical infrastructure*

10. *Sustainable land use and growth management*

11. *Good governance*

With respect to the proposed project, the following goals, objectives, policies and implementing actions are illustrative of the project's compliance with the Countywide Policy Plan.

PROTECT THE NATURAL ENVIRONMENT

Goal:

Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity.

Objective:

Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.

Policies:

- *Regulate the use and maintenance of storm-water treatment systems that incorporate the use of native vegetation and mimic natural systems.*

IMPROVE PHYSICAL INFRASTRUCTURE

Goal:

Maui County's physical infrastructure will be maintained in optimum condition and will provide for and effectively serve the needs of the County through clean and sustainable technologies.

Objective:

Directed growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.

Policies:

Capitalize on existing infrastructure capacity as a priority over infrastructure expansions.

Objective:

Improve the planning and management of infrastructure systems.

Policies:

- *Provide a reliable and sufficient level of funding to enhance and maintain infrastructure system.*
- *Maintain inventories of infrastructure capacity, and project future infrastructure needs.*
- *Ensure that infrastructure is built concurrent with or prior to development.*
- *Ensure that basic infrastructure needs can be met during a disaster.*

In summary, the proposed project is consistent with the above-noted themes and principles of the Countywide Policy Plan.

E. MAUI ISLAND PLAN

The Maui Island Plan (MIP), is applicable to the island of Maui only, providing more specific policy-based strategies for population, land use, transportation, public and community facilities, water and sewage systems, visitor destinations, urban design, and other matters related to future growth.

As provided by Chapter 2.80B, the MIP shall include the following components:

1. *An island-wide land use strategy, including a managed and directed growth plan*
2. *A water element addressing supply, demand and quality parameters*
3. *A nearshore ecosystem element addressing nearshore waters and requirements for preservation and restoration*
4. *An implementation program which addresses the County's 20-year capital improvement requirements, financial program for implementation, and action implementation schedule*
5. *Milestone indicators designed to measure implementation progress of the MIP*

It is noted that Ordinance No. 4004, which adopted the MIP on December 28, 2012, does not address the component relating to the implementation program. The implementation program component of the MIP was adopted by Ordinance No. 4126 on May 29, 2014.

The MIP addresses a number of planning categories with detailed policy analysis and recommendations which are framed in terms of goals, objectives, policies, and implementing actions. These planning categories address the following areas:

1. *Population*
2. *Heritage Resources*
3. *Natural Hazards*
4. *Economic Development*
5. *Housing*
6. *Infrastructure and Public Facilities*
7. *Land Use*

Additionally, an essential element of the MIP is its directed growth plan which provides a management framework for future growth in a manner that is fiscally, environmentally, and culturally prudent. Among the directed growth management tools developed through the MIP process are maps delineating urban growth boundaries (UGB), small town boundaries (SRB) and rural growth boundaries (RGB). The respective boundaries identify areas appropriate for growth and their corresponding intent with respect to development character.

The proposed infrastructure improvements project is located within the UGB. In this regard, it is consistent with the directed growth strategy defined via growth maps adopted in the MIP.

In addition, the proposed project has been reviewed with respect to pertinent goals, objectives, policies and implementing actions of the MIP. A summary of these policy statements are provided below:

NATURAL HAZARD

Goal:

3.1 Maui will be disaster resilient.

Objective:

3.1.2 Greater protection of life and property.

Policies:

3.1.2c Strengthen current development standards to minimize destruction of land and property.

3.1.2.d Encourage the use of construction techniques that reduce the potential for damage from natural hazards.

F. WEST MAUI COMMUNITY PLAN

Within Maui County, there are nine (9) community plan regions. From a General Plan implementation standpoint, each region is governed by a community plan which sets forth desired land use patterns, as well as goals, objectives, policies, and implementing actions for a number of functional areas including infrastructure-related parameters.

The West Maui Community Plan designation for Parcel 3 is "Park", for Parcel 23 is "Open Space", and for County ROW is "Multi-Family Residential". See **Figure 12**.

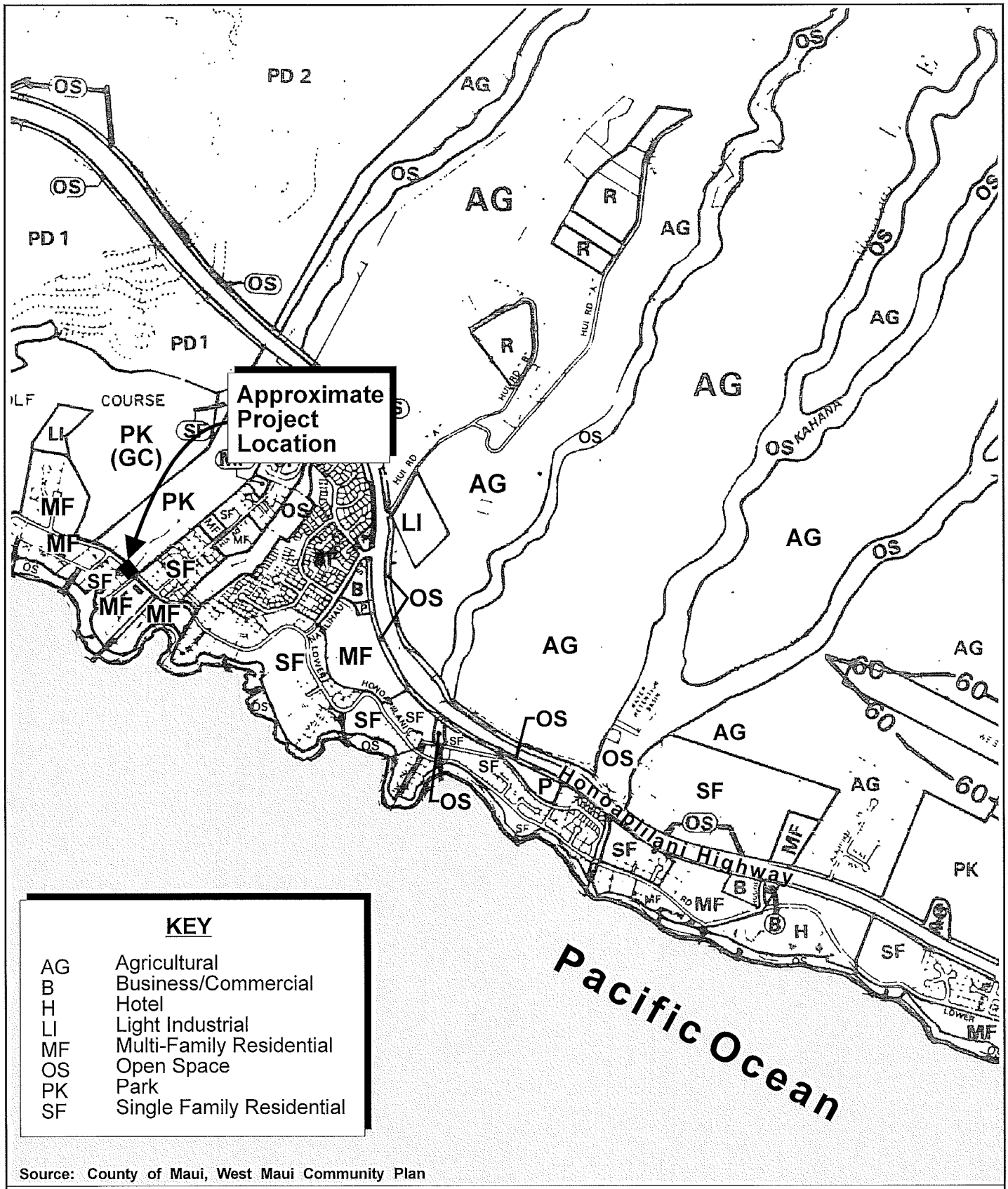
ENVIRONMENT

Goal:

A clean and attractive physical, natural and marine environment in which man-made developments on or alterations to the natural and marine environment are based on sound environmental and ecological practices, and important scenic and open space resources are preserved and protected for public use and enjoyment.

Objectives and Policies:

- *Promote drainage and stormwater management practices that prevent flooding and protect coastal water quality.*



Source: County of Maui, West Maui Community Plan

Figure 12 Nāpili Culverts Replacement Project

West Maui Community Plan

NOT TO SCALE

Prepared for: County of Maui, Department of Public Works

MUNEKIYO HIRAGA

FE\DPW Napili Culvert\Applications\Figures\W Maui Comm Plan.DEA

DRAINAGE

Objective and Policy:

- *Construct necessary drainage improvements in flood-prone areas, incorporating landscaped swales and unlined channels to provide open space continuity. Urge the use of landscaped/green belt drainage culverts as opposed to concrete-lined channels or culverts.*

- *Support the implementation of flood control projects and siltation basins mauka of Honoapi'ilani Highway to address present problem areas.*

As noted, the proposed project is in conformance with various goals, objectives, and policies of the West Maui Community Plan. The project will address deficiencies of the existing culverts system with the new replacement culverts and associated improvements to improve drainage, manage stormwater and prevent flooding.

G. COUNTY ZONING

The Maui County Zoning for Parcel 3 is "Agricultural", Parcel 23 is zoned "Nāpili Bay Civic Improvement" district, and County ROW is zoned "Interim" district. The proposed public project replaces an existing culverts system and related improvements which is nearing the end of its useful life and as such, the action does not contravene the County Zoning Ordinance.

H. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

Pursuant to Chapter 205-A, HRS, projects should be evaluated with respect to Coastal Zone Management (CZM) objectives, policies and guidelines. The CZM includes *"all lands of the state and the area extending seaward from the shoreline to the limit of the State's power and management authority, including the U.S. territorial sea".* The project site is approximately 800 feet away from the coastline and will involve work within the County of Maui's Special Management Area (SMA). A SMA Assessment application will be submitted to the Department of Planning requesting an exemption or SMA Minor Permit for the proposed culverts replacement project. The cost of the project components which are new (not existing) is estimated at less than $500,000.00. The applicability of coastal zone management considerations has been reviewed and assessed for the project as discussed in this Environmental Assessment (EA) document.

1. Recreational Resources

Objective:

Provide coastal recreational opportunities accessible to the public.

Policies:

(a) Improve coordination and funding of coastal recreational planning and management; and

(b) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS.

Response: The project site is located approximately 800 feet from the coastline. There are several beach access points near the shoreline. The existing drainage channel is not used for beach access. Over the long term, there are no

anticipated significant adverse impacts from the project on coastal recreational opportunities or existing public access to the shoreline.

2. **Historic Resources**

Objective:

Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(a) Identify and analyze significant archeological resources;

(b) Maximize information retention through preservation of remains and artifacts or salvage operations; and

(c) Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: A cultural impact assessment was conducted for the project site including cultural impact interviews. Wes Nohara and Tim Medeiros, who are familiar with the project area, expressed that they were not aware of any traditional or cultural practices on the project area or surrounding areas. As such, significant adverse impacts to cultural and historic resources are not anticipated. Refer to **Appendix "F".**

As previously discussed, the archaeological monitoring plan for the project was accepted by SHPD. See **Appendix "E"** and **Appendix "E-1"**.

3. **Scenic and Open Space Resources**

Objective:

Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(a) Identify valued scenic resources in the coastal zone management area;

(b) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

(c) *Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*

(d) *Encourage those developments which are not coastal dependent to locate in inland areas.*

Response: The project site does not lie within a coastal scenic view corridor or the shoreline. The proposed project improvements will primarily entail a low-profile new drainage culvert and associated improvements such as guardrails, a chainlink fence, road improvements, and drainage catch basin. As such, significant adverse impacts on scenic or open space resources are not anticipated from the project.

4. **Coastal Ecosystems**

Objective:

Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(a) *Improve the technical basis for natural resource management;*

(b) *Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;*

(c) *Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and*

(d) *Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.*

Response: As previously noted, the project area is located approximately 800 feet from the coastline. During storm events, the proposed culverts replacement and associated improvements project is designed to convey flood waters into the existing drainage channel which outlets into Nāpili Bay. The existing sediment basin upstream of the project area filters and removes sediments prior to discharge into the channel and ocean. Over the long term, significant adverse impacts to coastal ecosystems from the proposed project are not anticipated.

5. Economic Uses

Objective:

Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

(a) Concentrate coastal dependent development in appropriate areas;

(b) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

(c) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and

(iii) The development is important to the State's economy.

Response: The proposed project will generate short-term construction-related employment and spending which will benefit the local economy. The proposed action does not contradict the objectives and policies for economic uses.

6. Coastal Hazards

Objective:

Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence and pollution.

Policies:

(a) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

(b) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;

(c) *Ensure that developments comply with requirements of the Federal Flood Insurance Program;*

(d) *Prevent coastal flooding from inland projects; and*

(e) *Develop a coastal point and nonpoint source pollution control program.*

Response: The project site falls within Zone X and Zone AE, as indicated by the Flood Insurance Rate Map for the County of Maui. Zone X is characterized as areas of minimal flooding and Zone AE is characterized as areas of high flood risk. Refer to **Figure 8**. As previously noted, a Section 404 Department of Army (DA) Permit, State Stream Alteration Channel Permit (SCAP), and State 401 Water Quality Certification approval will be obtained (as applicable) prior to project construction. A Flood Development Permit will also be obtained from the Planning Department as may be applicable.

Best Management Practices (BMPs) will be implemented during project construction to mitigate potential erosion and stormwater impacts to downstream and nearby properties. BMPs include the installation of silt fences down-slope of the project site to contain soil, temporary berms, and cut-off ditches to control erosion and sediment control measures (e.g., basins, traps, sand bags, and vegetated filter strips). Refer to **Appendix "B"**, Sheet C-3 and Sheet C-4.

7. Managing Development

Objective:

Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

(a) *Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*

(b) *Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and*

(c) *Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.*

Response: The HRS Chapter 343 EA involves review by governmental agencies and provide for public involvement opportunities to comment on the

project. Applicable State and County requirements will be adhered to in the design and construction of the project.

8. Public Participation

Objective:

Stimulate public awareness, education, and participation in coastal management.

Policies:

(a) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;

(b) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and

(c) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: The DPW consulted with the Nāpili Bay Civic organization board members during the preliminary development of plans. Comments received from the Nāpili Bay Civic organization have been incorporated into the preliminary project plans. The DPW will continue to communicate with the organization as the project progresses. Opportunities for agency and public review will be provided as part of the review and comment process required for the EA.

9. Beach Protection

Objective:

Protect beaches for public use and recreation.

Policies:

(a) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;

(b) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(c) *Minimize the construction of public erosion-protection structures seaward of the shoreline.*

Response: During storm events, the proposed culvert project is designed to convey flood waters during storm events into the existing drainage channel which outlets to Nāpili Bay. Stormwater design of the proposed project includes open vegetated channels and reduced stormwater velocity. The decreased stormwater velocity will reduce erosion and increase permeability mitigating adverse impacts on recreational and beach areas. Over the long term, significant adverse impacts on beach resources are not anticipated.

10. Marine Resources

Objective:

Implement the State's ocean resources management plan.

Policies:

(a) *Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*

(b) *Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*

(c) *Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;*

(d) *Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;*

(e) *Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and*

(f) *Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.*

Response: During storm events, the proposed culvert project is designed to convey flood waters during storm events into the existing drainage channel which outlets to Nāpili Bay. Stormwater design of the proposed project includes open vegetated channels and reduced stormwater velocity. This design characteristic will reduce erosion and increase permeability mitigating adverse impact on ocean resources. Over the long term, significant adverse impacts on marine or coastal resources is not anticipated.

As discussed in Section II of this document, the AECOS water quality report concluded that the proposed project is not anticipated to adversely affect the already poor water quality in the muliwai of Nāpili Gulch or in the nearshore waters of Nāpili Bay. Refer to **Appendix "D"**. As recommended in the report, the project will include a BMP Plan and a monitoring and assessment plan to minimize potential adverse impacts.

I. MAUI PLANNING COMMISSION SPECIAL MANAGEMENT AREA RULES AND REGULATIONS

The Rules and Regulations of the Maui Planning Commission, Chapter 202 were established in order to implement HRS, Chapter 205A relating to Coastal Zone Management and Special Management Areas. In addition to establishing procedures for processing of SMA applications and procurement of related permits, the rules assist the Commission in giving consideration to State policy regarding coastal zones.

This section addresses the project's relationship to applicable coastal zone management considerations as set forth in the Maui Planning Commission Rules and Regulations, Chapter 202, "Special Management Area Permit Procedures", which are provided for considering the significance of potential environmental and ecological effects of a proposed action. As previously noted, a SMA Assessment application is being prepared for the proposed project and will be filed with the Department of Planning for review and processing. The criteria have been reviewed and analyzed with respect to the proposed project as follows:

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

Scientific Consultant Services, Inc. (SCS) prepared an Archaeological Monitoring Plan associated with ground disturbing subsurface activities for the proposed project, in accordance with the rules of the State Historic Preservation Division (SHPD) to ensure that if human skeletal remains are identified during subsurface work, that the protocol concerning the inadvertent discovery of human remains is followed pursuant to Hawai'i Administrative Rules (HAR). Refer to **Appendix "E"**. SCS reviewed a sampling of studies illustrating types of sites and features that may be encountered in the project area and found that Archaeological Monitoring may lead to the identification of intact or previously disturbed pre-Contact Period cultural deposits associated with temporary or permanent habitation areas, human skeletal remains (isolated find spots or in situ, articulated individuals), and Historic Period cultural deposits associated with the Plantation Era. The criteria applied by SCS for determining the need for Archaeological Monitoring was based on the soil type present in the project area and the findings of previous Archaeological Monitoring investigations. Based on

findings of previous archaeological studies conducted in the vicinity of the project site, SCS determined that the project area has the potential for yielding intact or previously disturbed cultural material. As recommended by SCS, archaeological monitoring will be conducted in the project area during construction to identify, document, and record any historic properties inadvertently identified, and to provide appropriate mitigation methods, as necessary. Refer to **Appendix "E"**. SHPD accepted the Archaeological Monitoring Plan prepared for the project. See **Appendix "E-1"**. A Cultural impact assessment conducted by interviewing persons familiar with the project area did not identify cultural or traditional resources. Refer to **Appendix "F"**. Significant adverse impacts to natural or cultural resources are not anticipated from the project.

2. **Significantly curtails the range of beneficial uses of the environment.**

The vegetation within the project area primarily consists of secondary growth. Plants within the project area include koa haole *(Leucaena leucocephala)*, coconut *(Cocos nucifera)*, papaya *(Carica sp.)*, Phothos sp., *Hibiscus rosa-sinensis*, banana *(Musa sp.)*, Octopus tree *(Scehlfflera actinophylla)*, Cook's pine *(Araucaria columnaris)*, and various grasses. The Nāpili Bay and Beach Foundation planted native Hawaiian vegetation in Nāpili Gulch, downstream of the project area.

Grading and ground disturbance is contained to the existing culvert area, and small areas above and below Lower Honoapi'ilani Road that totals less than an acre in size. All grading improvements are over 50 feet away from the toe of the embankment dam of the drainage basin. The drainage channel between the basin and culvert will be regraded to increase capacity to handle stormwater flow during peak rainfall events. The slope of the channel centerline will be increased to lessen the elevation differences at the downstream channel. A channel liner will be installed to address the increased velocity of the stormwater. Based on the "Rules for the Design of Storm Drainage Facilities in the County of Maui", the proposed drainage culvert system will be designed to handle a storm with a recurrence interval of 100 years, as the drainage area is greater than 100 acres. Refer to **Appendix "A"**, Preliminary Drainage Report.

As the proposed project replaces the existing culverts system which is nearing the end of its useful life, the proposed action is not anticipated to impact environmentally sensitive features or create long-term adverse effects to air, water, and ambient noise conditions. In this regard, the proposed action does not significantly curtail the beneficial uses of the environment.

3. **Conflicts with the county's or the state's long-term environmental policies or goals.**

The State Land Use District designation for Parcel 3 is "Agricultural", for Parcel 23 is "Urban" and County ROW is "Urban" and "Agricultural". The West Maui Community Plan designation for Parcel 3 is "Park", for Parcel 23 is "Open Space", and for County ROW is "Multi-Family Residential". The Maui County zoning for Parcel 3 is "Agricultural", Parcel 23 is zoned "Nāpili Bay Civic Improvement District" and the County ROW is zoned "Interim". The proposed project area is within the Urban Growth Boundary designated in the Maui Island Plan and involves replacing the existing drainage culverts, with new culverts. See Section E of this Chapter. The proposed action does not represent a use that conflicts with the long-term environmental goals and policies of the Hawai'i State Plan, the Maui County General Plan, or the West Maui Community Plan.

4. **Substantially affects the economic or social welfare and activities of the community, county, or state.**

In the short term, the proposed action will provide economic benefits through construction-related employment as services will be made available through local suppliers and employment of local labor. Over the long term, the proposed action will benefit the community by providing a new culvert system to handle stormwater flow in the area.

A traffic control plan will be implemented for the project, including the notification of road work to affected property owners in the vicinity through the media (e.g. newspaper, radio).

No substantial adverse long-term economic or social welfare impacts to the community, County, or State are anticipated.

5. **Involves substantial secondary impacts, such as population changes and increased effects on public facilities, streets, drainage, sewage, and water systems, and pedestrian walkways.**

The drainage culverts replacement project is not a population generator. The proposed project provides an improved culvert system and associated improvements to handle drainage in the region. As such, the proposed project will not alter the population or result in any increased demand or have an adverse effect upon existing utilities, infrastructure, or public services. The proposed action will not extend the service area limits for emergency services such as police and fire protection. In this regard, no secondary impacts are anticipated to occur as a result of the proposed action.

6. **In itself has no significant adverse effects but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.**

The proposed action is limited to a culverts replacement project and associated improvements and are not anticipated to place new demands or have a cumulative impact upon existing infrastructure or public services. As such, the proposed action is not anticipated to result in significant adverse effects on the environment and public infrastructure.

7. **Substantially affects a rare, threatened, or endangered species of animal or plant, or its habitat.**

Robert W. Hobdy conducted a survey of the project area in October 2015. The survey found that vegetation in the project area is dominated by one (1) non-native grass, Guinea grass *(Megathyrsus maximus)* which is found in all parts of the area. Much of the area is maintained in a closely mowed condition. More diversity is found with the stream channel above and below the culverts. A total of 61 plant species were recorded during the course of the survey. Of these, nine (9) were native species and the remaining 52 were non-native agricultural or roadside weeds that survey concluded are of no particular concern. The native plant species are widespread in Hawai'i. The survey found no endangered or threatened species and determined that none of the native species are candidates for such status. The flora and fauna survey noted that this disturbed environment did not include any special habitats for native plant species or ecosystems, and concluded that the project is not expected to result in significant negative impacts on native plant communities in the region. Refer to **Appendix "D"**.

Hobdy's survey found that fauna on the property is strongly dominated by non-native species. One (1) indigenous dragonfly, the green darner, was found and the survey noted that these species are common in Hawai'i and of no special conservation concern. No endangered animal species were found on the property, nor were any found that are candidates for such status. While no endangered bats were detected during the evening survey, the survey noted that bats roost in trees and rear their young in trees during summer months. The survey observed that there are no trees in the project area and any potential for disturbance for bats is not an issue. Noting that there are two (2) native birds, the endangered Hawaiian petrel and the Threatened Newell shearwater, that fly over these lowlands on the way to their burrows in the mountains, the survey recommended that any significant outdoor lighting associated with the project be shielded to direct the light downward. The project does not have lighting associated with it, and construction will occur during daylight hours. As such,

significant negative impacts on native fauna in the region is not anticipated from the proposed project. Refer to **Appendix "D"**.

AECOS's December 2015 field work included delineating the ordinary high water mark (OHWM) in Nāpili Gulch in the vicinity of the project area. The only physical characteristic that would potentially represent the OHWM within the surveyed segment in Nāpili Gulch is a change in bank slope (at the bottom of bank) along the edges of the central channel. No other physical evidence of flow could be located in the surveyed area. There will be consultation with the U.S. Army Corps of Engineers in regards to AECOS' OHWM report. Refer to **Appendix "C"**.

8. **Is contrary to the state plan, county's general plan, appropriate community plans, zoning and subdivision ordinances.**

The State Land Use District designation for Parcel 3 is "Agricultural", for Parcel 23 is "Urban" and County ROW is "Urban" and "Agricultural". The West Maui Community Plan designation for Parcel 3 is "Park", for Parcel 23 is "Open Space", and for County ROW is "Multi-Family Residential". The Maui County zoning for Parcel 3 is "Agricultural", and Parcel 23 is zoned "Nāpili Bay Civic Improvement" district and County ROW is zoned "Interim" district. The proposed project area is within the Urban Growth Boundary designated in the Maui Island Plan and involves replacing the existing drainage culverts, with new culverts. Infrastructure improvements such as the drainage improvements proposed are permitted in all of the State Land Use districts, County Zoning, and Community Plan districts. Refer to Sections A, F, and G of this Chapter. The proposed action does not represent a use that is contrary to the State plan, County's general plan, community plans and zoning ordinances.

9. **Detrimentally affects air or water quality or ambient noise levels.**

Limited construction-related impacts (i.e., noise and air quality) are anticipated. Construction activities will be carried out in compliance with Title 11, Administrative Rules, Department of Health, Chapter 46, Community Noise Control. Appropriate Best Management Practices (BMPs) will be implemented to mitigate construction-related impacts.

A report prepared by AECOS based on a water quality survey conducted in December 2015 in the vicinity of the project area. The AECOS report concluded the proposed project is not anticipated to adversely affect the already poor water quality in the muliwai of Nāpili Gulch or in the nearshore waters of Nāpili Bay. The report further states that unless a large storm occurs during construction, all work should be able to be completed in a dry setting. Refer to **Appendix "C"**. As recommended by AECOS, BMPs will be implemented as well as a monitoring

and assessment plan to minimize the potential for adverse environmental impacts and monitor any such impacts.

In the long term, the proposed action is not anticipated to result in any significant adverse air or water quality impacts, nor is it expected to adversely affect ambient noise levels.

10. **Affects an environmentally sensitive area, such as flood plain, shoreline, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh waters, or coastal waters.**

According to the Flood Insurance Rate Map, the project site is within a floodway area in Zone AE, an area subject to inundation due to stormwater from upland areas. (FEMA Firm Panel 1500030262F) The base flood elevation at the project site ranges from 25 feet AMSL to 31 feet AMSL. Refer to **Figure 8**.

As the proposed project area is in a special designated flood zone, a Special Flood Hazard Development Permit will be obtained from the Department of Planning, as may be applicable.

The project area is a non-habitable improvement and portions of the activity will be within the tsunami evacuation zone. Refer to **Figure 9**.

Erosion Control Measures and BMPs will be implemented during construction for the proposed project. Refer to **Appendix "B"**, Sheet C-3 and Sheet C-4. As previously discussed, a BMP plan and monitoring and assessment plan will be implemented for the project as recommended by the AECOS water quality report. Refer to **Appendix "D"**.

11. **Substantially alters natural land forms and existing public views to and along the shoreline.**

As the proposed action involves work in an existing drainage culvert area, and involves low-profile improvements, significant adverse impacts to natural land forms or public views are not anticipated.

12. **Is contrary to the objectives and policies of chapter 205A, HRS.**

The proposed activity will be outside of the 150-foot shoreline setback area, and as the proposed improvements involve the replacement of existing culverts with new drainage culverts and associated improvements, the use does not conflict with or represent a use that is contrary to the objectives and policies of the Coastal Zone Management Program as established by Chapter 205A, HRS. As

previously discussed, the recommendations of the SCS Archaeological Monitoring Plan will be implemented for this project.

UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

IV

IV. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

In the short term, the proposed project will result in unavoidable construction-related impacts, including noise impacts generated by construction equipment and activities. In addition, there may be temporary air quality impacts associated with dust generated from site work and exhaust emissions from construction equipment and vehicles. These noise and air quality impacts will be temporary in nature, occurring only during the construction period, and will be mitigated to the extent practicable through implementation of Best Management Practices (BMPs).

The proposed project commits a small area of land, about 0.66 acre, for the construction of the proposed culverts replacement project and associated improvements. Other resources which will be committed in the implementation of the proposed action include material and fuel resources. The project will result in short-term beneficial impacts related to temporary construction employment and spending.

The proposed project is intended to have a positive effect as it will provide a reliable drainage culvert system to minimize significant adverse flooding impacts to the area and community during peak wet weather events.

ALTERNATIVES TO THE PROPOSED ACTION

V

V. ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the preferred alternative, which is the proposed action, include the "no action", "deferred action," and "design alternatives". These alternatives are addressed below.

A. PREFERRED ALTERNATIVE

The preferred alternative involves the removal of the existing two (2) 90-inch by 40-inch box culverts and replacement with two (2) new 8-foot wide by 5-foot high precast box drainage culverts that will pass under Lower Honoapi'ilani Road and associated road, sidewalk, curb and gutter improvements. The project design increases the capacity to accommodate peak discharge rates of the design storm.

B. NO ACTION ALTERNATIVE

The "No Action" alternative is not considered a viable option as this scenario will result in the continued reliance on the existing drainage culvert system in the area. As previously noted, Department of Public Works (DPW) has determined that the culverts and associated headwalls downstream of the culverts are in a deteriorated condition and are nearing the end of useful life and reliability is not sustainable. Replacement of this culvert system is essential towards ensuring a drainage culvert system that is functional and manages stormwater during peak wet weather events.

C. DEFERRED ACTION ALTERNATIVE

The "Deferred Alternative" will also compromise the long-term sustainability of the drainage culvert system that currently exists in the area. There is evidence of undermining of the embankment and channel erosion on the makai side of the existing culverts which pose a hazard to the developed properties. Due to the deteriorated condition of the existing culverts, the proposed project is needed to ensure a functional and reliable drainage system to manage stormwater flow in the area.

D. DESIGN ALTERNATIVES

The original conceptual design for the project included a small elevation drop at the culvert inlet to eliminate flood waters overtopping Lower Honoapi'ilani Road during the design storm. The remaining elevation drop to the lower drainage channel was addressed with steep concrete paving with energy dissipators at the bottom.

Two (2) alternates were considered that include lowering the box culvert to allow stormwater to discharge at lower velocity and energy. The elevation drop is addressed on the upstream side of the culvert. Alternate #1 included a concrete inlet structure. Alternate #2 included regrading the open grassy area upstream of the culvert.

Additionally, per consultation with the Army Corps of Engineers, alternative project materials were incorporated into the project which would encourage vegetation in the basin of the drainageway, rather than grouted CRM.

The preferred alternative evolved from Alternate #2 because it includes less hardened concrete surface than the original concept, and less chance of clogging than Alternate #1. Stormwater design characteristics of the proposed plan include open vegetated channels and reduced stormwater velocity. The decreased stormwater velocity will reduce erosion and increase permeability.

SIGNIFICANCE CRITERIA ASSESSMENT

VI

VI. SIGNIFICANCE CRITERIA ASSESSMENT

The proposed project involves the removal of two (2) existing box culverts and replacement with two (2) new precast box drainage culverts that will pass under Lower Honoapi'ilani Road. Additionally, the proposed work includes replacement of guardrails and a 6-foot high chain link fence, installation of an open concrete mat material, installation of ungrouted rip rap, widening of a portion of Lower Honoapi'ilani Road, extending the existing sidewalk on the makai side of Lower Honoapi'ilani Road in the vicinity of the culverts crossing, and roadwork improvements (asphalt pavement, shoulder widening, railing, vehicle barriers, curb and gutter, drainage catch basin and drainline connection and reinstallation of water and wastewater lines).

Pursuant to Chapter 343, Hawai'i Revised Statutes (HRS), and Chapter 200 (Title 11), Environmental Impact Statement Rules, Hawai'i Administrative Rules (HAR), every aspect of the proposed action, expected primary and secondary consequences, and the cumulative as well as the short-term and long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Administrative Rules. Discussion of project conformance to the Significance Criteria is as follows:

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

   The subject property is developed and contains an existing drainage culvert that is located within Nāpili 4/5 Gulch, along Lower Honoapi'ilani Road and is between the intersections of Nāpili Place/Lower Honoapi'ilani Road and Hui Drive/Honoapi'ilani Road. The proposed project involves work in the culvert areas and small areas above and below Honoapi'ilani Road that totals less than an acre in size. The project area is located along the northwestern coast of Maui island, approximately 210 feet inland and is approximately 40 feet AMSL on portions of lands adjacent to the east and west sides of Lower Honoapi'ilani Road between Nāpili Place and Hui Drive.

   Scientific Consultant Services (SCS) reviewed a sampling of studies illustrating types of sites and features that may be encountered in the project area and found that Archaeological Monitoring may lead to the identification of intact or previously disturbed pre-Contact Period cultural deposits associated with temporary or permanent habitation areas, human skeletal remains (isolated find spots or in situ, articulated individuals), and Historic Period cultural deposits associated with the Plantation Era. The criteria applied by SCS for determining the need for Archaeological Monitoring was based on the soil type present in the project area and the findings of previous Archaeological Monitoring investigations. Based on findings of previous archaeological studies conducted

in the vicinity, SCS determined that the project area has the potential for yielding intact or previously disturbed cultural material. Refer to **Appendix "E"**.

SCS prepared an Archaeological Monitoring Plan associated with ground disturbing subsurface activities for the proposed 0.66-acre project, in accordance with the rules of the State Historic Preservation Division (SHPD) to ensure that if human skeletal remains are identified during subsurface work, that the protocol concerning the inadvertent discovery of human remains pursuant to the HAR is followed. The Archaeological Monitoring Plan was reviewed and approved by the SHPD and will be implemented during construction to identify, document, and record any historic properties inadvertently identified, and to provide appropriate mitigation methods, as necessary. Refer to **Appendix "E"** and **Appendix "E-1"**.

As the proposed activity involves work in the Nāpili Gulch, there will be consultation with the U.S. Army Corps of Engineers as to whether a Section 404 Department of the Army (DA) Permit is required. A State 401 Water Quality Certification approval and State Stream Channel Alteration Permit (SCAP) will be obtained prior to construction, as may be required. Best Management Practices (BMPs) will be implemented during project construction to mitigate significant adverse impacts to the stream in the project area.

The proposed project is not anticipated to involve an irrevocable commitment to loss or destruction of any natural or cultural resource.

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

The vegetation within the project area is dominated by one non-native grass, Guinea grass, which is found in all parts of the area. More diversity is found in the channel above and below the project area.

Grading and ground disturbance is contained to the existing culvert area, and small areas above and below Lower Honoapi'ilani Road that totals less than an acre in size. All grading improvements are over 50 feet away from the toe of the embankment dam of the drainage basin. The drainage channel between the basin and culvert will be regraded to increase capacity. The slope of the channel centerline will be increased to lessen the elevation differences at the downstream channel. A channel liner will be installed to address the increased velocity of the stormwater. Based on the "Rules for the Design of Storm Drainage Facilities in the County of Maui", the proposed drainage culvert system will be designed to handle a storm with a recurrence interval of 100 years, as the drainage area is greater than 100 acres. Refer to **Appendix "A"**.

The proposed project involves the removal of the existing two (2) 90-inch by 40-inch box culverts and replacement with two (2) new 8-foot by 5-foot precast

drainage box culverts and related sidewalk and road improvements. Excavation work will extend 15 to 20 feet down to the new culvert. The area of grading for the project is contained within an area that is approximately 0.66 acre. Refer to **Appendix "B"**. As the proposed project replaces the existing culverts system which is nearing the end of its useful life, the proposed action is not anticipated to impact environmentally sensitive features or create long-term adverse effects to air, water, and ambient noise conditions.

The project area has been previously graded to install the existing drainage culverts system. There are no significant adverse impacts to climate, topography, or soils anticipated to result from the proposed project. There are also no known rare, threatened, or endangered species of flora, fauna, or avifauna located within the project site. Refer to **Appendix "D"**.

The proposed project is not anticipated to adversely affect the already poor water quality in the muliwai of Nāpili Gulch or in the nearshore waters of Nāpili Bay. Refer to **Appendix "C"**.

The project site and surrounding lands are within the Urban Growth Boundary (UGB) of the Maui Island Plan (MIP). The proposed project will not curtail the beneficial use of the site.

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 involves the replacement of the existing culverts system in the area to provide reliable management of wet weather flow and does not conflict with the State's Environmental Policy and Guidelines as set forth in Chapter 344, HRS.

Section 344-3. Environmental Policy

It shall be the policy of the State, through its programs, authorities, and resources to:

(1) *Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawai'i.*

4. **Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.**

The proposed project will directly benefit the local economy by providing construction and construction-related employment. Therefore, the proposed project will have a positive short-term effect on economic and social welfare. From a long-term perspective, the proposed project will ensure that a reliable drainage system is provided to manage stormwater flow during rain events. A traffic control plan during construction will be implemented for the project, including the notification of road work to affected property owners in the vicinity through the media (e.g. newspaper, radio). Refer to **Appendix "B"**, Sheet C-8.

The cultural impact assessment did not identify any ongoing traditional or cultural practices occurring within the project site.

No substantial adverse long-term economic or social welfare impacts to the community, County or State are anticipated.

5. **Substantially affects public health.**

During the construction period, appropriate BMPs will be implemented to mitigate potential air quality and noise impacts. Refer to **Appendix "B"**, Sheet C-1, Sheet C-3 and Sheet C-4. Following construction, long-term adverse public health impacts resulting from the proposed project are not anticipated. The proposed project will provide a drainage system to protect the community in the area.

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

The proposed drainage project provides an improved culverts system to handle drainage in the region during wet weather and is not a population generator. As such, the project is not anticipated to result in significant adverse secondary impacts. The proposed infrastructure improvements are not anticipated to significantly adversely impact public facilities or services.

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

The project provides a reliable drainage system to manage stormwater flow during rain events to protect the area. Construction activities will create temporary short-term nuisances related to noise and dust. Appropriate dust control and noise mitigation measures will be implemented by the contractor to ensure that fugitive dust and noise generated in connection with construction is minimized.

As previously discussed in Chapter II of this EA document, significant adverse impacts to natural resources, cultural resources, and the natural environment are not anticipated.

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

The proposed culverts replacement project and related improvements are not anticipated to cumulatively have a significant negative impact on the physical environment or involve a commitment for larger action. See Chapter II, Section E.

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

As discussed in Section II of this EA document, the proposed project is not anticipated to adversely affect the already poor water quality in the muliwai of Nāpili Gulch or in the nearshore waters of Nāpili Bay. Refer to **Appendix "C"**.

Rare, threatened or endangered species of flora, fauna, avifauna or their habitats are not expected to be adversely affected by the proposed project as none were identified in a survey conducted in October 2015 by Robert Hobdy. Refer to **Appendix "D"**.

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

Construction activities will result in short-term air quality and noise impacts. BMPs for dust control measures, such as regular watering and sprinkling, and erection of dust screens will be implemented to minimize construction-related air quality impacts, as warranted. Short-term noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance and other BMPs are anticipated to mitigate noise from construction activities. Erosion control measures implemented during construction, including the installation of silt fences, will reduce the amount of silt and stormwater runoff flowing into downstream properties. Refer to **Appendix "B"**, Sheet C-3 and Sheet C-4.

Based on the discussion provided above, the proposed project is not anticipated to significantly detrimentally affect air or water quality or ambient noise levels.

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

According to the Flood Insurance Rate Map, the site is within a floodway area in Zone AE, an area subject to inundation due to storm water from upland areas. (FEMA Firm Panel 1500030262F) The base flood elevation at the project site ranges from 21 feet AMSL to 32 feet AMSL. Refer to **Figure 8**.

As the proposed project area is in a special designated flood zone, a Flood Development Hazard Permit may need to be obtained from the Department of Planning.

Erosion Control Measures and BMPs will be implemented for the proposed project. Refer to **Appendix "B"**, Sheet C-3 and Sheet C-4.

The proposed non-habitable project is located within the tsunami zone. As the proposed work involves activity in the Nāpili Gulch, there is consultation with the U.S. Army Corps of Engineers as to whether a Section 404 Department of Army (DA) Permit is required. A State Stream Channel Alteration Permit (SCAP), and State 401 Water Quality Certification approval will be obtained, as may be required, prior to construction.

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

The proposed culverts replacement project is low-profile and is not anticipated to adversely affect scenic view corridors.

13. **Requires substantial energy consumption.**

Substantial new energy requirements are not anticipated for the proposed project as the scope of improvements is limited to drainage infrastructure and related improvements.

Based on the aforementioned findings, the Department of Public Works (DPW) has determined that the proposed project will result in an Anticipated Finding of No Significant Impact (AFONSI).

LIST OF PERMITS AND APPROVALS

VII

VII. LIST OF PERMITS AND APPROVALS

The following permits and approvals will be required prior to the implementation of the project:

Federal

1. Department of Army (DA) Section 404 Permit, as applicable

State of Hawai'i

1. National Pollutant Discharge Elimination System (NPDES), as applicable
2. Department of Health (DOH) Section 401 Water Quality Certification Permit, as applicable
3. Stream Channel Alteration Permit (SCAP) from Commission on Water Resource Management, as applicable
4. Community Noise Permit, as applicable

County of Maui

1. Special Management Area (Exemption or Minor Permit)
2. Construction Permits (Grading, Building, Electrical, Plumbing)
3. Special Flood Hazard Development Permit, as applicable

PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

VIII

VIII. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during preparation of the Draft Environmental Assessment (EA). Agency comments and responses to substantive comments are included herein.

FEDERAL AGENCIES

1. Lt. Furyisa Miller
   U.S. Coast Guard
   Fourteenth Coast Guard District
   300 Ala Moana Boulevard, Room 9-204
   Honolulu, Hawai'i 96850-4982

2. Larry Yamamoto, State Conservationist
   Natural Resources Conservation Service
   U.S. Department of Agriculture
   P.O. Box 50004
   Honolulu, Hawai'i 96850-0001

3. Ranae Ganske-Cerizo, Soil Conservationist
   Natural Resources Conservation Service
   U.S. Department of Agriculture
   77 Hookele Street, Suite 202
   Kahului, Hawai'i 96732

4. Shelly Lynch, Chief, Regulatory Branch
   U.S. Department of the Army
   U.S. Army Engineer District, Honolulu
   Regulatory Branch, Building 230
   Fort Shafter, Hawai'i 96858-5440

5. Kristi Young, Acting Field Supervisor
   U. S. Fish and Wildlife Service
   300 Ala Moana Blvd., Rm. 3-122
   Box 50088
   Honolulu, Hawai'i 96850

6. Kay Zukeran
   Pacific Islands Regional Office
   1601 Kapiolani Boulevard, Suite 1100
   Honolulu, Hawai'i 96814-4700

STATE AGENCIES

7. Douglas G. Murdock, Comptroller
   Department of Accounting and General Services
   1151 Punchbowl Street, #426
   Honolulu, Hawai'i 96813

8. Scott Enright, Chair
   Department of Agriculture
   1428 South King Street
   Honolulu, Hawai'i 96814-2512

9. Luis P. Salaveria, Director
   State of Hawai'i
   Department of Business, Economic Development & Tourism
   P.O. Box 2359
   Honolulu, Hawai'i 96804

10. Kathryn Matayoshi, Superintendent
    State of Hawai'i
    Department of Education
    P.O. Box 2360
    Honolulu, Hawai'i 96804

11. Heidi Meeker
    Office of Business Services
    Department of Education
    c/o Kalani High School
    4680 Kalanianaole Highway, #T-B1A
    Honolulu, Hawai'i 96821

12. Virginia "Ginny" Pressler, MD, MBA, FACS, Director
    State of Hawai'i
    Department of Health
    919 Ala Moana Blvd., Room 300
    Honolulu, Hawai'i 96814

13. Alec Wong, P.E., Chief
Clean Water Branch
State of Hawai'i
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawai'i 96814

14. Patti Kitkowski
State of Hawai'i
Department of Health
Maui Sanitation Branch
54 South High Street, Room 300
Wailuku, Hawai'i 96793

15. Laura McIntyre, AICP
Environmental Planning Office
Department of Health
919 Ala Moana Blvd., Suite 312
Honolulu, Hawai'i 96814

16. Suzanne Case, Chairperson
State of Hawai'i
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawai'i 96809

17. Alan Downer, Administrator
State of Hawai'i
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawai'i 96707

18. Morgan Davis
State of Hawai'i
Department of Land and Natural Resources
State Historic Preservation Division
130 Mahalani Street
Wailuku, Hawai'i 96793

19. Ford Fuchigami, Director
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813

20. Brigadier General Arthur "Joe" Logan, Adjutant General
Hawai'i State Civil Defense
3949 Diamond Head Road
Honolulu, Hawai'i 96813-4495

21. Jobie Masagatani, Chair
Hawaiian Home Lands Commission
P.O. Box 1879
Honolulu, Hawai'i 96805

22. Scott Glenn, Interim Director
Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawai'i 96813

23. Dr. Kamana'opono Crabbe, Chief Executive Officer
Office of Hawaiian Affairs
560 N. Nimitz Highway, Suite 200
Honolulu, Hawai'i 96817

24. Leo R. Asuncion, Jr., AICP, Acting Director
State of Hawai'i
Office of Planning
P. O. Box 2359
Honolulu, Hawai'i 96804

COUNTY AGENCIES

25. Mayor Alan Arakawa
County of Maui
200 South High Street
Wailuku, Hawai'i 96793

26. Anna Foust
Maui Civil Defense Agency
200 South High Street
Wailuku, Hawai'i 96793

27. Mike Miyamoto, Deputy Director
County of Maui
Department of Environmental Management
2050 Main Street, Suite 1C
Wailuku, Hawai'i 96793

28. Jeffrey A. Murray, Fire Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawai'i 96732

29. Carol Reimann, Director
County of Maui
Department of Housing and Human Concerns
One Main Plaza
2200 Main Street, Suite 546
Wailuku, Hawai'i 96793

30. Ka'ala Buenconsejo, Director
County of Maui
Department of Parks and Recreation
700 Halia Nakoa Street, Unit 2
Wailuku, Hawai'i 96793

31. William Spence, Director
County of Maui
Department of Planning
2200 Main Street, Suite 315
Wailuku, Hawai'i 96793

32. Tivoli Faaumu, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawai'i 96793

33. Jo Anne Johnson Winer, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawai'i 96793

34. David Taylor, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawai'i 96793

35. Honorable Elle Cochran
Maui County Council
200 South High Street
Wailuku, Hawai'i 96793

OTHER

36. Michael Grider
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawai'i 96732
Kahului, Hawai'i 96733

37. Hawaiian Telcom
60 South Church Street
Wailuku, Hawai'i 96793

38. Joe Pluta, President
West Maui Improvement Foundation
P. O. Box 10338
Lahaina, Hawai'i 96761

39. Rick Nava, President
West Maui Taxpayers Association
P. O. Box 10338
Lahaina, Hawai'i 96761

40. Scott Fisher, Director of Conservation
Polanui Hiu, CMMA
393B Front Street
Lahaina, Hawai'i 96761

41. Ekolu Lindsey
Maui Cultural Lands, Inc.
P. O. Box #122
Lahaina, Hawai'i 96767

42. Gregg Nelson, General Manager
Napili Kai Beach Resort
5900 Lower Honoapi'ilani Road
Lahaina, Hawai'i 96761

43. Patricia Lindquist
Napili Bay and Beach Foundation
P.O. Box 10823
Lahaina, Hawai'i 96761

DEPARTMENT OF THE ARMY
HONOLULU DISTRICT, U.S. ARMY CORPS OF ENGINEERS
FORT SHAFTER, HAWAII 96858-5440

February 5, 2016

SUBJECT: Early Consultation Request for Napili Culvert Replacement Project, Lahaina, Maui, Hawaii: Department of the Army File Number POH-2016-00269

Munekiyo Hiraga, Inc.
Attention: Cheryl K. Okuma
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

The Honolulu District, U.S. Army Corps of Engineers (Corps), has received your letter dated December 15, 2015 for the Napili Culvert Replacement Project, Lahaina, Maui, Hawaii. Your project has been assigned Department of the Army (DA) file number POH-2016-00269. Please reference this number in all future correspondence.

Please be advised, if the proposed project involves work in waters of the U.S., a DA authorization may be required. Under Section 10 of the Rivers and Harbors Act, structures and/or work in or affecting the course, location, condition, or capacity of navigable waters of the U.S. require DA authorization. Navigable waters of the U.S. are waters subject to the ebb and flow of the tide.

Under Section 404 of the Clean Water Act, DA authorization is required for discharges of dredged or fill material into waters of the U.S., including wetlands. Generally, discharges of fill material include materials that change the bottom elevation of a water of the U.S. and includes rock, sand, soil, debris, overburden, etc. Waters of the U.S. include navigable waters of the U.S. and other waters including wetlands, rivers, streams, lakes, and ponds.

Thank you for your cooperation with the Honolulu District Regulatory Program. Please contact this office if you have any questions. You may contact me at 808-835-4306 or kate.m.bliss@usace.army.mil.

Sincerely,

Kate Bliss

Kate Bliss
Senior Project Manager
Regulatory Office

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Gletys Guardia-Montoya
Project Manager
Department of the Army
Honolulu District, Army Corps of Engineers
Fort Shafter, Hawai'i 96858-5440

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui
Reference: POH-2016-00269

Dear Ms. Guardia-Montoya:

Thank you for your office's letter dated February 5, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW) we offer the following responses in the order of the comments in your letter.

Comment:

The Honolulu District, U.S. Army Corps of Engineers (Corps), has received your letter dated December 15, 2015 for the Napili Culvert Replacement Project, Lahaina, Maui, Hawaii. Your project has been assigned Department of the Army (DA) file number POH-2016-00269. Please reference this number in all future correspondence.

Response:

Future correspondence to your office regarding this project will reference POH 2016-00269

Comment:

Please be advised, if the proposed project involves work in waters of the U.S., a DA authorization may be required. Under Section 10 of the Rivers and Harbors Act, structures and/or work in or affecting the course, location, condition, or capacity of navigable waters of the U.S. require DA authorization. Navigable waters of the U.S. are waters subject to the ebb and flow of the tide.

Response:

Your office is being consulted as to the requirements for a Department of Army (DA) permit for the project under Section 10 of the Rivers and Harbors Act. A letter requesting Jurisdictional Determination for the project was submitted on December 13, 2016.

Comment:

Under Section 404 of the Clean Water Act, DA authorization is required for discharges of dredged or fill material into waters of the U.S., including wetlands. Generally, discharges of fill material include materials that change the bottom elevation of a water of the U.S. and includes rock, sand, soil, debris, overburden, etc. Waters of the U.S. include navigable waters of the U.S. and other waters including wetlands, rivers, streams, lakes, and ponds.

Response:

Your office is being consulted as to the requirements for a Section 404 DA Permit under the Clean Water Act for the project. We look forward to a response to our Jurisdictional Determination letter noted above.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\Army Response.doc

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

December 13, 2016

Tunis W. McElwain, Acting Chief, Regulatory Branch
U.S. Department of the Army
U.S. Army Engineer District, Honolulu
Attention: Gletys Guardia-Montoya, Project Manager
Regulatory Branch, Building 230
Fort Shafter, Hawai'i 96858-5440

SUBJECT: Request for Preliminary Jurisdictional Determination for Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui (POH-2016-00269)

Dear Mr. McElwain:

The County of Maui, Department of Public Works (DPW) has proposed a culvert replacement project in Nāpili, which has been assigned a DA file number POH-2016-00269. Fukumoto Engineering, Inc., has been selected to provide design and construction documents for the project, and they have engaged Munekiyo Hiraga to prepare and process regulatory approvals.

It is noted that your office provided comments by letter dated February 5, 2016 to our early consultation request in regards to the project and preparation of the Hawai'i Revised Statutes (HRS) Chapter 343 Draft Environmental Assessment. See **Exhibit "A"**. We understand that under Section 10 of the Rivers and Harbors Act, structures and/or work in or affecting the course, location, or capacity of navigable waters of the U.S. require authorization from the Department of Army (DA), as you have communicated in your February 5, 2016 letter. We further acknowledge, as stated in the same letter, that under Section 404 of the Clean Water Act, DA authorization is required for discharges of dredged or fill material into waters of the U.S., including wetlands. Also on June 8, 2016, Mike Silva (Fukumoto Engineering, Inc.) and Cheryl Okuma (Munekiyo Hiraga) met with Kate Bliss, Senior Project Manager, in regards to the project.

On behalf of the DPW, we are writing to request a preliminary jurisdictional determination to establish whether the lands encompassed by the proposed drainage replacement project in Nāpili (West Maui) involve any waters of the U.S. as governed by Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

PROJECT SUMMARY

The proposed project area contains an existing culvert that is located along Lower Honoapi`ilani Road, within Napili 4/5 Gulch, between Napili Place and Hui Drive. The location is shown in **Exhibit "B"**, Regional Location Map. The proposed project will affect Tax Map Keys (TMK): (2)2-4-3-001:003 (por.) (Parcel 3), (2)4-3-002:023 (por.) (Parcel 23), and 40-foot County right-of-way. See **Exhibit "C"**. Parcel 3 and Parcel 23 are owned by the State of Hawai'i. Parcel 3 is under the control and management of DPW by Executive Order 3277 from the State. For site and construction plans for the project, please see **Exhibit "D"**. It is noted that a third parcel (2)4-3-002:045 (por.) was originally proposed to be included in the project area, however, it has since been removed.

The proposed project involves work within the culvert area and small areas above and below Lower Honoapi'ilani Road. Excavation work will extend 15 to 20 feet down to the new culverts, within an area of approximately 0.66 acre. The proposed project entails the removal of the existing two (2) 90-inch by 40-inch box culverts and replacement with two (2) new 8-foot by 5-foot precast drainage box culverts that will pass under Lower Honoapi'ilani Road, with associated inlet and outlet structures and regrading the areas upstream and downstream of the culvert.

Based on the June 2016 discussions with Army Corps representatives, the project improvements were refined. The current improvements proposed will include grading and slope and channel stabilization, with ungrouted riprap on the downstream side of the proposed culverts, and vegetated articulating concrete open block mat ("Armor Flex") on the upstream side. Native plantings will be incorporated into the vegetated portions of the project. It is noted that the community previously planted native plants in Napili Gulch downstream and makai of Lower Honoapiilani Road. Lastly, a retaining wall along a portion of the west side of the makai project area, approximately 20 feet in length, is proposed.

A portion of the road will be widened from approximately 22 feet to 38 feet. The proposed work will also include improvements to the surrounding sidewalk and apron areas, as well as some modification of existing utilities (e.g. water, wastewater, and electric) shall be undertaken in coordination with the appropriate agencies.

The project is a low impact development stormwater management feature that is intended to address water quality and flooding and as such, will result in minimal adverse effects.

ORDINARY HIGH WATER MARK AND WATER QUALITY SURVEY

AECOS, Inc. conducted a survey of the project area to delineate the ordinary high water mark (OHWM) and also conducted a water quality survey, shown in **Exhibit "E"**. As the proposed project involves excavation and grading inside the gulch, the OHWM lies within the project area. The AECOS report notes that Nāpili Kahawai, the stream segment within the project area, is classified as an intermittent stream, and that all work can be completed in a dry setting unless a large storm occurs during construction. The report concludes that the project is not expected to adversely affect the downstream water quality due to the poor water quality conditions in Napili Gulch and the nearshore waters of Napili Bay. A Best Management Practices (BMP) plan and an Applicable Monitoring Assessment Plan (AMAP) will be implemented for the project as recommended by the report to minimize and document any impacts.

DRAINAGE REPORT

Fukumoto Engineering, Inc. has prepared a Drainage Report for the proposed Nāpili Culverts Replacement project. See **Exhibit "F"**. This report includes an analysis of the drainage area, existing improvements, and proposed improvements, and concludes that there will be no adverse effects on the adjacent or downstream properties due to this project.

ADDITIONAL SUBMITTAL INFORMATION

As requested by Ms. Bliss, we are transmitting a topographic map (See **Exhibit "G**"), FEMA FIRM Panel map (150003026F) and wetland inventory map for the project. According to the FEMA Firm map, the project improvements are located within Zone AE designation and as such, a Flood Development Permit will be obtained from the County of Maui, Department of Planning, as applicable. See **Exhibit "H"**. According to the wetland inventory map there is no wetland within the project area, or in the nearby surrounding areas. See **Exhibit "I"**.

At the June 8, 2016 meeting, Ms. Bliss suggested that in the event a Section 404 Department of Army (DA) permit is required, consultation should be initiated with the U.S. Fish and Wildlife Service for technical assistance and State Historic Preservation Division (SHPD) in regards to Section 106 (National Historic Preservation Act). Ms. Bliss indicated that the Concrete Rubble Masonry (CRM) proposed for the project would not be allowed by the U.S. Army Corps of Engineers. To address this, the project design has been changed to include the ArmorFlex (open concrete mat material) and remove CRM from the project scope on the mauka side of Lower Honoapiilani Road. Additionally, the project originally proposed to include CRM on the makai side of Lower

Honoapiilani Road. This has been replaced with ungrouted riprap. See **Exhibit "J"**. Also, she generally discussed the application for a DA Permit and requirements for permits (e.g. Nationwide, Individual), and inquired about native plantings in the project area.

REQUEST FOR PRELIMINARY JURISDICTIONAL DETERMINATION

In order to ensure that the project is implemented in compliance with all County, State, and Federal regulatory requirements, we respectfully request a preliminary jurisdictional determination by the U.S. Department of the Army to establish whether the lands involved in the proposed project affect U.S. waters and if so, the requirements for a Nationwide Permit.

Also, in the event a DA permit is required for the proposed activity, we request your agency's determination that the project qualifies for a Nationwide Permit under NWP 3 (Maintenance) and NWP 41 (Reshaping Existing Drainage Channel).

If there are any questions, or if additional information is needed to facilitate your review and determination, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Leialoha Cheney Rivera
Senior Associate

GLCR:la
Enclosures
cc: John Smith, Department of Public Works (w/ enclosures)
Mike Silva, Fukumoto Engineering, Inc. (w/ enclosures)
Susan Burr, AECOS, Inc. (w/ enclosures)
K:\DATA\FE\DPW Napili Culvert\JurisdictionalDetermination.ltr.docx

EXHIBIT "A"

U.S. Army Corps of Engineers Letter
Dated February 5, 2016 to Early Consultation Request

DEPARTMENT OF THE ARMY
HONOLULU DISTRICT, U.S. ARMY CORPS OF ENGINEERS
FORT SHAFTER, HAWAII 96858-5440

February 5, 2016

SUBJECT: Early Consultation Request for Napili Culvert Replacement Project, Lahaina, Maui, Hawaii: Department of the Army File Number POH-2016-00269

Munekiyo Hiraga, Inc.
Attention: Cheryl K. Okuma
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

The Honolulu District, U.S. Army Corps of Engineers (Corps), has received your letter dated December 15, 2015 for the Napili Culvert Replacement Project, Lahaina, Maui, Hawaii. Your project has been assigned Department of the Army (DA) file number POH-2016-00269. Please reference this number in all future correspondence.

Please be advised, if the proposed project involves work in waters of the U.S., a DA authorization may be required. Under Section 10 of the Rivers and Harbors Act, structures and/or work in or affecting the course, location, condition, or capacity of navigable waters of the U.S. require DA authorization. Navigable waters of the U.S. are waters subject to the ebb and flow of the tide.

Under Section 404 of the Clean Water Act, DA authorization is required for discharges of dredged or fill material into waters of the U.S., including wetlands. Generally, discharges of fill material include materials that change the bottom elevation of a water of the U.S. and includes rock, sand, soil, debris, overburden, etc. Waters of the U.S. include navigable waters of the U.S. and other waters including wetlands, rivers, streams, lakes, and ponds.

Thank you for your cooperation with the Honolulu District Regulatory Program. Please contact this office if you have any questions. You may contact me at 808-835-4306 or kate.m.bliss@usace.army.mil.

Sincerely,

Kate Bliss

Kate Bliss
Senior Project Manager
Regulatory Office

EXHIBIT "B"

Regional Location Map

Proposed Nāpili Culvert Replacement Project
Lahaina, Maui (POH-2016-00269)
Regional Location Map

NOT TO SCALE

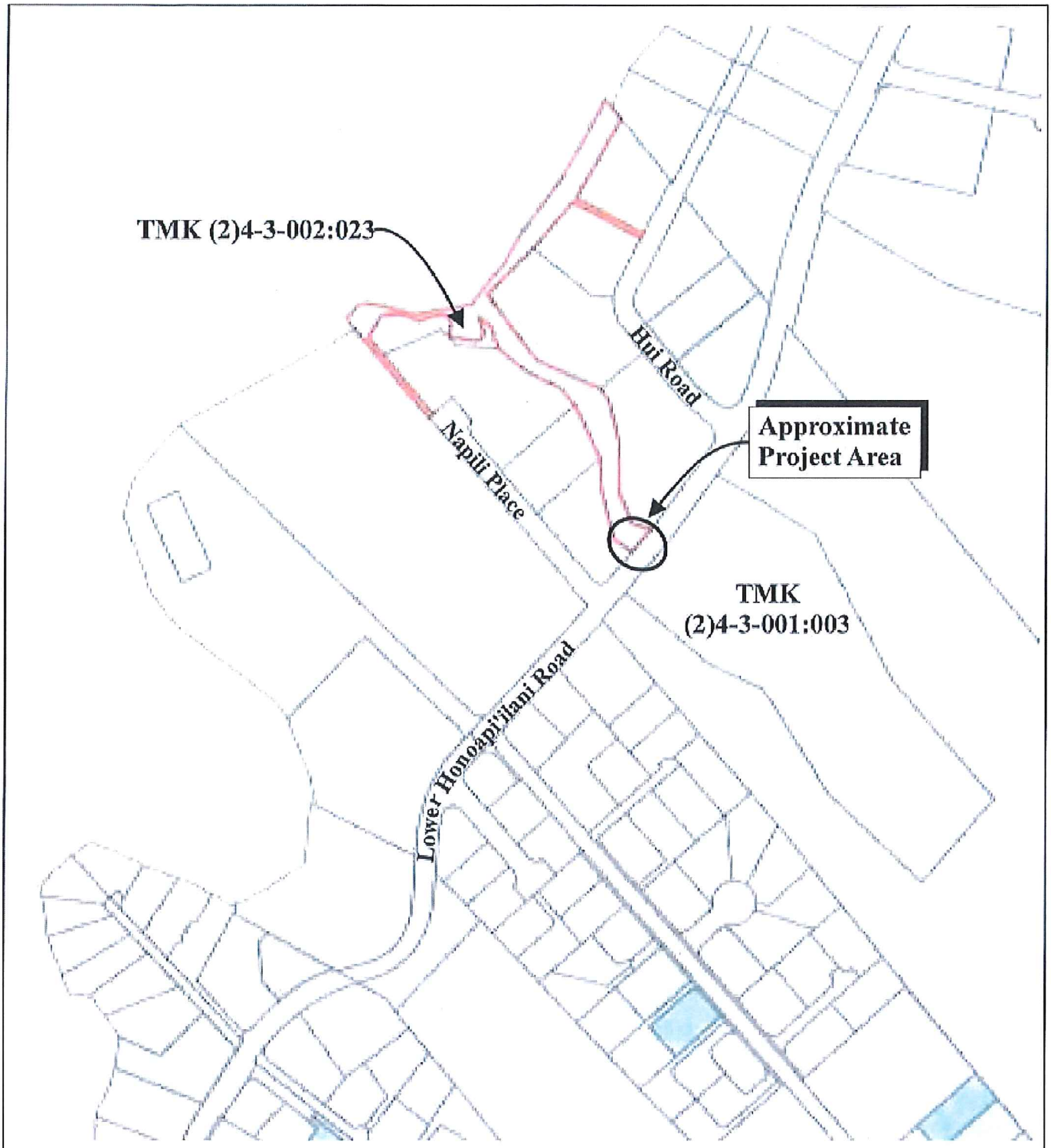
MUNEKIYO HIRAGA

Prepared for: County of Maui, Department of Public Works

FE/DPW Napili Culvert/Applications/Figures/Regional Location.Army Ltr

EXHIBIT "C"

Affected Tax Map Key Parcels



Source: County of Maui, Real Property Tax

Proposed Napili Culvert Replacement Project
Lahaina, Maui (POH-2016-00269)
Affected Tax Map Key Parcels

NOT TO SCALE

MUNEKIYO HIRAGA

Prepared for: Fukumoto Engineering, Inc.

FB/DPW Napili Culvert/TMK Map.Annual.ai

EXHIBIT "D"

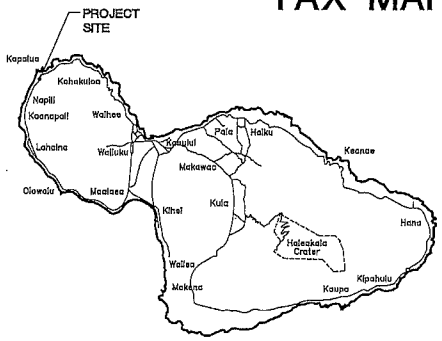
Site and Construction Plans

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TAX MAP KEY (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII



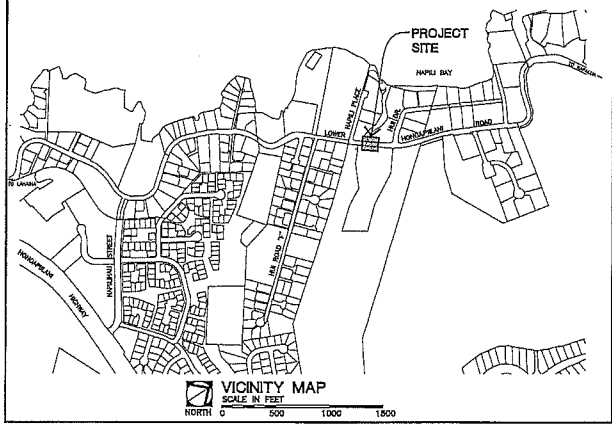
MAP OF MAUI
SCALE IN MILES
NORTH 0 5 10 15 20

PREPARED FOR:

DEPARTMENT OF PUBLIC WORKS
COUNTY OF MAUI
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

PREPARED BY:

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203 • Wailuku, Hawaii 96793



VICINITY MAP
SCALE IN FEET
NORTH 0 500 1000 1500

SUBCONSULTANT:

STRUCTURAL ENGINEER:

GHOLKAR & ASSOCIATES, INC.
85 LUNAULO STREET
WAILUKU, HAWAII 96793
PHONE: (808) 243-2248

APPROVALS:

DIRECTOR,
DEPARTMENT OF PUBLIC WORKS
COUNTY OF MAUI
(APPROVAL GRANTED FOR WORK WITHIN COUNTY RIGHT-OF-WAY)

DATE

DIRECTOR, DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
(APPROVAL LIMITED TO WATER IMPROVEMENTS WHICH WILL BE DEDICATED TO THE DEPARTMENT OF WATER SUPPLY)

DATE

INDEX OF DRAWINGS

SHEET T-1 OF 22 SHEETS

CONSTRUCTION NOTES

GENERAL NOTES

1. LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE BASED ON AVAILABLE "AS-BUILT" OF RECORD CONSTRUCTION PLANS, ARE APPROXIMATE ONLY, AND THEIR ACCURACY IS NOT GUARANTEED.
2. EXISTING CONTOURS AND FEATURES ARE BASED ON "TOPOGRAPHIC SURVEY" PREPARED BY FUKUMOTO ENGINEERING, INC. DATED JULY 13, 2015 THROUGH JULY 22, 2015.
3. ELEVATIONS SHOWN ARE BASED ON PROJECT BENCH MARK DRILLED HOLE (STA CBD-4) LOCATED ON THE CONCRETE CURB 21 FEET NORTHEASTERLY OF THE CONCRETE DRIVEWAY FROM SIXTY-FIVE NAPILI WAY LOCATED ON THE WESTERLY SIDE OF LOWER HONOAPIILANI ROAD. ELEVATION = 30.59 FEET ABOVE M.S.L.
4. VERIFY EXISTING GRADES BEFORE PROCEEDING WITH GRADING WORK. SHOULD ANY DISCREPANCIES BE DISCOVERED IN THE EXISTING GRADES OR DIMENSIONS GIVEN ON THE PLANS, NOTIFY THE ENGINEER BEFORE PROCEEDING ANY FURTHER WITH THE WORK. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY COST INVOLVED IN THE CORRECTION OF CONSTRUCTION PLACED DUE TO SUCH DISCREPANCIES.
5. DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES WITHIN PROJECT LIMITS BEFORE COMMENCING WORK, AND AGREE TO BE FULLY RESPONSIBLE FOR DAMAGES DUE TO FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES.
6. REPORT ANY INCONSISTENCIES WITH THE PROPOSED PLAN TO THE OWNER'S REPRESENTATIVE AND DEMOLISH, REMOVE, OR RELOCATE ALL EXISTING UTILITIES, IMPROVEMENTS, ETC. INCONSISTENT WITH THE PROPOSED PLAN AS DIRECTED BY THE OWNER'S REPRESENTATIVE AND AT THE CONTRACTOR'S EXPENSE.
7. THE LATEST REVISIONS OF THE "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION," SEPTEMBER 1984 AND THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," 2005 IS INCLUDED AS PART OF THESE CONSTRUCTION PLANS. OBTAIN THE LATEST REVISIONS BEFORE COMMENCING CONSTRUCTION.
8. SHOULD HISTORIC SITES SUCH AS WALLS, PLATFORMS, PAVEMENTS AND MOUNDS, OR REMAINS SUCH AS ARTIFACTS, BURIALS, CONCENTRATION OF CHARCOAL OR SHELLS BE ENCOUNTERED DURING CONSTRUCTION WORK, CEASE WORK IN THE IMMEDIATE VICINITY OF THE FIND, AND PROTECT THE FIND FROM FURTHER DAMAGE. THE CONTRACTOR MUST IMMEDIATELY CONTACT THE STATE HISTORIC PRESERVATION DIVISION (PH: 243-1285 OR 243-4640), WHICH WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND MITIGATION MEASURES, IF NECESSARY.
9. PURSUANT TO CHAPTER 6E OF THE HAWAII REVISED STATUTES, IN THE EVENT THAT ANY HUMAN SKELETAL REMAINS ARE INADVERTENTLY DISCOVERED DURING CONSTRUCTION, DO NOT MOVE THE REMAINS, CEASE ANY ACTIVITY IN THE IMMEDIATE AREA THAT COULD DAMAGE THE REMAINS OR THE POTENTIAL HISTORIC SITE, AND CONTACT THE DEPARTMENT OF LAND AND NATURAL RESOURCES' HISTORIC PRESERVATION DIVISION (PH: 243-1285 OR 243-4640). THE APPROPRIATE MEDICAL EXAMINER OR CORONER, AND THE POLICE DEPARTMENT (TELEPHONE: 244-6400).

DEPARTMENT OF PUBLIC WORKS NOTES

1. THE CONTRACTOR SHALL ALLOW FOUR WEEKS TO OBTAIN A GRADING PERMIT FROM THE DEVELOPMENT SERVICES ADMINISTRATION PRIOR TO COMMENCEMENT OF ANY CLEARING AND GRUBBING. A SATISFACTORY DRAINAGE AND EROSION CONTROL PLAN SHALL BE SUBMITTED IN THE EVENT THE GRUBBING AREA EXCEEDS ONE ACRE OR IF PROPOSED CUT OR FILL IS GREATER THAN 15 FEET IN HEIGHT. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL BEST MANAGEMENT PRACTICE MEASURES.
2. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, AND OTHER PROTECTIVE DEVICES FOR THE PROTECTION, SAFETY AND CONVENIENCE OF THE PUBLIC AND IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAY, 2003 EDITION WITH REVISION No. 1 INCORPORATED, DATED NOVEMBER 2004". THE CONTRACTOR SHALL PREPARE AND OBTAIN NECESSARY APPROVALS OF TRAFFIC CONTROL PLANS IF REQUIRED BY THE DEVELOPMENT SERVICES ADMINISTRATION.
3. STANDARD DETAIL DRAWINGS OF THE DEPARTMENT OF PUBLIC WORKS AND THE HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION (1994) SHALL BE INCLUDED AS PART OF THE CONSTRUCTION PLANS.
4. ALL CONSTRUCTION WORK SHALL STRICTLY CONFORM TO THE APPLICABLE SECTIONS OF THE 2005 HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND THE SEPTEMBER 1984 "STANDARD DETAILS" FOR PUBLIC WORKS CONSTRUCTION OF THE DEPARTMENT OF PUBLIC WORKS, AS AMENDED.
5. THE CONTRACTOR SHALL AT HIS OWN EXPENSE, KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH AND COUNTY GRADING ORDINANCE.
6. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION ORDERED BY THE DIRECTOR OF PUBLIC WORKS SHALL BE PAID BY THE CONTRACTOR.

WATER SYSTEM

1. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF WATER SUPPLY (DWS), IN WRITING, ONE (1) WEEK PRIOR TO COMMENCEMENT OF WORK.
2. ALL MATERIALS USED AND METHOD OF CONSTRUCTION OF WATER SYSTEM FACILITIES SHALL BE IN ACCORDANCE WITH THE LATEST REVISIONS OF DWS STANDARDS. CONTRACTOR SHALL OBTAIN THE LATEST REVISIONS OF THE DWS STANDARD DETAILS BEFORE COMMENCING CONSTRUCTION.
3. ALL WATER SYSTEM WORK SHALL BE PERFORMED BY CONTRACTORS POSSESSING VALID STATE OF HAWAII CONTRACTOR'S LICENSES, REGARDLESS OF THE VALUE OF THE WORK.
4. THE EXACT DEPTH AND LOCATION OF EXISTING WATERLINES, SERVICE LATERALS AND OTHER UTILITIES ARE NOT KNOWN. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE SAME PRIOR TO TRENCHING FOR THE NEW WATERLINE. THE COST OF LOWERING, RELOCATING OR ADJUSTING EXISTING WATERLINES, SERVICE LATERALS AND OTHER UTILITIES SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE NEW WATERLINE, UNLESS NOTED OTHERWISE, AND WILL NOT BE PAID FOR SEPARATELY.
5. CONCRETE FOR REACTION BLOCKS AND ANCHOR BLOCKS SHALL BE DWS CLASS 2500.
6. THE MAXIMUM DISTANCE BETWEEN VALVE NUT AND TOP OF VALVE MANHOLE COVER SHALL BE THREE (3) FEET.
7. THE CONTRACTOR SHALL SUBMIT A MATERIALS LIST TO DWS FOR APPROVAL PRIOR TO CONSTRUCTION.
8. CONNECTION TO DWS SYSTEM:
   A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL NECESSARY FITTINGS AND OTHER MATERIALS AND EQUIPMENT REQUIRED FOR THE HOOK-UP. HE SHALL VERIFY THE EXACT LOCATION, DEPTH, TYPE, AND CONDITION OF THE EXISTING LINE BEFORE ORDERING MATERIALS FOR THE HOOK-UP. HE SHALL, HOWEVER, CHECK WITH DWS BEFORE EXCAVATING FOR VERIFICATION PURPOSES.
   B. WHENEVER FEASIBLE, MECHANICAL JOINT FITTINGS SHALL BE USED FOR BURIED APPLICATIONS, AND FLANGED JOINT FITTINGS SHALL BE USED FOR EXPOSED APPLICATIONS.
   C. AUTHORIZED DWS PERSONNEL MAY BE REQUIRED TO MAKE THE FINAL CONNECTION TO THE EXISTING LINE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS INCURRED BY DWS FOR SAID WORK, INCLUDING THE COST OF PRESSURE TESTING AND DISINFECTION.
   D. IF THE DWS PROVIDES ONLY INSPECTION AND SUPERVISING OPERATORS, AND DOES NOT PROVIDE PERSONNEL FOR THE ACTUAL CONNECTION, THE CONTRACTOR SHALL PROVIDE ALL PIPETTERS AND LABORS TO MAKE THE CONNECTION.
   E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR FOR TRENCH EXCAVATION, BACKFILLING, CLEANING AND CHLORINATION, PAVING, AND OTHER WORK NECESSARY TO COMPLETE THE HOOK-UP, AS DIRECTED BY AND TO THE SATISFACTION OF DWS.
9. MINIMUM COVER OVER WATER MAIN, 8" DIAMETER OR LARGER, SHALL BE 3'-0". MINIMUM COVER FOR 4" DIAMETER SHALL BE 2'-6". MINIMUM COVER FOR DIAMETERS LESS THAN 4" SHALL BE 1'-6".
10. BOLTS FOR EXPOSED FLANGED DUCTILE IRON PIPE JOINTS SHALL BE EITHER SILICON BRONZE BOLTS AND NUTS OR 316 STAINLESS STEEL BOLTING WITH THE HEAVY DUTY STAINLESS STEEL NUTS (ONLY FURNISHED WITH TRIPAC 2000 BLUE COATING SYSTEM). ANTI-SEIZE SHALL NOT BE USED. T-BOLTS FOR DUCTILE IRON MECHANICAL JOINT (MJ) PIPE AND FITTING CONNECTIONS IN UNDERGROUND SITUATIONS SHALL BE ONE OF THE FOLLOWING SYSTEMS:
   A. 316 STAINLESS STEEL T-BOLTS WITH THE HEAVY DUTY STAINLESS STEEL NUTS (ONLY FURNISHED WITH TRIPAC 2000 BLUE COATING SYSTEM. ANTI-SEIZE SHALL NOT BE USED.
   B. COR-TEN T-BOLTS AND NUTS WITH HIGH GRADE ZINC SACRIFICIAL ANODES. EQUIVALENT TO "MARATRON" SACRIFICIAL "SAC-PAC" MODULES, INSTALLED ON THE NUTS FOR ALL STANDARD COR-TEN T-BOLTS.
   C. COR-TEN T-BOLTS AND NUTS BOTH FACTORY COATED WITH TRIPAC 2000 BLUE COATING SYSTEM BY "TRIPAC FASTENERS".

   ALL HOT FORGED STAINLESS STEEL BOLTS ARE REQUIRED TO BE PASSIVATED PER ASTM A380. MANUFACTURERS CERTIFICATES ARE REQUIRED FOR PROOF WITH EACH SHIPMENT.
11. ALL BURIED METALS, INCLUDING COPPER PIPES, SHALL BE WRAPPED WITH POLY-WRAP. FOR ALL BURIED INSTALLATIONS OF DUCTILE IRON PIPE AND FITTINGS, POLY-WRAP IS REQUIRED EXCEPT WITHIN CONCRETE JACKETS.
12. LUBRICATE HYDRANT NOZZLE THREADS WITH NON-TOXIC GREASE.
13. THE CONTRACTOR SHALL PAINT AND NUMBER THE FIRE HYDRANT. NUMBERING TO BE FURNISHED BY DWS.
14. WATER MAINS AND APPURTENANCES SHALL BE SUBJECT TO HYDROSTATIC TESTING IN ACCORDANCE WITH THE LATEST REVISION OF AWWA C600, UNDER THE "HYDROSTATIC TESTING" SECTION, TO A PRESSURE OF AT LEAST 1.5 TIMES THE WORKING PRESSURE. UNLESS OTHERWISE STATED IN THE CONSTRUCTION DOCUMENTS OR LIMITED BY THE PRESSURE RATING OF EQUIPMENT, THE PRESSURE TEST AND LEAKAGE TEST SHALL BE PERFORMED AT 225 POUNDS PER SQUARE INCH PRESSURE.
15. THE DEVELOPER SHALL SUBMIT A COST LIST ALONG WITH AN AFFIDAVIT FOR THE WATER SYSTEM PRIOR TO ACCEPTANCE.
16. THE CONTRACTOR SHALL SUBMIT TWO SETS OF RECORD DRAWINGS VIA A CONSULTANT PRIOR TO ACCEPTANCE OF THE WATER SYSTEM. AN ELECTRONIC IMAGE FILE IN TIFF FORMAT SHALL BE PROVIDED TO THE DWS FOR ALL PROJECTS.

REVISED: 2/14/13

CHLORINATION OF WATER SYSTEMS

1. WATER MAINS AND APPURTENANCES SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651. ALL PROCEDURES AND MATERIALS (LIQUID CHLORINE OR CALCIUM HYPOCHLORITE) USED FOR THE CHLORINATION OF THE PROJECT SHALL CONFORM TO AWWA REQUIREMENTS.
2. PRIOR TO CHLORINATION, THE PROJECT PIPELINES SHALL BE THOROUGHLY CLEANED. CLEANING OF LINES 8" AND LARGER SHALL BE BY PIGGING USING FOAM PIGS. SMALLER LINES CAN BE FLUSHED IN ACCORDANCE WITH AWWA REQUIREMENTS IF ADEQUATE WATER SUPPLY IS PROVIDED, OTHERWISE BY PIGGING. THE CONTRACTOR SHALL SUBMIT HIS PLAN FOR PIPELINE CLEANING, INCLUDING FITTING REQUIREMENTS FOR PIGGING, FOR APPROVAL PRIOR TO PROCEEDING.
3. THE INTERIOR SURFACES OF THE PROJECT SHALL BE EXPOSED TO THE CHLORINATING SOLUTION FOR A MINIMUM OF 24 HOURS AND THE CHLORINE RESIDUAL SHALL NOT BE LESS THAN 10 PPM AFTER SUCH TIME.
4. SHOULD CALCIUM HYPOCHLORITE BE USED, NO SOLID AND/OR UNDISSOLVED PORTION OF THE COMPOUND SHALL BE INTRODUCED INTO ANY SECTION OF THE PROJECT TO BE CHLORINATED.
5. AT THE END OF THE 24-HOUR DISINFECTION PERIOD, REPRESENTATIVE SAMPLES SHALL BE TAKEN AND ANALYZED TO ASSURE A CHLORINE RESIDUAL OF AT LEAST 10 PPM. MEASUREMENTS FOR CHLORINE RESIDUAL TESTS SHALL BE BY A TRAINED, QUALIFIED TESTER APPROVED BY THE DIRECTOR.
6. SHOULD THE RESULTS INDICATE ADEQUATE CHLORINATION, THE PROJECT SHALL BE THOROUGHLY FLUSHED AND FILLED WITH POTABLE WATER FROM THE EXISTING POTABLE WATER SYSTEM AND AGAIN TESTED FOR CHLORINE RESIDUAL. THE FLUSHING SHALL BE CONSIDERED ADEQUATE IF THE TEST RESULTS INDICATE THAT THE WATER IN THE PROJECT HAS A COMPARABLE CHLORINE RESIDUAL AS THE WATER IN THE EXISTING SYSTEM.
7. FOLLOWING THE ACCEPTABLE FLUSHING OF THE HIGH CONCENTRATION CHLORINE SOLUTION, TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES SHALL BE TAKEN AT LEAST 24 HOURS APART FROM REPRESENTATIVE POINTS IN THE PROJECT AND SUBJECTED TO MICROBIOLOGICAL TESTS PERFORMED BY A CERTIFIED LABORATORY APPROVED BY THE DEPARTMENT OF HEALTH. AT LEAST ONE SET OF SAMPLES SHALL BE COLLECTED AND TESTED FROM EVERY 1,200 FEET OF THE NEW WATER MAIN, PLUS ONE SET FROM THE END OF THE LINE AND AT LEAST ONE SET FROM EACH BRANCH. IF ANY RESULTS WILL NOT BE ACCEPTABLE AND THE ENTIRE CHLORINATION PROCESS WILL BE REPEATED.
8. ANALYSIS FOR RESIDUAL CHLORINE SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, CURRENT EDITION.
9. MICROBIOLOGICAL TESTS SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, CURRENT EDITION.
10. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ALL OF THE FOREGOING.

REVISED: 12/1/07

WASTEWATER NOTES

1. ALL WASTEWATER LINES AND APPURTENANCES SHALL CONFORM TO THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, DATED SEPTEMBER 1984, OF THE DEPARTMENT OF PUBLIC WORKS, COUNTY OF MAUI.
2. ALL SEWERLINE AND APPURTENANCES SHALL FOLLOW THE DESIGN STANDARDS OF THE WASTEWATER RECLAMATION DIVISION, CITY AND COUNTY OF HONOLULU, VOLUMES 1 & 2, DATED JULY 1983 AND JULY 1984 RESPECTIVELY, UNLESS OTHERWISE NOTED.
3. BEFORE CONSTRUCTION COMMENCES, THE CONTRACTOR SHALL SCHEDULE AND DOCUMENT A PRE-CONSTRUCTION MEETING WITH ALL AGENCIES HAVING UTILITIES AFFECTED BY THE WORK.
4. THE DEPARTMENT OF ENVIRONMENTAL MANAGEMENT, WASTEWATER RECLAMATION DIVISION, HAS THE RIGHT TO STOP CONSTRUCTION, SHOULD ANY WORK BE FOUND CONTRARY TO THE APPROVED PLANS AND SPECIFICATIONS, OR DETRIMENTAL TO THE PUBLIC INTEREST.
5. ALL EXISTING WASTEWATER LINES, WHETHER OR NOT SHOWN ON THE PLANS, IF DAMAGED DURING CONSTRUCTION, SHALL BE REPAIRED BY THE CONTRACTOR AND THE CONTRACTOR SHALL PAY ALL EXPENSES.
6. THE CONTRACTOR SHALL NOTIFY THE WASTEWATER RECLAMATION DIVISION ONE (1) WEEK PRIOR TO CONNECTION TO ANY EXISTING WASTEWATER LINES.
7. SHOULD THE CONTRACTOR EXCAVATE BEYOND THE TRENCH PAY-WIDTH, AS SPECIFIED IN THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, DATED SEPTEMBER 1984, AND SUCH ACTION RESULTS IN A GREATER LOAD TO THE PIPE, THE CONTRACTOR SHALL PROVIDE, AT THE CONTRACTOR'S EXPENSE, A HIGHER CLASS OF BEDDING MATERIAL THAT WILL WITHSTAND THE ADDED LOAD.
8. WASTEWATER LATERALS SHALL BE SIX (6) INCHES IN DIAMETER AT A MINIMUM OF 2% SLOPE, UNLESS APPROVED OTHERWISE.
9. AN ADVANCE RISER CONNECTION SHALL BE INSTALLED AT EACH NEW WASTEWATER LATERAL.
10. WHERE THE CLEARANCE BETWEEN A WASTEWATER LINE AND A NEW OR EXISTING UTILITY LINE IS EIGHTEEN (18) INCHES OR LESS, THE WASTEWATER LINE SHALL BE CONCRETE JACKETED IN ACCORDANCE WITH THE STANDARD DETAILS OF PUBLIC WORKS CONSTRUCTION, DATED SEPTEMBER 1984.
11. WHEN THE WASTEWATER MAINS ARE OF A DIFFERENT MATERIAL THAN THE LATERALS, THE CONTRACTOR SHALL INSTALL APPROVED ADAPTERS.
12. ALL BACKFILL FOR WASTEWATER TRENCHES SHALL BE COMPACTED IN ONE (1) FOOT LIFTS TO A MINIMUM OF 95% OF ITS MAXIMUM DENSITY.
13. WHERE CONSTRUCTION IS TO BE DONE IN PHASES OR INCREMENTS, EACH PHASE OR INCREMENT SHALL BE APPROVED BY WASTEWATER RECLAMATION DIVISION BEFORE THE NEXT PHASE OR INCREMENT IS STARTED.
14. ALL WASTEWATER MAINS SHALL PASS A MANDREL TEST AS A CONDITION OF ACCEPTANCE 30 DAYS AFTER COMPLETION AND BACKFILL. THE MANDREL DIAMETER SHALL BE 95% OR MORE OF THE INSIDE DIAMETER OF THE PIPE BEING TESTED. A CERTIFICATION LETTER FROM THE CONTRACTOR, SIGNED BY THE DSA INSPECTOR, WILL BE FORWARDED TO THE WASTEWATER RECLAMATION DIVISION.
15. PRIOR TO INSPECTION BY CLOSED CIRCUIT TELEVISION (CCTV), ALL WASTEWATER LINES INSTALLED, INCLUDING LATERALS, SHALL BE FLUSHED WITH WATER AND ANY ACCUMULATED CONSTRUCTION DEBRIS AND OTHER FOREIGN MATERIALS SHALL BE REMOVED.
16. "AS-BUILT" DRAWINGS SHALL BE SUBMITTED AS A CONDITION FOR THE FINAL ACCEPTANCE OF THE PROJECT. IF MAIN TRANSMISSION LINES WILL BE DEDICATED TO THE COUNTY, THE CONTRACTOR SHALL ALSO SUBMIT GIS SHAPE FILE LAYER FILES (SHAPEFILE DATA IN NAD83 STATE PLANE ZONE 2 METERS) TO THE WASTEWATER RECLAMATION DIVISION.
17. ALL MAIN WASTEWATER LINES WHICH WILL BE DEDICATED TO THE COUNTY OF MAUI SHALL BE INSPECTED BY CCTV IN STRICT ACCORDANCE WITH DEPARTMENT OF PUBLIC WORKS CCTV POLICY, EFFECTIVE DATE JULY 15, 2001. FINAL ACCEPTANCE OF THE SYSTEM SHALL BE CONTINGENT UPON THE PASSING OF ALL REQUIREMENTS OF THIS POLICY. CCTV RESULTS SHOULD BE SUBMITTED ON DVD PER MEMO DATED OCTOBER 1,2008.
18. ANY CONNECTION MADE UNDER THE WATER TABLE WILL REQUIRE CCTV AT HIGH TIDE TO DETERMINE WATER TIGHTNESS, IN ACCORDANCE WITH DEPARTMENT OF PUBLIC WORKS CCTV POLICY, EFFECTIVE DATE JULY 15, 2001. FINAL ACCEPTANCE OF THE SYSTEM SHALL BE CONTINGENT UPON THE PASSING OF ALL REQUIREMENTS OF THIS POLICY.
19. CONTRACTOR MUST HAVE A SITE SPECIFIC SPILL PREVENTION PLAN (SSSPP) APPROVED BY WWRD PRIOR TO SEWER LINE CONSTRUCTION AND/OR SEWER LATERAL CONNECTION TO EXISTING FACILITIES, OR ANY WORK WITHIN FIVE (5) FEET OF WASTEWATER SYSTEM IMPROVEMENTS.

REVISED: OCTOBER, 2013

CONSTRUCTION NOTES WITHIN COUNTY RIGHT-OF-WAY

1. CONTRACTOR SHALL OBTAIN A PERMIT TO PERFORM WORK ON COUNTY HIGHWAYS FROM THE DEVELOPMENT SERVICES ADMINISTRATION TWO WEEKS PRIOR TO THE COMMENCEMENT OF WORK.
2. STANDARD DETAIL DRAWINGS AND STANDARD SPECIFICATIONS OF THE DEPARTMENT OF PUBLIC WORKS SHALL BE INCLUDED AS PART OF THE CONSTRUCTION PLANS.
3. ALL CONSTRUCTION WORK SHALL STRICTLY CONFORM TO THE LATEST VERSION OF THE HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE PUBLIC WORKS CONSTRUCTION, AND THE SEPTEMBER 1984 "STANDARD DETAILS" FOR PUBLIC WORKS CONSTRUCTION OF THE DEPARTMENT OF PUBLIC WORKS, AS AMENDED.
4. IF EXISTING UTILITIES, WHETHER OR NOT SHOWN ON PLANS, ARE DAMAGED DURING CONSTRUCTION, THE CONTRACTOR SHALL AT HIS OWN EXPENSE BE REQUIRED TO REPAIR SUCH UTILITIES.
5. CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, AND OTHER PROTECTIVE DEVICES FOR THE PROTECTION, SAFETY AND CONVENIENCE OF THE PUBLIC, ACCORDING TO THE LATEST VERSION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICE FOR STREETS AND HIGHWAYS" AND TO THE RULES AND REGULATIONS GOVERNING THE USE OF TRAFFIC CONTROL DEVICES AT WORKSITES AND/OR ADJACENT TO PUBLIC STREETS AND HIGHWAYS ADOPTED BY THE HIGHWAY SAFETY COORDINATOR AND THE U.S. FEDERAL HIGHWAY ADMINISTRATION "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS".
6. THE DIRECTOR OF PUBLIC WORKS AND/OR THE DIRECTOR OF THE DEPARTMENT OF WATER SUPPLY HAS THE RIGHT TO STOP CONSTRUCTION SHOULD ANY WORK BE FOUND CONTRARY TO THE APPROVED CONSTRUCTION PLAN OR DETRIMENTAL TO THE PUBLIC'S INTEREST.
7. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE DEVELOPMENT SERVICES ADMINISTRATION FIVE (5) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
8. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH AND COUNTY GRADING ORDINANCE.
9. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION ORDERED BY THE DIRECTOR OF PUBLIC WORKS SHALL BE PAID BY THE CONTRACTOR.
10. CONSTRUCTION DEBRIS AND WASTES SHALL BE DEPOSITED AT AN APPROPRIATE WORK SITE. THE CONTRACTOR SHALL INFORM THE DIRECTOR OF PUBLIC WORKS OF THE LOCATION OF THE DISPOSAL SITES. THE DISPOSAL SITE MUST FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCE.
11. THE CONTRACTOR SHALL SUBMIT A TYPE AND FIVE (5) COPIES OF THE "AS-BUILT" DRAWINGS PRIOR TO THE FINAL APPROVAL OF THE IMPROVEMENTS.
12. IF THE CLEARANCE BETWEEN A WASTEWATER LINE AND A NEW OR EXISTING WATERLINE IS EIGHTEEN INCHES (18") OR LESS, THE WASTEWATER LINE SHALL BE CONCRETE-JACKETED IN ACCORDANCE WITH THE STANDARD DETAILS OF PUBLIC WORKS CONSTRUCTION DATED SEPTEMBER 1984, AS AMENDED.
13. SHOULD HISTORIC SITES SUCH AS WALLS, PLATFORMS, PAVEMENTS OR MOUNDS, OR REMAINS SUCH AS ARTIFACTS BURIALS, CONCENTRATION OF SHELL OR CHARCOAL BE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES, WORK SHALL CEASE IMMEDIATELY IN THE IMMEDIATE VICINITY OF THE FIND AND THE FIND SHALL BE PROTECTED FROM FURTHER DAMAGE. THE CONTRACTOR AND/OR LANDOWNER SHALL IMMEDIATELY CONTACT THE STATE HISTORIC PRESERVATION DIVISION (692-8015), WHICH WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND AN APPROPRIATE MITIGATION MEASURE, IF NECESSARY.
14. THE COUNTY OF MAUI IS NOT RESPONSIBLE FOR ANY PARK, ROADWAY, EASEMENT (INCLUDING BUT NOT LIMITED TO DRAINAGE, SEWER, ACCESS, RECLAIMED WATER, OR AVIGATION EASEMENT), OR ANY OTHER INTEREST IN REAL PROPERTY SHOWN ON THIS MAP OR SHOWN ON THESE PLANS, UNLESS THE MAUI COUNTY COUNCIL HAS ACCEPTED ITS DEDICATION BY A RESOLUTION APPROVED BY A MAJORITY OF A COUNCIL MEMBERS AT A REGULAR OR SPECIAL MEETING OF THE MAUI COUNTY COUNCIL, OR THE COUNTY OF MAUI HAS SIGNED ITS ACCEPTANCE VIA A CONVEYANCE DOCUMENT RECORDED IN THE BUREAU OF CONVEYANCES OF THE STATE OF HAWAII IN COMPLIANCE WITH MAUI COUNTY CODE SECTION 3.44.015.
15. STEEL PLATE WARNING SIGNS ARE REQUIRED FOR ALL STEEL PLATES IN THE RIGHT-OF-WAY.
16. WHEELCHAIR RAMP INSPECTION/CERTIFICATION FORMS SHALL BE REQUIRED FOR ALL NEWLY CONSTRUCTED RAMPS.
17. ALL STRIPING AND PAVEMENT MARKINGS SHALL BE OF THERMOPLASTIC MATERIAL.
18. COMPACTION REQUIREMENTS
   A. TESTING OF MATERIALS SHALL BE CONDUCTED BY AN APPROVED INDEPENDENT TESTING AGENCY IN ACCORDANCE WITH ASTM STANDARD METHODS OR AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, AS FOLLOWS:
      I. EMBANKMENT/SELECT BORROW AND SUBGRADE MATERIALS: ONE (1) COMPACTION TEST PER 500 SQUARE YARDS PER LIFT;
      II. AGGREGATE SUBBASE COURSE: ONE (1) COMPACTION TEST PER 400 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER LIFT PER PROJECT;
      III. AGGREGATE BASE COURSE: ONE (1) COMPACTION TEST PER 300 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER LIFT PER PROJECT;
      IV. ASPHALT CONCRETE PAVEMENT OR ASPHALT TREATED BASE COURSE: THREE (3) A.C. CORES FOR THICKNESS AND DENSITY TESTS PER PROJECT;
      V. TRENCH BACKFILL MATERIAL: ONE (1) TEST FOR EACH 300 LINEAL FEET OF TRENCH PER LIFT OF MATERIAL.
   B. CONTRACTOR SHALL SUBMIT ALL TESTING REPORTS INCLUDING RESULTS TO THE COUNTY'S INSPECTION AGENCY FOR REVIEW AND APPROVAL PRIOR TO COUNTY'S ACCEPTANCE OF WORK.
   C. THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE COUNTY OF ANY TESTING FAILURES AND CORRECT EACH FAILURE PRIOR TO PROCEEDING TO THE NEXT PHASE OF CONSTRUCTION.

REVISED: 04/2016

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8511
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

CONSTRUCTION NOTES

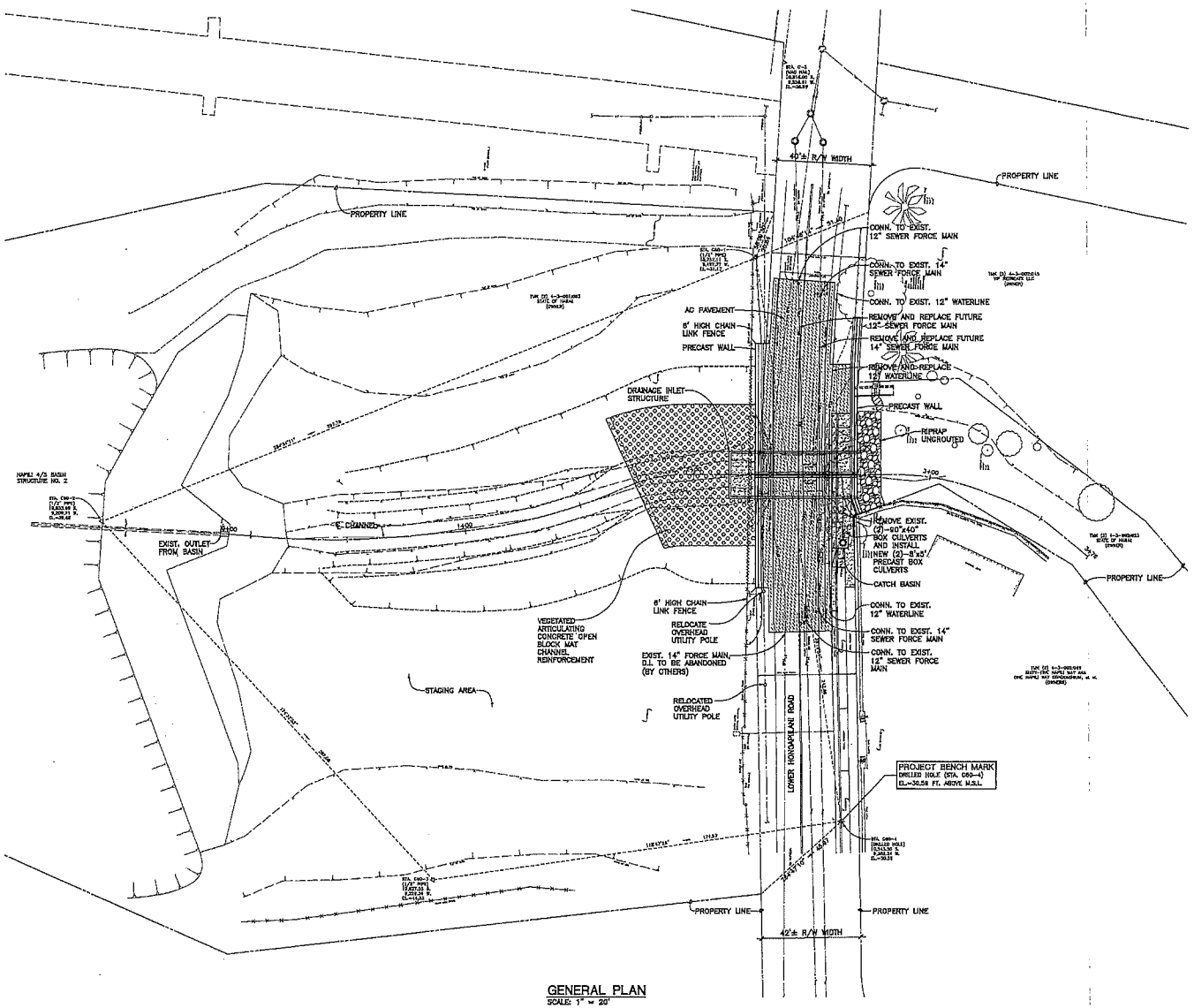
RANDY K. SATO
LICENSED PROFESSIONAL ENGINEER
No. 14784-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.N., S.N.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	CON60

SHEET C-1
2 of 22



GENERAL PLAN

SCALE 1" = 20'

SCALE IN FEET

0 10 20 40 80

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII

GENERAL PLAN

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14764-C
HAWAII, U.S.A.

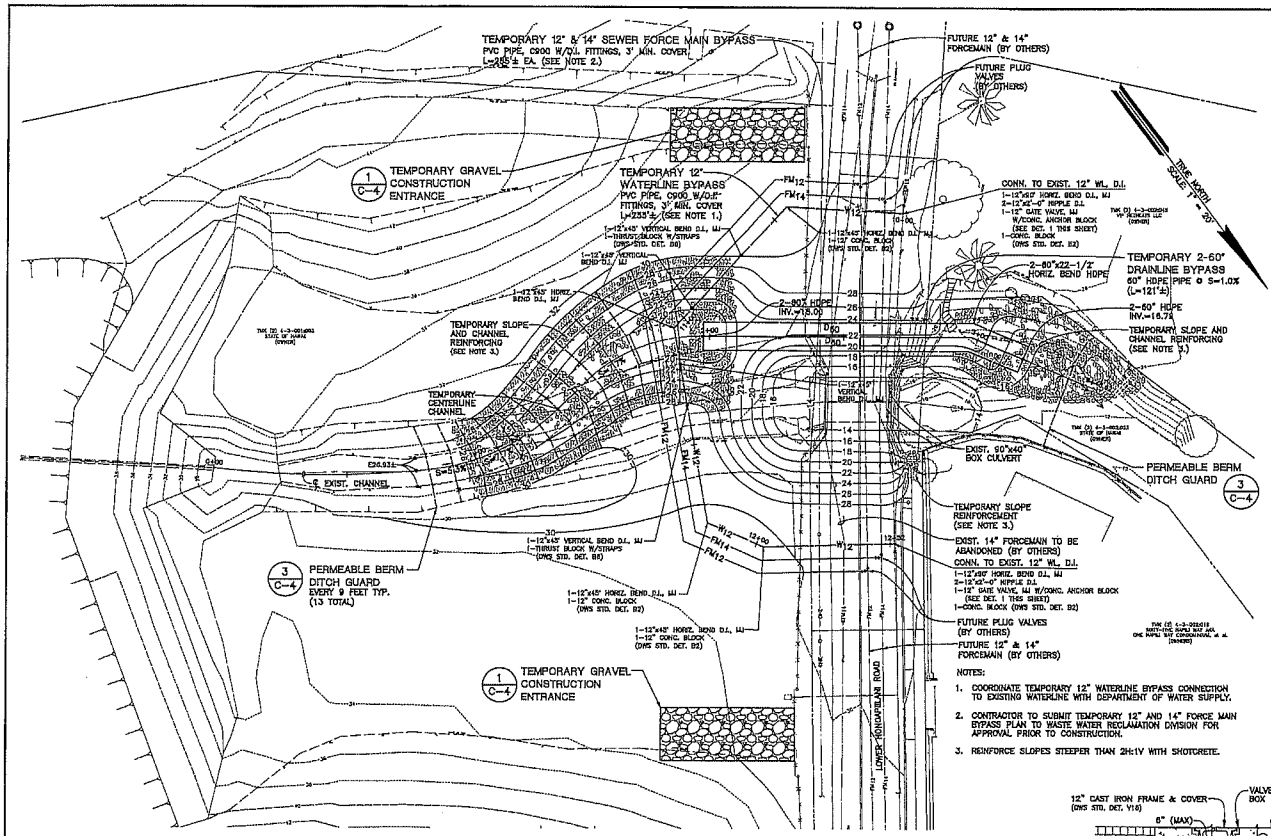
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	H.M., S.W.
CHECKED BY:	M.K.
DATE:	OCTOBER 18, 2016
FILE NO:	COM80

SHEET C-2

3 or 22



PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 1
SCALE: 1" = 20'

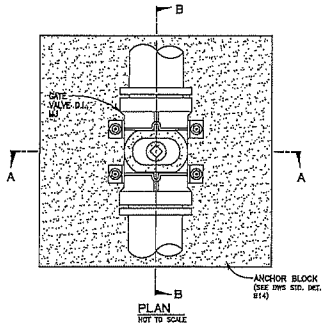
EROSION CONTROL NOTES

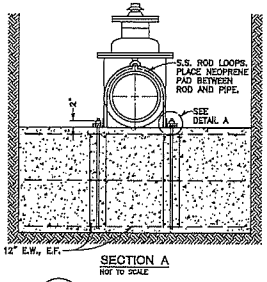
(IMPLEMENT THE FOLLOWING OUTLINE OF THE EROSION CONTROL MEASURES DURING CONSTRUCTION.

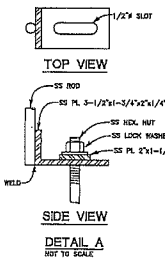
1. GENERAL EROSION CONTROL MEASURES
   A. MINIMIZE TIME OF CONSTRUCTION.
   B. RETAIN EXISTING GROUND COVER UNTIL THE LATEST DATE TO COMPLETE CONSTRUCTION.
   C. PROVIDE TEMPORARY GRAVEL APRON(S) (APPROXIMATELY 50' LONG BY 30' WIDE) AT POINT OF CONNECTION TO PAVED STREET TO PREVENT TRACKING OF SEDIMENTS ONTO STREET.
   D. CONTROL DUST BY SPRINKLING WITH WATER WAGONS OR OTHER SUITABLE METHODS. GRADED AREAS SHALL BE THOROUGHLY WATERED AFTER CONSTRUCTION ACTIVITY HAS CEASED FOR THE DAY AND ON WEEKENDS.
   E. USE TEMPORARY BERMS AND CUT-OFF DITCHES, WHERE NEEDED, FOR CONTROL OF EROSION.
   F. CONSTRUCT PERMANENT EROSION AND DRAINAGE CONTROL FEATURES AS EARLY AS POSSIBLE. ALL CUT AND FILL SLOPES SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER GRADING WORK HAS BEEN COMPLETED.
   G. MAINTAIN EROSION CONTROL MEASURES UNTIL ESTABLISHMENT OF GRASS AND LANDSCAPE PLANTING.
2. SITE-SPECIFIC EROSION CONTROL MEASURES
   A. INSTALL PERMEABLE DITCH GUARD AS NOTED ON PLAN. INSPECT DITCH GUARDS WEEKLY AND AFTER STORMS. DURING PROLONGED RAINFALL INSPECT DITCH GUARDS AT LEAST DAILY. REMOVE AND STABILIZE SEDIMENT WHEN IT REACHES HALF THE HEIGHT THE DITCH GUARD.
   B. INSTALL CURB DRAIN INLET FILTER AS NOTED ON PLAN. INSPECT FILTER WEEKLY AND AFTER STORMS. REMOVE AND DISPOSE OF SEDIMENT AFTER EACH STORM EVENT.
3. ADDITIONAL EROSION CONTROL NOTES
   A. ALL CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY WEEKLY IN DRY PERIODS AND WITHIN 24 HOURS AFTER ANY RAINFALL OF 1/2 INCH OR GREATER WITHIN A 24-HOUR PERIOD. DURING PROLONGED PERIODS OF RAINFALL, DAILY CHECKING IS NECESSARY. THE PERMITTEE SHALL MAINTAIN RECORDS OF THE DURATION AND ESTIMATED VOLUME OF STORM WATER DISCHARGE(S), CHECKS, AND REPAIRS.
   B. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND FUNCTIONAL BEFORE EARTH MOVING OPERATIONS BEGIN. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
   C. A SPECIFIC INDIVIDUAL SHALL BE DESIGNATED TO BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROLS ON EACH PROJECT.
   D. TEMPORARY SOIL STABILIZATION WITH APPROPRIATE VEGETATION SHALL BE APPLIED ON AREAS THAT WILL REMAIN UNFINISHED FOR MORE THAN 30 CALENDAR DAYS.
   E. PERMANENT SOIL STABILIZATION WITH PERENNIAL VEGETATION OR PAVEMENT SHALL BE APPLIED AS SOON AS PRACTICAL AFTER FINAL GRADING. IRRIGATION AND MAINTENANCE OF THE PERENNIAL VEGETATION SHALL BE PROVIDED FOR 30 DAYS OR UNTIL THE VEGETATION TAKES ROOT, WHICHEVER IS SHORTER.

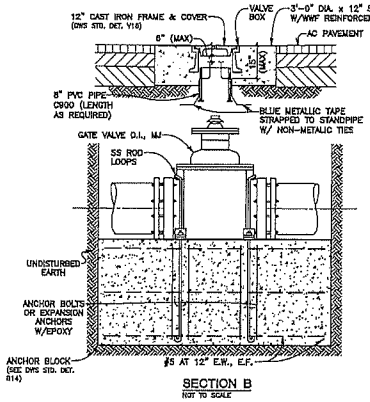
MINIMUM BEST MANAGEMENT PRACTICES

1. DRAINAGE: HANDLE DRAINAGE TO CONTROL EROSION, PREVENT DAMAGE TO DOWNSTREAM PROPERTIES, AND RETURN WATER TO THE NATURAL DRAINAGE COURSE IN A MANNER WHICH MINIMIZES SEDIMENTATION OR OTHER POLLUTION TO THE MAXIMUM EXTENT PRACTICABLE.
2. DUST CONTROL: CONTROL DUST EMISSIONS TO THE MAXIMUM EXTENT PRACTICABLE THROUGH BMPS SUCH AS WATER SPRINKLING, DUST FENCES, LIMITING AREA OF DISTURBANCE, AND TIMELY GRASSING OF FINISHED AREAS.
3. VEGETATION: RETAIN NATURAL VEGETATION, ESPECIALLY GRASSES, WHEREVER FEASIBLE. AVOID STORAGE OF GRUBBED MATERIALS NEAR WATERCOURSES.
4. EROSION CONTROLS: STABILIZE ALL DISTURBED AREAS WITH EROSION CONTROL MEASURES SUCH AS VEGETATION, RUNOFF DIVERSION, CHECK DAMS, MULCHING, BLANKETS, BONDED FIBER MATRICES, AND VEHICLE WHEEL WASH FACILITIES.
5. SEDIMENT CONTROL: CAPTURE SEDIMENT TRANSPORTED IN RUNOFF TO MINIMIZE THE SEDIMENT FROM LEAVING THE SITE WITH METHODS SUCH AS SEDIMENT BASINS, SEDIMENT TRAPS, SILT FENCES, SAND BAGS, AND VEGETATED FILTER STRIPS.
6. MATERIAL AND WASTE MANAGEMENT: PROPERLY STORE TOXIC MATERIAL AND PREVENT THE DISCHARGE OF POLLUTANTS ASSOCIATED WITH CONSTRUCTION MATERIALS.
7. TIMING OF CONTROL MEASURE IMPLEMENTATION: TIMING OF CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION CONTROL PLAN. DISTURBED AREAS OF CONSTRUCTION SITES THAT WILL NOT BE RE-DISTURBED FOR TWENTY-ONE DAYS OR MORE WILL BE STABILIZED (GRASSES OR GRAVELED) BY NO LATER THAN THE FOURTEENTH DAY AFTER THE LAST DISTURBANCE.









1 C-3 CONCRETE ANCHOR BLOCK - GATE VALVE
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 1

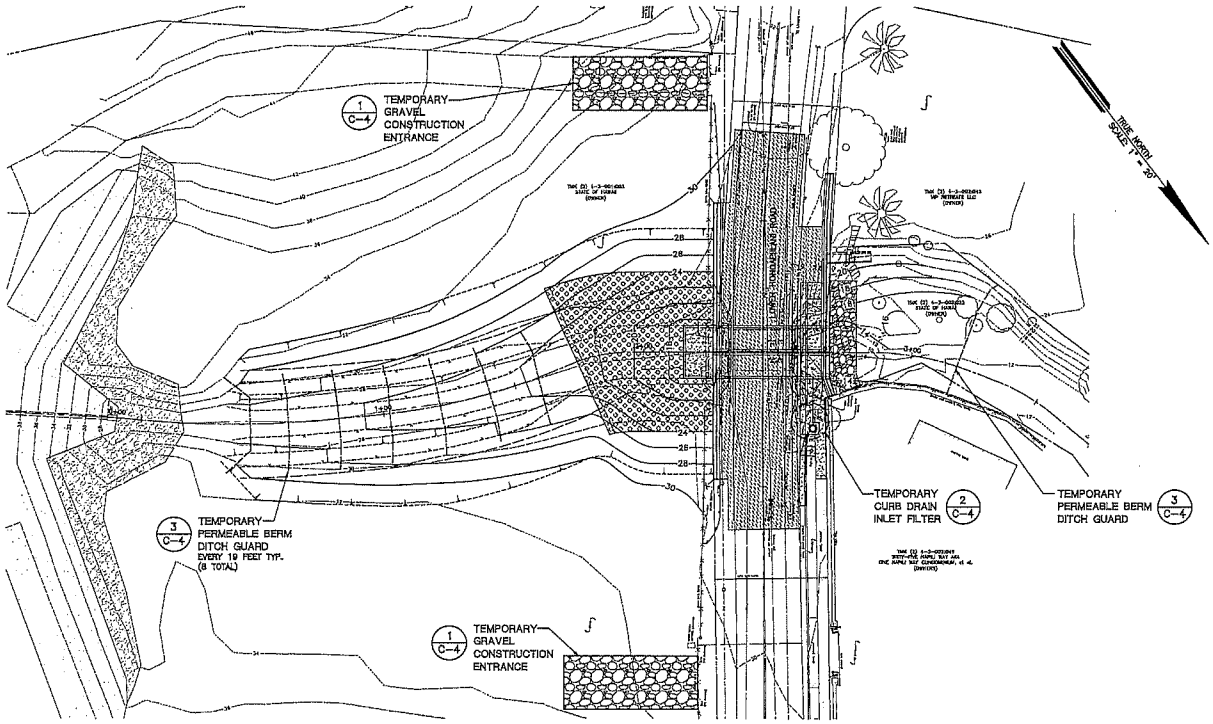
HANDY K. SATO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-7

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 19, 2015
FILE NO:	CO1150

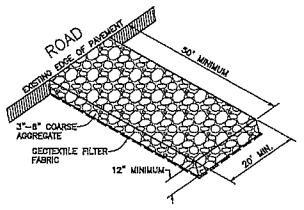
SHEET C-3
4 OF 22



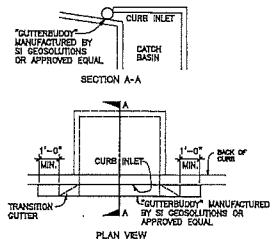
PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 2

SCALE: 1" = 10'

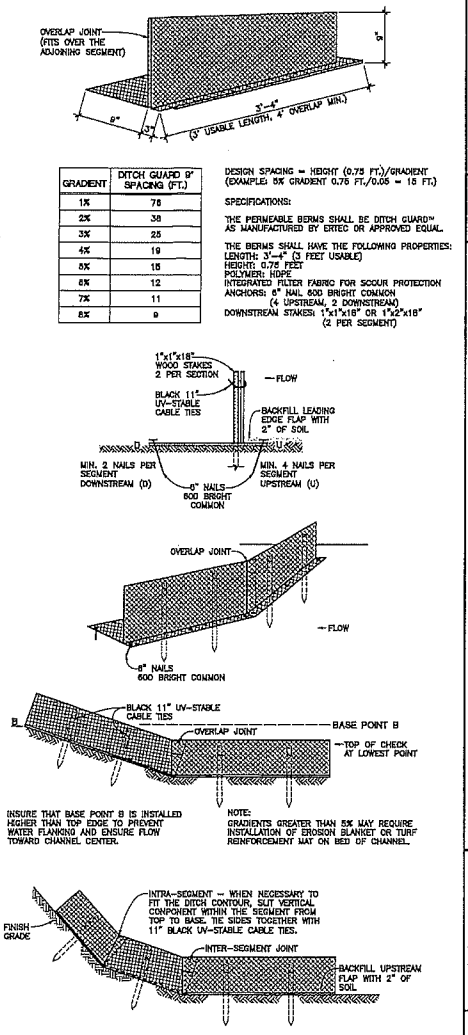
SCALE IN FEET
0 5 10 20 30



1 C-4 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
NOT TO SCALE



1 C-4 TEMPORARY CURB DRAIN INLET FILTER
NOT TO SCALE



GRADIENT	DITCH GUARD 9' SPACING (FT.)
1%	75
2%	38
3%	25
4%	19
5%	15
6%	12
7%	11
8%	9

DESIGN SPACING = HEIGHT (0.75 FT.)/GRADIENT
(EXAMPLE: 5% GRADIENT 0.75 FT./0.05 = 15 FT.)

SPECIFICATIONS:

THE PERMEABLE BERMS SHALL BE DITCH GUARD™ AS MANUFACTURED BY ERTEC OR APPROVED EQUAL.

THE BERMS SHALL HAVE THE FOLLOWING PROPERTIES:
LENGTH: 3'-4" (3 FEET USABLE)
HEIGHT: 0.75 FEET
POLYMER: HDPE
INTEGRATED FILTER FABRIC FOR SCOUR PROTECTION
ANCHORS: 6" NAIL 600 BRIGHT COMMON
(4 UPSTREAM, 2 DOWNSTREAM)
DOWNSTREAM STAKES: 1"x1"x18" OR 1"x2"x18"
(2 PER SEGMENT)

3 C-4 TEMPORARY PERMEABLE BERM DITCH GUARD DETAILS
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

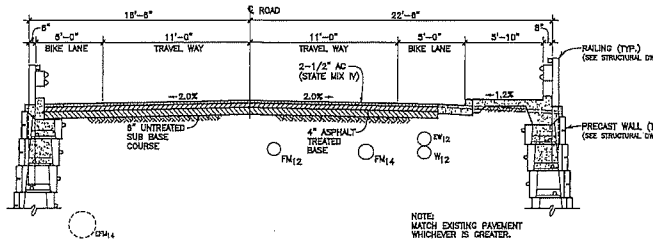
PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 2

RANDY K. SATO
LICENSED PROFESSIONAL ENGINEER
No. 14764-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-7.
LICENSE EXPIRES: 04/30/2018

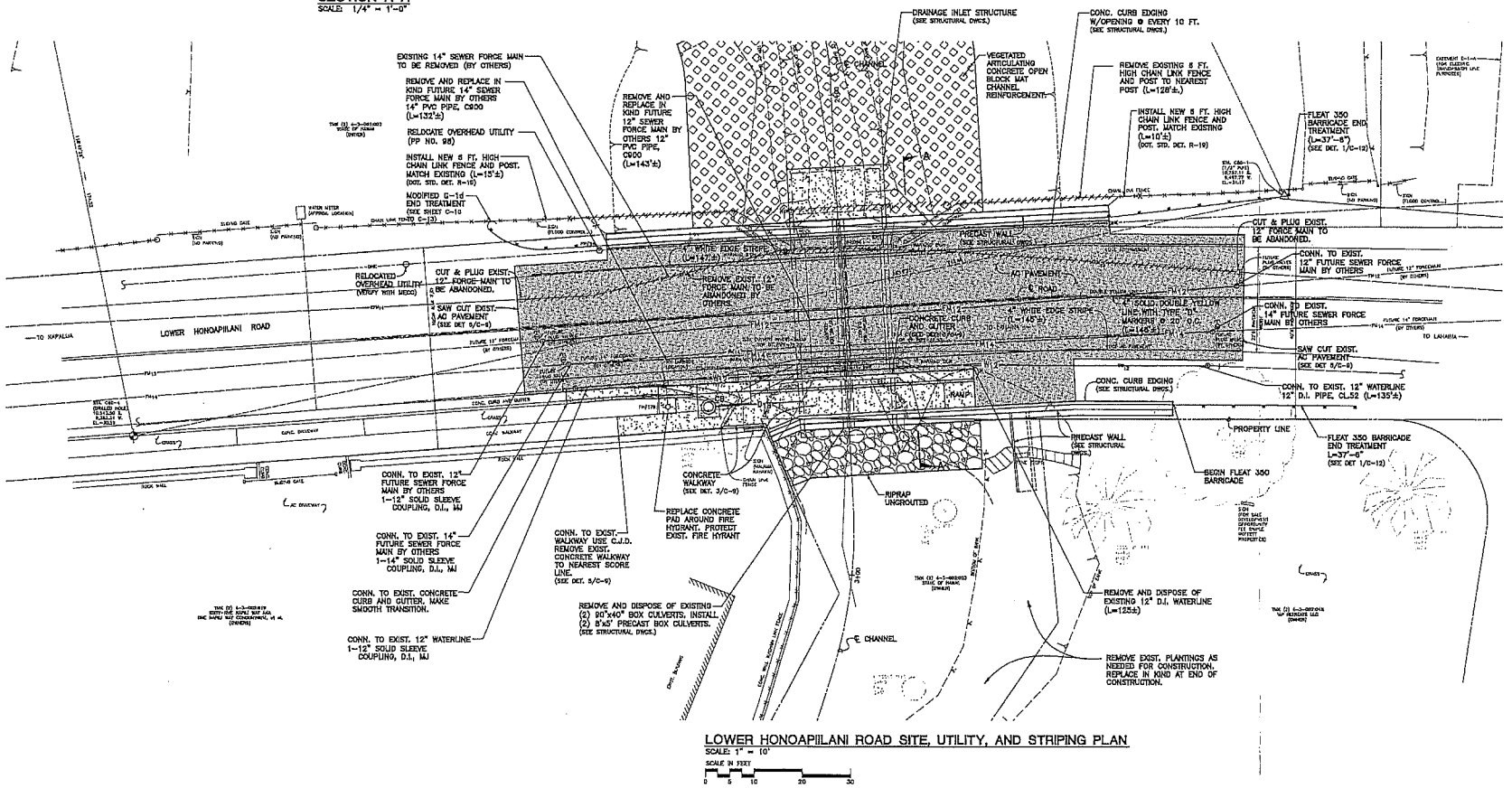
DESIGNED BY:	M.K.S.
DRAWN BY:	M.M., S.N.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COU50

SHEET C-4
5 OF 22



SECTION A-A

SCALE: 1/4" = 1'-0"



LOWER HONOAPIILANI ROAD SITE, UTILITY, AND STRIPING PLAN

SCALE: 1" = 10'

SCALE IN FEET
0 5 10 20 30

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

LOWER HONOAPIILANI ROAD SITE, UTILITY, AND STRIPING PLAN

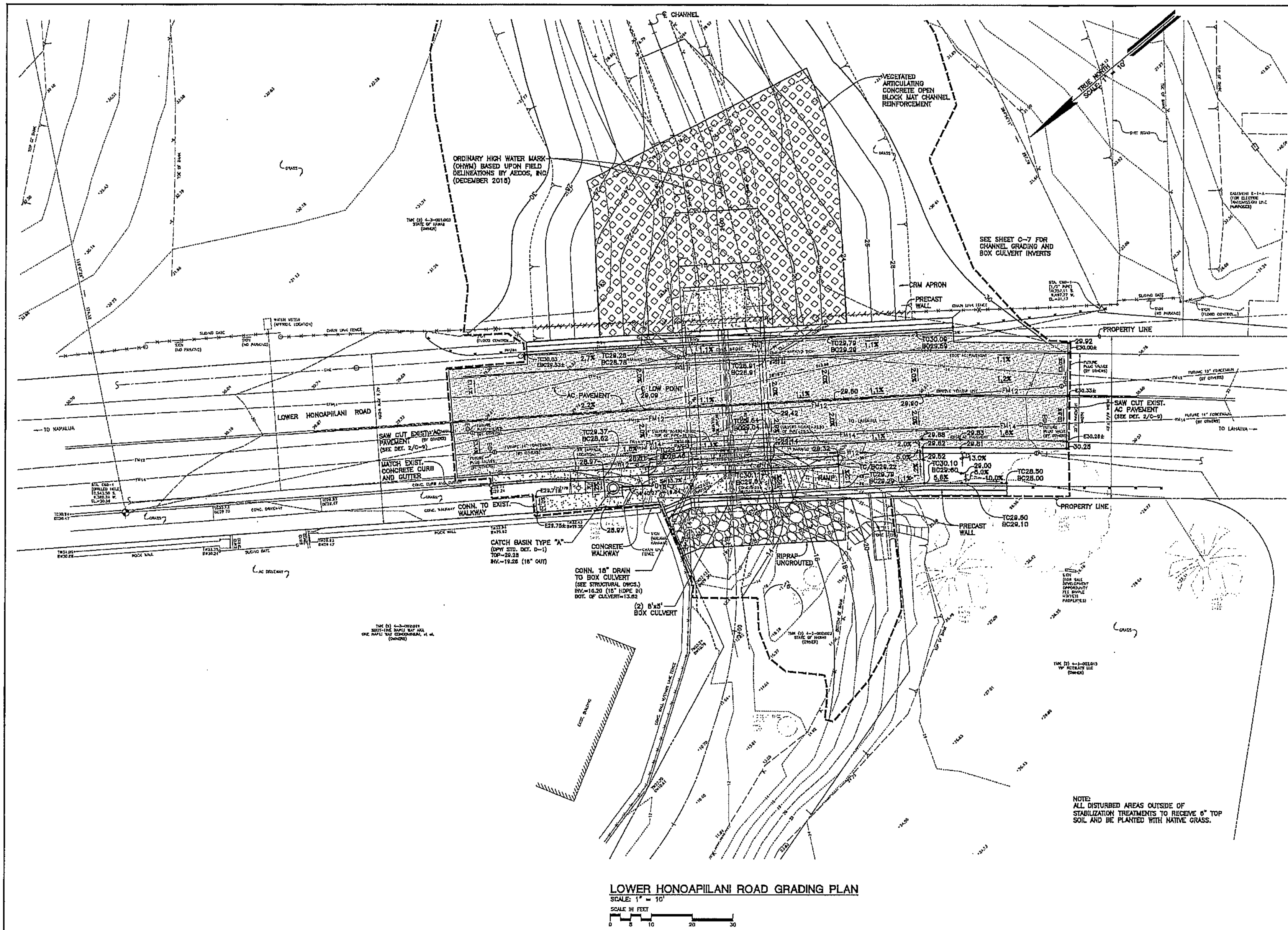
MANDY K. SATO
LICENSED PROFESSIONAL ENGINEER
No. 14764-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2

LICENSE EXPIRES: 04/30/2016

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 15, 2015
FILE NO:	CO160

SHEET C-5
6 OF 22



FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@fernaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

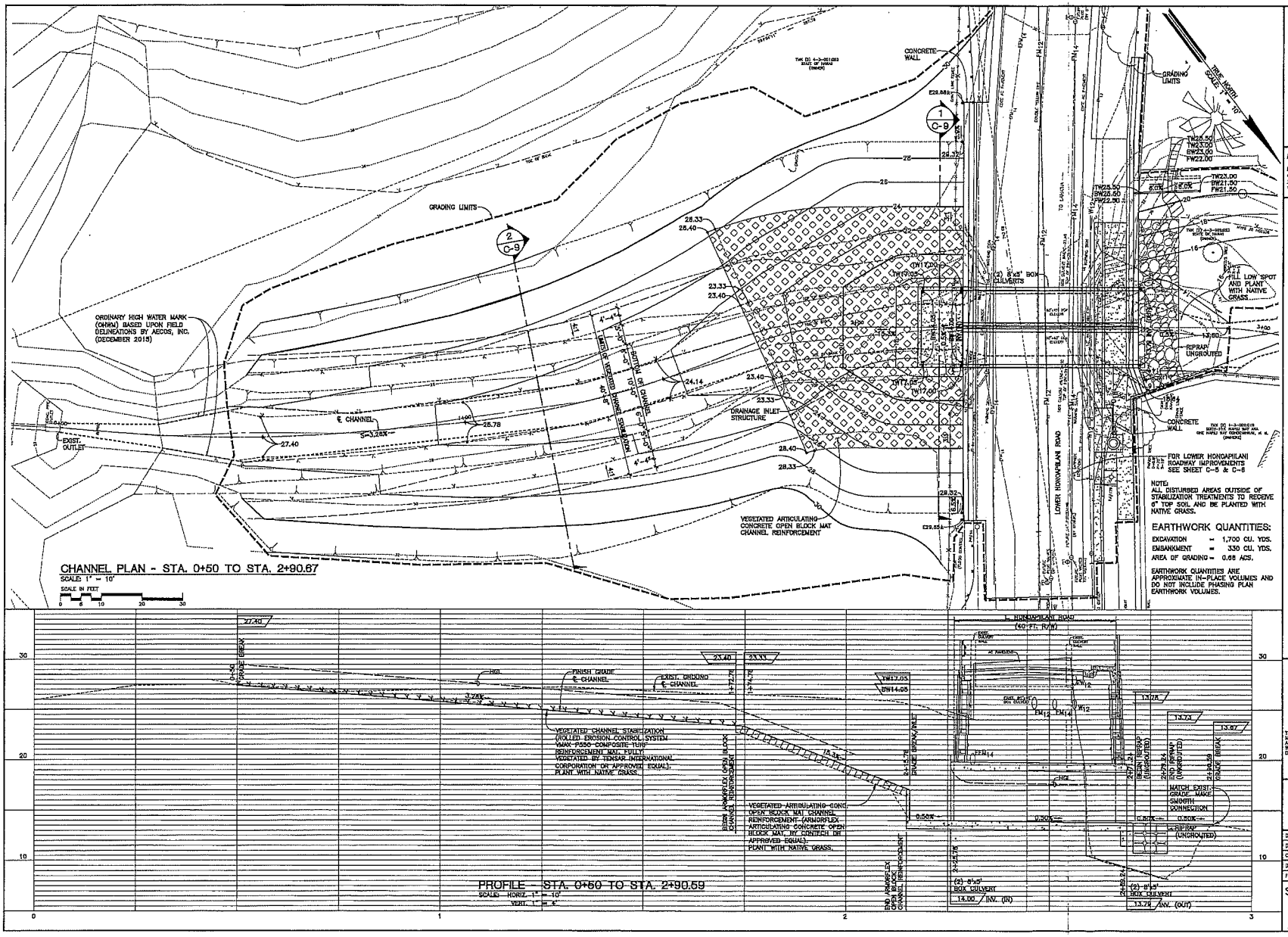
LOWER HONOAPIILANI ROAD GRADING PLAN

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	C0480

SHEET C-6
7 of 22



FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants

1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793

Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII

CHANNEL PLAN AND PROFILE - STA. 0+50 TO STA. 2+90.59

HANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14784-C
HAWAII, U.S.A.

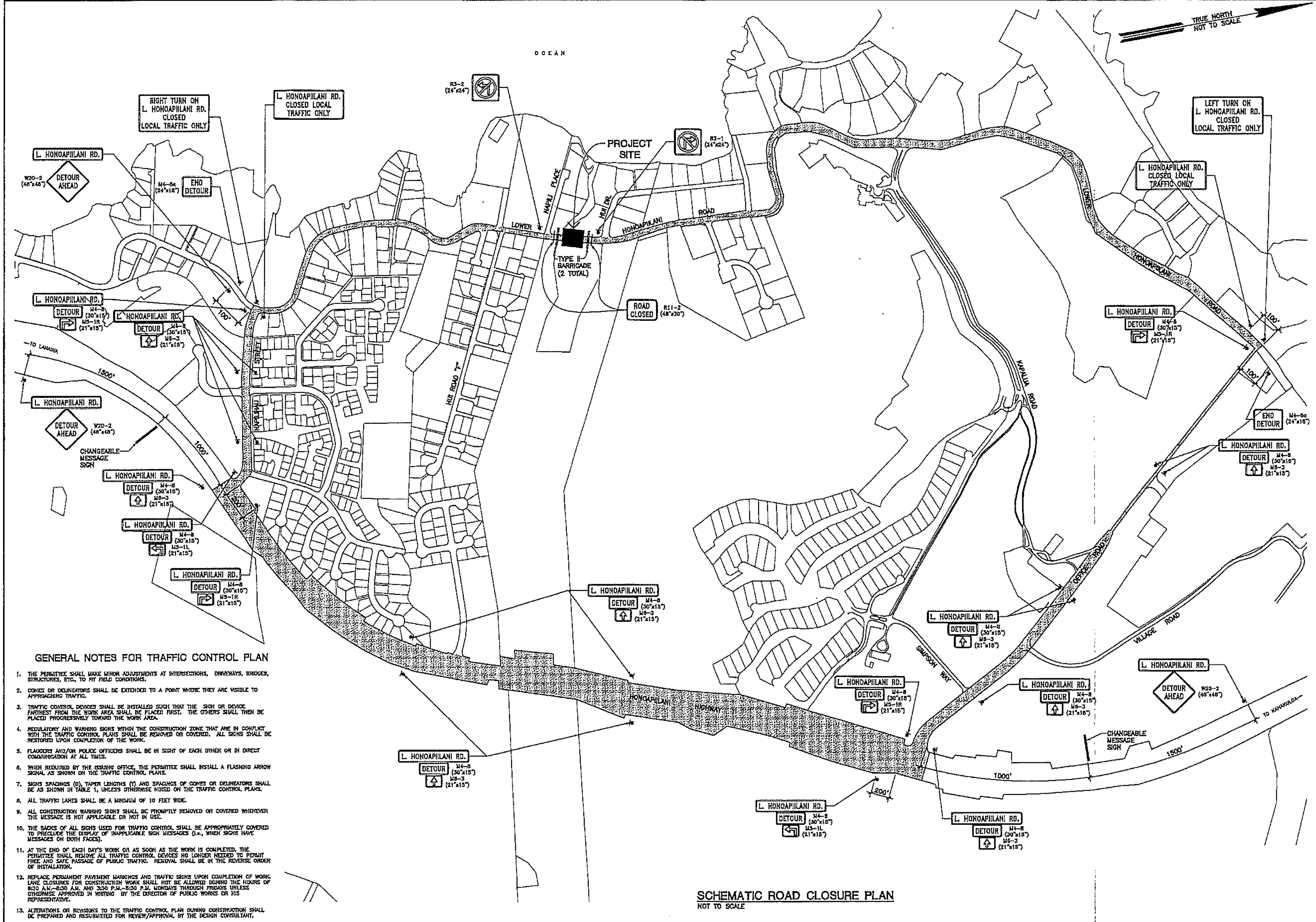
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONTRIBUTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN RAR §16-115-9

LICENSE EXPIRES: 04/30/2018

DESIGNED BY: M.K.S.
DRAWN BY: H.N., S.W.
CHECKED BY: M.S.
DATE: OCTOBER 15, 2016
FILE NO.: 00050

SHEET C-7

8 OF 22



GENERAL NOTES FOR TRAFFIC CONTROL PLAN

1. THE PERMITTEE SHALL MAKE MINOR ADJUSTMENTS AT INTERSECTIONS, DRIVEWAYS, BRIDGES, STRUCTURES, ETC., TO FIT FIELD CONDITIONS.
2. CONES OR DELINEATORS SHALL BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
3. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED SUCH THAT THE SIGN OR DEVICE FARTHEST FROM THE WORK AREA SHALL BE PLACED FIRST. THE OTHERS SHALL THEN BE PLACED PROGRESSIVELY TOWARD THE WORK AREA.
4. REGULATORY AND WARNING SIGNS WITHIN THE CONSTRUCTION ZONE THAT ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLANS SHALL BE REMOVED OR COVERED. ALL SIGNS SHALL BE RESTORED UPON COMPLETION OF THE WORK.
5. FLAGGERS AND/OR POLICE OFFICERS SHALL BE IN SIGHT OF EACH OTHER OR IN DIRECT COMMUNICATION AT ALL TIMES.
6. WHEN REQUIRED BY THE ISSUING OFFICE, THE PERMITTEE SHALL INSTALL A FLASHING ARROW SIGNAL AS SHOWN ON THE TRAFFIC CONTROL PLANS.
7. SIGNS SPACINGS (D), TAPER LENGTHS (T) AND SPACINGS OF CONES OR DELINEATORS SHALL BE AS SHOWN IN TABLE 1, UNLESS OTHERWISE NOTED ON THE TRAFFIC CONTROL PLANS.
8. ALL TRAFFIC LANES SHALL BE A MINIMUM OF 10 FEET WIDE.
9. ALL CONSTRUCTION WARNING SIGNS SHALL BE PROMPTLY REMOVED OR COVERED WHENEVER THE MESSAGE IS NOT APPLICABLE OR NOT IN USE.
10. THE BACKS OF ALL SIGNS USED FOR TRAFFIC CONTROL SHALL BE APPROPRIATELY COVERED TO PRECLUDE THE DISPLAY OF INAPPLICABLE SIGN MESSAGES (i.e., WHEN SIGNS HAVE MESSAGES ON BOTH FACES).
11. AT THE END OF EACH DAY'S WORK OR AS SOON AS THE WORK IS COMPLETED, THE PERMITTEE SHALL REMOVE ALL TRAFFIC CONTROL DEVICES NO LONGER NEEDED TO PERMIT FREE AND SAFE PASSAGE OF PUBLIC TRAFFIC. REMOVAL SHALL BE IN THE REVERSE ORDER OF INSTALLATION.
12. REPLACE PERMANENT PAVEMENT MARKINGS AND TRAFFIC SIGNS UPON COMPLETION OF WORK. LANE CLOSURES FOR CONSTRUCTION WORK SHALL NOT BE ALLOWED DURING THE HOURS OF 6:30 A.M.–8:30 A.M. AND 3:30 P.M.–5:30 P.M. MONDAYS THROUGH FRIDAYS UNLESS OTHERWISE APPROVED IN WRITING BY THE DIRECTOR OF PUBLIC WORKS OR HIS REPRESENTATIVE.
13. ALTERATIONS OR REVISIONS TO THE TRAFFIC CONTROL PLAN DURING CONSTRUCTION SHALL BE PREPARED AND RESUBMITTED FOR REVIEW/APPROVAL BY THE DESIGN CONSULTANT.
14. INSTALL ARROW/MESSAGE BOARDS IN ALL DIRECTIONS OF TRAFFIC.
15. PROVIDE NOTIFICATION OF ROAD WORK TO AFFECTED PROPERTY OWNERS IN THE VICINITY AND NOTIFY THROUGH THE MEDIA, (NEWSPAPERS, RADIO, ETC...).

SCHEMATIC ROAD CLOSURE PLAN
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

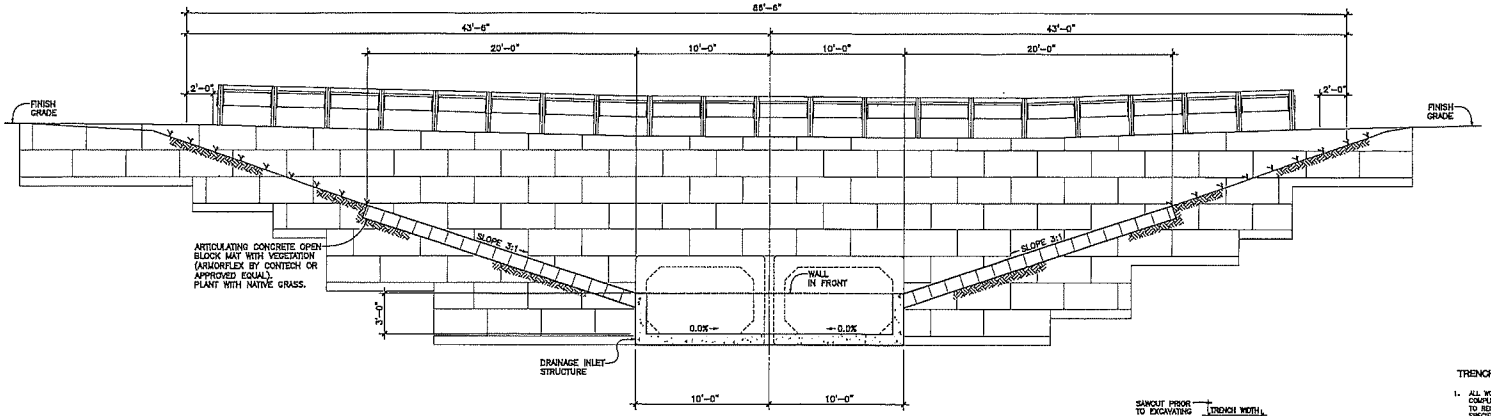
SCHEMATIC ROAD CLOSURE PLAN

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14784-C
HAWAII, U.S.A.

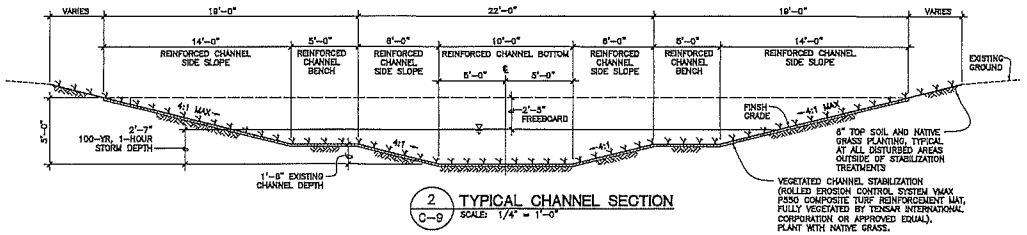
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 15-115-2.
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 15, 2016
FILE NO:	C0480

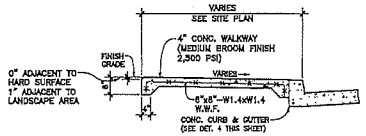
SHEET C-8
9 of 22



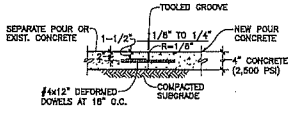
1 / C-9 UPSTREAM SECTION AT CULVERT (INLET)
SCALE: 1/4" = 1'-0"



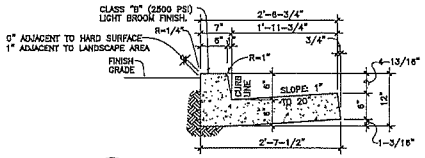
2 / C-9 TYPICAL CHANNEL SECTION
SCALE: 1/4" = 1'-0"



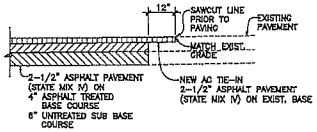
3 / C-9 CONCRETE WALKWAY DETAIL
SCALE: 1/2" = 1'-0"



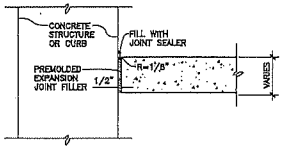
5 / C-9 CONSTRUCTION JOINT WITH DOWELS (C.J.D.) FOR SIDEWALK
SCALE: 1" = 1'-0"



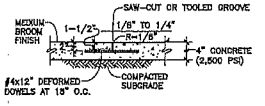
4 / C-9 CONCRETE CURB & GUTTER
SCALE: 1" = 1'-0"



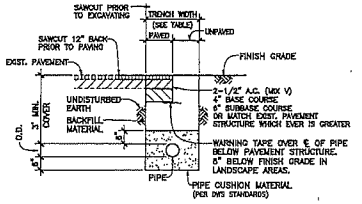
6 / C-9 ASPHALT PAVING TIE-IN DETAIL
SCALE: 1/2" = 1'-0"



9 / C-9 EXPANSION JOINT (E.J.)
SCALE: 1" = 1'-0"



10 / C-9 CONTRACTION JOINT (C.J.) FOR SIDEWALK
SCALE: 1" = 1'-0"

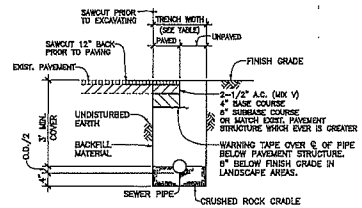


7 / C-9 TYPICAL WATERLINE TRENCH SECTION
NOT TO SCALE

TRENCH SECTION NOTES:

1. ALL WORK AND MATERIALS REQUIRED TO COMPLETE THE AC PAVING SHALL CONFORM TO REQUIREMENTS OF THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION 1994".
2. CONTRACTOR SHALL PROVIDE A TEMPORARY COLD MIX PATCH IF PERMANENT RESTORATION CANNOT BE MADE WITHIN 24 HOURS OF BACKFILL.
3. ALL EXPOSED AREAS TO BE GRASSED.
4. MINIMUM COVER:
   A. UNDER ROAD PAVEMENT = 36"
   B. UNDER SHOULDER AREA:
      1. SMALLER THAN 4" = 24"
      2. 4" – 30"
      3. 6" AND LARGER = 36"
5. PIPE CUSHION MATERIAL ABOVE PIPE:
   A. 12" FOR PIPES 18" OR LARGER
   B. 6" FOR PIPES 12" OR SMALLER
6. ANY DAMAGES TO EXISTING UTILITIES SHALL BE REPLACED AND/OR RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO OWNER.
7.

PIPE SIZE	TRENCH WIDTH
<4"	18"
4"	18"
6"	18"
8"	18"
12"	24"
16"	24"
24"	24"



8 / C-9 TYPICAL SEWERLINE TRENCH SECTION
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

DRAINAGE SECTIONS AND MISCELLANEOUS DETAILS

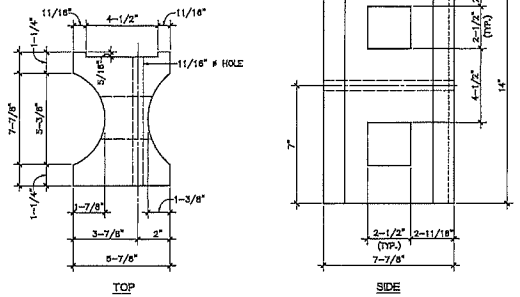
MANDY K. SATO
LICENSED PROFESSIONAL ENGINEER
No. 14734-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-7.

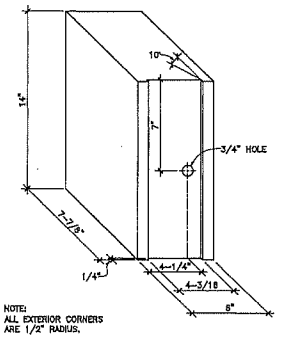
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	00890

SHEET C-9
10 OF 22

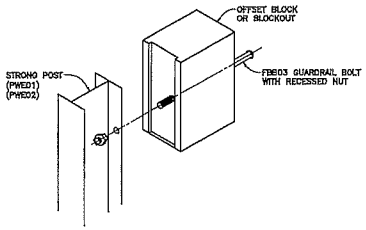


RECYCLED PLASTIC BLOCKOUT (TYPE I)



NOTE:
ALL EXTERIOR CORNERS
ARE 1/2" RADIUS.

RECYCLED POLYETHLENE OFFSET BLOCK (TYPE II)



EXPLODED VIEW
(RAIL AND WASHER NOT SHOWN)

STEEL POST AND BLOCK DETAIL

GENERAL NOTES

1. ALL HARDWARE, POSTS, AND FASTENERS SHALL BE HOT-DIP ZINC COATED GALVANIZED AFTER FABRICATION. NO PUNCHING, DRILLING, OR CUTTING WILL BE PERMITTED AFTER GALVANIZING.
2. WHERE CONDITIONS REQUIRE, SPECIAL POST LENGTHS IN INCREMENTS OF 6 INCHES MAY BE SPECIFIED.
3. ALL FASTENERS, POSTS, AND RAIL ELEMENTS (I.E. FBB03, PWED1, RWM02b, ETC.) SHALL CONFORM TO THE LATEST EDITION AND AMENDMENTS OF "A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE", A REPORT PREPARED AND APPROVED BY AASHTO—AGC—ARTBA JOINT COOPERATIVE COMMITTEE, SUBCOMMITTEE ON NEW HIGHWAY MATERIALS, TASK FORCE 13 REPORT. DIMENSIONS OF FASTNERS, POSTS, AND RAIL ELEMENTS HAVE BEEN CONVERTED FROM METRIC UNITS INTO THEIR PRESENT FORM.
4. THE RECYCLED PLASTIC BLOCK OR OFFSET BLOCK SHALL BE APPROVED BY THE STATE.
5. ALL NEW GUARDRAIL SYSTEMS (SYSTEM CONSISTS OF TOTAL LENGTH OF GUARDRAIL INCLUDING BOTH END TREATMENTS) SHALL INCLUDE THE ADDITIONAL PAVED AREA.
6. AFTER THE GUARDRAIL POSTS ARE INSTALLED IN THE PAVED AREA, THE CONTRACTOR SHALL FILL/SEAL AROUND EACH GUARDRAIL POST AND ALL CRACKS IN THE PAVED AREA CAUSED DURING THE GUARDRAIL POST INSTALLATION. IF REQUIRED BY THE INSPECTOR/ENGINEER, THE CONTRACTOR SHALL TAMPER THE PAVED AREA AROUND THE GUARDRAIL POST PRIOR TO FILLING/SEALING. ALL COSTS ASSOCIATED WITH THIS WORK SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS GUARDRAIL ITEMS.
7. WHEN STANDARDS FOR THE FILL SLOPE AREA CANNOT BE MET, A SITE SPECIFIC, ENGINEER APPROVED DESIGN MAY BE USED.
8. NEW A.C. PAVEMENT AT GUARDRAILS SHALL EXTEND 5 FEET LONGITUDINALLY BEYOND TERMINAL ENDS.
9. REFLECTOR MARKERS (RM-5) MOUNTED ON GUARDRAILS SHALL BE SPACED EVERY 25 FEET. RM-5'S SHALL NOT BE INSTALLED ON TERMINAL SECTIONS. FURNISHING AND INSTALLING OF EACH RM-5 SHALL BE CONSIDERED INCIDENTAL TO THE ADJACENT GUARDRAIL SYSTEM.

GUARDRAIL TYPE	DIMENSIONS	
	H	A
STRONG POST W-BEAM	1'-9-5/8"	1'-6"
STRONG POST RUBRAIL (W-BEAM)	2'-0"	1'-6"

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants

1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793

Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII

W-BEAM GUARDRAIL DETAILS - 1

MANDY K. SATO
LICENSED PROFESSIONAL ENGINEER
No. 14734-C
HAWAII, U.S.A.

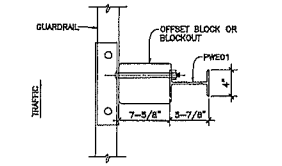
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSIDERATION OF THIS PROJECT WILL BE UNDER MY DESIGNATION AS DEFINED IN HAR 16-115-2

LICENSE EXPIRES: 04/30/2016

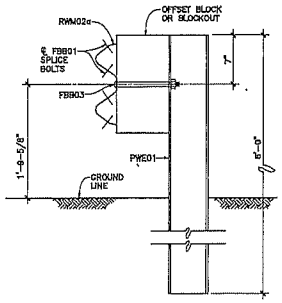
DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.K.
DATE:	OCTOBER 18, 2016
FILE NO:	00460

SHEET C-10

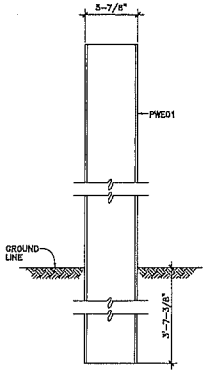
11 of 22



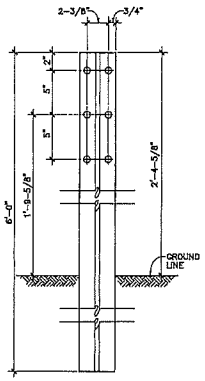
PLAN



ELEVATION

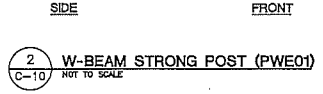


SIDE

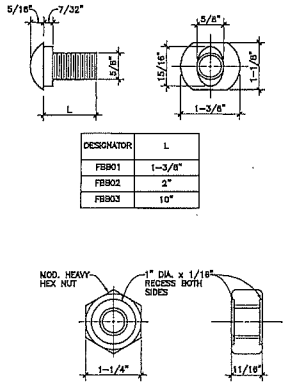


FRONT

1 C-10 STRONG POST W-BEAM GUARDRAIL (SGR04a)
NOT TO SCALE

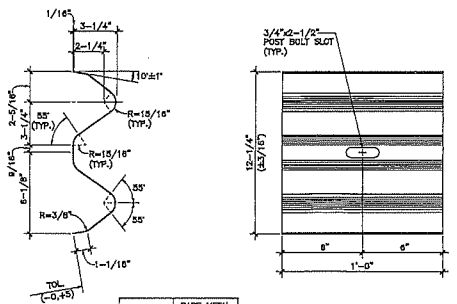


2 C-10 W-BEAM STRONG POST (PWE01)
NOT TO SCALE



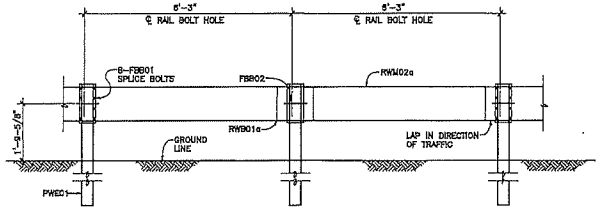
DESIGNATOR	L
FBB01	1-3/8"
FBB02	2"
FBB03	10"

3 C-10 GUARDRAIL BOLTS AND RECESSED NUT
NOT TO SCALE



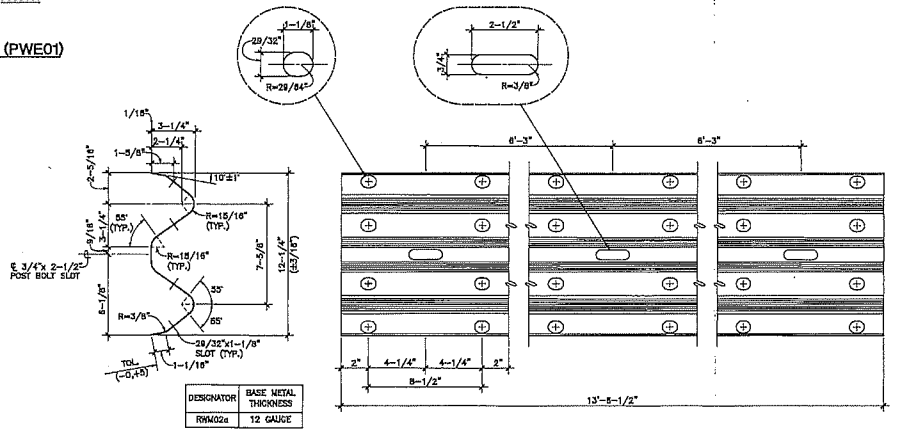
DESIGNATOR	BASE METAL THICKNESS
RWB01a	12 GAUGE

4 C-10 W-BEAM BACK-UP-PLATE (RWB01a)
NOT TO SCALE



ELEVATION

5 C-10 STRONG POST W-BEAM GUARDRAIL WITH RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT
NOT TO SCALE



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 GAUGE

6 C-10 2 SPACE W-BEAM GUARDRAIL (RWM02a)
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@fomaui.com
Website: www.fomaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

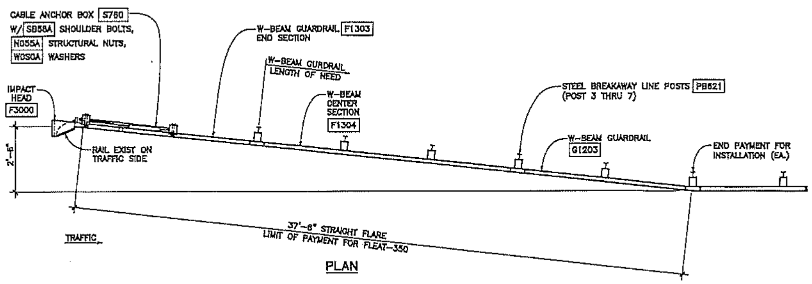
W-BEAM GUARDRAIL DETAILS - 2

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT SHALL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-73-9

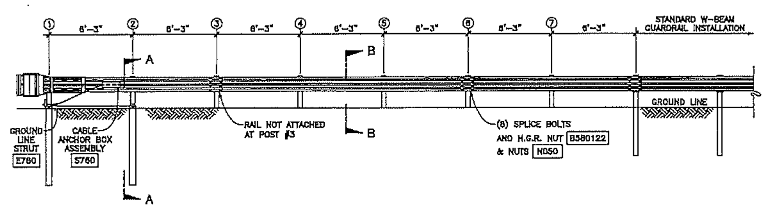
LICENSE EXPIRES: 04/30/2016

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 15, 2015
FILE NO:	CSW20

SHEET C-11
12 OF 22



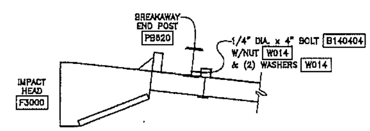
PLAN



ELEVATION

GENERAL NOTES:

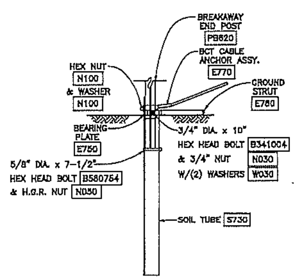
1. BREAKAWAY POSTS ARE REQUIRED WITH THE FLEAT TERMINAL.
2. ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS AND BEARING PLATES SHALL BE GALVANIZED.
3. THE SOIL TUBES SHALL NOT PROTRUDE MORE THAN 4" ABOVE GROUND (MEASURED ALONG A 5' CORD). SITE GRADING MAY BE NECESSARY TO MEET THIS REQUIREMENT.
4. THE SOIL TUBES MAY BE DRIVEN WITH AN APPROVED DRIVING HEAD. SOIL TUBES SHALL NOT BE DRIVEN WITH THE POST IN THE TUBE. IF THE TUBES ARE PLACED IN DRILLED HOLES, THE BACKFILL MATERIAL MUST BE SATISFACTORILY COMPACTED TO PREVENT SETTLEMENT.
5. WHEN ROCK IS ENCOUNTERED DURING EXCAVATION, A 12" DIA. POST HOLE, 20" DEEP MAY BE USED IF APPROVED BY THE ENGINEER. GRANULAR MATERIAL WILL BE PLACED IN THE BOTTOM OF THE HOLE APPROX. 2-1/2" DEEP TO PROVIDE DRAINAGE. THE SOIL TUBES WILL BE FIELD CUT TO LENGTH, PLACED IN THE HOLE AND BACKFILLED WITH ADEQUATELY COMPACTED MATERIAL EXCAVATED FROM THE HOLE.
6. THE BREAKAWAY CABLE ASSEMBLY MUST BE TAUT. A LOCKING DEVICE, (VICE GRIPS OR CHANNEL LOCK PLIERS) SHOULD BE USED TO PREVENT THE CABLE FROM TWISTING WHEN TIGHTENING NUTS.
7. (R) OR (L) INDICATES RIGHT OR LEFT IMPACT HEAD REFLECTOR MARKER (IHRM).
8. THE STRIPES FOR IHRM SHALL SLOPE DOWNWARD AT AN ANGLE OF 45° TOWARDS THE SIDE OF THE END TREATMENT THAT TRAFFIC IS TO PASS.



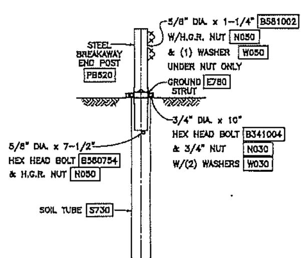
IMPACT HEAD CONNECTING DETAIL
NOT TO SCALE

ITEM NO.	QTY.	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA.
F1304	1	W-BEAM GUARDRAIL CENTER SECTION, 12 GA.
G1203	1	W-BEAM GUARDRAIL, 12 GA.
S730	2	*FOUNDATION SOIL TUBE, 6"x8"x72"
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
E780	1	GROUND STRUT
PB620	2	STEEL BREAKAWAY END POST
PB621	5	STEEL BREAKAWAY LINE POST
	5	RECYCLED PLASTIC BLOCKOUT OR OFFSET BLOCK
	1	IMPACT HEAD REFLECTOR MARKER – IHRM(R) OR (L)
		HARDWARE
B580122	25	5/8" DIA. x 1-1/4" SPLICE BOLT, POST #2
B580754	2	5/8" DIA. x 7-1/2" HEX BOLT
B341004	2	3/4" DIA. x 10" HEX BOLT
B581002	5	5/8" DIA. x 10" H.G.R. BOLT (POST 3 THRU 7)
N050	32	5/8" DIA. H.G.R. NUT [illegible]
N030	2	3/4" DIA. HEX NUT
W050	5	H.G.R. WASHER
W030	4	3/4" ID WASHER
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
B140404	2	1/4" x 4" HEX BOLT
N014	2	1/4" HEX NUT
W014	4	1/4" WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	1/2" A325 STRUCTURAL NUT
W050A	16	1-1/16" OD x 9/16" ID A325 STR. WASHER

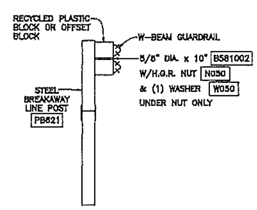
FOUNDATION TUBE OPTIONS FOR POSTS 1 & 2
*6'-0" SPLIT FOUNDATION TUBES S730
*6'-0" SOLID FOUNDATION TUBES E731
*5'-0" FOUNDATION TUBES S735 W/SOIL PLATES SP600
*4'-6" FOUNDATION TUBES E735 W/SOIL PLATES SP600



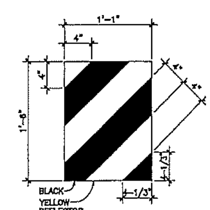
PARTIAL VIEW OF POST 1



SECTION A-A
(@ POST #2)



SECTION B-B
(TYPICAL @ POST 3 – 7)
NOTE: RAIL NOT BOLTED @ POST #3



IHRM (R)
IMPACT HEAD REFLECTOR MARKER INSERT DETAIL
SCALE: 1-1/2" = 1'-0"

1 / C-11 FLEAT-350 GUARDRAIL DETAILS
SCALE: AS SHOWN

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@fomaui.com
Website: www.fomaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001003 AND 4-3-002023 & 045
NAPILI, MAUI, HAWAII

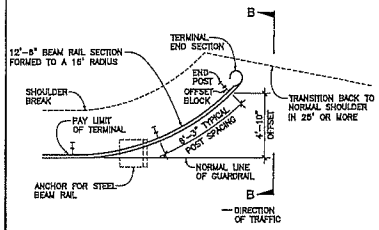
FLEAT 350 GUARDRAIL DETAILS

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14784-C
HAWAII, U.S.A.

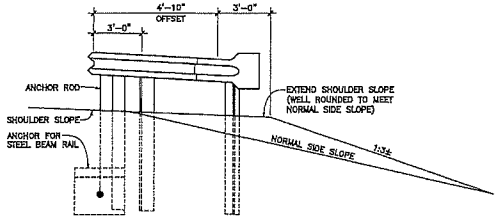
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.
LICENSE EXPIRES: 04/30/2016

DESIGNED BY: M.K.S.
DRAWN BY: K.M., S.W.
CHECKED BY: M.S.
DATE: OCTOBER 15, 2016
FILE NO: C0U60

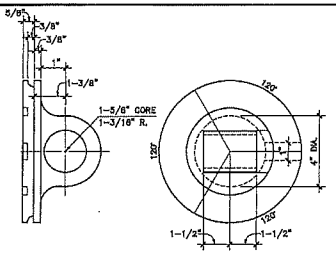
SHEET C-12
13 OF 22



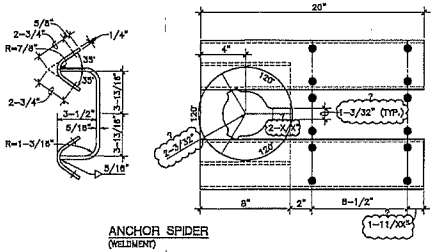
APPROACH END DETAIL
(APPROVED FOR USE WHERE V < 45 MPH)



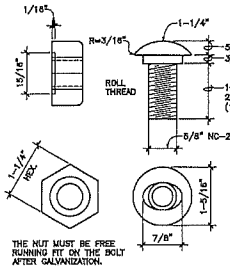
SECTION B-B

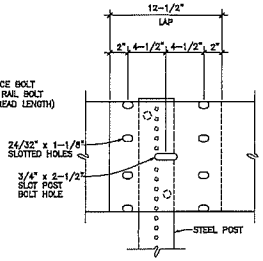


ANCHOR ROD CONNECTOR
(MALLEABLE IRON CASTING OR EQUAL)

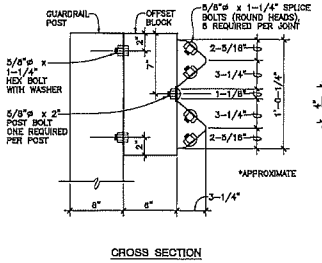


ANCHOR SPIDER
(WELDMENT)

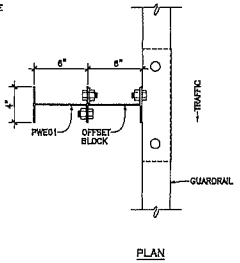




ELEVATION OF GUARDRAIL SPLICE AT POST

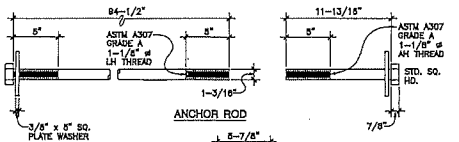


CROSS SECTION



PLAN

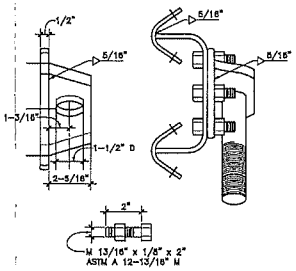
GUARDRAIL SPLICE

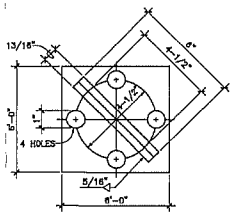


ANCHOR ROD

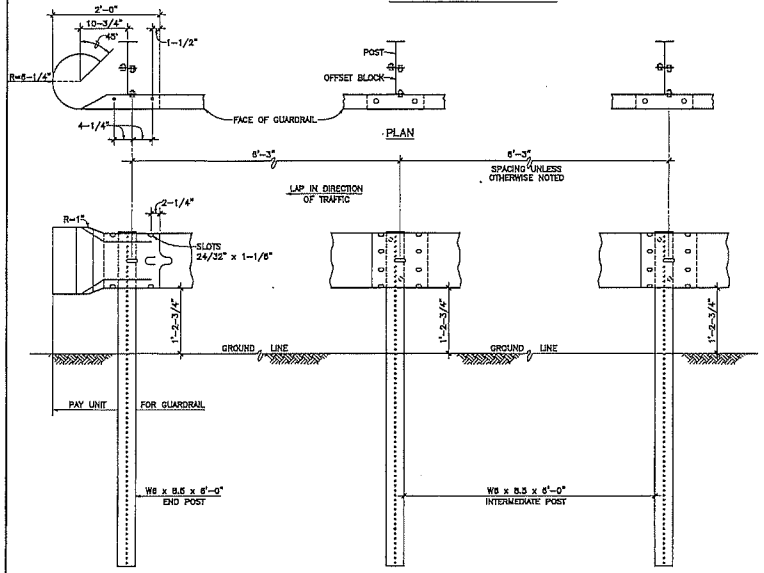
NOTE:
TENSILE STRENGTH 60,816 PSI APPLIED THROUGH ASSEMBLY.

TURNBUCKLE

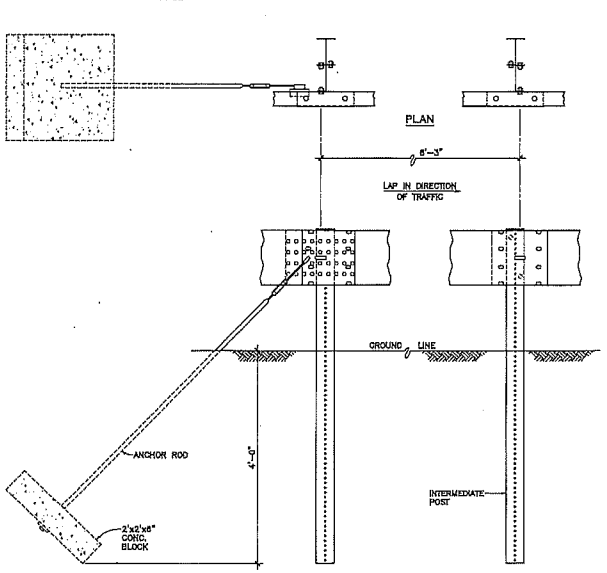




ALTERNATE ANCHOR ROD CONNECTOR



ASSEMBLY ELEVATION



ANCHOR FOR STEEL BEAM RAIL

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

MODIFIED G-1d GUARDRAIL DETAIL

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14794-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-12

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	U.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	U.S.
DATE:	OCTOBER 18, 2016
FILE NO:	CO480

SHEET C-13
14 OF 22

GENERAL NOTES:
1. THE CONTRACTOR SHALL VERIFY ALL FIELD DIMENSIONS AND CONDITIONS PRIOR TO STARTING WORK. ALL DISCREPANCIES SHALL BE PROMPTLY REPORTED TO DPW MANAGER.

2. ALL OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND/OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE DPW MANAGER BEFORE PROCEEDING WITH ANY WORK SO INVOLVED.

3. ALL WORK SHALL CONFORM TO HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION DATED 2005 AND STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, 1984 AS AMENDED, UNLESS OTHERWISE NOTED AND LRFD AASHTO SPECIFICATIONS (LATEST EDITION).

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SHORING. THE CONTRACTOR SHALL PROVIDE TEMPORARY ERECTION BRACING AND SHORING FOR ALL STRUCTURAL MEMBERS AS REQUIRED FOR STRUCTURAL STABILITY OF THE STRUCTURE DURING ALL PHASES OF CONSTRUCTION.

5. STRUCTURAL DRAWINGS, WHERE INDICATED, HAVE BEEN DRAWN TO APPROXIMATE SCALE. UNLESS DRAWINGS SPECIFICALLY PROVIDES A DIMENSION, THE CONTRACTOR SHALL NOT USE STRUCTURAL DRAWINGS TO DETERMINE DIMENSIONS. DRAWINGS SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

REINFORCING STEEL:
1. UNLESS OTHERWISE INDICATED ON PLANS AND/OR SCHEDULE, ALL REINFORCING STEEL SHALL BE HIGH STRENGTH GRADE DEFORMED BARS WHICH SHALL CONFORM TO THE STANDARD SPECIFICATION OF ASTM A615 GRADE 60. ALL WELDED WIRE FABRIC REINFORCING STEEL SHALL CONFORM TO ASTM A706, GRADE 65. ALL REINFORCING SHALL BE EPOXY COATED IN ACCORDANCE WITH ASTM A775. ANY DAMAGE TO EPOXY SHALL BE PATCHED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

2. LOW HYDROGEN WELDING RODS SHALL BE USED FOR ALL WELDING TO REINFORCING BARS.

3. REINFORCING SHALL BE SPLICED ONLY AS SHOWN OR NOTED. SPLICES AT OTHER LOCATIONS SHALL BE MADE AWAY FROM POINTS OF MAXIMUM STRESS AND APPROVED BY THE ENGINEER. SEE DETAILS FOR "LAP SPLICES".

4. BARS NOTED AS "CONT." VERTICAL AND HORIZONTAL WALL REINFORCING AND COLUMN REINFORCING SHALL HAVE A MINIMUM SPLICE EQUAL TO 48 BAR DIAMETERS BUT NOT LESS THAN 24 INCHES, UNLESS OTHERWISE NOTED.

5. PROVIDE DOWELS IN FOOTINGS THE SAME SIZE AND NUMBER AND IN THE SAME LOCATION AS VERTICAL COLUMN AND WALL REINFORCING. DOWELS SHALL HAVE A MINIMUM PROJECTION EQUAL TO 48 BAR DIAMETERS BUT NOT LESS THAN 24 INCHES, UNLESS OTHERWISE NOTED.

6. ALL REINFORCING STEEL, ANCHOR BOLTS AND OTHER INSERTS SHALL BE SECURED IN POSITION PRIOR TO PLACING CONCRETE.

7. CONCRETE PROTECTION FOR REINFORCING STEEL SHALL BE UNLESS OTHERWISE SHOWN:

CONCRETE CAST AGAINST EARTH ..... 3"
CONCRETE EXPOSED TO EARTH OR
WEATHER (BUT NOT CAST AGAINST EARTH)
WALLS AND RAILINGS ..... 2"
CULVERT ..... 2"
CULVERT DESIGN LOADS:
1. DESIGN IN CONFORMANCE WITH ASHTO LRFD DESIGN SPECIFICATIONS, LATEST EDITION.

2. TRAFFIC LOAD: (WHICHEVER PRODUCES THE LARGEST MOMENT)
HS20 – TRUCK LOADING WITH DESIGN LANE LOADING. COMBINATION OF DESIGN TRUCK OR DESIGN TANDEM WITH DESIGN LANE LOAD.

3. UPSTREAM AND DOWNSTREAM TRAFFIC RAIL LOAD:
DESIGN SPEED OF 30 MPH OR LESS.
CULVERT RAILING TEST LEVEL TL-1.

CONCRETE:
1. ALL CONCRETE WORK SHALL CONFORM TO ACI 318 LATEST.

2. PIPES AND SLEEVES SHALL NOT BE PLACED IN STRUCTURAL CONCRETE UNLESS SPECIFICALLY DETAILED.

3. SECURE ALL BOLTS, ANCHORS, INSERTS, ETC. AND VERIFY ALL GROOVES, SLOTS AND FINISHES PRIOR TO PLACING CONCRETE

4. ALL CONCRETE WORK SHALL BE THOROUGHLY CONSOLIDATED DURING PLACEMENT USING A MECHANICAL VIBRATOR. ALL CONCRETE SHALL BE CURED FOR A PERIOD OF NOT LESS THAN 14 DAYS.

5. LOCATIONS OF ALL CONSTRUCTION OR COLD JOINTS SHALL BE COORDINATED WITH AND APPROVED BY THE DPW MANAGER.

6. 72 HOURS PRIOR TO THE POURING OF ANY STRUCTURAL CONCRETE, THE CONTRACTOR SHALL NOTIFY THE DPW MANAGER SO AN INSPECTION CAN BE MADE OF ALL FORMS AND REINFORCING STEEL.

CONCRETE: (CONT.)
7. THE CAST-IN-PLACE OR PRECAST CONCRETE 28 DAY COMPRESSIVE STRENGTH, MAXIMUM AGGREGATE SIZE AND MAXIMUM WATER-TO-CEMENT RATIO TO BE AS FOLLOWS:

	STRENGTH (PSI)	TOP SIZE AGGREGATE TO BE USED	MAX. W/C RATIO
CULVERT (PRECAST)	5,000	$\frac{3}{4}$"	0.40
VERTICRETE WALLS (OR APPROVED EQUAL)	5,000	$\frac{3}{4}$"	0.40
FOOTINGS (CIP)	5,000	$\frac{3}{4}$"	0.40

9. CONCRETE MIXES SHALL BE DESIGNED BY A QUALIFIED TESTING LABORATORY AND SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND ACCEPTANCE AT LEAST 21 DAYS BEFORE ACTUAL CONCRETE PLACING OPERATIONS.

10. THE USE OF CALCIUM CHLORIDE IN ANY CONCRETE IS PROHIBITED.

11. JOINT SEALING COMPOUND SHALL BE POLYSULFIDE OR URETHANE COMPOUND CONFORMING TO ASTM C 920, TYPE S OR M, CLASS 100/50, USE T. (RAMNK OR APPROVED EQUAL)

12. EXPANSION JOINT FILLER SHALL BE PREMOULDED MATERIAL COMPOSED OF NON CELLULOSE RUBBER MATERIAL CONFORMING TO ASTM D 1752. THICKNESS SHALL BE AS DESIGNATED IN THE PLANS.

13. EPOXY BONDING AGENT USED TO BOND FRESH CONCRETE TO HARDENED CONCRETE SHALL CONFORM TO ASTM C 881, GRADE 1 OR 2, CLASS C, TYPE V.

14. CONCRETE COMPRESSIVE STRENGTH SHALL BE VERIFIED BY TEST CYLINDERS. (MIN. 3 CYLINDERS PER 50 CU.YRDS OR DAY'S POUR WHICHEVER IS LESS. SEE SPECIFICATIONS. COST OF REQUIRED TESTING SHALL BE BORNE BY THE CONTRACTOR.

15. A CONCRETE CORROSION INHIBITING ADMIXTURE, SUCH AS "MCI-2005", SHALL BE ADDED TO THE CONCRETE AT A RATE OF 1.5 PINTS/CUBIC YARD.

FOUNDATION NOTES:
1. FOUNDATION DESIGN OF CULVERT AND RETAINING WALLS SHALL BE BASED ON THE "GEOTECHNICAL INVESTIGATION REPORT, NAPILI 4/5 CULVERT REPLACEMENT, NAPILI MAUI HAWAII" DATED SEPTEMBER 25, 2015 BY HAWAII GEOTECHNICAL CONSULTING INC. THE NOTES STATED BELOW ARE THOSE RELATED TO THE CULVERT AND RETAINING WALLS ONLY. OTHER REQUIREMENTS, RELATED TO WATER QUALITY BASIN, SHORING AND PAVEMENTS HAVE NOT BEEN INCLUDED BELOW. THE CONTRACTOR SHALL FOLLOW ALL RECOMMENDATIONS WITHIN THIS REPORT.

2. VEGETATION, CONCRETE DEBRIS, DELETERIOUS MATERIAL AND OTHER UNSUITABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF PROPERLY OFF-SITE. SOFT AND YIELDING AREAS ENCOUNTERED DURING CLEARING AND GRUBBING BELOW AREAS DESIGNATED TO RECEIVE FILL SHALL BE OVER-EXCAVATED TO EXPOSE FIRM MATERIAL AND THE RESULTING EXCAVATION SHALL BE BACKFILLED WITH WELL COMPACTED GENERAL FILL. THE EXCAVATED SOFT SOILS SHALL BE DISPOSED OF PROPERLY OFF-SITE.

3. IN GENERAL, THE OVER-EXCAVATED SUBGRADES AND AREAS DESIGNATED TO RECEIVE FILLS (EXPOSING SOILS) SHALL BE SCARIFIED TO A DEPTH OF 12-INCHES, MOISTURE-CONDITIONED TO ABOVE THE OPTIMUM MOISTURE CONTENT AND RECOMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION.

4. IMPORTED FILL MATERIALS SHALL CONSIST OF NON-EXPANSIVE SELECT GRANULAR MATERIALS SUCH AS CRUSHED BASALT. THE MATERIAL SHALL BE WELL GRADED FROM COURSE TO FINE WITH PARTICLES NO LARGER THAN 3-INCHES IN LARGEST DIMENSION. IN ADDITION, THE MATERIAL SHALL CONTAIN BETWEEN 10 AND 30 PERCENT PARTICLES PASSING THE NO. 200 SIEVE. THE MATERIAL SHALL HAVE A LABORATORY CBR VALUE OF 20 OR MORE AND SHALL HAVE A MAXIMUM SWELL OF 1 PERCENT OR LESS WHEN TESTED IN ACCORDANCE WITH ASTM 1883. IMPORTED FILL MATERIAL SHALL BE TESTED FOR CONFORMANCE PRIOR TO DELIVERY TO THE PROJECT SITE FOR THE INTENDED USE.

5. IN GENERAL, FILLS AND BACKFILLS SHALL BE MOISTURE-CONDITIONED TO ABOVE OPTIMUM MOISTURE, PLACED IN LEVEL LIFTS NOT EXCEEDING 8-INCHES IN LOOSE THICKNESS AND COMPACTED TO A MINIMUM OF 90 PERCENT RELATIVE COMPACTION. FILLS AND BACKFILLS WITHIN 3-FEET OF THE PAVEMENT GRADE ELEVATION SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION. RELATIVE COMPACTION REFERS TO THE IN-PLACE DRY-DENSITY OF SOIL EXPRESSED AS A PERCENTAGE OF THE MAXIMUM DRY-DENSITY OF THE SAME SOIL ESTABLISHED IN ACCORDANCE WITH ASTM D1557. OPTIMUM MOISTURE IS THE WATER CONTENT (PERCENTAGE BY DRY WEIGHT) CORRESPONDING TO THE MAXIMUM DRY DENSITY. COMPACTION SHALL BE ACCOMPLISHED BY SHEEPSFOOT ROLLERS, VIBRATORY ROLLERS OR OTHER TYPES OF ACCEPTABLE COMPACTION EQUIPMENT. WATER TAMPING, JETTING OR PONDING SHALL NOT BE ALLOWED TO COMPACT THE FILLS.

6. SOME OF THE ON-SITE SOILS GENERALLY EXIST IN A MOIST TO WET CONDITION. SIGNIFICANT MOISTURE REDUCTION MAY BE REQUIRED TO ACHIEVE THE MINIMUM 95 PERCENT COMPACTION CRITERIA, ESPECIALLY FOR MATERIALS PRIMARILY CONSISTING OF SILTS AND CLAYS. AERATION TO LOWER THE SOIL MOISTURE AND MORE COMPACTION EFFORT TO ACHIEVE THE REQUIRED COMPACTION WOULD GENERALLY REDUCE THE RATE OF FILL PLACEMENT.

7. THE SUBGRADE BENEATH THE NEW BOX CULVERT SHALL BE SCARIFIED TO A DEPTH OF ABOUT 12-INCHES, MOISTURE-CONDITIONED TO AT LEAST 2 PERCENT ABOVE THE OPTIMUM MOISTURE CONTENT AND RECOMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION.

FOUNDATION NOTES: (CONT.)
8. SOFT AND/OR LOOSE SOILS ENCOUNTERED AT THE BOTTOM OF THE BOX CULVERT EXCAVATIONS SHALL BE REMOVED TO EXPOSE THE FIRM UNDERLYING FIRM MATERIALS. ALTERNATELY, A SUBGRADE STABILIZATION LAYER CONSISTING OF 24-INCHES OF NO. 2 ROCK (ASTM C33, NO. 4 GRADATION) WRAPPED IN A NON-WOVEN FILTER FABRIC (MIRAFI 180N OR EQUIVALENT) MAY BE PROVIDED BELOW THE 12-INCH BEDDING LAYER FOR UNIFORM SUPPORT OF THE NEW BOX CULVERT. THE STABILIZATION LAYER SHALL EXTEND BEYOND THE SIDES OF THE BOX CULVERT A MINIMUM OF 12-INCHES.

9. AN 12-INCH THICK GRAVEL CUSHION LAYER SHALL BE PLACED BETWEEN THE NEW BOX CULVERT AND THE UNDERLYING SUBGRADE SOILS OR STABILIZATION LAYER. THE GRAVEL SHALL CONSIST OF FREE-DRAINING MATERIALS, SUCH AS NO.3B FINE GRAVEL (ASTM C33, NO. 67 GRADATION) OR SIMILAR MATERIAL.

10. THE USE OF SAND OR S4C AS BACKFILL MATERIALS AROUND THE CULVERT STRUCTURE IS PROHIBITED.

11. THE BOTTOM OF RETAINING WALL FOUNDATIONS SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION TO PROVIDE A RELATIVELY FIRM SMOOTH BEARING SURFACE PRIOR TO PLACEMENT OF REINFORCING STEEL AND CONCRETE. SOFT AND/OR MATERIALS ENCOUNTERED AT THE BOTTOM OF RETAINING WALL FOUNDATION EXCAVATIONS SHALL BE OVER-EXCAVATED TO EXPOSE THE UNDERLYING FIRM MATERIALS. THE OVER-EXCAVATION TO REMOVE THE SOFT AND /OR LOOSE MATERIALS SHALL BE BACKFILLED WITH SELECTED GRANULAR FILL MATERIALS COMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION OR THE FOUNDATION MAY EXTEND DEEPER TO BEAR DIRECTLY ON THE UNDERLYING COMPETENT MATERIAL.

12. RELATIVE MOIST TO WET SOIL CONDITION MAY BE ENCOUNTERED NEAR THE BOTTOM OF EXCAVATIONS. IF PUMPING OR YIELDING CONDITIONS OCCURS AT THE BOTTOM OF EXCAVATIONS OR IF SOFT POCKETS ARE TOO THICK TO BE REMOVED COMPLETELY FROM A PRACTICAL STANDPOINT, PROVIDE A STABILIZATION LAYER CONSISTING OF 24-INCHES OF NO. 2 ROCK (ASTM C33, NO. 4 GRADATION) WRAPPED IN A NON-WOVEN FILTER FABRIC (MIRAFI 180N OR EQUIVALENT) BELOW THE 12-INCH BEDDING LAYER FOR UNIFORM SUPPORT OF THE NEW BOX CULVERT. THE STABILIZATION LAYER SHALL EXTEND BEYOND THE SIDES OF THE BOX CULVERT A MINIMUM OF 18-INCHES.

13. RETAINING WALLS SHALL BE WELL DRAINED TO REDUCE THE BUILD-UP OF HYDROSTATIC PRESSURES. PROVIDE PERFORATED PIPE AS SHOWN ON DETAILS. DAYLIGHTING THE PIPES AS SHOWN.

14. SOIL DESIGN VALUES ARE:

a. ACTIVE EARTH PRESSURE:

ACTIVE, LEVEL BACKFILL	40 PCF (HORIZ.)
AT-REST, LEVEL BACKFILL	60 PCF (HORIZ.)
ACTIVE, 2H:1V BACKFILL	58 PCF (HORIZ.)
	29 PCF (VERT.)
AT-REST, LEVEL BACKFILL	75 PCF (HORIZ.)
	38 PCF (VERT.)

b. ASHTO LRFD RESISTANCE LIMITS (FOR CULVERTS)

	EXTREME EVENT LIMIT STATE	STRENGTH LIMIT STATE
BEARING PRESSURE (PSF)	2,500	2,900
COEFFICIENT OF SLIDING FRICTION	0.45	0.34
PASSIVE PRESSURE RESISTANCE (PCF)	275	150

c. SERVICE LIMITS (FOR RETAINING WALLS)

BEARING PRESSURE	2,500 PSF
COEFFICIENT OF SLIDING FRICTION	0.30
PASSIVE PRESSURE	300 PCF

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL WORK SHALL COMPLY WITH THE LATEST EDITION OF A.I.S.C. "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL FOR BUILDINGS" AND THE A.I.S.C. "CODE OF STANDARD PRACTICE".

2. ALL WELDING TO BE MADE BY CERTIFIED (BY STATE OF HAWAII) WELDERS USING E-70XX SERIES ELECTRODES. ALL WELDED JOINTS SHALL BE GRIND SMOOTH.

3. PROVIDE (2) COATS (MINIMUM OF 5 MIL DRY) OF AMERLOCK 400 HI BUILD EPOXY PRIMER. PROVIDE (2) FINAL COATS (5 MIL DRY) OF PSX 700 PRIOR TO INSTALLING (OR APPROVED EQUAL).

LEGEND

NEW PAVEMENT
NEW CONCRETE / CURB
NEW CRM
SOIL
BASE COURSE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

TYPICAL NOTES & DETAILS

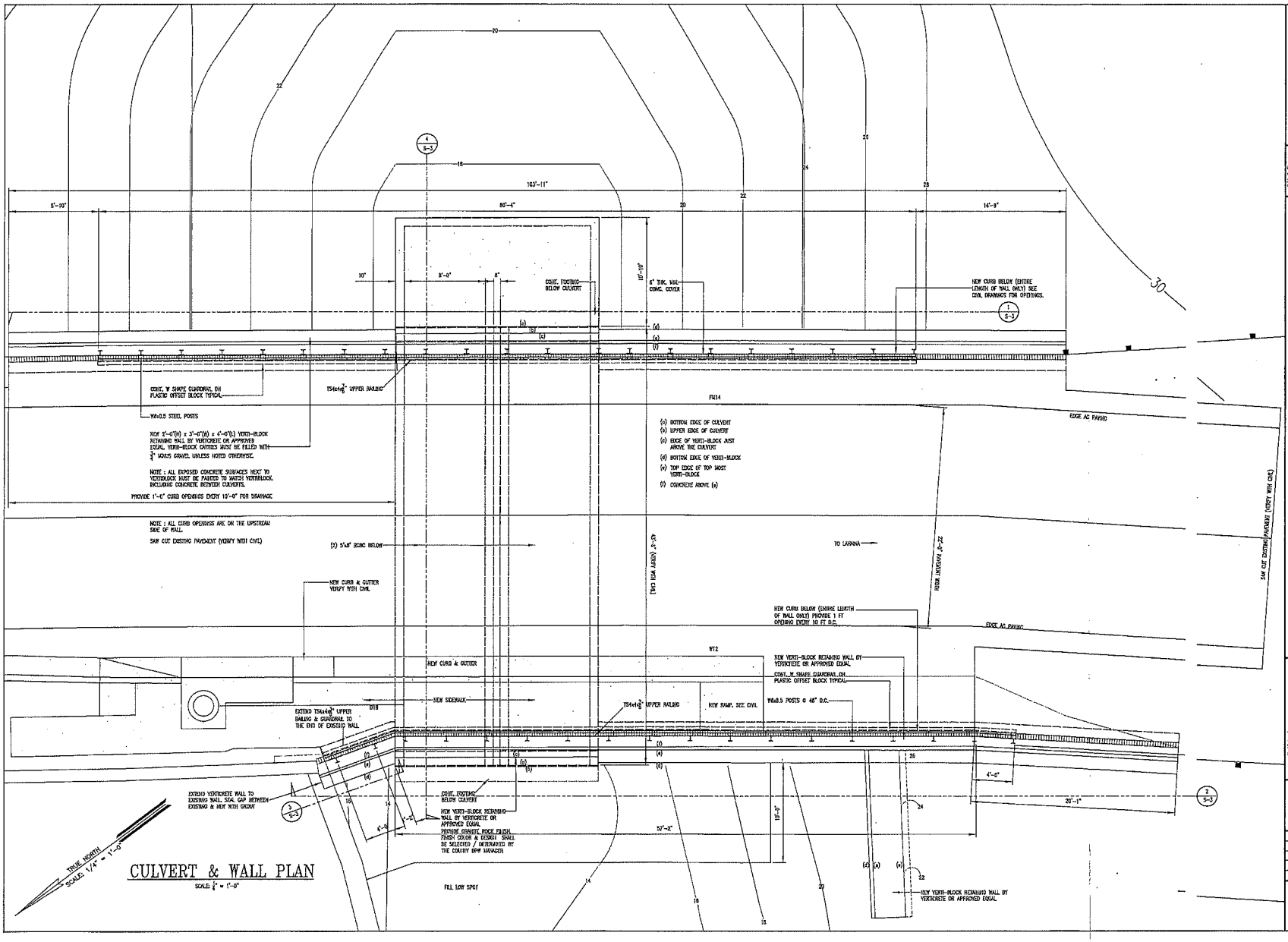
SATISH K. DHOKIA
LICENSED PROFESSIONAL ENGINEER
No. 9823-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

Satish K. Dhokia
LICENSE EXPIRES: 04/30/2018

DESIGNED BY: SKD
DRAWN BY: RGP
CHECKED BY: SKD
DATE: OCTOBER 18, 2016
FILE NO: --

SHEET S-1
15 OF 22



FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

CULVERT & WALL PLAN

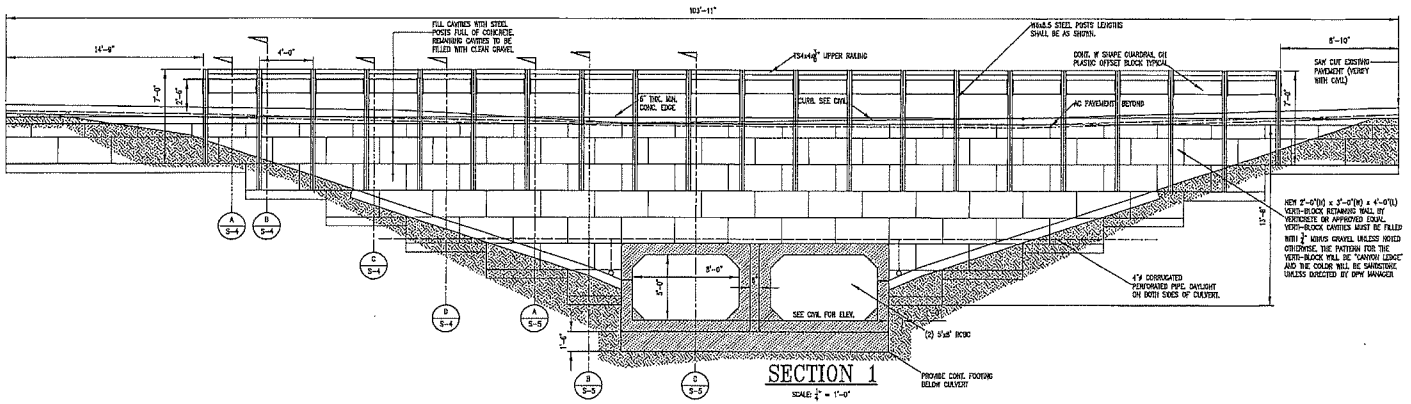
SATISH K. DHOLAKIA
LICENSED PROFESSIONAL ENGINEER
No. 5823-S
HAWAII, U.S.A.

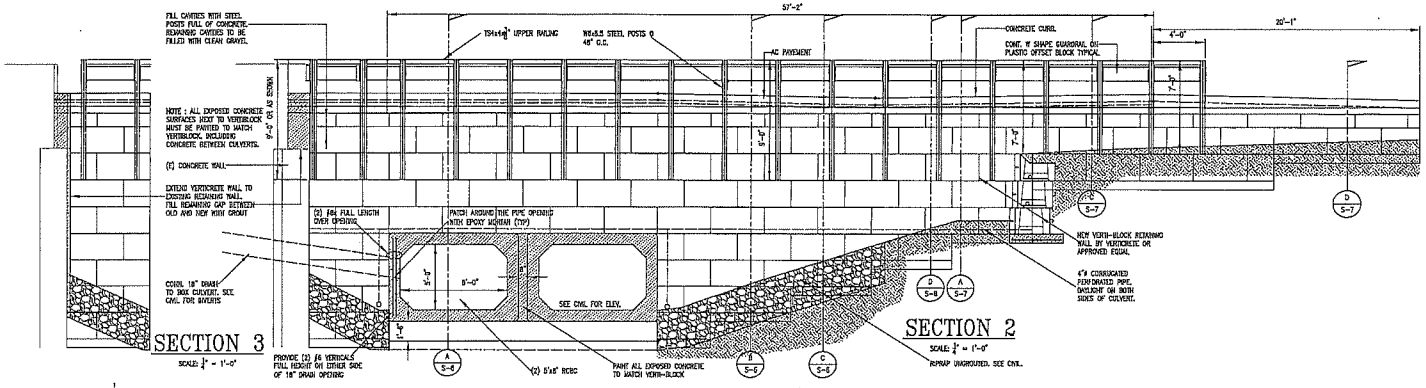
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

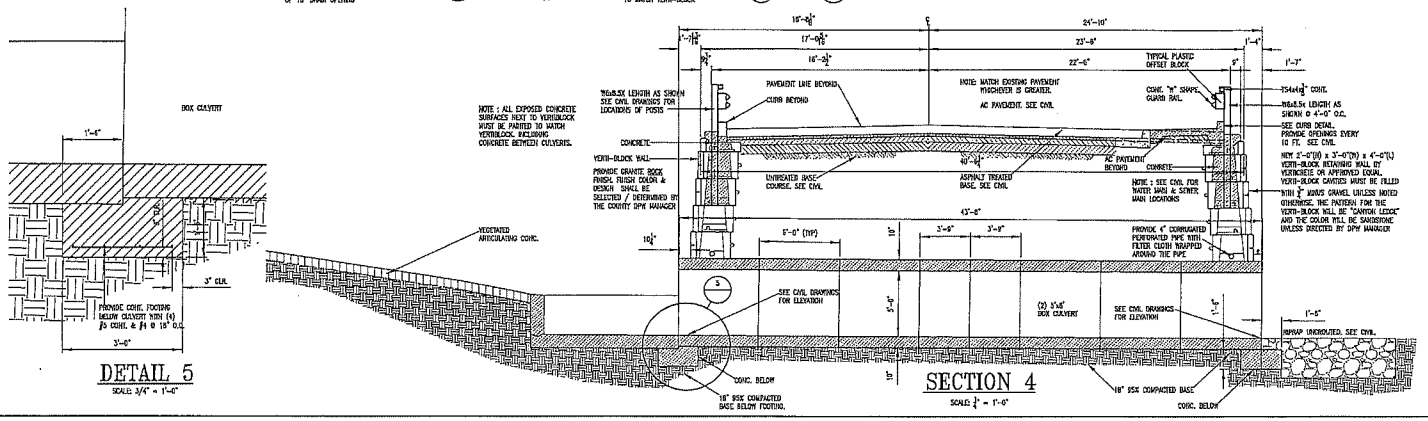
LICENSE EXPIRES: 04/30/2019

DESIGNED BY: SKD
DRAWN BY: RGP
CHECKED BY: SKD
DATE: OCTOBER 19, 2016
FILE NO: –

SHEET S-2
16 OF 22







FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-8-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

ELEVATIONS & SECTION

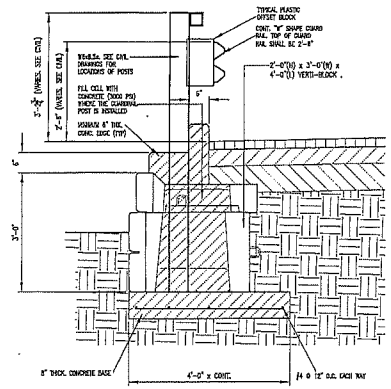
SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5823-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND COORDINATION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

Satish K. Gholkar
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 10, 2016
FILE NO:	–

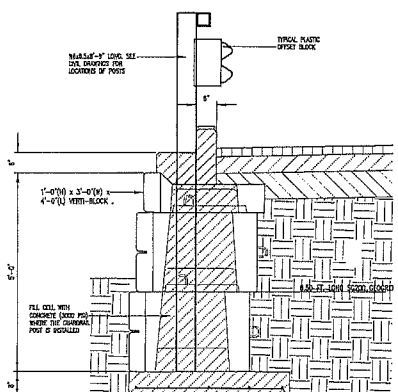
SHEET S-3
17 OF 22



WALL SECTION

SCALE: 1/2" = 1'-0"

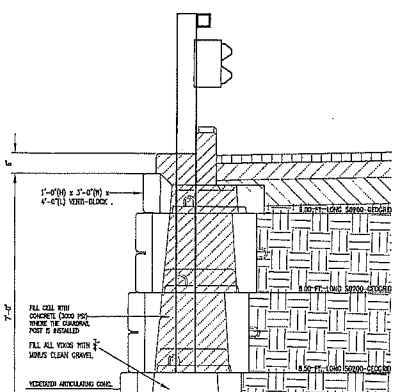
(A)



WALL SECTION

SCALE: 1/2" = 1'-0"

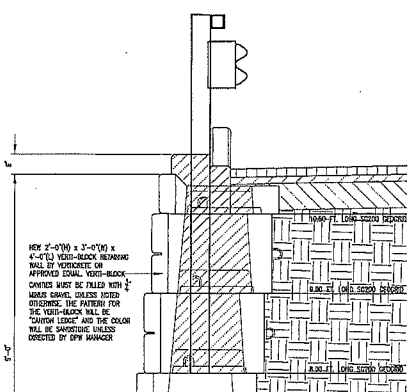
(B)



WALL SECTION

SCALE: 1/2" = 1'-0"

(C)

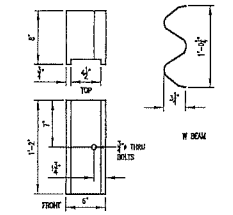


WALL SECTION

SCALE: 1/2" = 1'-0"

(D)

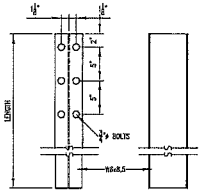
NOTE: ALL GEOGRID FABRICS SHOWN ARE MANUFACTURED BY STRATA GLOBAL SOLUTIONS OR APPROVED EQUAL (TYP.) ALL GEOGRID FABRICS MUST COMPLY PER ASTM D4637 (METHOD A).
50 500 STANDS FOR GRID OF 2.45"Ø.05" WITH ULTIMATE TENSILE STRENGTH OF 6,400 LBS/SQFT. FABRIC WEIGHT 125 LBS PER 6 FT X 300 FT ROLL.
50 200 STANDS FOR GRID OF 0.72"Ø.05" WITH ULTIMATE TENSILE STRENGTH OF 2,600 LBS/SQFT. FABRIC WEIGHT 95 LBS PER 6 FT X 300 FT ROLL.



WOOD OR PLASTIC ROUTED OFFSET BLOCK

SCALE: 1/2" = 1'-0"

(E)



TYPICAL STEEL POST DETAIL

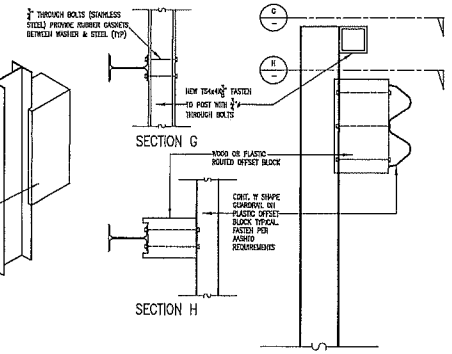
SCALE: 1/2" = 1'-0"

(F)

TYPICAL PAINTING NOTES FOR ALL COLUMNS & RAILS

PROVIDE (2) COATS (MINIMUM OF 5 MIL DRY) OF AMERLOCK 400 IS BUILD EPOXY PRIMER. PROVIDE (2) FINAL COATS (5 MIL DRY) OF PSX 700 PRIOR TO INSTALLING IN THE CONCRETE.

ALL BOLTINGS OF RAIL TO COLUMNS SHOULD BE STAINLESS STEEL THE REST SHOULD BE GALVANIZED.



FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

SECTIONS / POST DETAILS

SATISH K. GHOLAP
LICENSED PROFESSIONAL ENGINEER
No. 5823-S
HAWAII, U.S.A.

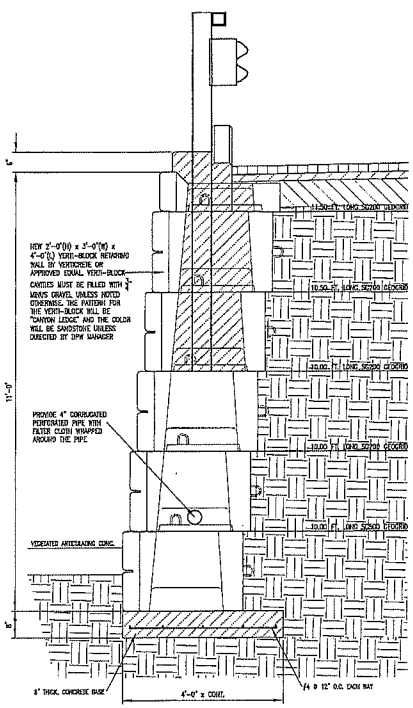
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

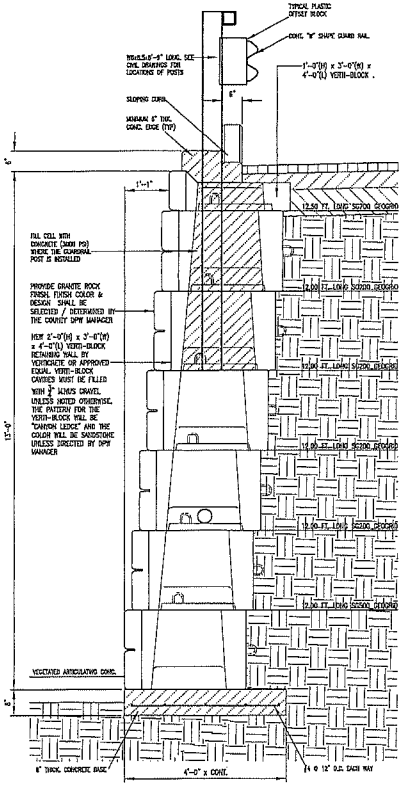
DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 10, 2016
FILE NO:	--

SHEET S-4

18 OF 22

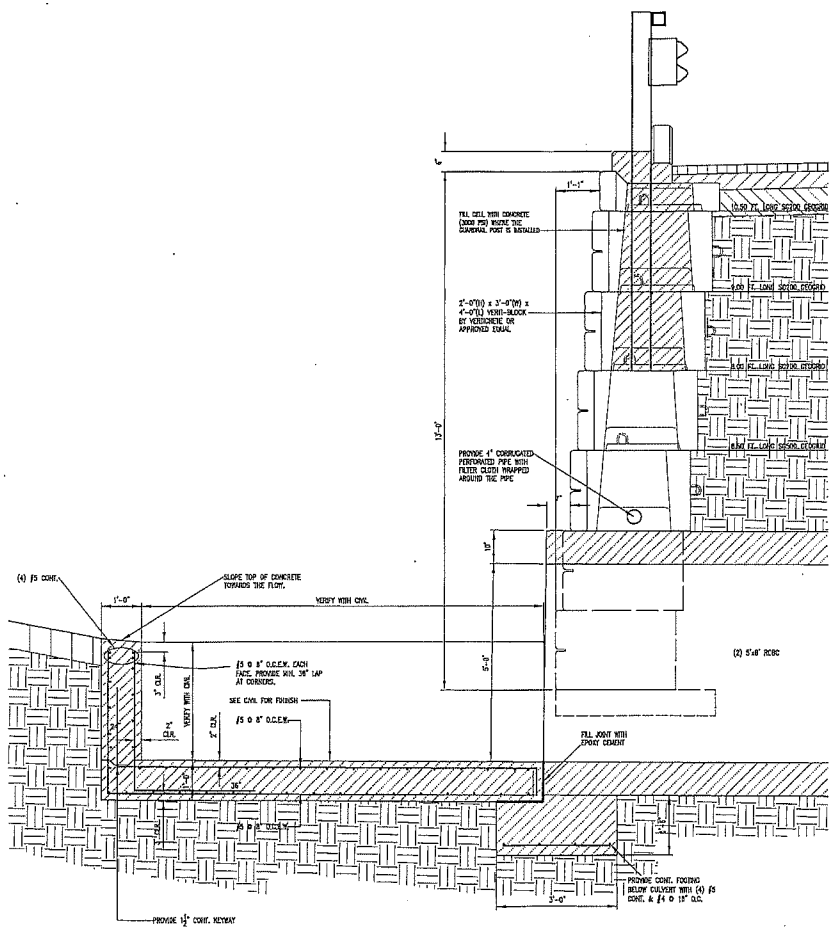


WALL SECTION
SCALE ¾" = 1'-0" (A)



WALL SECTION
SCALE ¾" = 1'-0" (B)

NOTE: ALL GEOCORD FABRICS SHOWN ARE MANUFACTURED BY STRATA GLOBAL SOLUTIONS OR APPROVED EQUAL (TYP.) ALL GEOCORD FABRICS MUST COMPLY PER ASTM D4437 (MODIFIED A).
SG 500 STANDS FOR GRID OF 2.45"X0.65" WITH ULTIMATE TENSILE STRENGTH OF 8,400 LBS/56FT. FABRIC WEIGHT 125 LBS PER 6 FT X 300 FT ROLL.
SG 200 STANDS FOR GRID OF 0.72"X0.65" WITH ULTIMATE TENSILE STRENGTH OF 3,000 LBS/56FT. FABRIC WEIGHT 95 LBS PER 6 FT X 300 FT ROLL.



WALL & CULVERT SECTION
SCALE ¾" = 1'-0" (C)

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 202
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@fomaui.com
Website: www.fomaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-006:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

SECTIONS

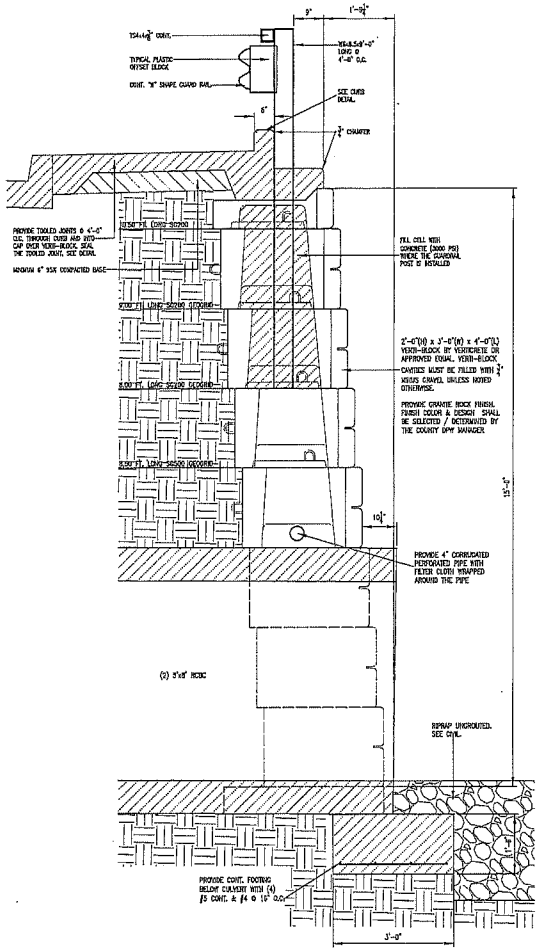
SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 8823-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

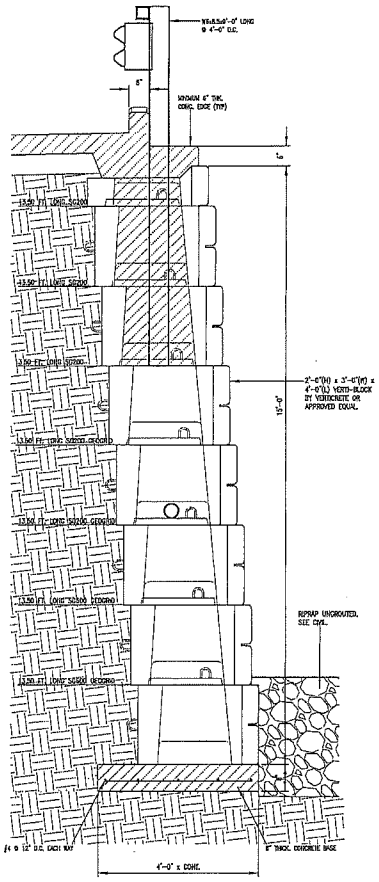
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RDP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	--

SHEET S-5
19 OF 22

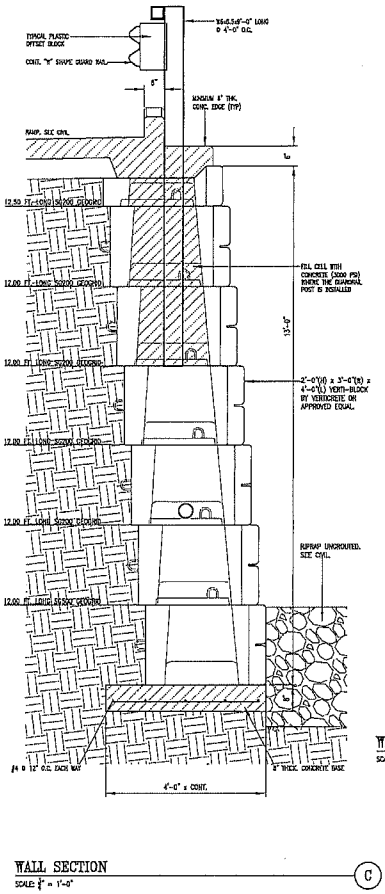


WALL & CULVERT SECTION
SCALE: 3/4" = 1'-0" (A)

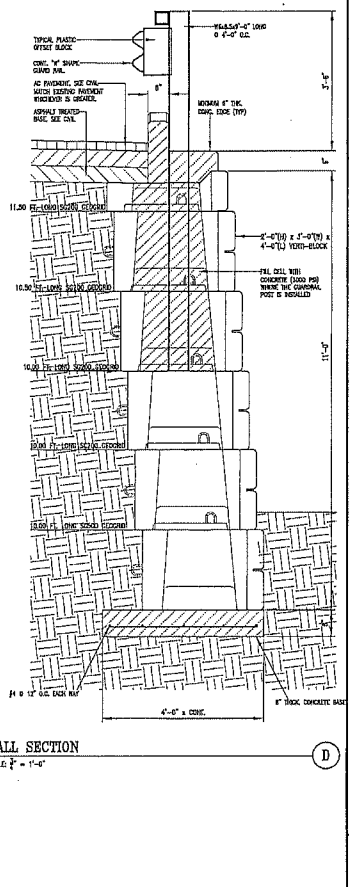


WALL SECTION
SCALE: 3/4" = 1'-0" (B)

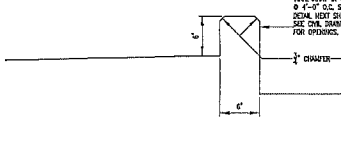
NOTE: ALL GEOGRID FABRICS SHOWN ARE MANUFACTURED BY STRATA GLOBAL SOLUTIONS OR APPROVED EQUAL (TYP.) ALL GEOGRID FABRICS MUST COMPLY PER ASTM D4837 (METHOD A).
SG 350 STANDS FOR GRID OF 0.45"X0.45" WITH ULTIMATE TENSILE STRENGTH OF 9,400 LBS/SQFT. FABRIC WEIGHT 125 LBS PER 8 FT X 300 FT ROLL.
SG 200 STANDS FOR GRID OF 0.72"X0.85" WITH ULTIMATE TENSILE STRENGTH OF 3,500 LBS/SQFT. FABRIC WEIGHT 95 LBS PER 8 FT X 300 FT ROLL.



WALL SECTION
SCALE: 3/4" = 1'-0" (C)



WALL SECTION
SCALE: 3/4" = 1'-0" (D)



CURB DETAIL
SCALE: 3/4" = 1'-0" (E)

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@fomaui.com
Website: www.fomaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:03 AND 4-3-002:23
NAPILI, MAUI, HAWAII

SECTIONS

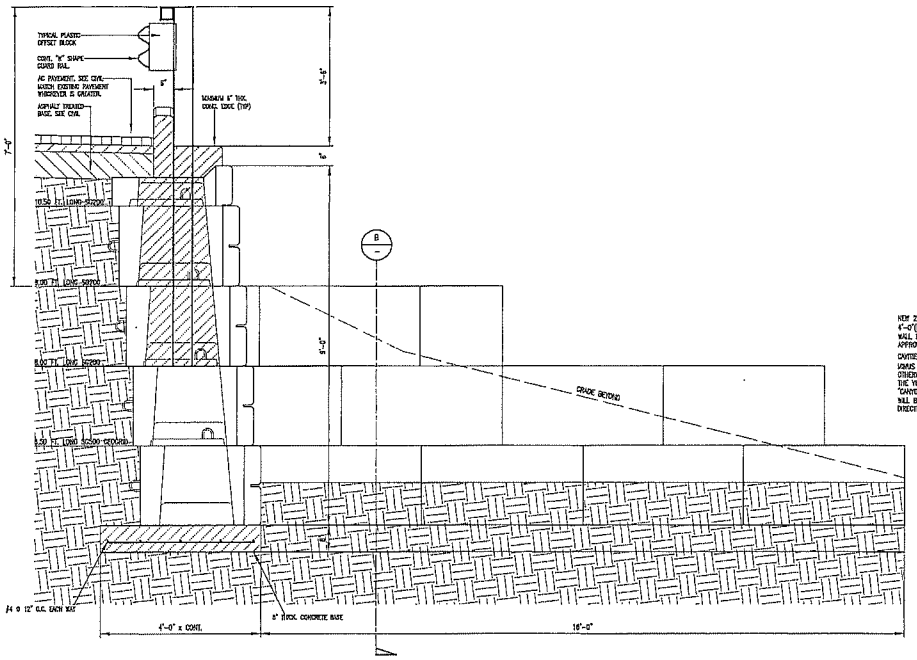
SANJEN K. GHOSH
LICENSED PROFESSIONAL ENGINEER
No. 5823-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE OBSERVED OR DELEGATED AS DEFINED IN HAR 16-115-2.

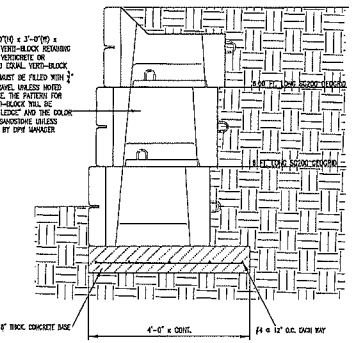
Sanjen K Ghosh
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2018
FILE NO:	-

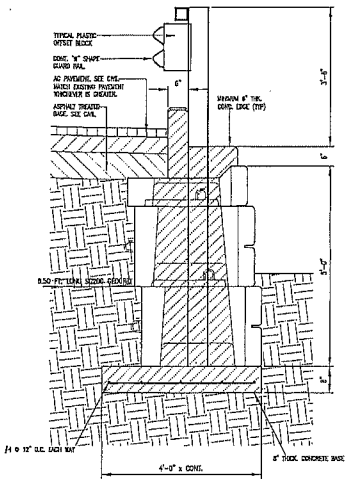
SHEET S-6
20 OF 22



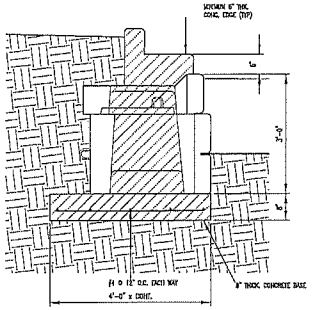
WALL SECTION
SCALE: 3/4" = 1'-0"
A



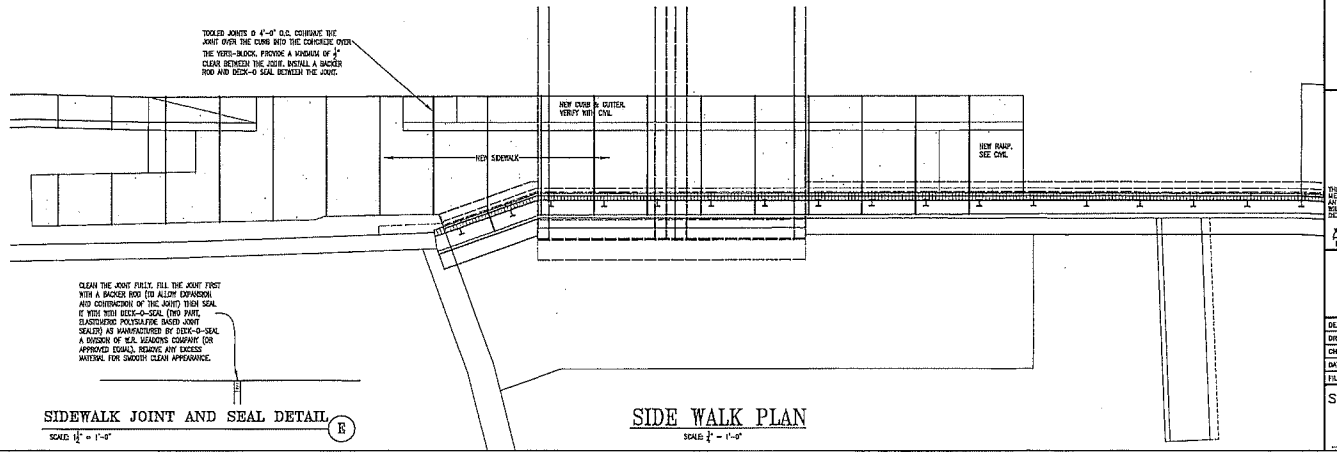
WALL SECTION
SCALE: 3/4" = 1'-0"
B



WALL SECTION
SCALE: 3/4" = 1'-0"
C



WALL SECTION
SCALE: 3/4" = 1'-0"
D



SIDEWALK JOINT AND SEAL DETAIL
SCALE: 1 1/2" = 1'-0"
E

SIDE WALK PLAN
SCALE: 3/4" = 1'-0"

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8511
Email: office@fenaui.com
Website: www.fenaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

SECTIONS / SIDEWALK PLAN

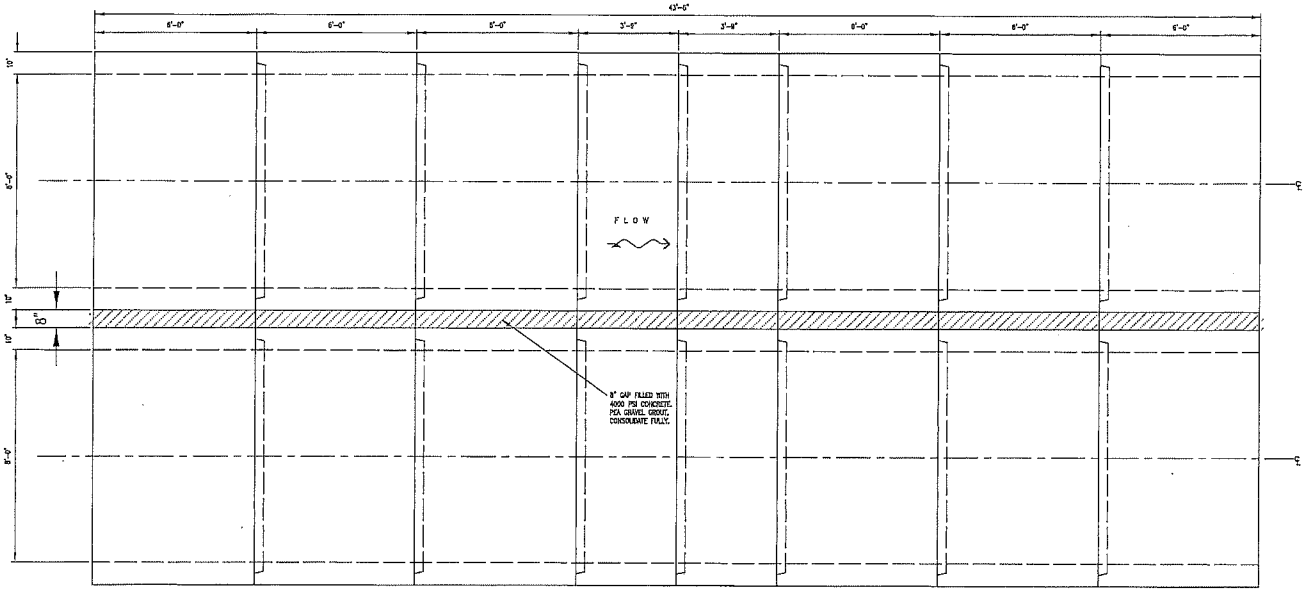
SATISH K. DHOLAKIA
LICENSED PROFESSIONAL ENGINEER
No. 5923-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT ARE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

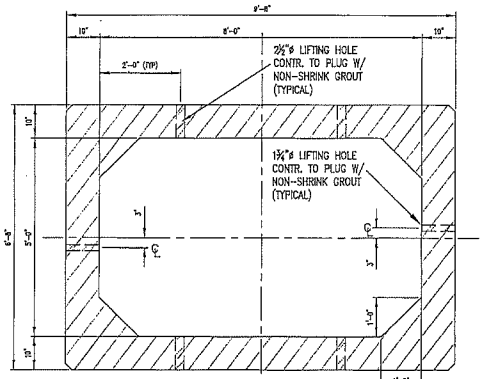
DESIGNED BY: SKD
DRAWN BY: RDP
CHECKED BY: SKD
DATE: OCTOBER 18, 2016
FILE NO: –

SHEET S-7
21 OF 22



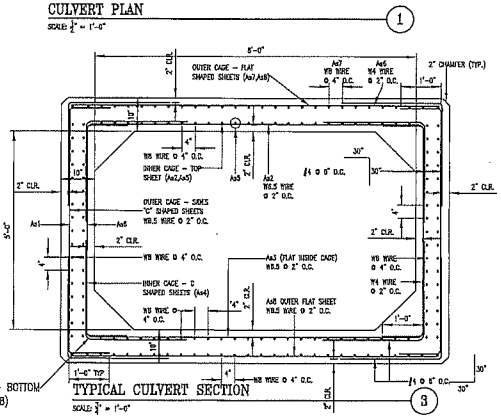
CULVERT PLAN

SCALE: $\frac{1}{4}$" = 1'-0" (1)



TYPICAL CULVERT SECTION WITH DIMENSIONS

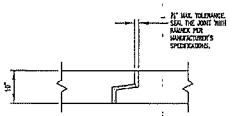
SCALE: $\frac{1}{4}$" = 1'-0" (2)



INNER CAGE – BOTTOM SHEET (As3,As8)

TYPICAL CULVERT SECTION

SCALE: $\frac{1}{4}$" = 1'-0" (3)



TYPICAL JOINT DETAIL

SCALE: $\frac{1}{4}$" = 1'-0" (4)

REINFORCING SCHEDULE

* ASTM REINFORCING BASED ON 8" WALLS, ROOF & FLOOR SLAB

BOX TYPE	BOX SIZE	WALL THICKNESS (INCHES)				CIRCUMFERENTIAL REINFORCEMENT AREAS						DISTRIBUTION REINF. AREAS	
		TOP	BOTTOM	WALL		As1	As2	As3	As4	As7	As8	As5	As6
–	8'x5'	10	10	10	* PER ASTM C-1433	0.24	0.33	0.35	0.19	0.19	0.19	0.19	0.19
					PER CALCULATIONS	0.28	0.35	0.36	0.24	0.24	0.24	0.24	0.24
					ACTUAL	0.39	0.39	0.39	0.24	0.24	0.24	0.24	0.24

CAST-IN-PLACE OR PRECAST CONCRETE 28 DAY COMPRESSIVE STRENGTH, MAXIMUM AGGREGATE SIZE AND MAXIMUM WATER-TO-CEMENT RATIO TO BE AS FOLLOWS:

	STRENGTH (PSI)	TOP SIZE AGGREGATE TO BE USED	MAX. W/C RATIO
CULVERT (PRECAST)	5,000	¾"	0.40

UNLESS OTHERWISE INDICATED ON PLANS AND/OR SCHEDULE, ALL REINFORCING STEEL SHALL BE HIGH STRENGTH GRADE DEFORMED BARS WHICH SHALL CONFORM TO THE STANDARD SPECIFICATION OF ASTM A615 GRADE 60. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A706, GRADE 65. ALL REINFORCING SHALL BE EPOXY COATED IN ACCORDANCE WITH ASTM A775. ANY DAMAGE TO EPOXY SHALL BE PATCHED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

CULVERT DRAWINGS & REINFORCING SCHEDULE

SATISH K. UNDEKAR
LICENSED PROFESSIONAL ENGINEER
No. 5923-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS REVISED IN MAR 14-1-15-2.

LICENSE EXPIRES: 04/30/2018

DESIGNED BY: SKD
DRAWN BY: RGP
CHECKED BY: SKD
DATE: OCTOBER 16, 2015
FILE NO: --

SHEET S-8
22 OF 22

EXHIBIT "E"

Ordinary High Water Mark (OHWM) Delineation and Water Quality Survey of Napili Gulch, Lahaina District, West Maui

Ordinary High Water Mark (OHWM) delineation and water quality survey of Nāpili Gulch, Lahaina District, West Maui

February 22, 2016 *AECOS* No. 1452

Susan Burr
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe, Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: SBurr@aecos.com

Introduction

AECOS, Inc. was contracted by Fukumoto Engineering, Inc[1] to delineate the ordinary high water mark (OHWM) and conduct a water quality survey in Nāpili Gulch in the vicinity of Lower Hono-a-Pi'ilani Road, Lahaina District, Island of Maui (Figure 1). The County of Maui, Department of Public Works (DPW) proposes to replace the existing double-cell culvert under Lower Hono-a-Pi'ilani Road with a larger structure. Additional improvements include grading, slope and channel stabilization, and concrete rock masonry (CRM) paving upstream of the culverts at Lower Hono-a-Pi'ilani Road (Figure 2).

Stream Information

Nāpili Gulch is a fluvial feature on the leeward side of West Maui Mountains that extends from an elevation around 425 m (1,400 ft) above sea level (ASL) to Nāpili Bay (Figure 3). Some sources (USGS, 1997; Group 70, 2015) identify the upper segment (>245 m or 800 ft) ASL as Nāpili 1, the lower segment (including that within the project area) as Nāpili 4-5, and the less well-defined gulch to the north as Nāpili 2-3. The Napili Bay and Beach Foundation (NBBF, 2011) has named the segment of Nāpili 4-5 within the project area "Nāpili Kahawai."

[1] Report prepared for Fukumoto Engineering, Inc. for project permitting and intended to become part of the public record.

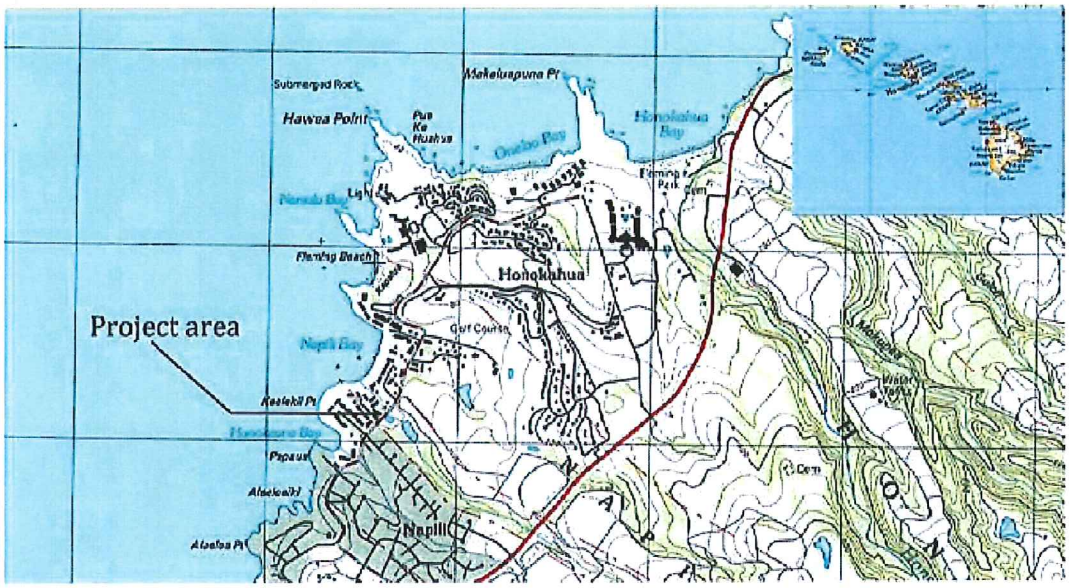


Figure 1. Location of Nāpili Gulch at Lower Hono-a-Pi'ilani Road in the Lahaina District of West Maui.

Pu'u Kukui, at the top of West Maui Mountains, is one of the wettest places on earth with an average annual rainfall of 9,296 mm (366 in; Giambelluca et al., 2013). Lower elevations of the Lahaina District lie in the rain shadow and experience a relatively dry climate—average annual rainfall in the project area at the coast is only 908 mm (36 in). Rainfall in the Lahaina District for 2015 was below average and was only six percent of the monthly average for December (NOAA-NWS, 2016).

Under natural average conditions, most stream reaches of West Maui are dry below about the 245-m (800-ft) elevation ASL (Group 70, 2015). Nāpili appears to flow intermittently throughout the length of the gulch. The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit, 1990) does not include Nāpili Gulch in the inventory of perennial streams and Nāpili Gulch is not included in the Atlas of Hawaiian Watersheds (DLNR-DAR, 2009). The latest U.S. Geological Survey (USGS) map (USGS, 2013) depicts the entire gulch with a combination of dashes and dots—indicating Nāpili is mapped as an intermittent stream.

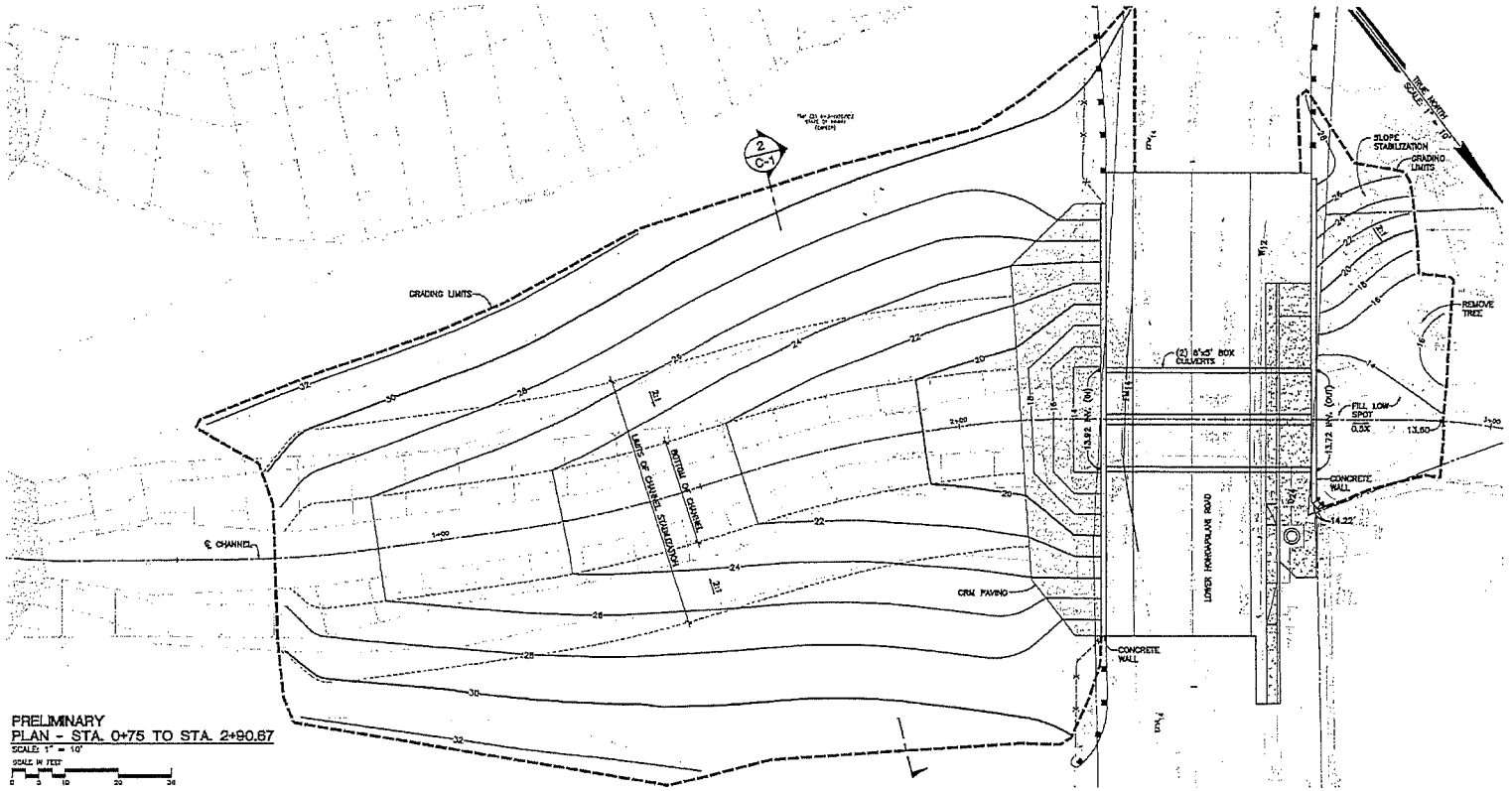


Figure 2. Project plans in Nāpili 4-5 Gulch located between desilting basin and Lower Hono-a-Pi'ilani Road.

Several "desilting basins" are located throughout West Maui watersheds (Group 70, 2015). Most desilting basins were constructed during the sugar cane and pineapple era to reduce the amount of eroded sediment from agricultural fields reaching nearshore reefs. A desilting basin (Figure 4) is located in Nāpili 4-5, just upstream of the project area. In 2010 and 2011, an outlet valve was constructed in the basin. The segment between the basin and Lower Hono-a-Pi'ilani Road was seeded with grass, and Maui County ceased mowing the gulch between the basin and the road (NBBF, 2011). Recent community efforts have focused on planting and maintaining native species in the riparian zone of Nāpili Kahawai downstream of Lower Hono-a-Pi'ilani Road.

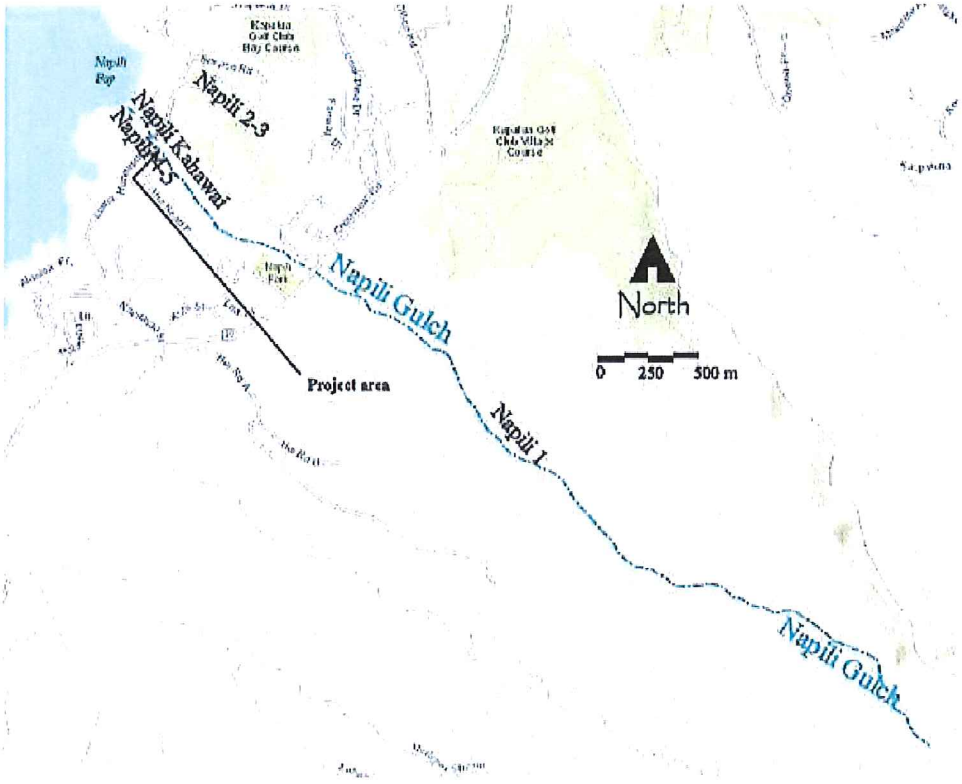


Figure 3. Within project area, Nāpili Gulch is called Nāpili 4-5 or Nāpili Kahawai.

NBBF (2011) reported that, prior to installation of the basin outlet valve, the desilting basin overflowed during a storm in January 2011 and sediment-laden runoff reached Nāpili Bay. A rain gage on Pu'u Kukui at 1760 m (5,771 ft)

recorded 285 mm (11.21 in) of rainfall from this storm between January 10 and 13, 2011 (USGS, 2015).

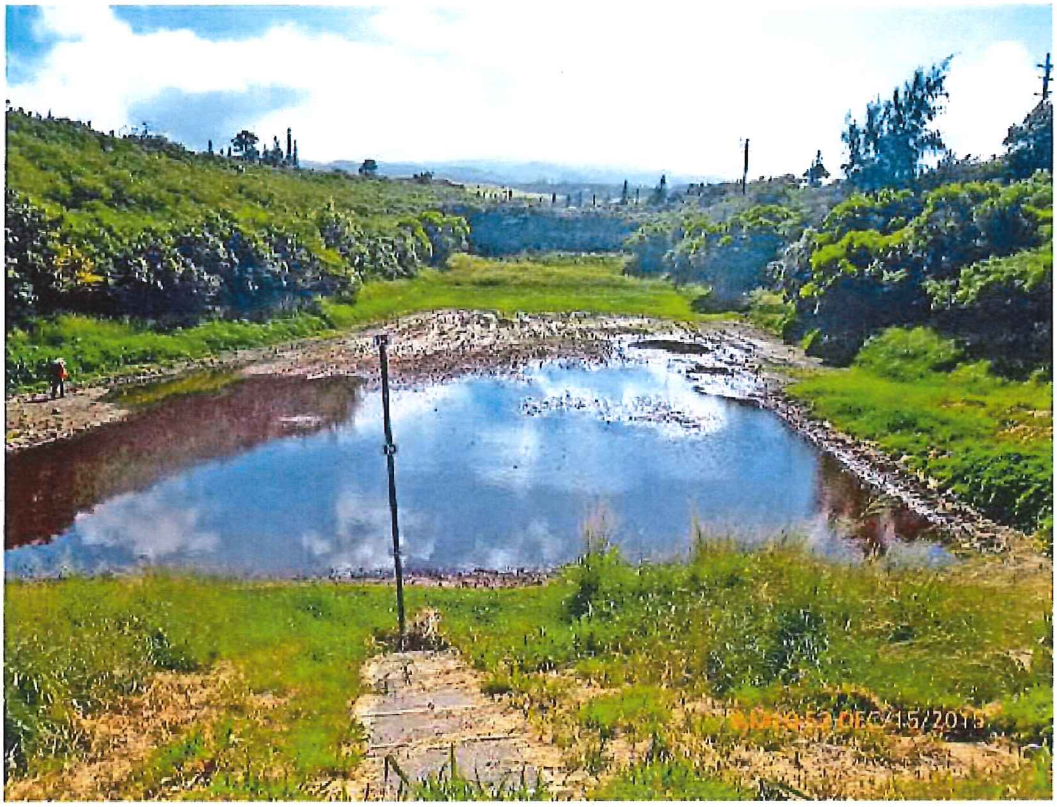


Figure 4. Desilting basin in Nāpili 4-5 located upstream of project area.

The outlet of Nāpili Gulch at the ocean shore is usually blocked by a wide deposit of sand (Nāpili Beach), forming a *muliwai* (brackish water pond or estuary) extending inland from the beach approximately 25 m (82 ft).

Site Description

Approximately 0.3 m (1 ft) of standing water was present in the lower end of the desilting basin during our site visit on December 15, 2015. The desilting basin appears to have been recently dredged. A manually-operated valve opens outlets on the levee (note grate in center foreground of Fig. 4) and allows water to exit the basin through a concrete box culvert (Figure 5) when water in the

basin reaches three different levels. The outlet directs flow into the straightened channel of Nāpili Gulch. Both sides of the channel are lined with CRM for approximately 8 m (25 ft) downstream of the outlet. Within the project area, upstream of Lower Hono-a-Pi'ilani Road and downstream of the CRM, the channel is unlined.

Figure 5. Water exits desilting basin through a box culvert.

The margins of the gulch downstream of the basin were mowed on the morning of our site visit. Vegetative growth on the bottom and sides of the central channel is not maintained (with the possible exception of regular removal of woody vegetation). Stream flow under Lower Hono-a-Pi'ilani Road is through two 7.5-ft wide box culverts. Downstream of the road, the right side of the channel is a concrete wall and native plants have been planted in the floodplain to the left side of the channel. An irrigation system waters these plants and appears to be the source of a small amount of standing water in the gulch downstream of the culverts. This was the only water present in the project area during our site visit. The lower segment of Nāpili 4-5 is confined to a

straightened channel between two condominiums. The channel ends as a *muliwai* at Nāpili Beach (Figure 6).

Figure 6. Nāpili Gulch ends as a *muliwai*.
Surface flow to the ocean is blocked by Nāpili Beach.

Methods

OHWM

The OHWM is defined in the federal regulations [33 CFR 328.3(e); USACE, 1986] as:

> "... the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of

> the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

On December 15, 2015, *AECOS* scientists established the OHWM of an approximately 100-m (300-ft) segment of Nāpili Gulch. Within this survey area, we considered the physical characteristics (listed below) as provided in a regulatory guidance letter to establish an OHWM (USACE, 2005).

Natural line impressed on the bank	Leaf litter disturbed or washed away
Shelving	Scour
Changes in the character of the soil	Deposition
Destruction of terrestrial vegetation	Multiple observed flow events
Presence of litter and debris	Bed and banks
Wracking	Water staining

AECOS scientists recorded the OHWM with a handheld GNSS (Trimble Geo-XT) unit. GPS data were differentially corrected and mapped using GPS Pathfinder and ArcView 10 software.

Water Quality

Except for a small amount of ponded water from the irrigation system just downstream of Lower Hono-a-Pi'ilani Road, no water was present in Nāpili Gulch within the project area. The scientists measured field parameters and collected water samples in the *muliwai* and at two ocean stations in Nāpili Bay (Figure 7). Samples were collected just below water surface during a low tide (NOAA, 2016). Temperature, pH, and dissolved oxygen (DO) were measured *in situ*. Water samples were collected, chilled, and returned to the *AECOS* laboratory for analyses (*AECOS* Log No. 31707). The following parameters were measured in the laboratory: salinity, turbidity, total suspended solids (TSS), ammonia, nitrate+nitrite, total nitrogen, total phosphorus, and chlorophyll a. Table 1 lists the instruments and analytical methods used for field and laboratory analyses.

Results

OHWM

The only physical characteristic that could potentially represent the OHWM within the segment of Nāpili Gulch in the project area is a change in bank slope

(at the bottom-of-bank) along the edges of the central channel. No other physical evidence of flow could be located in the survey area.

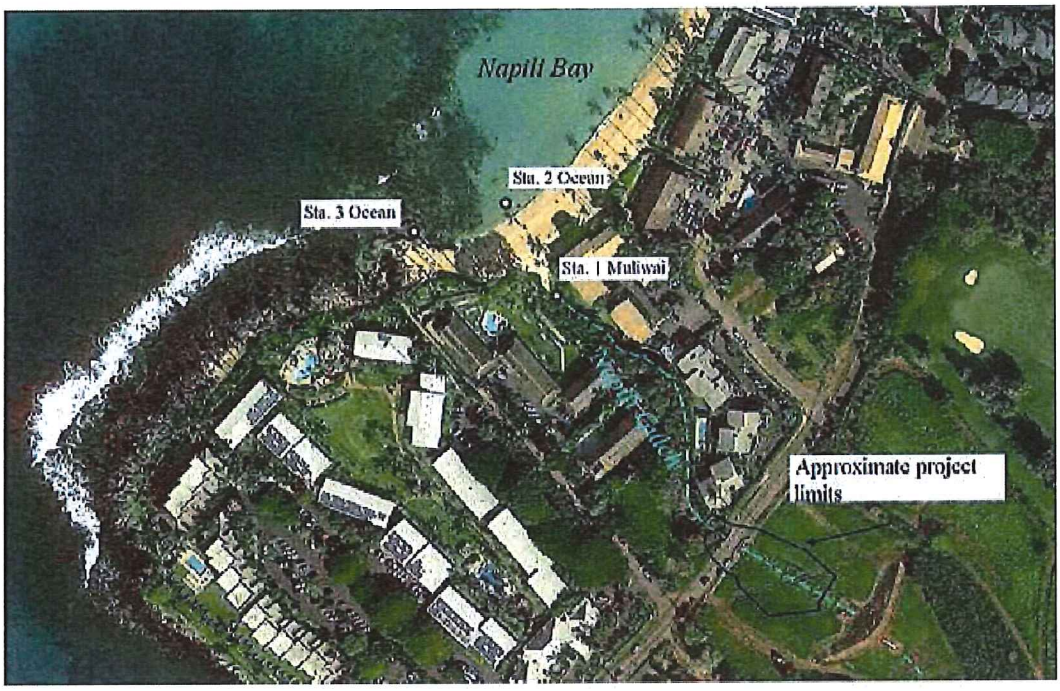


Figure 7. Location of December 15, 2015 water quality sampling stations.

Attachment A presents the OHWM elevation as delineated and recorded in the field by *AECOS*. Photographs (upstream, left and right bank, and downstream) were taken from the center of the gulch in six locations (as shown in Attachment A) to document the OHWM and to characterize the environment. The photographs are provided in Attachment B. Fukumoto Engineering, Inc will include the OWHM on project plans.

Table 1. Analytical methods used for December 15, 2015 water quality analyses.

Analysis	Method	Reference
Temperature	SM 2550B	SM (1998)
Salinity	Bench salinometer	Grasshoff et al. (1999)
pH	SM 4500H+	SM (1998)
Dissolved Oxygen	SM 4500-O G	SM (1998)
Turbidity	EPA 180.1, Rev. 2.0	USEPA (1993a)
Total Suspended Solids	SM 2540D	SM (1998)
Ammonia	SM 4500-NH_3-G	SM (1998)
Nitrate + Nitrite	EPA 343.2	USEPA (1993b)
Total Nitrogen	NCASI-TNTP-W10900	NCASI (2011)
Total Phosphorus	EPA 365.3	USEPA (1993c)
Chlorophyll a	SM 10200H (M)	SM (1998)

Water quality

The results from *in situ* measurements and analyses of water samples collected well downstream from the project area are provided in Table 2. As is typical, waters in the estuarine reach of Nāpili Gulch (*muliwai*) were not flowing over the sand surface into Nāpili Bay, although seepage through the sand would be occurring. Salinity was 20 ppt within the *muliwai*, indicating brackish water composed of a mix of seawater and freshwater. Dissolved oxygen (DO) in the *muliwai* was very low (0.90 mg/L); DO saturation was 12 percent.

Particulates, as measured by total suspended solids (TSS), were high (34 mg/L) in the *muliwai*. Turbidity, an indication of cloudiness of the water, was also high (8.90 ntu), reflecting the turbid condition observed during sampling. Ammonia (NH_3), total nitrogen (TN), and total phosphorus (TP) were high (387 µg N/L, 1670 µg N/L, and 1180 µg P/L, respectively). Chlorophyll a was high (23.9 µg/L), indicating an abundance of phytoplankton in the water column contributing to elevated turbidity. Such conditions are common in blocked estuaries in Hawai'i as nutrients in runoff accumulates in the stagnant water, promoting algal blooms; these blooms may persist until a freshet flow in the gulch breaks through the sand barrier and flushes out the estuarine water.

Nearshore marine waters sampled at Sta. 2 Ocean and Sta. 3 Ocean revealed typical conditions for nearshore waters of West Maui: well-oxygenated

seawater with a pH near 8.0. Values for turbidity, TSS, nutrients, and chlorophyll a were all elevated, although much lower than levels in the *muliwai.*

Table 2. Water quality results from December 15, 2015 sampling event.

Station	Time	Temp (°C)	Salinity (ppt)	DO (mg/l)	DO % sat (%)	pH
Sta. 1 Muliwai	1230	25.8	20.5045	0.90	12	7.39
Sta. 2 Ocean	1300	26.7	34.1117	5.30	80	8.24
Sta. 3 Ocean	1310	26.6	33.4987	7.38	111	8.30

	Turbidity (ntu)	TSS (mg/l)	NH_3 (µg N/l)	NO_3+NO_2 (µg N/l)	Total N (µg N/l)	Total P (µg P/l)	Chl a (µg/l)
Sta. 1 Muliwai	8.90	34	587	26	1670	1180	23.9
Sta. 2 Ocean	1.32	5.8	12	37	157	29	0.75
Sta. 3 Ocean	0.68	3.4	16	63	184	27	0.66

Discussion

OHWM

The purpose of the OHWM delineation is to establish lateral limits of federal jurisdiction within the project area. Our delineated line is not official until accepted by the U.S. Army Corps of Engineers (USACE). Our survey of Nāpili Gulch between the desilting basin and a short distance downstream of Lower Hono-a-Pi'ilani Road found the OHWM to be located at the edge of the channel bottom. Our delineation of the OHWM is based upon best professional judgment; however, federal jurisdiction is solely determined by the USACE and is based upon the USACE accepting our delineation. Acceptance may require a field visit by a USACE representative from the Regulatory Branch. Our delineation is not official until an acceptance letter from the USACE is received by the applicant.

Water quality

During the December 15, 2015 water quality survey, brackish *muliwai* waters of Nāpili Gulch were nutrient-, sediment-, and chlorophyll-laden relative to State of Hawai'i water quality criteria values for estuaries (HDOH, 2014a; Table 3). Values obtained in our survey cannot be directly compared with the values in Table 3 to assess compliance with state standards, because a comparison requires a representative geometric mean calculated from a minimum of three sampling events. The results do indicate that generally poor water quality conditions were present during the survey, although not an unusual situation for a *muliwai*.

Table 3. State of Hawai'i water quality criteria for estuaries from HAR §11-54-05.2(b) (HDOH, 2014a).

Parameter	Total N (µg N/l)	NH_3 (µg N/l)	NO_3+NO_2 (µg N/l)	Total P (µg P/l)	Turbidity (NTU)	Chl a (µg/l)
Geometric mean not to exceed given value	200.00	6.00	8.00	25.00	1.5	2.00
Not to exceed more than 10% of the time	350.00	10.00	25.00	50.00	3.00	5.00
Not to exceed more than 2% of the time	500.00	20.00	35.00	75.00	5.00	10.00

pH – shall not deviate more than 0.5 units from ambient and shall not be < 7.0 nor > 8.6.
Dissolved oxygen – not less than 75% saturation.
Temperature – shall not vary more than 1 °C from ambient.
Salinity – not more than 10% from ambient conditions.

The coastal waters of Nāpili Gulch are also impaired. Nāpili Bay (HI764060) and West Maui Coast-Nāpili Bay (HIW00078) are on the Department of Health list of impaired waters in Hawai'i (HDOH, 2014b) prepared under Clean Water Act, §303(d). The listings indicate the bay may not meet State of Hawai'i water quality criteria for coastal waters with minimal freshwater discharge (Table 4).

HI764060 is listed as impaired for ammonia, nitrate+nitrite, total phosphorus, and chlorophyll and has been assigned a low priority for Total Maximum Daily Load (TMDL) studies. HIW00078 is listed as impaired for nitrate+nitrite, turbidity, and chlorophyll and has been assigned a medium priority for Total Maximum Daily Load (TMDL) studies. The results of our water quality survey support the listing decisions for each listed parameter.

Table 4. State of Hawai'i water quality criteria for dry coastal waters from HAR §11-54-05.2(b) (HDOH, 2014b).

Parameter	Total N (µg N/l)	NH_3 (µg N/l)	NO_3+NO_2 (µg N/l)	Total P (µg P/l)	Turbidity (NTU)	Chl a (µg/l)
Geometric mean not to exceed given value	110.00	2.00	3.50	16.00	0.20	0.15
Not to exceed more than 10% of the time	180.00	5.00	10.00	30.00	0.50	0.50
Not to exceed more than 2% of the time	250.00	9.00	20.00	45.00	1.00	1.00

pH – between 7.6 and 8.6, except at coastal locations where and when freshwater from stream, storm drain, or groundwater discharge may depress pH to 7.0.
Dissolved oxygen – not less than 75% saturation.
Temperature – shall not vary more than 1 °C from ambient.
Salinity – not more than 10% from ambient conditions.

Conclusions and Recommendations

The proposed project is not anticipated to adversely affect the already poor water quality in the *muliwai* of Nāpili Gulch or in the nearshore waters of Nāpili Bay. Unless a large storm occurs during construction, all work should be able to be completed in a dry setting. A best management practices (BMP) plan and an applicable monitoring and assessment plan (AMAP) should be designed and

implemented to minimize and localize adverse environmental impacts and monitor any impacts.

References

Giambelluca, T. W., Q. Chen, A. G. Frazier, J. P. Price, Y. -L. Chen, P. -S. Chu, J. K. Eischeid, and D. M. Delparte. 2013: Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94: 313-316. doi. 10.1175/BAMS-D-11-00228.1. Available online at URL: http://rainfall.geography.hawaii.edu/interactivemap.html; last accessed December 17, 2015.

Grasshoff, K., M. Ehrhardt, and K. Kremling (eds). 1999. Methods of Seawater Analysis (3rd ed). Wiley-VHC. 419 pp.

Group 70 International. 2015. West Maui watershed plan: Kahana, Honokahua and Honolua watersheds, strategies and implementation report. Public review draft, November 2015. Prep. for: U.S. Army Corps of Engineer and State of Hawai'i Department of Land and Natural Resources. 165 pp.

Hawaii Cooperative Park Service Unit. 1990. Hawaii stream assessment. A preliminary appraisal of Hawaii's stream resources. Prep. for State of Hawaii, Commission on Water Resource Management. National Park Service, Hawaii Cooperative Park Service Unit, Rept. No. R84: 294 pp.

Hawai'i Department of Health (HDOH). 2014a. Hawai'i Administrative Rules, Title 11, Department of Health, Chapter 54, Water Quality Standards. November 15, 2014. 110 pp.

Hawai'i Department of Land and Natural Resources, Division of Aquatic Resources (DLNR-DAR). 2009. Atlas of Hawaiian Watershed & Their Aquatic Resources. Island of Maui, Lahaina Watersheds. Department of Land and Natural Resources. State of Hawai'i. Available online at URL: http://www.hawaiiwatershedatlas.com/watersheds/hawaii; last accessed on December 17, 2015.

_____. 2014b. 2014 State of Hawai'i water quality monitoring and assessment report: integrated report to the U.S. Environmental Protection Agency and the U.S. Congress pursuant to §303(3) and §305(b), Clean Water Act (P.L. 97-117). 123 pp.

Napili Bay and Beach Foundation (NBBF). 2011. Coral Reef Conservation Fund Final Programmatic Report. 10 pp.

National Council for Air and Stream Improvement, Inc. (NCASI), 2011. NCASI Methods Manual Method TNTP-W10900. Total nitrogen and total phosphorus in pulp and paper biologically treated effluent by alkaline persulfate. West Coast Regional Center Aquatic Biology Program. 22pp.

National Oceanographic and Atmospheric Administration (NOAA). 2016. NOAA/NOS/CO-OPS, Observed water levels at 1615680, Kahului, Kahului Harbor, HI, from 2015/12/15 00:00 LST to 2015/12/15 23:59 LST. Available online at URL: http://tidesandcurrents.noaa.gov/waterlevels.html?id=1615680&units=standard&bdate=20151215&edate=20151215&timezone=LST&datum=MSL&interval=6&action=; last accessed January 6, 2016.

National Oceanographic and Atmospheric Administration, National Weather Service Forecast Office (NOAA-NWS). 2016. December 2015 precipitation summary. Available online at: www.prh.noaa.gov/hnl/hydro/pages/dec15sum.php; last accessed on January 7, 2016.

Standard Methods (SM). 1998. Standard Methods for the Examination of Water and Wastewater. 20th Edition. 1998. (Greenberg, Clesceri, and Eaton, eds.). APHA, AWWA, & WEF. 1220 pp.

U.S. Army Corps of Engineers (USACE). 1986. Corps of Engineers, Department of the Army, Department of Defense, 33 CFR II, Parts 328 and 329. Navigation and Navigable Waters. *Federal Register*, 51 (41250 and 41251, November 13, 1986).

_____. 2005. Regulatory Guidance Letter 05-05 Ordinary High Water Mark (OHWM) Identification. 4 pp.

U.S. Environmental Protection Agency (USEPA). 1993a. Method 180.1 Determination of turbidity by nephelometry. Revision 2.0. Environmental Monitoring Systems Laboratory Research and Development. Environmental Protection Agency. Cincinnati, OH. 10 pp.

_____. 1993b. Method 353.2. Determination of nitrate-nitrite by automated colorimetry. Revision 2.0. Environmental Monitoring Systems Laboratory Research and Development. Environmental Protection Agency. Cincinnati, OH. 14 pp.

U.S. Environmental Protection Agency (USEPA). 1993c. Method 365.3. Determination of total phosphorus by automated colorimetry. Revision 2.0. Environmental Monitoring Systems Laboratory Research and Development. Environmental Protection Agency. Cincinnati, OH. 4 pp.

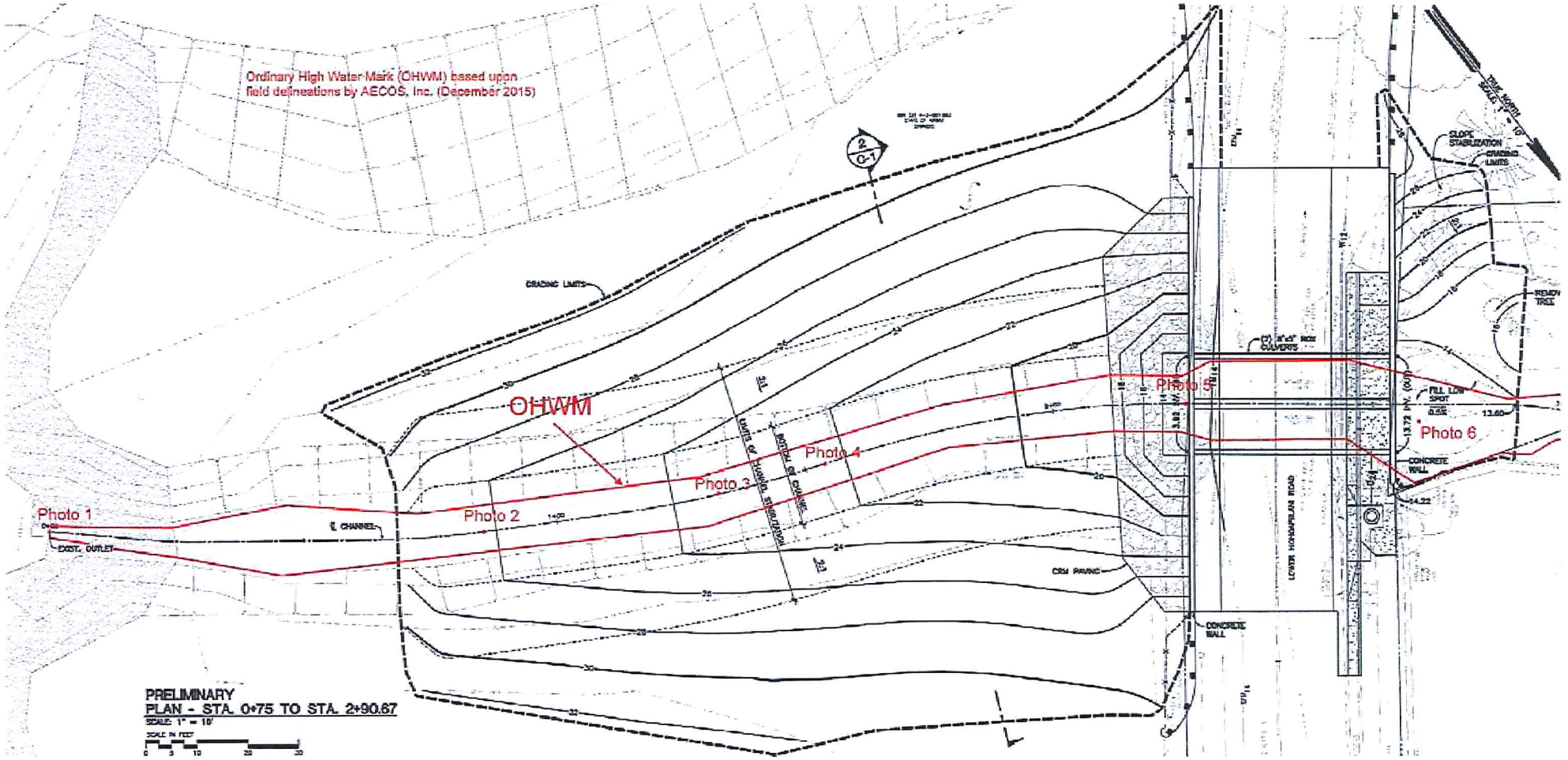
U.S. Geological Survey (USGS). 1997. Napili Quadrangle, Hawaii-Maui Co., 7.5-minute series (topographic).

_____. 2013. Napili Quadrangle, Hawaii-Maui Co., 7.5-minute series (topographic).

_____. 2015. USGS 205327156351102 380.0 Puu Kukui Rain Gage at alt 5,771 ft, Maui, HI. Available online at URL: http://nwis.waterdata.usgs.gov/hi/nwis/dv?cb_00045=on&format=gif_default&site_no=205327156351102&referred_module=sw&period=&begin_date=2011-01-01&end_date=2011-01-31; last accessed December 17, 2015.

Attachment A

Ordinary High Water Mark Map


Ordinary High Water Mark (OHWM) based upon
field delineations by AECOS, Inc. (December 2015)
OHWM
Photo 1
Photo 2
Photo 3
Photo 4
Photo 5
Photo 6
GRADING LIMITS
℄ CHANNEL
EXIST. OUTLET
CRM PAVING
CONCRETE WALL
SLOPE STABILIZATION
FILL LOW SPOT
LOWER HOWARD LANE ROAD
PRELIMINARY
PLAN - STA. 0+75 TO STA. 2+90.67
SCALE: 1" = 10'

Attachment B

Ordinary High Water Mark Photographs

Photo 1 Upstream

Photo 1 Left bank

Photo 1Right bank

Photo 1 Downstream

Photo 2 Upstream

Photo 2 Left bank

Photo 2 Right bank

Photo 2 Downstream

Photo 3 Upstream

Photo 3 Left bank

Photo 3 Right bank

Photo 3 Downstream

Photo 4 Upstream

Photo 4 Left bank

Photo 4 Right bank

Photo 4 Downstream

Photo 5 Upstream

Flag 5 Photo bank

Flag 5 Photo bank

Photo 5 Downstream left culvert

Photo 5 Downstream right culvert

Photo 6 Upstream

Photo 6 Left bank

Photo 6 Right bank

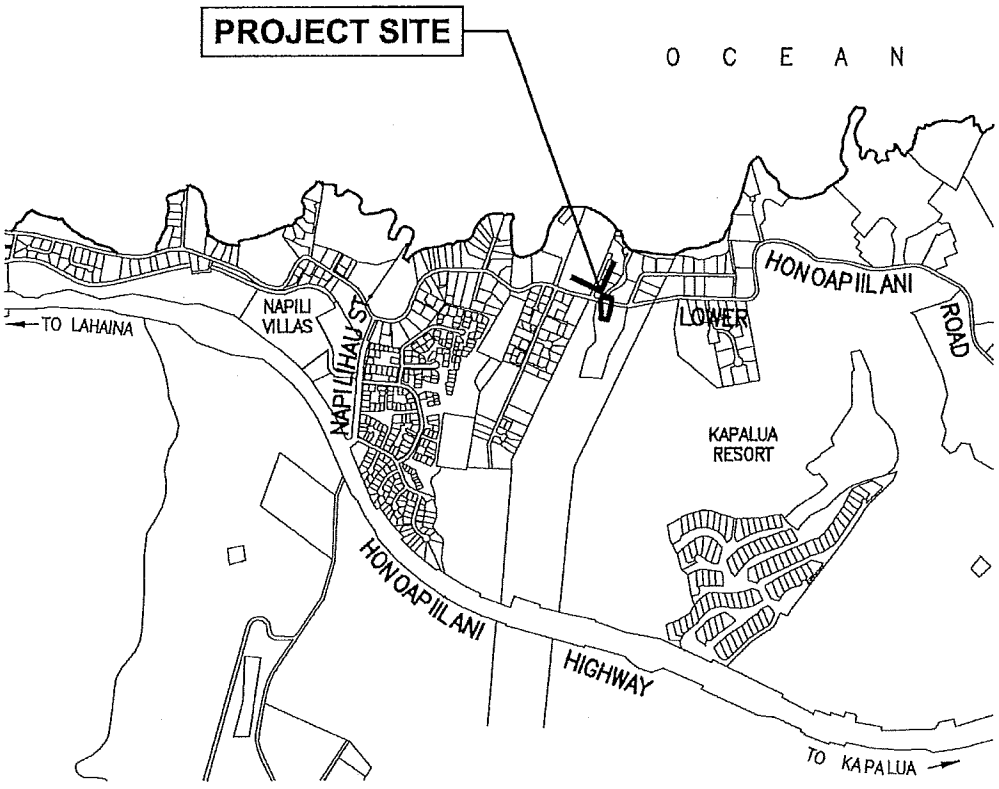
Photo 6 Downstream

EXHIBIT "F"

Drainage Report for Napili 4/5 Culvert Replacement

DRAINAGE REPORT
For Napili 4/5 Culvert Replacement

Napili, Maui, Hawaii
Tax Map Keys (2) 4-3-001:003 and (2) 4-3-002:045



Client:

Department of Public Works, Engineering Division,
County of Maui
200 South High Street
Kalana O Maui Building, 4th Floor
Wailuku, Hawaii 96793

This work was prepared by me or under my supervision.

MICHAEL E. SILVA
LICENSED PROFESSIONAL ENGINEER
No. 11185-C
HAWAII, U.S.A.

License Expires 4/30/2018

Consultant:

Fukumoto Engineering, Inc.
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
E-Mail: office@femaui.com

Date: October 31, 2016

TABLE OF CONTENTS

I. PURPOSE

The purpose of this report is to present storm drainage design information and to comply with Chapter 20.08, Soil Erosion and Sedimentation Control, of the Maui County Code to obtain a grubbing and grading permit.

II. PROJECT DESCRIPTION

A. General Location

The project involves replacing the Napili 4/5 Culvert on Lower Honoapiilani Road in Napili, Maui. The project area will include the property upstream of the culvert (owned by the State of Hawaii and maintained by the County of Maui), and the property downstream of the culvert (owned by the State of Hawaii). The site adjoins One Napili Way residences to the northwest. The drainageway is an unnamed gulch.

The tax map designates the project parcels as Tax Map Keys (2) 4-3-001:003 and (2) 4-3-002:045. (See Figure 1 - Location Map (USGS Map), page 5 and Figure 2 - Vicinity Map (Tax Map), page 6.)

B. Project Components

The project involves replacing the existing drainage culverts with two new 8-foot wide by 5-foot high box culverts with associated inlet and outlet wall structures, regrading the areas upstream and downstream of the culvert, and road improvements. Road improvements include installation of asphalt pavement, shoulder widening, sidewalk, fall protection railing, vehicle barriers, curb and gutter, drainage catch basin, drainline, and reinstallation of water and wastewater lines that cross above the new culvert.

III. DRAINAGE SYSTEM

A. Topography

The project area upstream of the culvert includes a grassy lot with a narrow drainageway located below Napili 4/5 Basin Structure No. 2. Elevations range from about 32 feet above mean sea level (AMSL) to 25 feet AMSL.

The project area within Lower Honoapiilani Road includes a paved roadway, and a sidewalk on the northwesterly side of the culvert. Concrete walls extend up above the pavement from both the inlet and outlet sides of the culvert. The walls provide 22-feet of travel lane across the top of the culvert. Elevations in the project area along the roadway are relatively flat and range from about 29 feet AMSL to 31 feet AMSL.

The project area downstream includes the drainageway, a vertical-face retaining wall to the northeast, and a vegetated slope to the southwest. The invert at the culvert outlet is about 24

feet AMSL. Storm water drops vertically about 16 feet to an elevation of 8 feet AMSL which causes scouring and erosion at the bottom of the drainageway. There is a concern of potential erosion below the culvert and walls that would undermine the structures. Elevations along the vegetated slope to the southwest range from about 14 feet AMSL to 26 feet AMSL. (See Figure 5 – Existing Grading Plan, page 9.)

B. Soil

According to the Soil Conservation Service, the site soils include Rough Broken and Stony Land (rRS). Rough Broken and Stony Land consists of very steep, stony gulches. The survey characterizes the soils as being generally less than 20 inches deep over saprolite or bedrock. Other characteristics include rapid runoff and active erosion. (See Figure 3 – Soil Map, page 7.)

C. Flood and Tsunami Hazard

According to the Flood Insurance Rate Map, the site is within a floodway area in Zone AE, an area subject to inundation due to storm water from upland areas. The base flood elevation at the site ranges from 21 feet AMSL to 32 feet AMSL. Floodways are noted to be kept free of encroachments so the 1% annual chance flood can be carried without substantial increases in flood heights. (See Appendix A - Flood Hazard Assessment Report.)

D. Existing Drainage Improvements

The existing drainage basin above the project site includes an 18.5-foot high by 262-foot long earthen embankment dam, a 13.5-foot wide concrete crest on top of the dam, and a 12-inch outlet drainline through the dam. The bottom of the 12-inch outlet drainline is set approximately 6 feet above the bottom of the basin. The total storage volume of the basin is roughly 1,080,000 cubic feet (cf) or 24.8 acre-feet. The area that drains into the site is 553 acres with a peak flow of 743 cubic feet per second (cfs) from a 100-year design storm. The drainage basin was designed as a sediment settling basin, and only reduces the peak flow of 100-year design storm to 734 cfs. (See Figure 4 – Drainage Area Map, page 8.)

Storm runoff passes under Lower Honoapiilani Road through two 90-inch by 40-inch box culverts. Allowing for 1 foot of freeboard (maximum storm water height to the top of the road surface), the culverts are capable of conveying approximately 250 cfs. After passing through the culverts, storm runoff travels through a gulch to the ocean. Our office has been informed by the Napili Bay and Beach Foundation, who are made up of managers of local condominiums, that heavy flooding overtops the dam, exceeds the capacity of the culvert at Lower Honoapiilani Road, and erodes the gulch downstream about every two years.

E. Proposed Drainage Improvements

All grading improvements are over 50 feet away from the toe of the embankment dam of the drainage basin. The drainage channel between the basin and culvert will be regraded to reduce erosion and improve water quality downstream of the proposed culvert. Native plantings will be used to stabilize and restore the regraded areas. The slope of the channel centerline will be increased and a drainage inlet structure will be installed on the upstream inlet side of the culvert to lessen the elevation difference on the downstream side of the channel. A channel liner will be installed to address the increased velocity of storm water on the upstream side of the culvert. The regraded channel will continue the meet the County drainage standards for a 100-year, 24-hour rainfall.

The culverts will be replaced with two 8-foot wide by 5-foot tall box culverts. The culverts will be lowered to eliminate the existing elevation drop at the outlet. Lowering the culverts will also allow adequate height at the culvert entrance measured from the invert to the roadway elevation. Sufficient freeboard is included in this height.

A drainage catch basin will be installed on the northwesterly side of the roadway that has a curb and gutter. An 18-inch drainline will connect the catch basin to the box culvert.

The County drainage standards require the use of a 100-year, 24-hour rainfall for computing volumes and rates of flow. Drainage design will be based on the Rational Method.

Drainage improvements that involve transmission of storm flows will conform to the "Rules for the Design of Storm Drainage Facilities in the County of Maui." The rules will be applied to the sizing of drain lines, channels, and culverts. Based on the County rules, the drainage system will be designed to handle a storm with a recurrence interval of 100 years since the drainage area is greater than 100 acres.

F. Conclusion

There will be no adverse effects on the adjacent or downstream properties due to this project. This conclusion is based on the proposed drainage improvement being designed to accommodate peak discharge rates.

IV. REFERENCES

1. City and County of Honolulu, Department of Public Works, Division of Engineering, *Storm Drainage Standards*, Honolulu, Hawaii, May 1988.

2. County of Maui, "Title MC-15, Department of Public Works and Waste Management, Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui," Wailuku, Hawaii, November 1995.

3. Federal Emergency Management Agency, Federal Insurance Administration, *Flood Insurance Study, Maui County, Hawaii*, December 1, 1980.

4. R. M. Towill Corporation, *Drainage Master Plan for the County of Maui*, Honolulu, Hawaii, October 1971.

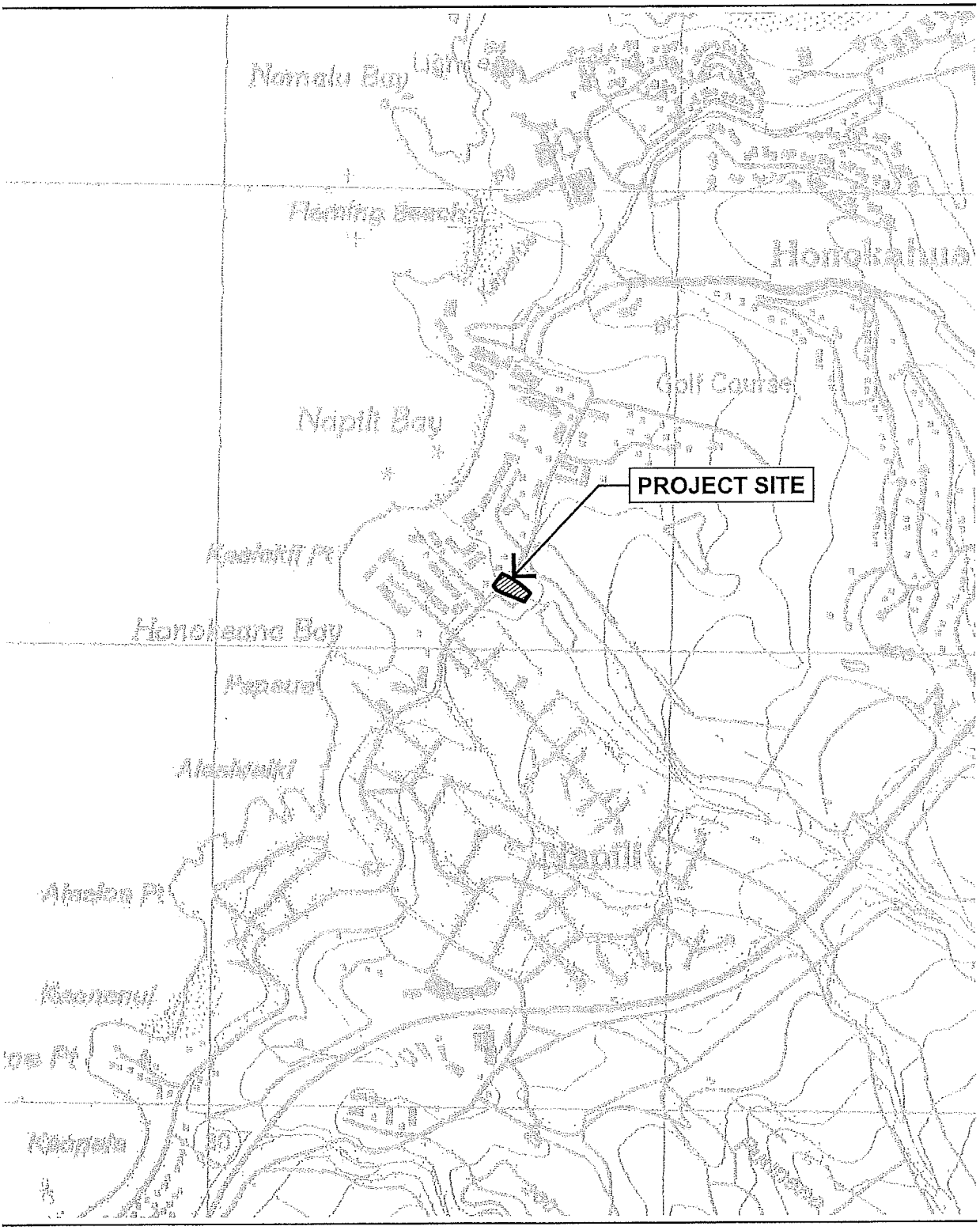
5. U. S. Department of Agriculture, Soil Conservation Service, *Erosion and Sediment Control Guide for Hawaii*, Honolulu, Hawaii, March 1981.

6. U. S. Department of Agriculture, Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, Washington, D.C., August 1972.

7. U. S. Department of Agriculture, Soil Conservation Service, *Urban Hydrology for Small Watersheds*, Technical Release 55, Second Edition, Washington, D.C., June 1986.

8. U. S. Department of Commerce, Weather Bureau, *Rainfall-Frequency Atlas of the Hawaiian Islands for Areas to 200 Square Miles, Durations to 24 Hours, and Return Periods from 1 to 100 Years*, Technical Paper No. 43, Washington, D.C., 1962.

9. West Maui Watershed Management Advisory Committee, *West Maui Watershed Owners Manual*, Honolulu, Hawaii, November 1997.



LOCATION MAP (USGS Map)

SCALE IN FEET

NORTH 0 500 1000 2000 3000

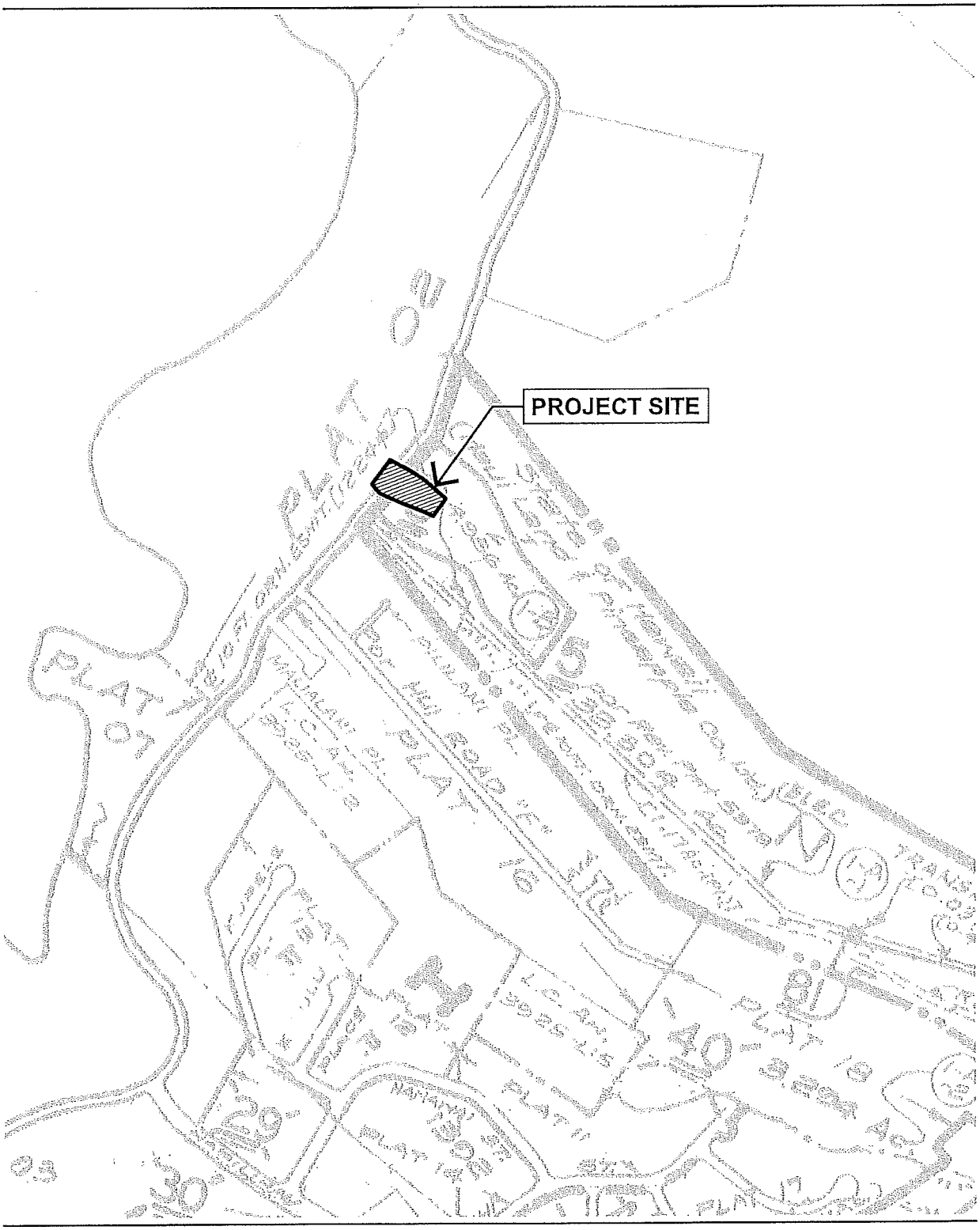
Figure 1

SOURCE: USGS NAPILI QUADRANGLE MAP

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

DRAINAGE REPORT FOR NAPILI 4/5 CULVERT REPLACEMENT



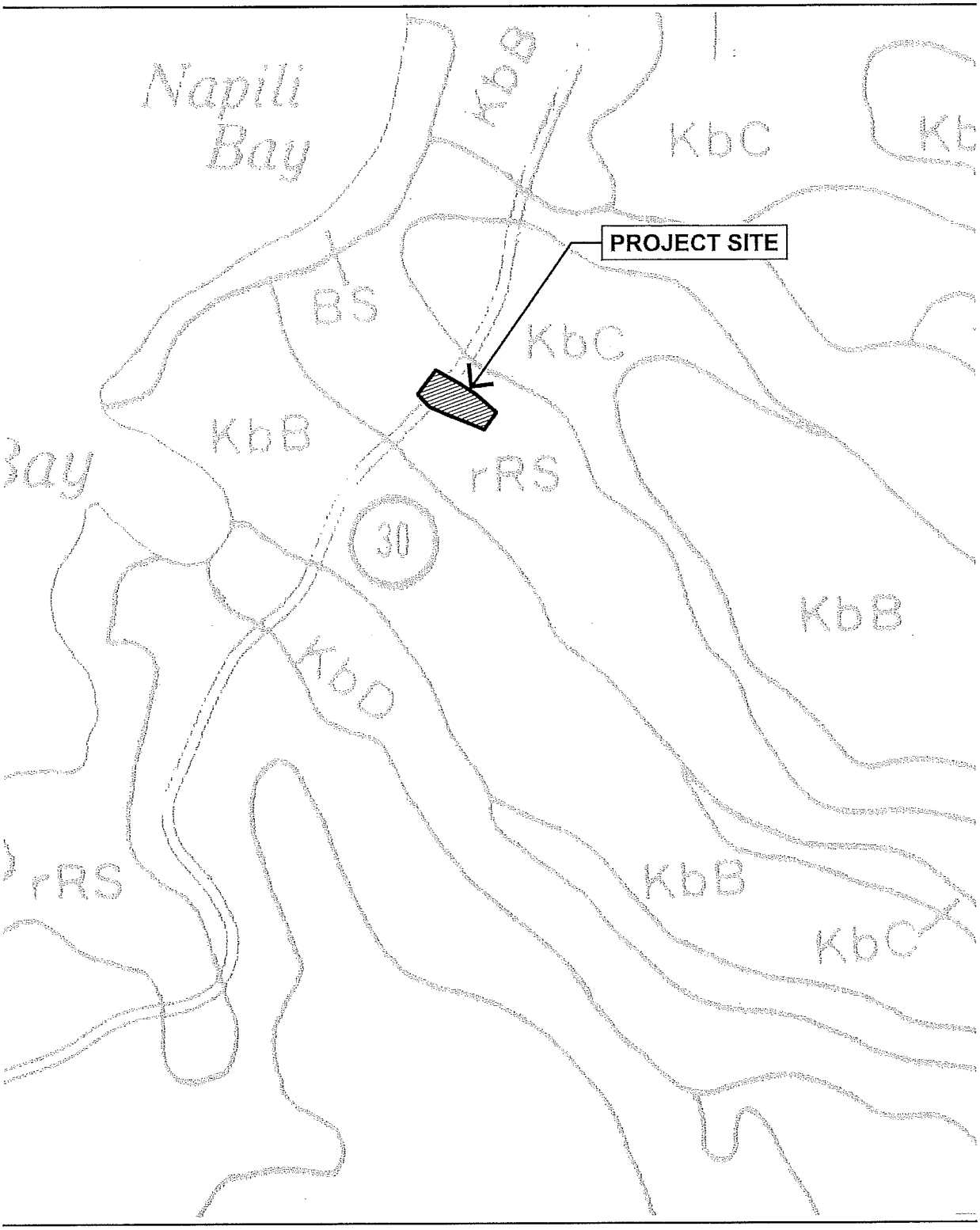
VICINITY MAP (Tax Map)

Figure 2

SOURCE: TAX MAP KEY: (2) 4-3-001

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



SOIL MAP

SCALE IN FEET

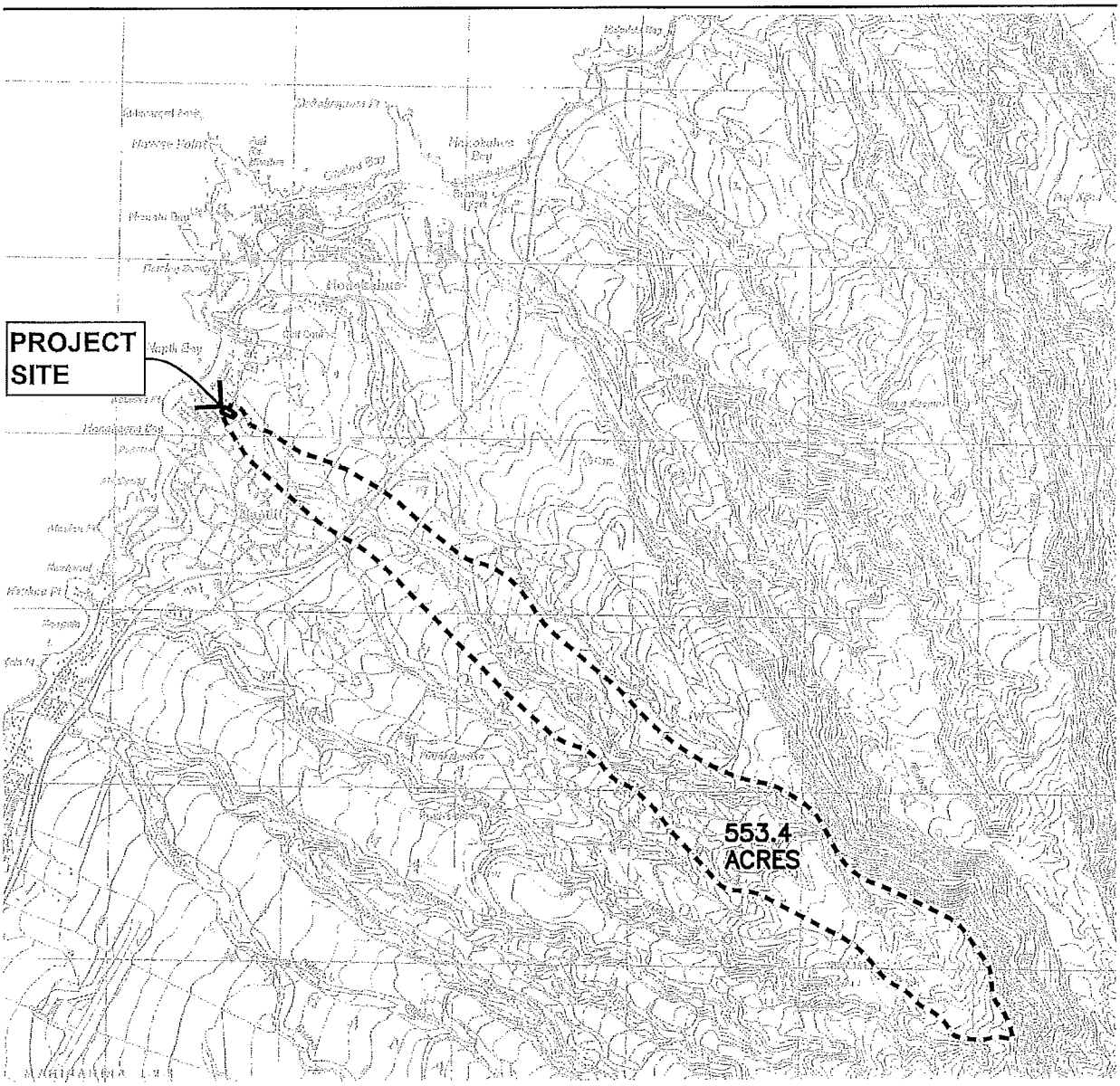
NORTH 0 250 500 1000 1500

Figure 3

SOURCE: SOIL SURVEY

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



LEGEND:

------ LIMITS OF DRAINAGE AREA

DRAINAGE AREA MAP

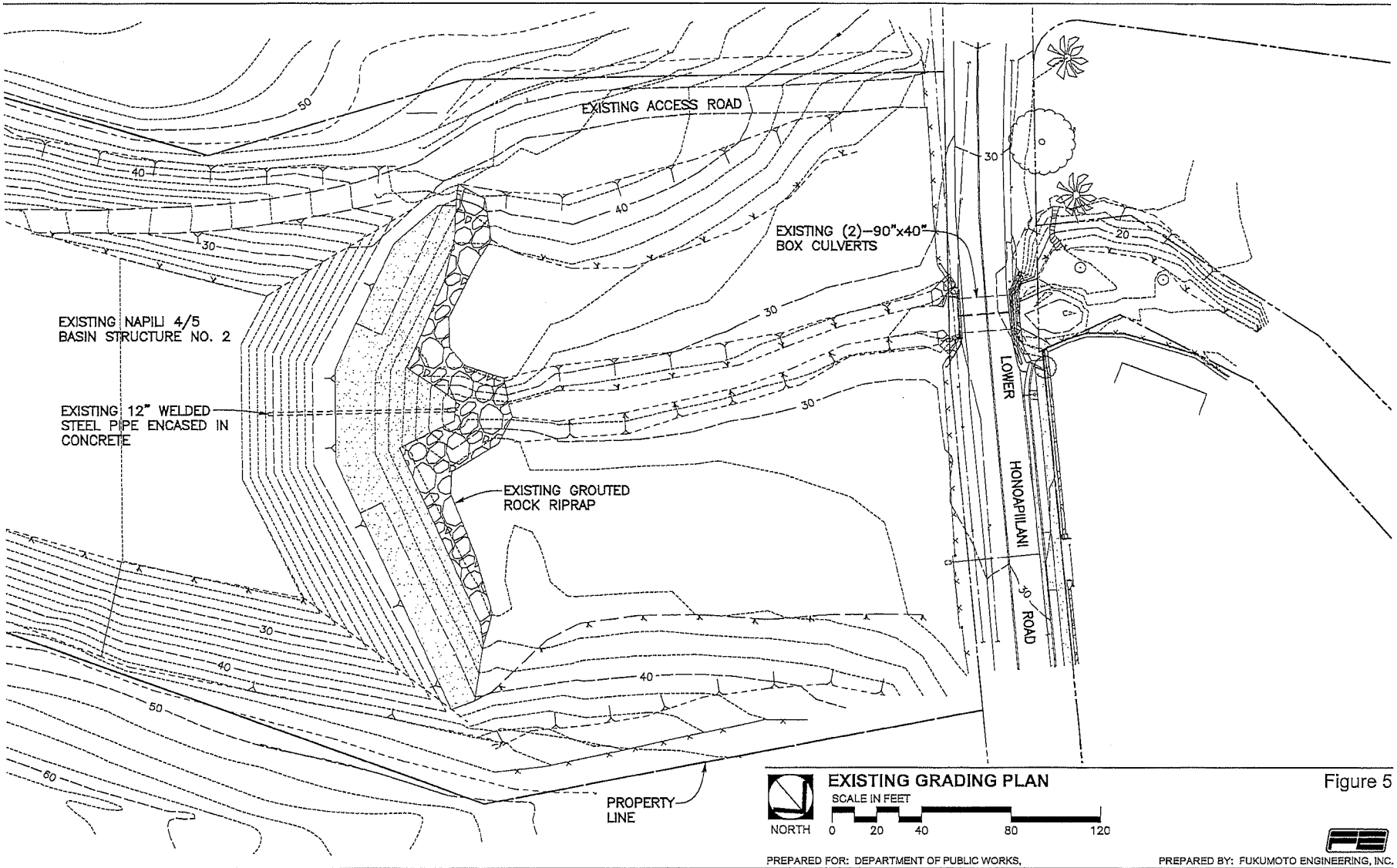
Figure 4

SCALE IN FEET

NORTH 0 1500 3000 6000 9000

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



EXISTING GRADING PLAN

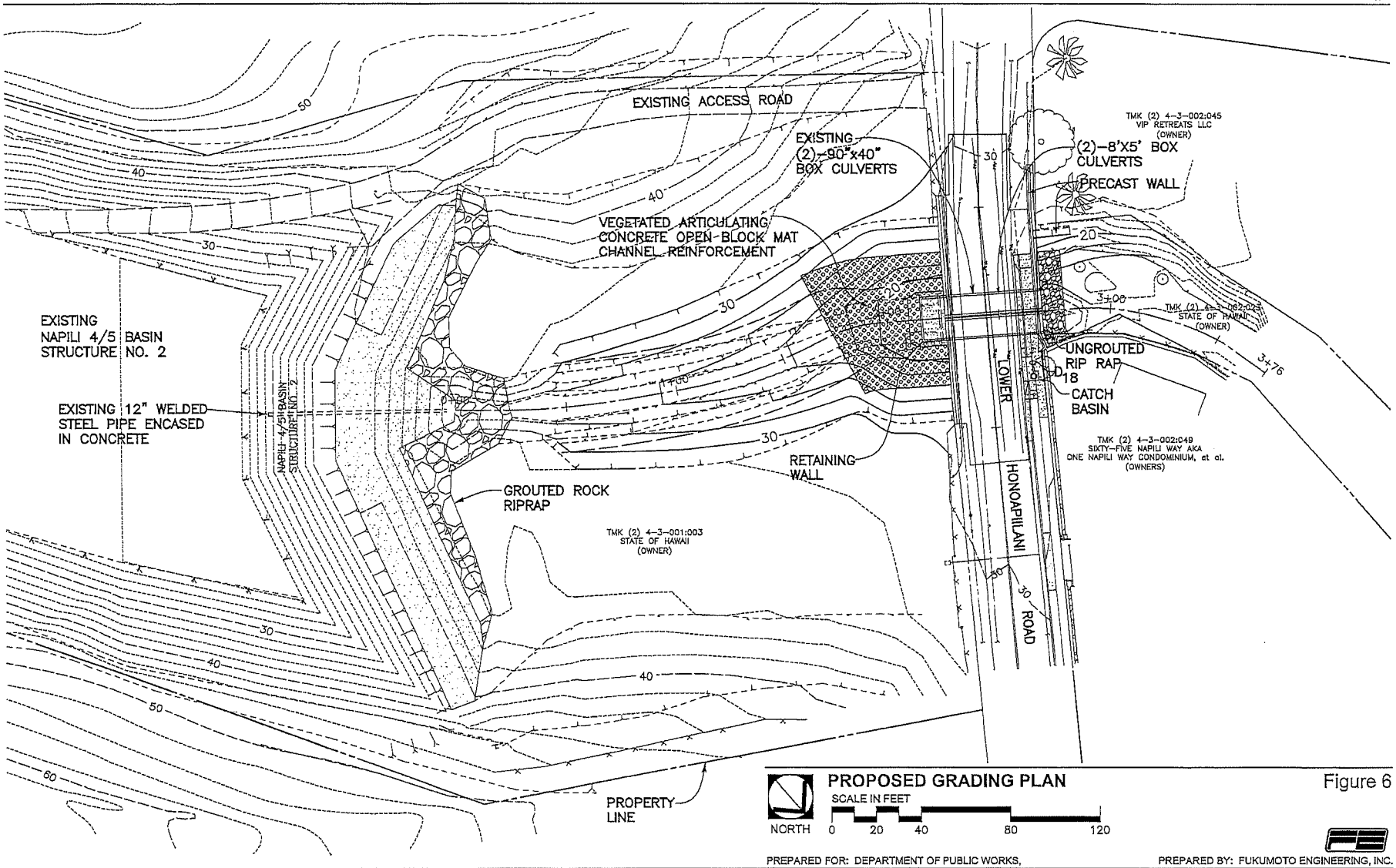
SCALE IN FEET

Figure 5

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

DRAINAGE REPORT FOR NAPILI 4/5 CULVERT REPLACEMENT



PROPOSED GRADING PLAN Figure 6

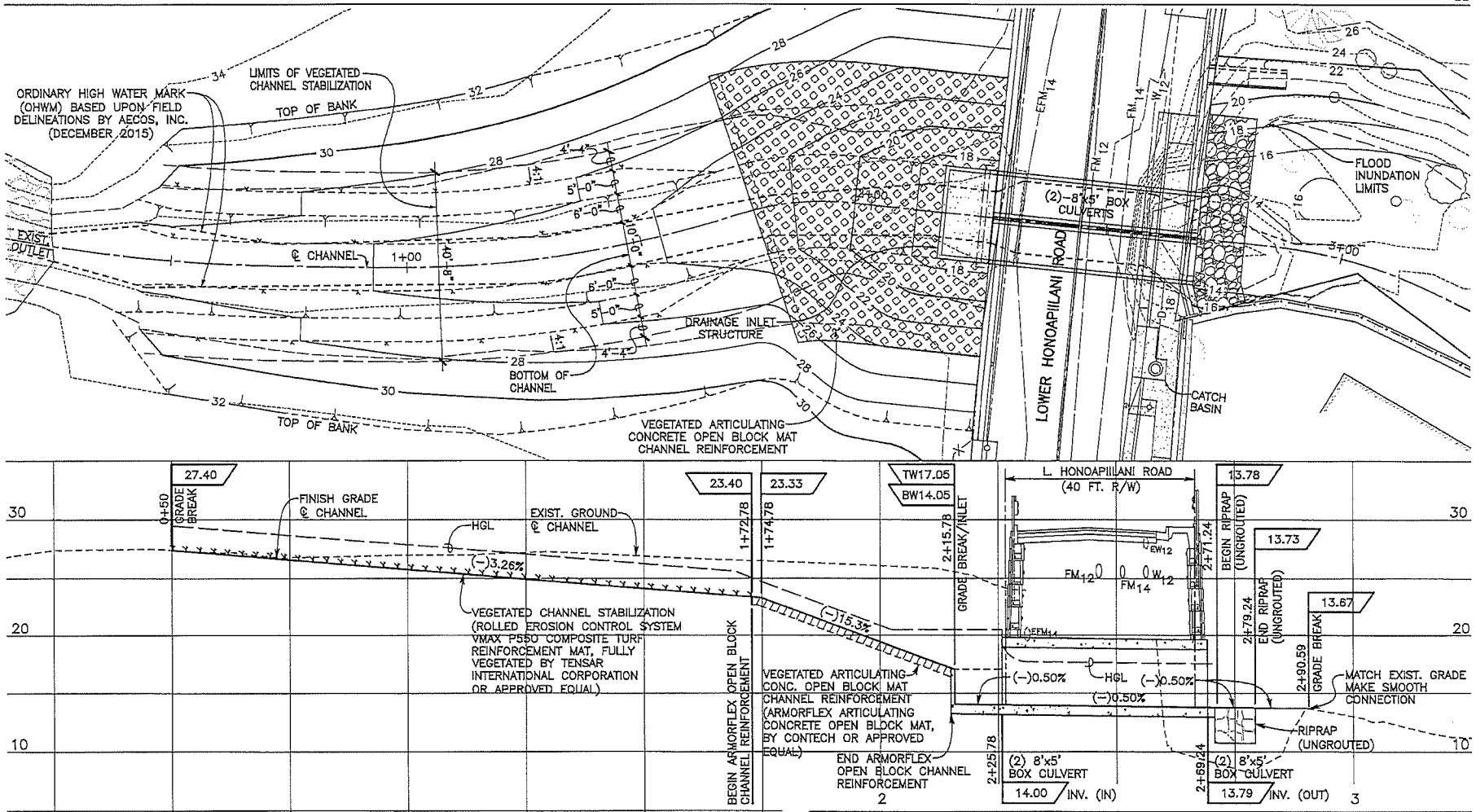
SCALE IN FEET

NORTH 0 20 40 80 120

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

DRAINAGE REPORT FOR NAPILI 4/5 CULVERT REPLACEMENT

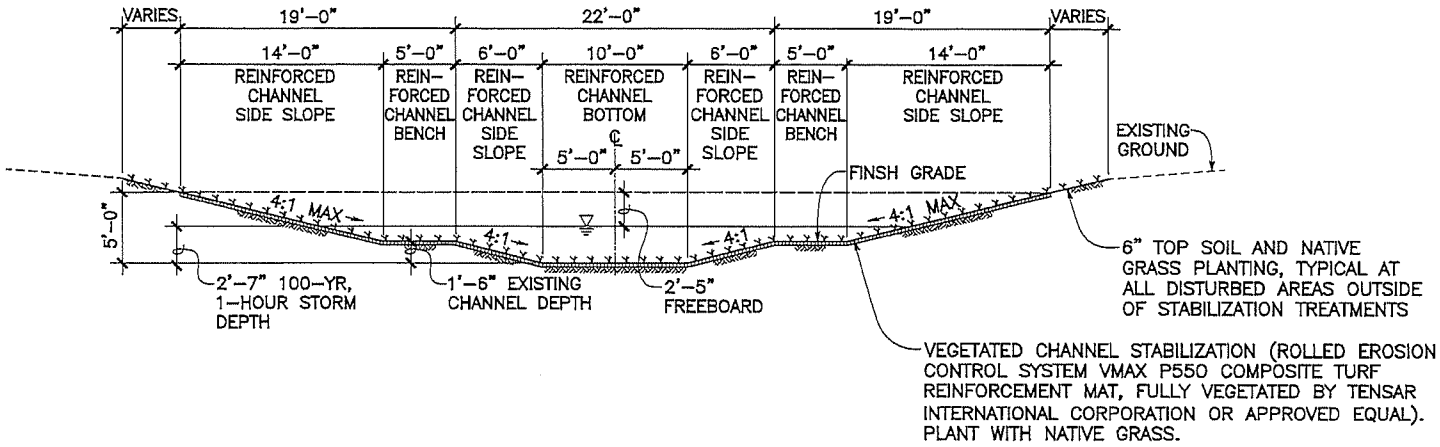


DRAINAGEWAY HYDRAULIC GRADIENT Figure 7

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

DRAINAGE REPORT FOR NAPILI 4/5 CULVERT REPLACEMENT



TYPICAL CHANNEL SECTION

SCALE: 1/8" = 1'–0"

TYPICAL CHANNEL SECTION Figure 8

SCALE IN FEET

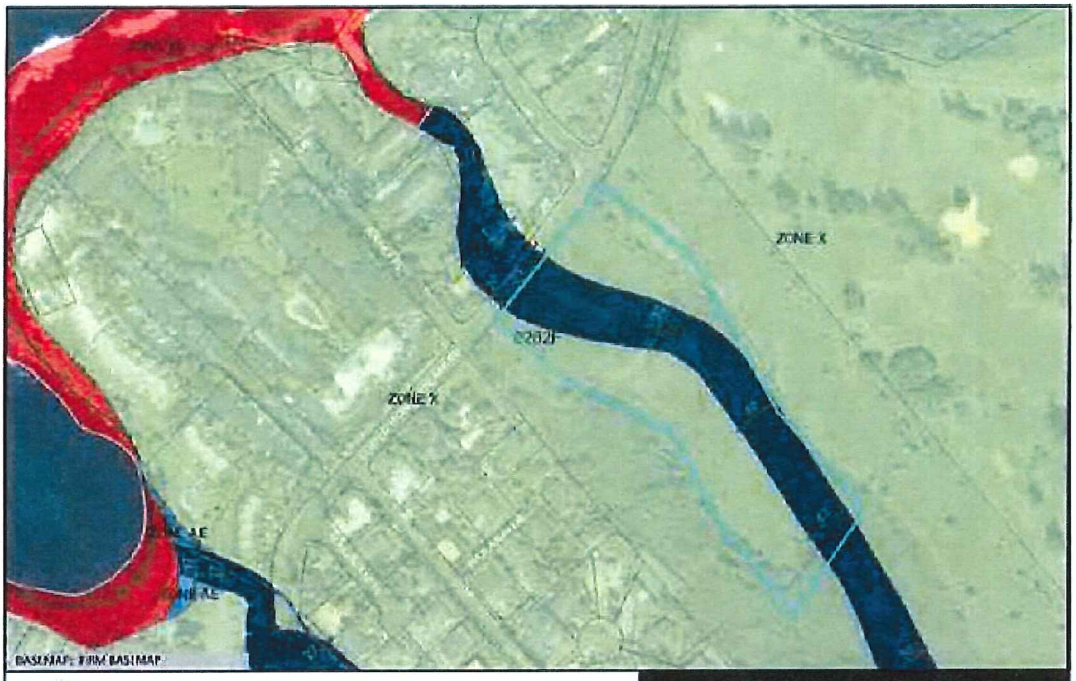
0 4 8 16 24

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

DRAINAGE REPORT FOR NAPILI 4/5 CULVERT REPLACEMENT

FLOOD HAZARD ASSESSMENT REPORT



Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY: MAUI

TMK NO: (2) 4-3-001:003

WATERSHED: KAHALA

PARCEL ADDRESS: LOWER HONOAPIILANI RD
LAHAINA, HI 96761

Notes:

Flood Hazard Information

FIRM INDEX DATE:	SEPTEMBER 19, 2012
LETTER OF MAP CHANGE(S)	NONE
FEMA FIRM PANEL:	15009C0326F
PANEL EFFECTIVE DATE:	SEPTEMBER 19, 2012

THIS PROPERTY IS WITHIN A TSUNAMI EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: YES (MA-0127)
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 200 400 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any claim or loss due to use of its data or information.

If any map has been identified as PRELIMINARY, please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determination to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: Legend does not correspond with a Map)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHA include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies to these zones.

- Zone A: No BFE determined.
- Zone AE: BFE determined.
- Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
- Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
- Zone AE: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- Zone X (shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply. But coverage is available in participating communities.

DRAINAGE INFORMATION

A. AREA
A=553.4 acres

B. RUNOFF COEFFICIENT
Calibrated based on historical observation of 2-year storm exceeding road culvert capacity.
C=0.44

C. RECURRENCE INTERVAL & RAINFALL
Recurrence interval T_m = 100 year
1-hour rainfall I_{100} = 3.5 inches

D. TIME OF CONCENTRATION
T_C = L/3600V
Channel Flow
Total Hydraulic Length = 18,530 ft
Average Slope =9.4%
Average Velocity = 4.0 ft/s
T_C= 18530 ft/(3600 s/hr x 4.0 ft/s) =1.38 hrs
= 1.38 hours x 60 min/1hour = 77 minutes

E. HYDRAFLOW REPORTS
The reports at the end of this section are for the 100-year storm event using the Rational Method that show Q_{100} = 743 cfs.

F. LOWER HONOAPIILANI ROAD CULVERT PEAK FLOW SIZING
Try culvert size: (2) – 8-foot x 5-foot Box Culverts, depth 3.75 feet
$Q = AV$, $V = 1.486\ R^{2/3}\ S^{1/2} / n$, and $R = A/P$

Where
Q = Flow rate in cfs
V = Velocity in feet per second
A = area of flow in square feet
n = Manning's roughness coefficient = 0.013
R = Hydraulic radius in feet
S = Slope in feet per feet = 0.005
P_w = Wetted perimeter

A = 2 x (8 x 3.75 - 1 [for haunches]) = 58.0 square feet
P_w = 2 x (2.75 x 2 + 6 + 1.4 x 2) = 28.6 feet
R = 58.0/28.6 = 2.03 feet
$V = 1.486\ R^{2/3}\ S^{1/2} / n = 1.486 \times 2.03^{2/3} \times 0.005^{1/2}/0.013$ = 12.96 ft/s
Q = 58.0 x 12.96 = 752 cfs

G. UPSTREAM CHANNEL SIZING

Try channel size: 20-foot bottom, 4:1-sloped sides, depth 2.08 feet

$Q = AV$, $V = 1.486\ R^{2/3}\ S^{1/2} / n$, and $R = A/P$

Where
- Q = Flow rate in cfs
- V = Velocity in feet per second
- A = area of flow in square feet
- n = Manning's roughness coef. = 0.029 (from stabilizer manufacturer)
- R = Hydraulic radius in feet
- S = Slope in feet per feet = 0.0326
- P_w = Wetted perimeter

$A = 1.50 \times (10 + 6) + 1.08 \times (1.08/0.25 + 32) = 63.22$ square feet

$P_w = 10 + 2 \times (6^2 + 1.5^2)^{1/2} + 2 \times 5 + 2 \times ((1.08/0.25)^2 + 1.08^2)^{1/2} = 41.28$

$R = 63.22/41.28 = 1.53$ feet

$V = 1.486\ R^{2/3}\ S^{1/2} / n = 1.486 \times 1.53^{2/3} \times 0.0326^{1/2}/0.029 = 12.28$ ft/s

$Q = 12.28 \times 63.22 = 776.7$ cfs

H. LOWER HONOAPIILANI ROAD DRAINAGE IMPROVEMENTS SIZING

1. Catch Basin Capacities

10-foot standard depressed gutter inlets (per Honolulu Storm Drainage Standards)

(1) Gutter Grade = 0.4%, Q = 6 cfs
(2) Gutter Grade = 4.0%, Q = 4 cfs
(3) Sump, Q = 10 cfs

Compute developed runoff based on a weighted C factor and a T_c of 5 minutes.

$Q = CiA$

Where
- Q = Flow rate in cfs
- C = Runoff coefficient
- i = Weighted rainfall intensity
- A = area of flow in square feet

$C = 0.85$ (drive and walks)

$T_c = 5$ minutes

$i = 3.5 \times 2.5575 = 6.91$ inches/hour

$A = 7{,}200$ square feet $= 0.17$ acres

$Q = 0.85 \times 8.95 \times 0.17 = 1.3$ cfs

2. Pipe Sizing

Using Plate 8, Pipe Flow Chart 18 inch diameter, from the City and County of Honolulu Rules Relating to Storm Drainage Standards, the normal depth of flow is 0.2 feet. Therefore, okay to use County of Maui minimum diameter of 18 inches for drainage lateral less than 50 feet in length.

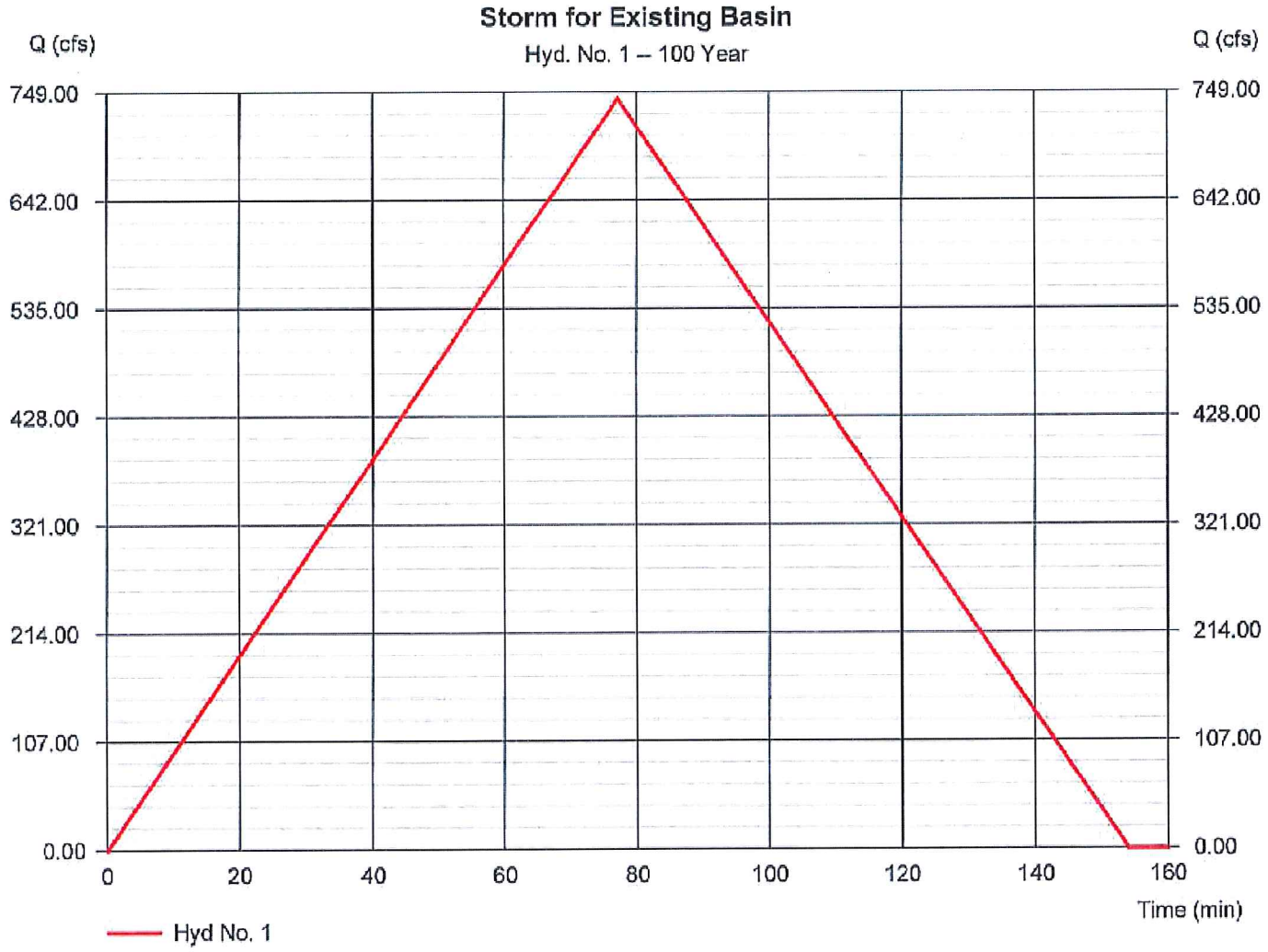
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Wednesday, 10 / 21 / 2015

Hyd. No. 1

Storm for Existing Basin

Hydrograph type	= Mod. Rational	Peak discharge	= 743.28 cfs
Storm frequency	= 100 yrs	Time to peak	= 77 min
Time interval	= 1 min	Hyd. volume	= 3,433,971 cuft
Drainage area	= 553.400 ac	Runoff coeff.	= 0.44
Intensity	= 3.053 in/hr	Tc by User	= 77.00 min
IDF Curve	= NBBF01.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a



Hydrograph Report

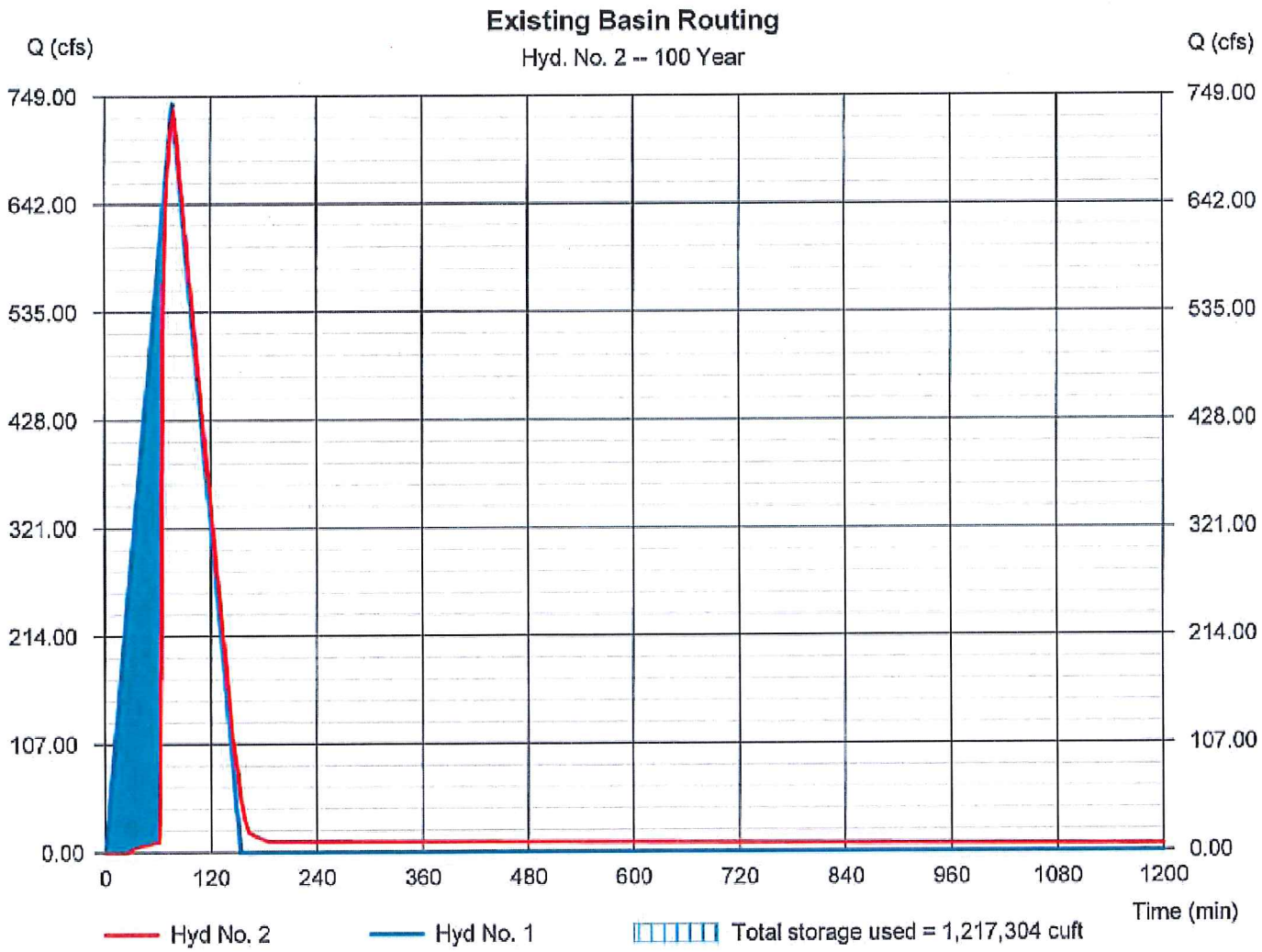
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Wednesday, 10 / 21 / 2015

Hyd. No. 2

Existing Basin Routing

Hydrograph type	= Reservoir	Peak discharge	= 734.38 cfs
Storm frequency	= 100 yrs	Time to peak	= 78 min
Time interval	= 1 min	Hyd. volume	= 3,236,717 cuft
Inflow hyd. No.	= 1 - Storm for Existing Basin	Max. Elevation	= 41.71 ft
Reservoir name	= Existing Basin	Max. Storage	= 1,217,304 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Wednesday, 10 / 21 / 2015

Pond No. 1 - Existing Basin

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 22.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	22.00	8,179	0	0
2.00	24.00	19,321	26,711	26,711
4.00	26.00	31,312	50,148	76,859
6.00	28.00	43,966	74,913	151,773
7.00	29.00	57,143	50,406	202,178
8.00	30.00	56,752	56,942	259,120
10.00	32.00	66,033	122,656	381,776
12.00	34.00	77,877	143,733	525,509
14.00	36.00	83,802	161,627	687,135
16.00	38.00	89,948	173,696	860,832
18.00	40.00	96,333	186,226	1,047,057
20.00	42.00	103,406	199,678	1,246,735
22.00	44.00	109,240	212,598	1,459,333

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 28.02	0.00	0.00	0.00
Length (ft)	= 82.00	0.00	82.00	0.00
Slope (%)	= 0.02	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

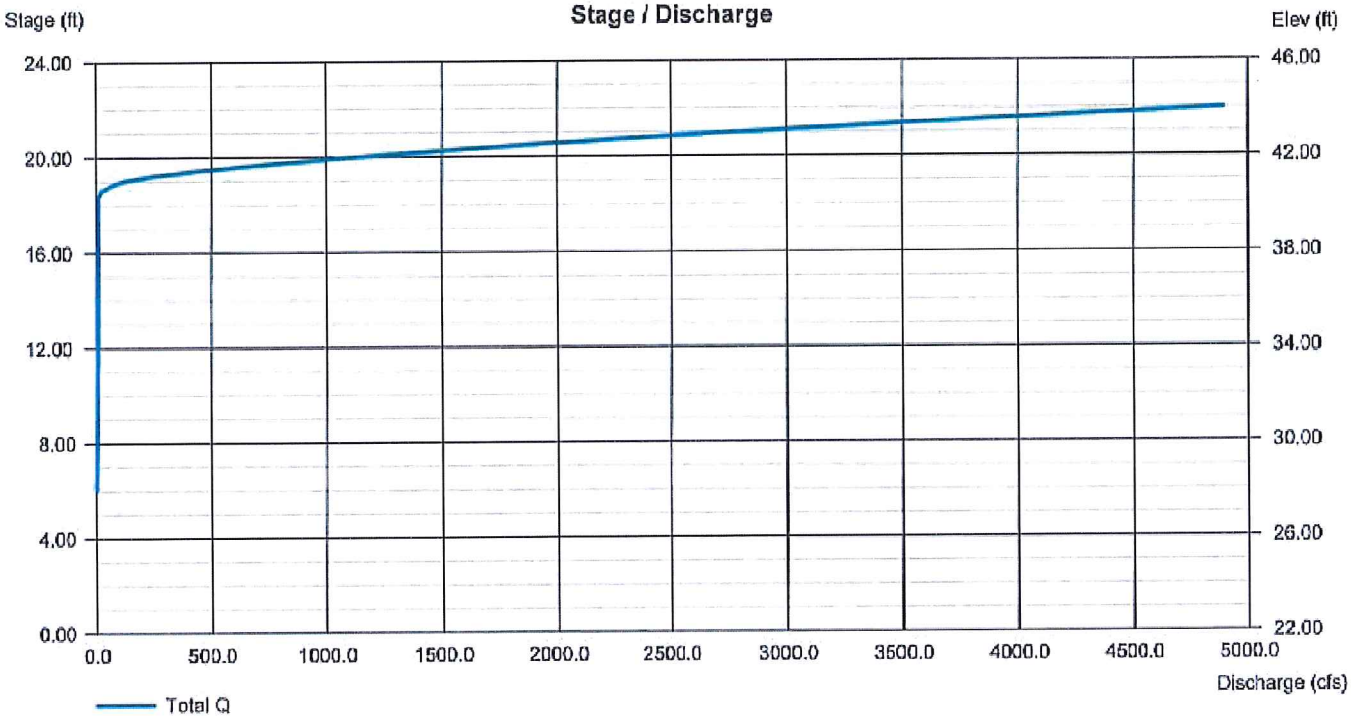
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 85.00	175.00	0.00	0.00
Crest El. (ft)	= 40.50	41.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydraflow Table of Contents

COM60 Basin Analysis 100 year.gpw

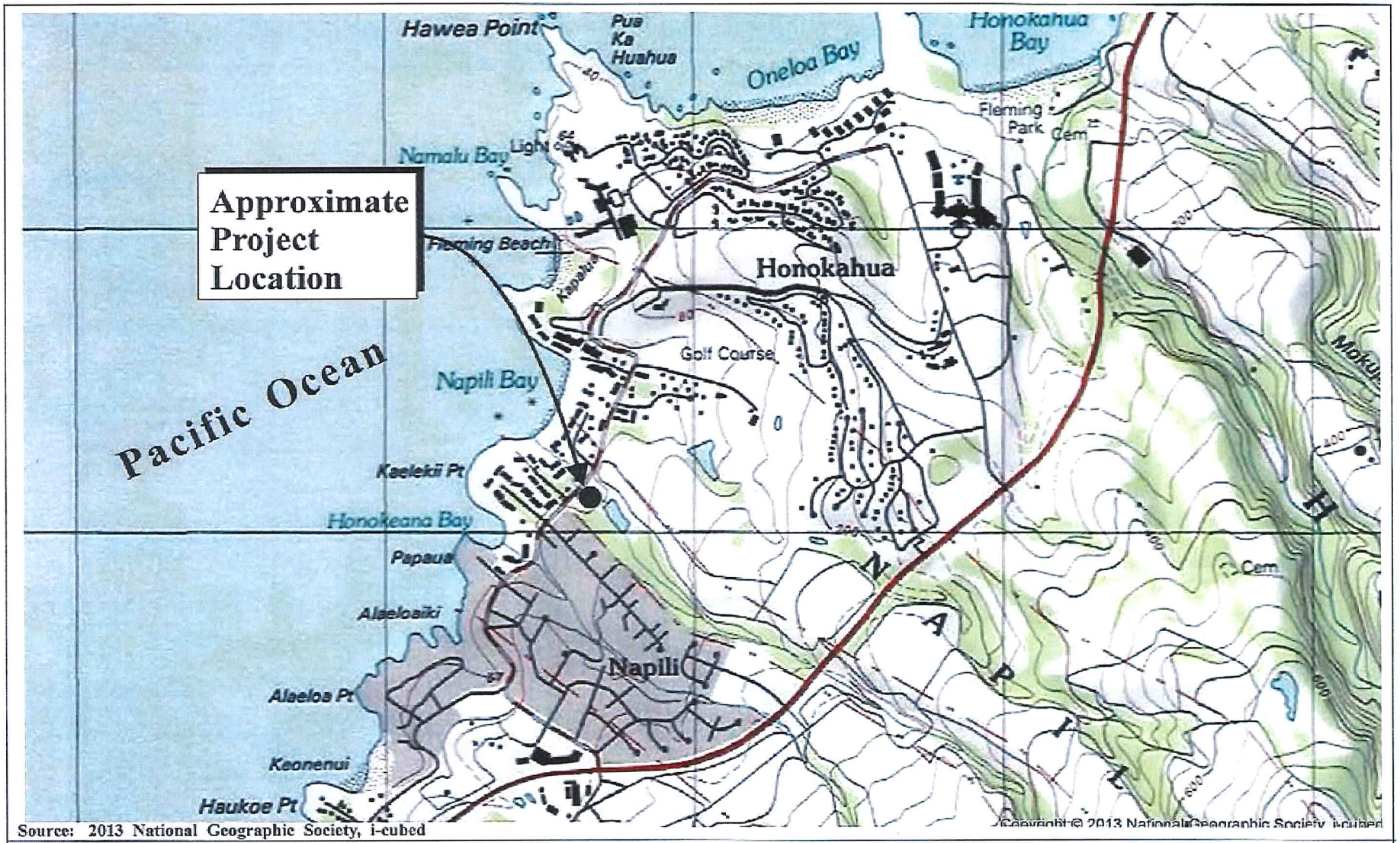
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Wednesday, 10 / 21 / 2015

100 - Year

EXHIBIT "G"

USGS Topographic Map



Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui (POH-2016-00269)

Topographic Map

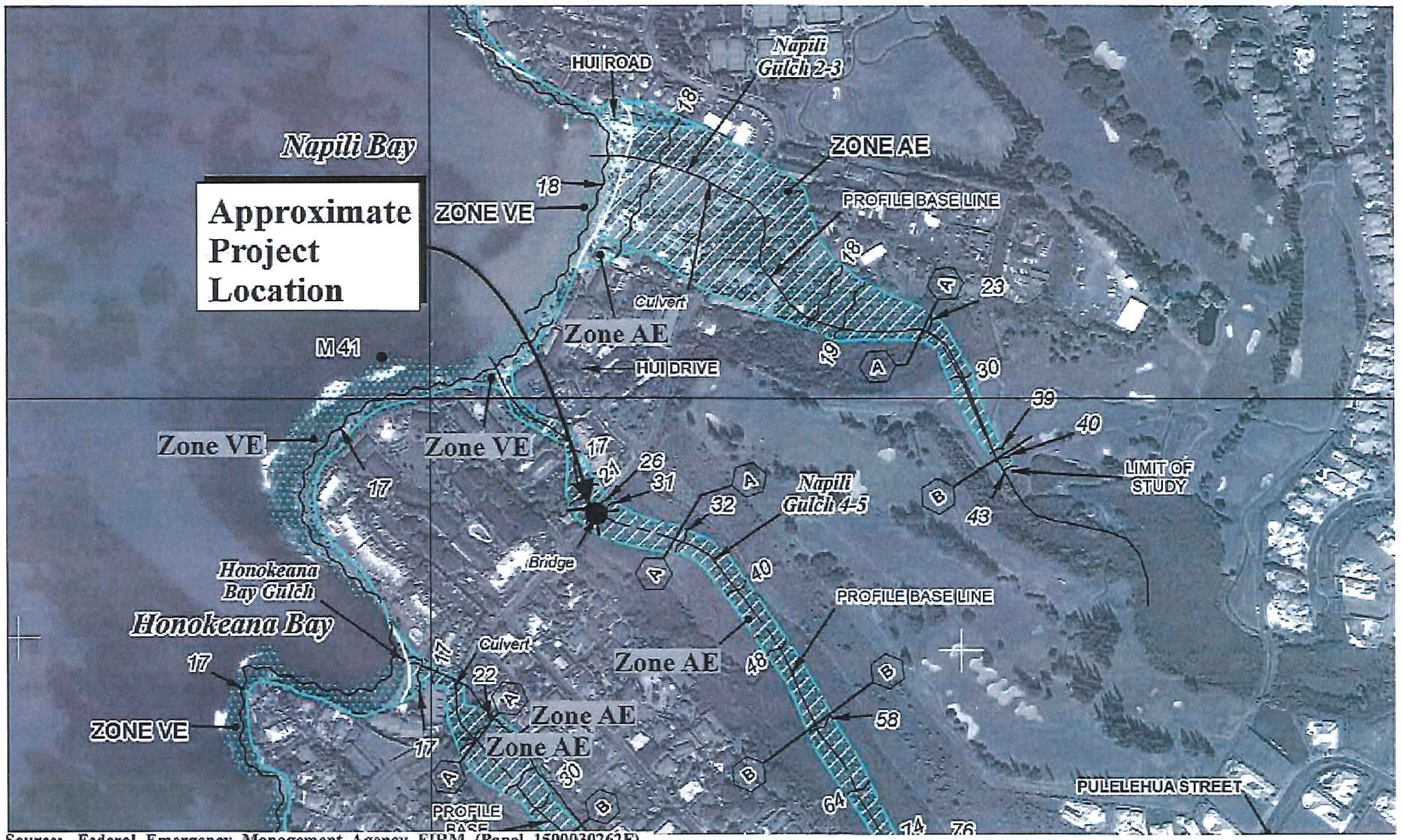
0 750 Feet
375 1500

MUNEKIYO HIRAGA

FE\DPW Napili Culvert\Applications\Figures\Topographic Map.Army Ltr

EXHIBIT "H"

FEMA Firm Map



Source: Federal Emergency Management Agency FIRM (Panel 1500030262F)

Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui (POH-2016-00269)

Flood Insurance Rate Map

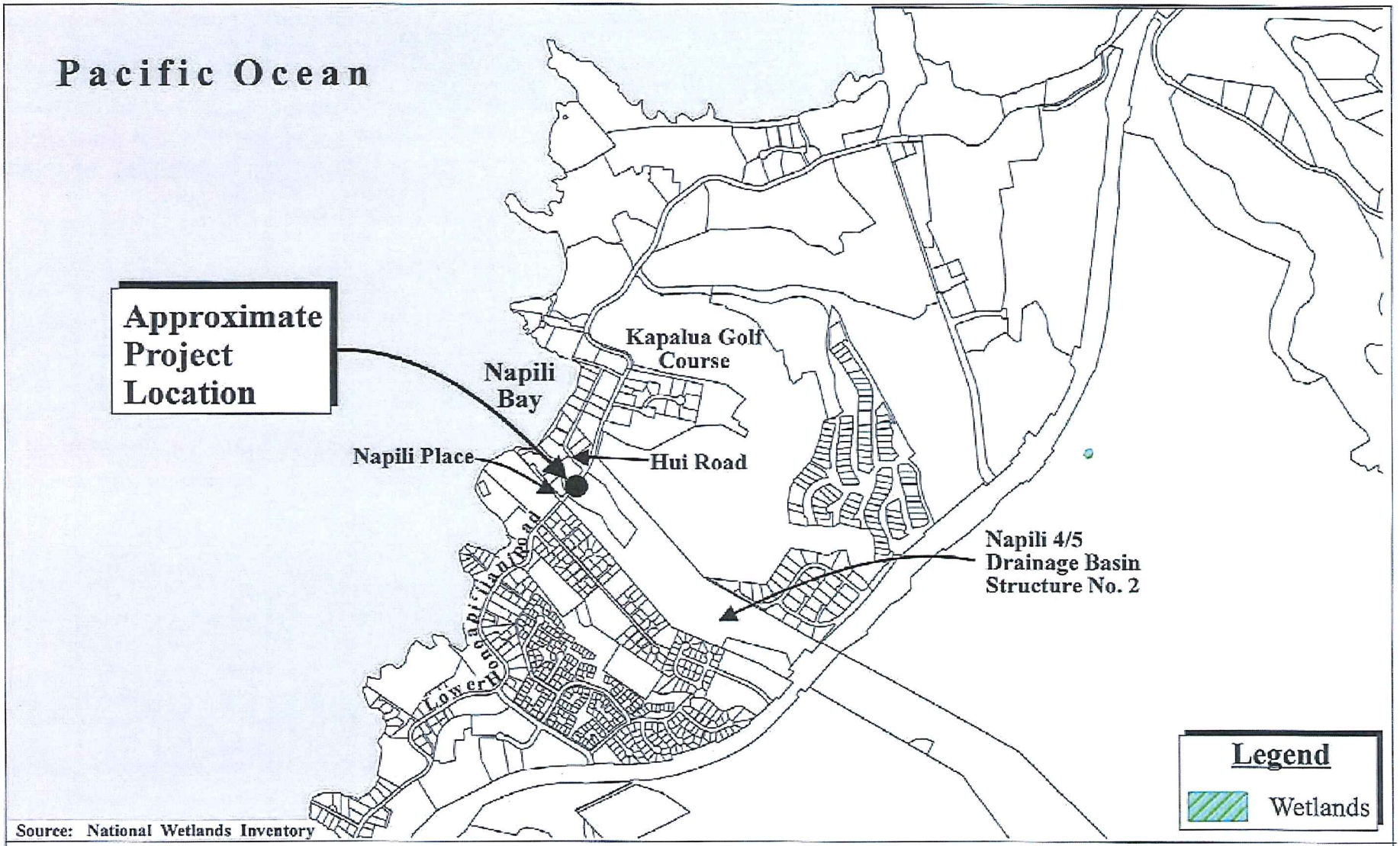
NOT TO SCALE

MUNEKIYO HIRAGA

FE\DPW Napili Culvert\Applications\Figures\FIRM.Army 1.ai

EXHIBIT "I"

Wetland Inventory Map



Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui (POH-2016-00269)

Wetlands Map

0 375 750 1500 Feet

MUNEKIYO HIRAGA

FE\DPW Napili Culvert\Applications\Figures\Wetlands Map.Army Ltr

EXHIBIT "J"

Open-Cell Concrete Block Design

CONTECH®
ENGINEERED SOLUTIONS

ARMORTEC

Fort Shafter Flats Flood Mitigation
Honolulu, HI

www.ContechES.com

ArmorFlex: Articulating Concrete Block Mats

The industry leader since 1978, ArmorFlex® articulating concrete block (ACB) mats make a flexible matrix of concrete blocks with uniform size, shape and weight used for hard armor erosion control. ArmorFlex blocks have specific hydraulic capacities and are laced longitudinally with galvanized steel, stainless steel or polyester revetment cables which provide ease of handling and installation.

Open-Cell Block

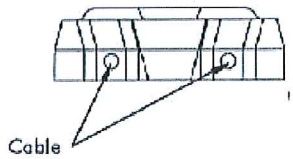
Closed-Cell Block

Applications

- Channel Lining
- Shoreline Protection
- Boat Ramps & Access Roads
- Dam Overtopping Protection
- Pipeline & Cable Protection
- Bridge Abutment Protection
- Retention Basins
- Levee Stabilization
- Bridge Scour Protection

Side View

End View



ArmorFlex has proven to be an aesthetic and functional alternative to dumped stone riprap, gabions, structural concrete and other hard armor erosion protection systems. ArmorFlex is easy to install and has a low life-cycle cost when compared to other permanent solutions. These two benefits can drastically reduce the cost to install and maintain the system. ArmorFlex mats are installed on a prepared subgrade utilizing conventional construction equipment and site-specific filter fabric. While both block types provide protection and stability, only the open-cell specifically offers the void space necessary for revegetation.

Research Proven Performance

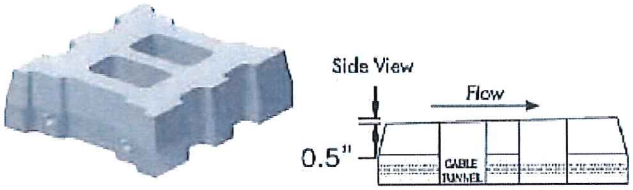
Armortec has carried out extensive research into wave and open channel flow conditions on ArmorFlex in the United States and the Netherlands. Design manuals and computer programs are available to assist in the proper ArmorFlex block selection for your hydraulic conditions.

ArmorFlex: Articulating Concrete Block Mats

Tapered Series

Armortec's unique Tapered Series ArmorFlex block design offers superior protection for embankment dams, spillways, high velocity channels and down chutes. The essential design component of ArmorFlex Tapered series is the 0.5 inch taper that virtually eliminates destabilizing impact flow forces, thereby providing a high factor of safety. The ArmorFlex Tapered block system has been successfully tested under hydraulic jump conditions at Colorado State University. Each Tapered series design incorporates a four inch rock drainage layer beneath the system.

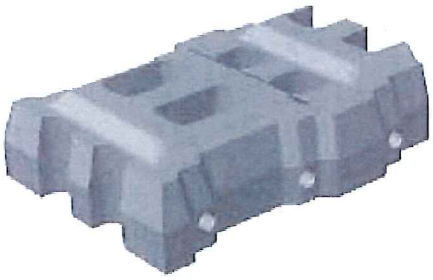
Tapered-Cell Block



Block and A Half

The latest innovation in ACB technology is the ArmorFlex Block and a Half®. This new product introduction increases the factor of safety for the overall system while maintaining the ease of installation and overall benefits of the typical ArmorFlex systems.

Block and A Half Block

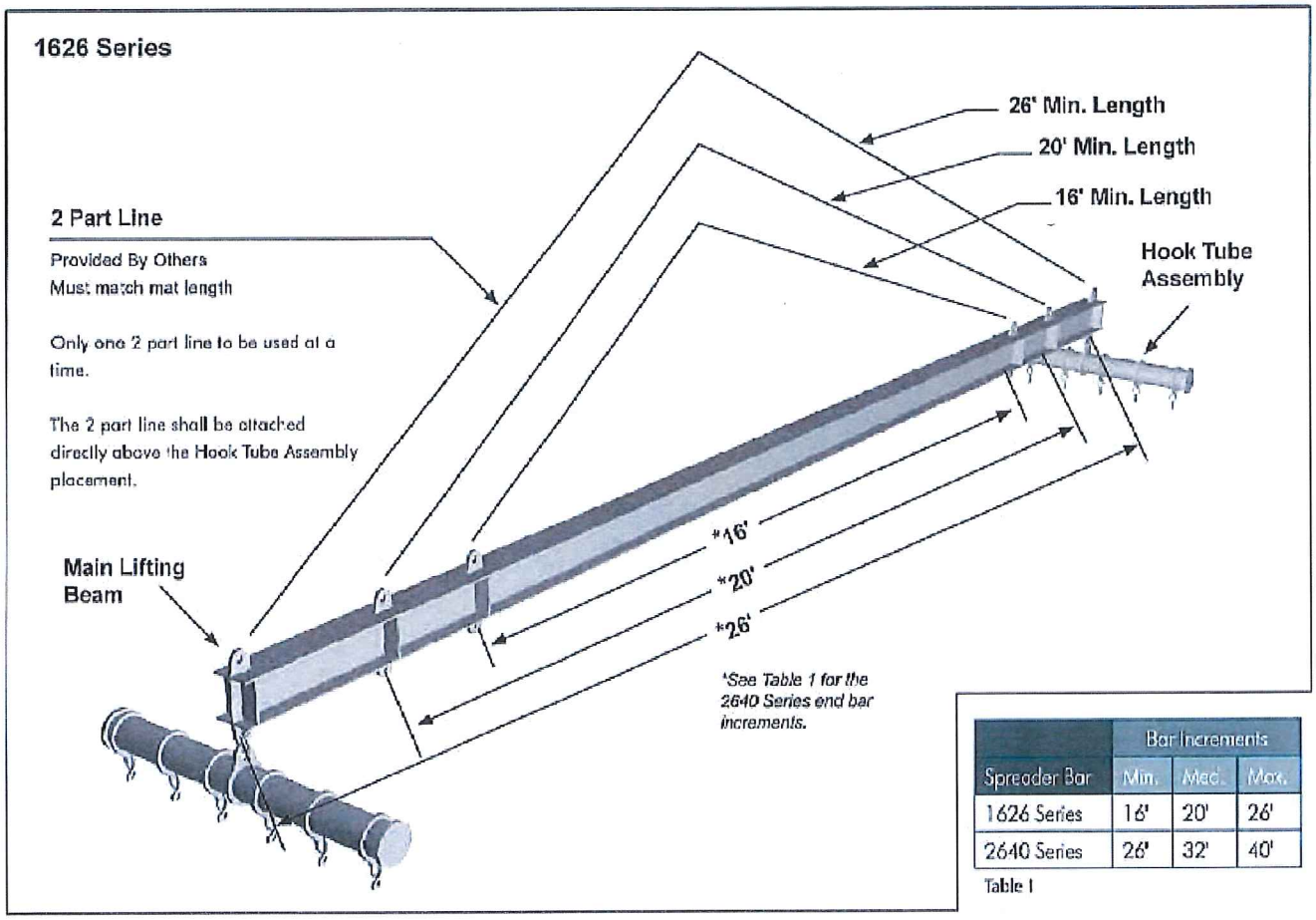


ArmorFlex Design Software and Guidelines are available through the CONTECH website at www.contech-cpi.com

ArmorFlex: Installation

The proper installation of ArmorFlex ACB mats is important to achieving the intended hydraulic performance and maintaining stability against the erosive forces of flowing water. An ACB revetment system consists of a suitably prepared and compacted subgrade, a suitable site-specific filter fabric and properly sized ACB mattresses placed in "intimate contact" with the filter fabric and subgrade. Each individual site will vary, so it is important to follow the engineering project drawings as designed and sealed by a registered Professional Engineer; particularly as they relate to standard termination details. Please refer to the Armortec Installation Guide for further instructions on proper material handling.

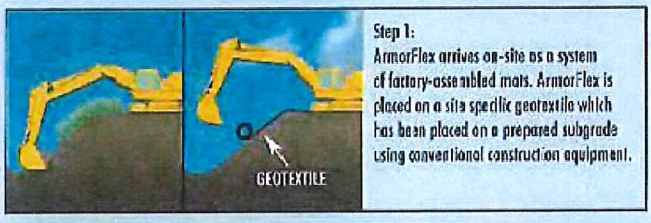
Spreader Bar Rigging Detail



Spreader Bar	Bar Increments		
	Min.	Mod.	Max.
1626 Series	16'	20'	26'
2640 Series	26'	32'	40'

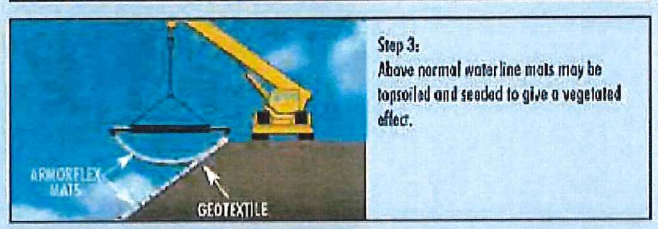
Table 1

ArmorFlex: Installation

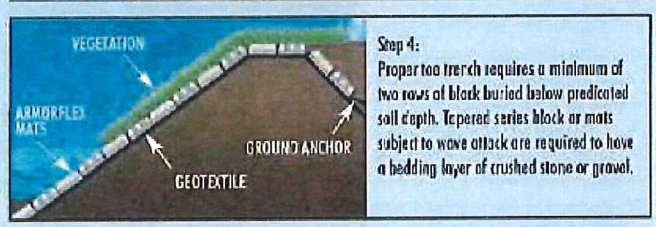


Step 1:
ArmorFlex arrives on-site as a system of factory-assembled mats. ArmorFlex is placed on a site specific geotextile which has been placed on a prepared subgrade using conventional construction equipment.

Step 2:
Mats are supplied on flat bed trailers. Mats can be handled with a spreader bar which can be rented from CONTECH.



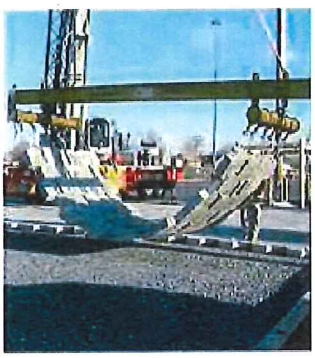
Step 3:
Above normal waterline mats may be topsoiled and seeded to give a vegetated effect.



Step 4:
Proper toe trench requires a minimum of two rows of block buried below predicated soil depth. Tapered series block or mats subject to wave attack are required to have a bedding layer of crushed stone or gravel.

See Armortec Installation Guide for complete information on how to properly install ArmorFlex.

ArmorRoad



ArmorRoad® was developed in the field with input from contractors, construction managers and owners. The result is a flexible product that is efficient to install, aesthetically pleasing and able to withstand heavy traffic loads in harsh environments. ArmorRoad does not require the sand backfill typically required of standard pavers due to its unmatched durability with 8,000 PSI and 6" thickness. In addition, should a problem occur in the subgrade, ArmorRoad can be removed quickly and reinstalled.

Applications

- Durable Driving Surface
- Temporary Road Application
- Heaving and Expanding Subgrade Condition

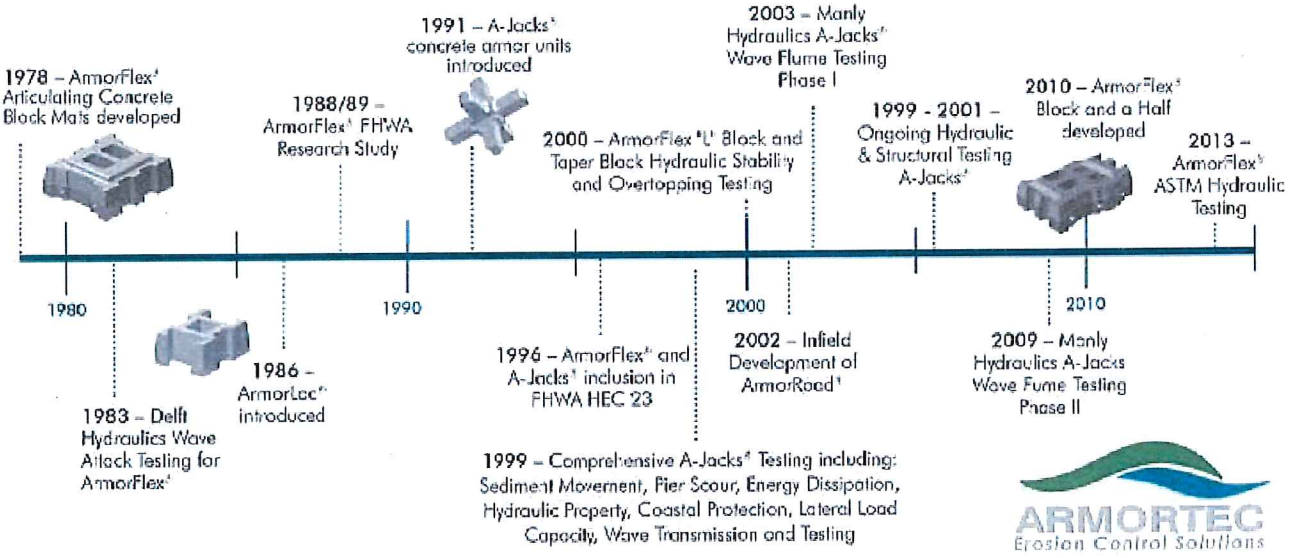
ArmorRoad Block

ArmorFlex Design Software and Guidelines are available through the CONTECH website at www.contech-cpi.com

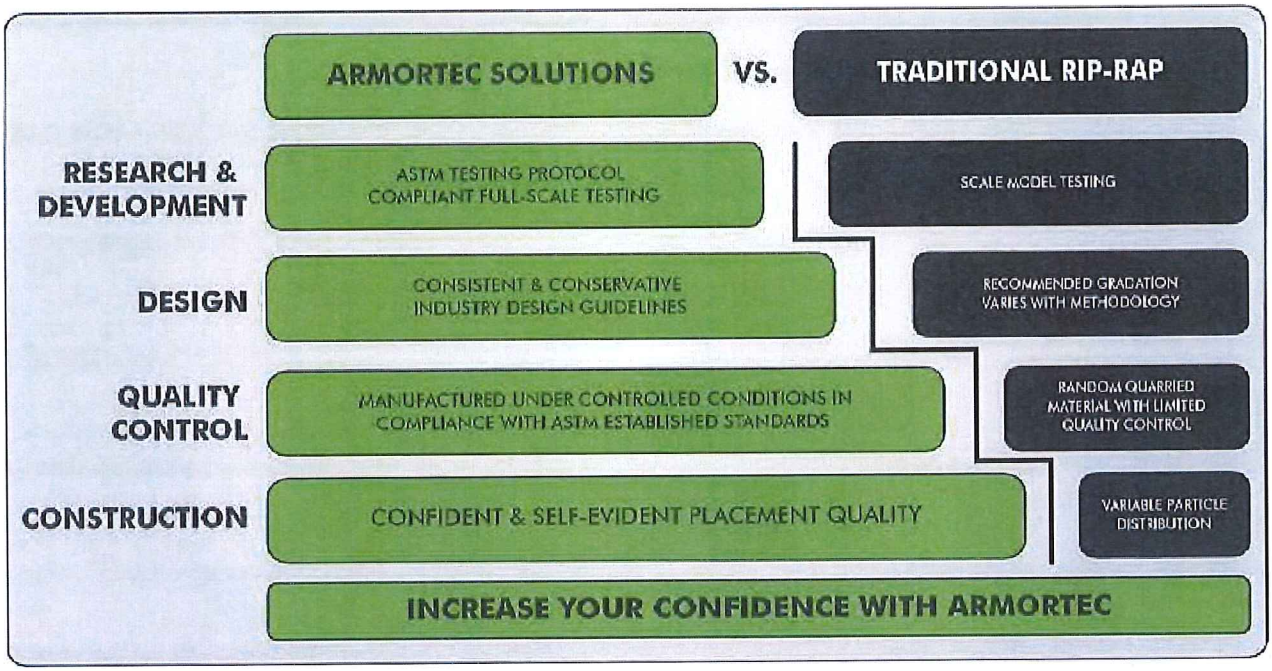
ARMORTEC HARD ARMOR SOLUTIONS.

A LEGACY OF SUCCESS

Doing the seemingly impossible is an everyday job. With erosion control systems for any need in any application, Contech Engineered Solutions delivers a range of effective, efficient solutions. Our engineered systems provide performance-tested solutions for a wide variety of applications including channel lining, shoreline protection, dam crests and spillways, energy dissipation, pipeline and cable protection, bridge and abutment protection, boat ramps, low water crossings, outfall protection, wave attack protection and more.



BUILDING CONFIDENCE EVERY STEP OF THE WAY



PROCESS – DESIGN, PREFABRICATION, INSTALL.

	ARMORFLEX®	HAND-PLACED	A-JACKS®
PRODUCTION			
TRANSPORTATION			
SITE PREPARATION			
INSTALLATION			
COMPLETION			

ARMORFLEX® ARTICULATING CONCRETE BLOCKS

OPEN CELL BLOCK DESIGN ALLOWS FOR REVEGETATION

CLOSED CELL BLOCK DESIGN ALLOWS FOR HEAVY LOADING

BOTH BLOCKS READILY ADAPT TO COMPLEX SITE GEOMETRIES

BLOCK OPTIONS

Open-Cell Block

Closed-Cell Block

Tapered-Cell Block

Block and a Half®

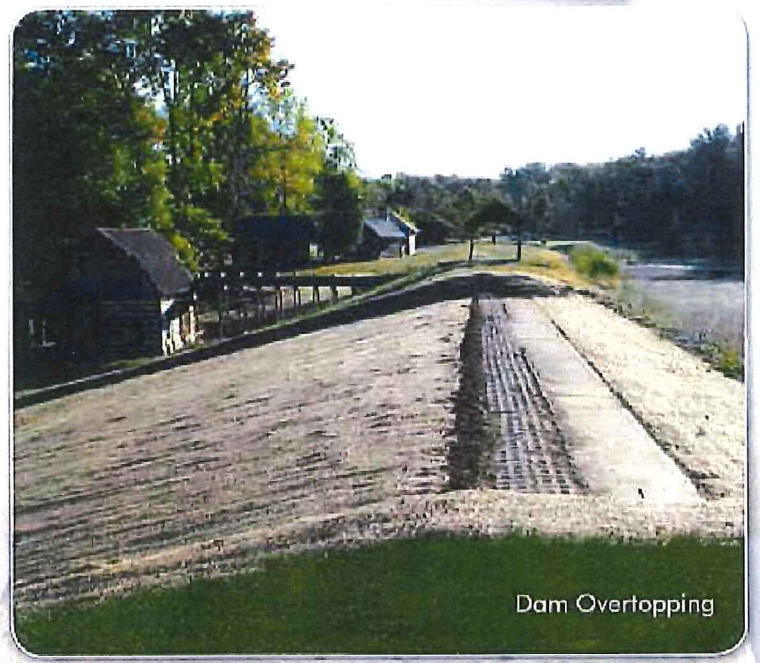
ARMORFLEX UNIT SPECIFICATION

Block Class	Open/Closed Cell	Nominal Thickness	Gross Area (sf)	Block Weight (lbs)	Open Area %
30-S	Open	4.75	0.98	33-35	20
50-S	Open	6.00	0.98	42-45	20
40	Open	4.75	1.77	59-64	20
50	Open	6.00	1.77	76-82	20
70	Open	8.50	1.77	108-117	20
40-L	Open	4.75	2.58	97-105	20
70-L	Open	8.50	2.58	174-188	20
45-S	Closed	4.75	0.98	39-42	10
55-S	Closed	6.00	0.98	50-54	10
45	Closed	4.75	1.77	71-77	10
55	Closed	6.00	1.77	91-98	10
85	Closed	8.50	1.77	136-146	10
45-L	Closed	4.75	2.58	109-118	10
85-L	Closed	8.50	2.58	207-223	10
High Velocity Application Block Classes					
40-T	Open	4.75	1.77	58-63	20
50-T	Open	6.00	1.77	75-81	20
70-T	Open	8.50	1.77	116-124	20

ARMORFLEX® ARTICULATING CONCRETE BLOCKS

APPLICATIONS

- Channel Lining
- Shoreline Protection
- Scour Protection
- Slope Protection
- Outfall Protection
- Pipeline & Cable Protection
- Weirs
- Spillways
- Dam Overtopping
- Emergency Overflows
- Grade Transitions
- Intercoastal Waterways
- Bays
- Lakes
- Reservoirs
- Low Water Crossings
- Boat Ramps
- Down Chutes



Dam Overtopping

SCOUR PROTECTION

SHORELINE PROTECTION

VEGETATED SLOPE

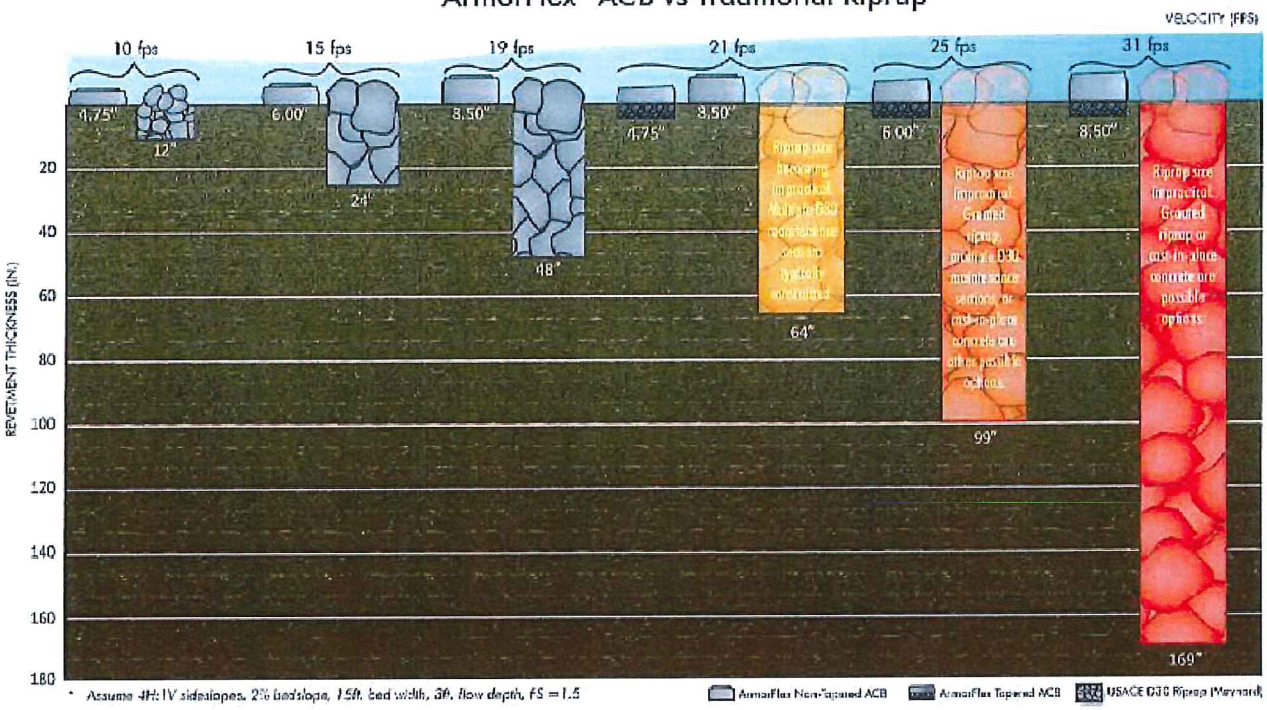
CHANNEL LINING

SUBMERGED ARMORING

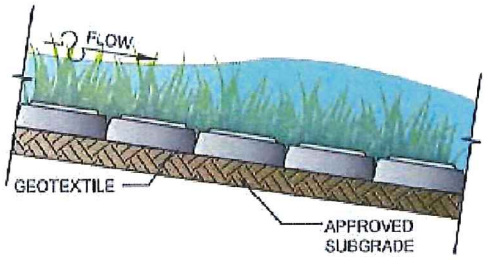
MATTED SOLUTIONS

ARMORFLEX® DESIGN CONSIDERATIONS

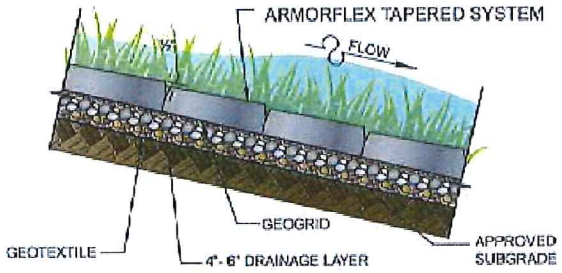
SIZING



TYPICAL CROSS SECTIONS (not to scale)



Standard Cross Section



Tapered Series - Cross Section

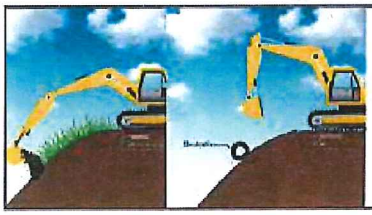
REFERENCES AND STANDARDS

- National Concrete Masonry Association (2010), "Design Manual for Articulating Block (ACB) Revetment Systems", NCMA Publication TR 220A
- ASTM D 7276 – Standard Guide for Analysis and Interpretation of Test Data for ACB Revetment Systems in Open Channel Flow
- ASTM D 7277 – Standard Test Method for Performance Testing for ACB Revetment Systems for Hydraulic Stability in Open Channel
- ASTM D 6684 – Standard Specification for Materials and Manufacture of Articulating Concrete Block (ACB) Revetment Systems
- ASTM D 6884 – Standard Practice for Installation of Articulating Concrete Block (ACB) Revetment Systems
- FHWA Hydraulic Engineering Circular NO. 23: Bridge Scour and Stream Instability Countermeasures: Experience, Selection and Design Guidance – Third Edition, Volume II, Design Guideline 8.
- USDOT Federal Highway Administration Hydraulic Engineering Circular NO. 15, Third Edition (2005) "Design of Roadside Channels with Flexible Linings" National Highway Institute.
- Julien, Pierre Y. (2010) "Erosion and Sedimentation", 2nd Edition, Cambridge University Press

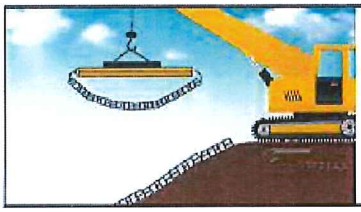
ARMORFLEX® INSTALLATION

THE ARMORTEC® HARD ARMOR ADVANTAGE

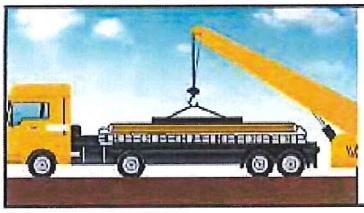
PROCESS



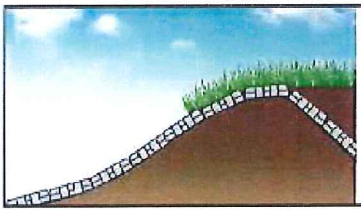
Step 1:
ArmorFlex arrives on-site as a system of factory-assembled mats. ArmorFlex is placed on a site specific geotextile which has been placed on a prepared subgrade using conventional construction equipment.



Step 3:
ArmorFlex Mats are placed according to the site plans with appropriately sized equipment. Above normal waterline mats may be topsoiled and seeded to give a vegetated effect.



Step 2:
Mats are supplied on flat bed trailers. Mats can be handled with a spreader bar which can be rented from Contech.



Step 4:
Proper toe trench requires a minimum of two rows of block buried below predicated soil depth. Tapered series block or mats subject to wave attack are required to have a bedding layer of crushed stone or gravel.

* See ArmorFlex Installation Guide for additional information.

ARMORROAD® CONCRETE UNITS

APPLICATIONS

- Industrial Yards
- Durable Driving Surface
- Temporary Road
- Lay Down Yard
- Heaving and Expanding Subgrades

ARMORROAD UNIT SPECIFICATION							
Block	Type	L	W	H	SF Coverage per Unit	Weight (lbs per Unit)	SF per Truck load
Mat	Closed	18.00	15.60	6.00	1.74	105-109	750

JAN 2 1 2016

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

In Reply Refer To:
01EPIF00-2016-TA-0135

JAN 1 9 2016

Ms. Cheryl K. Okuma
Senior Associate
Munekiyo Hiraga, Inc.
305 High Street, suite 104
Wailuku, Hawaii 96793

Subject: Species List for Culvert Replacement on Lower Honoapiilani Road, Lahaina, Maui

Dear Ms. Okuma:

The U.S. Fish and Wildlife Service (Service) received your correspondence on December 17, 2015, requesting comments prior to drafting an environmental assessment for a proposed culvert replacement. The proposed project is on Lower Honoapiilani Road near the intersection with Napili Place in Lahaina, Maui (affected TMK: (2) 4-3-001:003, 4-3-002:023, 4-3-002:045) and includes replacing two 90-inch by 40-inch box culverts with two new 96-inch by 60-inch culverts, replacing existing guardrails and fence, extending the existing sidewalk, increasing the width of the road from 22 to 37 feet, and relocating the existing 14-inch sewer force main in the area.

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Project, there are four listed species and one proposed species in the vicinity of the project area: the endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*), Hawaiian hoary bat (*Lasiurus semotus*), and Blackburn's sphinx moth (*Manduca blackburni*), the threatened Newell's shearwater (*Puffinusauricularis newelli*), and a species proposed for listing as endangered, the band-rumped storm petrel (*Oceanodroma castro*). The Service recommends the following measures to avoid and minimize project impacts to these listed species:

Hawaiian Hoary Bat
The Hawaiian hoary bat roosts in both exotic and native woody vegetation and, while foraging, will leave young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for bat roosting are cleared during the breeding season, there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). Site clearing should be timed to avoid disturbance to Hawaiian hoary bats in the project area.

Blackburn's sphinx moth

The Blackburn's sphinx moth could potentially be in the vicinity of the proposed project area. Adult moths feed on nectar from native plants, including beach morning glory (*Ipomoea pes-caprae*), iliee (*Plumbago zeylanica*), and maiapilo (*Capparis sandwichiana*); larvae feed upon non-native tree tobacco (*Nicotiana glauca*) and native aiea (*Nothocestrum latifolium*). To pupate, the larvae burrow into the soil and can remain in a state of torpor for up to a year (or more) before emerging from the soil. Soil disturbance can result in death of the pupae. The Service recommends that a qualified biologist survey areas of proposed construction activities for Blackburn's sphinx moth and its host plants prior to work initiation. We recommend these surveys be conducted during the wettest portion of the year (usually November-April or several weeks after a significant rain) and immediately prior to construction. Surveys should include searches for eggs, larvae, and signs of larval feeding (chewed stems, frass, or leaf damage). Any host plants of Blackburn's sphinx moth identified should not be cut or disturbed without further discussions with the Service.

Seabirds

Seabirds, including the Newell's shearwater, Hawaiian petrel, and band-rumped storm-petrel, fly at night and are attracted to artificially-lighted areas resulting in disorientation and subsequent fallout due to exhaustion. Seabirds are also susceptible to collision with objects that protrude above the vegetation layer, such as utility lines, guy-wires, and communication towers. Additionally, once grounded, they are vulnerable to predators and are often struck by vehicles along roadways. To reduce potential impacts to seabirds, we recommend the following minimization measures be incorporated into your project description:

- Construction activities should only occur during daylight hours. Any increase in the use of nighttime lighting, particularly during peak fallout period (September 15 through December 15), could result in additional seabird injury or mortality.

- If lights cannot be eliminated due to safety or security concerns, then they should be positioned low to the ground, be motion-triggered, and be shielded and/or full cut-off. Effective light shields should be completely opaque, sufficiently large, and positioned so that the bulb is only visible from below.

General Comments

Terrestrial, aquatic, and marine fish and wildlife resources occur immediately adjacent to the proposed terrestrial and submerged project areas. Particular attention should be given to potential construction impacts to sea turtles, water quality, seabirds and migratory birds, coral reefs, macroalgae beds, and rare and native species and the habitats. The direct, indirect effects of potential impacts over time should be discussed in the Environmental Assessment. Measures to avoid unnecessary impacts and minimize unavoidable impacts should also be addressed including the use of silt curtains to contain suspended sediments. Impacts that cannot be avoided or minimized should be mitigated. Enclosed is our Best Management Practices (BMP) regarding sedimentation and erosion in aquatic environments. We encourage you to incorporate the relevant practices into your project design.

Thank you for your efforts to conserve listed species and native habitats. Please contact Fish and Wildlife Biologist Jon Sprague (808-792-9573) if you have any questions or for further guidance.

Sincerely,

Michelle Bogardus
Island Team Leader
Maui Nui and Hawaii Island

Enclosure

U.S. Fish and Wildlife Service
Recommended Standard Best Management Practices

The U.S. Fish and Wildlife Service recommends that the measures below be incorporated into projects to minimize the degradation of water quality and minimize the impacts to fish and wildlife resources.

1. Turbidity and siltation from project-related work shall be minimized and contained within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.

2. Dredging/filling in the marine environment shall be scheduled to avoid coral spawning and recruitment periods and sea turtle nesting and hatching periods.

3. Dredging and filling in the marine/aquatic environment shall be designed to avoid or minimize the loss special aquatic site habitat (beaches, coral reefs, wetlands, etc.) and the function of such habitat shall be replaced.

4. All project-related materials and equipment (dredges, barges, backhoes, etc.) to be placed in the water shall be cleaned of pollutants prior to use.

5. No project-related materials (fill, revetment rock, pipe, etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands, etc.) or on beach habitats.

6. All debris removed from the marine/aquatic environment shall be disposed of at an approved upland or ocean dumping site.

7. No contamination (trash or debris disposal, non-native species introductions, attraction of non-native pests, etc.) of adjacent habitats (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests, etc.) shall result from project-related activities. This shall be accomplished by implementing a litter-control plan and developing a Hazard Analysis and Critical Control Point Plan (HACCP – see http://www.haccp-nrm.org/Wizard/default.asp) to prevent attraction and introduction of non-native species.

8. Fueling of project-related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during the project shall be developed. Absorbent pads and containment booms shall be stored on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.

9. Any under-layer fills used in the project shall be protected from erosion with stones (or core-loc units) as soon after placement as practicable.

10. Any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Michelle Bogardus
United States Department of the Interior
Fish and Wildlife Service
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhaina, Maui
Reference: 01EPIF00-2016-TA-0135

Dear Ms. Bogardus:

Thank you for your letter dated January 19, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW) we provide the following responses in the order of the comments in your letter.

Comment:

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Project, there are four listed species and one proposed species in the vicinity of the project area: the endangered Hawaiian petrel (Pterodroma phaeopygia sandwichensis), Hawaiian hoary bat (Lasiurus semotus), and Blackburn's sphinx moth (Manduca blackburni), the threatened Newell's shearwater (Puffinusauricularis newelli), and a species proposed for listing as endangered, the band-romped storm petrel (Oceanodroma castro). The Service recommends the following measures to avoid and minimize project impacts to these listed species:

Hawaiian Hoary Bat

The Hawaiian hoary bat roosts in both exotic and native woody vegetation and, while foraging, will leave young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for bat roosting are cleared during the breeding season, there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet (4.6 meters) tall

should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). Site clearing should be timed to avoid disturbance to Hawaiian hoary bats in the project area.

Response:

Site clearing for the project will be scheduled to avoid disturbance to Hawaiian hoary bats in the project area. Woody plants greater than 15 feet in height will not be disturbed, removed, or trimmed during the bat birthing and pup rearing period (June 1 through September 15).

Comment:

Blackburn's sphinx moth

The Blackburn's sphinx moth could potentially be in the vicinity of the proposed project area. Adult moths feed on nectar from native plants, including beach morning glory (Ipomoea pescaprae), iliee (Plumbago zeylanica), and maiapilo (Capparis sandwichiana); larvae feed upon non-native tree tobacco (Nicotiana glauca) and native aiea (Nothocestrum latifolium). To pupate, the larvae burrow into the soil and can remain in a state of torpor for up to a year (or more) before emerging from the soil. Soil disturbance can result in death of the pupae. The Service recommends that a qualified biologist survey areas of proposed construction activities for Blackburn's sphinx moth and its host plants prior to work initiation. We recommend these surveys be conducted during the wettest portion of the year (usually November-April or several weeks after a significant rain) and immediately prior to construction. Surveys should include searches for eggs, larvae, and signs of larval feeding (chewed stems, frass, or leaf damage). Any host plants of Blackburn's sphinx moth identified should not be cut or disturbed without further discussions with the Service.

Response:

Prior to project initiation, a qualified biologist will survey areas of the proposed construction work for Blackburn's sphinx moth and its host plants. The surveys will be conducted during the wettest portion of the year and immediately prior to construction, and will include searches for eggs, larvae, and signs of larval feeding. There will be discussion with your office should host plants of the Blackburn's sphinx moth identified for cutting or disturbance on the project site.

A Flora and Fauna Survey report was prepared for the project, and did not identify any tree tobacco plants in the project area. Said report and will be included in the Draft Environmental Assessment (EA).

Comment:

Seabirds

Seabirds, including the Newell's shearwater, Hawaiian petrel, and band-romped storm-petrel, fly at night and are attracted to artificially-lighted areas resulting in disorientation and subsequent fallout due to exhaustion. Seabirds are also susceptible to collision with objects that protrude above the vegetation layer, such as utility lines, guy-wires, and communication towers. Additionally, once grounded, they are vulnerable to predators and are often struck by vehicles along roadways. To reduce potential impacts to seabirds, we recommend the following minimization measures be incorporated into your project description:

- *Construction activities should only occur during daylight hours. Any increase in the use of nighttime lighting, particularly during peak fallout period (September 15 through December 15), could result in additional seabird injury or mortality.*

- *If lights cannot be eliminated due to safety or security concerns, then they should be positioned low to the ground, be motion-triggered, and be shielded and/or full cut-off. Effective light shields should be completely opaque, sufficiently large, and positioned so that the bulb is only visible from below.*

Response:

Construction activities for the project will occur during daylight hours. In the event lights are included in the project, these features will be positioned low to the ground, be motion-triggered, be shielded and/or full cut-off. Effective light shields will be opaque, sufficiently large, and positioned so the bulb is only visible from below.

Comment:

General Comments

Terrestrial, aquatic, and marine fish and wildlife resources occur immediately adjacent to the proposed terrestrial and submerged project areas. Particular attention should be given to potential construction impacts to sea turtles, water quality, seabirds and

migratory birds, coral reefs, macroalgae beds, and rare and native species and the habitats. The direct, indirect effects of potential impacts over time should be discussed in the Environmental Assessment. Measures to avoid unnecessary impacts and minimize unavoidable impacts should also be addressed including the use of silt curtains to contain suspended sediments. Impacts that cannot be avoided or minimized should be mitigated. Enclosed is our Best Management Practices (BMP) regarding sedimentation and erosion in aquatic environments. We encourage you to incorporate the relevant practices into your project design.

Response:

The list of Best Management Practices (BMPs) provided in your letter will be reviewed by the design team as may be applicable to the project. The project includes the implementation of BMPs which will be discussed in the Draft EA. Current BMP measures to reduce sediment erosion include temporary gravel construction entrance, curb drain inlet filters, and permeable berm ditch guards. Control of construction area and schedule, in combination with the project BMPs, will reduce impacts to terrestrial, aquatic, marine fish and wildlife resources near the project area.

We appreciate your input and will include a copy of your comment letter as well as this response in the Draft EA. A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
Robert Hobdy
K:\DATA\FE\DPW Napili Culvert\ECL Responses\USFWS Response.doc

JAN 06 2016

DAVID Y. IGE
GOVERNOR

DOUGLAS MURDOCK
Comptroller

AUDREY HIDANO
Deputy Comptroller

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1326.5

DEC 31 2015

Ms. Cheryl K. Okuma, Senior Associate
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

Subject: Early Consultation Request for
Napili Culvert Replacement Project
Lahaina, Maui, Hawaii
Various TMKs

Thank you for the opportunity to comment on the subject project. We have no comments to offer at this time as the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities.

If you have any questions, your staff may call Ms. Dora Choy of the Planning Branch at 586-0488.

Sincerely,

Scott M. Oji

for DOUGLAS MURDOCK
Comptroller

c: Mr. Wade Shimabukuro, DAGS MDO

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Roderick Becker
Comptroller
State of Hawai'i
Department of Accounting and General Services
P.O. Box 119
Honolulu, Hawai'i 96810-0119

SUBJECT: Early Consultation Letter Request For the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui; Reference: (P)1326.5

Dear Mr. Becker:

Thank you for your Department's letter dated December 31, 2015 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW) we acknowledge that the Department of Accounting and General Services (DAGS) has no comments to offer at this time as the proposed project does not impact any of DAGS' projects or existing facilities.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
Wade Shimabukuro, DAGS MDO
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DAGS response.doc

JAN 19 2016

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

01013PNN.16

January 13, 2016

Ms. Cheryl K. Okuma
Munekiyo Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

SUBJECT: Comments on the Early Consultation Request for the Napili Culvert Replacement Project TMK: (2) 4-3-001:003, (2) 4-3-002:023 and 045 Lahaina, Island of Maui, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated December 15, 2015, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommended that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like

community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g., minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at: http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

NN:ak

c: DOH-EPO #15-328 [via e-mail Noella.Narimatsu@doh.hawaii.gov only]

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Alec Wong, P.E., Chief
State of Hawai'i
Department of Health
Clean Water Branch
P.O. Box 3378
Honolulu, Hawai'i 96801-3378

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui; Reference: EMD/CWB 01013PNN.16, DOH/CWB 01018PNN.17

Dear Mr. Wong:

Thank you for your letters dated January 13, 2016 and January 20, 2017on the subject project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the following responses in the order of the Department of Health, Clean Water Branch's (CWB) comments regarding the project.

Comment:

1. *Any project and its potential impacts to State waters must meet the following criteria:*

   a. *Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.*

   b. *Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.*

   c. *Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).*

Response:

AECOS, Inc. conducted a water quality survey in Nāpili Gulch in the vicinity of the project area and prepared a report. The report noted the location of a desilting basin located in the Nāpili 4/5 Gulch, just upstream of the project area. In 2010 and 2011, an outlet valve was constructed in the basin. The segment between the basin and Lower Honoapi'ilani Road was seeded with grass. Recent community efforts focus on planting and maintaining native species in the riparian zone of Nāpili Gulch, downstream of the project.

The AECOS survey found generally poor water quality conditions, although not an unusual situation for a muliwai and that the coastal waters of Nāpili Gulch are impaired. Nāpili Bay and West Maui Coast-Nāpili Bay are on the Department of Health's list of impaired waters in Hawai'i. The listings indicate the Bay may not meet State water quality criteria for coastal waters with minimal freshwater discharge. The proposed project is not anticipated to adversely affect the already poor water quality in the muliwai of Nāpili Gulch or the nearshore waters of the Bay. AECOS recommended a Best Management Practices (BMP) Plan and applicable monitoring and assessment plan be implemented with the project. The AECOS report is discussed and included in the Draft Environmental Assessment (EA).

Comment:

2. *You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).*

   For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

Response:

The project area is less than one (1) acre in size. DPW does not anticipate needing a NPDES Permit from the Department of Health, CWB at this time.

Comment:

3. *If your project involves work in, over, or under waters of the United States, it is highly recommended that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.*

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401 (a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters ..." (emphasis added).

   The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

Response:

Consultation with a U.S. Corps of Engineers is being conducted to determine whether a Section 404 Department of Army Nationwide Permit is required for the project. Should a Department of Army Permit be required, it will be secured prior to commencement of project construction.

Comment:

4. *Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.*

Response:

DPW notes that all discharges related to the proposed project construction or operations are to comply with the State's Water Quality Standards, irregardless of the requirement for an NPDES permit and/or Section 401 Water Quality Certification.

Comment:

5. *It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:*

   a. *Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.*

Response:

The proposed project involves the replacement of existing culverts, which will continue to allow stormwater in Nāpili Gulch to cross under Lower Honoapi'ilani Road. The replacement culverts will have greater capacity to convey stormwater, and avoid eroding the downstream properties and overtopping of Lower Honoapi'ilani Road. Low impact considerations for the project include open vegetated channels, installation of an open concrete mat (Armor flex or approved equal) material on the mauka (south) portion of the drainageway and reduction of stormwater velocity. The decreased velocity will reduce erosion and increase permeability. The installation of the Armor flex or approved equal material will also encourage vegetation growth in the basin of the drainageway which will also enhance natural filtration of the stormwater runoff.

Comment:

b. *Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g., minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.*

Response:

The proposed project is a culverts replacement project, intended to address flooding and erosion in the area during storm events. As previously discussed, an AECOS survey found generally poor water quality condition in the muliwai for Nāpili Gulch and its coastal waters. Nāpili Bay and West Maui Coast-Nāpili Bay are on the Department of Health's list of impaired waters in Hawai'i. The listings indicate the Bay may not meet State water quality criteria for coastal waters with minimal freshwater discharge. As such, the proposed project is not anticipated to adversely affect the already poor water quality in the muliwai of Nāpili Gulch or the nearshore waters of the Bay. AECOS recommended a BMP Plan and applicable monitoring and assessment plan be implemented with the project. The AECOS report is discussed and included in the Draft EA.

Comment:

c. *Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.*

Response:

The channel downstream of the proposed culverts is unlined and its natural topography leads to the ocean, allowing for recharge of the groundwater. There is an existing desilting basin upstream of the project area which reduces the amount of eroded sediment from agricultural fields from reaching the nearshore area. As previously noted, the open mat concrete material in the drainageway will also provide the opportunity to encourage vegetative growth.

Comment:

d. *Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.*

Response:

As previously noted, the project improvements include the installation of a concrete mat material in a mauka (south) portion of the drainageway. The open mat material will also allow for vegetation growth in the drainage basin.

The community planted native plants in the Nāpili Gulch, downstream of the proposed culverts. There is an existing desilting basin upstream of the project area which reduces the amount of eroded sediment from reaching the nearshore area.

Comment:

e. *Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.*

Response:

The proposed project will replace an existing drainage culvert infrastructure system which DPW has assessed as nearing the end of its useful life. There have been accounts of flooding in the area, where Lower Honoapi'ilani Road has overtopped with stormwater and the nearby properties of One Nāpili Way have been adversely impacted during storm events. The proposed project is intended to address the flooding concerns by providing a new culvert system designed with the capacity to manage stormwater flow while continuing to keep open vegetated channels.

We appreciate your input and will include a copy of your comment letter and this response in the Draft EA. A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
Snookie Mello, AECOS
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DOH CWB Response.doc

JAN 25 2017

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
DOH/CWB

01018PNN.17

January 20, 2017

Ms. Gwendolyn Rivera
Senior Associate
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Rivera:

SUBJECT: Comments on the Revised Proposed Project Improvements for the Napili Culvert Replacement Project Lahaina, Island of Maui, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), has reviewed the subject document and has no comments at this time. The DOH-CWB provided comments on the Early Consultation for the Environmental Assessment for this project (Letter No. 01013PNN.16, dated January 13, 2016).

Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf.

If you have any questions, please visit our website at: http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

Alec Wong

ALEC WONG, P.E., CHIEF
Clean Water Branch

NN:ak

c: DOH-EPO [via e-mail Noella.Narimatsu@doh.hawaii.gov only]

JAN 19 2016

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

01013PNN.16

January 13, 2016

Ms. Cheryl K. Okuma
Munekiyo Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

SUBJECT: Comments on the Early Consultation Request for the Napili Culvert Replacement Project
TMK: (2) 4-3-001:003, (2) 4-3-002:023 and 045
Lahaina, Island of Maui, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated December 15, 2015, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommended that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like

community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g., minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at: http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

NN:ak

c: DOH-EPO #15-328 [via e-mail Noella.Narimatsu@doh.hawaii.gov only]

JAN 0 8 2016

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

LORRIN W. PANG, M.D., M.P.H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, HAWAII 96793-3378

January 6, 2016

Ms. Cheryl K. Okuma
Senior Associate
Munekiyo Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

Subject: **Early Consultation Request for Napili Culvert Replacement Project, Lahaina, Maui**
TMK: (2) 4-3-001:003 (por); 4-3-002:023 (por); 4-3-002:045 (por)

Thank you for the opportunity to review this project. We have the following comments to offer:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage may be required for this project. The Clean Water Branch should be contacted at 808 586-4309.

2. A Section 401 Water Quality Certification (WQC) may be required. To determine if your project requires a federal permit, license, certificate, approval, registration, or statutory exemption please contact the appropriate federal agencies (e.g. Department of the Army, US Army Corps of Engineers, Pacific Ocean Division Honolulu District Office; US Environmental Protection Agency; Federal Energy Regulatory Commission; US Coast Guard, etc.). To request a Section 401 WQC, you must complete and submit the Section 401 application. This application is available on the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/ .

3. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control." A noise permit may be required and should be obtained before the commencement of work. Please call the Indoor & Radiological Health Branch at 808 586-4700.

It is strongly recommended that the Standard Comments found at the Department's website: http://health.hawaii.gov/epo/home/landuse-planning-review-program/ be reviewed and any comments specifically applicable to this project should be adhered to.

Should you have any questions, please contact me at patricia.kitkowski@doh.hawaii.gov or 808 984-8230.

Sincerely,

Patti Kitkowski
District Environmental Health Program Chief

c EPO

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Patti Kitkowski
District Environmental Health Program Chief
Maui District Health Office
Department of Health
State of Hawai'i
54 High Street
Wailuku, Hawai'i 96793-3378

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Ms. Kitkowski:

Thank you for your letter dated January 6, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the following responses in the order of the Department of Health, Maui District Health Office (DOH) comments.

Comment:

1. *National Pollutant Discharge Elimination System (NPDES) permit coverage may be required for this project. The Clean Water Branch should be contacted at 808 586-4309.*

Response:

DPW will apply for a NPDES permit from the Clean Water Branch, as may be required for the project. We note that the project area is approximately 0.66-acre in size, and a NPDES permit is not anticipated at this time.

Comment:

2. *A Section 401 Water Quality Certification (WQC) may be required. To determine if your project requires a federal permit, license, certificate, approval, registration, or statutory exemption please contact the appropriate agencies (e.g. Department of the Army, US Army Corps of Engineers, Pacific Ocean Division Honolulu District Office; US Environmental Protection Agency; Federal Energy Regulatory*

Commission; US Coast Guard, etc.). To request a Section 401 WQC, you must complete and submit the Section 401 application. This application is available on the e-Permitting Portal website located at: https://eha-cloud.doh.hawa..gov/epermit/.

Response:

A US Army Corps of Engineers, Section 404 Department of Army Nationwide Permit and a Section 401 Water Quality Certification will be obtained by DPW prior to initiation of construction for the project, as applicable.

Comment:

3. *The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control." A noise permit may be required and should be obtained before commencement of work. Please call the Indoor & Radiological Health Branch at 808 586-4700.*

Response:

A noise permit will be obtained for the project, as may be applicable.

Comment:

4. *It is strongly recommended that the Standard Comments found at the Department's website: http://health.hawaii.gov/epo/home/landuse-planning-review-program/ be reviewed and any comments specifically applicable to this project should be adhered to.*

Response:

The design team will review and incorporate the standard comments on the Department's website, as may be applicable for this project.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:la
cc: John Smith, County of Maui, Department of Public Works
Mike Silva, Fukumoto Engineering, Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DOH, Maui response.docx

JAN 04 2016

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

EPO 15-328

December 23, 2015

Ms. Cheryl K. Okuma
Munekiyo Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

SUBJECT: Early Consultation (EC) Request for Napili Culvert Replacement Project Lahaina, Maui

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your EC to our office on December 22, 2015. Thank you for allowing us to review and comment on the proposed project. The EC was routed to the District Health Office on Maui, Clean Water, Wastewater and Safe Drinking Water Branches. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments and available strategies to support sustainable and healthy design provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal. The portal provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings. The Portal is continually updated. Please visit it regularly at: https://eha-cloud.doh.hawaii.gov

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design.

Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

LM:nn

Attachment: U.S. EPA EJSCREEN Map 3 page report - http://www2.epa.gov/ejscreen

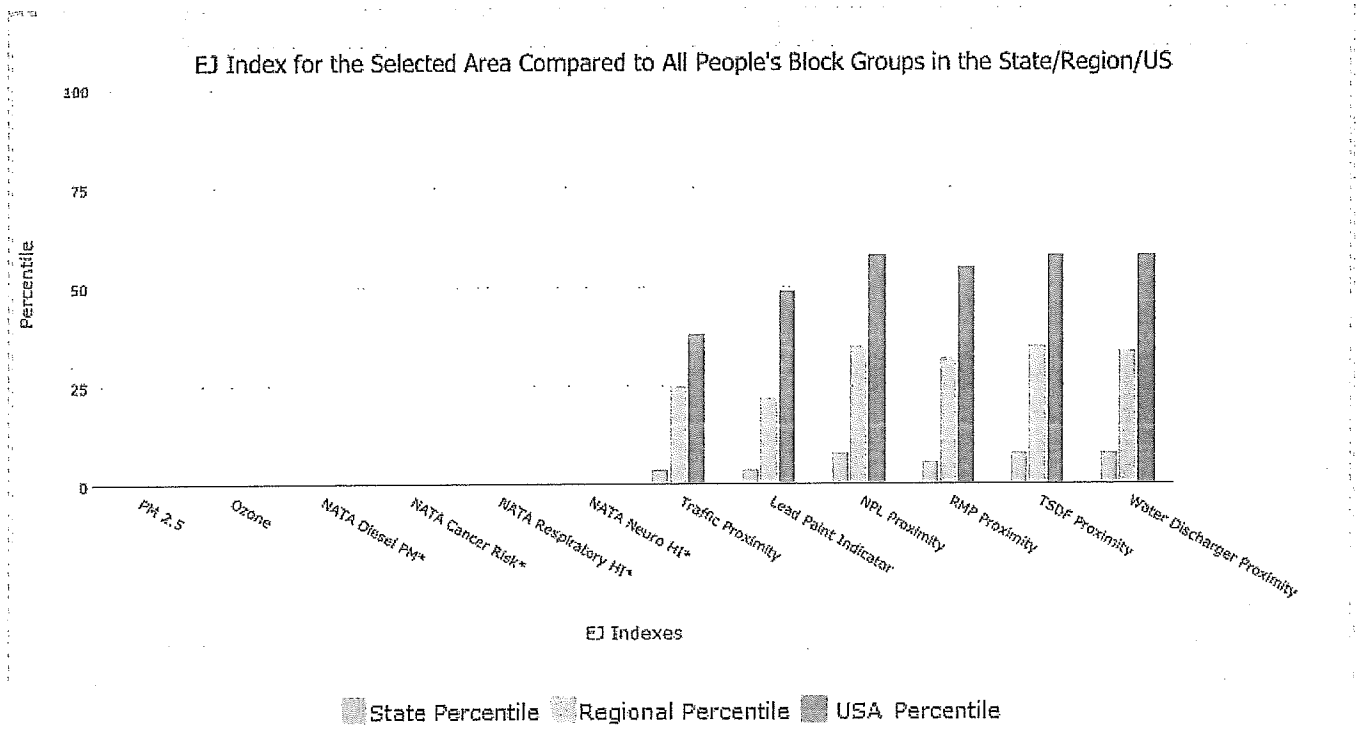
c: John Smith, Department of Public Works
Mike Silva, Fukumoto Engineering
DHO Maui, CWB, WWB, SDWB {via email only}

EJSCREEN Report

for 1 mile Ring Centered at 20.992954,-156.666524, HAWAII, EPA Region 9

Approximate Population: 2539

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA Diesel PM*	N/A	N/A	N/A
EJ Index for NATA Air Toxics Cancer Risk*	N/A	N/A	N/A
EJ Index for NATA Respiratory Hazard Index*	N/A	N/A	N/A
EJ Index for NATA Neurological Hazard Index*	N/A	N/A	N/A
EJ Index for Traffic Proximity and Volume	4	25	38
EJ Index for Lead Paint Indicator	4	22	49
EJ Index for Proximity to NPL sites	8	35	58
EJ Index for Proximity to RMP sites	6	32	55
EJ Index for Proximity to TSDFs	8	35	58
EJ Index for Proximity to Major Direct Dischargers	8	34	58



This report shows environmental, demographic, and EJ indicator values. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report

for 1 mile Ring Centered at 20.992954,-156.666524, HAWAII, EPA Region 9

Approximate Population: 2539

December 28, 2015

Digitized Point

1:2,257

0 0.0175 0.035 0.07 mi

0 0.03 0.06 0.12 km

© 2010 DigitalGlobe © 2010 GeoEye © 2015 Microsoft Corporation © 2010 NAVTEQ © AND

EJSCREEN Report

for 1 mile Ring Centered at 20.992954,-156.666524, HAWAII, EPA Region 9

Approximate Population: 2539

Selected Variables	Raw Data	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	N/A	N/A	N/A	9.95	N/A	9.78	N/A
Ozone (ppb)	N/A	N/A	N/A	49.7	N/A	46.1	N/A
NATA Diesel PM (µg/m^3)*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Cancer Risk (lifetime risk per million)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Respiratory Hazard Index*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Neurological Hazard Index*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Proximity and Volume (daily traffic count/distance to road)	100	280	57	190	56	110	74
Lead Paint Indicator (% Pre-1960 Housing)	0.038	0.17	29	0.25	31	0.3	22
NPL Proximity (site count/km distance)	0.0065	0.092	28	0.11	6	0.096	2
RMP Proximity (facility count/km distance)	0.18	0.18	75	0.41	51	0.31	61
TSDF Proximity (facility count/km distance)	0.007	0.092	28	0.12	3	0.054	17
Water Discharger Proximity (facility count/km distance)	0.04	0.33	9	0.19	9	0.25	8
Demographic Indicators							
Demographic Index	32%	51%	6	46%	31	35%	54
Minority Population	50%	77%	10	57%	41	36%	69
Low Income Population	14%	25%	30	35%	20	34%	20
Linguistically Isolated Population	3%	6%	46	9%	33	5%	61
Population With Less Than High School Education	5%	10%	34	18%	24	14%	26
Population Under 5 years of age	5%	6%	39	7%	35	7%	38
Population over 64 years of age	10%	14%	29	12%	50	13%	39

* The National-scale Air Toxics Assessment (NATA) environmental indicators and EJ indexes, which include cancer risk, respiratory hazard, neurodevelopment hazard, and diesel particulate matter will be added into EJSCREEN during the first full public update after the soon-to-be-released 2011 dataset is made available. The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: http://www.epa.gov/ttn/atw/natamain/index.html.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, Hawai'i 96801-3378

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui; Reference File: EPO 15-328

Dear Ms. McIntyre:

Thank you for your letter dated December 23, 2015 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW), the following responses are offered in the order of the Department of Health, Environmental Planning Office's comments regarding the project.

COMMENT:

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your EC to our office on December 22, 2015. Thank you for allowing us to review and comment on the proposed project. The EC was routed to the District Health Office on Maui, Clean Water, Wastewater and Safe Drinking Water Branches. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments and available strategies to support sustainable and healthy design provided at http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments.

RESPONSE:

The information provided on the website at http://health.hawaii.gov/epo/landuse will be reviewed by the design team. Components may be incorporated as applicable for the proposed project.

COMMENT:

EPO also encourages you to examine and utilize the Hawai'i Environmental Health Portal. The portal provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawai'i Emergency Response Exchange, Hawai'i State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings. The Portal is continually updated. Please visit it regularly at https://eha-cloud.doh.hawaii.gov.

RESPONSE:

The Hawai'i Environmental Health Portal and links will be reviewed for consideration by the design team for the proposed project, as may apply.

COMMENT:

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design.

RESPONSE:

The proposed project involves the replacement of an existing culvert system with a new culvert system, to accommodate peak discharge rates and protect properties in the nearby area and the Lower Honoapi'ilani Road from flooding. The project also includes the implementation of Best Management Practices (BMPs) which is discussed in the Draft Environmental Assessment (EA). As project work involves the Nāpili Gulch, a U.S. Corps of Engineers Section 404 Department of the Army (Nationwide) (DA) Permit, Section 401 State Water Quality Certification, and State Commission on Water Resource Management Stream Channel Alteration Permit will be obtained for the project prior to construction as applicable. Should a DA Permit be involved for the project, there will be Section 106 consultation per the National Historic Preservation Act.

We appreciate your input and will include a copy of your comment letter as well as this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DOH EPO response.doc

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 7, 2016

Munekiyo & Hiraga, Inc.
Attention: Ms. Cheryl Okuma, Senior Associate via email: planning@mhplanning.com
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

SUBJECT: Early Consultation Request for Napili Culvert Replacement Project

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 comments.

At this time, the DLNR has no comments to offer on the subject matter. If you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 12, 2016

Munekiyo & Hiraga, Inc.
Attention: Ms. Cheryl Okuma, Senior Associate via email: planning@mhplanning.com
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

SUBJECT: Early Consultation Request for Napili Culvert Replacement Project

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments previously sent you on January 7, 2016, enclosed are comments from the Engineering Division on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 24, 2015

MEMORANDUM

TO: FR:

DLNR Agencies:
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
X Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
X Commission on Water Resource Management
___ Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

'15 DEC 24 AM 10:43 ENGINEER

FROM: TO:
SUBJECT: Russell Y. Tsuji, Land Administrator
LOCATION: Early Consultation Request for Napili Culvert Replacement Project
APPLICANT: Lahaina, Island of Maui; TMK: (2) 4-3-001:003 (por.), 4-3-002:023 (por.) & 045 (por.) and the 40-foot County ROW
County of Maui, Department of Public Works

Transmitted for your review and comment is information on the above-referenced project. Please submit any comments by **January 6, 2016**.

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 Lydia Morikawa at 587-0410. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: _____
Print Name: Carty S. Chang, Chief Engineer
Date: 1/8/16

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/ Russell Y. Tsuji

REF: **Early Consultation Request: Processing of an Environmental Assessment (EA) and Application for a Conservation District Use Permit (CDUA) and Special Management Area (SMA) Assessment for the Proposed Engel Residence, Lahaina, Maui, HI Maui.002**

COMMENTS

(X) **We confirm that the sections of the parcel/project site, according to the Flood Insurance Rate Map (FIRM), is located in Zones VE and AEF. The National Flood Insurance Program regulates developments within Zones VE and AEF as indicated in bold letters below, but not in Zone X.**

( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is also located in Zone X.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

(X) **Please note that the project site 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. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Carter Romero (Acting) at (808) 961-8943 of the County of Hawaii, Department of Public Works.

(X) Ms. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.

( ) Mr. Stanford Iwamoto at (808) 241-4896 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 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: _____

_____

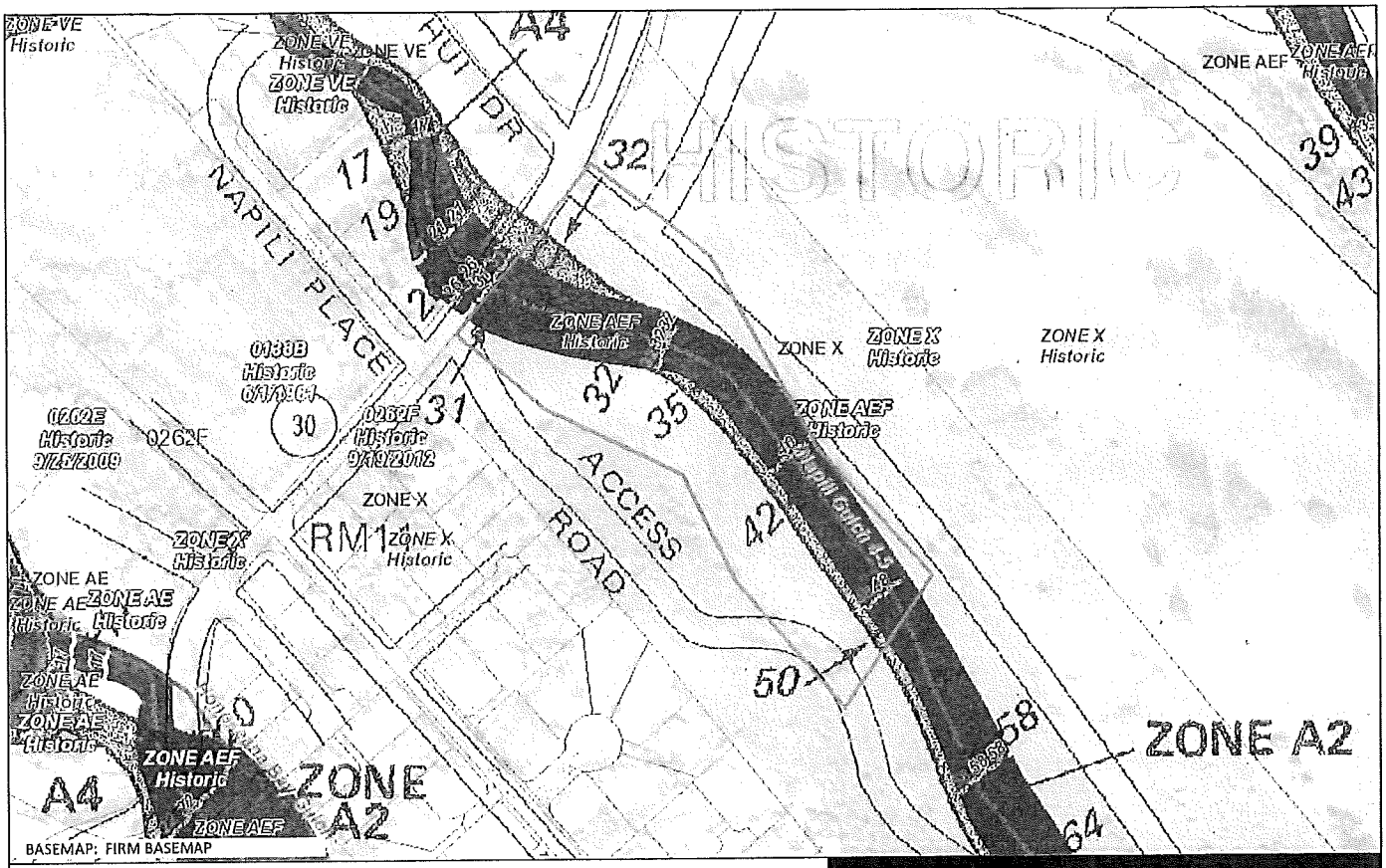
( ) Other: _____

_____

Should you have any questions, please call Mr. Rodney Shiraishi of the Planning Branch at 587-0258.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 1/8/16



Flood Hazard Assessment Report

www.hawaiinfip.org

Napali Culvert Repl 1/3

Property Information

COUNTY:	MAUI
TMK NO:	(2) 4-3-001:003
WATERSHED:	KAHANA
PARCEL ADDRESS:	LOWER HONOAPIILANI RD LAHAINA, HI 96761

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 04, 2015
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1500030262F
PANEL EFFECTIVE DATE:	SEPTEMBER 19, 2012

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: YES (MA-0127)
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 200 400 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

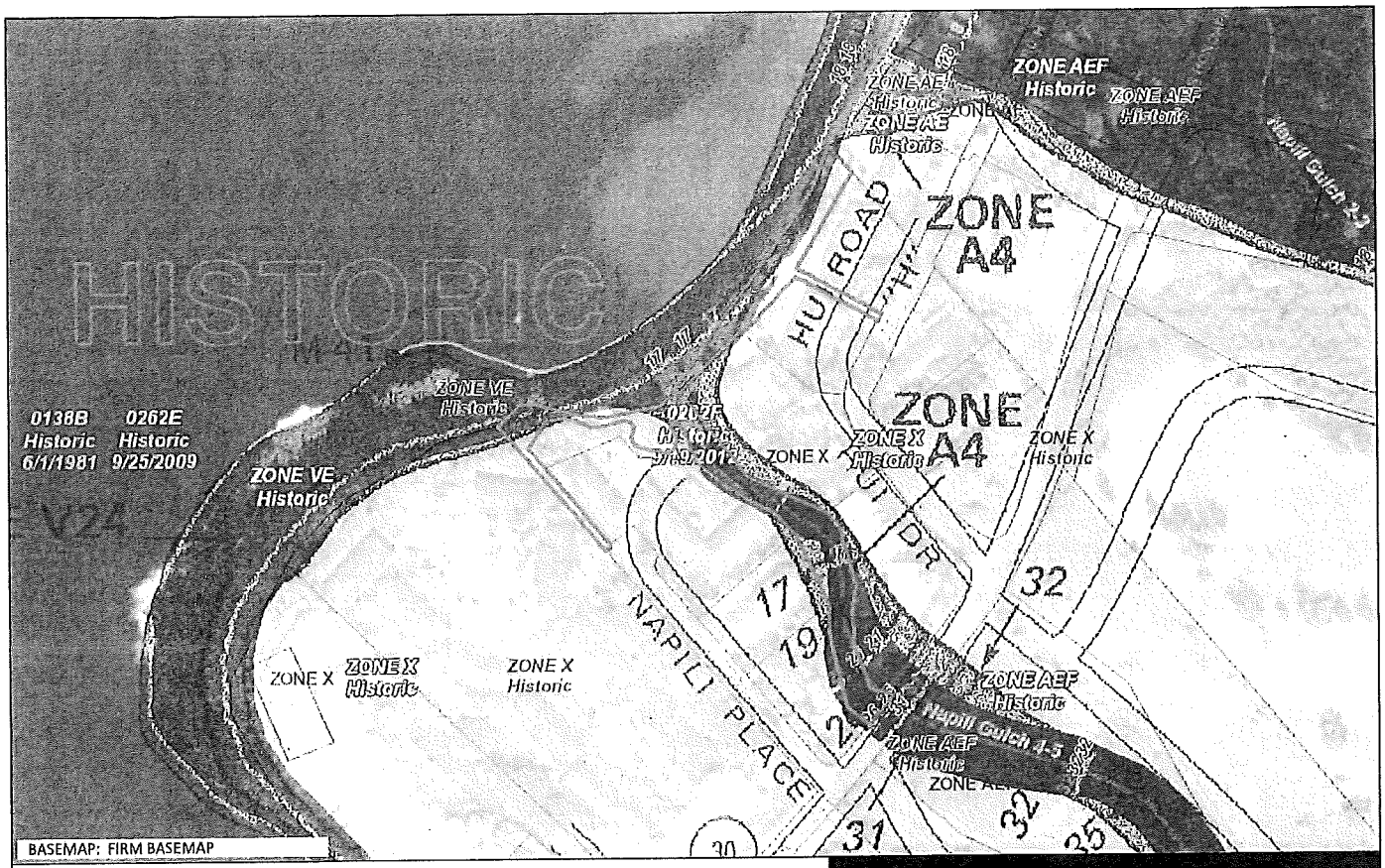
	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.



Flood Hazard Assessment Report

www.hawaiinfip.org

Napali Culvert Repl 2/3

Property Information

COUNTY:	MAUI
TMK NO:	(2) 4-3-002:023
WATERSHED:	KAHANA
PARCEL ADDRESS:	NAPILI PL LAHAINA, HI 96761

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 04, 2015
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1500030262F
PANEL EFFECTIVE DATE:	SEPTEMBER 19, 2012

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: YES
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: YES (MA-0127; MA-0128)
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 200 400 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

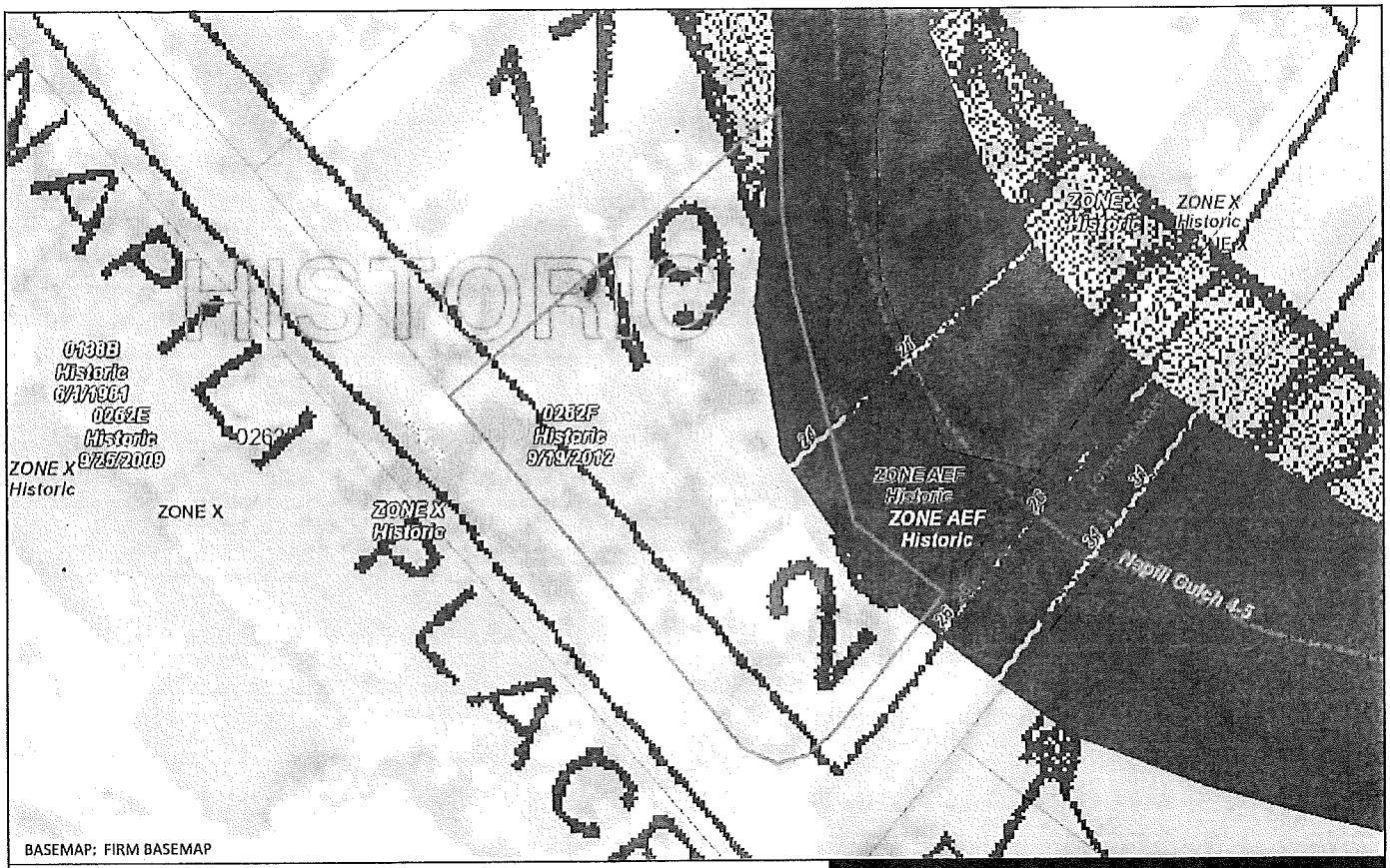
	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.



Flood Hazard Assessment Report

www.hawaiinfip.org

Napali Culvert Repl 3/3

Property Information

COUNTY:	MAUI
TMK NO:	(2) 4-3-002:045
WATERSHED:	KAHANA
PARCEL ADDRESS:	5335 LOWER HONOAPIILANI RD LAHAINA, HI 96761

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 04, 2015
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1500030262F
PANEL EFFECTIVE DATE:	SEPTEMBER 19, 2012

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: YES
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: YES (MA-0127)
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 40 80 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Russell Y. Tsuji, Land Administrator
Department of Land and Natural Resources
Land Division
State of Hawai'i
P.O. Box 621
Honolulu, Hawai'i 96809

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Tsuji:

Thank you for your letters dated January 7, 2016 and January 12, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the following responses in the order of the State of Hawai'i, Department of Land and Natural Resources, Engineering Division comments regarding the project.

Comment:

We confirm that the sections of the parcel/project site, according to the Flood Insurance Rate Map (FIRM), is located in Zones VE and AEF. The National Flood Insurance Program regulates developments within Zones VE and AEF as indicated in bold letters below, but not in Zone X.

Response:

We have confirmation from the County of Maui, Department of Planning that the project site is located within Flood Zone AE on portions of land identified as Tax Map Key (2)4-3-001:003; (2)4-3-002:023; (2)4-3-002:45, and (2)4-3-002:999. The flood zone designation for the project is addressed in the Draft Environmental Assessment (EA). See **Exhibit "1"**. Please note that TMK (2)4-3-002:045 has since been removed from the project.

Comment:

Please note that the project site 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 44 CFR 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 Coordinator's below:*
>
> > *Ms. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.*

Response:

A Special Flood Hazard Development Permit will be requested for the project, as may be applicable and questions pertaining to the requirements of NFIP and local flood ordinances will be coordinated with Ms. Carolyn Cortez.

We appreciate your input and will include a copy of your comment letter and this response in the Draft EA. A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:la
Attachment
cc: John Smith PE, County of Maui, Department of Public Works (w/attachment)
Mike Silva PE, Fukumoto Engineering Inc. (w/attachment)
Carty S. Chang, Department of Land and Natural Resources (w/attachment)
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DLNR Eng Division response.docx

NOV 16 2015

COUNTY OF MAUI
DEPARTMENT OF PLANNING
One Main Plaza Building
2200 Main Street, Suite 335
Wailuku, Hawaii 96793

Zoning Administration and
Enforcement Division (ZAED)
Telephone: (808) 270-7253
Facsimile: (808) 270-7634
E-mail: planning@mauicounty.gov

RECEIVED

ZONING AND FLOOD CONFIRMATION FORM

(This section to be completed by the Applicant)

2015 NOV 12 P 3:17

COUNTY OF MAUI
PLANNING
ZONING DIVISION

APPLICANT NAME Munekiyo Hiraga **TELEPHONE** 244-2015

PROJECT NAME Napili Culvert Replacement **E-MAIL** planning@munekiyohiraga.com

PROPERTY ADDRESS Vicinity of Napili Place/Lower Honoapiilani Road **TAX MAP KEY** (2)4-3-001:003(por.)

☐ Yes ■ No **Will this Zoning & Flood Confirmation Form be used with a Subdivision Application?**
IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A) ☐ Yes ☐ No **Will it be processed under a consistency exemption from** Section 18.04.030(B), MCC?
IF YES, which exemption? (No. 1, 2, 3, 4 or 5) _____

B) State the purpose of subdivision and the proposed land uses *(ie 1-lot into 2-lots for all land uses allowed by law)*:

INSTRUCTIONS:

1) **Please use a separate Zoning & Flood Confirmation Form for each Tax Map Key (TMK) number.**
2) **If this will be used with a subdivision application AND the subject property contains multiple districts/designations of (1) State Land Use Districts, (2) Maui Island Plan Growth Boundaries, (3) Community Plan Designations, or (4) County Zoning Districts; submit a signed and dated Land Use Designations Map, prepared by a licensed surveyor, showing the metes & bounds of the subject parcel and of each district/designation including any subdistricts.**
3) **If this will be used with a subdivision application AND the subject property contains multiple State Land Use Districts; submit an approved District Boundary Interpretation from the State Land Use Commission.**

(This section to be completed by ZAED)

LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION: [1]

☑ (SMA) Special Management Area

STATE DISTRICT: ☐ Urban ☐ Rural ☑ Agriculture ☐ Conservation

MAUI ISLAND PLAN — Growth Boundary: [2] ☑ Urban ☐ Small Town ☐ Rural ☐ Planned Growth Area ☐ Outside Growth Boundaries

MAUI ISLAND PLAN — Protected Area: [2] ☐ Preservation ☑ Park ☐ Greenbelt ☐ Greenway ☐ Sensitive Land ☐ Outside Protected Areas

COMMUNITY PLAN: [2] Park

COUNTY ZONING: Agriculture

OTHER/COMMENTS:

☐ (PD) Planned Development
☐ (PH) Project District
☐ See Additional Comments (Pg.2)
☐ See Attached LUD Map

FEMA FLOOD INFORMATION:

FLOOD HAZARD AREA ZONES & BASE FLOOD ELEVATIONS: [3] AE (31') based on attached site plan

☐ FEMA DESIGNATED FLOODWAY — For Flood Zone AO, FLOOD DEPTH:

☑ FLOOD DEVELOPMENT PERMIT REQUIRED (Zones V, VE, A, AO, AE, AH, D, & Floodways)

SUBDIVISION LAND USE CONSISTENCY: ☐ Not Consistent, (LUDs appear to have NO permitted uses in common).

_____ (Signature) ☐ Not Applicable, (Due to processing under consistency exemption No. ☐1, ☐2, ☐3, ☐4, ☐5).

☐ Interim Zoning, (The parcel or portion of the parcel that is zoned interim shall not be subdivided).

☐ [4] Consistent, (LUDs appear to have ALL permitted uses in common).

☐ [4] Consistent, upon obtaining an SMA, PD, or PH subdivision approval from Planning.

☐ [4] Consistent, upon recording a permissible uses unilateral agreement processed by Public Works (See Pg.2).

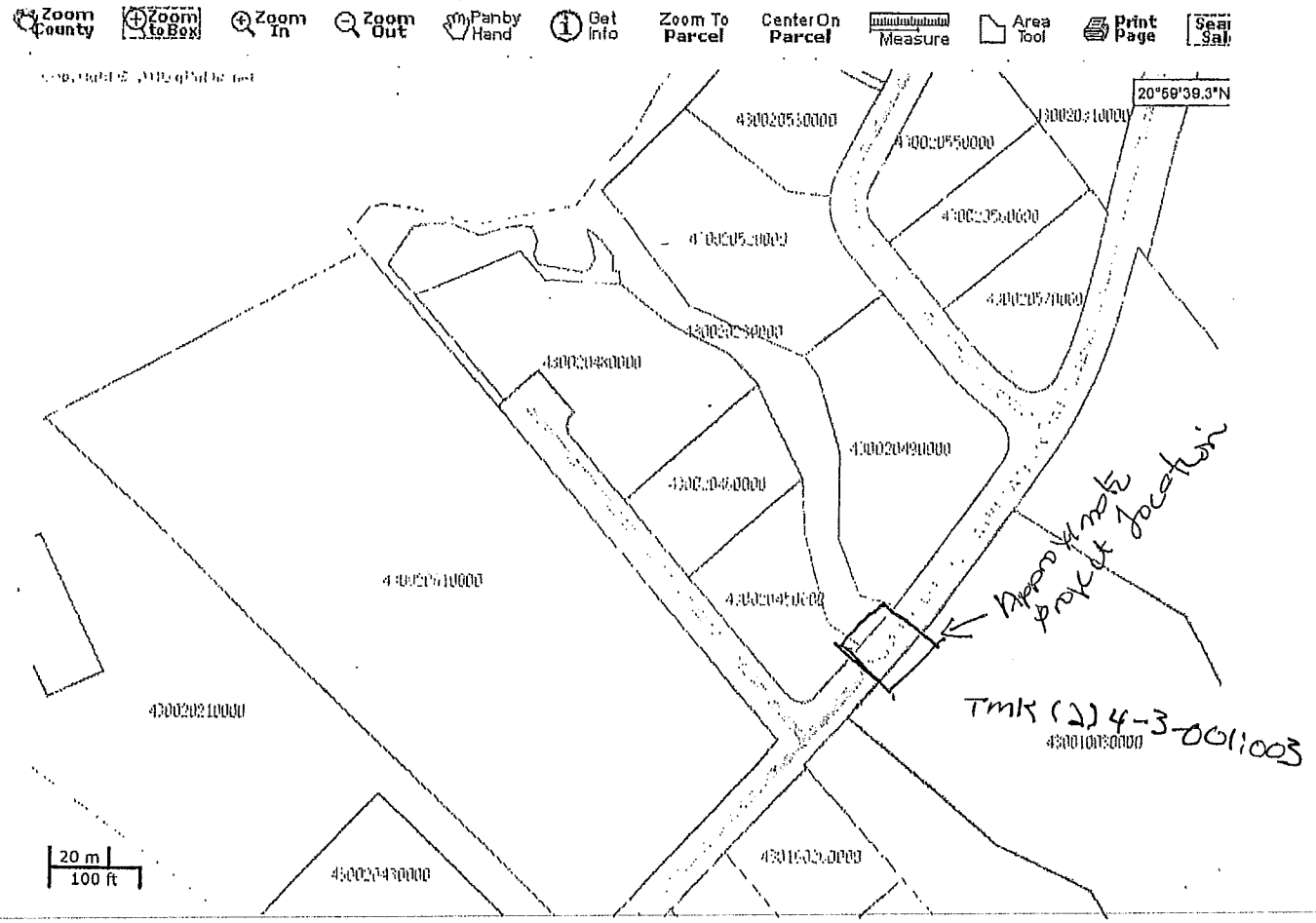
NOTES:

1 The conditions and/or representations made in the approval of a State District Boundary Amendment, Community Plan Amendment, County Change In Zoning, SMA Permit, Planned Development, Project District and/or a previous subdivision, may affect building permits, subdivisions, and uses on the land.
2 Please review the Maui Island Plan and the Community Plan document for any goals, objectives, policies or actions that may affect this parcel.
3 Flood development permits might be required in zones X and XS for any work done in streams, gulches, low-lying areas, or any type of drainageway; Flood development permits are required for work in all other zones. Subdivisions that include/adjoin streams, gulches, low-lying areas, or any type of drainageway might require the following designations to be shown on the subdivision map: 100-year flood inundation limits; base flood elevations; drainage reserves.
4 Subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030.D, Maui County Code].

REVIEWED & CONFIRMED BY:

_____ (Signature) 11/13/15 (Date)

For: John S. Rapacz, Planning Program Administrator, Zoning Administration and Enforcement Division



Maul County makes every effort to produce the most accurate information possible. No warranties, expressed or implied, are provided for the data he assessment information is from the last certified taxroll. All data is subject to change before the next certified taxroll.

NOV 1 6 2015

COUNTY OF MAUI
DEPARTMENT OF PLANNING
One Main Plaza Building
2200 Main Street, Suite 335
Wailuku, Hawaii 96793

Zoning Administration and
Enforcement Division (ZAED)
Telephone: (808) 270-7253
Facsimile: (808) 270-7634
E-mail: planning@mauicounty.gov

ZONING AND FLOOD CONFIRMATION FORM

2015 NOV 12 P 3:18
COUNTY OF MAUI
PLANNING
ZONING DIVISION

(This section to be completed by the Applicant)

APPLICANT NAME Munekiyo Hiraga TELEPHONE 244-2015

PROJECT NAME Napili Culvert Replacement E-MAIL planning@munekiyohiraga.com

PROPERTY ADDRESS Vicinity of Napili Place/Lower Honoapiilani Road TAX MAP KEY (2)4-3-002:023

☐ Yes ■ No **Will this Zoning & Flood Confirmation Form be used with a Subdivision Application?**
IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A) ☐ Yes ☐ No **Will it be processed under a consistency exemption from** Section 18.04.030(B), MCC?
IF YES, which exemption? (No. 1, 2, 3, 4 or 5) _____

B) State the purpose of subdivision and the proposed land uses (*ie 1-lot into 2-lots for all land uses allowed by law*):

INSTRUCTIONS:
1) **Please use a separate Zoning & Flood Confirmation Form for each Tax Map Key (TMK) number.**
2) **If this will be used with a subdivision application AND the subject property contains multiple districts/designations of (1) State Land Use Districts, (2) Maui Island Plan Growth Boundaries, (3) Community Plan Designations, or (4) County Zoning Districts; submit a signed and dated Land Use Designations Map, prepared by a licensed surveyor, showing the metes & bounds of the subject parcel and of each district/designation including any subdistricts.**
3) **If this will be used with a subdivision application AND the subject property contains multiple State Land Use Districts; submit an approved District Boundary Interpretation from the State Land Use Commission.**

(This section to be completed by ZAED)

LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION: [1]

☑ (SMA) Special Management Area

STATE DISTRICT: ☑ Urban ☐ Rural ☐ Agriculture ☐ Conservation

MAUI ISLAND PLAN: Growth Boundary: [2] ☑ Urban ☐ Small Town ☐ Rural ☐ Planned Growth Area ☐ Outside Growth Boundaries

Protected Area: [2] ☑ Preservation ☐ Park ☐ Greenbelt ☐ Greenway ☐ Sensitive Land ☐ Outside Protected Areas

COMMUNITY PLAN: [2] Open Space

COUNTY ZONING: Napili Bay Civic Improvement District

OTHER/COMMENTS: based on attached site plan

☐ (PD) Planned Development
☐ (PH) Project District
☐ See Additional Comments (Pg.2)
☐ See Attached LUD Map

FEMA FLOOD INFORMATION:

FLOOD HAZARD AREA ZONES [3] & BASE FLOOD ELEVATIONS: AE (25'-26') based on attached site plan

☐ FEMA DESIGNATED FLOODWAY — For Flood Zone AO, FLOOD DEPTH:

☑ FLOOD DEVELOPMENT PERMIT REQUIRED (Zones V, VE, A, AO, AE, AH, D, & Floodways)

SUBDIVISION LAND USE CONSISTENCY: ☐ Not Consistent, (LUDs appear to have NO permitted uses in common).

_____ (Signature) ☐ Not Applicable, (Due to processing under consistency exemption No. ☐1, ☐2, ☐3, ☐4, ☐5).

☐ Interim Zoning, (The parcel or portion of the parcel that is zoned interim shall not be subdivided).

☐ [4] Consistent, (LUDs appear to have ALL permitted uses in common).

☐ [4] Consistent, upon obtaining an SMA, PD, or PH subdivision approval from Planning.

☐ [4] Consistent, upon recording a permissible uses unilateral agreement processed by Public Works (See Pg.2).

NOTES:

1 The conditions and/or representations made in the approval of a State District Boundary Amendment, Community Plan Amendment, County Change In Zoning, SMA Permit, Planned Development, Project District and/or a previous subdivision, may affect building permits, subdivisions, and uses on the land.

2 Please review the Maui Island Plan and the Community Plan document for any goals, objectives, policies or actions that may affect this parcel.

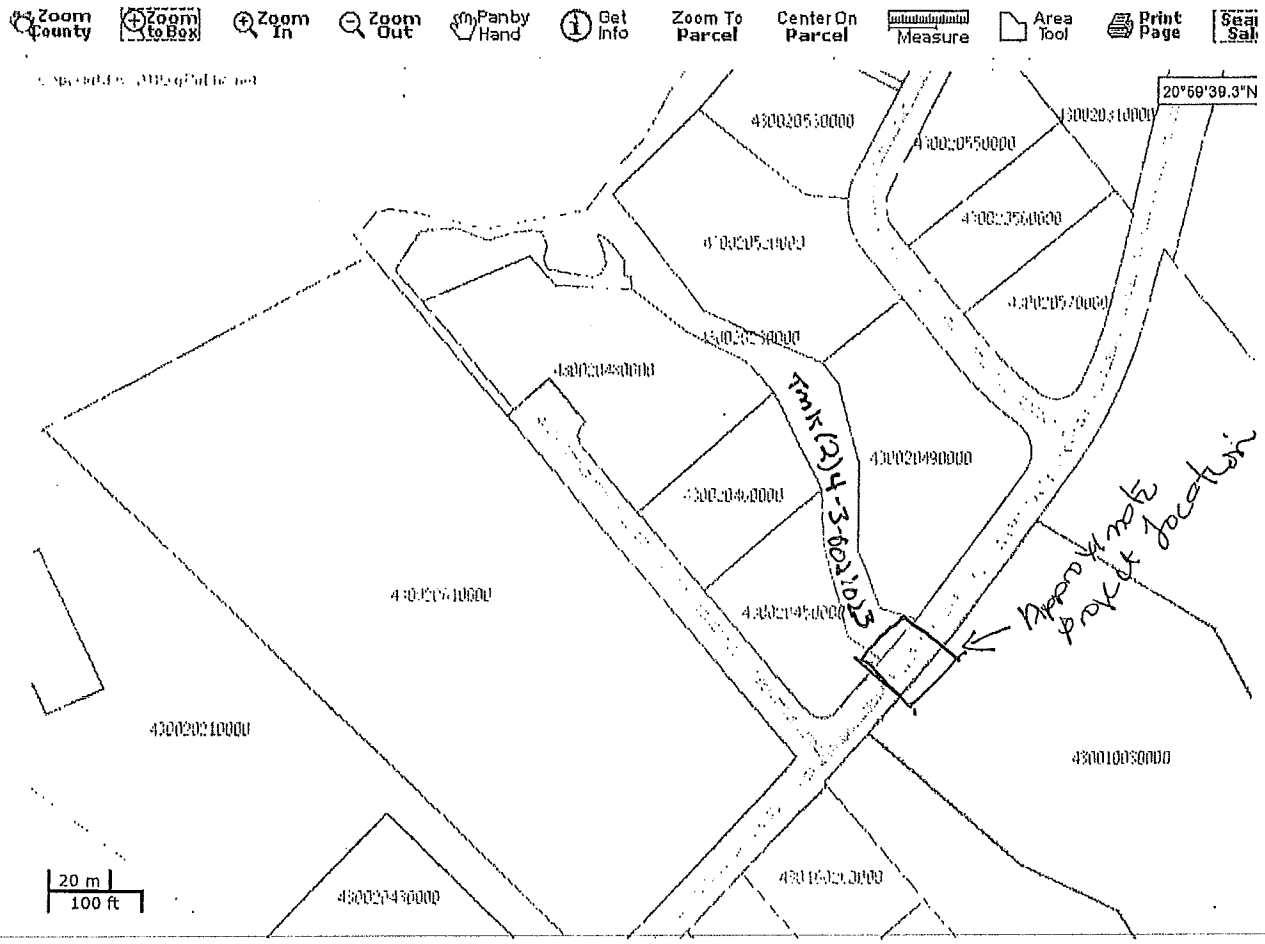
3 Flood development permits might be required in zones X and XS for any work done in streams, gulches, low-lying areas, or any type of drainageway; Flood development permits are required for work in all other zones. Subdivisions that include/adjoin streams, gulches, low-lying areas, or any type of drainageway might require the following designations to be shown on the subdivision map: 100-year flood inundation limits; base flood elevations; drainage reserves.

4 Subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030.D, Maui County Code].

REVIEWED & CONFIRMED BY:

_____ (Signature) 11/13/15 (Date)

For: John S. Rapacz, Planning Program Administrator, Zoning Administration and Enforcement Division



Maul County makes every effort to produce the most accurate information possible. No warranties, expressed or implied, are provided for the data he assessment information is from the last certified taxroll. All data is subject to change before the next certified taxroll.

NOV 13 2015

COUNTY OF MAUI
DEPARTMENT OF PLANNING
One Main Plaza Building
2200 Main Street, Suite 335
Wailuku, Hawaii 96793

Zoning Administration and
Enforcement Division (ZAED)
Telephone: (808) 270-7253
Facsimile: (808) 270-7634
E-mail: planning@mauicounty.gov

ZONING AND FLOOD CONFIRMATION FORM

RECEIVED
2015 NOV 12 PM 3:18
DEPT OF PLANNING
ZONING DIVISION

(This section to be completed by the Applicant)

APPLICANT NAME Munekiyo Hiraga TELEPHONE 244-2015

PROJECT NAME Napili Culvert Replacement E-MAIL planning@munekiyohiraga.com

PROPERTY ADDRESS Vicinity of Napili Place/Lower Honoapiilani Road TAX MAP KEY (2) 4-3-002:999 (Lower Honoapiilani Road)

☐ Yes ■ No **Will this Zoning & Flood Confirmation Form be used with a Subdivision Application?**
IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A) ☐ Yes ☐ No **Will it be processed under a consistency exemption from** Section 18.04.030(B), MCC?
IF YES, which exemption? (No. 1, 2, 3, 4 or 5) _____

B) State the purpose of subdivision and the proposed land uses (*ie 1-lot into 2-lots for all land uses allowed by law*):

INSTRUCTIONS:
1) **Please use a separate Zoning & Flood Confirmation Form for each Tax Map Key (TMK) number.**
2) **If this will be used with a subdivision application AND the subject property contains multiple districts/designations of (1) State Land Use Districts, (2) Maui Island Plan Growth Boundaries, (3) Community Plan Designations, or (4) County Zoning Districts; submit a signed and dated Land Use Designations Map, prepared by a licensed surveyor, showing the metes & bounds of the subject parcel and of each district/designation including any subdistricts.**
3) **If this will be used with a subdivision application AND the subject property contains multiple State Land Use Districts; submit an approved District Boundary Interpretation from the State Land Use Commission.**

(This section to be completed by ZAED)

LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION: [1]

☑ (SMA) Special Management Area

STATE DISTRICT: ☑ Urban ☐ Rural ☑ Agriculture ☐ Conservation

MAUI ISLAND PLAN
Growth Boundary: [2] ☑ Urban ☐ Small Town ☐ Rural ☐ Planned Growth Area ☐ Outside Growth Boundaries
Protected Area: [2] ☐ Preservation ☐ Park ☐ Greenbelt ☐ Greenway ☐ Sensitive Land ☑ Outside Protected Areas

COMMUNITY PLAN: [2] Multi-Family Residential

COUNTY ZONING: Interim

OTHER/COMMENTS: all info. based on attached site plan

☐ (PD) Planned Development
☐ (PH) Project District
☐ See Additional Comments (Pg.2)
☐ See Attached LUD Map

FEMA FLOOD INFORMATION:

FLOOD HAZARD AREA ZONES [3] & BASE FLOOD ELEVATIONS: AE (31') * TMK: 4-3-002:999

☐ FEMA DESIGNATED FLOODWAY | For Flood Zone AO, FLOOD DEPTH:

☑ FLOOD DEVELOPMENT PERMIT REQUIRED (Zones V, VE, A, AO, AE, AH, D, & Floodways)

SUBDIVISION LAND USE CONSISTENCY: ☐ Not Consistent, (LUDs appear to have NO permitted uses in common).

_____ (Signature)
☐ Not Applicable, (Due to processing under consistency exemption No. ☐1, ☐2, ☐3, ☐4, ☐5).
☐ Interim Zoning, (The parcel or portion of the parcel that is zoned interim shall not be subdivided).

☐ [4] Consistent, (LUDs appear to have ALL permitted uses in common).
☐ [4] Consistent, upon obtaining an SMA, PD, or PH subdivision approval from Planning.
☐ [4] Consistent, upon recording a permissible uses unilateral agreement processed by Public Works (See Pg.2).

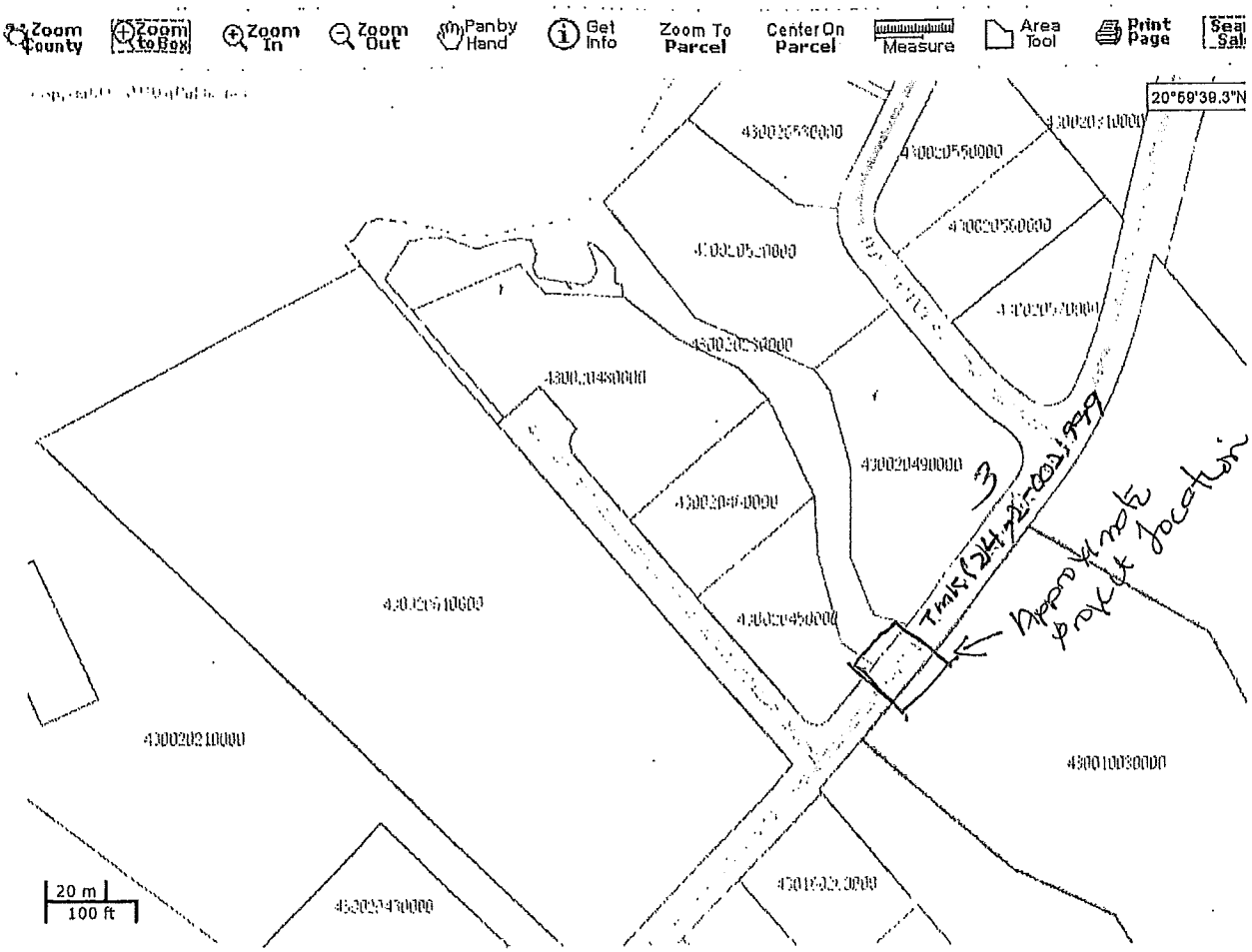
NOTES:

1 The conditions and/or representations made in the approval of a State District Boundary Amendment, Community Plan Amendment, County Change In Zoning, SMA Permit, Planned Development, Project District and/or a previous subdivision, may affect building permits, subdivisions, and uses on the land.
2 Please review the Maui Island Plan and the Community Plan document for any goals, objectives, policies or actions that may affect this parcel.
3 Flood development permits might be required in zones X and XS for any work done in streams, gulches, low-lying areas, or any type of drainageway; Flood development permits are required for work in all other zones. Subdivisions that include/adjoin streams, gulches, low-lying areas, or any type of drainageway might require the following designations to be shown on the subdivision map: 100-year flood inundation limits; base flood elevations; drainage reserves.
4 Subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement (Section 18.04.030.D, Maui County Code).

REVIEWED & CONFIRMED BY:

_____ (Signature) 11/13/15 (Date)

For: John S. Rapacz, Planning Program Administrator, Zoning Administration and Enforcement Division



Maui County makes every effort to produce the most accurate information possible. No warranties, expressed or implied, are provided for the data he assessment information is from the last certified taxroll. All data is subject to change before the next certified taxroll.

JAN 15 2016

DAVID Y. IGE
GOVERNOR

FORD N. FUCHIGAMI
DIRECTOR

Deputy Directors
JADE T. BUTAY
ROSS M. HIGASHI
EDWIN H. SNIFFEN
DARRELL T. YOUNG

IN REPLY REFER TO:
STP 8.1916

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

January 5, 2016

Ms. Cheryl K. Okuma
Senior Associate
Munekiyo Hiraga, Inc
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

Subject: Napili Culvert Replacement Project
Early Consultation Request
Lahaina, Maui, Hawaii
TMK: (2) 4-3-001:003 (Por.); 4-3-002:023 (Por.) and 045 (Por.)

The subject project is not expected to significantly impact the State highway facility. However, a permit from DOT Highways Division, Maui District Office is required for the transport of oversized and/or overweight materials and equipment on State highway facilities.

If there are any questions, please contact Mr. Norren Kato of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Sincerely,

FOR FORD N. FUCHIGAMI
Director of Transportation

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Ford N. Fuchigami, Director
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui, Ref: STP 8.1916

Dear Mr. Fuchigami:

Thank you for your letter dated January 5, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW), we provide the following response to State of Hawai'i, Department of Transportation's (SDOT) comment regarding the project.

Comment:

The subject project is not expected to significantly impact the State highway facility. However, a permit from DOT Highways Division, Maui District Office is required for the transport of oversized and/or overweight materials and equipment on State highway facilities.

Response:

We acknowledge SDOT's comment that the proposed project is not expected to significantly impact the State highway facility. As may be necessary for the project, a permit from the SDOT Highways Division, Maui District Office will be obtained in the event oversized and/or overweight materials and equipment would need to be transported on State highway facilities.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith, P.E., County of Maui, Department of Public Works
Mike Silva, P.E., Fukumoto Engineering, Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\SDOT response.doc

JAN 2 2 2016

DAVID Y. IGE
GOVERNOR

ARTHUR J. LOGAN
MAJOR GENERAL
ADJUTANT GENERAL

KENNETH S. HARA
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

JAN 19 2016

Ms. Cheryl K. Okuma
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

Subject: Early Consultation Request for Napili Culvert Replacement Project, Lahaina, Maui; TMK: (2) 4-3-001:003 (por.) (Parcel 3), (2) 4-3-002: 023 (por.) (Parcel 23); (2) 4-3-002: 045 (por.) (Parcel 45); and 40-foot County ROW

Thank you for the opportunity to comment on the above project. The State of Hawaii Department of Defense has no comments to offer relative to the project.

Should you have any questions, please contact Mr. Lloyd Maki, Assistant Chief Engineering Officer at (808) 733-8441.

Sincerely,

ARTHUR J. LOGAN
Major General
Hawaii National Guard
Adjutant General

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Major General Arthur J. Logan
State of Hawai'i
Department of Defense
Office of the Adjutant General
3949 Diamond Head Road
Honolulu, Hawai'i 96816-4495

SUBJECT: Early Consultation Letter Request for the Proposed Napili Culvert Replacement Project, Lahaina, Maui

Dear Major General Logan:

Thank you for your letter dated January 19, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works we acknowledge that the Department of Defense, Office of the Adjutant General has no comments in regards to the project.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\Defense Response.doc

DEC 23 2015

DAVID Y. IGE
GOVERNOR
STATE OF HAWAII

SHAN S. TSUTSUI
LT. GOVERNOR
STATE OF HAWAII

JOBIE M. K. MĀSAGATANI
CHAIRMAN
HAWAIIAN HOMES COMMISSION

WILLIAM J. AILA, JR.
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

December 21, 2015

Munekiyo Hiraga, Inc.
Attn: Cheryl K. Okuma
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Okuma:

Subject: Early Consultation Request for Napili Culvert Replacement Project, Lahaina, Maui

The Department of Hawaiian Home Lands acknowledges receiving the request for comments on the above-cited project. After reviewing the materials submitted, due to its lack of proximity to Hawaiian Home Lands, we do not anticipate any impacts to our lands or beneficiaries from the project.

However, we highly encourage all agencies to consult with Hawaiian Homestead community associations and other (N)native Hawaiian organizations when preparing environmental assessments in order to better assess potential impacts to cultural and natural resources, access and other rights of Native Hawaiians.

Mahalo for the opportunity to provide comments. If you have any questions, please call Julie-Ann Cachola, Planner at 620-9485 or contact via email at Julie-Ann.Cachola@hawaii.gov.

Mahalo,

M. Kaleo Manuel
Acting Planning Program Manager

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

M. Kaleo Manuel
Acting Planning Program Manager
State of Hawai'i
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, Hawai'i 96805

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Manuel:

Thank you for your letter dated December 21, 2015 on the subject project. On behalf of the County of Maui, Department of Public Works we offer the following responses in the order of the comments in your letter.

COMMENT:

The Department of Hawaiian Home Lands acknowledges receiving the request for comments on the above-cited project. After reviewing the materials submitted, due to its lack of proximity to Hawaiian Home Lands, we do not anticipate any impacts to our lands or beneficiaries from the project.

RESPONSE:

We understand that as the proposed project is not in proximity to Hawaiian Home Lands (HHL), the Department of Hawaiian Home Lands does not anticipate any impacts to HHL or beneficiaries from the project.

COMMENT:

However, we highly encourage all agencies to consult with Hawaiian Homestead community associations and other (N)native Hawaiian organizations when preparing environmental assessments in order to better assess potential impacts to cultural and natural resources, access and other rights of Native Hawaiians.

RESPONSE:

As the proposed project is anticipated to need a U.S. Army Corp of Engineers Section 404 Department of Army (Nationwide) Permit, Section 106 consultation with Hawaiian Homestead community associations and other native Hawaiian organizations per the National Historic Preservation Act of 1966 will be conducted. The Draft Environmental Assessment (EA) includes a cultural assessment discussion, including interview summaries.

We appreciate your input and will include a copy of your comment letter and this response in the Draft EA. A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering, Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DHHL response.doc

DAVID Y. IGE
GOVERNOR OF HAWAI'I

JAN 14 2016

SCOTT GLENN
INTERIM DIRECTOR

STATE OF HAWAI'I
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
Department of Health
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813
Telephone (808) 586-4185
Facsimile (808) 586-4186
Email: oeqchawaii@doh.hawaii.gov

January 11, 2016

Munekiyo Hiraga, Inc.
Attn: Cheryl Okuma, Senior Associate
305 High Sotreet, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma,

SUBJECT: Pre-Consultation Request for Napili Culvert Replacement Project, Lahaina, Maui

The Office of Environmental Quality Control has reviewed the information contained in your December 15, 2015 letter about the subject project, and offers the following comments for your consideration.

Based on the information provided, the OEQC recommends not just the use of erosion and stormwater BMPs during construction, but additional permanent mitigation measures for pollution and runoff prevention. The project's proximity to the shoreline likely would not allow runoff sufficient time to drop its sediment load and pollution before it reaches the ocean. OECQ recommends vegetation along the culvert that would help absorb pollution and sediment, while stabilizing the bank. A concrete channel for the culvert would intensify the runoff, pollution, and bacteria load on the nearby reef. Water quality testing before and after the project is also recommended to help determine if the mitigation measures are successful. Lastly, OEQC recommends taking future climate change into consideration. Sea levels and heavy precipitation events are projected to increase which the culvert design should be able to handle. OEQC looks forward to reviewing a Draft EA that includes sufficient information to enable recipients and the public to understand the project and to provide substantive feedback.

Thank you for your role in Hawaii's environmental review process and for the opportunity to comment at this early stage of this project. If you have any questions as you navigate this process, please consult our website at http://health.hawaii.gov/oeqc (see in particular the link to the Environmental Assessment Preparation Toolkit on the right panel) or contact our office at (808) 586-4185.

Sincerely,

Scott Glenn, Interim Director

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Scott Glenn, Director
State of Hawai'i
Department of Health
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Glenn:

Thank you for your letter dated January 11, 2016 on the subject project. The County of Maui, Department of Public Works (DPW) offers the following in response in the order of the comments in your letter.

COMMENT:

Based on the information provided, the OEQC recommends not just the use of erosion and stormwater BMPs during construction, but additional permanent mitigation measures for pollution and runoff prevention. The project's proximity to the shoreline likely would not allow runoff sufficient time to drop its sediment load and pollution before it reaches the ocean. OECQ recommends vegetation along the culvert that would help absorb pollution and sediment, while stabilizing the bank. A concrete channel for the culvert would intensify the runoff, pollution, and bacteria load on the nearby reef. Water quality testing before and after the project is also recommended to help determine if the mitigation measures are successful. Lastly, OEQC recommends taking future climate change into consideration. Sea levels and heavy precipitation events are projected to increase which the culvert design should be able to handle. OEQC looks forward to reviewing a Draft EA that includes sufficient information to enable recipients and the public to understand the project and to provide substantive feedback.

RESPONSE:

The Nāpili Bay and Beach Foundation, has planted native vegetation in the Nāpili Gulch downstream of the project area which will mitigate pollution and sediment during storm events before reaching the ocean. Additionally, based on

consultation with the Army Corps of Engineers, the project improvements have been revised to remove the Concrete Rubble Masonry (CRM) from the project. The CRM is proposed to be replaced with a concrete open block mat material (Armor Flex or approved equal) on the mauka (south) portion of the drainageway and ungrouted rip rap on the makai (north) portion of the drainageway.

The existing culverts do not have the capacity to handle the flows that have been experienced in the area. The design for the proposed culvert improvements will conform to the "Rules for the Design of Storm Drainage Facilities in the County of Maui" and as such, the drainage system design will handle a storm with a recurrence interval of 100 years. The project includes erosion and control and Best Management Practices (BMP) measures, including vegetating cut and fill slopes after grading work is completed, and maintaining these measures until grass and vegetation is established. The Draft Environmental Assessment (EA) includes a discussion of BMP measures in regards to the project. Additionally, a water quality survey report prepared by AECOS, Inc. for the project is included and discussed in the Draft EA. The report concluded that the project is not anticipated to affect the nearshore waters of Nāpili Bay which is of poor water quality. As recommended by the report a BMP plan and monitoring and assessment plan will be designed to implement for the project to minimize the potential for adverse impacts.

COMMENT:

Thank you for your role in Hawaii's environmental review process and for the opportunity to comment at this early stage of this project. If you have any questions as you navigate this process, please consult our website at http://health.hawaii.gov/oeqc (see in particular the link to the Environmental Assessment Preparation Toolkit on the right panel) or contact our office at (808) 586-4185.

RESPONSE:

The website noted in your letter and the link to the Environmental Assessment Preparation Kit will be consulted for any questions or your office contacted in the event we have questions regarding the EA process.

We appreciate your input and will include a copy of your comment letter as well as this response in the Draft EA. A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith, Department of Public Works
Mike Silva, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\OEQC Response.doc

JAN 2 2 2016

PHONE (808) 594-1888

FAX (808) 594-1938

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
560 N. NIMITZ HWY., SUITE 200
HONOLULU, HAWAI'I 96817

HRD 15-7710

December 28, 2015

Munekiyo Hiraga, Inc.
Attention Cheryl K. Okuma
305 High Street, Suite 104
Wailuku, HI 96793

Re: Early Consultation Request for Napili Culvert Replacement Project, Lahaina, Maui

Aloha Ms. Okuma:

The Office of Hawaiian Affairs (OHA) received your letter dated December 15, 2015, requesting comments on the above-titled project. Given the project descriptions provided, our agency has no comments at this time. Should you have any questions, please contact Everett Ohta at 594-0231 or everetto@oha.org.

'O wau iho nō me ka 'oia 'i'o,

Kamana'opono M. Crabbe, Ph.D.
Ka Pouhana, Chief Executive Officer

KC: acm

Please address replies and similar, future correspondence to our agency:
Dr. Kamana'opono Crabbe
Attn: OHA Compliance Enforcement
560 N. Nimitz Hwy., Ste. 200
Honolulu, Hawai'i 96817

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Kamana'opono M. Crabbe, Ph.D.
Chief Executive Officer
State of Hawai'i
Office of Hawaiian Affairs
Attention: OHA Compliance Enforcement
560 N. Nimitz Hwy., Suite 200
Honolulu, Hawai'i 96817

SUBJECT: Early Consultation Letter Request for the Proposed Napili Culvert Replacement Project, Lahaina, Maui; Ref: HRD 15-1770

Dear Dr. Crabbe:

Thank you for your letter dated December 28, 2015 on the subject project. On behalf of the County of Maui, Department of Public Works we acknowledge that the Office of Hawaiian Affairs has no comments at this time based on the project description provided to your office.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\OHA Response.doc

JAN 0 7 2016

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
DIRECTOR
OFFICE OF PLANNING

OFFICE OF PLANNING
STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

Ref. No. P-14999

January 4, 2016

Ms. Cheryl K. Okuma
Senior Associate
Munekiyo Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

Subject: Early Consultation Request for the Proposed Napili Culvert Replacement Project, Lahaina, Maui; TMK's: (2) 4-3-001:003 (por); (2) 4-3-002:023 (por); (2) 4-3-002:045

Thank you for the opportunity to provide comments on the pre-assessment consultation request for the Napili Culvert Replacement project, located in West Maui. The pre-consultation review material was transmitted to our office by letter dated December 15, 2015.

It is our understanding that the County of Maui, Department of Public Works proposes a drainage replacement in Napili to order to mitigate erosion of the embankment on the makai side of an existing culvert. Furthermore, the culverts and associated headwalls downstream are in a deteriorated condition. The project focuses on an existing culvert that is located along Lower Honoapiilani Road. It proposes construction work in the culvert area and within small areas above and below the roadway. The project calls for the removal of the two existing 90-inch by 40-inch box culverts and will replacement with two new eight-foot by five-foot precast box drainage culverts that will pass under the roadway.

Additional work includes replacement of guardrails and a six-foot high chain link fence, concrete apron, and extending the existing sidewalk on the makai side of the roadway in the vicinity of the culvert crossing. The road will be expanded from approximately 22 feet to 37 feet wide. Excavation work will extend 10 to 15 feet down to the new culvert.

There is an existing county owned waterline that is located above ground in the vicinity of the project site. The project will also involve the replacement and relocation of the waterline. The existing 14-inch force main in the right-of way will be removed and a new connection will be made.

The Office of Planning (OP) has reviewed the transmitted material and has the following comments to offer:

1. Pursuant to the Hawaii Administrative Rules (HAR) § 11-200-10(4) – general description of the action's technical, economic, social, and environmental characteristics; this project must demonstrate that it is consistent with a number of State environmental, social, and economic goals and policies for land use and housing development. OP provides technical assistance to State and county agencies in administering the statewide planning system in Hawaii Revised Statutes (HRS) Chapter 226, the Hawaii State Plan. The Hawaii State Plan provides goals, objectives, policies, and priority guidelines for growth, development, and the allocation of resources throughout the State in areas of state interest including but not limited to the economy, agriculture, the visitor industry, federal expenditure, the physical environment, facility systems, socio-cultural advancement, climate change adaptation, and sustainability.

   The Draft Environmental Assessment (Draft EA) should include an analysis that addresses whether the proposed project conforms or is in conflict with the goals, objectives, policies, and priority guidelines listed in the Hawaii State Plan.

2. The coastal zone management area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" see HRS § 205A-1 (definition of "coastal zone management area").

   HRS Chapter 205A requires all State and county agencies to enforce the coastal zone management (CZM) objectives and policies. The Draft EA should include an assessment as to how the proposed project conforms to the CZM objectives and its supporting policies set forth in HRS § 205A-2. The assessment on compliance with HRS § 205A-2 is an important component for satisfying the requirements of HRS Chapter 343. These objectives and policies include recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources.

3. The review material acknowledges that this site is within the Special Management Area (SMA) delineated by the County of Maui, Department of Planning and may be subject to SMA permitting. Please consult with said agency on the policies and procedures governing SMA permits.

4. The review material acknowledges the need for a U.S. Army Corps of Engineers Section 404 Department of the Army Nationwide Permit. If said permit is deemed necessary, then this project may require evaluation on Federal Consistency requirements as well. The national Coastal Zone Management Act requires direct federal activities and development projects to be consistent with approved state coastal program enforceable policies to the maximum extent practicable. Federal

actions are defined by this act as activities performed by a Federal agency or contractor for the benefit of a Federal agency; activities not performed by a Federal agency, but require federal permits or approval; or State and local government projects that receive Federal financial assistance.

OP is the lead state agency in charge of conducting Federal Consistency evaluations. Please contact our office on the procedures for this review.

5. Pursuant to HAR § 11-200-10(6) – identification and summary of impacts and alternatives considered; in order to ensure that the coastline and water resources near West Maui remain protected, the negative effects of stormwater inundation ensuing from development activities should be evaluated in the Draft EA. The area in question is an urbanized residential community. It is unclear what level of drainage infrastructure is in place along Lower Honoapiilani Road. The area surrounding the culvert appears to be heavily vegetated, with the concrete wall and guardrails in a state of deterioration. During heavy storm events, the gulch running under the roadway can transport upslope sediment, land-based pollutants, and toxicant-load contributions into nearshore waters of Napili Bay.

   The Draft EA should examine potential benefits and/or negative impacts resulting from this project on coastal and marine resources. Issues that may be examined in the Draft EA include, but are not limited to, project site characteristics in relation to erosion controls on flood prone areas, undeveloped open spaces, and the absorption characteristics of the soil. Furthermore, it should differentiate between the existing permeable surfaces versus hardened surfaces in the area. These items, as well as the marine water quality classification, should be considered when developing mitigation measures to protect the coastal ecosystem.

   The enclosed map of this project, as well as resources available to us, indicate that this project is located approximately 700 feet from the coastline of Napili Bay. The project site is located within an area zoned urban in the makai direction, and agricultural mauka of Honoapiilani Road. It is essentially a low-density residential region. Furthermore, portions of this project site are within the tsunami inundation zone and are within Flood Hazard Zone X.

   The Draft EA should examine the cumulative impact on coastal resources from land-based polluted runoff and sediment loss. It should take into account any of the natural features in the area, undeveloped open spaces, down-sloping topography, hardened non-permeable surfaces that have a cumulative effect on the volume and speed of storm runoff, and soil absorption rates.

   Furthermore, since this project involves expanding the roadway near the culvert and construction of a concrete rubble masonry apron along the culvert, please consider the

use of permeable surfaces and vegetated filter strips to treat the water in place, rather than allow the rainfall to flow offsite. Permeable roadway material, such as porous concrete pavers, will allow rainfall to be filtered on site, rather than to sheet flow into the stream area, and ultimately inundate the marine resources of Napili Bay.

OP has a number of resources available to assist in the development of projects which ensure sediment and stormwater control on land, thus protecting the nearshore environment. OP recommends consulting these guidance documents and stormwater evaluative tools when developing strategies to address polluted runoff. They offer useful techniques to keep land-based pollutants and sediment in place and prevent contaminating nearshore waters, while considering the practices best suited for this project. These three evaluative tools that should be used during the design process include:

- Hawaii Watershed Guidance provides direction on mitigation strategies in urban areas that will safeguard Hawaii's watersheds and implement watershed plans http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI Watershed Guidance Final.pdf

- Stormwater Impact Assessments can be used to identify and evaluate information on hydrology, stressors, sensitivity of aquatic and riparian resources, and management measures to control runoff, as well as consider secondary and cumulative impacts to the area http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_imapct/final_storm water_impact_assessments_guidance.pdf

- Low Impact Development (LID), A Practitioners Guide covers a range of structural best management practices (BMP's) for stormwater control management, roadway development, and urban layout that minimizes negative environmental impacts http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf

If you have any questions regarding this comment letter, please contact Josh Hekekia of our office at (808) 587-2845.

Sincerely,

Leo R. Asuncion
Director

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Leo R. Asuncion, Director
Office of Planning
State of Hawai'i
P. O. Box 2359
Honolulu, Hawai'i 96804

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui (Ref No. P-14999)

Dear Mr. Asuncion:

Thank you for your letter dated January 4, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the following responses in the order of the State of Hawai'i, Office of Planning comments regarding the project.

Comment:

1. *Pursuant to the Hawaii Administrative Rules (HAR) § 11-200-10(4) – general description of the action's technical, economic, social, and environmental characteristics; this project must demonstrate that it is consistent with a number of State environmental, social, and economic goals and policies for land use and housing development. OP provides technical assistance to State and county agencies in administering the statewide planning system in Hawaii Revised Statutes (HRS) Chapter 226, the Hawaii State Plan. The Hawaii State Plan provides goals, objectives, policies, and priority guidelines for growth, development, and the allocation of resources throughout the State in areas of state interest including but not limited to the economy, agriculture, the visitor industry, federal expenditure, the physical environment, facility systems, socio-cultural advancement, climate change adaptation, and sustainability.*

   The Draft Environmental Assessment (Draft EA) should include an analysis that addresses whether the proposed project conforms or is in conflict with the goals, objectives, policies, and priority guidelines listed in the Hawaii State Plan.

Response:

The Draft Environmental Assessment (EA) includes a discussion of the proposed project's conformance to the goals, objectives, policies and priority guidelines listed in the Hawai'i State Plan, HRS Chapter 226 and pursuant to Hawai'i Administrative Rules (HAR) Section 11-200-10(4).

Comment:

2. *The coastal zone management area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" see HRS § 205A-1 (definition of "coastal zone management area").*

   HRS Chapter 205A requires all State and county agencies to enforce the coastal zone management (CZM) objectives and policies. The Draft EA should include an assessment as to how the proposed project conforms to the CZM objectives and its supporting policies set forth in HRS § 205A-2. The assessment on compliance with HRS § 205A-2 is an important component for satisfying the requirements of HRS Chapter 343. These objectives and policies include recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources

Response:

The Draft EA includes an assessment of the project conformance to HRS, Chapter 205A pertaining to the CZM objectives and policies.

Comment:

3. *The review material acknowledges that this site is within the Special Management Area (SMA) delineated by the County of Maui, Department of Planning and may be subject to SMA permitting. Please consult with said agency on the policies and procedures governing SMA permits.*

Response:

As the project site is within the County of Maui's Special Management Area (SMA) designation, approval from the Department of Planning for an exemption

from SMA requirements or a SMA minor permit will be obtained for the project prior to construction.

Comment:

4. *The review material acknowledges the need for a U.S. Army Corps of Engineers Section 404 Department of the Army Nationwide Permit. If said permit is deemed necessary, then this project may require evaluation on Federal Consistency requirements as well. The national Coastal Zone Management Act requires direct federal activities and development projects to be consistent with approved state coastal program enforceable policies to the maximum extent practicable. Federal actions are defined by this act as activities performed by a Federal agency or contractor for the benefit of a Federal agency; activities not performed by a Federal agency, but require federal permits or approval; or State and local government projects that receive Federal financial assistance.*

   OP is the lead state agency in charge of conducting Federal Consistency evaluations. Please contact our office on the procedures for this review.

   Response:

   Consultation with U.S. Army Corps of Engineers is being conducted to determine whether a Section 404 Department of Army Nationwide Permit is required for the proposed project. We will follow-up with your office on Federal Consistency requirements should a Department of Army Permit be required.

Comment:

5. *Pursuant to HAR § 11-200-10(6) – identification and summary of impacts and alternatives considered; in order to ensure that the coastline and water resources near West Maui remain protected, the negative effects of stormwater inundation ensuing from development activities should be evaluated in the Draft EA. The area in question is an urbanized residential community. It is unclear what level of drainage infrastructure is in place along Lower Honoapiilani Road. The area surrounding the culvert appears to be heavily vegetated, with the concrete wall and guardrails in a state of deterioration. During heavy storm events, the gulch running under the roadway can transport upslope sediment, land-based pollutants, and toxicant-load contributions into nearshore waters of Napili Bay.*

The Draft EA should examine potential benefits and/ or negative impacts resulting from this project on coastal and marine resources. Issues that may be examined in the Draft EA include, but are not limited to, project site characteristics in relation to erosion controls on flood prone areas, undeveloped open spaces, and the absorption characteristics of the soil. Furthermore, it should differentiate between the existing permeable surfaces versus hardened surfaces in the area. These items, as well as the marine water quality classification, should be considered when developing mitigation measures to protect the coastal ecosystem.

Response:

There is an existing desilting basin upstream of the project area to reduce the amount of eroded sediment from agricultural fields reaching the nearshore area.

Additionally, based on pre-consultation with the Department of Army, the project improvements have been revised to include installation of a flexible concrete open mat material (Armor Flex or approved equal) within a mauka (south) portion of the drainageway and ungrouted rip rap in a makai (north) portion of the drainageway. The open concrete mat material will provide the opportunity for vegetation growth in the drainage basin.

AECOS, Inc. conducted a site visit in December 2015 and prepared a "Ordinary High Water Mark (OHWM) Delineation and Water Quality Survey of Napili Gulch" report. The report concluded that the proposed project is not anticipated to adversely affect the already poor water quality in the muliwai of Nāpili Gulch or in the nearshore waters of Nāpili Bay. A Best Management Practices (BMP) Plan and Monitoring and Assessment Plan was recommended by the report. The Draft EA includes discussion regarding the impacts on coastal and marine resources from the project and BMPs Report. The proposed improvements include open vegetated channels. Hardened surfaces were minimized. The stormwater velocity was reduced which will improve water quality by reducing erosion. Reduced velocity will also increase permeability which reduces the volume that reaches the ocean.

Comment:

The enclosed map of this project, as well as resources available to us, indicate that this project is located approximately 700 feet from the coastline of Napili Bay. The project site is located within an area zoned urban in the makai direction, and agricultural mauka of Honoapiilani Road. It is essentially a low-

density residential region. Furthermore, portions of this project site are within the tsunami inundation zone and are within Flood Hazard Zone X.

The Draft EA should examine the cumulative impact on coastal resources from land-based polluted runoff and sediment loss. It should take into account any of the natural features in the area, undeveloped open spaces, down-sloping topography, hardened non-permeable surfaces that have a cumulative effect on the volume and speed of storm runoff, and soil absorption rates.

Response:

The Draft EA includes discussion regarding the cumulative impact on coastal resources. As previously noted, the existing desilting basin upstream of the project site reduces the amount of eroded sediment from agricultural fields located mauka (east) of the project site reaching the nearshore area. The AECOS survey concluded that the proposed project is not anticipated to affect the already poor water quality in the muliwai of Nāpili Gulch or in the nearshore waters of Nāpili Bay.

Comment:

Furthermore, since this project involves expanding the roadway near the culvert and construction of a concrete rubble masonry apron along the culvert, please consider the use of permeable surfaces and vegetated filter strips to treat the water in place, rather than allow the rainfall to flow offsite. Permeable roadway material, such as porous concrete pavers, will allow rainfall to be filtered. on site, rather than to sheet flow into the stream area, and ultimately inundate the marine resources of Napili Bay.

OP has a number of resources available to assist in the development of projects which ensure sediment and storm water control on land, thus protecting the nearshore environment. OP recommends consulting these guidance documents and stormwater evaluative tools when developing strategies to address polluted runoff. They offer useful techniques to keep land-based pollutants and sediment in place and prevent contaminating nearshore waters, while considering the practices best suited for this project. These three evaluative tools that should be used during the design process include:

- *Hawaii Watershed Guidance provides direction on mitigation strategies in urban areas that will safeguard Hawaii's watersheds and implement watershed plans http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI Watershed Guidance Final.pdf*

- *Storm water Impact Assessments can be used to identify and evaluate information on hydrology, stressors, sensitivity of aquatic and riparian resources, and management measures to control runoff, as well as consider secondary and cumulative impacts to the area http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_imapct/final_stormwater_impact_assessments_guidance.pdf*

- *Low Impact Development (LID), A Practitioners Guide covers a range of structural best management practices (BMP's) for stormwater control management, roadway development, and urban layout that minimizes negative environmental impacts http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf*

Response:

Vegetated filter strips are installed adjacent to this project. Unfortunately there is not enough road width to extend the vegetated filter strips at the project location due to the width of the retaining walls. To minimize the impact of off-site flow, the stormwater design strategies being implemented for the project include open vegetated channels and reduction of stormwater velocity. As previously noted, the originally proposed CRM improvements have been replaced with the Armor Flex (or approved equal) material in the mauka (south) portion of the drainageway which will allow for vegetative growth in the drainageway and ungrouted rip rap will also be installed in the makai (north) portion of the drainageway. The decreased velocity will reduce erosion and increase permeability. The Design Team will review the Hawai'i Watershed Guidance, Stormwater Impact Assessments and Low Impact Development (LID), A Practitioners Guide for applicability and feasibility for project implementation.

We appreciate your input and will include a copy of your comment letter and this response in the Draft EA. A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:la
cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
Snookie Mello, AECOS
K:\DATA\FE\DPW Napili Culvert\ECL Responses\OP response.docx

JAN 19 2016

ALAN M. ARAKAWA
Mayor

STEWART STANT
Director

MICHAEL M. MIYAMOTO
Deputy Director

MICHAEL RATTE
Solid Waste Division

ERIC NAKAGAWA, P.E.
Wastewater Reclamation Division

COUNTY OF MAUI
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
2050 MAIN STREET, SUITE 1C
WAILUKU, MAUI, HAWAII 96793

January 13, 2016

Munekiyo Hiraga, Inc.
Attention: Cheryl K. Okuma
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: NAPILI CULVERT REPLACEMENT PROJECT
EARLY CONSULTATION
NAPILI, LAHAINA, MAUI

We reviewed the subject application and have the following comments:

1. Solid Waste Division comments:

   a. None.

2. Wastewater Reclamation Division (WWRD) comments:

   a. Submit construction plans to our division for review and approval prior to commencement of work.
   b. A Site Specific Spill Prevention Plan (SSSPP) and Bypass Plan shall be submitted to our division for review and approval prior to commencement of work.

If you have any questions regarding this letter, please contact Michael Miyamoto at 270-8230.

Sincerely,

STEWART STANT
Director of Environmental Management

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Stewart Stant, Director
County of Maui
Department of Environmental Management
2050 Main Street, Suite 1C
Wailuku, Hawai'i 96793

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Stant:

Thank you for your Department's letter dated January 13, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW) we offer the following responses in the order of the Department of Environmental Management, Wastewater Reclamation Division's (WWRD) comments regarding the project.

Wastewater Reclamation Division (WWRD) Comments:

Comment:

a. *Submit construction plans to our division for review and approval prior to commencement of work.*

Response:

The contract documents will include requirements for the contractor to submit construction plans to WWRD for review and approval prior to commencement of project work.

Comment:

b. A Site Specific Spill Prevention Plan (SSSPP) and Bypass Plan shall be submitted to our division for review and approval prior to commencement of work.

Response:

The project team will submit a SSSPP and Bypass Plan to the Division for review and approval prior to commencement of project work.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith, P.E., County of Maui, Department of Public Works
Mike Silva, P.E., Fukumoto Engineering, Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DEM response.doc

FEB 16 2016

ALAN M. ARAKAWA
MAYOR

JEFFREY A. MURRAY
FIRE CHIEF

ROBERT M. SHIMADA
DEPUTY FIRE CHIEF

COUNTY OF MAUI
DEPARTMENT OF FIRE AND PUBLIC SAFETY
FIRE PREVENTION BUREAU

313 MANEA PLACE • WAILUKU, HAWAII 96793
(808) 876-4690 • FAX (808) 244-1363

February 10, 2016

Munekiyo & Hiraga, Inc.
Attn: Cheryl K. Okuma, Senior Associate
305 High Street, Suite 104
Wailuku, HI 96793

Re: Napili Culvert Replacement Project
North of Napili Place, Napili, HI

Dear Cheryl:

In regards to your request for information for the referenced subject, our office provides the following comments:

- If there should be a prolonged period of time (4 hours or more) when the water supply for fire protection in the respective area is disconnected, the contractor for the project must notify the in-district fire station (Station 11- Napili).
- The in-district fire station shall also be notified of the closure of any roads.
- Once water supply for fire protection and fire apparatus access is back on-line, the in-district fire station shall be notified.

If there are any questions or comments, please feel free to contact me at (808) 876-4693.

Sincerely,

Paul Haake
Captain, Fire Prevention Bureau

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Captain Paul Haake
County of Maui
Department of Fire and Public Safety
Fire Prevention Bureau
313 Manea Place
Wailuku, Hawai'i 96793

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Captain Haake:

Thank you for your letter dated February 10, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW) we offer the following responses in the order of the Department of Fire and Public Safety, Fire Prevention Bureau's comments regarding the project.

Comment:

If there should be a prolonged period of time (4 hours or more) when the water supply for fire protection in the respective area is disconnected, the contractor for the project must notify the in-district fire station (Station 11-Napili)

Response:

A temporary by-pass waterline will be installed to eliminate long-term shut down of water supply for fire protection in the project area. The DPW will instruct the contractor for the project, that for any prolonged period of time (four (4) hours or more) when water supply for fire protection in the area is disconnected, there must be notification to the Nāpili Fire Station.

Comment:

The in-district fire station shall also be notified of the closure of any roads.

Response:

The DPW will instruct contractor to notify the Nāpili Fire Station of any road closures as a result of the project.

Comment:

Once water supply for fire protection and fire apparatus access is back on-line, the in-district fire station shall be notified.

Response:

Contractor will notify the Nāpili Fire Station, once water supply for fire protection and fire apparatus access is back on-line.

We appreciate your input and will include a copy of your comment letter as well as this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\Fire Response.doc

JAN 04 2016

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
HOUSING DIVISION
COUNTY OF MAUI

ALAN M. ARAKAWA
Mayor
CAROL K. REIMANN
Director
JAN SHISHIDO
Deputy Director

35 LUNALILO STREET, SUITE 102 • WAILUKU, HAWAII 96793 • PHONE (808) 270-7351 • FAX (808) 270-6284

December 23, 2015

Ms. Cheryl K. Okuma
Senior Associate
Munekiyo Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

Subject: Early Consultation Request for Napili Culvert Replacement Project at Lahaina, Maui, Hawaii (TMK (2) 4-3-001:003 (por.) (Parcel 3); (2) 4-3-002:023 (por.) (Parcel 23); (2) 4-3-002:045 (por.) (Parcel 45) and County ROW)

The Department has reviewed the request for Early Consultation for the above subject project. Based on our review, we have determined that the subject project is not subject to Chapter 2.96, Maui County Code. At the present time, the Department has no additional comments to offer.

Please call Mr. Veranio Tongson Jr. of our Housing Division at (808) 270-1741 if you have any questions.

Sincerely,

BUDDY A. ALMEIDA
Housing Administrator

cc: Director of Housing and Human Concerns

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Buddy A. Almeida
Housing Administrator
County of Maui
Department of Housing and Human Concerns
35 Lunalilo Street, Suite 102
Wailuku, Hawai'i 96793

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Almeida:

Thank you for your letter dated December 23, 2015 on the subject project. On behalf of the County of Maui, Department of Public Works, we acknowledge your comment that the subject project is not subject to Chapter 2.96 of the Maui County Code and that the Department of Housing and Human Concerns has no additional comments to offer regarding the project at this time.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DHHC response.doc

ALAN M. ARAKAWA
Mayor

KA'ALA BUENCONSEJO
Director

BRIANNE L. SAVAGE
Deputy Director

JAN 15 2016

(808) 270-7230
FAX (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

January 6, 2016

Cheryl K. Okuma
Munekiyo Hiraga, Inc.
305 High Street Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

SUBJECT: Early Consultation Request for Napili Culvert Replacement Project, Lahaina, Maui

Thank you for the opportunity to review and comment on the subject project. The Department of Parks & Recreation has reviewed the above proposed improvements to the drainage system in Napili, West Maui. The Department is in support of infrastructure upgrades and improving erosion control.

Please feel free to contact me or Robert Halvorson, Chief of Planning and Development, at 270-7931, should you have any questions.

Sincerely,

KA'ALA BUENCONSEJO
Director of Parks & Recreation

c: Brianne L. Savage, Deputy Director of Parks & Recreation
Robert Halvorson, Chief of Planning and Development
John Smith, Department of Public Works
Mike Silva, PE, Fukumoto Engineering, Inc.

KB:RH:as

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Ka'ala Buenconsejo, Director
County of Maui
Department of Parks & Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawai'i 96793

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Buenconsejo:

Thank you for your letter dated January 6, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW), we acknowledge the Department of Parks and Recreation comment in support of the proposed project as an infrastructure upgrade and to address erosion control.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith, P.E., County of Maui, Department of Public Works
Mike Silva, P.E., Fukumoto Engineering, Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\Parks response.doc

ALAN M. ARAKAWA
Mayor

WILLIAM R. SPENCE
Director

MICHELE CHOUTEAU McLEAN
Deputy Director

FEB 04 2016

COUNTY OF MAUI
DEPARTMENT OF PLANNING

February 3, 2016

Ms. Cheryl K. Okuma
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Okuma:

SUBJECT: EARLY CONSULTATION REQUEST FOR THE PROPOSED NAPILI CULVERT REPLACEMENT PROJECT, LAHAINA, MAUI, HAWAII; TMKS: (2) 4-3-001:003 (POR.) (2) 4-3-002:023 (POR.) AND 045 (POR.) AND THE 40-FOOT COUNTY RIGHT-OF-WAY (RFC 2015/0198)

The Department of Planning (Department) is in receipt of your request as noted above. The Department is very familiar with the site and has visited the site several times with respect to other permits mauka and makai of the culvert project in this same waterway. The Department understands that you are the authorized representative for the Department of Public Works.

The Department has the following comments on the subject proposed project:

1. The Department is in favor of this much needed replacement project;

2. The proposed action will require a Special Management Area (SMA) Assessment;

3. Please consult with the Napili Bay and Beach Foundation for comments. This foundation has been doing rehabilitation work in this gulch with the goal of improving the health of Napili Bay, downstream. Ms. Patricia Lundquist is the point of contact;

4. Research the available recent *West Maui Ridge to Reef Watershed Study* and discuss how this project supports the watershed project;

5. The proposed project should also support the upstream major watershed retention structure; and

6. The Department would appreciate the opportunity to review the Draft Environmental Assessment (EA) when it is available.

Thank you for the opportunity to comment on this matter. If additional clarification is required, please contact Coastal Resources Planner James Buika at james.buika@mauicounty.gov or at (808) 270-6271.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

for WILLIAM SPENCE
Planning Director

xc: John S. Rapacz, Planning Program Administrator (PDF)
James A. Buika, Coastal Resources Planner (PDF)
Tara Owens UH Sea Grant Extension Agent – Maui (PDF)
John Smith, Dept. of Public Works (PDF)
Development Services Administration
Mike Silva, PE, Fukumoto Engineering, Inc. (PDF)
Project File
General File

WRS:CIY:JAB:ls
K:\WP_DOCS\PLANNING\RFC\2015\0198_NapiliCulvert\CommentLtr.doc

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

William Spence, Director
Attention: Jim Buika, Planner
County of Maui
Department of Planning
2200 Main Street Suite 315
Wailuku, Hawai'i 96793

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Spence:

Thank you for your letter dated February 3, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW) we offer the following responses in the order of the Department of Planning's (DP) comments regarding the project.

Comment:

The Department is in favor of this much needed replacement project.

Response:

DP's support for the replacement project is acknowledged.

Comment:

The proposed action will require a Special Management Area (SMA) Assessment.

Response:

A SMA Assessment will be submitted to DP for a determination as to whether the proposed improvements are exempt from SMA requirements or may require a SMA minor permit.

Comment:

Please consult with the Napili Bay and Beach Foundation for comments. This foundation has been doing rehabilitation work in this gulch with the goal of improving the health of Napili Bay, downstream. Ms. Patricia Lundquist is the point of contact.

Response:

The Napili Bay and Beach Foundation is being consulted for comments regarding the project. Any comments from the Foundation and response to their comments will be included in the Draft Environmental Assessment (EA).

Comment:

Research the available recent West Maui Ridge to Reef Watershed Study and discuss how this project supports the watershed project.

Response:

The recent West Maui Ridge to Reef Watershed Study will be reviewed and discussed in the Draft EA.

Comment:

The proposed project should also support the upstream major watershed retention structure.

Response:

An outlet valve was constructed in the upstream sediment retention basin, which releases storm water flow from the desilting basin. The stormwater flow through Nāpili Gulch, reaches the existing Nāpili 4/5 culvert which will be replaced by the proposed new culvert improvements. The elevation of the culverts will be lowered to accommodate flows from the basin and reduce occurrences of stormwater overtopping Lower Honoapi'ilani Road. The proposed improvements are part of the drainage infrastructure in the area.

Comment:

The Department would appreciate the opportunity to review the Draft Environmental Assessment (EA) when it is available.

Response:

The Department will be provided the Draft EA for review when it is available.

We appreciate your input and will include a copy of your comment letter and this response in the Draft EA. A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera
Senior Associate

GR:la
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DP response.docx

ALAN M. ARAKAWA
Mayor

JAN 04 2016
JO ANNE JOHNSON-WINER
Director
MARC I. TAKAMORI
Deputy Director
Telephone (808) 270-7511

DEPARTMENT OF TRANSPORTATION

COUNTY OF MAUI
200 South High Street
Wailuku, Hawaii, USA 96793-2155

December 29, 2015

Ms. Cheryl Okuma
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Subject: Napili Culvert Project

Ms. Okuma,

Thank you for the opportunity to comment on this project. We have no comments to make regarding this project.

Please feel free to contact me if you have any questions.

Sincerely,

Jo Anne Johnson Winer
Director

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Don Medeiros, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawai'i 96793-2155

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Medeiros:

Thank you for your Department's letter dated December 29, 2015 on the subject project. On behalf of the County of Maui, Department of Public Works, we acknowledge that your Department has no comments to offer regarding the project at this time.

We appreciate your input and will include a copy of your Department's comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith PE, County of Maui, Department of Public Works
Mike Silva PE, Fukumoto Engineering Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\County DOT response.doc

JAN 15 2016

ALAN M. ARAKAWA
Mayor

DAVID TAYLOR, P.E.
Director

PAUL J. MEYER
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2155
www.mauiwater.org

January 4, 2016

Munekiyo & Hiraga, Inc.
Attention: Cheryl K. Okuma
305 High Street, Suite 104
Wailuku HI 96793

SUBJECT: Early Consultation Request for Napili Culvert Replacement Project, Lahaina
TMK: (2) 4-3-001:003 (por.), 4-3-002:023 (por.) and 4-3-002:045 (por.)

Dear Ms. Okuma,

Thank you for the opportunity to provide comments on the early consultation phase of the subject project.

The project site overlies the Honolua aquifer with a sustainable yield of eight (8) million gallons per day and is served by the Department of Water Supply's Lahaina System.

The proposed improvement involves the replacement and relocation of the 12-inch waterline which runs along Honoapiilani Highway. A detailed construction plan indicating the relocation site should be submitted to our Engineering Division for review. The project plan should also include the downtime so as to minimize service interruption.

In order to protect ground and surface water sources, we recommend that in addition to the required Best Management Practices (BMPs), the following measures designed to minimize infiltration and runoff be implemented during construction:

- Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the ground.
- Maintain vehicles and equipment to prevent oil or other fluids from leaking. Concrete trucks and tools used for construction should be rinsed off-site.
- Staging and storage of construction machinery and storage of debris should not take place on any sandy beach areas.
- Properly install and maintain erosion control barriers such as silt fencing or straw bales.
- Disturb the smallest area possible.

- Retain ground cover until the last possible date. Stabilize denuded areas by sodding or planting as soon as possible. Use high seeding rates to ensure rapid stand establishment. Apply biocides only during dry periods of low rainfall to minimize chemical run-off.
- Keep run-off on site.
- Construction debris and sediment should be removed from construction areas each day that construction occurs to prevent the accumulation of sediment and other debris.

Should you have any questions, please contact Edna Manzano, Staff Planner at 463-3108 or edna.manzano@co.maui.hi.us.

Sincerely,

David S. Taylor, P.E.
Director

eam
cc. Engineering Division

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

David S. Taylor, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawai'i 96793-2155

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Taylor:

Thank you for your letter dated January 4, 2016 on the subject project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the following responses to the Department of Water Supply's (DWS) comments regarding the project.

Comment:

The proposed improvement involves the replacement and relocation of the 12-inch waterline which runs along Honoapiilani Highway. A detailed construction plan indicating the relocation site should be submitted to our Engineering Division for review. The project plan should also include the downtime so as to minimize service interruption.

Response:

The project team will submit construction plans to DWS for review and approval prior to commencement of project work.

Comment:

In order to protect ground and surface water sources, we recommend that in addition to the required Best Management Practices (BMPs), the following measures designed to minimize infiltration and runoff be implemented during construction:

- *Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the ground.*
- *Maintain vehicles and equipment to prevent oil or other fluids from leaking. Concrete trucks and tools used for construction should be rinsed off-site.*
- *Staging and storage of construction machinery and storage of debris should not take place on any sandy beach areas.*
- *Properly install and maintain erosion control barriers such as silt fencing or straw bales.*
- *Disturb the smallest area possible.*
- *Retain ground cover until the last possible date. Stabilize denuded areas by sodding or planting as soon as possible. Use high seeding rates to ensure rapid stand establishment. Apply biocides only during dry periods of low rainfall to minimize chemical runoff.*
- *Keep runoff on site.*
- *Construction debris and sediment should be removed from construction areas each day that construction occurs to prevent the accumulation of sediment and other debris.*

Response:

BMP suggested by DWS will be considered and implemented where feasible. Due to the large storm flows, runoff will be allowed to leave the site with the installation of appropriate sediment and erosion control measures. Additional information regarding the proposed BMPs is included in the Draft Environmental Assessment (EA).

We appreciate your input and will include a copy of your comment letter and this response in the Draft EA. A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:tn
Cc: John Smith, P.E., County of Maui, Department of Public Works
Mike Silva, P.E., Fukumoto Engineering, Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\DWS response.doc

DEC 2 4 2015

NAPILI KAI
BEACH RESORT

December 18, 2015

Cheryl Okuma, Senior Associate
Munekiyo Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Okuma,

I am a member of the West Maui Taxpayers Board of Directors and recently received a copy of your December 15th letter to Rick Nava regarding the Napili Culvert Replacement Project. I was already aware of this project as a member of the Napili Bay and Beach Foundation Board of Directors.

As part of NBBF we had an opportunity to attend a presentation given by Mike Silva and John Smith on the Culvert Replacement Project a month or so ago and I am very much in favour of this project proceeding. I believe our only concern at the time was regarding the location of the staging area for equipment and how the existing bridge would be dismantled and the new bridge constructed. Essentially, our suggestion was to have the equipment located mauka of the bridge in the large field below the retention basin. We felt it was also a good idea to utilize the same area, mauka of the bridge, to remove the old bridge rather than attempting to demolish the bridge from the ocean side of the structure, which would be more hazardous for large equipment due to the steep terrane and potentially damaging to the many native plants we have introduced to the stream bed and banks on the ocean side of the bridge.

Regardless, NBBF is in favor of the project and hopes to work closely with the County and the contractor on completing this development in the best manner possible.

Aloha,

Gregg Nelson
General Manager
Napili Kai Beach Resort

GN:d

5900 Lower Honoapi'ilani Road, Lahaina, Hawai'i 96761 :: t: 808.669.6271 :: f: 808.669-5740 :: www.napilikai.com

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

February 21, 2017

Gregg Nelson, General Manager
Napili Kai Beach Resort
5900 Lower Honoapi'ilani Road
Lāhāina, Hawai'i 96761

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Mr. Nelson:

Thank you for your letter dated December 18, 2015. On behalf of the County of Maui, Department of Public Works (DPW), we offer the following responses in the order of the comments in your letter.

Comment:

I am a member of the West Maui Taxpayers Board of Directors and recently received a copy of your December 15th letter to Rick Nava regarding the Nāpili Culvert Replacement Project. I was already aware of this project as a member of the Nāpili Bay and Beach Foundation Board of Directors.

As part of NBBF we had an opportunity attend a presentation given by Mike Silva and John Smith on the Culvert Replacement Project a month or so ago and I am very much in favour of this project proceeding. I believe our only concern at the time was regarding the location of the staging area for equipment and how the existing bridge would be dismantled and the new bridge constructed. Essentially, our suggestion was to have the equipment located mauka of the bridge in the large field below the retention basin. We felt it was also a good idea to utilize the same area, mauka of the bridge, to remove the old bridge rather than attempting to demolish the bridge from the ocean side of the structure, which would be more hazardous for large equipment due to the steep terrane and potentially damaging to the many native plants we have introduced to the stream bed and banks on the ocean side of the bridge.

Response:

DPW will allow and encourage the contractor to use the large field area mauka of the culvert for staging and access. The design team agrees this would be the least disruptive to the surroundings.

Comment:

Regardless, NBBF is in favor of the project and hopes to work closely with the County and the contractor on completing this development in the best manner possible.

Response:

The project will include outreach to and working with NBBF by DPW for the implementation of the proposed work.

We appreciate your input and will include a copy of your comment letter and this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

Gwendolyn Rivera

Gwendolyn Rivera
Senior Associate

GR:la
cc: John Smith, County of Maui, Department of Public Works
Mike Silva, Fukumoto Engineering, Inc.
K:\DATA\FE\DPW Napili Culvert\ECL Responses\NapiliKaiBeachResort response.docx

NAPILI
Bay and Beach Foundation

PO Box 10823
Lahaina, HI 96761

Munekiyo Kiraga, Inc.
Attention: Cheryl K. Okuma
305 High Street, Suite 104
Wailuku, Hawaii 96793

March 1, 2016

Dear Ms. Okuma:

Thank you so much for your email letter of February 19th, soliciting early consultation on the proposed Napili Culvert Replacement Project , Lahaina, Hawaii. I have requested feedback from all Napili resort managers, as well as three water activity sports stores and two restaurants, all located on the makai side of Lower HonoaPi'ilani Road at Napili. I have 'signed' their names to this letter, below, and will pass along all updates you can provide.

Many of us have waited anxiously for years, for the 'old bridge' to be replaced, and especially for installation of sidewalks for improved pedestrian safety. We are pleased that this is now 'imminent'. We do have some concerns, from community and business perspectives, as well as from 'drainage' and erosion perspectives.

Overall big picture questions, comments and concerns

1. The vacant lot to south and makai side of the bridge has a new owner (not Mr. Svoboda). I believe Mike Silva (Fukumoto Eng.) has that information for this key stakeholder in this project.

2. We'd like **more information on the sewer work to be done** as part of this project. We have recently been made aware of the concerns about integrity of the old sewer pipes, and wonder if " The existing14 inch force main in the right of way (ROW) will be removed, as there will be a new connection to the existing 14 " sewer force main in the area", implies that the sewer lines on Lower HonoaPi'ilani Road in the Napili and Kapalua areas will be replaced at the same time as this project work is being done? Can you put us in touch with a Wastewater Department contact person who can provide that information?

3. The community (and I can be the point person for communications) will **need to know the Contractor or the point person from their company** in order to ensure that anything that impacts business as usual in Napili is known far enough in advance that the project and community life proceed as smoothly as possible. This includes:

- need to know when the projects will start, expected duration for road closures/traffic/noise/utilities impacts: how guests/customers will be informed
- environmental concerns which include damage to the streambed flora restoration project that is now beginning its third year. (see photos attached)
- creation of erosion events, especially during/following heavy rains, as we've been successful in mitigating 'brown water events' at Napili Bay and don't want that success to be 'undone'.

More Detailed Comments and Questions from Napili Bay stakeholders:

Drainage and Erosion :

1. The ephemeral streambed makai of the road was cleaned out from the bridge to ~ 250 ft. mauka of high tide mark, about 2 years ago. In that project, huge albizia trees and other woody plants, especially non-native plants were removed, and the south streambank and southern side of the streambed were planted with native plants for appropriate erosion control. Napili Bay and Beach Foundation and two Federal grants covered costs of this project. A concern is how much damage will occur to the two year old plants now filling in nicely in this restoration project. Our contractor has made suggestions for limiting large machinery use from the vacant lot, and **we hope further consultation between him and the contractor who is awarded this work, will keep damage of our repaired areas to a minimum.** We understand that new plants will be put in place for those vegetated areas that are damaged, but obviously new plants still have lots of exposed dirt around them and need much more care/ weeding/watering to become established. Our work was done as a way to protect the reef/marine life and water quality in the Bay from sedimented runoff, and we continue to support those efforts on multiple fronts.

2. As we all know, construction projects that have not effectively mitigated erosion from their building sites, have caused much destruction to the water quality and marine life of the coastal bays below them. This project will be so close to the water's edge that very stringent erosion controls (BMPs) will be necessary. We understand that new construction BMPs have been or are being created by Maui County. **We want the contractor to abide by the most stringent erosion controls before/during and after the project completion.**

3. Related to this, if the vacant lot is used as a large equipment staging site, more erosion will be created that can runoff into the streambed. This is because the lot has not been compacted, so the earth is easily disturbed/torn up. **Mike Silva has the name and contact information for the new owner so we definitely recommend you consult with him before the project begins.**

More Detailed questions and comments from Napili business community stakeholders

General Manager of a Napili beach resort:

- Work hours? Will homeowners / guests and staff need to use Office Road or Pineapple Hill to get in and out of Napili during this period?
- Will our water source be turned off? If so, how many days will our water be off? For how long each day? Will we receive advance notice of this the day of or day before regarding water shut off?
- Will our sewer be blocked or inoperable? For how long each day? Will we receive advance notice of this the day of or day before?

Manager of a watersports activity store in Napili:

- The construction site poses significant interruption in road traffic access to our Napili Village location.
- We can't afford this interruption during March, April, June, July or August–prime time for spring break and summer visitor arrivals.
- We'd also like to know the anticipated length of project and how electrical work will impact our ability to function during business hours - 7:30 AM to 5:30 PM.

Professional Forensic Architect who is a Napili Resort Property Board member :

- Overall schedule: start date, completion date.
- Will work be performed Monday through Friday? What will be the start/stop times?
- Should neighboring properties expect higher than normal noise levels prior to the county allowed start/stop times?
- Date(s) and time(s) that the road would be open/closed to through traffic
- If the road is to be closed for extended periods of time, will there be detours established? If so, where will the detour signs be posted?
- Where will flaggers be set? This sets the point along the road where drivers can expect to be stopped / slowed down.
- The maps indicate that the project will begin just north of Napili Place. The county should confirm that traffic in/out of Napili Place will not be effected.
- What equipment does the county envision being required? Where will the equipment be stored/staged?
- Where will materials be stored/staged?

The project is shown (Figure 2) to include a limited amount of pavement. Assuming equipment including delivery and haul off of soil/rock will be from the south along Lower Honoapi'ilani Road, it is likely that the truck traffic will damage the pavement, particularly in the area of turning around at Napili Place. Will the Contractor be required to restore the damaged asphalt?

What you can see is that knowing what to expect and having open communications with the contractors involved in both the Sewer and the Bridge Culvert Replacement Project is essential for the people, businesses and environment of Napili Bay. We appreciate the work to improve the roadway/bridge/culverts and sewer lines, as an important part of keeping the public works infrastructure sound and functional for Napili.

Sincerely,

Pat B. Lindquist

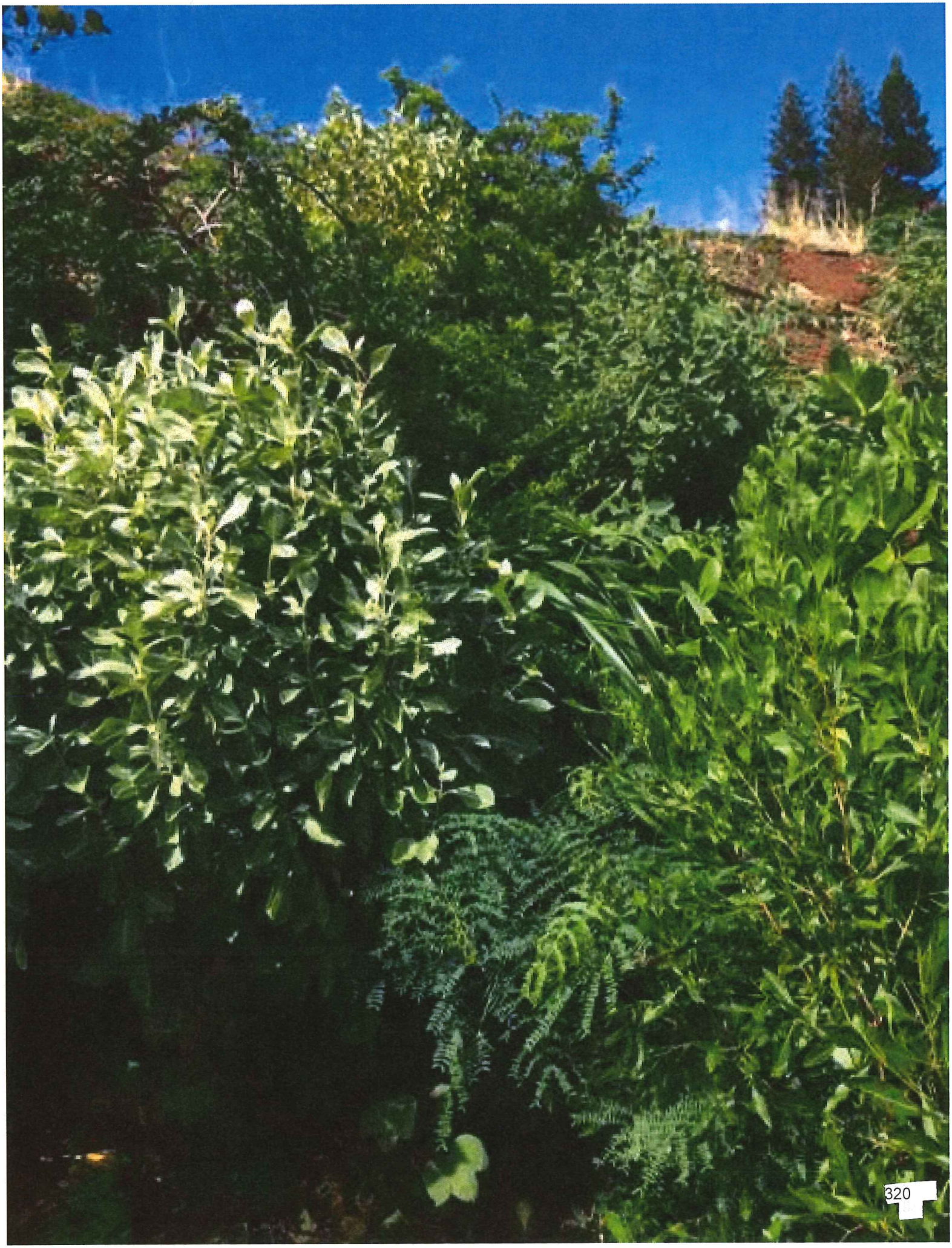
Pat B. Lindquist, President , Napili Bay and Beach Foundation

We are a non-profit organization formed to protect and improve the health of Napili beach and bay, tax ID # 20 5394259

Napili Bay and Beach Foundation BOD and Members: Gregg Nelson, Nane Aluli, Jamie Lung Ka'eo, Dana Reed, Scott Ullrich, Frederick Hidalgo, Lee Loomis, Dan Williams, Tano Taitano, Norm Runyan

Napili Bay and Beach Community Stakeholders: Joseph Ward, Dallas Mitchell, Robert Wintner, Joan Lloyd, Nick Yamada, Convergent Conservation, 808 Boards, Snorkel Bob's, Waterworks Sports, Iron Imu, and The Gazebo

cc. John Smith, Department of Public Works
Mike Silva, PE, Fukumoto Engineering, Inc.


320

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT
Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

April 20, 2016

Email: pblindquist@gmail.com

Ms. Patricia Lindquist
Napili Bay and Beach Foundation
P.O. Box 10823
Lahaina, Hawai'i 96761

SUBJECT: Early Consultation Letter Request for the Proposed Nāpili Culvert Replacement Project, Lāhainā, Maui

Dear Ms. Lindquist:

Thank you for your letter dated March 1, 2016. On behalf of the County of Maui, Department of Public Works (DPW), we offer the following responses in the order of the comments in your letter.

Comment:

I have requested feedback from all Napili resort managers, as well as three water activity sports stores and two restaurants, all located on the makai side of Lower HonoaPi'ilani Road at Napili. I have 'signed' their names to this letter, below, and will pass along all updates you can provide.

Many of us have waited anxiously for years, for the 'old bridge' to be replaced, and especially for installation of sidewalks for improved pedestrian safety. We are pleased that this is now 'imminent'. We do have some concerns, from community and business perspectives, as well as from 'drainage' and erosion perspectives.

Response:

We acknowledge that due to some concerns from the community and businesses, you requested comments from all Napili Resort managers as well as three (3) water activity sports stores and two (2) restaurants located on the makai side of Lower Honoapi'ilani Road in the vicinity of the proposed project area and that you will be distributing any project updates to the individuals listed in your letter.

Overall Big Picture Questions, Comments and Concerns

Comment:

1. The vacant lot to south and makai side of the bridge has a new owner (not Mr. Svoboda). I believe Mike Silva (Fukumoto Eng.) has that information for this key stakeholder in this project.

Response:

We understand from Mike Silva that the new owner of the vacant lot you indicate in your letter is VIP Retreat LLC.

Comment:

2. We'd like ***more information on the sewer work to be done*** *as part of this project. We have recently been made aware of the concerns about integrity of the old sewer pipes, and wonder if " The existing14 inch force main in the right of way (ROW) will be removed, as there will be a new connection to the existing 14 " sewer force main in the area", implies that the sewer lines on Lower HonoaPi'ilani Road in the Napili and Kapalua areas will be replaced at the same time as this project work is being done? Can you put us in touch with a Wastewater Department contact person who can provide that information?*

Response:

The contractor for the project will coordinate with the Department of Environmental Management, Wastewater Reclamation Division (WWRD) in regards to the proposed sewerline replacement for the project. Sewer improvements include the removal of the existing 14-inch force main and installation of 149 lineal feet of sewerline in Lower Honoapi'ilani Road in the vicinity of the project. A contact person at the Wastewater Reclamation Division is Juan Rivera and he can be reached at (808) 270-7268.

Separately, we understand that WWRD will be replacing the existing sewer force main in the area. The sewer force main project and this drainage culvert project will not likely be constructed at the same time. However, the two (2) projects will coordinate their improvements to the extent practical to eliminate duplication of work and minimize construction duration and traffic impact.

Comment:

3. The community (and I can be the point person for communications) will ***need to know the Contractor or the point person from their company*** *in order to ensure that anything that impacts business as usual in Napili is known far enough in advance that the project and community life proceed as smoothly as possible. This includes:*

- need to know when the projects will start, expected duration for road closures/traffic/noise/utilities impacts: how guests/customers will be informed
- environmental concerns which include damage to the streambed flora restoration project that is now beginning its third year. (see photos attached)
- creation of erosion events, especially during/following heavy rains, as we've been successful in mitigating 'brown water events' at Napili Bay and don't want that success to be 'undone'.

Response:

We understand that you will be a contact person for the purpose of communications in regards to the project and potential impacts on the community. When a contractor is selected for the project, information regarding a contact person will be provided to you. The project will be put out to bid for construction and a contractor selected after permits and approvals are obtained for the project (e.g. Special Management Area, Section 404 Department of Army, Section 404 State of Hawaii Water Quality Certification, and State of Hawaii Stream Channel Alternation Permit).

More Detailed Comments and Questions From Napili Bay Stakeholders

Comment:

1. The ephemeral streambed makai of the road was cleaned out from the bridge to ~ 250 ft. mauka of high tide mark, about 2 years ago. In that project, huge albizia trees and other woody plants, especially non-native plants were removed, and the south streambank and southern side of the streambed were planted with native plants for appropriate erosion control. Napili Bay and Beach Foundation and two Federal grants covered costs of this project. A concern is how much damage will occur to the two year old plants now filling in nicely in this restoration project. Our contractor has made suggestions for limiting large machinery use from the vacant lot, and ***we hope further consultation between him and the contractor who is awarded this work, will keep damage of our repaired areas to a minimum.*** *We understand that new plants will be put in place for those vegetated areas that are damaged, but obviously new plants still*

have lots of exposed dirt around them and need much more care/weeding/watering to become established. Our work was done as a way to protect the reef/marine life and water quality in the Bay from sedimented runoff, and we continue to support those efforts on multiple fronts.

Response:

In support of the efforts of the Nāpili Bay and Beach Foundation (NBBF) to protect marine life and water quality of the Nāpili Bay, DPW will inform the project's contractor, when the contract is awarded, to consult with you in order to avoid and minimize potential damage to the areas that NBBF repaired.

Comment:

2. As we all know, construction projects that have not effectively mitigated erosion from their building sites, have caused much destruction to the water quality and marine life of the coastal bays below them. This project will be so close to the water's edge that very stringent erosion controls (BMPs) will be necessary. We understand that new construction BMPs have been or are being created by Maui County. ***We want the contractor to abide by the most stringent erosion controls before/during and after the project completion.***

Response:

The project will implement Best Management Practices (BMPs) for erosion control as indicated in **Attachment "1"** and as required by the County of Maui and DPW. The County of Maui will ensure the contractor follows the BMPs during all phases of the project.

Comment:

3. Related to this, if the vacant lot is used as a large equipment staging site, more erosion will be created that can runoff into the streambed. This is because the lot has not been compacted, so the earth is easily disturbed/torn up. ***Mike Silva has the name and contact information for the new owner so we definitely recommend you consult with him before the project begins.***

Response:

VIP Retreat LLC, the new owner of the vacant lot referenced in your letter, will be consulted before the project begins in regards to use of the vacant property as a

construction equipment staging area and to address concerns of potential impacts from erosion.

More Detailed Questions and Comments From Napili Business Community Stakeholders

Comment:

General Manager of a Napili beach resort:

- *Work hours? Will homeowners / guests and staff need to use Office Road or Pineapple Hill to get in and out of Napili during this period?*

Response:

Construction work hours on open County roadways are 8:30 am to 3:30 pm, Monday through Friday. However, Lower Honoapiilani Road will need to be closed for an extended period of time while under construction and not reopened until construction is completed. During this time, those persons going in and out of Nāpili will need to use Office Road.

Comment:

- *Will our water source be turned off? If so, how many days will our water be off? For how long each day? Will we receive advance notice of this the day of or day before regarding water shut off?*

Response:

A temporary by-pass waterline will be installed to eliminate long-term shut down. In the event there is a project need that results in a prolonged period of time (4 hours or more) when water supply for fire protection in the area is disconnected, there will be notification to the Napili Fire Station as required by the Department of Fire and Public Safety. Further, the DPW will require the project's contractor to coordinate with NBBF if any prolonged period of water service restriction will affect the area residents and businesses.

Comment:

- *Will our sewer be blocked or inoperable? For how long each day? Will we receive advance notice of this the day of or day before?*

Response:

Sewer work will be done in a manner to avoid disruption to sewer service. In the event the project results in a disruption of service, residents in the area will be provided advance notice through the issuance of a press release and written notice from the DPW or project's contractor.

Comment:

Manager of a watersports activity store in Napili:

- *The construction site poses significant interruption in road traffic access to our Napili Village location.*
- *We can't afford this interruption during March, April, June, July or August– prime time for spring break and summer visitor arrivals.*
- *We'd also like to know the anticipated length of project and how electrical work will impact our ability to function during business hours - 7:30 AM to 5:30 PM.*

Response:

DPW will assess the feasibility of undertaking project construction outside of the spring break and summer season. Electrical work will be done in a manner to avoid disruption of electrical service. In the event the project results in a disruption of service, residents in the area will be provided advance notice through the issuance of a press release and written notice from the DPW or project's contractor.

Comment:

Professional Forensic Architect who is a Napili Resort Property Board member :

- *Overall schedule: start date, completion date.*

Response:

Generally, the DPW anticipates the Environmental Assessment (EA) and permitting processes for the proposed project to be in progress for the next 18 months. Once permits are secured for the project, the DPW will proceed through the selection process for a contractor. The construction timeframe is estimated to be 6 to 9 months once construction is initiated.

- *Will work be performed Monday through Friday? What will be the start/stop times?*

Response:

As previously noted, construction is currently anticipated to occur Monday through Friday between 8:30 am and 3:30 pm within County roadways. Prep and clean-up work can occur 30 minutes prior to and after those hours.

- *Should neighboring properties expect higher than normal noise levels prior to the county allowed start/stop times?*

Response:

Neighboring properties can expect normal noise levels outside of the construction times that are allowed. The DPW will require that the project's contractor secure all needed permits prior to the start of construction.

- *Date(s) and time(s) that the road would be open/closed to through traffic*

Response:

The DPW anticipates that the permitting process will be ongoing through the 18 months. The DPW will continue to keep the NBBF informed on the progress of the project. As such time when the specific details are confirmed for the project construction, the information will be shared with the NBBF.

- *If the road is to be closed for extended periods of time, will there be detours established? If so, where will the detour signs be posted?*

Response:

The project includes a traffic control plan which includes detour routes for extended periods of time. Preliminarily, detour signs are proposed to be posted on Honoapi'ilani Highway, Lower Honoapi'ilani Road, Napilihau Street, and Office Road.

- *Where will flaggers be set? This sets the point along the road where drivers can expect to be stopped / slowed down.*

Response:

The project does not anticipate the use of flaggers for the detour during road closure. Drivers will be notified by appropriate signage.

- *The maps indicate that the project will begin just north of Napili Place. The county should confirm that traffic in/out of Napili Place will not be effected.*

Response:

Local traffic in and out of Nāpili Place will be allowed to continue to access Lower Honoapi'ilani Road during construction, however, during the culvert replacement work, no left turns onto Lower Honoapi'ilani Road from Nāpili Place will be permitted.

- *What equipment does the county envision being required? Where will the equipment be stored/staged?*

Response:

Construction equipment anticipated for the project includes bulldozers, excavators, trucks, and a variety of other heavy equipment. DPW will encourage equipment to be stored and staged in the grassy area above Lower Honoapiilani Road.

- *Where will materials be stored/staged?*

Response:

DPW will encourage materials to be stored and staged in the grassy area above Lower Honoapiilani Road.

The project is shown (Figure 2) to include a limited amount of pavement. Assuming equipment including delivery and haul off of soil/rock will be from the south along Lower Honoapi'ilani Road, it is likely that the truck traffic will damage the pavement, particularly in the area of turning around at Napili Place. Will the Contractor be required to restore the damaged asphalt?

Response:

In the event of damage to the pavement in the area of turning around Nāpili Place, DPW will instruct the contractor to restore the damaged asphalt.

Comment:

What you can see is that knowing what to expect and having open communications with the contractors involved in both the Sewer and the Bridge Culvert Replacement Project is essential for the people, businesses and environment of Napili Bay. We appreciate the work to improve the roadway/bridge/culverts and sewer lines, as an important part of keeping the public works infrastructure sound and functional for Napili.

Response:

DPW acknowledges that there will be ongoing communication with the NBBF and community as the proposed project goes through its planning, design and construction phase, and that updates in regards to the project will be provided by the DPW, its consultants, or its contractors.

We appreciate your input and will include a copy of your comment letter as well as this response in the Draft Environmental Assessment (EA). A copy of the Draft EA will be sent to your office for review and comment. Should you have any questions or require further information regarding the proposed action, please contact me at 244-2015.

Very truly yours,

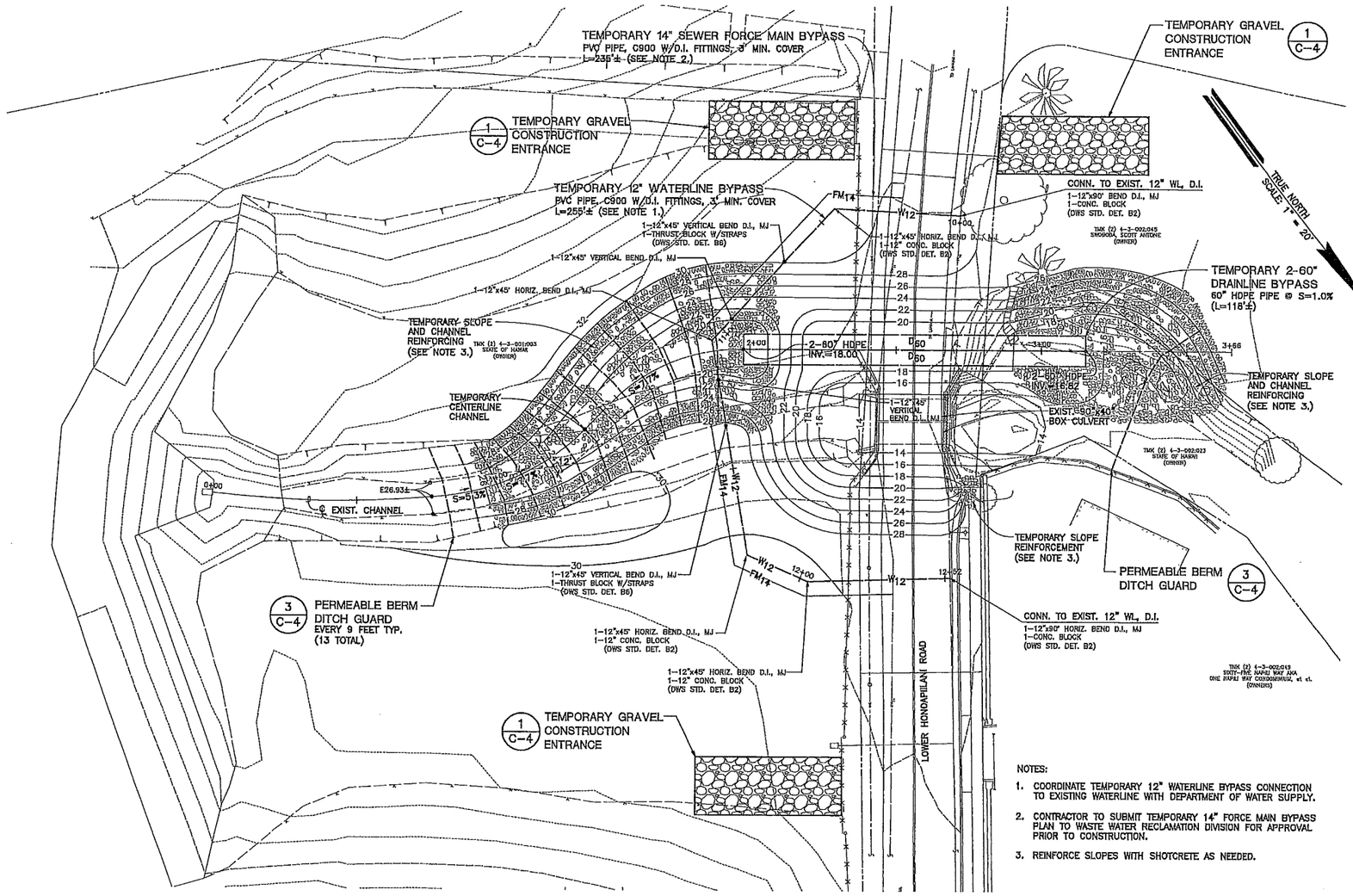
Cheryl K. Okuma

Cheryl K. Okuma
Senior Associate

CKO:la
Attachment
cc: John Smith PE, County of Maui, Department of Public Works (w/attachment)
Mike Silva PE, Fukumoto Engineering Inc. (w/attachment)
K:\DATA\FE\DPW Napili Culvert\ECL Responses\NapiliBayAndBeachFoundation response.docx

ATTACHMENT "1"

Erosion Control Best Management Practices Plan



NOTES:

1. COORDINATE TEMPORARY 12" WATERLINE BYPASS CONNECTION TO EXISTING WATERLINE WITH DEPARTMENT OF WATER SUPPLY.
2. CONTRACTOR TO SUBMIT TEMPORARY 14" FORCE MAIN BYPASS PLAN TO WASTE WATER RECLAMATION DIVISION FOR APPROVAL PRIOR TO CONSTRUCTION.
3. REINFORCE SLOPES WITH SHOTCRETE AS NEEDED.

PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 1
SCALE: 1" = 20'

SCALE IN FEET
0 10 20 30 40

EROSION CONTROL NOTES

THE FOLLOWING IS AN OUTLINE OF THE EROSION CONTROL MEASURES THAT WILL BE IMPLEMENTED FOR THIS PROJECT.

1. GENERAL EROSION CONTROL MEASURES
   - A. MINIMIZE TIME OF CONSTRUCTION.
   - B. RETAIN EXISTING GROUND COVER UNTIL THE LATEST DATE TO COMPLETE CONSTRUCTION.
   - C. PROVIDE TEMPORARY GRAVEL APRON(S) (APPROXIMATELY 50' LONG BY 30' WIDE) AT POINT OF CONNECTION TO PAVED STREET TO PREVENT TRACKING OF SEDIMENTS ONTO STREET.
   - D. CONTROL DUST BY SPRINKLING WITH WATER WAGONS OR OTHER SUITABLE METHODS. GRADED AREAS SHALL BE THOROUGHLY WATERED AFTER CONSTRUCTION ACTIVITY HAS CEASED FOR THE DAY AND ON WEEKENDS.
   - E. USE TEMPORARY BERMS AND CUT-OFF DITCHES, WHERE NEEDED, FOR CONTROL OF EROSION.
   - F. CONSTRUCT PERMANENT EROSION AND DRAINAGE CONTROL FEATURES AS EARLY AS POSSIBLE. ALL CUT AND FILL SLOPES SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER GRADING WORK HAS BEEN COMPLETED.
   - G. MAINTAIN EROSION CONTROL MEASURES UNTIL ESTABLISHMENT OF GRASS AND LANDSCAPE PLANTING.
2. SITE-SPECIFIC EROSION CONTROL MEASURES
   - A. INSTALL GOOD NEIGHBOR BARRIER AS NOTED ON PLAN. INSPECT BARRIER WEEKLY AND AFTER STORMS. REMOVE AND STABILIZE SEDIMENT WHEN IT REACHES A HEIGHT OF 8 INCHES AT THE BARRIER. SECURE GATE TO AREA DURING NON WORKING HOURS.
   - B. INSTALL SILT FENCES AS NOTED ON PLAN. INSPECT FENCES WEEKLY AND AFTER STORMS. REMOVE AND STABILIZE SEDIMENT WHEN IT REACHES A HEIGHT OF 8 INCHES AT THE FENCE.
   - C. INSTALL GRATED DRAIN INLET FILTER AS NOTED ON PLAN. INSPECT FILTER WEEKLY AND AFTER STORMS. REMOVE AND DISPOSE OF SEDIMENT AFTER EACH STORM EVENT.
   - D. INSTALL GRAVEL SNAKE BAG AS MANUFACTURED BY PROTECH GENERAL CONTRACTING SERVICES, INC., OR APPROVED EQUAL, PRIOR TO EXCAVATION WITHIN PAVEMENT. PROVIDE TRAFFIC CONTROL AS NECESSARY TO PROTECT EROSION CONTROL DEVICES. THE USE OF WATER TO CLEAN THE PAVEMENT IS PROHIBITED.
3. ADDITIONAL EROSION CONTROL NOTES
   - A. ALL CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY WEEKLY IN DRY PERIODS AND WITHIN 24 HOURS AFTER ANY RAINFALL OF 1/2 INCH OR GREATER WITHIN A 24-HOUR PERIOD. DURING PROLONGED PERIODS OF RAINFALL, DAILY CHECKING IS NECESSARY. THE PERMITTEE SHALL MAINTAIN RECORDS OF THE DURATION AND ESTIMATED VOLUME OF STORM WATER DISCHARGE(S), CHECKS, AND REPAIRS.
   - B. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND FUNCTIONAL BEFORE EARTH MOVING OPERATIONS BEGIN. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
   - C. A SPECIFIC INDIVIDUAL SHALL BE DESIGNATED TO BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROLS ON EACH PROJECT.
   - D. TEMPORARY SOIL STABILIZATION WITH APPROPRIATE VEGETATION SHALL BE APPLIED ON AREAS THAT WILL REMAIN UNFINISHED FOR MORE THAN 30 CALENDAR DAYS.
   - E. PERMANENT SOIL STABILIZATION WITH PERENNIAL VEGETATION OR PAVEMENT SHALL BE APPLIED AS SOON AS PRACTICAL AFTER FINAL GRADING. IRRIGATION AND MAINTENANCE OF THE PERENNIAL VEGETATION SHALL BE PROVIDED FOR 30 DAYS OR UNTIL THE VEGETATION TAKES ROOT, WHICHEVER IS SHORTER.

MINIMUM BEST MANAGEMENT PRACTICES

1. DRAINAGE: HANDLE DRAINAGE TO CONTROL EROSION, PREVENT DAMAGE TO DOWNSTREAM PROPERTIES, AND RETURN WATER TO THE NATURAL DRAINAGE COURSE IN A MANNER WHICH MINIMIZES SEDIMENTATION OR OTHER POLLUTION TO THE MAXIMUM EXTENT PRACTICABLE.
2. DUST CONTROL: CONTROL DUST EMISSIONS TO THE MAXIMUM EXTENT PRACTICABLE THROUGH BMPS SUCH AS WATER SPRINKLING, DUST FENCES, LIMITING AREA OF DISTURBANCE, AND TIMELY GRASSING OF FINISHED AREAS.
3. VEGETATION: RETAIN NATURAL VEGETATION, ESPECIALLY GRASSES, WHEREVER FEASIBLE. AVOID STORAGE OF GRUBBED MATERIALS NEAR WATERCOURSES.
4. EROSION CONTROLS: STABILIZE ALL DISTURBED AREAS WITH EROSION CONTROL MEASURES SUCH AS VEGETATION, RUNOFF DIVERSION, CHECK DAMS, MULCHING, BLANKETS, BONDED FIBER MATRICES, AND VEHICLE WHEEL WASH FACILITIES.
5. SEDIMENT CONTROL: CAPTURE SEDIMENT TRANSPORTED IN RUNOFF TO MINIMIZE THE SEDIMENT FROM LEAVING THE SITE WITH METHODS SUCH AS SEDIMENT BASINS, SEDIMENT TRAPS, SILT FENCES, SAND BAGS, AND VEGETATED FILTER STRIPS.
6. MATERIAL AND WASTE MANAGEMENT: PROPERLY STORE TOXIC MATERIAL AND PREVENT THE DISCHARGE OF POLLUTANTS ASSOCIATED WITH CONSTRUCTION MATERIALS.
7. TIMING OF CONTROL MEASURE IMPLEMENTATION: TIMING OF CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION CONTROL PLAN. DISTURBED AREAS OF CONSTRUCTION SITES THAT WILL NOT BE RE-DISTURBED FOR TWENTY-ONE DAYS OR MORE WILL BE STABILIZED (GRASSES OR GRAVELED) BY NO LATER THAN THE FOURTEENTH DAY AFTER THE LAST DISTURBANCE.

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 1

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

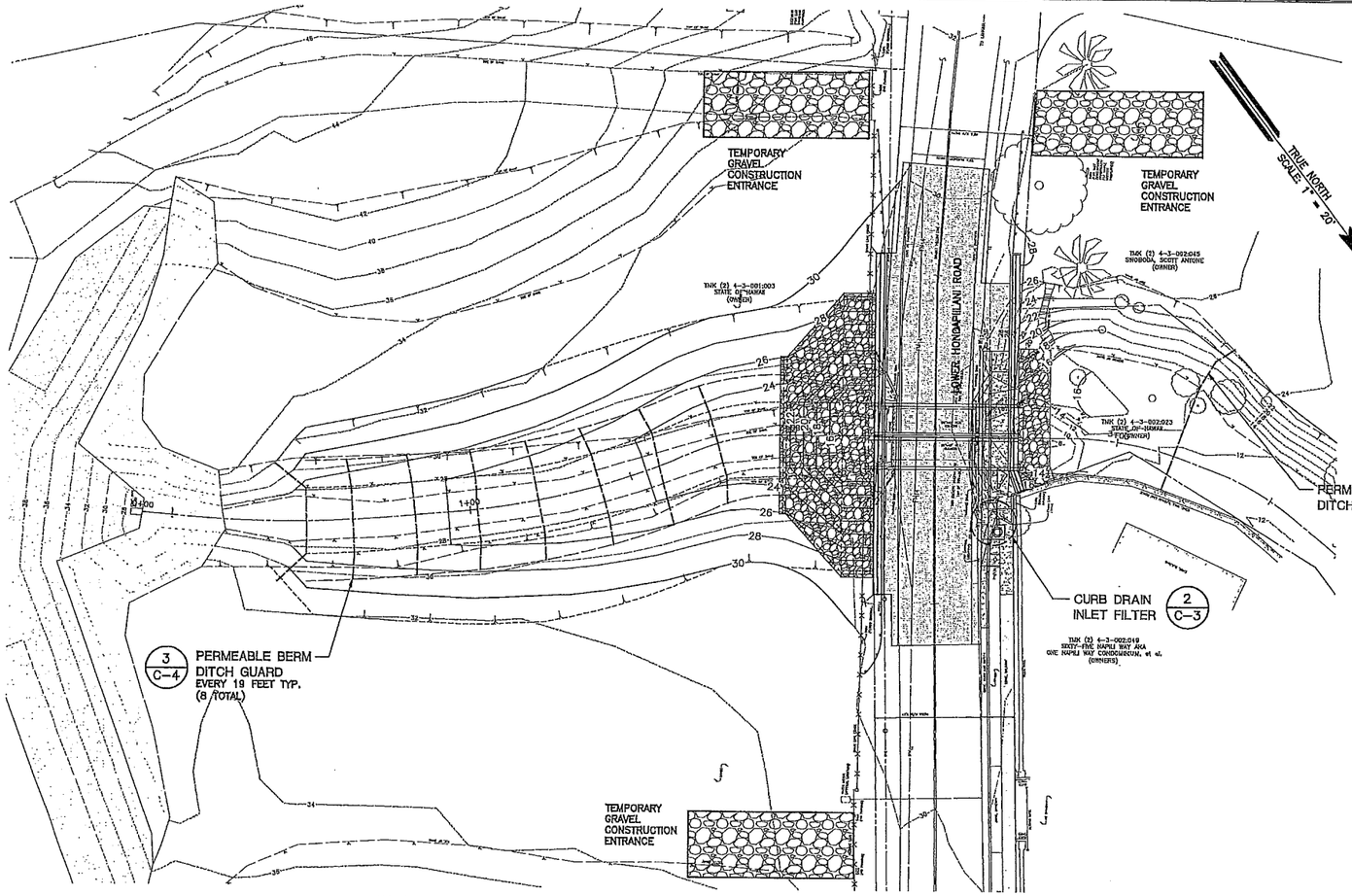
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2016

DESIGNED BY:	M.K.S.
DRAWN BY:	N.N., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 26, 2015
FILE NO:	COM60

SHEET C-3
4 OF 22

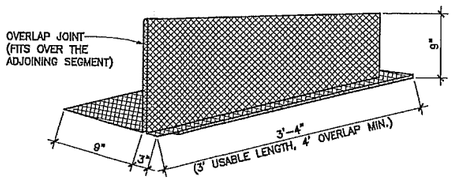
ATTACHMENT "1"



PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 2

SCALE: 1" = 10'

SCALE IN FEET
0 5 10 20 30



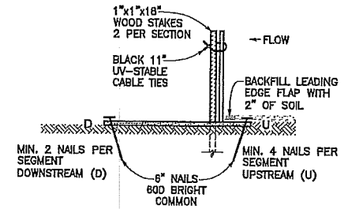
GRADIENT	DITCH GUARD 9" SPACING (FT.)
1%	76
2%	38
3%	25
4%	19
5%	15
6%	12
7%	11
8%	9

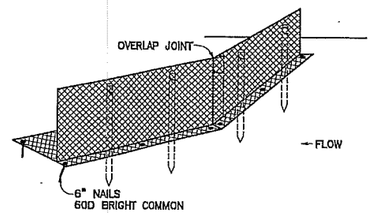
DESIGN SPACING = HEIGHT (0.75 FT.)/GRADIENT
(EXAMPLE: 5% GRADIENT 0.75 FT./0.05 = 15 FT.)

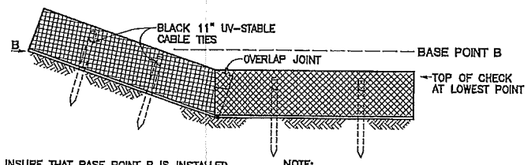
SPECIFICATIONS:

THE PERMEABLE BERMS SHALL BE DITCH GUARD™ AS MANUFACTURED BY ERTEC OR APPROVED EQUAL.

THE BERMS SHALL HAVE THE FOLLOWING PROPERTIES:
LENGTH: 3'-4" (3 FEET USABLE)
HEIGHT: 0.75 FEET
POLYMER: HDPE
INTEGRATED FILTER FABRIC FOR SCOUR PROTECTION
ANCHORS: 6" NAIL 60D BRIGHT COMMON
(4 UPSTREAM, 2 DOWNSTREAM)
DOWNSTREAM STAKES: 1"x1"x18" OR 1"x2"x18"
(2 PER SEGMENT)

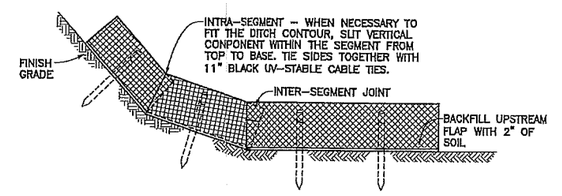


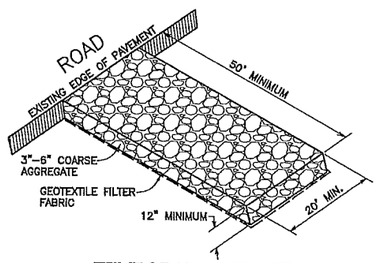




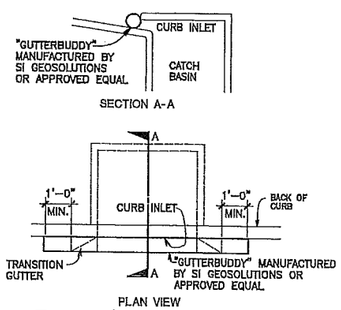
INSURE THAT BASE POINT B IS INSTALLED HIGHER THAN TOP EDGE TO PREVENT WATER FLANKING AND ENSURE FLOW TOWARD CHANNEL CENTER.

NOTE:
GRADIENTS GREATER THAN 5% MAY REQUIRE INSTALLATION OF EROSION BLANKET OR TURF REINFORCEMENT MAT ON BED OF CHANNEL.





1 C-4 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
NOT TO SCALE



2 C-4 CURB DRAIN INLET FILTER
NOT TO SCALE

3 C-4 PERMEABLE BERM DITCH GUARD DETAILS
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 2

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.
LICENSE EXPIRES: 04/30/2016

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 28, 2015
FILE NO:	COM60

SHEET C-4
5 OF 22

REFERENCES IX

IX. REFERENCES

Conte, Patty J. 2001, 2005. Archaeological Assessment Report for TMK: (2) 4-3-003:043 Mailepai Ahupua'a, Lāhainā District, Island of Maui. CRM Solutions Hawai'i, Inc., Makawao. On file at the State Historic Preservation Division, Kapolei.

Conte, Patty J. 2007. Archaeological Monitoring Report for Off-Site Construction Related to TMK (2) 4-3-003:043 (Mailepai Hui Land Lots 51 C-4-A, B, and C), Mailepai Ahupua'a, Lāhainā District Island of Maui. CRM Solutions Hawai'i, Inc., Makawao. On file at the State Historic Preservation Division, Kapolei.

County of Maui Charter (2003 Edition).

County of Maui, Department of Fire and Public Safety 2014-2015 Annual Report

County of Maui, "Island of Maui TMK Parcels," (GIS polygon shapefile). Created by Geographic Decision Systems International and County of Maui, (2010), Retrieved from http://hawaii.gov/dbedt/gis/download.htm.

County of Maui, Police Department 2013 Annual Report.

County of Maui, Police Department, http://co.maui.hi.us/index.aspx?NID=122, retrieved February 9, 2016.

County of Maui, "Special Management Areas." (GIS polygon shapefile). Digitized by Office of Planning using ArcInfo 7.1.1 from County blueline maps, (2009), Retrieved from http://hawaii.gov/dbedt/gis/download.htm.

County of Maui, Office of Economic Development, 2014 Maui County Data Book, February 2016.

County of Maui, Planning Department, Socio-Economic Forecast, Prepared for the County of Maui, June 2006.

County of Maui, 2030 General Plan Countywide Policy Plan, March 2010.

County of Maui, Maui Island Plan, December 2012.

County of Maui, West Maui Community Plan, 1996.

Federal Emergency Management Agency, Flood Insurance Rate Map Community/Panel No. 1500030262F, September 2012.

Fredericksen, E.M. and D.L. Fredericksen; 2003, 2000. An Archaeological Inventory Survey of the Lower Honoapiilani Road Improvements Corridor (TMK 4-3-03; 4-3-05; 4-3-10; 4-3-15) Lahaina, Maui Island. Xamanek Researches, Pukalani.

Geishman, Brickner & Bratton, Inc., Integrated Solid Waste Management Plan, Prepared for the County of Maui, February 2009.

HDR/Hawaii Pacific Engineers, Lāhainā Wastewater Pump Station No. 1 Modifications Preliminary Engineering Report, August 2007.

Kennedy, Joseph. 1990. Archaeological Inventory Survey of TMK: 4-3-02:68 and 69. Archaeological Consultants of Hawaii, Hale'iwa.

Kirch, Patrick; 1985. Feathered Gods and Fishhooks. University of Hawaii. Press, Honolulu.

Kirch, Patrick and Marshal Sahlins, 1992. Anahului: The Anthropology of History in the Kingdom of Hawaii. 2 Volumes. University of Chicago Press, Chicago.

Munekiyo & Hiraga, Inc., Final Environmental Assessment - Lower Honoapi'ilani Road Improvements (Hoohui Road to Nāpilihau Street), October 2002.

Munekiyo & Hiraga, Inc., Proposed Kahananui Bridge Replacement at Lower Honoapi'ilani Road – Application for Special Management Area Use Permit, June 2015.

Nees, R.C., R., Yamasato, S.D. Clark, and D. Gosser. 2005,2006. Archaeological Assessment for Two Adjacent Lots in Nāpili , Nāpili 4 and 4 Ahupua'a, Kā'anapali District, Island of Maui, TMK: 4-3-02:056 and 057. Pacific Consulting Services, Inc., Honolulu. On file at the State Historic Preservation Division, Kapolei.

Pacific Disaster Center. "Tsunami Evacuation Zones." [GIS polygon shapefile]. Digitized by Pacific Disaster Center using Arc View version 3.0a from State of Hawaii Civil Defense Tsunami Evacuation Zone proof maps. (1998). Retrieved from http://hawaii.gov/dbedt/gis/download.htm.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Maui, Hawai'i. Available online at http://soildatamart.nrcs.usda.gov. Accessed February 2012.

State of Hawai'i, Department of Agriculture, Agricultural Lands of Importance to the State of Hawaii, January 1977.

State of Hawai'i, Department of Agriculture, Agricultural Lands of Importance to the State of Hawai'i, (GIS polygon shapefile). Digitized by Office of State Planning using ArcInfo version 6 from State Department of Agriculture's 1:24,000 blueline maps. Retrieved from http://hawaii.gov/dbedt/gis/download.htm.

State of Hawai'i, Department of Labor and Industrial Relations, Local Area Unemployment Statistics, February 2017.

State Land Use Commission. "State Land Use District Boundaries." (GIS polygon shapefile). Digitized by Office of Planning using ArcInfo 4, 5, and 6 from State Land Use Commission's 1:24,000 mylar maps. (2010). Retrieved from http://hawaii.gov/dbedt/gis/download.htm. http://hawaii.gov/dbedt/gis/download.htm

Sterling, E.P., 1998. Sites of Maui, Bishop Museum Press, Honolulu.

Thram, T.G., 1909. Heiau and heiau sites throughout the Hawaiian Islands: Hawaiian, Honolulu.

University of Hawai'i, Land Study Bureau, Detailed Land Classification, Island of Maui, May 1967.
University of Hawai'i, Department of Geography, Atlas of Hawaii, Third Edition, 1999.

U.S. Census Bureau, 2000 Summary File 1, DP-1: Profile of General Demographic Characteristics: 2000, 2000.

U.S. Census Bureau, 2010 Census Redistricting Data, QT-PI – Race, Hispanic or Latino, Age, and Housing Occupancy: 2010, 2010.

U. S. Department of Agriculture, Soil Conservation Service, The Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, August 1972.

U.S. Fish and Wildlife Service; 2015. Endangered and Threatened Wildlife and Plants. www.fws.gov/endangered.

U.S. Geological Survey, Nāpili Quadrangle. (Topographic Map) 1997.

Walker, W.M., 1931. Archaeology of Maui. Manuscript. Department of Anthropology, B.P. Bishop Museum, Honolulu.

West Maui Ridge 2 Reef Initiative Website, http://www.westmauir2r.com/watershed-management-plans.html, February 2015.

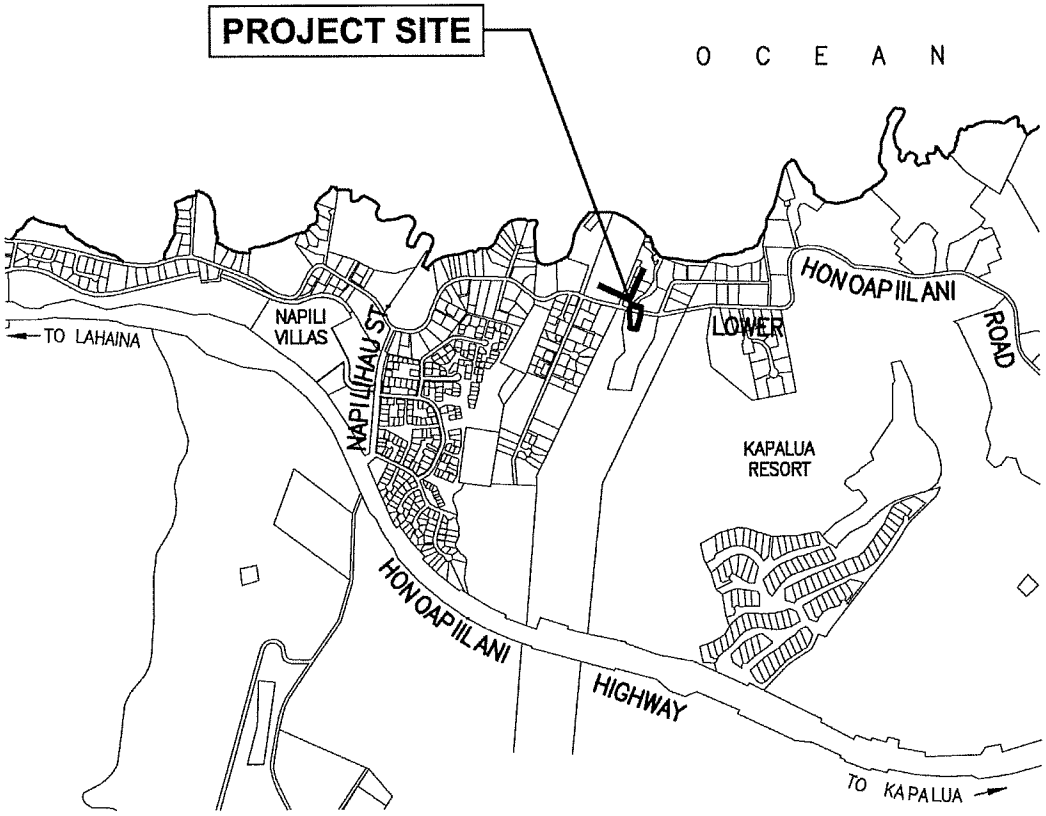
Drainage Report for Nāpili 4/5 Culvert Replacement

APPENDIX

A

DRAINAGE REPORT
For Napili 4/5 Culvert Replacement

Napili, Maui, Hawaii
Tax Map Keys (2) 4-3-001:003 and (2) 4-3-002:045



Client:

Department of Public Works, Engineering Division,
County of Maui
200 South High Street
Kalana O Maui Building, 4th Floor
Wailuku, Hawaii 96793

This work was prepared by me
or under my supervision.

MICHAEL E. SILVA
LICENSED PROFESSIONAL ENGINEER
No. 11185–C
HAWAII, U.S.A.

License Expires 4/30/2018

Consultant:

Fukumoto Engineering, Inc.
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
E-Mail: office@femaui.com

Date: October 31, 2016

TABLE OF CONTENTS

I. PURPOSE

The purpose of this report is to present storm drainage design information and to comply with Chapter 20.08, Soil Erosion and Sedimentation Control, of the Maui County Code to obtain a grubbing and grading permit.

II. PROJECT DESCRIPTION

A. General Location

The project involves replacing the Napili 4/5 Culvert on Lower Honoapiilani Road in Napili, Maui. The project area will include the property upstream of the culvert (owned by the State of Hawaii and maintained by the County of Maui), and the property downstream of the culvert (owned by the State of Hawaii). The site adjoins One Napili Way residences to the northwest. The drainageway is an unnamed gulch.

The tax map designates the project parcels as Tax Map Keys (2) 4-3-001:003 and (2) 4-3-002:045. (See Figure 1 - Location Map (USGS Map), page 5 and Figure 2 - Vicinity Map (Tax Map), page 6.)

B. Project Components

The project involves replacing the existing drainage culverts with two new 8-foot wide by 5-foot high box culverts with associated inlet and outlet wall structures, regrading the areas upstream and downstream of the culvert, and road improvements. Road improvements include installation of asphalt pavement, shoulder widening, sidewalk, fall protection railing, vehicle barriers, curb and gutter, drainage catch basin, drainline, and reinstallation of water and wastewater lines that cross above the new culvert.

III. DRAINAGE SYSTEM

A. Topography

The project area upstream of the culvert includes a grassy lot with a narrow drainageway located below Napili 4/5 Basin Structure No. 2. Elevations range from about 32 feet above mean sea level (AMSL) to 25 feet AMSL.

The project area within Lower Honoapiilani Road includes a paved roadway, and a sidewalk on the northwesterly side of the culvert. Concrete walls extend up above the pavement from both the inlet and outlet sides of the culvert. The walls provide 22-feet of travel lane across the top of the culvert. Elevations in the project area along the roadway are relatively flat and range from about 29 feet AMSL to 31 feet AMSL.

The project area downstream includes the drainageway, a vertical-face retaining wall to the northeast, and a vegetated slope to the southwest. The invert at the culvert outlet is about 24

feet AMSL. Storm water drops vertically about 16 feet to an elevation of 8 feet AMSL which causes scouring and erosion at the bottom of the drainageway. There is a concern of potential erosion below the culvert and walls that would undermine the structures. Elevations along the vegetated slope to the southwest range from about 14 feet AMSL to 26 feet AMSL. (See Figure 5 – Existing Grading Plan, page 9.)

B. Soil

According to the Soil Conservation Service, the site soils include Rough Broken and Stony Land (rRS). Rough Broken and Stony Land consists of very steep, stony gulches. The survey characterizes the soils as being generally less than 20 inches deep over saprolite or bedrock. Other characteristics include rapid runoff and active erosion. (See Figure 3 – Soil Map, page 7.)

C. Flood and Tsunami Hazard

According to the Flood Insurance Rate Map, the site is within a floodway area in Zone AE, an area subject to inundation due to storm water from upland areas. The base flood elevation at the site ranges from 21 feet AMSL to 32 feet AMSL. Floodways are noted to be kept free of encroachments so the 1% annual chance flood can be carried without substantial increases in flood heights. (See Appendix A - Flood Hazard Assessment Report.)

D. Existing Drainage Improvements

The existing drainage basin above the project site includes an 18.5-foot high by 262-foot long earthen embankment dam, a 13.5-foot wide concrete crest on top of the dam, and a 12-inch outlet drainline through the dam. The bottom of the 12-inch outlet drainline is set approximately 6 feet above the bottom of the basin. The total storage volume of the basin is roughly 1,080,000 cubic feet (cf) or 24.8 acre-feet. The area that drains into the site is 553 acres with a peak flow of 743 cubic feet per second (cfs) from a 100-year design storm. The drainage basin was designed as a sediment settling basin, and only reduces the peak flow of 100-year design storm to 734 cfs. (See Figure 4 – Drainage Area Map, page 8.)

Storm runoff passes under Lower Honoapiilani Road through two 90-inch by 40-inch box culverts. Allowing for 1 foot of freeboard (maximum storm water height to the top of the road surface), the culverts are capable of conveying approximately 250 cfs. After passing through the culverts, storm runoff travels through a gulch to the ocean. Our office has been informed by the Napili Bay and Beach Foundation, who are made up of managers of local condominiums, that heavy flooding overtops the dam, exceeds the capacity of the culvert at Lower Honoapiilani Road, and erodes the gulch downstream about every two years.

E. Proposed Drainage Improvements

All grading improvements are over 50 feet away from the toe of the embankment dam of the drainage basin. The drainage channel between the basin and culvert will be regraded to reduce erosion and improve water quality downstream of the proposed culvert. Native plantings will be used to stabilize and restore the regraded areas. The slope of the channel centerline will be increased and a drainage inlet structure will be installed on the upstream inlet side of the culvert to lessen the elevation difference on the downstream side of the channel. A channel liner will be installed to address the increased velocity of storm water on the upstream side of the culvert. The regraded channel will continue the meet the County drainage standards for a 100-year, 24-hour rainfall.

The culverts will be replaced with two 8-foot wide by 5-foot tall box culverts. The culverts will be lowered to eliminate the existing elevation drop at the outlet. Lowering the culverts will also allow adequate height at the culvert entrance measured from the invert to the roadway elevation. Sufficient freeboard is included in this height.

A drainage catch basin will be installed on the northwesterly side of the roadway that has a curb and gutter. An 18-inch drainline will connect the catch basin to the box culvert.

The County drainage standards require the use of a 100-year, 24-hour rainfall for computing volumes and rates of flow. Drainage design will be based on the Rational Method.

Drainage improvements that involve transmission of storm flows will conform to the "Rules for the Design of Storm Drainage Facilities in the County of Maui." The rules will be applied to the sizing of drain lines, channels, and culverts. Based on the County rules, the drainage system will be designed to handle a storm with a recurrence interval of 100 years since the drainage area is greater than 100 acres.

F. Conclusion

There will be no adverse effects on the adjacent or downstream properties due to this project. This conclusion is based on the proposed drainage improvement being designed to accommodate peak discharge rates.

IV. REFERENCES

1. City and County of Honolulu, Department of Public Works, Division of Engineering, *Storm Drainage Standards*, Honolulu, Hawaii, May 1988.

2. County of Maui, "Title MC-15, Department of Public Works and Waste Management, Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui," Wailuku, Hawaii, November 1995.

3. Federal Emergency Management Agency, Federal Insurance Administration, *Flood Insurance Study, Maui County, Hawaii*, December 1, 1980.

4. R. M. Towill Corporation, *Drainage Master Plan for the County of Maui*, Honolulu, Hawaii, October 1971.

5. U. S. Department of Agriculture, Soil Conservation Service, *Erosion and Sediment Control Guide for Hawaii*, Honolulu, Hawaii, March 1981.

6. U. S. Department of Agriculture, Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, Washington, D.C., August 1972.

7. U. S. Department of Agriculture, Soil Conservation Service, *Urban Hydrology for Small Watersheds*, Technical Release 55, Second Edition, Washington, D.C., June 1986.

8. U. S. Department of Commerce, Weather Bureau, *Rainfall-Frequency Atlas of the Hawaiian Islands for Areas to 200 Square Miles, Durations to 24 Hours, and Return Periods from 1 to 100 Years*, Technical Paper No. 43, Washington, D.C., 1962.

9. West Maui Watershed Management Advisory Committee, *West Maui Watershed Owners Manual*, Honolulu, Hawaii, November 1997.

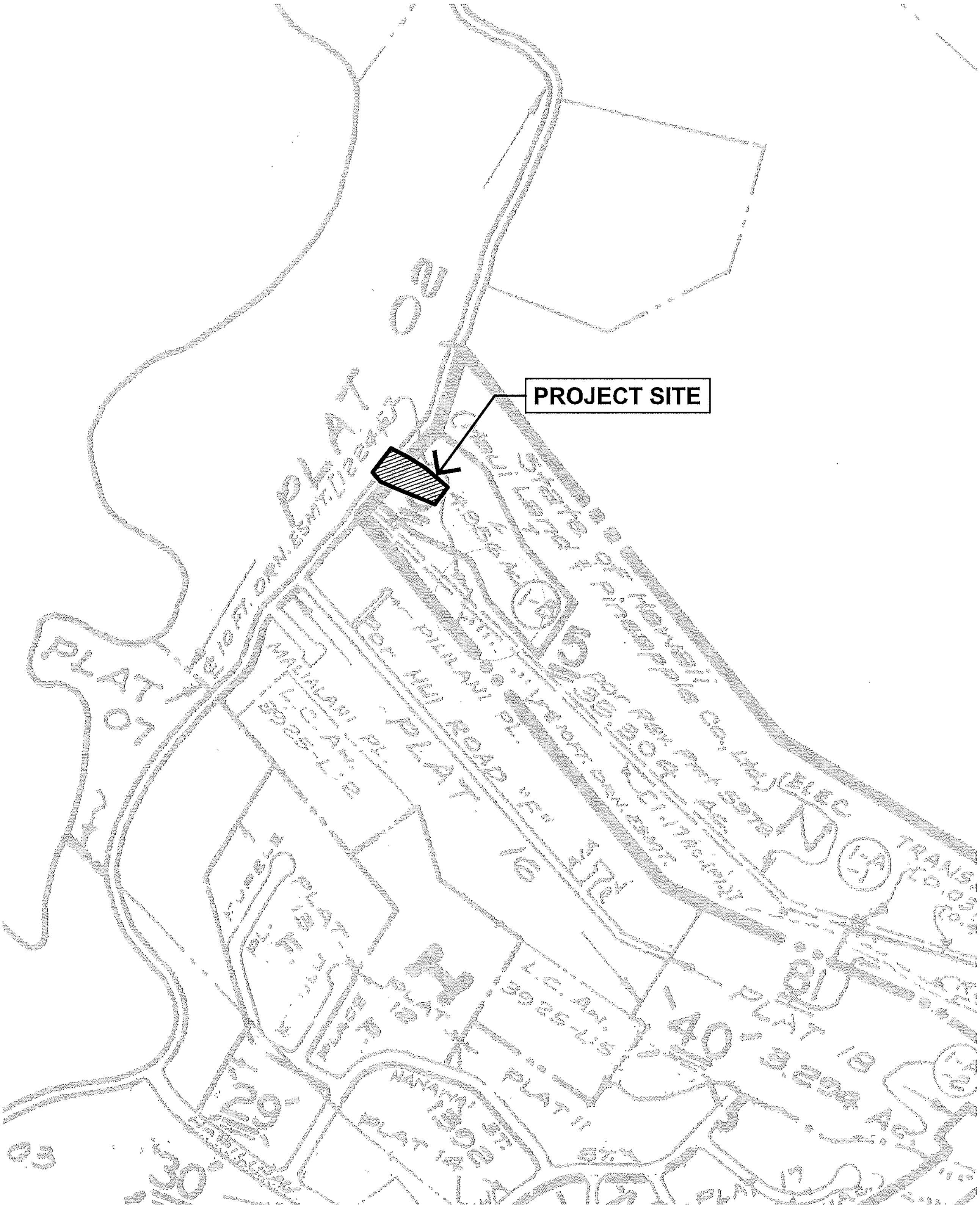
LOCATION MAP (USGS Map)

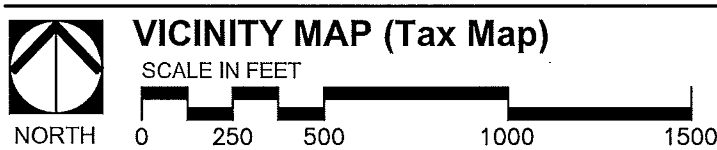
SCALE IN FEET

NORTH 0 500 1000 2000 3000

Figure 1

SOURCE: USGS NAPILI QUADRANGLE MAP

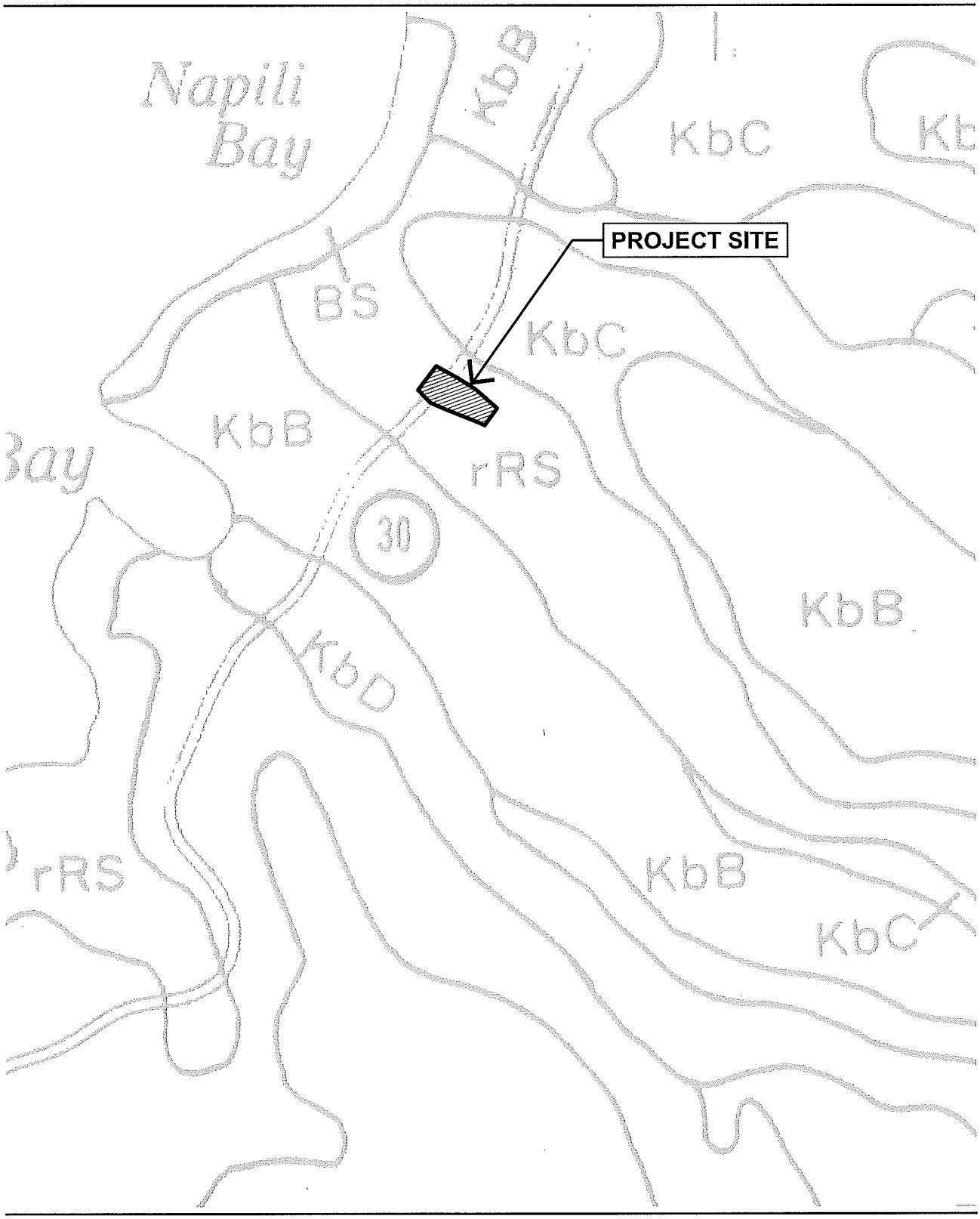




VICINITY MAP (Tax Map)

Figure 2

SOURCE: TAX MAP KEY: (2) 4-3-001



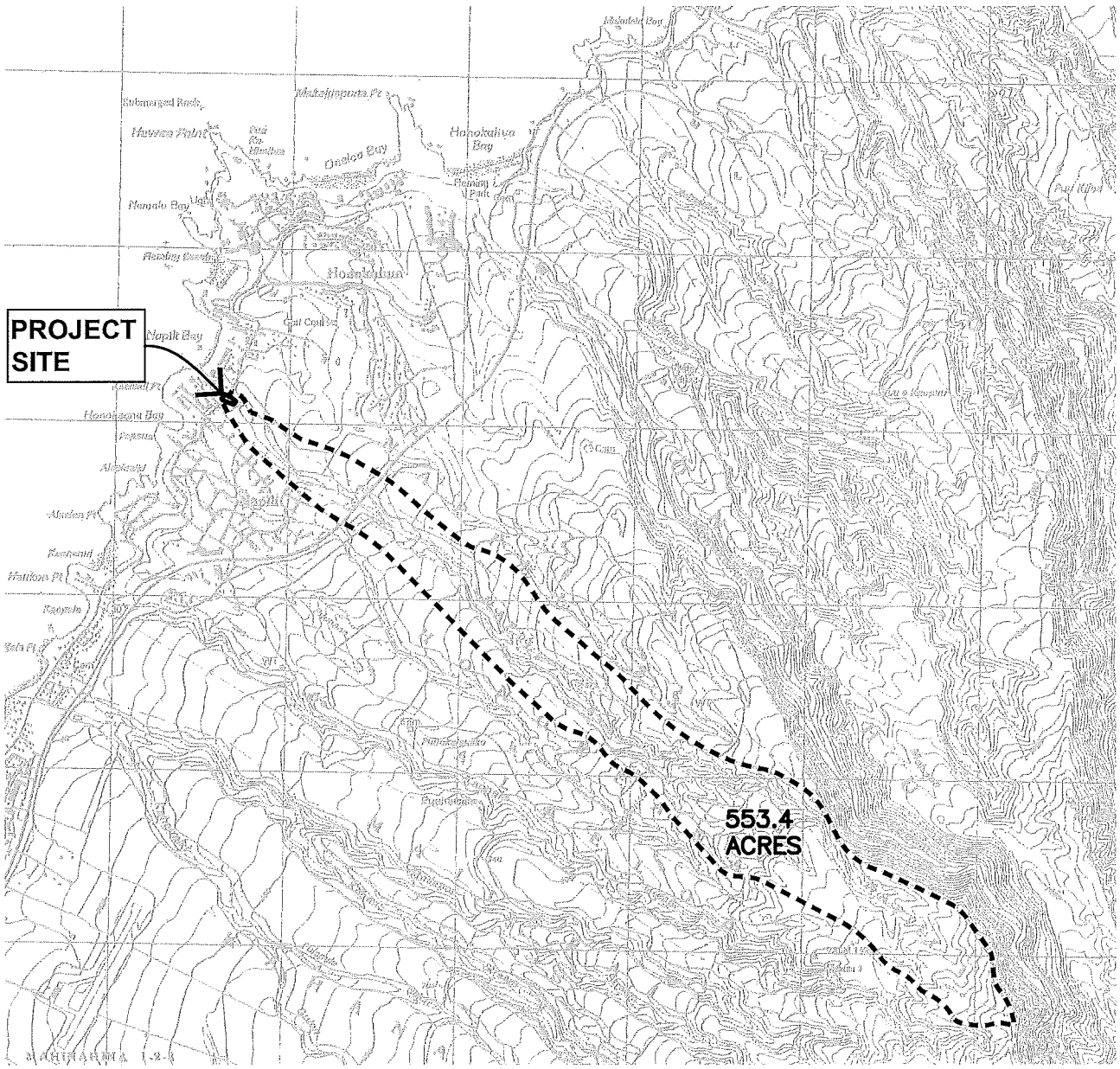
SOIL MAP

SCALE IN FEET

NORTH 0 250 500 1000 1500

Figure 3

SOURCE: SOIL SURVEY



LEGEND:

- - - - - - LIMITS OF DRAINAGE AREA

NORTH

DRAINAGE AREA MAP

SCALE IN FEET

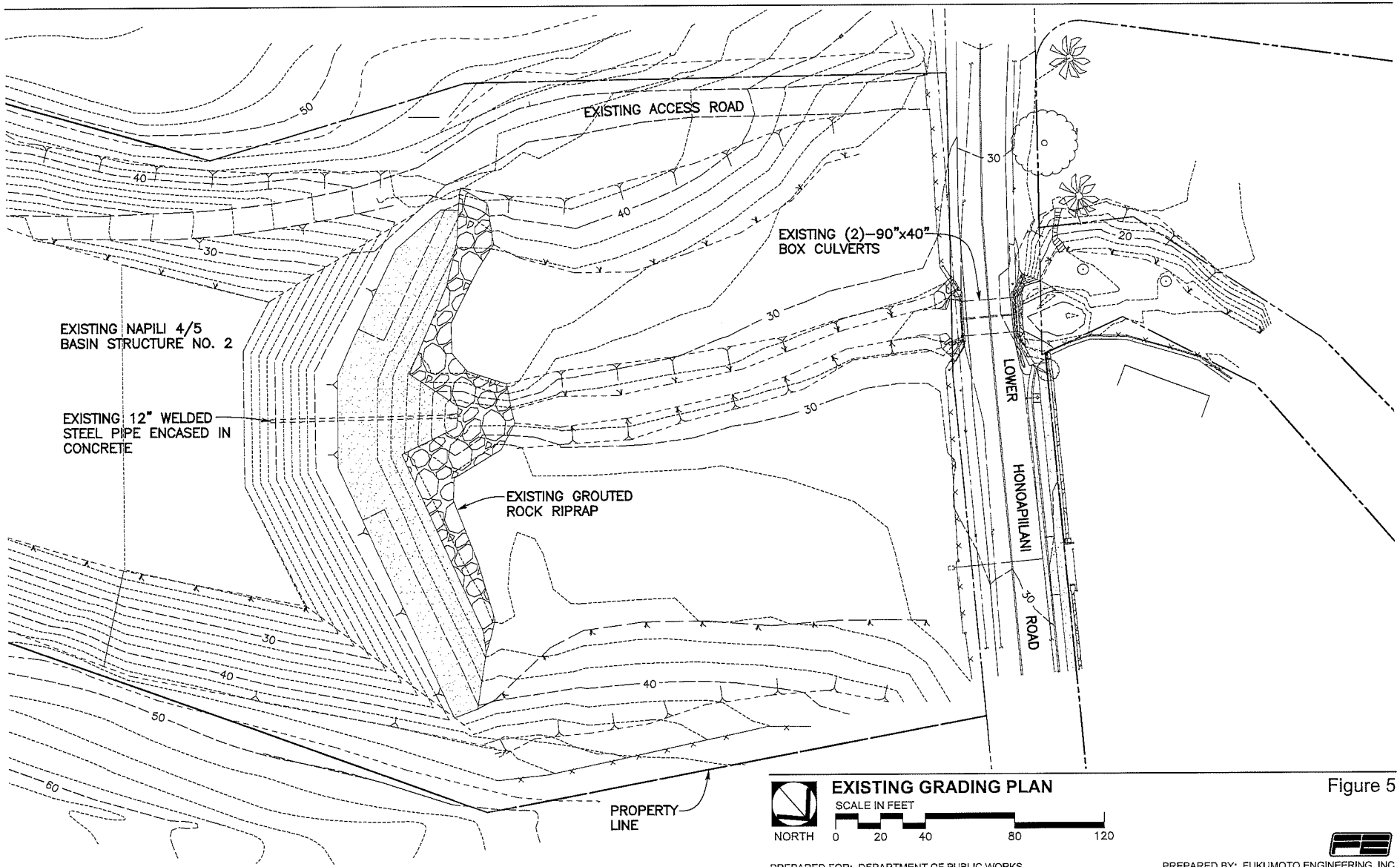
0 1500 3000 6000 9000

Figure 4

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

DRAINAGE REPORT FOR NAPILI 4/5 CULVERT REPLACEMENT



EXISTING GRADING PLAN

Figure 5

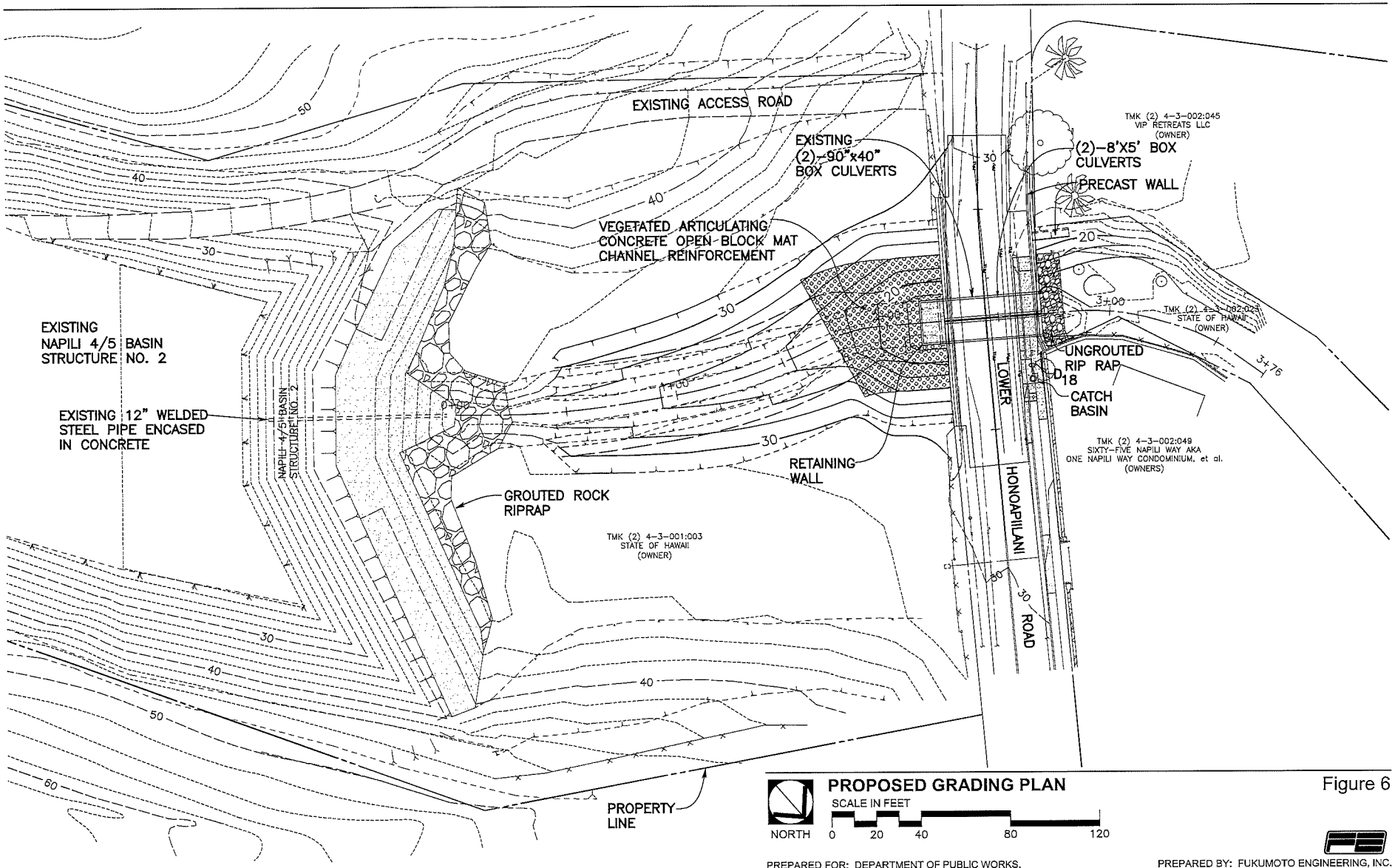
NORTH

SCALE IN FEET

0 20 40 80 120

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, COUNTY OF MAUI

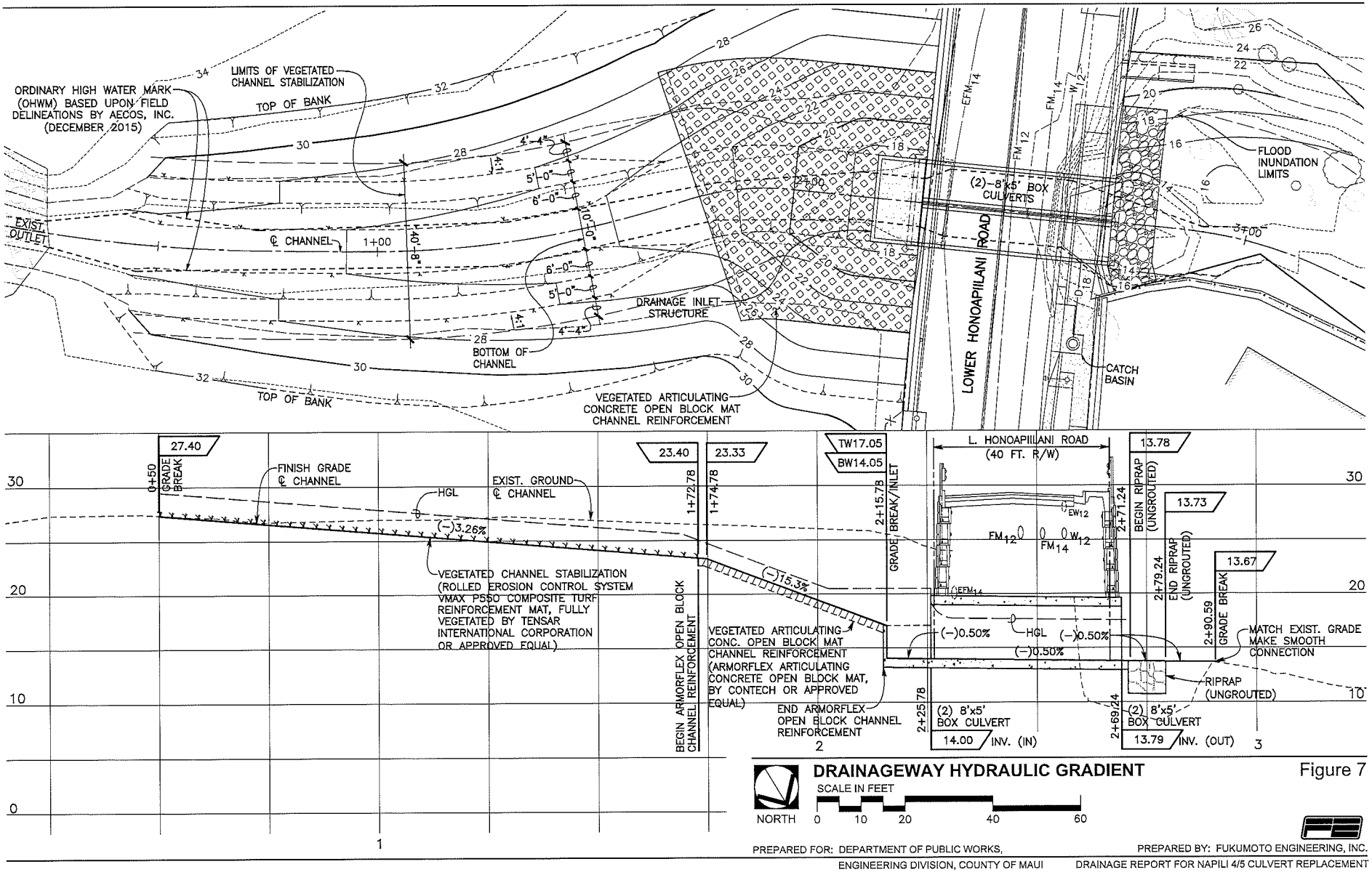
PREPARED BY: FUKUMOTO ENGINEERING, INC.



PROPOSED GRADING PLAN

SCALE IN FEET

Figure 6

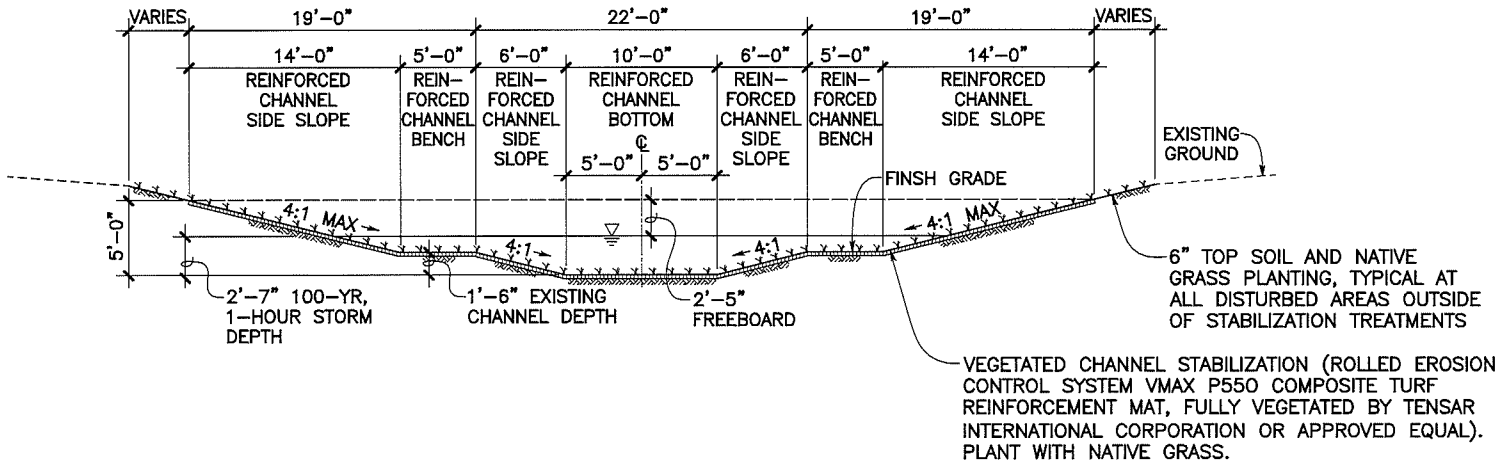


DRAINAGEWAY HYDRAULIC GRADIENT

Figure 7

SCALE IN FEET

NORTH 0 10 20 40 60



TYPICAL CHANNEL SECTION

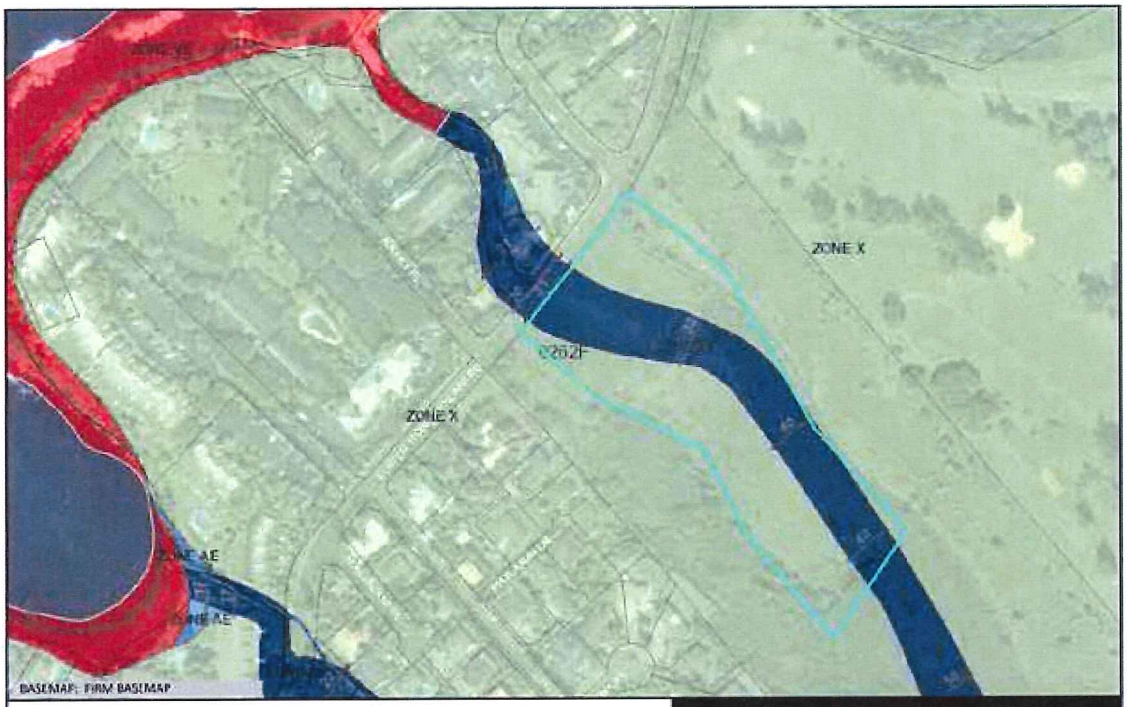
SCALE: 1/8" = 1'–0"

TYPICAL CHANNEL SECTION Figure 8

SCALE IN FEET

0 4 8 16 24

FLOOD HAZARD ASSESSMENT REPORT



Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY:	MAUI
TMK NO:	(2) 4-3-001:003
WATERSHED:	KAHANA
PARCEL ADDRESS:	LOWER HONOAPIILANI RD LAHAINA, HI 96761

Notes:

Flood Hazard Information

FIRM INDEX DATE:	SEPTEMBER 19, 2012
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	15003C0262F
PANEL EFFECTIVE DATE:	SEPTEMBER 19, 2012

THIS PROPERTY IS WITHIN A TSUNAMI EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: YES (MA-0127)
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 200 400 ft

Disclaimer. The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as "PRELIMINARY", please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A:** No BFE determined.
- **Zone AE:** BFE determined.
- **Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

DRAINAGE INFORMATION

A. AREA
A=553.4 acres

B. RUNOFF COEFFICIENT
Calibrated based on historical observation of 2-year storm exceeding road culvert capacity.
C=0.44

C. RECURRENCE INTERVAL & RAINFALL
Recurrence interval T_m = 100 year
1-hour rainfall I_{100} = 3.5 inches

D. TIME OF CONCENTRATION
T_C = L/3600V
Channel Flow
Total Hydraulic Length = 18,530 ft
Average Slope =9.4%
Average Velocity = 4.0 ft/s
T_C= 18530 ft/(3600 s/hr x 4.0 ft/s) =1.38 hrs
= 1.38 hours x 60 min/1hour = 77 minutes

E. HYDRAFLOW REPORTS
The reports at the end of this section are for the 100-year storm event using the Rational Method that show Q_{100} = 743 cfs.

F. LOWER HONOAPIILANI ROAD CULVERT PEAK FLOW SIZING
Try culvert size: (2) – 8-foot x 5-foot Box Culverts, depth 3.75 feet
$Q = AV$, $V = 1.486\ R^{2/3}\ S^{1/2} / n$, and $R = A/P$

Where
Q = Flow rate in cfs
V = Velocity in feet per second
A = area of flow in square feet
n = Manning's roughness coefficient = 0.013
R = Hydraulic radius in feet
S = Slope in feet per feet = 0.005
P_w = Wetted perimeter

A = 2 x (8 x 3.75 - 1 [for haunches]) = 58.0 square feet
P_w = 2 x (2.75 x 2 + 6 + 1.4 x 2) = 28.6 feet
R = 58.0/28.6 = 2.03 feet
$V = 1.486\ R^{2/3}\ S^{1/2} / n = 1.486 \times 2.03^{2/3} \times 0.005^{1/2}/0.013$ = 12.96 ft/s
Q = 58.0 x 12.96 = 752 cfs

G. UPSTREAM CHANNEL SIZING

Try channel size: 20-foot bottom, 4:1-sloped sides, depth 2.08 feet

$Q = AV$, $V = 1.486\ R^{2/3}\ S^{1/2} / n$, and $R = A/P$

Where
- Q = Flow rate in cfs
- V = Velocity in feet per second
- A = area of flow in square feet
- n = Manning's roughness coef. = 0.029 (from stabilizer manufacturer)
- R = Hydraulic radius in feet
- S = Slope in feet per feet = 0.0326
- P_w = Wetted perimeter

$A = 1.50 \times (10 + 6) + 1.08 \times (1.08/0.25 + 32) = 63.22$ square feet

$P_w = 10 + 2 \times (6^2 + 1.5^2)^{1/2} + 2 \times 5 + 2 \times ((1.08/0.25)^2 + 1.08^2)^{1/2} = 41.28$

$R = 63.22/41.28 = 1.53$ feet

$V = 1.486\ R^{2/3}\ S^{1/2} / n = 1.486 \times 1.53^{2/3} \times 0.0326^{1/2}/0.029 = 12.28$ ft/s

$Q = 12.28 \times 63.22 = 776.7$ cfs

H. LOWER HONOAPIILANI ROAD DRAINAGE IMPROVEMENTS SIZING

1. Catch Basin Capacities

10-foot standard depressed gutter inlets (per Honolulu Storm Drainage Standards)

(1) Gutter Grade = 0.4%, Q = 6 cfs
(2) Gutter Grade = 4.0%, Q = 4 cfs
(3) Sump, Q = 10 cfs

Compute developed runoff based on a weighted C factor and a T_c of 5 minutes.

$Q = CiA$

Where
- Q = Flow rate in cfs
- C = Runoff coefficient
- i = Weighted rainfall intensity
- A = area of flow in square feet

C = 0.85 (drive and walks)

T_c = 5 minutes

$i = 3.5 \times 2.5575 = 6.91$ inches/hour

A = 7,200 square feet = 0.17 acres

$Q = 0.85 \times 8.95 \times 0.17 = 1.3$ cfs

2. Pipe Sizing

Using Plate 8, Pipe Flow Chart 18 inch diameter, from the City and County of Honolulu Rules Relating to Storm Drainage Standards, the normal depth of flow is 0.2 feet. Therefore, okay to use County of Maui minimum diameter of 18 inches for drainage lateral less than 50 feet in length.

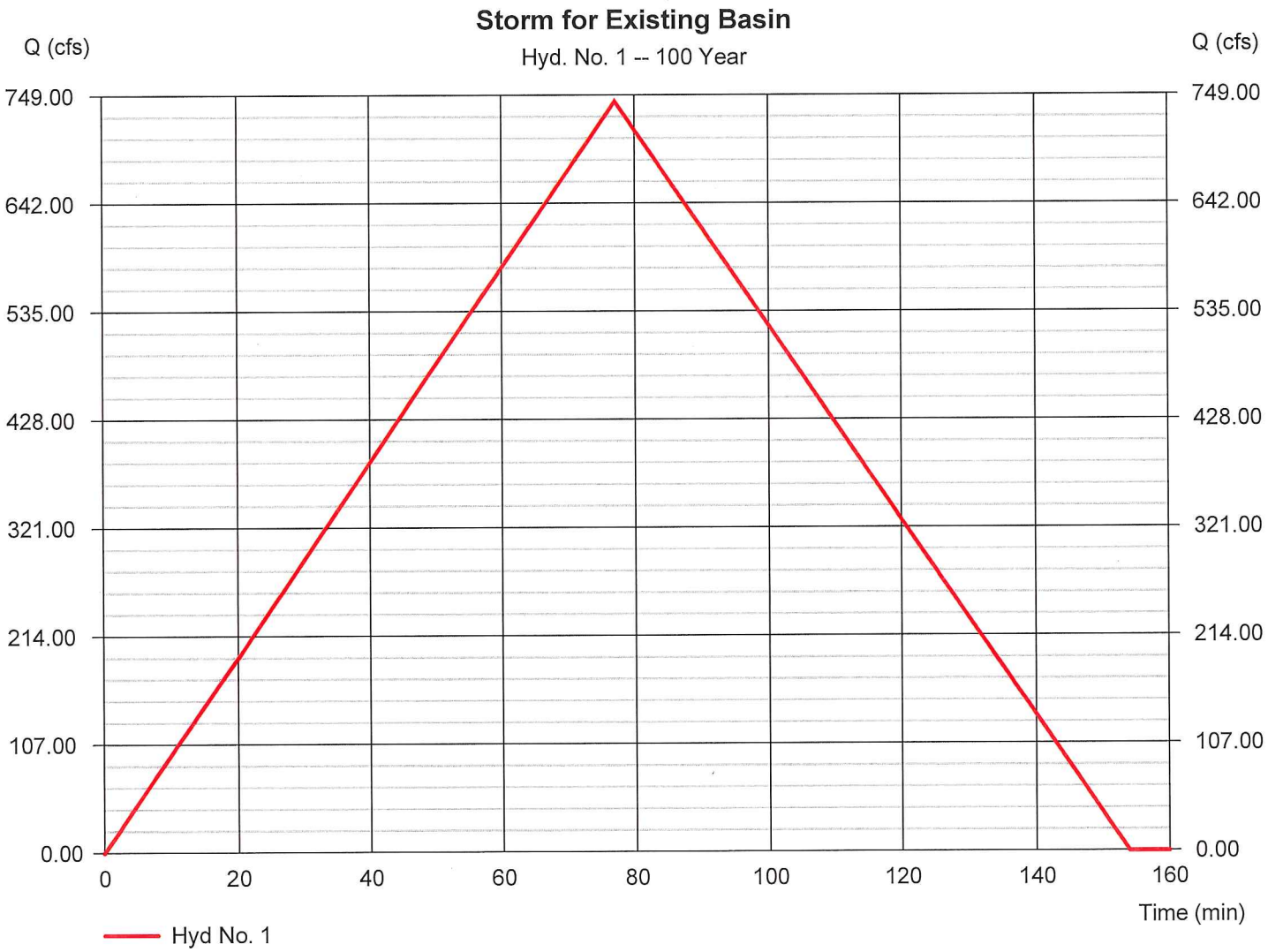
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Wednesday, 10 / 21 / 2015

Hyd. No. 1

Storm for Existing Basin

Hydrograph type	= Mod. Rational	Peak discharge	= 743.28 cfs
Storm frequency	= 100 yrs	Time to peak	= 77 min
Time interval	= 1 min	Hyd. volume	= 3,433,971 cuft
Drainage area	= 553.400 ac	Runoff coeff.	= 0.44
Intensity	= 3.053 in/hr	Tc by User	= 77.00 min
IDF Curve	= NBBF01.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a



Hydrograph Report

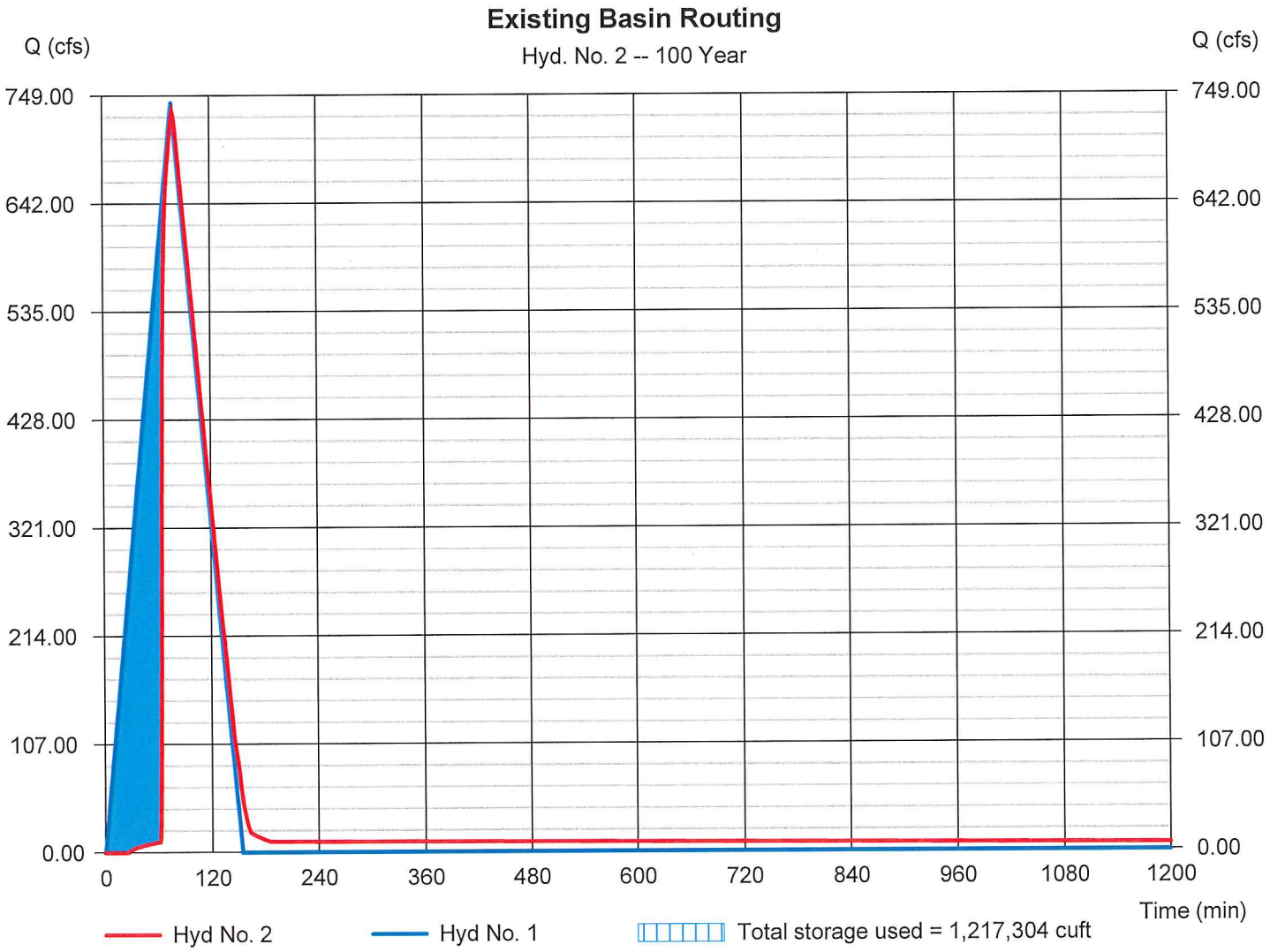
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Wednesday, 10 / 21 / 2015

Hyd. No. 2

Existing Basin Routing

Hydrograph type	= Reservoir	Peak discharge	= 734.38 cfs
Storm frequency	= 100 yrs	Time to peak	= 78 min
Time interval	= 1 min	Hyd. volume	= 3,236,717 cuft
Inflow hyd. No.	= 1 - Storm for Existing Basin	Max. Elevation	= 41.71 ft
Reservoir name	= Existing Basin	Max. Storage	= 1,217,304 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Existing Basin

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 22.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	22.00	8,179	0	0
2.00	24.00	19,321	26,711	26,711
4.00	26.00	31,312	50,148	76,859
6.00	28.00	43,966	74,913	151,773
7.00	29.00	57,143	50,406	202,178
8.00	30.00	56,752	56,942	259,120
10.00	32.00	66,033	122,656	381,776
12.00	34.00	77,877	143,733	525,509
14.00	36.00	83,802	161,627	687,135
16.00	38.00	89,948	173,696	860,832
18.00	40.00	96,333	186,226	1,047,057
20.00	42.00	103,406	199,678	1,246,735
22.00	44.00	109,240	212,598	1,459,333

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 28.02	0.00	0.00	0.00
Length (ft)	= 82.00	0.00	82.00	0.00
Slope (%)	= 0.02	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

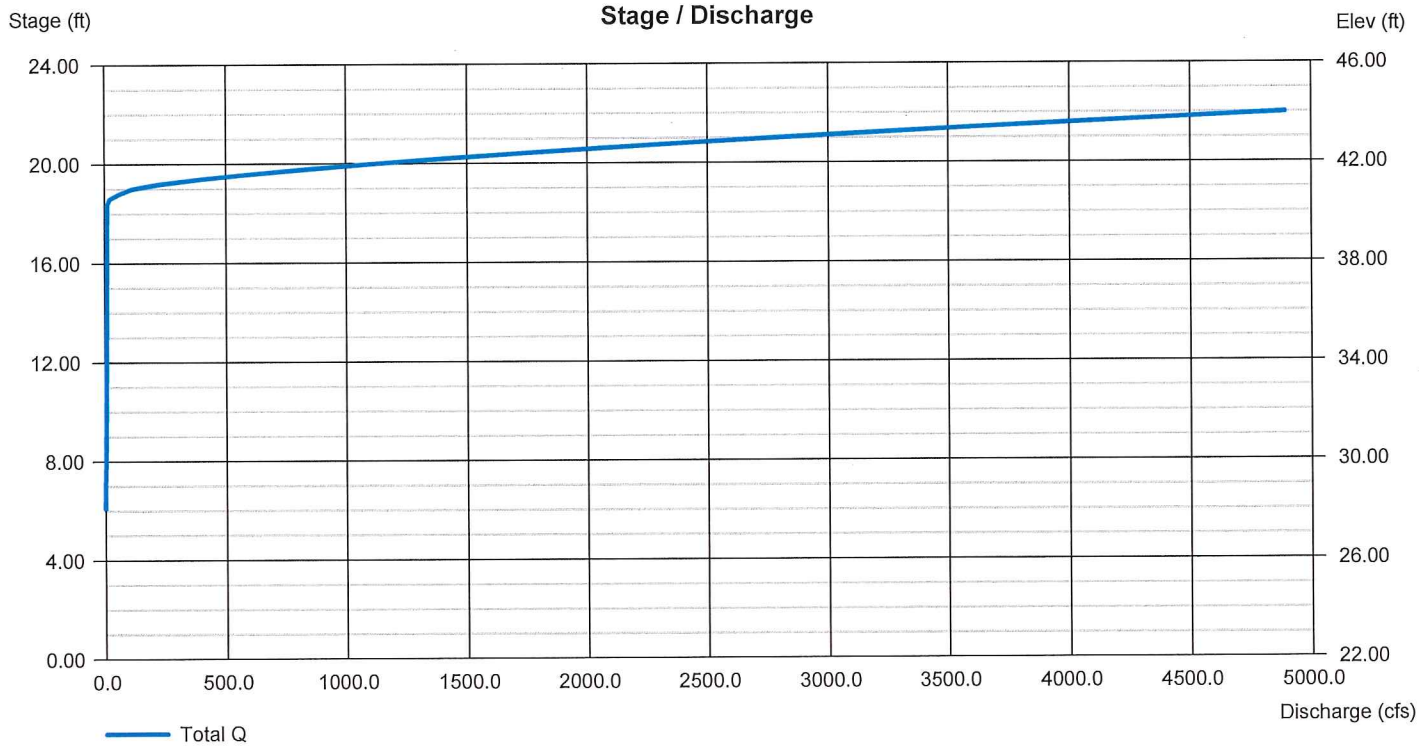
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 85.00	175.00	0.00	0.00
Crest El. (ft)	= 40.50	41.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydraflow Table of Contents

COM60 Basin Analysis 100 year.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Wednesday, 10 / 21 / 2015

100 - Year

APPENDIX B

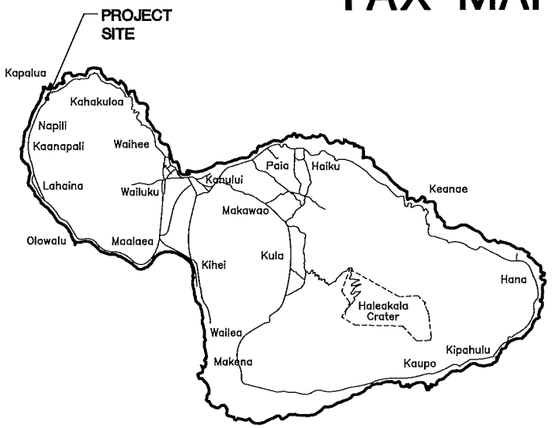
Project Plans

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TAX MAP KEY (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII



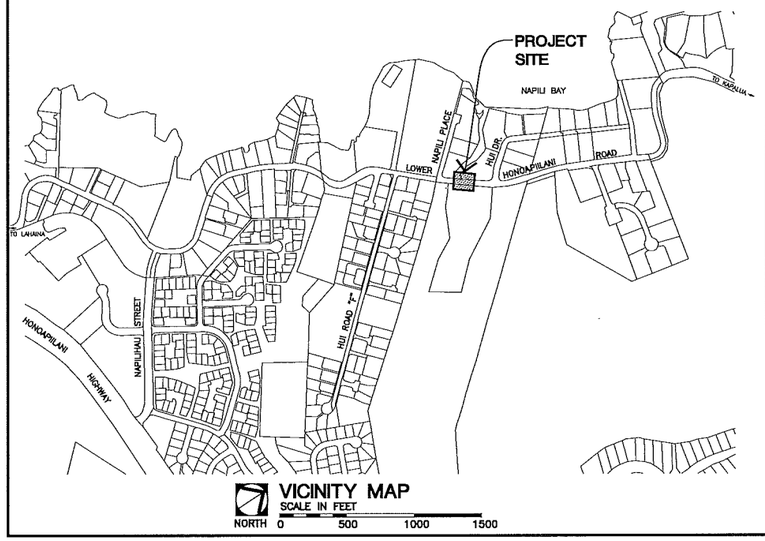
MAP OF MAUI
SCALE IN MILES
NORTH 5 0 5 10 15 20

PREPARED FOR:

DEPARTMENT OF PUBLIC WORKS
COUNTY OF MAUI
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

PREPARED BY:

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203 • Wailuku, Hawaii 96793



VICINITY MAP
SCALE IN FEET
NORTH 0 500 1000 1500

SUBCONSULTANT:

STRUCTURAL ENGINEER:

GHOLKAR & ASSOCIATES, INC.
95 LUNALILO STREET
WAILUKU, HAWAII 96793
PHONE: (808) 243-2248

APPROVALS:

_____ _____
DIRECTOR, DATE
DEPARTMENT OF PUBLIC WORKS
COUNTY OF MAUI
(APPROVAL GRANTED FOR WORK WITHIN COUNTY RIGHT-OF-WAY)

_____ _____
DIRECTOR, DEPARTMENT OF WATER SUPPLY DATE
COUNTY OF MAUI
(APPROVAL LIMITED TO WATER IMPROVEMENTS WHICH WILL
BE DEDICATED TO THE DEPARTMENT OF WATER SUPPLY)

INDEX OF DRAWINGS

CONSTRUCTION NOTES

GENERAL NOTES

1. LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE BASED ON AVAILABLE "AS-BUILT" OF RECORD CONSTRUCTION PLANS, ARE APPROXIMATE ONLY, AND THEIR ACCURACY IS NOT GUARANTEED.
2. EXISTING CONTOURS AND FEATURES ARE BASED ON "TOPOGRAPHIC SURVEY" PREPARED BY FUKUMOTO ENGINEERING, INC. DATED JULY 13, 2015 THROUGH JULY 22, 2015.
3. ELEVATIONS SHOWN ARE BASED ON PROJECT BENCH MARK DRILLED HOLE (STA C60-4) LOCATED ON THE CONCRETE CURB 21 FEET NORTHEASTERLY OF THE CONCRETE DRIVEWAY FROM SIXTY-FIVE NAPILI WAY LOCATED ON THE WESTERLY SIDE OF LOWER HONOAPIILANI ROAD. ELEVATION = 30.59 FEET ABOVE M.S.L.
4. VERIFY EXISTING GRADES BEFORE PROCEEDING WITH GRADING WORK. SHOULD ANY DISCREPANCIES BE DISCOVERED IN THE EXISTING GRADES OR DIMENSIONS GIVEN ON THE PLANS, NOTIFY THE ENGINEER BEFORE PROCEEDING ANY FURTHER WITH THE WORK. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY COST INVOLVED IN THE CORRECTION OF CONSTRUCTION PLACED DUE TO SUCH DISCREPANCIES.
5. DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES WITHIN PROJECT LIMITS BEFORE COMMENCING WORK, AND AGREE TO BE FULLY RESPONSIBLE FOR DAMAGES DUE TO FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES.
6. REPORT ANY INCONSISTENCIES WITH THE PROPOSED PLAN TO THE OWNER'S REPRESENTATIVE AND DEMOLISH, REMOVE, OR RELOCATE ALL EXISTING UTILITIES, IMPROVEMENTS, ETC. INCONSISTENT WITH THE PROPOSED PLAN AS DIRECTED BY THE OWNER'S REPRESENTATIVE AND AT THE CONTRACTOR'S EXPENSE.
7. THE LATEST REVISIONS OF THE "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION," SEPTEMBER 1984 AND THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," 2005 IS INCLUDED AS PART OF THESE CONSTRUCTION PLANS. OBTAIN THE LATEST REVISIONS BEFORE COMMENCING CONSTRUCTION.
8. SHOULD HISTORIC SITES SUCH AS WALLS, PLATFORMS, PAVEMENTS AND MOUNDS, OR REMAINS SUCH AS ARTIFACTS, BURIALS, CONCENTRATION OF CHARCOAL OR SHELLS BE ENCOUNTERED DURING CONSTRUCTION WORK, CEASE WORK IN THE IMMEDIATE VICINITY OF THE FIND, AND PROTECT THE FIND FROM FURTHER DAMAGE. THE CONTRACTOR MUST IMMEDIATELY CONTACT THE STATE HISTORIC PRESERVATION DIVISION (PH: 243-1285 OR 243-4640), WHICH WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND MITIGATION MEASURES, IF NECESSARY.
9. PURSUANT TO CHAPTER 6E OF THE HAWAII REVISED STATUTES, IN THE EVENT THAT ANY HUMAN SKELETAL REMAINS ARE INADVERTENTLY DISCOVERED DURING CONSTRUCTION, DO NOT MOVE THE REMAINS, CEASE ANY ACTIVITY IN THE IMMEDIATE AREA THAT COULD DAMAGE THE REMAINS OR THE POTENTIAL HISTORIC SITE, AND CONTACT THE DEPARTMENT OF LAND AND NATURAL RESOURCES' HISTORIC PRESERVATION DIVISION (PH: 243-1285 OR 243-4640), THE APPROPRIATE MEDICAL EXAMINER OR CORONER, AND THE POLICE DEPARTMENT (TELEPHONE: 244-6400).

DEPARTMENT OF PUBLIC WORKS NOTES

1. THE CONTRACTOR SHALL ALLOW FOUR WEEKS TO OBTAIN A GRADING PERMIT FROM THE DEVELOPMENT SERVICES ADMINISTRATION PRIOR TO COMMENCEMENT OF ANY CLEARING AND GRUBBING. A SATISFACTORY DRAINAGE AND EROSION CONTROL PLAN SHALL BE SUBMITTED IN THE EVENT THE GRUBBING AREA EXCEEDS ONE ACRE OR THE PROPOSED CUT OR FILL IS GREATER THAN 15 FEET IN HEIGHT. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL BEST MANAGEMENT PRACTICE MEASURES.
2. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, AND OTHER PROTECTIVE DEVICES FOR THE PROTECTION, SAFETY AND CONVENIENCE OF THE PUBLIC AND IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAY, 2003 EDITION WITH REVISION No. 1 INCORPORATED, DATED NOVEMBER 2004". THE CONTRACTOR SHALL PREPARE AND OBTAIN NECESSARY APPROVALS OF TRAFFIC CONTROL PLANS IF REQUIRED BY THE DEVELOPMENT SERVICES ADMINISTRATION.
3. STANDARD DETAIL DRAWINGS OF THE DEPARTMENT OF PUBLIC WORKS AND THE HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION (1994) SHALL BE INCLUDED AS PART OF THE CONSTRUCTION PLANS.
4. ALL CONSTRUCTION WORK SHALL STRICTLY CONFORM TO THE APPLICABLE SECTIONS OF THE 2005 HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND THE SEPTEMBER 1984 "STANDARD DETAILS" FOR PUBLIC WORKS CONSTRUCTION OF THE DEPARTMENT OF PUBLIC WORKS, AS AMENDED.
5. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH AND COUNTY GRADING ORDINANCE.
6. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION ORDERED BY THE DIRECTOR OF PUBLIC WORKS SHALL BE PAID BY THE CONTRACTOR.

WATER SYSTEM

1. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF WATER SUPPLY (DWS), IN WRITING, ONE (1) WEEK PRIOR TO COMMENCEMENT OF WORK.
2. ALL MATERIALS USED AND METHOD OF CONSTRUCTION OF WATER SYSTEM FACILITIES SHALL BE IN ACCORDANCE WITH THE LATEST REVISIONS OF DWS STANDARDS. CONTRACTOR SHALL OBTAIN THE LATEST REVISIONS OF THE DWS STANDARD DETAILS BEFORE COMMENCING CONSTRUCTION.
3. ALL WATER SYSTEM WORK SHALL BE PERFORMED BY CONTRACTORS POSSESSING VALID STATE OF HAWAII CONTRACTOR'S LICENSES, REGARDLESS OF THE VALUE OF THE WORK.
4. THE EXACT DEPTH AND LOCATION OF EXISTING WATERLINES, SERVICE LATERALS AND OTHER UTILITIES ARE NOT KNOWN. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE SAME PRIOR TO TRENCHING FOR THE NEW WATERLINE. THE COST OF LOWERING, RELOCATING OR ADJUSTING EXISTING WATERLINES, SERVICE LATERALS AND OTHER UTILITIES SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE NEW WATERLINE, UNLESS NOTED OTHERWISE, AND WILL NOT BE PAID FOR SEPARATELY.
5. CONCRETE FOR REACTION BLOCKS AND ANCHOR BLOCKS SHALL BE DWS CLASS 2500.
6. THE MAXIMUM DISTANCE BETWEEN VALVE NUT AND TOP OF VALVE MANHOLE COVER SHALL BE THREE (3) FEET.
7. THE CONTRACTOR SHALL SUBMIT A MATERIALS LIST TO DWS FOR APPROVAL PRIOR TO CONSTRUCTION.
8. CONNECTION TO DWS SYSTEM:
   A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL NECESSARY FITTINGS AND OTHER MATERIALS AND EQUIPMENT REQUIRED FOR THE HOOK-UP. HE SHALL VERIFY THE EXACT LOCATION, DEPTH, TYPE, AND CONDITION OF THE EXISTING LINE BEFORE ORDERING MATERIALS FOR THE HOOK-UP. HE SHALL, HOWEVER, CHECK WITH DWS BEFORE EXCAVATING FOR VERIFICATION PURPOSES.
   B. WHENEVER FEASIBLE, MECHANICAL JOINT FITTINGS SHALL BE USED FOR BURIED APPLICATIONS, AND FLANGED JOINT FITTINGS SHALL BE USED FOR EXPOSED APPLICATIONS.
   C. AUTHORIZED DWS PERSONNEL MAY BE REQUIRED TO MAKE THE FINAL CONNECTION TO THE EXISTING LINE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS INCURRED BY DWS FOR SAID WORK, INCLUDING THE COST OF PRESSURE TESTING AND DISINFECTION.
   D. IF THE DWS PROVIDES ONLY INSPECTION AND SUPERVISING OPERATORS, AND DOES NOT PROVIDE PERSONNEL FOR THE ACTUAL CONNECTION, THE CONTRACTOR SHALL PROVIDE ALL PIPEFITTERS AND LABORS TO MAKE THE CONNECTION.
   E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR FOR TRENCH EXCAVATION, BACKFILLING, CLEANING AND CHLORINATION, PAVING, AND OTHER WORK NECESSARY TO COMPLETE THE HOOK-UP, AS DIRECTED BY AND TO THE SATISFACTION OF DWS.
9. MINIMUM COVER OVER WATER MAIN, 6" DIAMETER OR LARGER, SHALL BE 3'-0". MINIMUM COVER FOR 4" DIAMETER SHALL BE 2'-6". MINIMUM COVER FOR DIAMETERS LESS THAN 4" SHALL BE 1'-6".
10. BOLTS FOR EXPOSED FLANGED DUCTILE IRON PIPE JOINTS SHALL BE EITHER SILICON BRONZE BOLTS AND NUTS OR 316 STAINLESS STEEL BOLTING WITH THE HEAVY DUTY STAINLESS STEEL NUTS (ONLY) FURNISHED WITH TRIPAC 2000 BLUE COATING SYSTEM. ANTI-SEIZE SHALL NOT BE USED. T-BOLTS FOR DUCTILE IRON MECHANICAL JOINT (MJ) PIPE AND FITTING CONNECTIONS IN UNDERGROUND SITUATIONS SHALL BE ONE OF THE FOLLOWING SYSTEMS:
    A. 316 STAINLESS STEEL T-BOLTS WITH THE HEAVY DUTY STAINLESS STEEL NUTS (ONLY) FURNISHED WITH TRIPAC 2000 BLUE COATING SYSTEM. ANTI-SEIZE SHALL NOT BE USED.
    B. COR-TEN T-BOLTS AND NUTS WITH HIGH GRADE ZINC SACRIFICIAL ANODES, EQUIVALENT TO "DURATRON" SACRIFICIAL "SAC-NUT" MODULES, INSTALLED ON THE NUTS FOR ALL STANDARD COR-TEN T-BOLTS.
    C. COR-TEN T-BOLTS AND NUTS BOTH FACTORY COATED WITH TRIPAC 2000 BLUE COATING SYSTEM BY "TRIPAC FASTENERS".

    ALL HOT FORGED STAINLESS STEEL BOLTS ARE REQUIRED TO BE PASSIVATED PER ASTM A380. MANUFACTURER CERTIFICATES ARE REQUIRED FOR PROOF WITH EACH SHIPMENT.
11. ALL BURIED METALS, INCLUDING COPPER PIPES, SHALL BE WRAPPED WITH POLY-WRAP. FOR ALL BURIED INSTALLATIONS OF DUCTILE IRON PIPE AND FITTINGS, POLY-WRAP IS REQUIRED EXCEPT WITHIN CONCRETE JACKETS.
12. LUBRICATE HYDRANT NOZZLE THREADS WITH NON-TOXIC GREASE.
13. THE CONTRACTOR SHALL PAINT AND NUMBER THE FIRE HYDRANT. NUMBERING TO BE FURNISHED BY DWS.
14. WATER MAINS AND APPURTENANCES SHALL BE SUBJECT TO HYDROSTATIC TESTING IN ACCORDANCE WITH THE LATEST REVISION OF AWWA C600, UNDER THE "HYDROSTATIC TESTING" SECTION, TO A PRESSURE OF AT LEAST 1.5 TIMES THE WORKING PRESSURE. UNLESS OTHERWISE STATED IN THE CONSTRUCTION DOCUMENTS OR LIMITED BY THE PRESSURE RATING OF EQUIPMENT, THE PRESSURE TEST AND LEAKAGE TEST SHALL BE PERFORMED AT 225 POUNDS PER SQUARE INCH PRESSURE.
15. THE DEVELOPER SHALL SUBMIT A COST LIST ALONG WITH AN AFFIDAVIT FOR THE WATER SYSTEM PRIOR TO ACCEPTANCE.
16. THE CONTRACTOR SHALL SUBMIT TWO SETS OF RECORD DRAWINGS VIA A CONSULTANT PRIOR TO ACCEPTANCE OF THE WATER SYSTEM. AN ELECTRONIC IMAGE FILE IN TIFF FORMAT SHALL BE PROVIDED TO THE DWS FOR ALL PROJECTS.

REVISED: 2/14/13

CHLORINATION OF WATER SYSTEMS

1. WATER MAINS AND APPURTENANCES SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651. ALL PROCEDURES AND MATERIALS (LIQUID CHLORINE OR CALCIUM HYPOCHLORITE) USED FOR THE CHLORINATION OF THE PROJECT SHALL CONFORM TO AWWA REQUIREMENTS.
2. PRIOR TO CHLORINATION, THE PROJECT PIPELINES SHALL BE THOROUGHLY CLEANED. CLEANING OF LINES 8" AND LARGER SHALL BE BY PIGGING USING FOAM PIGS. SMALLER LINES CAN BE FLUSHED IN ACCORDANCE WITH AWWA REQUIREMENTS IF ADEQUATE WATER SUPPLY IS PROVIDED, OTHERWISE BY PIGGING. THE CONTRACTOR SHALL SUBMIT HIS PLAN FOR PIPELINE CLEANING, INCLUDING FITTING REQUIREMENTS FOR PIGGING, FOR APPROVAL PRIOR TO PROCEEDING.
3. THE INTERIOR SURFACES OF THE PROJECT SHALL BE EXPOSED TO THE CHLORINATING SOLUTION FOR A MINIMUM OF 24 HOURS AND THE CHLORINE RESIDUAL SHALL NOT BE LESS THAN 10 PPM AFTER SUCH TIME.
4. SHOULD CALCIUM HYPOCHLORITE BE USED, NO SOLID AND/OR UNDISSOLVED PORTION OF THE COMPOUND SHALL BE INTRODUCED INTO ANY SECTION OF THE PROJECT TO BE CHLORINATED.
5. AT THE END OF THE 24-HOUR DISINFECTION PERIOD, REPRESENTATIVE SAMPLES SHALL BE TAKEN AND ANALYZED TO ASSURE A CHLORINE RESIDUAL OF AT LEAST 10 PPM. MEASUREMENTS FOR CHLORINE RESIDUAL TESTS SHALL BE BY A TRAINED, QUALIFIED TESTER APPROVED BY THE DIRECTOR.
6. SHOULD THE RESULTS INDICATE ADEQUATE CHLORINATION, THE PROJECT SHALL BE THOROUGHLY FLUSHED AND FILLED WITH POTABLE WATER FROM THE EXISTING POTABLE WATER SYSTEM AND AGAIN TESTED FOR CHLORINE RESIDUAL. THE FLUSHING SHALL BE CONSIDERED ADEQUATE IF THE TEST RESULTS INDICATE THAT THE WATER IN THE PROJECT HAS A COMPARABLE CHLORINE RESIDUAL AS THE WATER IN THE EXISTING SYSTEM.
7. FOLLOWING THE ACCEPTABLE FLUSHING OF THE HIGH CONCENTRATION CHLORINE SOLUTION, TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES SHALL BE TAKEN AT LEAST 24 HOURS APART FROM REPRESENTATIVE POINTS IN THE PROJECT AND SUBJECTED TO MICROBIOLOGICAL TESTS PERFORMED BY A CERTIFIED LABORATORY APPROVED BY THE DEPARTMENT OF HEALTH. AT LEAST ONE SET OF SAMPLES SHALL BE COLLECTED AND TESTED FROM EVERY 1,200 FEET OF THE NEW WATER MAIN, PLUS ONE SET FROM THE END OF THE LINE AND AT LEAST ONE SET FROM EACH BRANCH. POSITIVE RESULTS WILL NOT BE ACCEPTABLE AND THE ENTIRE CHLORINATION PROCESS WILL BE REPEATED.
8. ANALYSIS FOR RESIDUAL CHLORINE SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, CURRENT EDITION.
9. MICROBIOLOGICAL TESTS SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, CURRENT EDITION.
10. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ALL OF THE FOREGOING.

REVISED: 12/1/07

WASTEWATER NOTES

1. ALL WASTEWATER LINES AND APPURTENANCES SHALL CONFORM TO THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, DATED SEPTEMBER 1984, OF THE DEPARTMENT OF PUBLIC WORKS, COUNTY OF MAUI.
2. ALL SEWERLINE AND APPURTENANCES SHALL FOLLOW THE DESIGN STANDARDS OF THE WASTEWATER RECLAMATION DIVISION, CITY AND COUNTY OF HONOLULU, VOLUMES 1 & 2, DATED JULY 1993 AND JULY 1984 RESPECTIVELY, UNLESS OTHERWISE NOTED.
3. BEFORE CONSTRUCTION COMMENCES, THE CONTRACTOR SHALL SCHEDULE AND DOCUMENT A PRE-CONSTRUCTION MEETING WITH ALL AGENCIES HAVING UTILITIES AFFECTED BY THE WORK.
4. THE DEPARTMENT OF ENVIRONMENTAL MANAGEMENT, WASTEWATER RECLAMATION DIVISION, HAS THE RIGHT TO STOP CONSTRUCTION, SHOULD ANY WORK BE FOUND CONTRARY TO THE APPROVED PLANS AND SPECIFICATIONS, OR DETRIMENTAL TO THE PUBLIC INTEREST.
5. ALL EXISTING WASTEWATER LINES, WHETHER OR NOT SHOWN ON THE PLANS, IF DAMAGED DURING CONSTRUCTION, SHALL BE REPAIRED BY THE CONTRACTOR AND THE CONTRACTOR SHALL PAY ALL EXPENSES.
6. THE CONTRACTOR SHALL NOTIFY THE WASTEWATER RECLAMATION DIVISION ONE (1) WEEK PRIOR TO CONNECTION TO ANY EXISTING WASTEWATER LINES.
7. SHOULD THE CONTRACTOR EXCAVATE BEYOND THE TRENCH PAY-WIDTH, AS SPECIFIED IN THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, DATED SEPTEMBER 1984, AND SUCH ACTION RESULTS IN A GREATER LOAD TO THE PIPE, THE CONTRACTOR SHALL PROVIDE, AT THE CONTRACTOR'S EXPENSE, A HIGHER CLASS OF BEDDING MATERIAL THAT WILL WITHSTAND THE ADDED LOAD.
8. WASTEWATER LATERALS SHALL BE SIX (6) INCHES IN DIAMETER AT A MINIMUM OF 2% SLOPE, UNLESS APPROVED OTHERWISE.
9. AN ADVANCE RISER CONNECTION SHALL BE INSTALLED AT EACH NEW WASTEWATER LATERAL.
10. WHERE THE CLEARANCE BETWEEN A WASTEWATER LINE AND A NEW OR EXISTING UTILITY LINE IS EIGHTEEN (18) INCHES OR LESS, THE WASTEWATER LINE SHALL BE CONCRETE JACKETED IN ACCORDANCE WITH THE STANDARD DETAILS OF PUBLIC WORKS CONSTRUCTION, DATED SEPTEMBER 1984.
11. WHEN THE WASTEWATER MAINS ARE OF A DIFFERENT MATERIAL THAN THE LATERALS, THE CONTRACTOR SHALL INSTALL APPROVED ADAPTERS.
12. ALL BACKFILL FOR WASTEWATER TRENCHES SHALL BE COMPACTED IN ONE (1) FOOT LIFTS TO A MINIMUM OF 95% OF ITS MAXIMUM DENSITY.
13. WHERE CONSTRUCTION IS TO BE DONE IN PHASES OR INCREMENTS, EACH PHASE OR INCREMENT SHALL BE APPROVED BY WASTEWATER RECLAMATION DIVISION BEFORE THE NEXT PHASE OR INCREMENT IS STARTED.
14. ALL WASTEWATER MAINS SHALL PASS A MANDREL TEST AS A CONDITION OF ACCEPTANCE 30 DAYS AFTER COMPLETION AND BACKFILL. THE MANDREL DIAMETER SHALL BE 95% OR MORE OF THE INSIDE DIAMETER OF THE PIPE BEING TESTED. A CERTIFICATION LETTER FROM THE CONTRACTOR, SIGNED BY THE DSA INSPECTOR, WILL BE FORWARDED TO THE WASTEWATER RECLAMATION DIVISION.
15. PRIOR TO INSPECTION BY CLOSED CIRCUIT TELEVISION (CCTV), ALL WASTEWATER LINES INSTALLED, INCLUDING LATERALS, SHALL BE FLUSHED WITH WATER AND ANY ACCUMULATED CONSTRUCTION DEBRIS AND OTHER FOREIGN MATERIALS SHALL BE REMOVED.
16. "AS-BUILT" DRAWINGS SHALL BE SUBMITTED AS A CONDITION FOR THE FINAL ACCEPTANCE OF THE PROJECT. IF MAIN TRANSMISSION LINES WILL BE DEDICATED TO THE COUNTY, THE CONTRACTOR SHALL ALSO SUBMIT GIS SHAPE FILE LAYER FILES (SHAPEFILE DATA IN NAD83 STATE PLANE ZONE 2 METERS) TO THE WASTEWATER RECLAMATION DIVISION.
17. ALL MAIN WASTEWATER LINES WHICH WILL BE DEDICATED TO THE COUNTY OF MAUI SHALL BE INSPECTED BY CCTV IN STRICT ACCORDANCE WITH DEPARTMENT OF PUBLIC WORKS CCTV POLICY, EFFECTIVE DATE JULY 15, 2001. FINAL ACCEPTANCE OF THE SYSTEM SHALL BE CONTINGENT UPON THE PASSING OF ALL REQUIREMENTS OF THIS POLICY. CCTV RESULTS SHOULD BE SUBMITTED ON DVD PER MEMO DATED OCTOBER 1,2008.
18. ANY CONNECTION MADE UNDER THE WATER TABLE WILL REQUIRE CCTV AT HIGH TIDE TO DETERMINE WATER TIGHTNESS, IN ACCORDANCE WITH DEPARTMENT OF PUBLIC WORKS CCTV POLICY, EFFECTIVE DATE JULY 15, 2001. FINAL ACCEPTANCE OF THE SYSTEM SHALL BE CONTINGENT UPON THE PASSING OF ALL REQUIREMENTS OF THIS POLICY.
19. CONTRACTOR MUST HAVE A SITE SPECIFIC SPILL PREVENTION PLAN (SSSPP) APPROVED BY WWRD PRIOR TO SEWER LINE CONSTRUCTION AND/OR SEWER LATERAL CONNECTION TO EXISTING FACILITIES, OR ANY WORK WITHIN FIVE (5) FEET OF WASTEWATER SYSTEM IMPROVEMENTS.

REVISED: OCTOBER, 2013

CONSTRUCTION NOTES WITHIN COUNTY RIGHT-OF-WAY

1. CONTRACTOR SHALL OBTAIN A PERMIT TO PERFORM WORK ON COUNTY HIGHWAYS FROM THE DEVELOPMENT SERVICES ADMINISTRATION TWO WEEKS PRIOR TO THE COMMENCEMENT OF WORK.
2. STANDARD DETAIL DRAWINGS AND STANDARD SPECIFICATIONS OF THE DEPARTMENT OF PUBLIC WORKS SHALL BE INCLUDED AS PART OF THE CONSTRUCTION PLANS.
3. ALL CONSTRUCTION WORK SHALL STRICTLY CONFORM TO THE LATEST VERSION OF THE HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE PUBLIC WORKS CONSTRUCTION, AND THE SEPTEMBER 1984 "STANDARD DETAILS" FOR PUBLIC WORKS CONSTRUCTION OF THE DEPARTMENT OF PUBLIC WORKS, AS AMENDED.
4. IF EXISTING UTILITIES, WHETHER OR NOT SHOWN ON PLANS, ARE DAMAGED DURING CONSTRUCTION, THE CONTRACTOR SHALL AT HIS OWN EXPENSE BE REQUIRED TO REPAIR SUCH UTILITIES.
5. CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, AND OTHER PROTECTIVE DEVICES FOR THE PROTECTION, SAFETY AND CONVENIENCE OF THE PUBLIC, ACCORDING TO THE LATEST VERSION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICE FOR STREETS AND HIGHWAYS", AND TO THE RULES AND REGULATIONS GOVERNING THE USE OF TRAFFIC CONTROL DEVICES AT WORKSITES AND/OR ADJACENT TO PUBLIC STREETS AND HIGHWAYS ADOPTED BY THE HIGHWAY SAFETY COORDINATOR AND THE U.S. FEDERAL HIGHWAY ADMINISTRATION "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS".
6. THE DIRECTOR OF PUBLIC WORKS AND/OR THE DIRECTOR OF THE DEPARTMENT OF WATER SUPPLY HAS THE RIGHT TO STOP CONSTRUCTION SHOULD ANY WORK BE FOUND CONTRARY TO THE APPROVED CONSTRUCTION PLAN OR DETRIMENTAL TO THE PUBLIC'S INTEREST.
7. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE DEVELOPMENT SERVICES ADMINISTRATION FIVE (5) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
8. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH AND COUNTY GRADING ORDINANCE.
9. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION ORDERED BY THE DIRECTOR OF PUBLIC WORKS SHALL BE PAID BY THE CONTRACTOR.
10. CONSTRUCTION DEBRIS AND WASTES SHALL BE DEPOSITED AT AN APPROPRIATE WORK SITE. THE CONTRACTOR SHALL INFORM THE DIRECTOR OF PUBLIC WORKS OF THE LOCATION OF THE DISPOSAL SITES. THE DISPOSAL SITE MUST FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCE.
11. THE CONTRACTOR SHALL SUBMIT A TIFF AND FIVE (5) COPIES OF THE "AS-BUILT" DRAWINGS PRIOR TO THE FINAL APPROVAL OF THE IMPROVEMENTS.
12. IF THE CLEARANCE BETWEEN A WASTEWATER LINE AND A NEW OR EXISTING WATERLINE IS EIGHTEEN INCHES (18") OR LESS, THE WASTEWATER LINE SHALL BE CONCRETE-JACKETED IN ACCORDANCE WITH THE STANDARD DETAILS OF PUBLIC WORKS CONSTRUCTION DATED SEPTEMBER 1984, AS AMENDED.
13. SHOULD HISTORIC SITES SUCH AS WALLS, PLATFORMS, PAVEMENTS OR MOUNDS, OR REMAINS SUCH AS ARTIFACTS BURIALS, CONCENTRATION OF SHELL OR CHARCOAL BE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES, WORK SHALL CEASE IMMEDIATELY IN THE IMMEDIATE VICINITY OF THE FIND AND THE FIND SHALL BE PROTECTED FROM FURTHER DAMAGE. THE CONTRACTOR AND/OR LANDOWNER SHALL IMMEDIATELY CONTACT THE STATE HISTORIC PRESERVATION DIVISION (692-8015), WHICH WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND AN APPROPRIATE MITIGATION MEASURE, IF NECESSARY.
14. THE COUNTY OF MAUI IS NOT RESPONSIBLE FOR ANY PARK, ROADWAY, EASEMENT (INCLUDING BUT NOT LIMITED TO DRAINAGE, SEWER, ACCESS, RECLAIMED WATER, OR AVIGATION EASEMENT), OR ANY OTHER INTEREST IN REAL PROPERTY SHOWN ON THIS MAP OR SHOWN ON THESE PLANS, UNLESS THE MAUI COUNTY COUNCIL HAS ACCEPTED ITS DEDICATION BY A RESOLUTION APPROVED BY A MAJORITY OF A COUNCIL MEMBERS AT A REGULAR OR SPECIAL MEETING OF THE MAUI COUNTY COUNCIL OR THE COUNTY OF MAUI HAS SIGNED ITS ACCEPTANCE VIA A CONVEYANCE DOCUMENT RECORDED IN THE BUREAU OF CONVEYANCES OF THE STATE OF HAWAII IN COMPLIANCE WITH MAUI COUNTY CODE SECTION 3.44.015.
15. STEEL PLATE WARNING SIGNS ARE REQUIRED FOR ALL STEEL PLATES IN THE RIGHT-OF-WAY.
16. WHEELCHAIR RAMP INSPECTION/CERTIFICATION FORMS SHALL BE REQUIRED FOR ALL NEWLY CONSTRUCTED RAMPS.
17. ALL STRIPING AND PAVEMENT MARKINGS SHALL BE OF THERMOPLASTIC MATERIAL.
18. COMPACTION REQUIREMENTS
    A. TESTING OF MATERIALS SHALL BE CONDUCTED BY AN APPROVED INDEPENDENT TESTING AGENCY IN ACCORDANCE WITH ASTM STANDARD METHODS OR AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, AS FOLLOWS:
       I. EMBANKMENT/SELECT BORROW AND SUBGRADE MATERIALS: ONE (1) COMPACTION TEST PER 600 SQUARE YARDS PER LIFT;
       II. AGGREGATE SUBBASE COURSE: ONE (1) COMPACTION TEST PER 400 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER LIFT PER PROJECT;
       III. AGGREGATE BASE COURSE: ONE (1) COMPACTION TEST PER 300 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER LIFT PER PROJECT;
       IV. ASPHALT CONCRETE PAVEMENT OR ASPHALT TREATED BASE COURSE; THREE (3) A.C. CORES FOR THICKNESS AND DENSITY TESTS PER PROJECT;
       V. TRENCH BACKFILL MATERIAL: ONE (1) TEST FOR EACH 300 LINEAL FEET OF TRENCH PER LIFT OF MATERIAL.
    B. CONTRACTOR SHALL SUBMIT ALL TESTING REPORTS INCLUDING RESULTS TO THE COUNTY'S INSPECTION AGENCY FOR REVIEW AND APPROVAL PRIOR TO COUNTY'S ACCEPTANCE OF WORK.
    C. THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE COUNTY OF ANY TESTING FAILURES AND CORRECT EACH FAILURE PRIOR TO PROCEEDING TO THE NEXT PHASE OF CONSTRUCTION.

REVISED: 04/2016

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaul.com
Website: www.femaul.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001003 AND 4-3-002023 & 045
NAPILI, MAUI, HAWAII

CONSTRUCTION NOTES

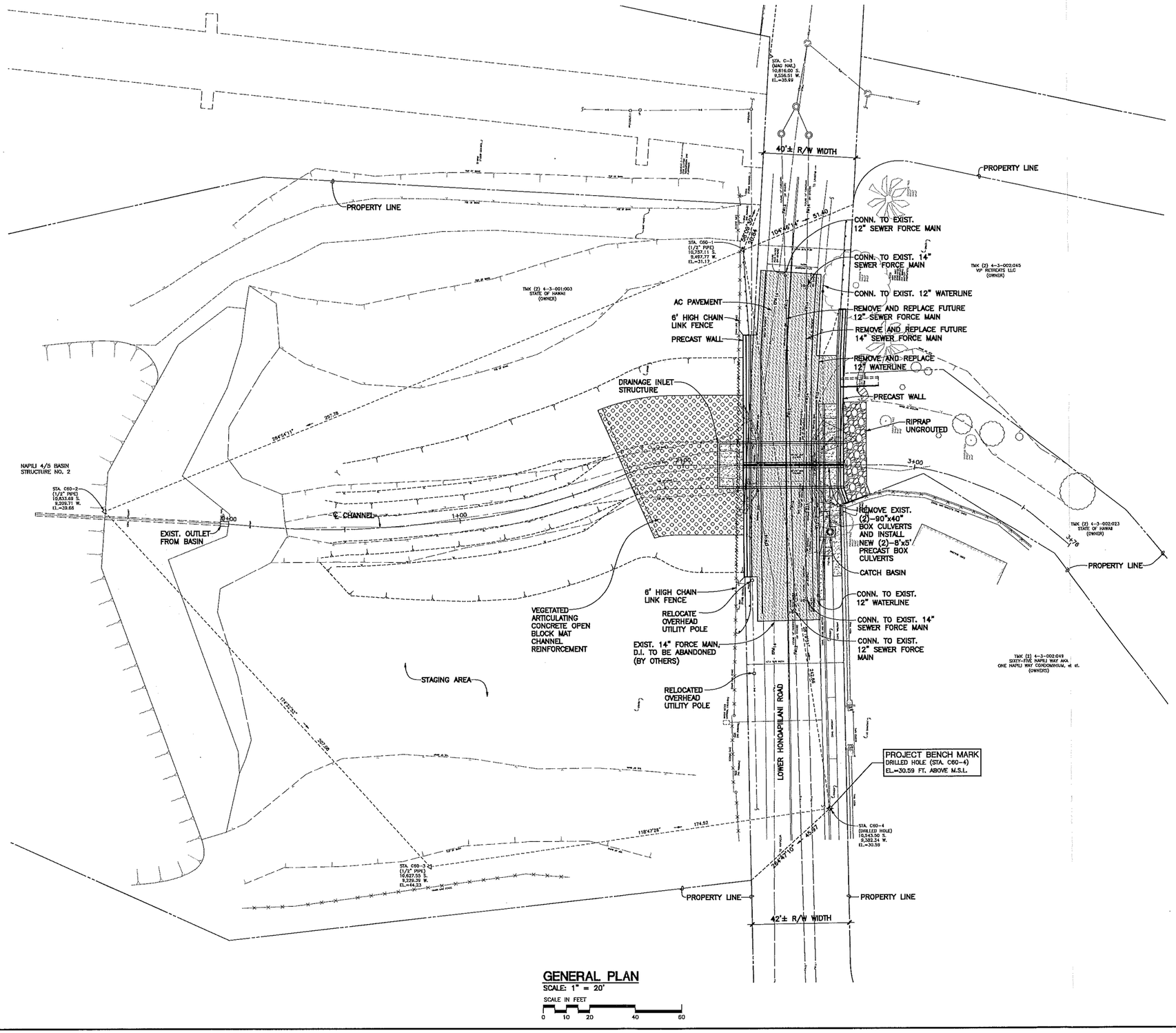
MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-1
2 OF 22



GENERAL PLAN

SCALE: 1" = 20'

SCALE IN FEET

0 10 20 40 60

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants

1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793

Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII

GENERAL PLAN

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

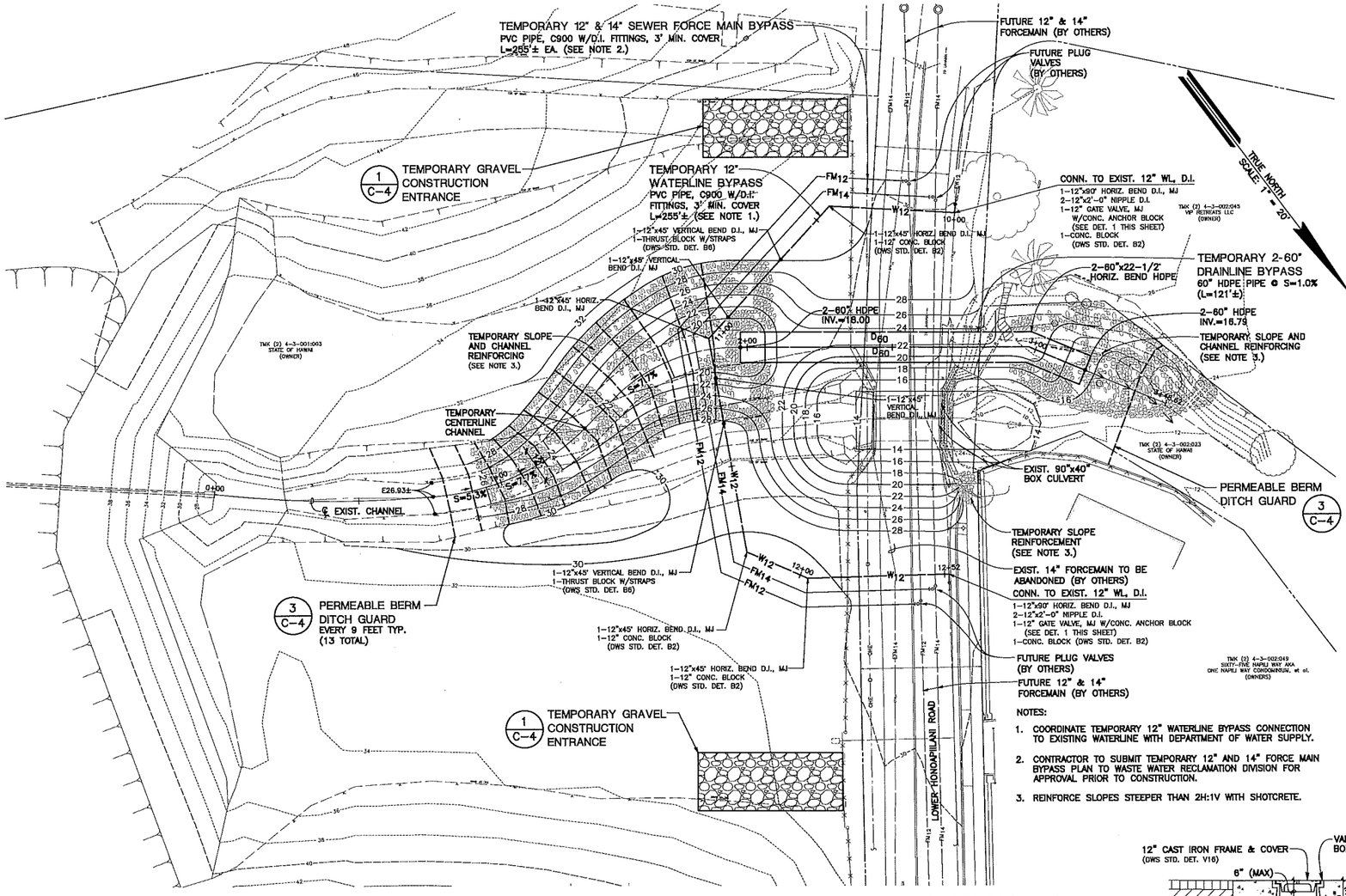
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-9

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-2

3 OF 22



PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 1

SCALE: 1" = 20'

SCALE IN FEET
0 10 20 30 40

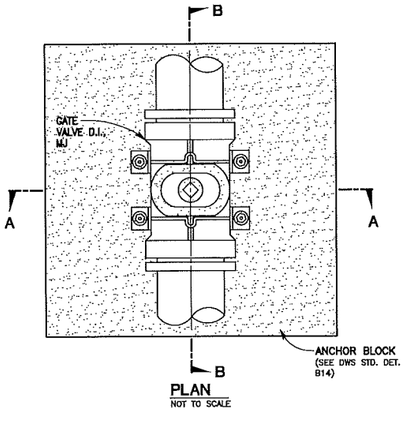
EROSION CONTROL NOTES

IMPLEMENT THE FOLLOWING OUTLINE OF THE EROSION CONTROL MEASURES DURING CONSTRUCTION.

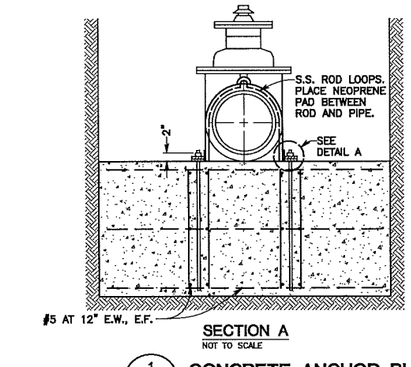
1. GENERAL EROSION CONTROL MEASURES
   - A. MINIMIZE TIME OF CONSTRUCTION.
   - B. RETAIN EXISTING GROUND COVER UNTIL THE LATEST DATE TO COMPLETE CONSTRUCTION.
   - C. PROVIDE TEMPORARY GRAVEL APRON(S) (APPROXIMATELY 50' LONG BY 30' WIDE) AT POINT OF CONNECTION TO PAVED STREET TO PREVENT TRACKING OF SEDIMENTS ONTO STREET.
   - D. CONTROL DUST BY SPRINKLING WITH WATER WAGONS OR OTHER SUITABLE METHODS. GRADED AREAS SHALL BE THOROUGHLY WATERED AFTER CONSTRUCTION ACTIVITY HAS CEASED FOR THE DAY AND ON WEEKENDS.
   - E. USE TEMPORARY BERMS AND CUT-OFF DITCHES, WHERE NEEDED, FOR CONTROL OF EROSION.
   - F. CONSTRUCT PERMANENT EROSION AND DRAINAGE CONTROL FEATURES AS EARLY AS POSSIBLE. ALL CUT AND FILL SLOPES SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER GRADING WORK HAS BEEN COMPLETED.
   - G. MAINTAIN EROSION CONTROL MEASURES UNTIL ESTABLISHMENT OF GRASS AND LANDSCAPE PLANTING.
2. SITE-SPECIFIC EROSION CONTROL MEASURES
   - A. INSTALL PERMEABLE DITCH GUARD AS NOTED ON PLAN. INSPECT DITCH GUARDS WEEKLY AND AFTER STORMS. DURING PROLONGED RAINFALL INSPECT DITCH GUARDS AT LEAST DAILY. REMOVE AND STABILIZE SEDIMENT WHEN IT REACHES HALF THE HEIGHT THE DITCH GUARD.
   - B. INSTALL CURB DRAIN INLET FILTER AS NOTED ON PLAN. INSPECT FILTER WEEKLY AND AFTER STORMS. REMOVE AND DISPOSE OF SEDIMENT AFTER EACH STORM EVENT.
3. ADDITIONAL EROSION CONTROL NOTES
   - A. ALL CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY WEEKLY IN DRY PERIODS AND WITHIN 24 HOURS AFTER ANY RAINFALL OF 1/2 INCH OR GREATER WITHIN A 24-HOUR PERIOD. DURING PROLONGED PERIODS OF RAINFALL, DAILY CHECKING IS NECESSARY. THE PERMITTEE SHALL MAINTAIN RECORDS OF THE DURATION AND ESTIMATED VOLUME OF STORM WATER DISCHARGE(S), CHECKS, AND REPAIRS.
   - B. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND FUNCTIONAL BEFORE EARTH MOVING OPERATIONS BEGIN. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
   - C. A SPECIFIC INDIVIDUAL SHALL BE DESIGNATED TO BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROLS ON EACH PROJECT.
   - D. TEMPORARY SOIL STABILIZATION WITH APPROPRIATE VEGETATION SHALL BE APPLIED ON AREAS THAT WILL REMAIN UNFINISHED FOR MORE THAN 30 CALENDAR DAYS.
   - E. PERMANENT SOIL STABILIZATION WITH PERENNIAL VEGETATION OR PAVEMENT SHALL BE APPLIED AS SOON AS PRACTICAL AFTER FINAL GRADING. IRRIGATION AND MAINTENANCE OF THE PERENNIAL VEGETATION SHALL BE PROVIDED FOR 30 DAYS OR UNTIL THE VEGETATION TAKES ROOT, WHICHEVER IS SHORTER.

MINIMUM BEST MANAGEMENT PRACTICES

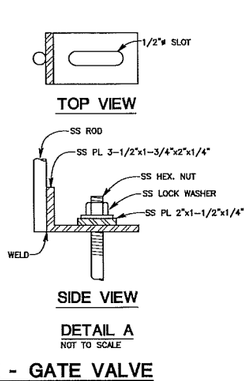
1. DRAINAGE: HANDLE DRAINAGE TO CONTROL EROSION, PREVENT DAMAGE TO DOWNSTREAM PROPERTIES, AND RETURN WATER TO THE NATURAL DRAINAGE COURSE IN A MANNER WHICH MINIMIZES SEDIMENTATION OR OTHER POLLUTION TO THE MAXIMUM EXTENT PRACTICABLE.
2. DUST CONTROL: CONTROL DUST EMISSIONS TO THE MAXIMUM EXTENT PRACTICABLE THROUGH BMPS SUCH AS WATER SPRINKLING, DUST FENCES, LIMITING AREA OF DISTURBANCE, AND TIMELY GRASSING OF FINISHED AREAS.
3. VEGETATION: RETAIN NATURAL VEGETATION, ESPECIALLY GRASSES, WHEREVER FEASIBLE. AVOID STORAGE OF GRUBBED MATERIALS NEAR WATERCOURSES.
4. EROSION CONTROLS: STABILIZE ALL DISTURBED AREAS WITH EROSION CONTROL MEASURES SUCH AS VEGETATION, RUNOFF DIVERSION, CHECK DAMS, MULCHING, BLANKETS, BONDED FIBER MATRICES, AND VEHICLE WHEEL WASH FACILITIES.
5. SEDIMENT CONTROL: CAPTURE SEDIMENT TRANSPORTED IN RUNOFF TO MINIMIZE THE SEDIMENT FROM LEAVING THE SITE WITH METHODS SUCH AS SEDIMENT BASINS, SEDIMENT TRAPS, SILT FENCES, SAND BAGS, AND VEGETATED FILTER STRIPS.
6. MATERIAL AND WASTE MANAGEMENT: PROPERLY STORE TOXIC MATERIAL AND PREVENT THE DISCHARGE OF POLLUTANTS ASSOCIATED WITH CONSTRUCTION MATERIALS.
7. TIMING OF CONTROL MEASURE IMPLEMENTATION: TIMING OF CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION CONTROL PLAN. DISTURBED AREAS OF CONSTRUCTION SITES THAT WILL NOT BE RE-DISTURBED FOR TWENTY-ONE DAYS OR MORE WILL BE STABILIZED (GRASSES OR GRAVELED) BY NO LATER THAN THE FOURTEENTH DAY AFTER THE LAST DISTURBANCE.



PLAN
NOT TO SCALE



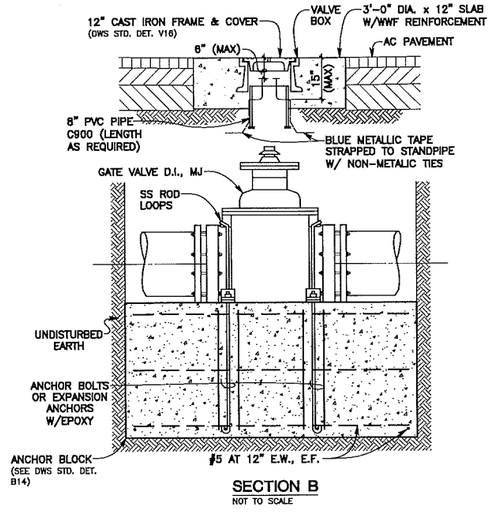
SECTION A
NOT TO SCALE



SIDE VIEW

DETAIL A
NOT TO SCALE

1 C-3 CONCRETE ANCHOR BLOCK - GATE VALVE
NOT TO SCALE



SECTION B
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 1

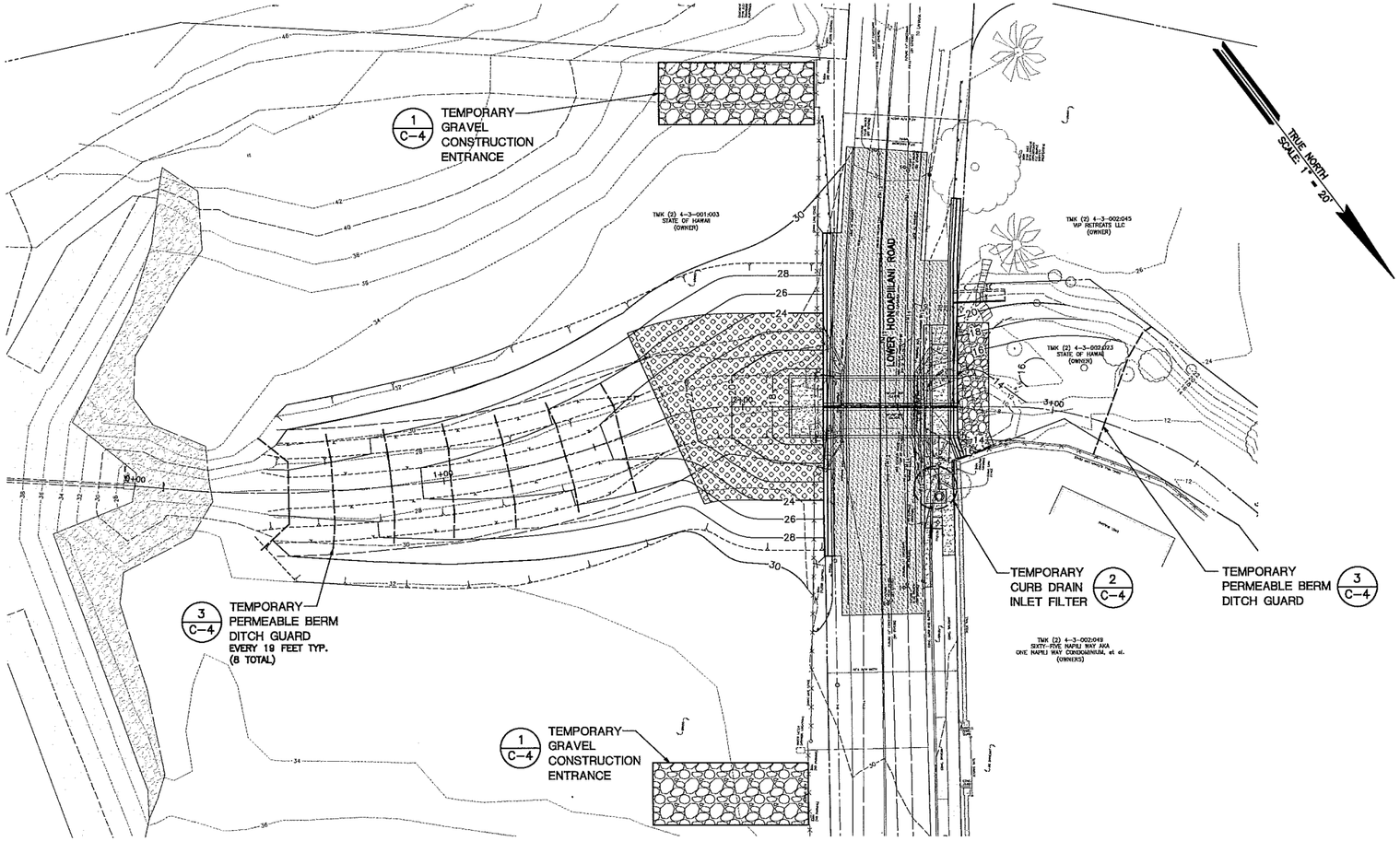
MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

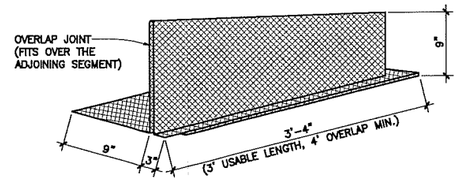
SHEET C-3
4 OF 22



PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 2

SCALE: 1" = 10'

SCALE IN FEET
0 5 10 20 30



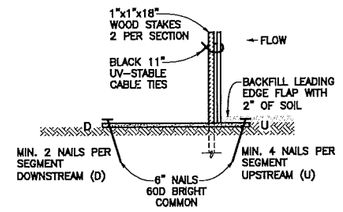
GRADIENT	DITCH GUARD 9" SPACING (FT.)
1%	76
2%	38
3%	25
4%	19
5%	15
6%	12
7%	11
8%	9

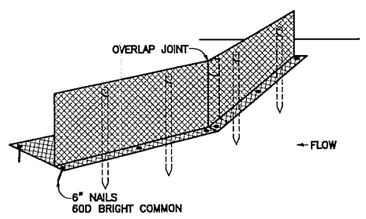
DESIGN SPACING = HEIGHT (0.75 FT.)/GRADIENT
(EXAMPLE: 5% GRADIENT 0.75 FT./0.05 = 15 FT.)

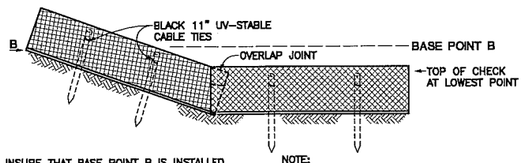
SPECIFICATIONS:

THE PERMEABLE BERMS SHALL BE DITCH GUARD™ AS MANUFACTURED BY ERTEC OR APPROVED EQUAL.

THE BERMS SHALL HAVE THE FOLLOWING PROPERTIES:
LENGTH: 3'-4" (3 FEET USABLE)
HEIGHT: 0.75 FEET
POLYMER: HDPE
INTEGRATED FILTER FABRIC FOR SCOUR PROTECTION
ANCHORS: 6" NAIL 60D BRIGHT COMMON
(4 UPSTREAM, 2 DOWNSTREAM)
DOWNSTREAM STAKES: 1"x1"x18" OR 1"x2"x18"
(2 PER SEGMENT)

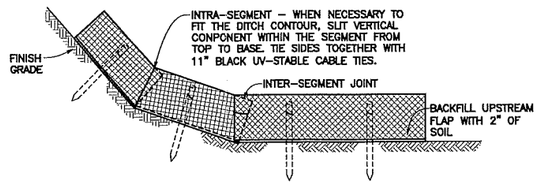


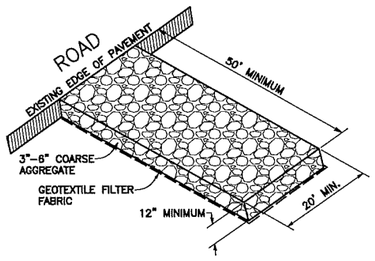




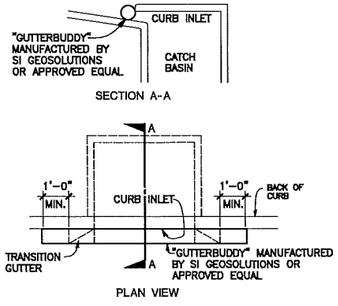
INSURE THAT BASE POINT B IS INSTALLED HIGHER THAN TOP EDGE TO PREVENT WATER FLANKING AND ENSURE FLOW TOWARD CHANNEL CENTER.

NOTE:
GRADIENTS GREATER THAN 5% MAY REQUIRE INSTALLATION OF EROSION BLANKET OR TURF REINFORCEMENT MAT ON BED OF CHANNEL.





1 C-4 **TEMPORARY GRAVEL CONSTRUCTION ENTRANCE**
NOT TO SCALE



1 C-4 **TEMPORARY CURB DRAIN INLET FILTER**
NOT TO SCALE

3 C-4 **TEMPORARY PERMEABLE BERM DITCH GUARD DETAILS**
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

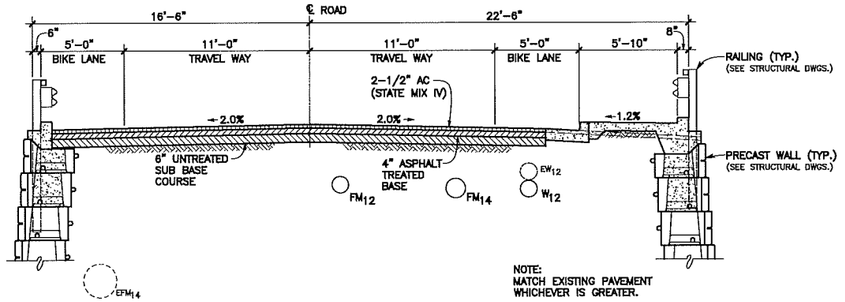
PHASING AND EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN - 2

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

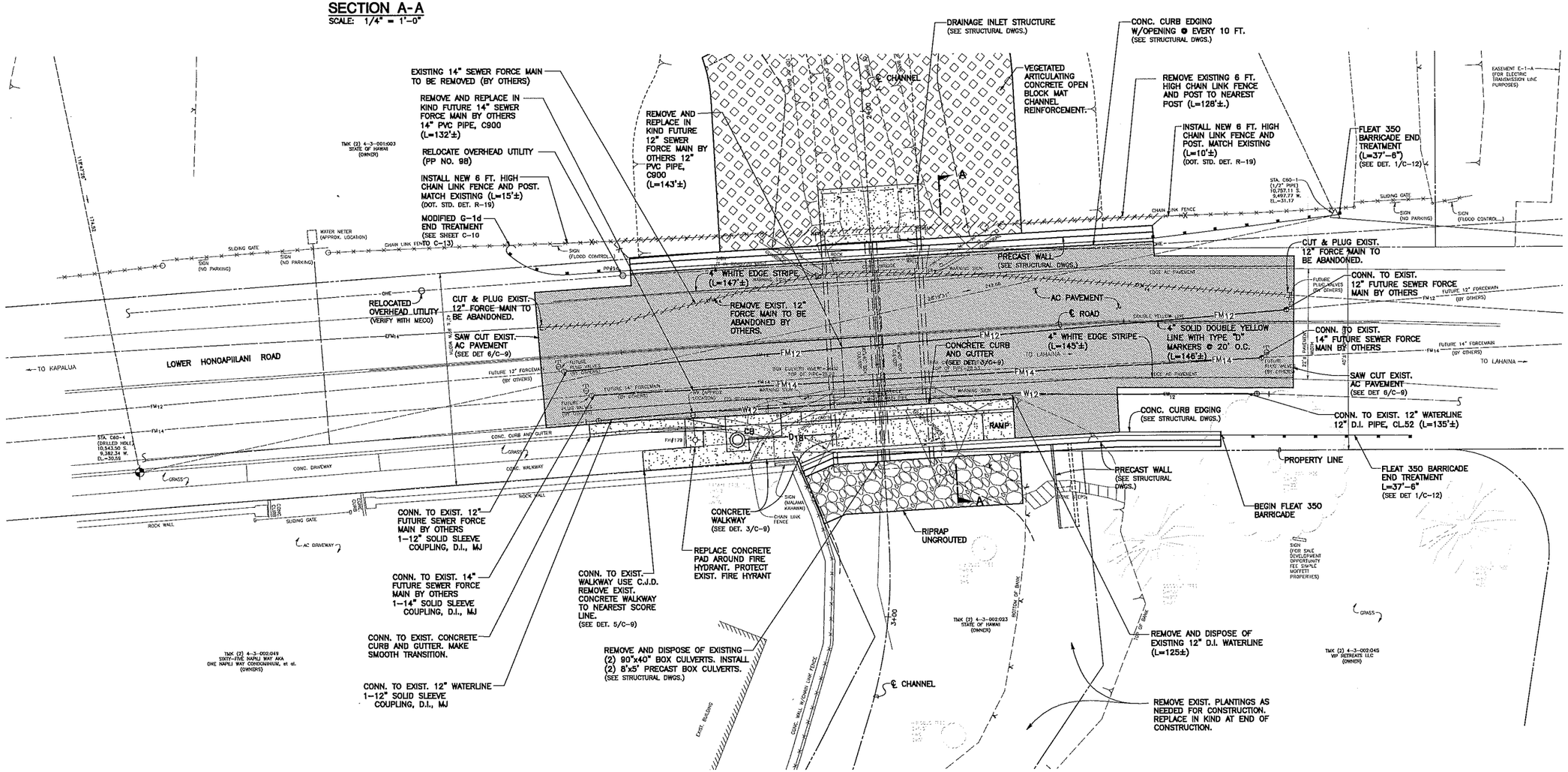
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-4
5 OF 22



SECTION A-A
SCALE: 1/4" = 1'-0"



LOWER HONOAPIILANI ROAD SITE, UTILITY, AND STRIPING PLAN
SCALE: 1" = 10'

SCALE IN FEET
0 5 10 20 30

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants

1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793

Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

LOWER HONOAPIILANI ROAD SITE, UTILITY, AND STRIPING PLAN

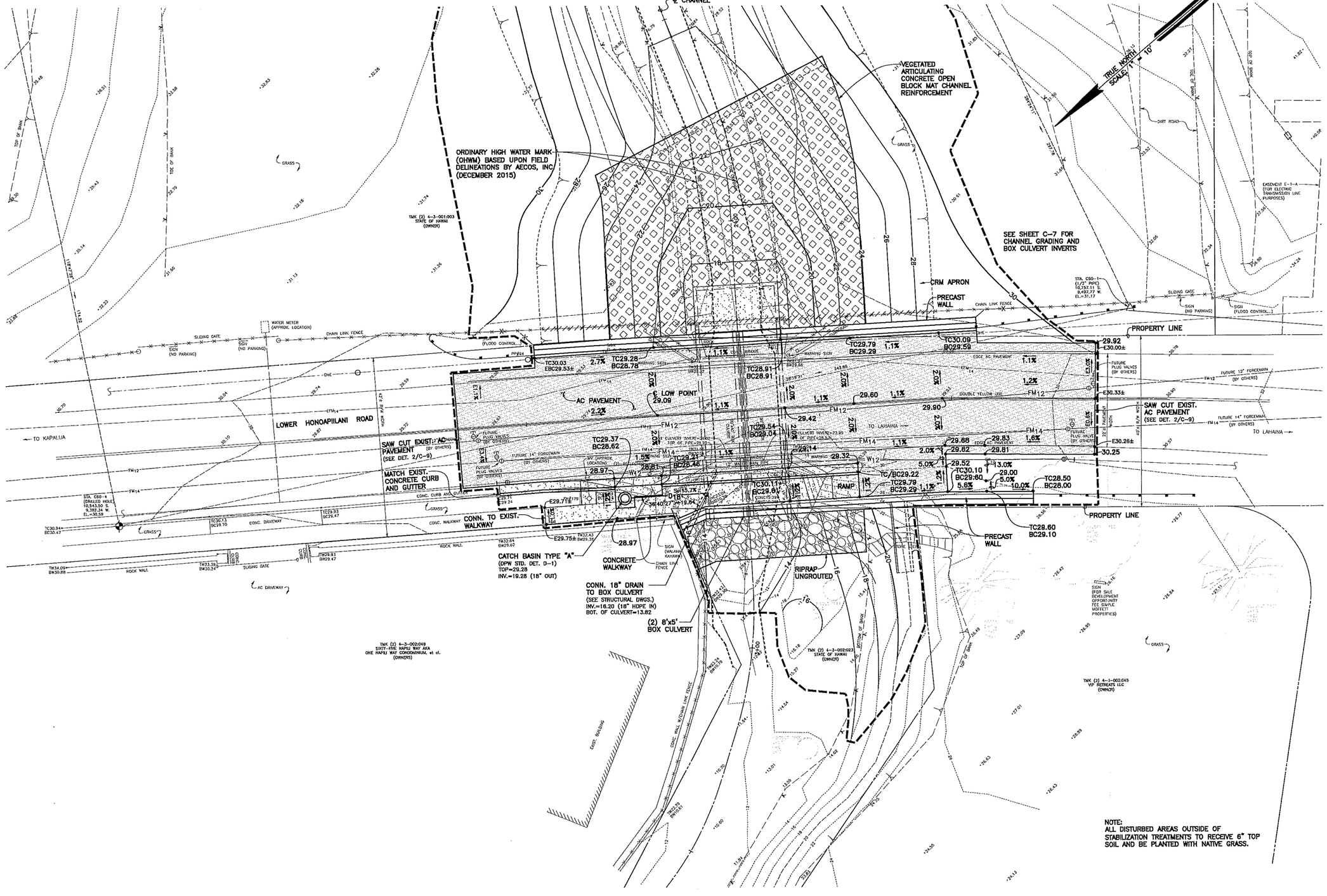
MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-9.

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-5
6 OF 22



LOWER HONOAPIILANI ROAD GRADING PLAN

SCALE: 1" = 10'

SCALE IN FEET

0 5 10 20 30

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

LOWER HONOAPIILANI ROAD GRADING PLAN

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

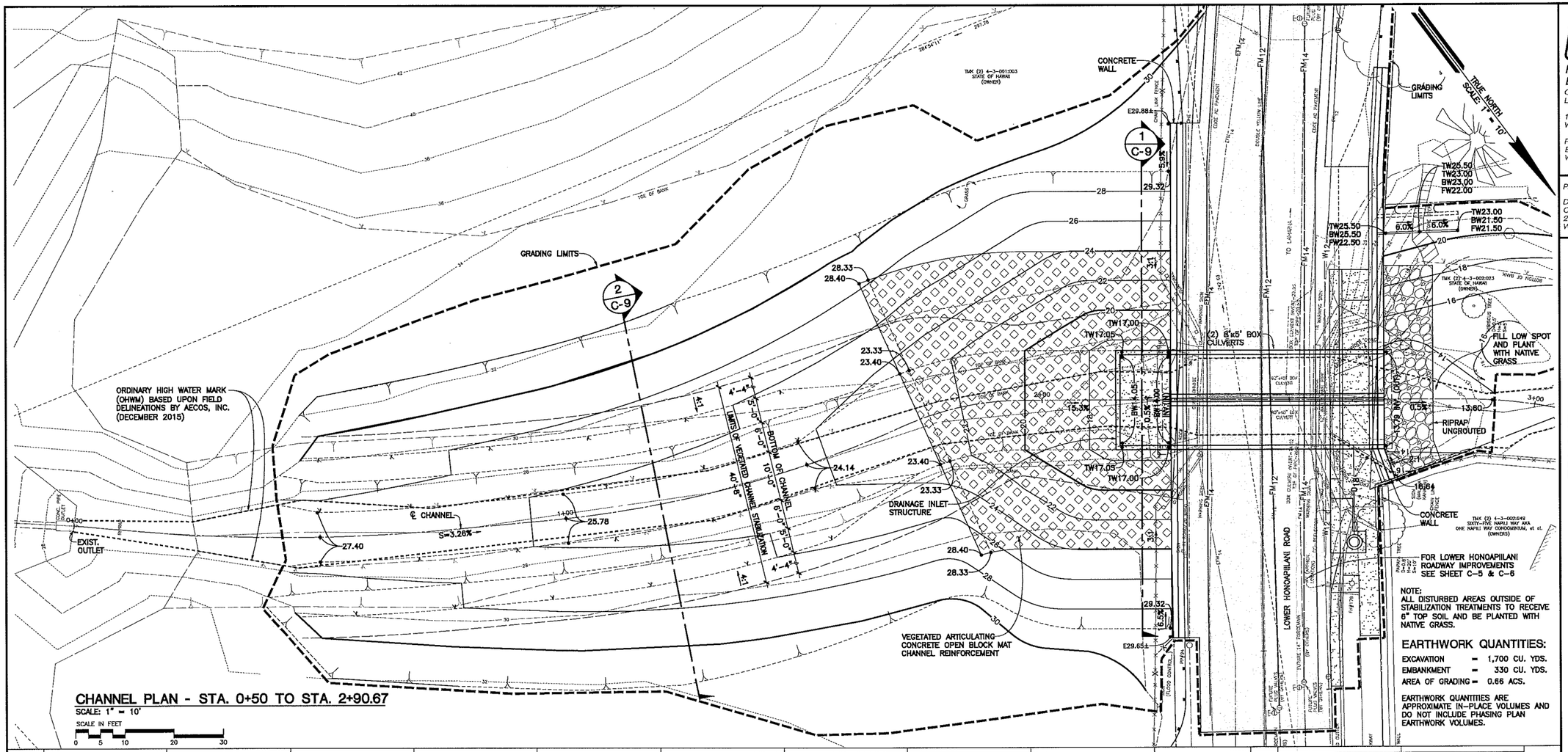
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION; AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-9

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-6

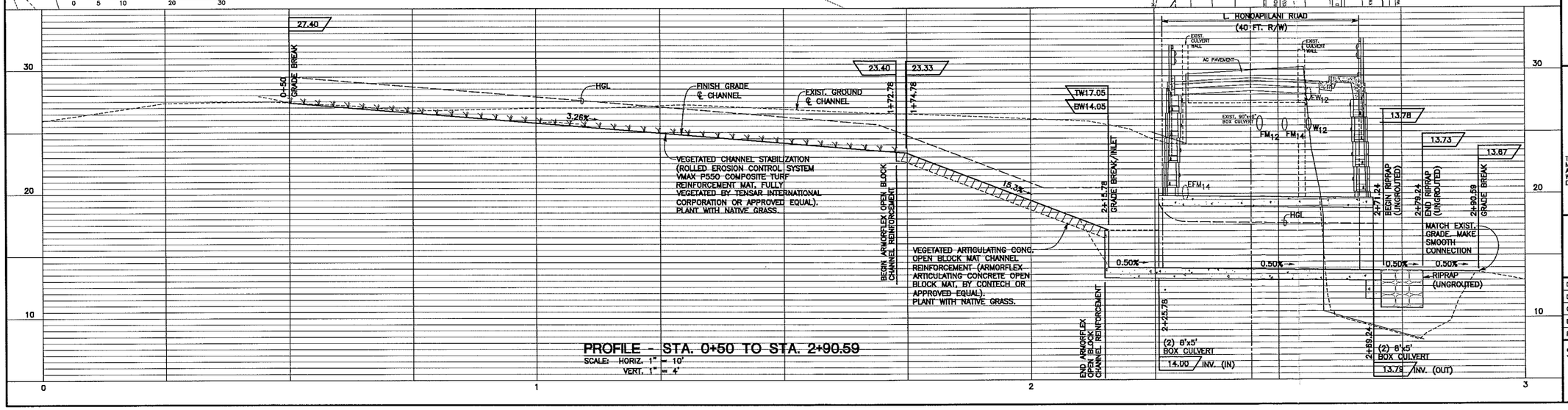
7 OF 22



CHANNEL PLAN - STA. 0+50 TO STA. 2+90.67

SCALE: 1" = 10'

SCALE IN FEET
0 5 10 20 30



PROFILE - STA. 0+50 TO STA. 2+90.59

SCALE: HORIZ. 1" = 10'
VERT. 1" = 4'

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants

1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793

Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII

CHANNEL PLAN AND PROFILE - STA. 0+50 TO STA. 2+90.59

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

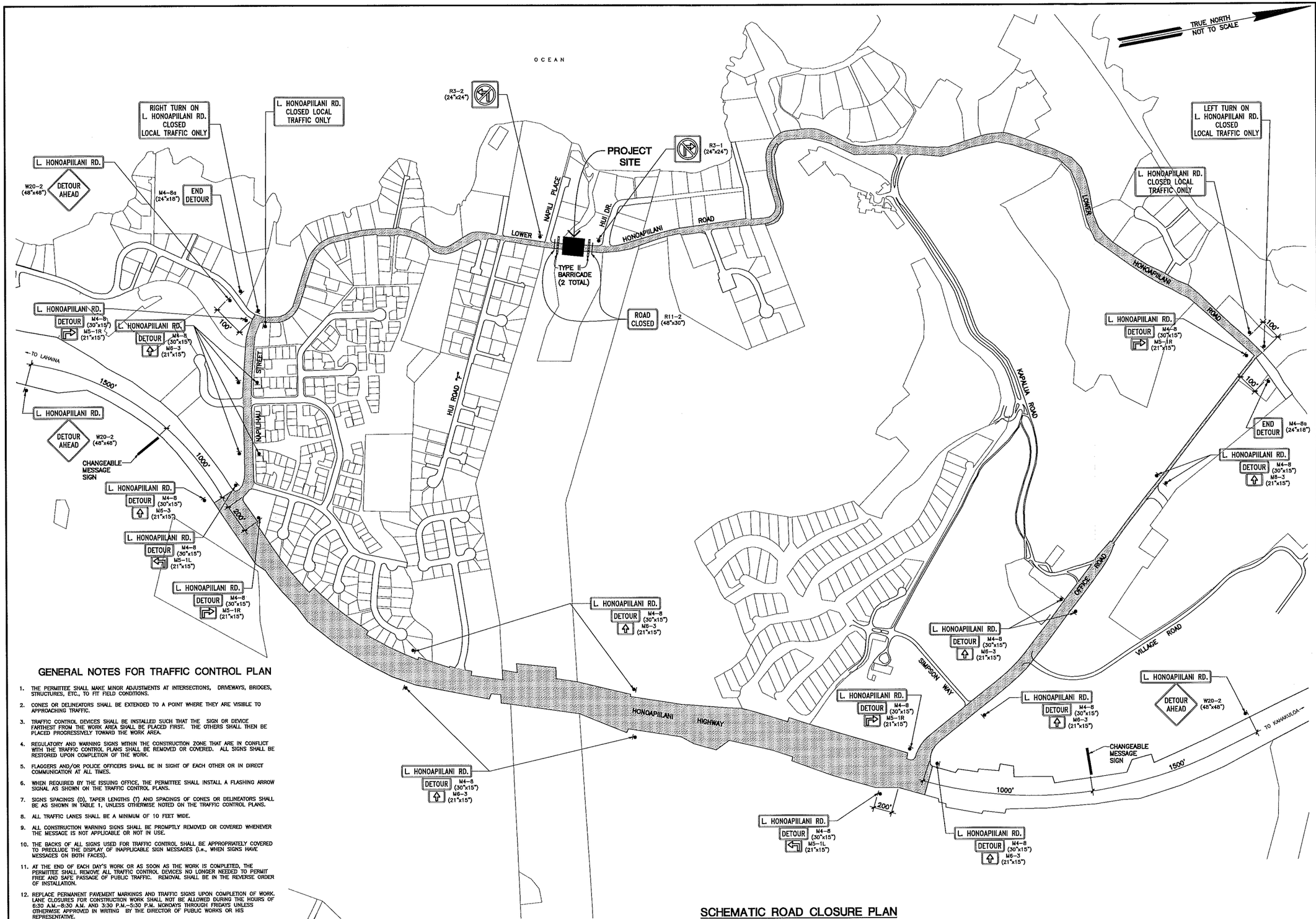
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-7

8 OF 22



GENERAL NOTES FOR TRAFFIC CONTROL PLAN

1. THE PERMITTEE SHALL MAKE MINOR ADJUSTMENTS AT INTERSECTIONS, DRIVEWAYS, BRIDGES, STRUCTURES, ETC., TO FIT FIELD CONDITIONS.
2. CONES OR DELINEATORS SHALL BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
3. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED SUCH THAT THE SIGN OR DEVICE FARTHEST FROM THE WORK AREA SHALL BE PLACED FIRST. THE OTHERS SHALL THEN BE PLACED PROGRESSIVELY TOWARD THE WORK AREA.
4. REGULATORY AND WARNING SIGNS WITHIN THE CONSTRUCTION ZONE THAT ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLANS SHALL BE REMOVED OR COVERED. ALL SIGNS SHALL BE RESTORED UPON COMPLETION OF THE WORK.
5. FLAGGERS AND/OR POLICE OFFICERS SHALL BE IN SIGHT OF EACH OTHER OR IN DIRECT COMMUNICATION AT ALL TIMES.
6. WHEN REQUIRED BY THE ISSUING OFFICE, THE PERMITTEE SHALL INSTALL A FLASHING ARROW SIGNAL AS SHOWN ON THE TRAFFIC CONTROL PLANS.
7. SIGNS SPACINGS (D), TAPER LENGTHS (T) AND SPACINGS OF CONES OR DELINEATORS SHALL BE AS SHOWN IN TABLE 1, UNLESS OTHERWISE NOTED ON THE TRAFFIC CONTROL PLANS.
8. ALL TRAFFIC LANES SHALL BE A MINIMUM OF 10 FEET WIDE.
9. ALL CONSTRUCTION WARNING SIGNS SHALL BE PROMPTLY REMOVED OR COVERED WHENEVER THE MESSAGE IS NOT APPLICABLE OR NOT IN USE.
10. THE BACKS OF ALL SIGNS USED FOR TRAFFIC CONTROL SHALL BE APPROPRIATELY COVERED TO PRECLUDE THE DISPLAY OF INAPPLICABLE SIGN MESSAGES (i.e., WHEN SIGNS HAVE MESSAGES ON BOTH FACES).
11. AT THE END OF EACH DAY'S WORK OR AS SOON AS THE WORK IS COMPLETED, THE PERMITTEE SHALL REMOVE ALL TRAFFIC CONTROL DEVICES NO LONGER NEEDED TO PERMIT FREE AND SAFE PASSAGE OF PUBLIC TRAFFIC. REMOVAL SHALL BE IN THE REVERSE ORDER OF INSTALLATION.
12. REPLACE PERMANENT PAVEMENT MARKINGS AND TRAFFIC SIGNS UPON COMPLETION OF WORK. LANE CLOSURES FOR CONSTRUCTION WORK SHALL NOT BE ALLOWED DURING THE HOURS OF 6:30 A.M.–8:30 A.M. AND 3:30 P.M.–5:30 P.M. MONDAYS THROUGH FRIDAYS UNLESS OTHERWISE APPROVED IN WRITING BY THE DIRECTOR OF PUBLIC WORKS OR HIS REPRESENTATIVE.
13. ALTERATIONS OR REVISIONS TO THE TRAFFIC CONTROL PLAN DURING CONSTRUCTION SHALL BE PREPARED AND RESUBMITTED FOR REVIEW/APPROVAL BY THE DESIGN CONSULTANT.
14. INSTALL ARROW/MESSAGE BOARDS IN ALL DIRECTIONS OF TRAFFIC.
15. PROVIDE NOTIFICATION OF ROAD WORK TO AFFECTED PROPERTY OWNERS IN THE VICINITY AND NOTIFY THROUGH THE MEDIA, (NEWSPAPERS, RADIO, ETC...).

SCHEMATIC ROAD CLOSURE PLAN

NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants

1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793

Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII

SCHEMATIC ROAD CLOSURE PLAN

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

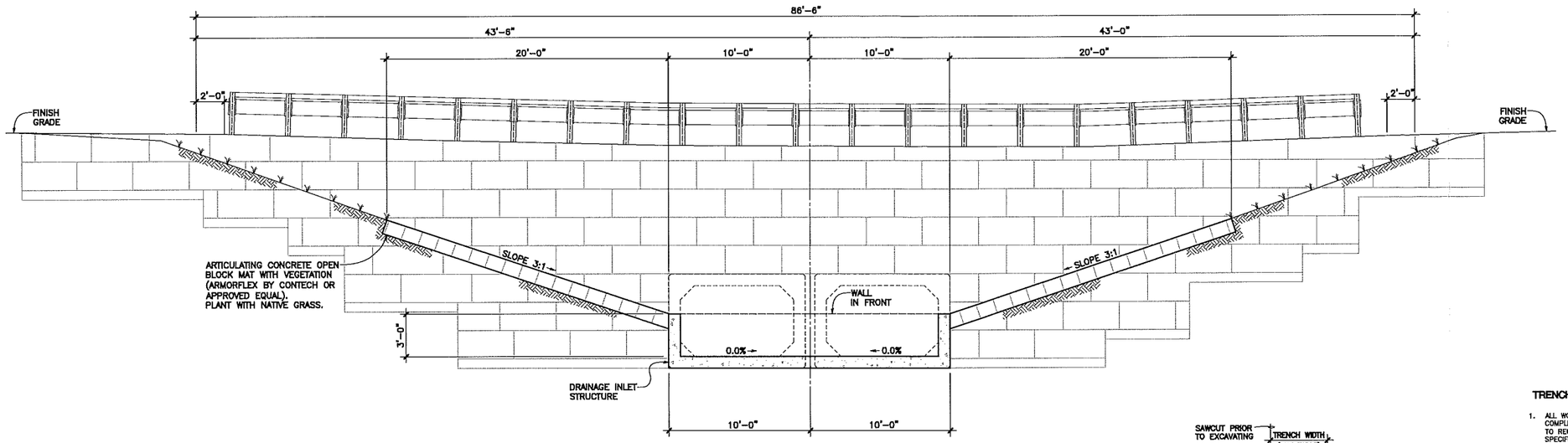
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

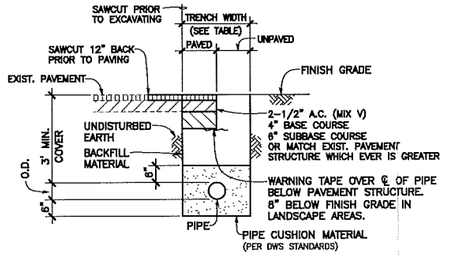
DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-8

9 OF 22



1 / C-9 **UPSTREAM SECTION AT CULVERT (INLET)**
SCALE: 1/4" = 1'-0"

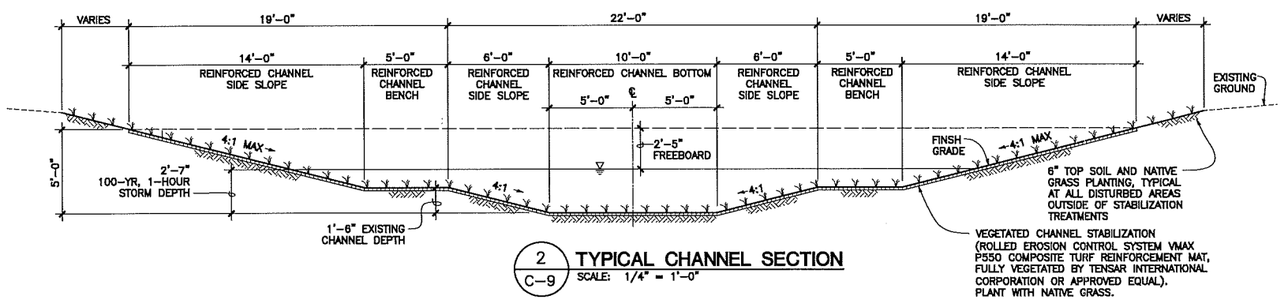


7 / C-9 **TYPICAL WATERLINE TRENCH SECTION**
NOT TO SCALE

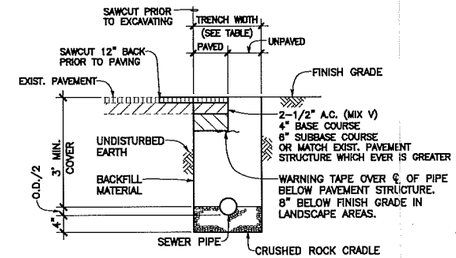
TRENCH SECTION NOTES:

1. ALL WORK AND MATERIALS REQUIRED TO COMPLETE THE AC PAVING SHALL CONFORM TO REQUIREMENTS OF THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION 1994".
2. CONTRACTOR SHALL PROVIDE A TEMPORARY COLD MIX PATCH IF PERMANENT RESTORATION CANNOT BE MADE WITHIN 24 HOURS OF BACKFILL.
3. ALL EXPOSED AREAS TO BE GRASSED.
4. MINIMUM COVER:
   A. UNDER ROAD PAVEMENT = 36"
   B. UNDER SHOULDER AREA:
      1. SMALLER THAN 4" = 24"
      2. 4" = 30"
      3. 6" AND LARGER = 36"
5. PIPE CUSHION MATERIAL ABOVE PIPE:
   A. 12" FOR PIPES 16" OR LARGER
   B. 6" FOR PIPES 12" OR SMALLER
6. ANY DAMAGES TO EXISTING UTILITIES SHALL BE REPLACED AND/OR RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO OWNER.
7.

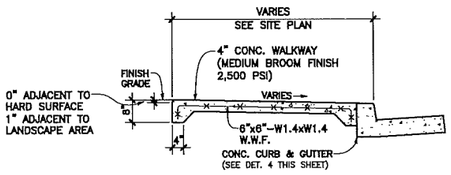
PIPE SIZE	TRENCH WIDTH
<4"	12"
4"	24"
6"	24"
8"	48"
12"	30"
24"	24"



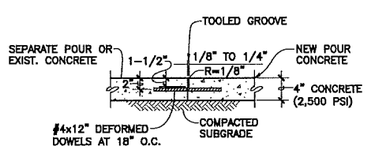
2 / C-9 **TYPICAL CHANNEL SECTION**
SCALE: 1/4" = 1'-0"



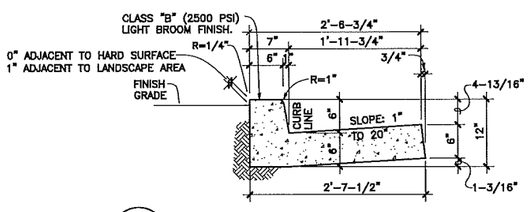
8 / C-9 **TYPICAL SEWERLINE TRENCH SECTION**
NOT TO SCALE



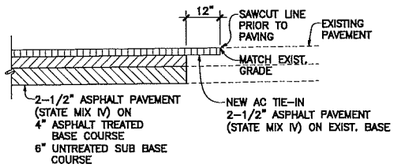
3 / C-9 **CONCRETE WALKWAY DETAIL**
SCALE: 1/2" = 1'-0"



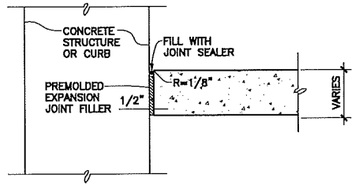
5 / C-9 **CONSTRUCTION JOINT WITH DOWELS** (C.J.D.) FOR SIDEWALK
SCALE: 1" = 1'-0"



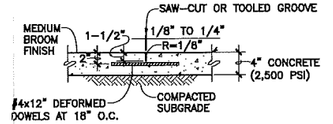
4 / C-9 **CONCRETE CURB & GUTTER**
SCALE: 1" = 1'-0"



6 / C-9 **ASPHALT PAVING TIE-IN DETAIL**
SCALE: 1/2" = 1'-0"



9 / C-9 **EXPANSION JOINT** (E.J.)
SCALE: 1" = 1'-0"



10 / C-9 **CONTRACTION JOINT** (C.J.) FOR SIDEWALK
SCALE: 1" = 1'-0"

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

DRAINAGE SECTIONS AND MISCELLANEOUS DETAILS

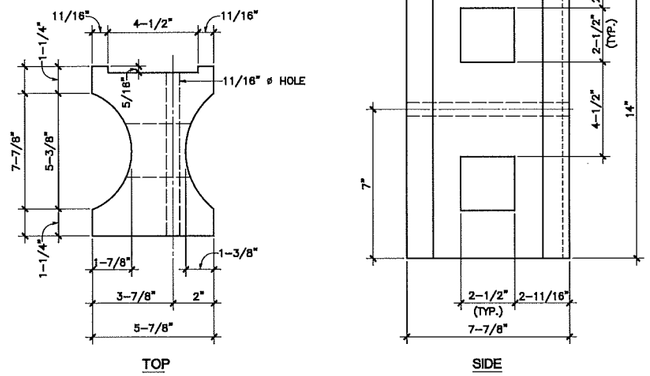
MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

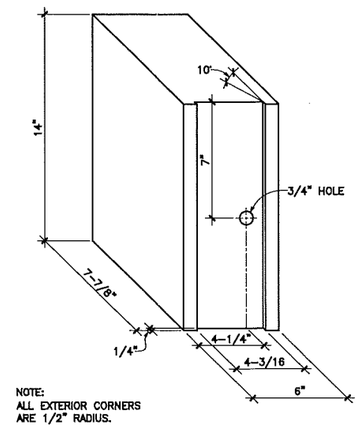
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-9
10 OF 22

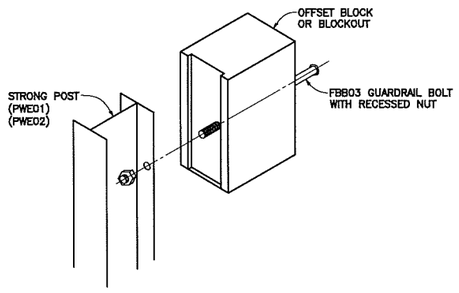


RECYCLED PLASTIC BLOCKOUT (TYPE I)



NOTE:
ALL EXTERIOR CORNERS
ARE 1/2" RADIUS.

RECYCLED POLYETHLENE OFFSET BLOCK (TYPE II)



EXPLODED VIEW
(RAIL AND WASHER NOT SHOWN)

STEEL POST AND BLOCK DETAIL

GENERAL NOTES

1. ALL HARDWARE, POSTS, AND FASTENERS SHALL BE HOT-DIP ZINC COATED GALVANIZED AFTER FABRICATION. NO PUNCHING, DRILLING, OR CUTTING WILL BE PERMITTED AFTER GALVANIZING.
2. WHERE CONDITIONS REQUIRE, SPECIAL POST LENGTHS IN INCREMENTS OF 6 INCHES MAY BE SPECIFIED.
3. ALL FASTENERS, POSTS, AND RAIL ELEMENTS (I.E. FBB03, PWE01, RWM02b, ETC.) SHALL CONFORM TO THE LATEST EDITION AND AMENDMENTS OF "A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE", A REPORT PREPARED AND APPROVED BY AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE, SUBCOMMITTEE ON NEW HIGHWAY MATERIALS, TASK FORCE 13 REPORT. DIMENSIONS OF FASTNERS, POSTS, AND RAIL ELEMENTS HAVE BEEN CONVERTED FROM METRIC UNITS INTO THEIR PRESENT FORM.
4. THE RECYCLED PLASTIC BLOCK OR OFFSET BLOCK SHALL BE APPROVED BY THE STATE.
5. ALL NEW GUARDRAIL SYSTEMS (SYSTEM CONSISTS OF TOTAL LENGTH OF GUARDRAIL INCLUDING BOTH END TREATMENTS) SHALL INCLUDE THE ADDITIONAL PAVED AREA.
6. AFTER THE GUARDRAIL POSTS ARE INSTALLED IN THE PAVED AREA, THE CONTRACTOR SHALL FILL/SEAL AROUND EACH GUARDRAIL POST AND ALL CRACKS IN THE PAVED AREA CAUSED DURING THE GUARDRAIL POST INSTALLATION. IF REQUIRED BY THE INSPECTOR/ENGINEER, THE CONTRACTOR SHALL TAMPER THE PAVED AREA AROUND THE GUARDRAIL POST PRIOR TO FILLING/SEALING. ALL COSTS ASSOCIATED WITH THIS WORK SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS GUARDRAIL ITEMS.
7. WHEN STANDARDS FOR THE FILL SLOPE AREA CANNOT BE MET, A SITE SPECIFIC, ENGINEER APPROVED DESIGN MAY BE USED.
8. NEW A.C. PAVEMENT AT GUARDRAILS SHALL EXTEND 8 FEET LONGITUDINALLY BEYOND TERMINAL ENDS.
9. REFLECTOR MARKERS (RM-5) MOUNTED ON GUARDRAILS SHALL BE SPACED EVERY 25 FEET. RM-5'S SHALL NOT BE INSTALLED ON TERMINAL SECTIONS. FURNISHING AND INSTALLING OF EACH RM-5 SHALL BE CONSIDERED INCIDENTAL TO THE ADJACENT GUARDRAIL SYSTEM.

GUARDRAIL TYPE	DIMENSIONS	
	H	A
STRONG POST W-BEAM	1'-9-5/8"	1'-6"
STRONG POST RUBRAIL (W-BEAM)	2'-0"	1'-6"

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants

1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793

Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045

NAPILI, MAUI, HAWAII

W-BEAM GUARDRAIL DETAILS - 1

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

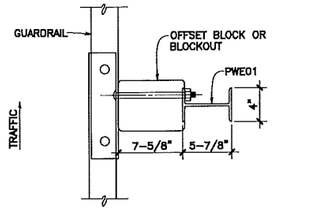
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-9

LICENSE EXPIRES: 04/30/2018

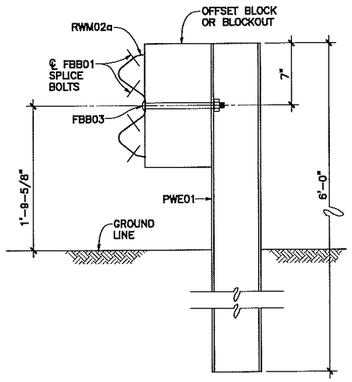
DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	CON60

SHEET C-10

11 OF 22

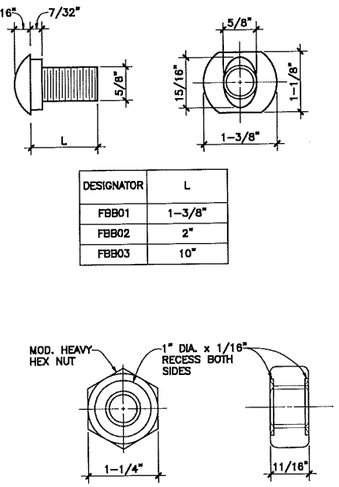


PLAN

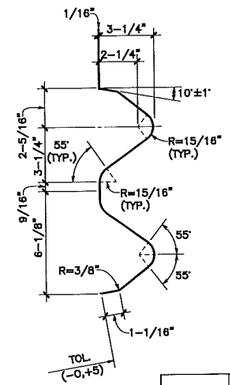


ELEVATION

3 C-10 **GURADRAIL BOLTS AND RECESSED NUT**
NOT TO SCALE

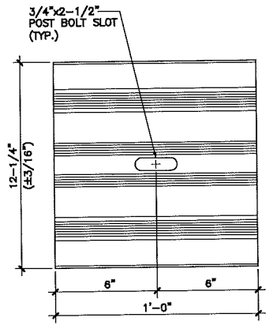


DESIGNATOR	L
FBB01	1-3/8"
FBB02	2"
FBB03	10"

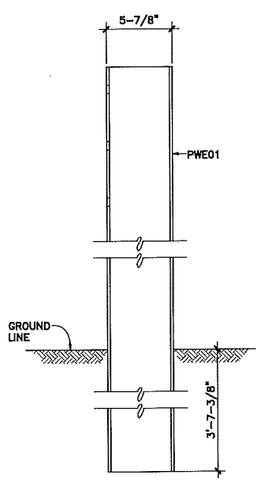


DESIGNATOR	BASE METAL THICKNESS
RWB01a	12 GAUGE

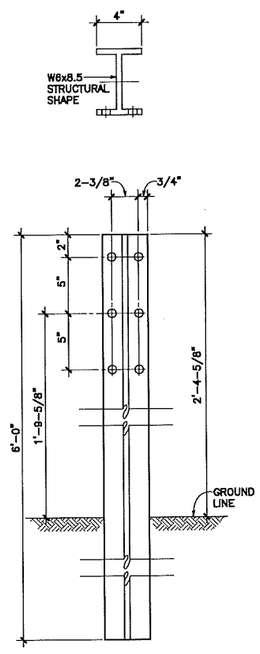
4 C-10 **W-BEAM BACK-UP-PLATE (RWB01a)**
NOT TO SCALE



NOTE:
ALL HOLES ARE 3/4" DIAMETER.



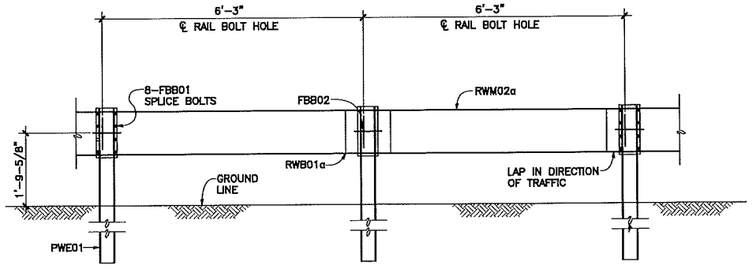
SIDE



FRONT

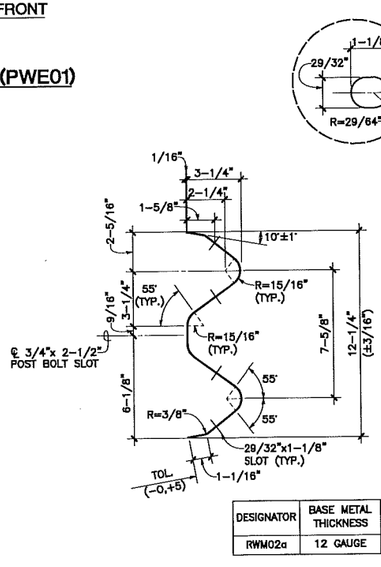
1 C-10 **STRONG POST W-BEAM GUARDRAIL (SGR04a)**
NOT TO SCALE

2 C-10 **W-BEAM STRONG POST (PWE01)**
NOT TO SCALE

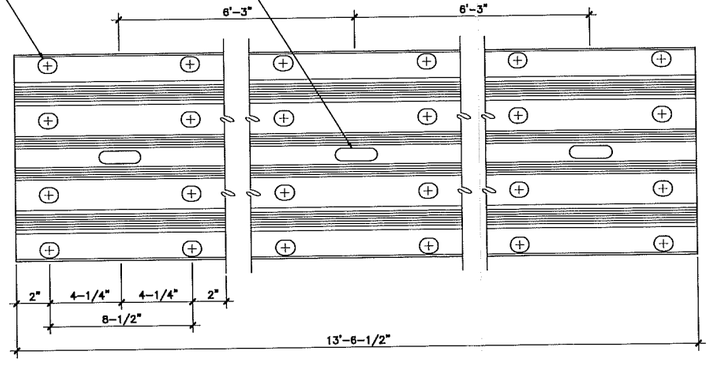


ELEVATION

5 C-10 **STRONG POST W-BEAM GUARDRAIL WITH RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT**
NOT TO SCALE



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 GAUGE



6 C-10 **2 SPACE W-BEAM GUARDRAIL (RWM02a)**
NOT TO SCALE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

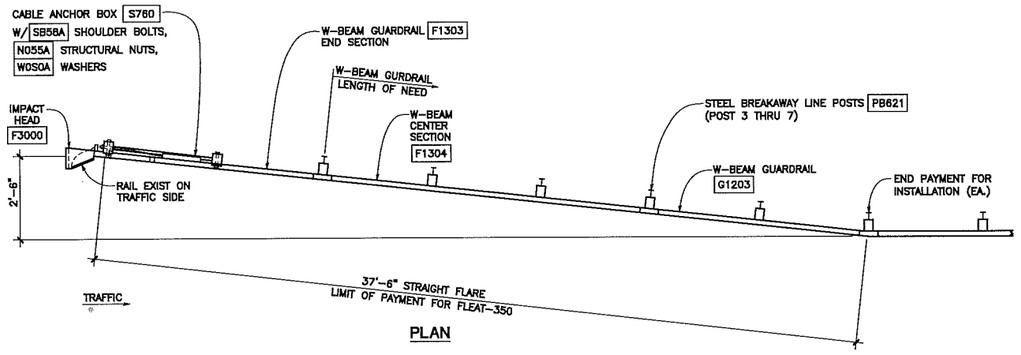
W-BEAM GUARDRAIL DETAILS - 2

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

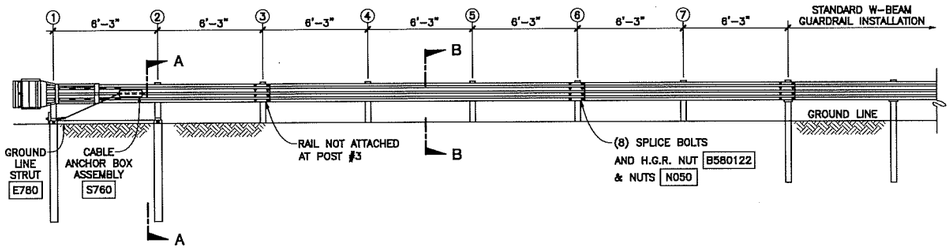
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-9.
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM00

SHEET C-11
12 OF 22



PLAN



ELEVATION

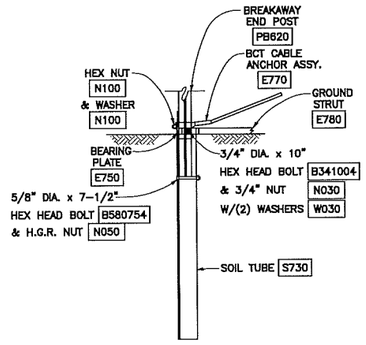
IMPACT HEAD CONNECTING DETAIL
NOT TO SCALE

GENERAL NOTES:

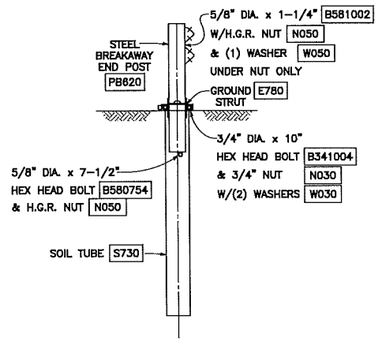
1. BREAKAWAY POSTS ARE REQUIRED WITH THE FLEAT TERMINAL.
2. ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS AND BEARING PLATES SHALL BE GALVANIZED.
3. THE SOIL TUBES SHALL NOT PROTRUDE MORE THAN 4" ABOVE GROUND (MEASURED ALONG A 5' CORD). SITE GRADING MAY BE NECESSARY TO MEET THIS REQUIREMENT.
4. THE SOIL TUBES MAY BE DRIVEN WITH AN APPROVED DRIVING HEAD. SOIL TUBES SHALL NOT BE DRIVEN WITH THE POST IN THE TUBE. IF THE TUBES ARE PLACED IN DRILLED HOLES, THE BACKFILL MATERIAL MUST BE SATISFACTORILY COMPACTED TO PREVENT SETTLEMENT.
5. WHEN ROCK IS ENCOUNTERED DURING EXCAVATION, A 12" DIA. POST HOLE, 20" DEEP MAY BE USED IF APPROVED BY THE ENGINEER. GRANULAR MATERIAL WILL BE PLACED IN THE BOTTOM OF THE HOLE APPROX. 2-1/2" DEEP TO PROVIDE DRAINAGE. THE SOIL TUBES WILL BE FIELD CUT TO LENGTH, PLACED IN THE HOLE AND BACKFILLED WITH ADEQUATELY COMPACTED MATERIAL EXCAVATED FROM THE HOLE.
6. THE BREAKAWAY CABLE ASSEMBLY MUST BE TAUT. A LOCKING DEVICE, (VICE GRIPS OR CHANNEL LOCK PLIERS) SHOULD BE USED TO PREVENT THE CABLE FROM TWISTING WHEN TIGHTENING NUTS.
7. (R) OR (L) INDICATES RIGHT OR LEFT IMPACT HEAD REFLECTOR MARKER (IHRM).
8. THE STRIPES FOR IHRM SHALLL SLOPE DOWNWARD AT AN ANGLE OF 45^ TOWARDS THE SIDE OF THE END TREATMENT THAT TRAFFIC IS TO PASS.

ITEM NO.	QTY.	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA.
F1304	1	W-BEAM GUARDRAIL CENTER SECTION, 12 GA.
G1203	1	W-BEAM GUARDRAIL, 12 GA.
S730	2	*FOUNDATION SOIL TUBE, 6"x8"x72"
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
E780	1	GROUND STRUT
PB620	2	STEEL BREAKAWAY END POST
PB621	5	STEEL BREAKAWAY LINE POST
	5	RECYCLED PLASTIC BLOCKOUT OR OFFSET BLOCK
	1	IMPACT HEAD REFLECTOR MARKER – IHRM(R) OR (L)
HARDWARE		
B580122	25	5/8" DIA. x 1-1/4" SPLICE BOLT, POST #2
B580754	2	5/8" DIA. x 7-1/2" HEX BOLT
B341004	2	3/4" DIA. x 10" HEX BOLT
B581002	5	5/8" DIA. x 10" H.G.R. BOLT (POST 3 THRU 7)
N050	32	5/8" DIA. H.G.R. NUT (SPLICE 24, SOIL TUBES 2, POST 2 THRU 7, 8)
N030	2	3/4" DIA. HEX NUT
W050	6	H.G.R. WASHER
W030	4	3/4" ID WASHER
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
B140404	2	1/4" x 4" HEX BOLT
N014	2	1/4" HEX NUT
W014	4	1/4" WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	1/2" A325 STRUCTURAL NUT
W050A	16	1-1/16" OD x 9/16" ID A325 STR. WASHER

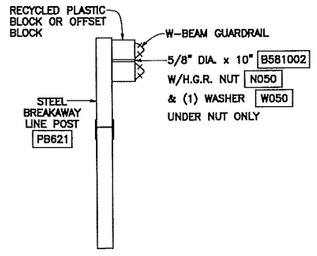
FOUNDATION TUBE OPTIONS FOR POSTS 1 & 2
*6'-0" SPLIT FOUNDATION TUBES S730
*6'-0" SOLID FOUNDATION TUBES E731
*5'-0" FOUNDATION TUBES S735 W/SOIL PLATES SP600
*4'-6" FOUNDATION TUBES E735 W/SOIL PLATES SP600



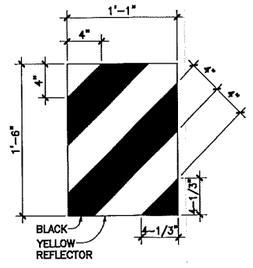
PARTIAL VIEW OF POST 1



SECTION A-A
(@ POST #2)



SECTION B-B
(TYPICAL @ POST 3 – 7)
NOTE: RAIL NOT BOLTED @ POST #3



IHRM (R)
IMPACT HEAD REFLECTOR
MARKER INSERT DETAIL
SCALE: 1-1/2" = 1'-0"

1 / C-11 FLEAT-350 GUARDRAIL DETAILS
SCALE: AS SHOWN

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

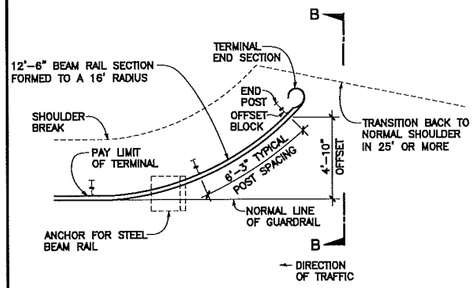
FLEAT 350 GUARDRAIL DETAILS

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

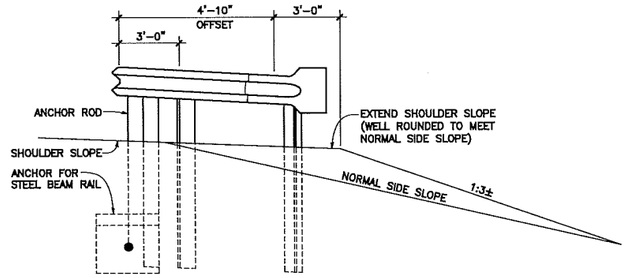
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-9.
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

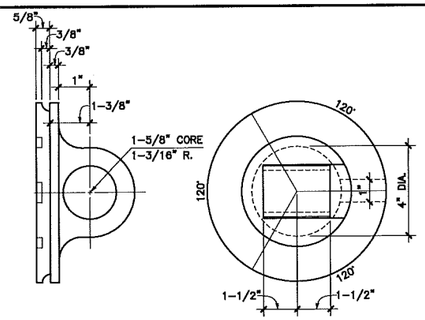
SHEET C-12
13 OF 22



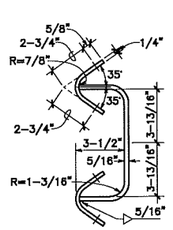
APPROACH END DETAIL
(APPROVED FOR USE WHERE V < 45 MPH)

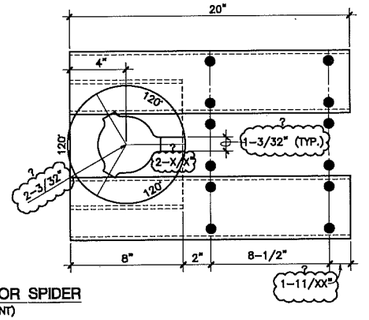


SECTION B-B

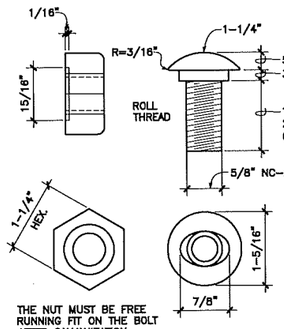


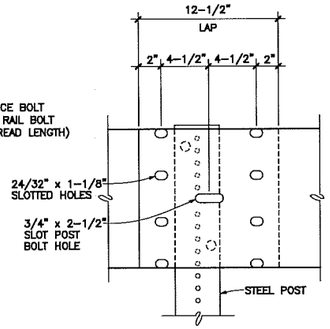
ANCHOR ROD CONNECTOR
(MALLEABLE IRON CASTING OR EQUAL)



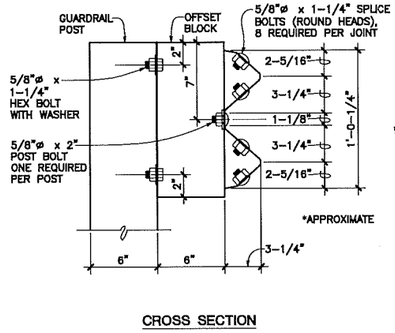


ANCHOR SPIDER
(WELDMENT)

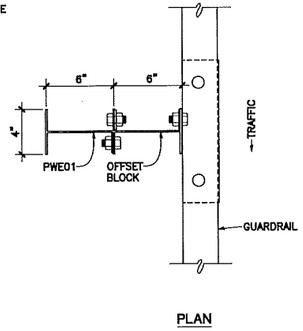




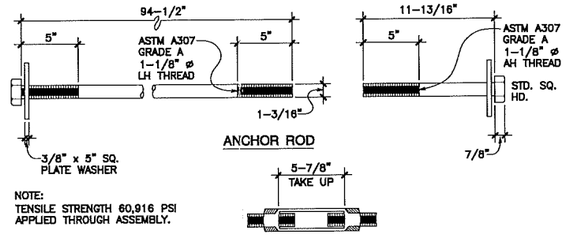
ELEVATION OF GUARDRAIL SPLICE AT POST



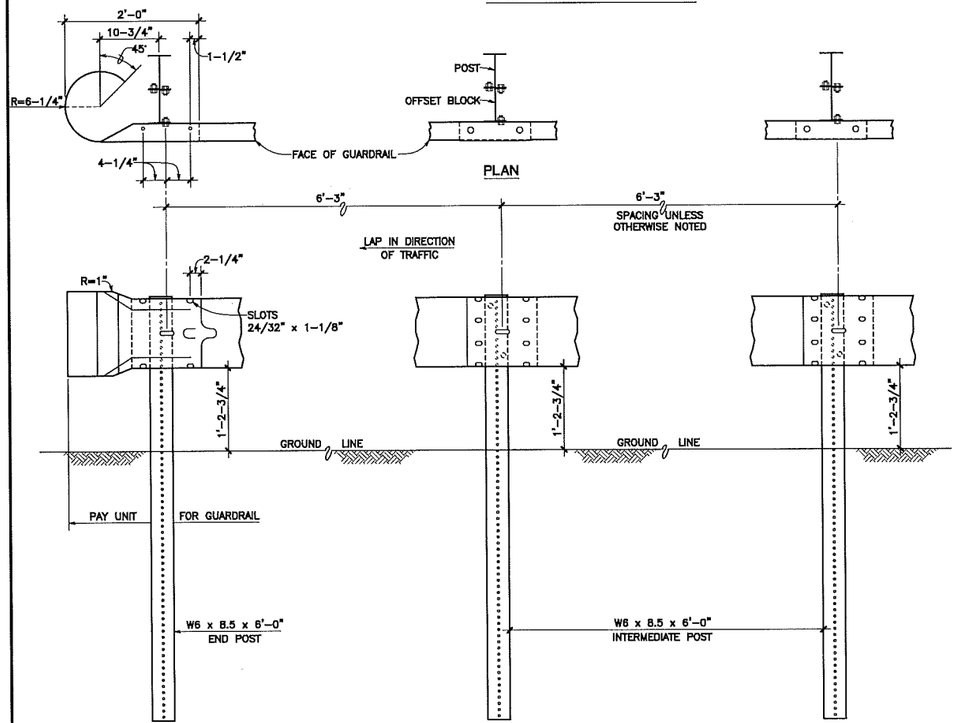
CROSS SECTION



PLAN

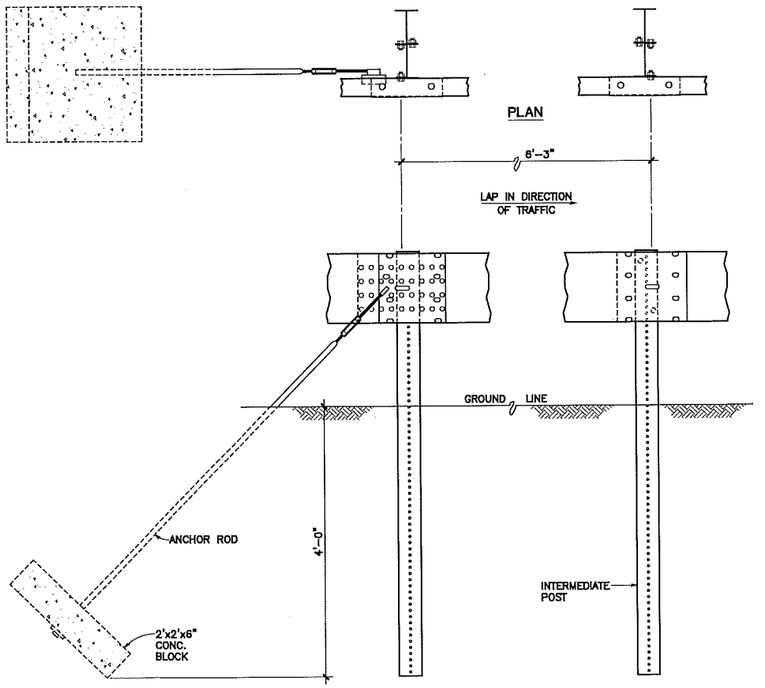


NOTE:
TENSILE STRENGTH 60,916 PSI APPLIED THROUGH ASSEMBLY.

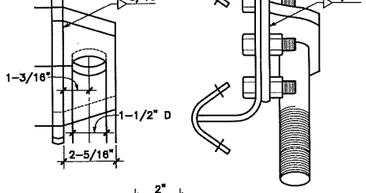


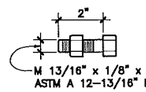
ASSEMBLY ELEVATION

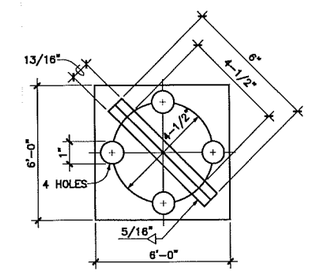
GUARDRAIL SPLICE



ANCHOR FOR STEEL BEAM RAIL







ALTERNATE ANCHOR ROD CONNECTOR

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023 & 045
NAPILI, MAUI, HAWAII

MODIFIED G-1d GUARDRAIL DETAIL

MANDY K. SAITO
LICENSED PROFESSIONAL ENGINEER
No. 14754-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	M.K.S.
DRAWN BY:	N.M., S.W.
CHECKED BY:	M.S.
DATE:	OCTOBER 18, 2016
FILE NO:	COM60

SHEET C-13
14 OF 22

GENERAL NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL FIELD DIMENSIONS AND CONDITIONS PRIOR TO STARTING WORK. ALL DISCREPANCIES SHALL BE PROMPTLY REPORTED TO DPW MANAGER.

2. ALL OMISSIONS OR CONFLICTS BE1WEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND/OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE DPW MANAGER BEFORE PROCEEDING WITH ANY WORK SO INVOLVED.

3. ALL WORK SHALL CONFORM TO HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION DATED 2005 AND STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, 1984 AS AMENDED, UNLESS OTHERWISE NOTED AND LRFD AASHTO SPECIFICATIONS (LATEST EDITION).

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SHORING. THE CONTRACTOR SHALL PROVIDE TEMPORARY ERECTION BRACING AND SHORING FOR ALL STRUCTURAL MEMBERS AS REQUIRED FOR STRUCTURAL STABILITY OF THE STRUCTURE DURING ALL PHASES OF CONSTRUCTION.

5. STRUCTURAL DRAWINGS, WHERE INDICATED, HAVE BEEN DRAWN TO APPROXIMATE SCALE. UNLESS DRAWINGS SPECIFICALLY PROVIDES A DIMENSION, THE CONTRACTOR SHALL NOT USE STRUCTURAL DRAWINGS TO DETERMINE DIMENSIONS. DRAWINGS SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

REINFORCING STEEL:

1. UNLESS OTHERWISE INDICATED ON PLANS AND/OR SCHEDULE, ALL REINFORCING STEEL SHALL BE HIGH STRENGTH GRADE DEFORMED BARS WHICH SHALL CONFORM TO THE STANDARD SPECIFICATION OF ASTM A615 GRADE 60. ALL WELDED WIRE FABRIC REINFORCING STEEL SHALL CONFORM TO ASTM A706, GRADE 65. ALL REINFORCING SHALL BE EPOXY COATED IN ACCORDANCE WITH ASTM A775. ANY DAMAGE TO EPOXY SHALL BE PATCHED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

2. LOW HYDROGEN WELDING RODS SHALL BE USED FOR ALL WELDING TO REINFORCING BARS.

3. REINFORCING SHALL BE SPLICED ONLY AS SHOWN OR NOTED. SPLICES AT OTHER LOCATIONS SHALL BE MADE AWAY FROM POINTS OF MAXIMUM STRESS AND APPROVED BY THE ENGINEER. SEE DETAILS FOR "LAP SPLICES".

4. BARS NOTED AS "CONT." VERTICAL AND HORIZONTAL WALL REINFORCING AND COLUMN REINFORCING SHALL HAVE A MINIMUM SPLICE EQUAL TO 48 BAR DIAMETERS BUT NOT LESS THAN 24 INCHES, UNLESS OTHERWISE NOTED.

5. PROVIDE DOWELS IN FOOTINGS THE SAME SIZE AND NUMBER AND IN THE SAME LOCATION AS VERTICAL COLUMN AND WALL REINFORCING. DOWELS SHALL HAVE A MINIMUM PROJECTION EQUAL TO 48 BAR DIAMETERS BUT NOT LESS THAN 24 INCHES, UNLESS OTHERWISE NOTED.

6. ALL REINFORCING STEEL, ANCHOR BOLTS AND OTHER INSERTS SHALL BE SECURED IN POSITION PRIOR TO PLACING CONCRETE.

7. CONCRETE PROTECTION FOR REINFORCING STEEL SHALL BE UNLESS OTHERWISE SHOWN:

CONCRETE CAST AGAINST EARTH ..... 3"
CONCRETE EXPOSED TO EARTH OR
WEATHER (BUT NOT CAST AGAINST EARTH)
WALLS AND RAILINGS ..... 2"
CULVERT ..... 2"

CULVERT DESIGN LOADS:

1. DESIGN IN CONFORMANCE WITH ASHTO LRFD DESIGN SPECIFICATIONS, LATEST EDITION.

2. TRAFFIC LOAD: (WHICHEVER PRODUCES THE LARGEST MOMENT)
HS20 – TRUCK LOADING WITH DESIGN LANE LOADING. COMBINATION OF DESIGN TRUCK OR DESIGN TANDEM WITH DESIGN LANE LOAD.

3. UPSTREAM AND DOWNSTREAM TRAFFIC RAIL LOAD:
DESIGN SPEED OF 30 MPH OR LESS.
CULVERT RAILING TEST LEVEL TL-1.

CONCRETE:

1. ALL CONCRETE WORK SHALL CONFORM TO ACI 318 LATEST.

2. PIPES AND SLEEVES SHALL NOT BE PLACED IN STRUCTURAL CONCRETE UNLESS SPECIFICALLY DETAILED.

3. SECURE ALL BOLTS, ANCHORS, INSERTS, ETC. AND VERIFY ALL GROOVES, SLOTS AND FINISHES PRIOR TO PLACING CONCRETE

4. ALL CONCRETE WORK SHALL BE THOROUGHLY CONSOLIDATED DURING PLACEMENT USING A MECHANICAL VIBRATOR. ALL CONCRETE SHALL BE CURED FOR A PERIOD OF NOT LESS THAN 14 DAYS.

5. LOCATIONS OF ALL CONSTRUCTION OR COLD JOINTS SHALL BE COORDINATED WITH AND APPROVED BY THE DPW MANAGER.

6. 72 HOURS PRIOR TO THE POURING OF ANY STRUCTURAL CONCRETE, THE CONTRACTOR SHALL NOTIFY THE DPW MANAGER SO AN INSPECTION CAN BE MADE OF ALL FORMS AND REINFORCING STEEL.

CONCRETE: (CONT.)

7. THE CAST-IN-PLACE OR PRECAST CONCRETE 28 DAY COMPRESSIVE STRENGTH, MAXIMUM AGGREGATE SIZE AND MAXIMUM WATER-TO-CEMENT RATIO TO BE AS FOLLOWS:

	STRENGTH (PSI)	TOP SIZE AGGREGATE TO BE USED	MAX. W/C RATIO
CULVERT (PRECAST)	5,000	$\frac{3}{4}$"	0.40
VERTICRETE WALLS (OR APPROVED EQUAL)	5,000	$\frac{3}{4}$"	0.40
FOOTINGS (CIP)	5,000	$\frac{3}{4}$"	0.40

9. CONCRETE MIXES SHALL BE DESIGNED BY A QUALIFIED TESTING LABORATORY AND SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND ACCEPTANCE AT LEAST 21 DAYS BEFORE ACTUAL CONCRETE PLACING OPERATIONS.

10. THE USE OF CALCIUM CHLORIDE IN ANY CONCRETE IS PROHIBITED.

11. JOINT SEALING COMPOUND SHALL BE POLYSULFIDE OR URETHANE COMPOUND CONFORMING TO ASTM C 920, TYPE S OR M, CLASS 100/50, USE T. (RAMNK OR APPROVED EQUAL)

12. EXPANSION JOINT FILLER SHALL BE PREMOULDED MATERIAL COMPOSED OF NON CELLULOSE RUBBER MATERIAL CONFORMING TO ASTM D 1752. THICKNESS SHALL BE AS DESIGNATED IN THE PLANS.

13. EPOXY BONDING AGENT USED TO BOND FRESH CONCRETE TO HARDENED CONCRETE SHALL CONFORM TO ASTM C 881, GRADE 1 OR 2, CLASS C, TYPE V.

14. CONCRETE COMPRESSIVE STRENGTH SHALL BE VERIFIED BY TEST CYLINDERS. (MIN. 3 CYLINDERS PER 50 CU.YRDS OR DAY'S POUR WHICHEVER IS LESS. SEE SPECIFICATIONS. COST OF REQUIRED TESTING SHALL BE BORNE BY THE CONTRACTOR.

15. A CONCRETE CORROSION INHIBITING ADMIXTURE, SUCH AS "MCI-2005", SHALL BE ADDED TO THE CONCRETE AT A RATE OF 1.5 PINTS/CUBIC YARD.

FOUNDATION NOTES:

1. FOUNDATION DESIGN OF CULVERT AND RETAINING WALLS SHALL BE BASED ON THE "GEOTECHNICAL INVESTIGATION REPORT, NAPILI 4/5 CULVERT REPLACEMENT, NAPILI MAUI HAWAII" DATED SEPTEMBER 25, 2015 BY HAWAII GEOTECHNICAL CONSULTING INC. THE NOTES STATED BELOW ARE THOSE RELATED TO THE CULVERT AND RETAINING WALLS ONLY. OTHER REQUIREMENTS, RELATED TO WATER QUALITY BASIN, SHORING AND PAVEMENTS HAVE NOT BEEN INCLUDED BELOW. THE CONTRACTOR SHALL FOLLOW ALL RECOMMENDATIONS WITHIN THIS REPORT.

2. VEGETATION, CONCRETE DEBRIS, DELETERIOUS MATERIAL AND OTHER UNSUITABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF PROPERLY OFF-SITE. SOFT AND YIELDING AREAS ENCOUNTERED DURING CLEARING AND GRUBBING BELOW AREAS DESIGNATED TO RECEIVE FILL SHALL BE OVER-EXCAVATED TO EXPOSE FIRM MATERIAL AND THE RESULTING EXCAVATION SHALL BE BACKFILLED WITH WELL COMPACTED GENERAL FILL. THE EXCAVATED SOFT SOILS SHALL BE DISPOSED OF PROPERLY OFF-SITE.

3. IN GENERAL, THE OVER-EXCAVATED SUBGRADES AND AREAS DESIGNATED TO RECEIVE FILLS (EXPOSING SOILS) SHALL BE SCARIFIED TO A DEPTH OF 12-INCHES, MOISTURE-CONDITIONED TO ABOVE THE OPTIMUM MOISTURE CONTENT AND RECOMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION.

4. IMPORTED FILL MATERIALS SHALL CONSIST OF NON-EXPANSIVE SELECT GRANULAR MATERIALS SUCH AS CRUSHED BASALT. THE MATERIAL SHALL BE WELL GRADED FROM COURSE TO FINE WITH PARTICLES NO LARGER THAN 3-INCHES IN LARGEST DIMENSION. IN ADDITION, THE MATERIAL SHALL CONTAIN BE1WEEN 10 AND 30 PERCENT PARTICLES PASSING THE NO. 200 SIEVE. THE MATERIAL SHALL HAVE A LABORATORY CBR VALUE OF 20 OR MORE AND SHALL HAVE A MAXIMUM SWELL OF 1 PERCENT OR LESS WHEN TESTED IN ACCORDANCE WITH ASTM 1883. IMPORTED FILL MATERIAL SHALL BE TESTED FOR CONFORMANCE PRIOR TO DELIVERY TO THE PROJECT SITE FOR THE INTENDED USE.

5. IN GENERAL, FILLS AND BACKFILLS SHALL BE MOISTURE-CONDITIONED TO ABOVE OPTIMUM MOISTURE, PLACED IN LEVEL LIFTS NOT EXCEEDING 8-INCHES IN LOOSE THICKNESS AND COMPACTED TO A MINIMUM OF 90 PERCENT RELATIVE COMPACTION. FILLS AND BACKFILLS WITHIN 3-FEET OF THE PAVEMENT GRADE ELEVATION SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION. RELATIVE COMPACTION REFERS TO THE IN-PLACE DRY-DENSITY OF SOIL EXPRESSED AS A PERCENTAGE OF THE MAXIMUM DRY-DENSITY OF THE SAME SOIL ESTABLISHED IN ACCORDANCE WITH ASTM D1557. OPTIMUM MOISTURE IS THE WATER CONTENT (PERCENTAGE BY DRY WEIGHT) CORRESPONDING TO THE MAXIMUM DRY DENSITY. COMPACTION SHALL BE ACCOMPLISHED BY SHEEPSFOOT ROLLERS, VIBRATORY ROLLERS OR OTHER TYPES OF ACCEPTABLE COMPACTION EQUIPMENT. WATER TAMPING, JETTING OR PONDING SHALL NOT BE ALLOWED TO COMPACT THE FILLS.

6. SOME OF THE ON-SITE SOILS GENERALLY EXIST IN A MOIST TO WET CONDITION. SIGNIFICANT MOISTURE REDUCTION MAY BE REQUIRED TO ACHIEVE THE MINIMUM 95 PERCENT COMPACTION CRITERIA, ESPECIALLY FOR MATERIALS PRIMARILY CONSISTING OF SILTS AND CLAYS. AERATION TO LOWER THE SOIL MOISTURE AND MORE COMPACTION EFFORT TO ACHIEVE THE REQUIRED COMPACTION WOULD GENERALLY REDUCE THE RATE OF FILL PLACEMENT.

7. THE SUBGRADE BENEATH THE NEW BOX CULVERT SHALL BE SCARIFIED TO A DEPTH OF ABOUT 12-INCHES, MOISTURE-CONDITIONED TO AT LEAST 2 PERCENT ABOVE THE OPTIMUM MOISTURE CONTENT AND RECOMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION.

FOUNDATION NOTES: (CONT.)

8. SOFT AND/OR LOOSE SOILS ENCOUNTERED AT THE BOTTOM OF THE BOX CULVERT EXCAVATIONS SHALL BE REMOVED TO EXPOSE THE FIRM UNDERLYING FIRM MATERIALS. ALTERNATELY, A SUBGRADE STABILIZATION LAYER CONSISTING OF 24-INCHES OF NO. 2 ROCK (ASTM C33, NO. 4 GRADATION) WRAPPED IN A NON-WOVEN FILTER FABRIC (MIRAFI 180N OR EQUIVALENT) MAY BE PROVIDED BELOW THE 12-INCH BEDDING LAYER FOR UNIFORM SUPPORT OF THE NEW BOX CULVERT. THE STABILIZATION LAYER SHALL EXTEND BEYOND THE SIDES OF THE BOX CULVERT A MINIMUM OF 12-INCHES.

9. AN 12-INCH THICK GRAVEL CUSHION LAYER SHALL BE PLACED BE1WEEN THE NEW BOX CULVERT AND THE UNDERLYING SUBGRADE SOILS OR STABILIZATION LAYER. THE GRAVEL SHALL CONSIST OF FREE-DRAINING MATERIALS, SUCH AS NO.3B FINE GRAVEL (ASTM C33, NO. 67 GRADATION) OR SIMILAR MATERIAL.

10. THE USE OF SAND OR S4C AS BACKFILL MATERIALS AROUND THE CULVERT STRUCTURE IS PROHIBITED.

11. THE BOTTOM OF RETAINING WALL FOUNDATIONS SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION TO PROVIDE A RELATIVELY FIRM SMOOTH BEARING SURFACE PRIOR TO PLACEMENT OF REINFORCING STEEL AND CONCRETE. SOFT AND/OR MATERIALS ENCOUNTERED AT THE BOTTOM OF RETAINING WALL FOUNDATION EXCAVATIONS SHALL BE OVER-EXCAVATED TO EXPOSE THE UNDERLYING FIRM MATERIALS. THE OVER-EXCAVATION TO REMOVE THE SOFT AND /OR LOOSE MATERIALS SHALL BE BACKFILLED WITH SELECTED GRANULAR FILL MATERIALS COMPACTED TO A MINIMUM OF 95 PERCENT RELATIVE COMPACTION OR THE FOUNDATION MAY EXTEND DEEPER TO BEAR DIRECTLY ON THE UNDERLYING COMPETENT MATERIAL.

12. RELATIVE MOIST TO WET SOIL CONDITION MAY BE ENCOUNTERED NEAR THE BOTTOM OF EXCAVATIONS. IF PUMPING OR YIELDING CONDITIONS OCCURS AT THE BOTTOM OF EXCAVATIONS OR IF SOFT POCKETS ARE TOO THICK TO BE REMOVED COMPLETELY FROM A PRACTICAL STANDPOINT, PROVIDE A STABILIZATION LAYER CONSISTING OF 24-INCHES OF NO. 2 ROCK (ASTM C33, NO. 4 GRADATION) WRAPPED IN A NON-WOVEN FILTER FABRIC (MIRAFI 180N OR EQUIVALENT) BELOW THE 12-INCH BEDDING LAYER FOR UNIFORM SUPPORT OF THE NEW BOX CULVERT. THE STABILIZATION LAYER SHALL EXTEND BEYOND THE SIDES OF THE BOX CULVERT A MINIMUM OF 18-INCHES.

13. RETAINING WALLS SHALL BE WELL DRAINED TO REDUCE THE BUILD-UP OF HYDROSTATIC PRESSURES. PROVIDE PERFORATED PIPE AS SHOWN ON DETAILS. DAYLIGHTING THE PIPES AS SHOWN.

14. SOIL DESIGN VALUES ARE:

a. ACTIVE EARTH PRESSURE:
ACTIVE, LEVEL BACKFILL ..... 40 PCF (HORIZ.)
AT-REST, LEVEL BACKFILL ..... 60 PCF (HORIZ.)
ACTIVE, 2H:1V BACKFILL ..... 58 PCF (HORIZ.)
29 PCF (VERT.)
AT-REST, LEVEL BACKFILL ..... 76 PCF (HORIZ.)
38 PCF (VERT.)

b. ASHTO LRFD RESISTANCE LIMITS (FOR CULVERTS)

	EXTREME EVENT LIMIT STATE	STRENGTH LIMIT STATE
BEARING PRESSURE (PSF)	2,500	2,500
COEFFICIENT OF SLIDING FRICTION	0.45	0.34
PASSIVE PRESSURE RESISTANCE (PCF)	275	150

c. SERVICE LIMITS (FOR RETAINING WALLS)
BEARING PRESSURE ..... 2,500 PSF 2500
COEFFICIENT OF SLIDING FRICTION 0.30
PASSIVE PRESSURE ..... 300 PCF

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL WORK SHALL COMPLY WITH THE LATEST EDITION OF A.I.S.C. "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL FOR BUILDINGS" AND THE A.I.S.C. "CODE OF STANDARD PRACTICE".

2. ALL WELDING TO BE MADE BY CERTIFIED (BY STATE OF HAWAII) WELDERS USING E-70XX SERIES ELECTRODES. ALL WELDED JOINTS SHALL BE GRIND SMOOTH.

3. PROVIDE (2) COATS (MINIMUM OF 5 MIL DRY) OF AMERLOCK 400 HI BUILD EPOXY PRIMER. PROVIDE (2) FINAL COATS (5 MIL DRY) OF PSX 700 PRIOR TO INSTALLING (OR APPROVED EQUAL).

LEGEND

NEW PAVEMENT
NEW CONCRETE / CURB
NEW CRM
SOIL
BASE COURSE

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

TYPICAL NOTES & DETAILS

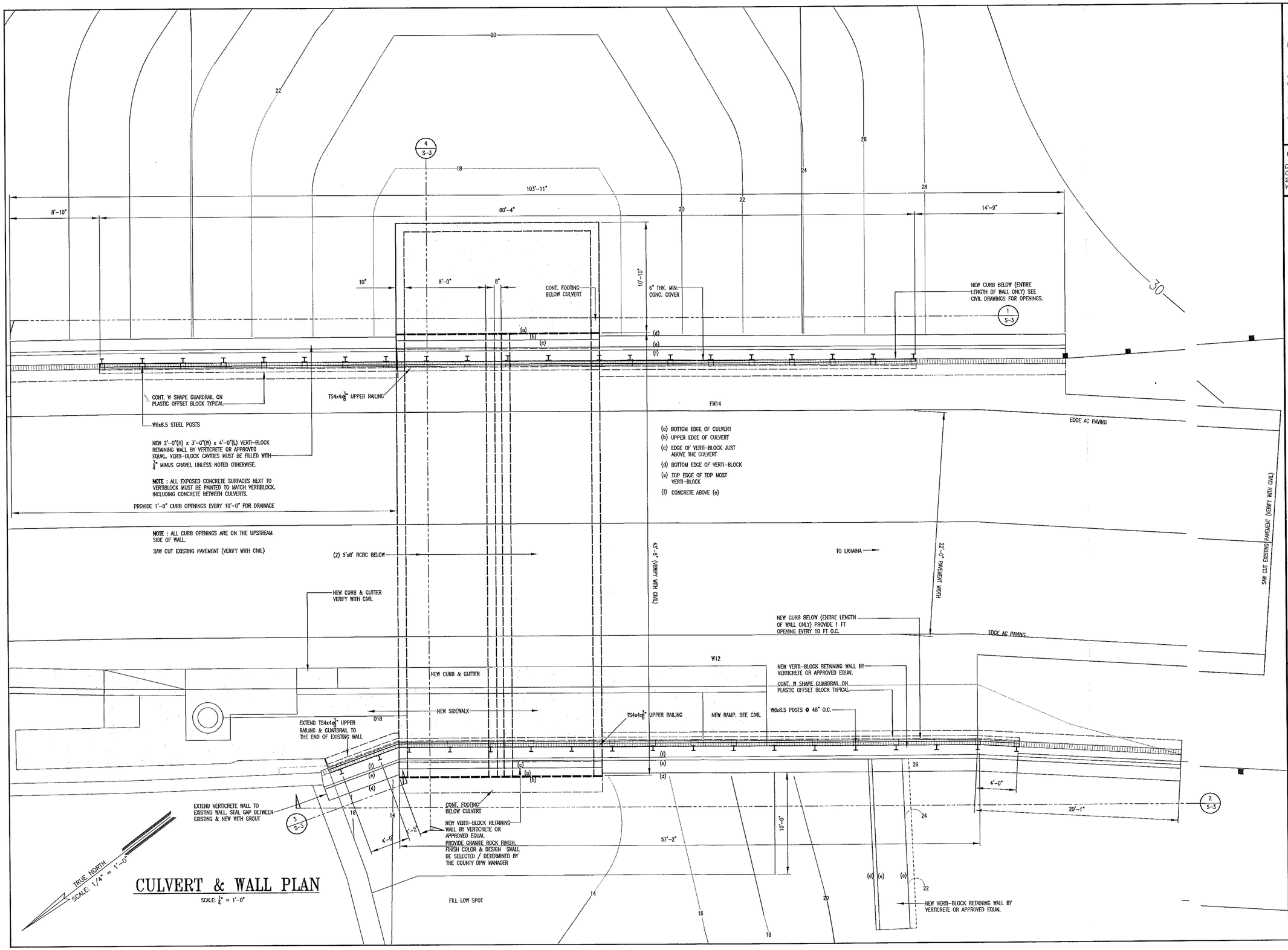
SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5623-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

Satish K Gholkar
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	–

SHEET S-1
15 OF 22



CULVERT & WALL PLAN

SCALE: 1/4" = 1'-0"

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023

NAPILI, MAUI, HAWAII

CULVERT & WALL PLAN

SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5623-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

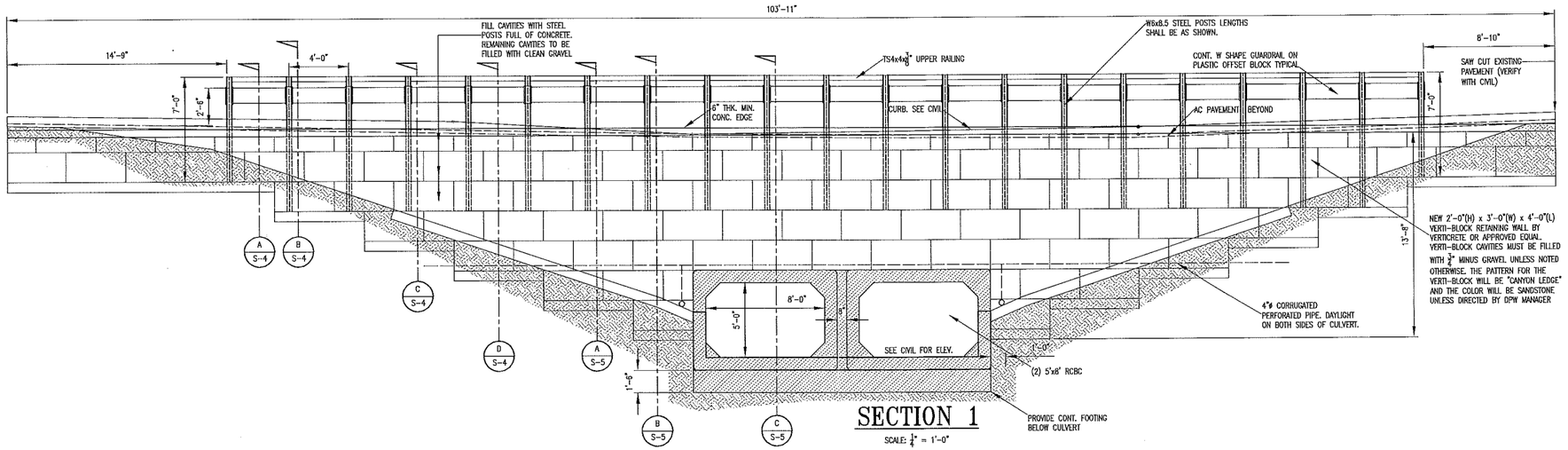
Satish K Gholkar

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	--

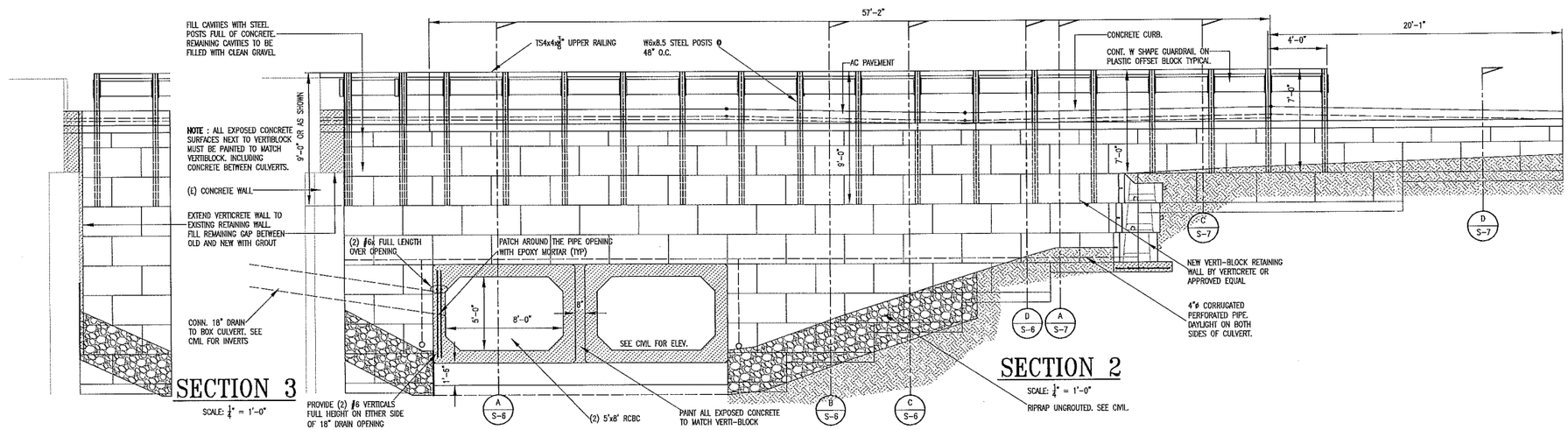
SHEET S-2

16 OF 22



SECTION 1

SCALE: ¼" = 1'-0"

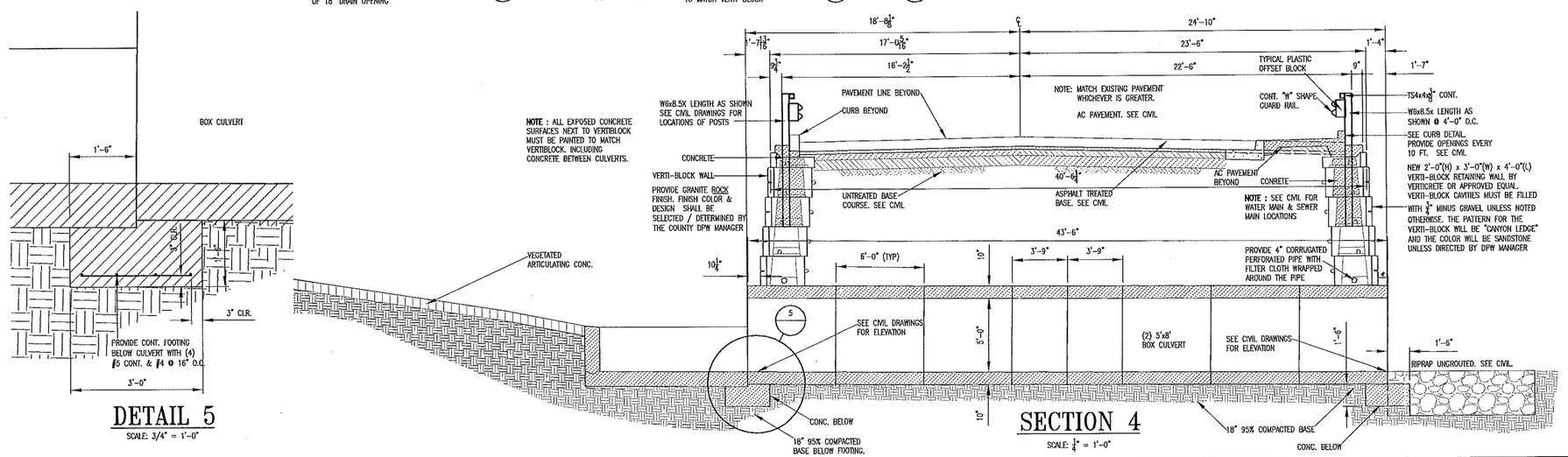


SECTION 3

SCALE: ¼" = 1'-0"

SECTION 2

SCALE: ¼" = 1'-0"



DETAIL 5

SCALE: 3/4" = 1'-0"

SECTION 4

SCALE: ¼" = 1'-0"

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

ELEVATIONS & SECTION

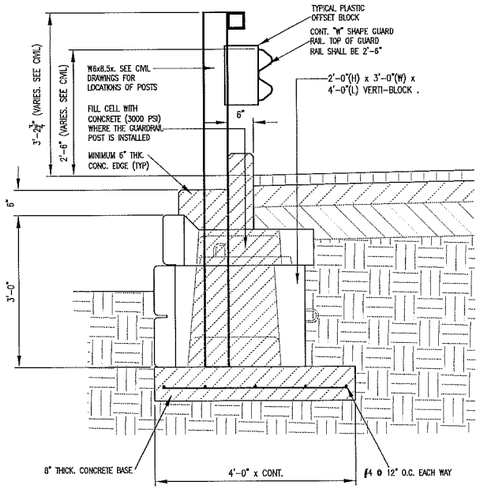
SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5623-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

Satish K Gholkar
LICENSE EXPIRES: 04/30/2018

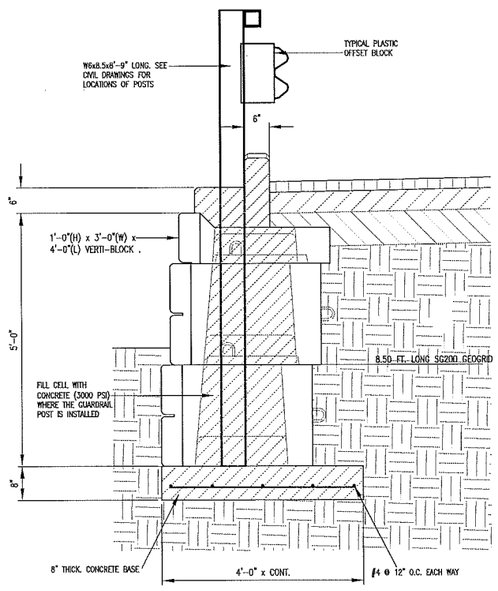
DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	–

SHEET S-3
17 OF 22



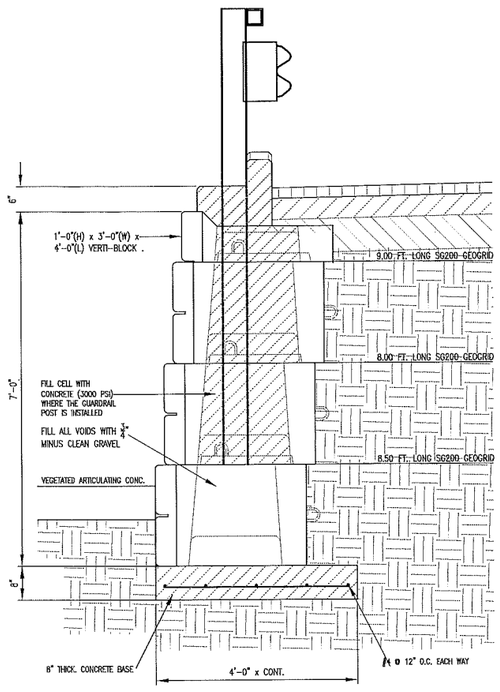
WALL SECTION (A)

SCALE: 3/4" = 1'-0"



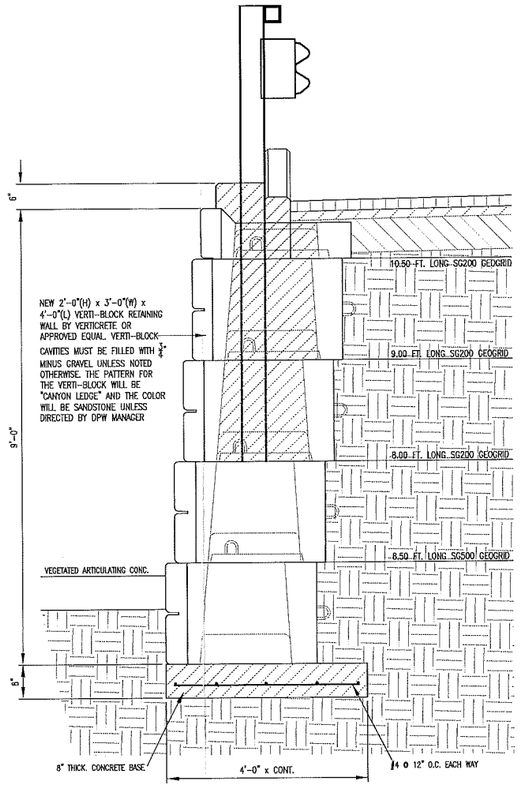
WALL SECTION (B)

SCALE: 3/4" = 1'-0"



WALL SECTION (C)

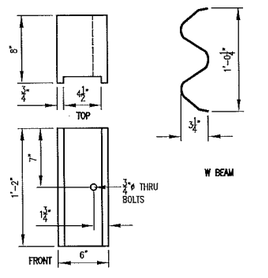
SCALE: 3/4" = 1'-0"



WALL SECTION (D)

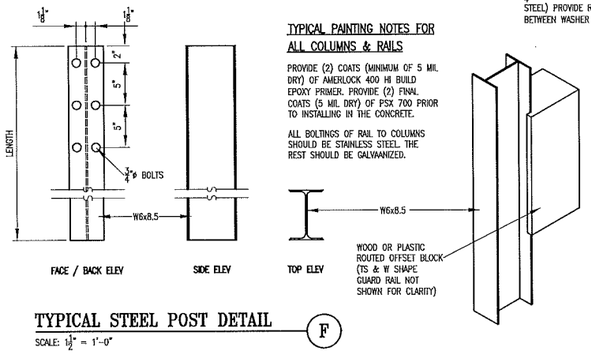
SCALE: 3/4" = 1'-0"

NOTE: ALL GEOGRID FABRICS SHOWN ARE MANUFACTURED BY STRATA GLOBAL SOLUTIONS OR APPROVED EQUAL (TYP.) ALL GEOGRID FABRICS MUST COMPLY PER ASTM D6637 (METHOD A).
SG 500 STANDS FOR GRID OF 2.45"X0.95" WITH ULTIMATE TENSILE STRENGTH OF 6,400 LBS/SQFT. FABRIC WEIGHT 125 LBS PER 6 FT X 300 FT ROLL.
SG 200 STANDS FOR GRID OF 0.72"X0.65" WITH ULTIMATE TENSILE STRENGTH OF 3,600 LBS./SQFT. FABRIC WEIGHT 95 LBS PER 6 FT X 300 FT ROLL.



WOOD OR PLASTIC ROUTED OFFSET BLOCK (E)

SCALE: 1½" = 1'-0"



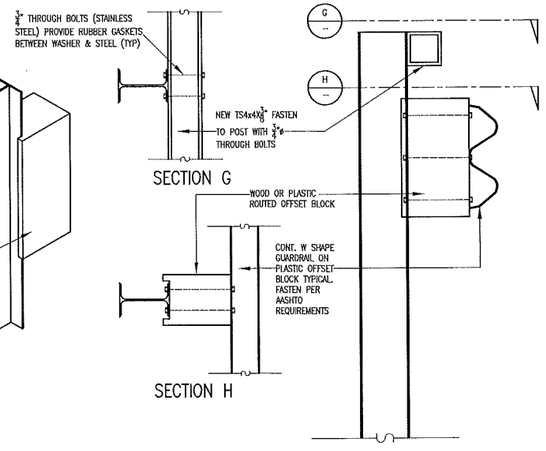
TYPICAL STEEL POST DETAIL (F)

SCALE: 1½" = 1'-0"

TYPICAL PAINTING NOTES FOR ALL COLUMNS & RAILS

PROVIDE (2) COATS (MINIMUM OF 5 MIL DRY) OF AMERLOCK 400 HI BUILD EPOXY PRIMER. PROVIDE (2) FINAL COATS (5 MIL DRY) OF PSX 700 PRIOR TO INSTALLING IN THE CONCRETE.

ALL BOLTINGS OF RAIL TO COLUMNS SHOULD BE STAINLESS STEEL. THE REST SHOULD BE GALVANIZED.



FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023

NAPILI, MAUI, HAWAII

SECTIONS / POST DETAILS

SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5623-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

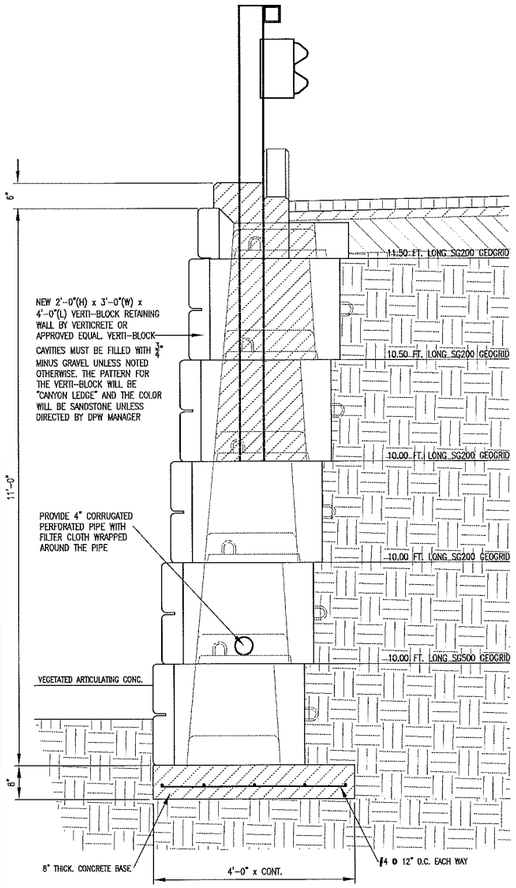
Satish K Gholkar

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	–

SHEET S-4

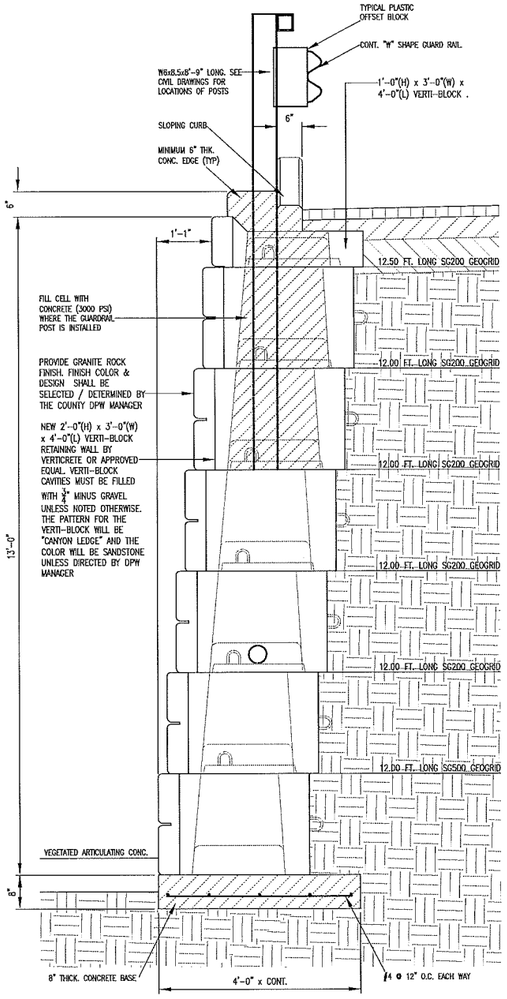
18 OF 22



WALL SECTION

SCALE: ¾" = 1'-0"

(A)

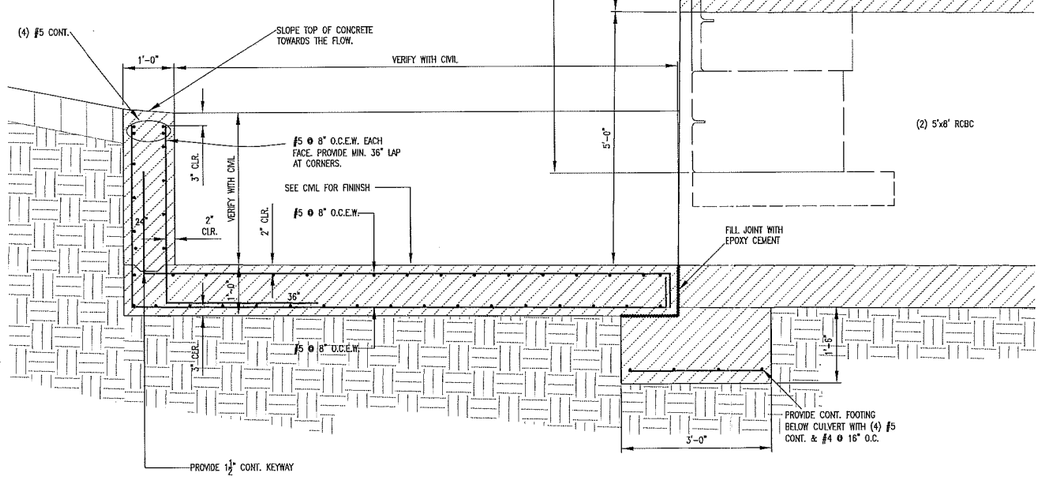


WALL SECTION

SCALE: ¾" = 1'-0"

(B)

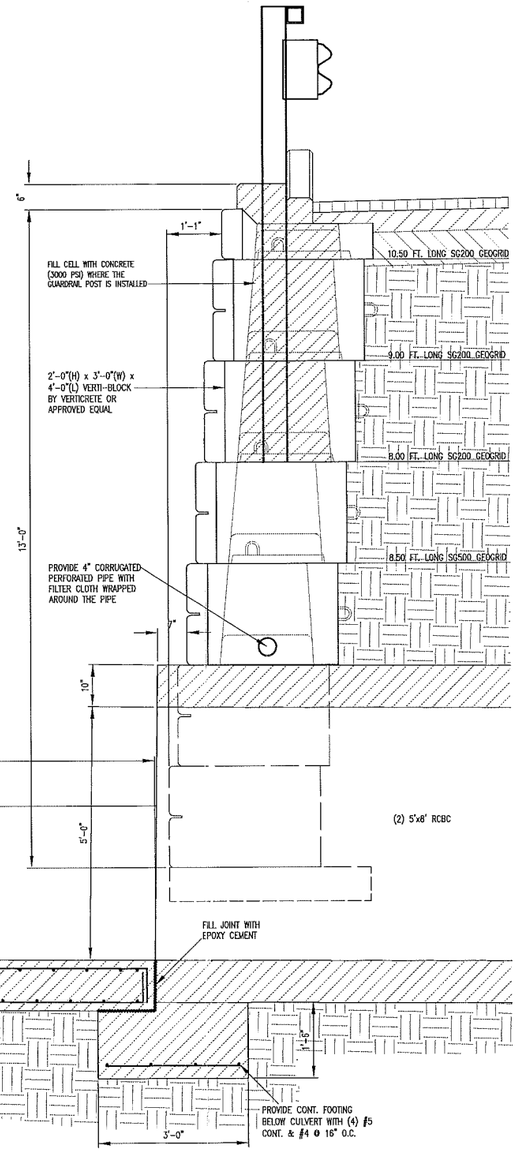
NOTE: ALL GEOGRID FABRICS SHOWN ARE MANUFACTURED BY STRATA GLOBAL SOLUTIONS OR APPROVED EQUAL (TYP.) ALL GEOGRID FABRICS MUST COMPLY PER ASTM D6637 (METHOD A).
SG 500 STANDS FOR GRID OF 2.45"X0.95" WITH ULTIMATE TENSILE STRENGTH OF 6,400 LBS/SQFT. FABRIC WEIGHT 125 LBS PER 6 FT X 300 FT ROLL.
SG 200 STANDS FOR GRID OF 0.72"X0.65" WITH ULTIMATE TENSILE STRENGTH OF 3,600 LBS./SQFT. FABRIC WEIGHT 95 LBS PER 6 FT X 300 FT ROLL.



WALL & CULVERT SECTION

SCALE: ¾" = 1'-0"

(C)



FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

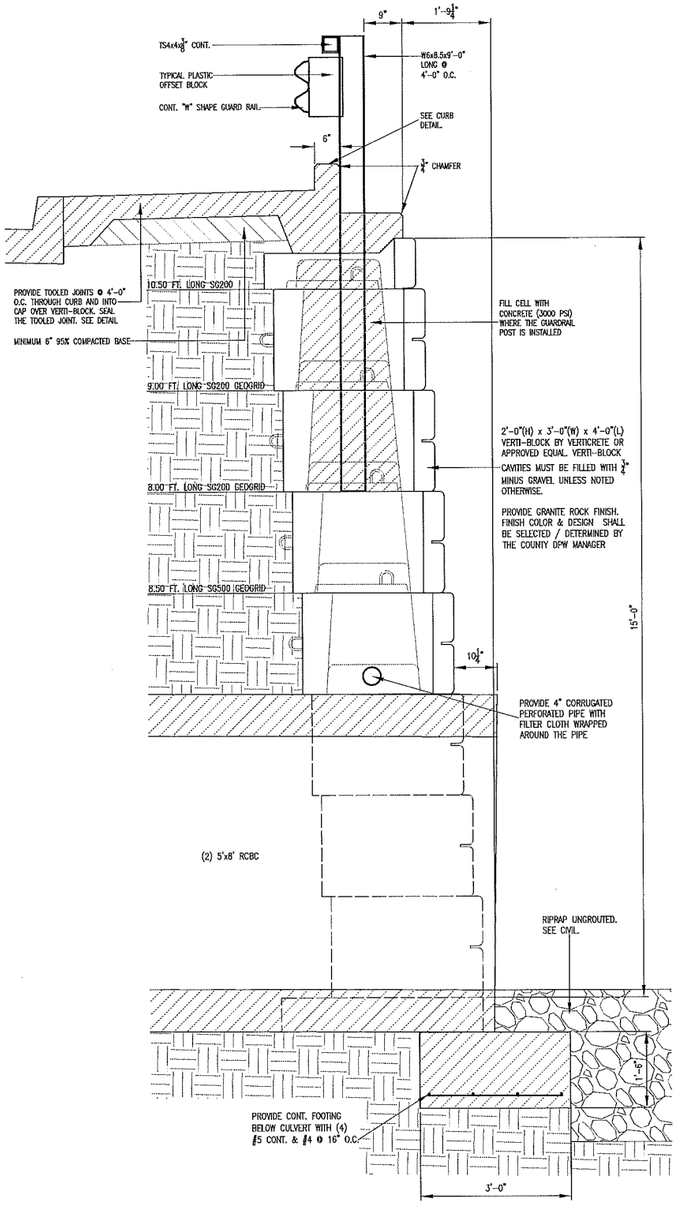
SECTIONS

SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5623-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.
Satish K Gholkar
LICENSE EXPIRES: 04/30/2018

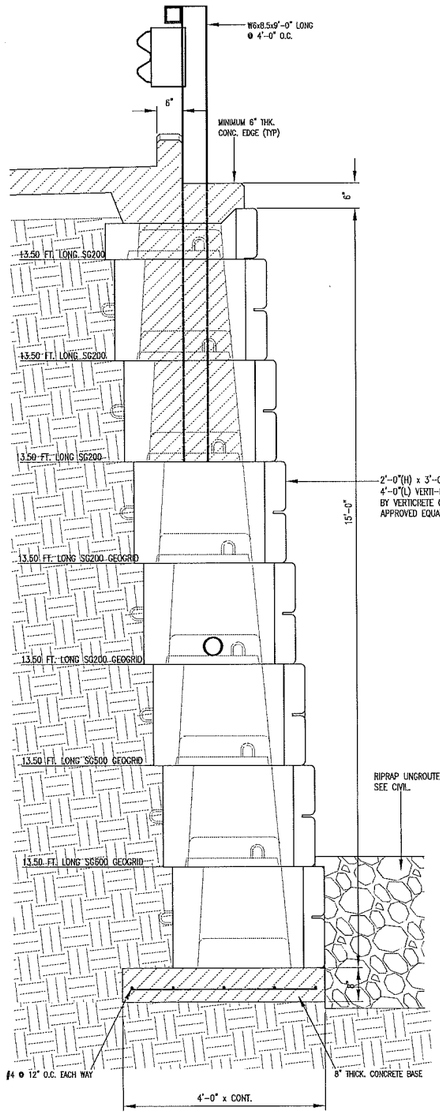
DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	–

SHEET S-5
19 OF 22



WALL & CULVERT SECTION

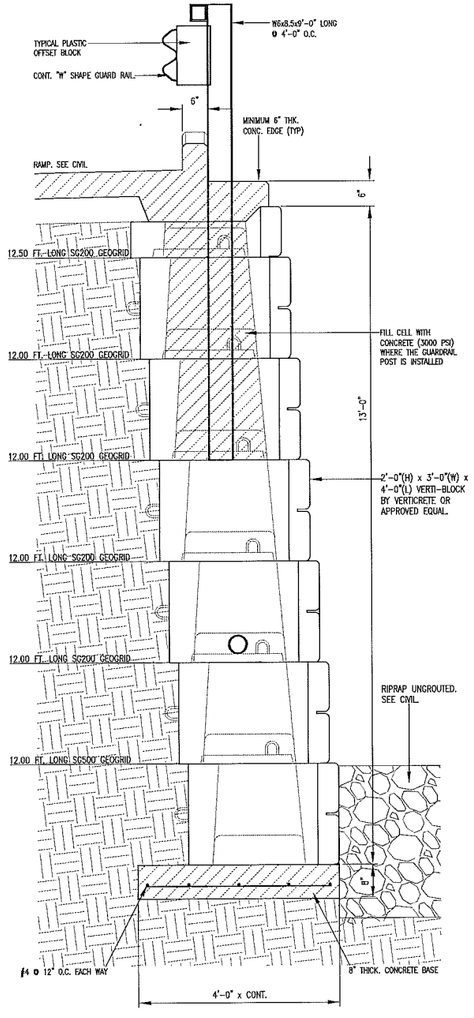
SCALE: $\frac{3}{4}$" = 1'-0" (A)



WALL SECTION

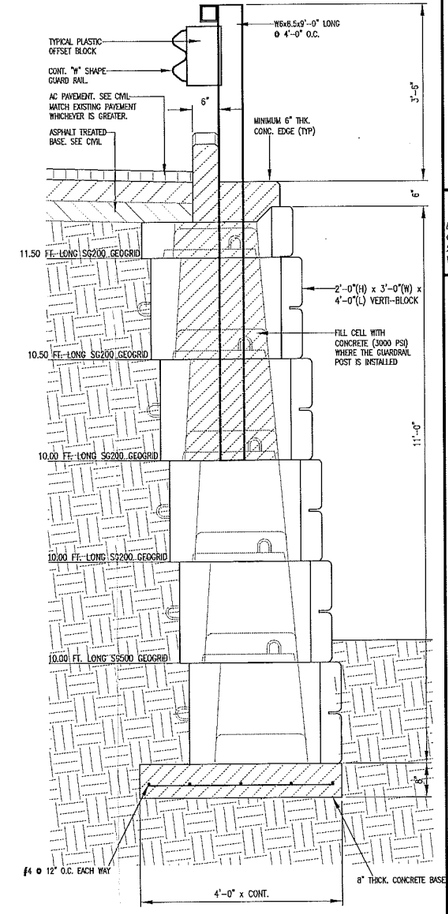
SCALE: $\frac{3}{4}$" = 1'-0" (B)

NOTE: ALL GEOGRID FABRICS SHOWN ARE MANUFACTURED BY STRATA GLOBAL SOLUTIONS OR APPROVED EQUAL (TYP.) ALL GEOGRID FABRICS MUST COMPLY PER ASTM D6637 (METHOD A).
SG 500 STANDS FOR GRID OF 2.45"X0.95" WITH ULTIMATE TENSILE STRENGTH OF 6,400 LBS/SQFT. FABRIC WEIGHT 125 LBS PER 6 FT X 300 FT ROLL.
SG 200 STANDS FOR GRID OF 0.72"X0.65" WITH ULTIMATE TENSILE STRENGTH OF 3,600 LBS./SQFT. FABRIC WEIGHT 95 LBS PER 6 FT X 300 FT ROLL.



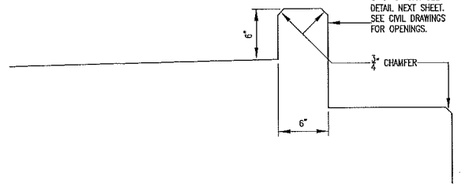
WALL SECTION

SCALE: $\frac{3}{4}$" = 1'-0" (C)



WALL SECTION

SCALE: $\frac{3}{4}$" = 1'-0" (D)



CURB DETAIL

SCALE: $\frac{1}{2}$" = 1'-0" (E)

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII

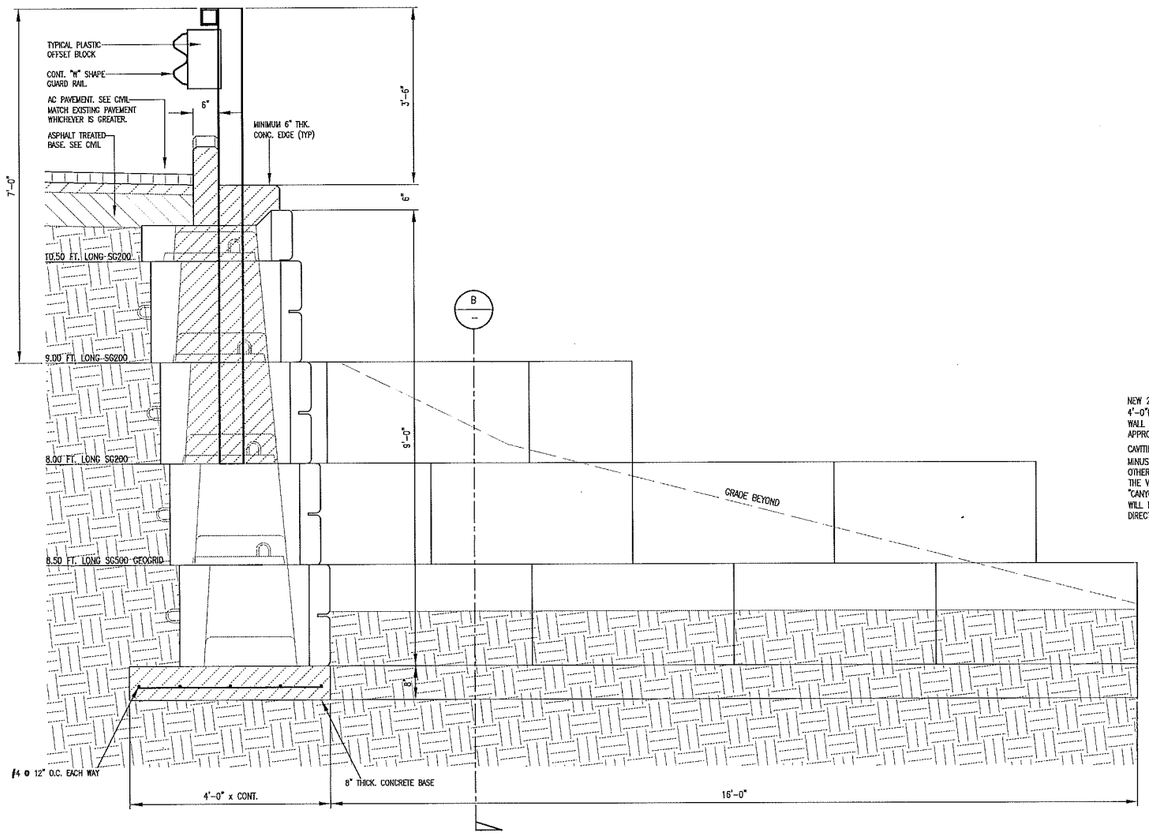
SECTIONS

SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5623-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.
Satish K Gholkar
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	–

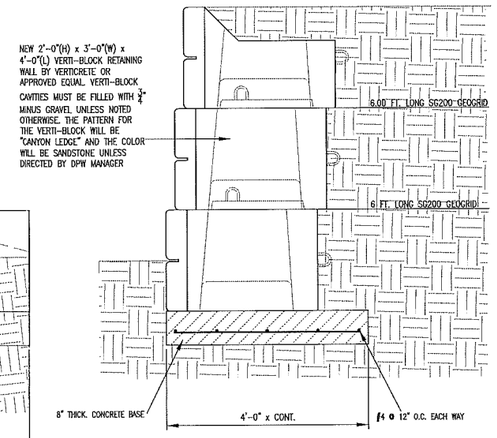
SHEET S-6
20 OF 22



WALL SECTION

SCALE: $\frac{3}{4}$" = 1'-0"

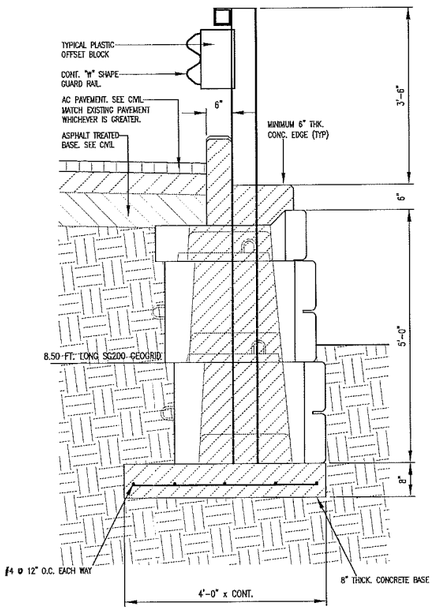
A



WALL SECTION

SCALE: $\frac{3}{4}$" = 1'-0"

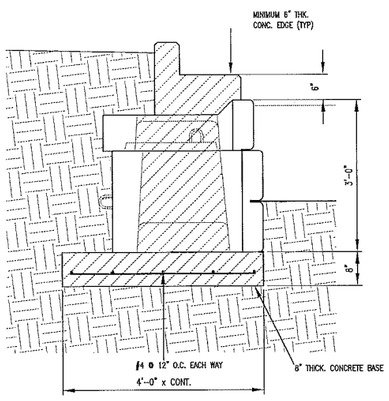
B



WALL SECTION

SCALE: $\frac{3}{4}$" = 1'-0"

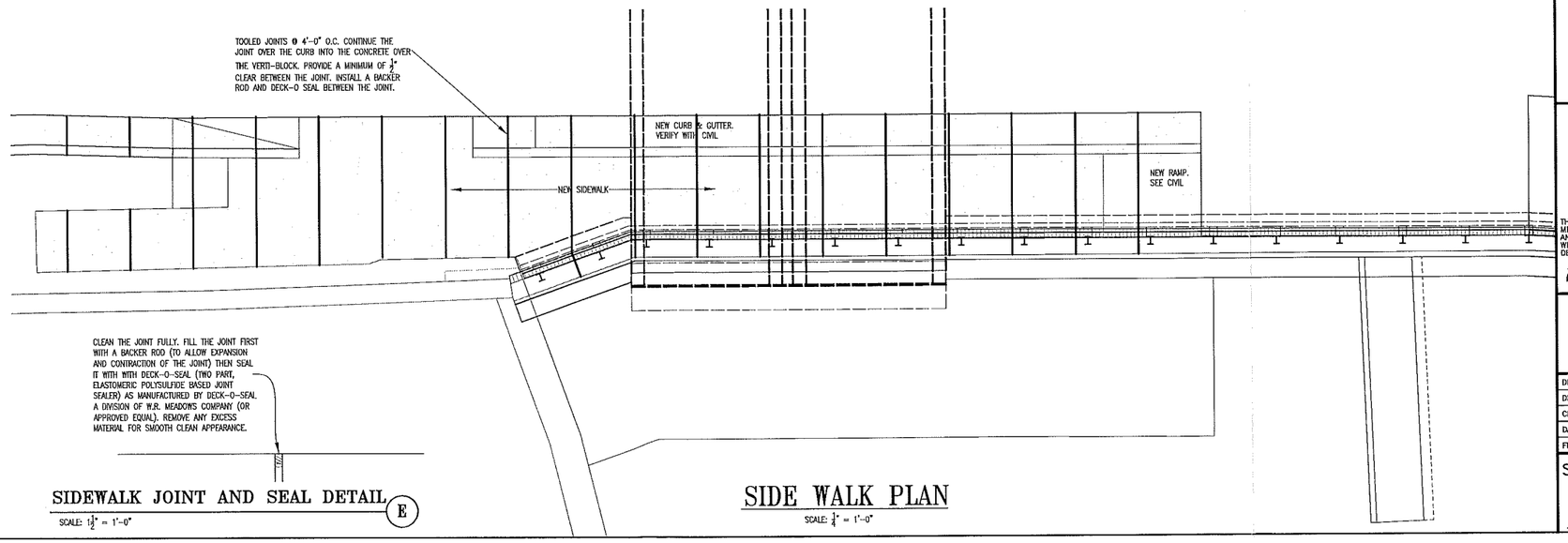
C



WALL SECTION

SCALE: $\frac{3}{4}$" = 1'-0"

D



SIDEWALK JOINT AND SEAL DETAIL

SCALE: $1\frac{1}{2}$" = 1'-0"

E

SIDE WALK PLAN

SCALE: $\frac{1}{4}$" = 1'-0"

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023

NAPILI, MAUI, HAWAII

SECTIONS / SIDEWALK PLAN

SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5623-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

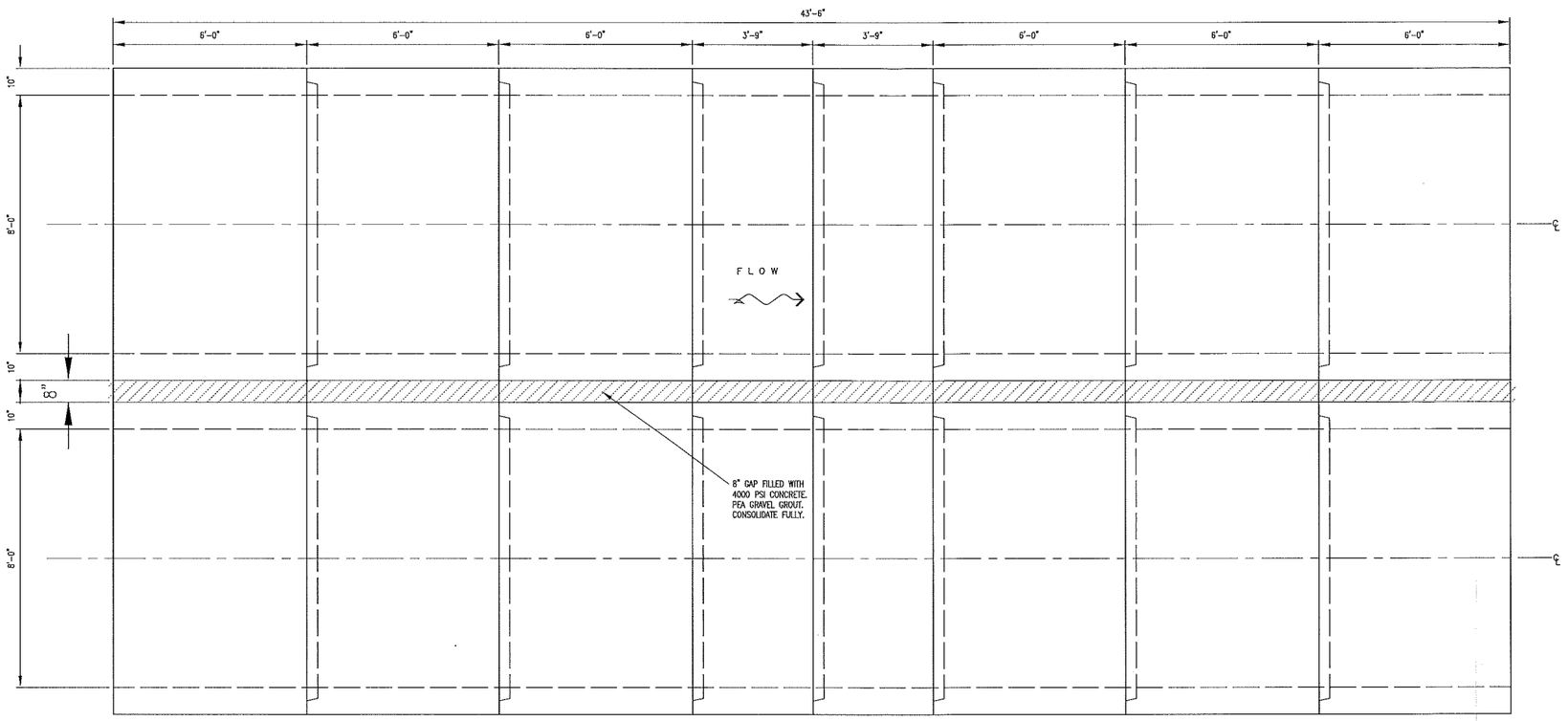
Satish K Gholkar

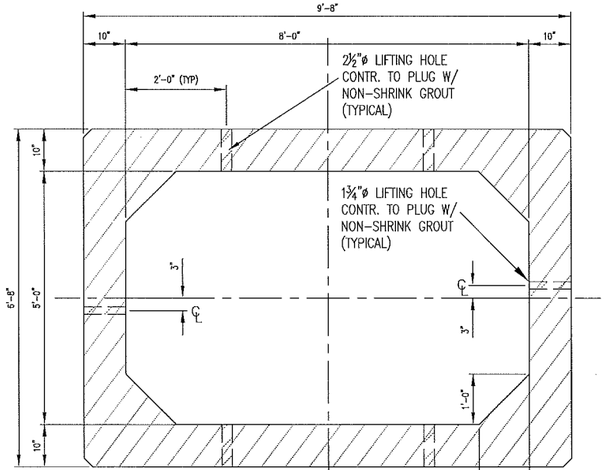
LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	–

SHEET S-7

21 OF 22



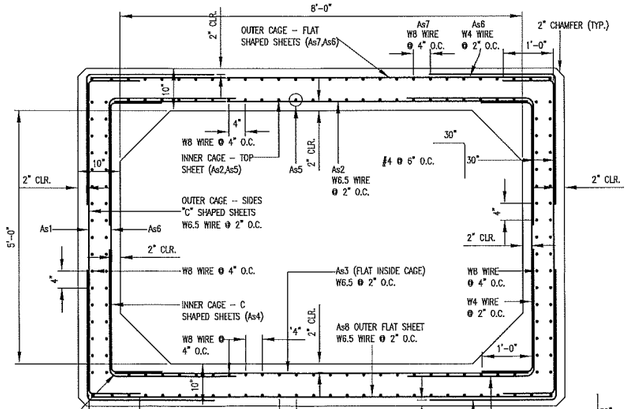


TYPICAL CULVERT SECTION WITH DIMENSIONS (2)

SCALE: ¾" = 1'-0"

CULVERT PLAN (1)

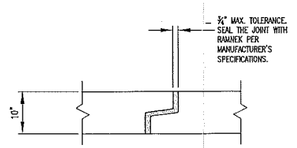
SCALE: ¾" = 1'-0"



INNER CAGE – BOTTOM SHEET (As3,As8)

TYPICAL CULVERT SECTION (3)

SCALE: ¾" = 1'-0"



TYPICAL JOINT DETAIL (4)

SCALE: ¾" = 1'-0"

REINFORCING SCHEDULE

✳ ASTM REINFORCING BASED ON 8" WALLS, ROOF & FLOOR SLAB

BOX TYPE	BOX SIZE	WALL THICKNESS (INCHES)				CIRCUMFERENTIAL REINFORCEMENT AREAS						DISTRIBUTION REINF. AREAS	
		TOP	BOTTOM	WALL		As1	As2	As3	As4	As7	As8	As5	As6
–	8'x5'	10	10	10	✳ PER ASTM C-1433	0.24	0.33	0.35	0.19	0.19	0.19	0.19	0.19
					PER CALCULATIONS	0.28	0.35	0.36	0.24	0.24	0.24	0.24	0.24
					ACTUAL	0.39	0.39	0.39	0.24	0.24	0.24	0.24	0.24

CAST-IN-PLACE OR PRECAST CONCRETE 28 DAY COMPRESSIVE STRENGTH, MAXIMUM AGGREGATE SIZE AND MAXIMUM WATER-TO-CEMENT RATIO TO BE AS FOLLOWS:

	STRENGTH (PSI)	TOP SIZE AGGREGATE TO BE USED	MAX. W/C RATIO
CULVERT (PRECAST)	5,000	¾"	0.40

UNLESS OTHERWISE INDICATED ON PLANS AND/OR SCHEDULE, ALL REINFORCING STEEL SHALL BE HIGH STRENGTH GRADE DEFORMED BARS WHICH SHALL CONFORM TO THE STANDARD SPECIFICATION OF ASTM A615 GRADE 60. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A706, GRADE 65. ALL REINFORCING SHALL BE EPOXY COATED IN ACCORDANCE WITH ASTM A775. ANY DAMAGE TO EPOXY SHALL BE PATCHED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203
Wailuku, Hawaii 96793
Phone: (808) 242-8611
Email: office@femaui.com
Website: www.femaui.com

Prepared for:

Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TMK: (2) 4-3-001:003 AND 4-3-002:023

NAPILI, MAUI, HAWAII

CULVERT DRAWINGS & REINFORCING SCHEDULE

SATISH K. GHOLKAR
LICENSED PROFESSIONAL ENGINEER
No. 5623-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

Satish K Gholkar

LICENSE EXPIRES: 04/30/2018

DESIGNED BY:	SKG
DRAWN BY:	RGP
CHECKED BY:	SKG
DATE:	OCTOBER 18, 2016
FILE NO:	–

SHEET S-8

22 OF 22

Ordinary High Water Mark (OHWM) Delineation and Water Quality Survey

APPENDIX C

Ordinary High Water Mark (OHWM) delineation and water quality survey of Nāpili Gulch, Lahaina District, West Maui

February 22, 2016 *AECOS* No. 1452

Susan Burr
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe, Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: SBurr@aecos.com

Introduction

AECOS, Inc. was contracted by Fukumoto Engineering, Inc[1] to delineate the ordinary high water mark (OHWM) and conduct a water quality survey in Nāpili Gulch in the vicinity of Lower Hono-a-Pi'ilani Road, Lahaina District, Island of Maui (Figure 1). The County of Maui, Department of Public Works (DPW) proposes to replace the existing double-cell culvert under Lower Hono-a-Pi'ilani Road with a larger structure. Additional improvements include grading, slope and channel stabilization, and concrete rock masonry (CRM) paving upstream of the culverts at Lower Hono-a-Pi'ilani Road (Figure 2).

Stream Information

Nāpili Gulch is a fluvial feature on the leeward side of West Maui Mountains that extends from an elevation around 425 m (1,400 ft) above sea level (ASL) to Nāpili Bay (Figure 3). Some sources (USGS, 1997; Group 70, 2015) identify the upper segment (>245 m or 800 ft) ASL as Nāpili 1, the lower segment (including that within the project area) as Nāpili 4-5, and the less well-defined gulch to the north as Nāpili 2-3. The Napili Bay and Beach Foundation (NBBF, 2011) has named the segment of Nāpili 4-5 within the project area "Nāpili Kahawai."

[1] Report prepared for Fukumoto Engineering, Inc. for project permitting and intended to become part of the public record.

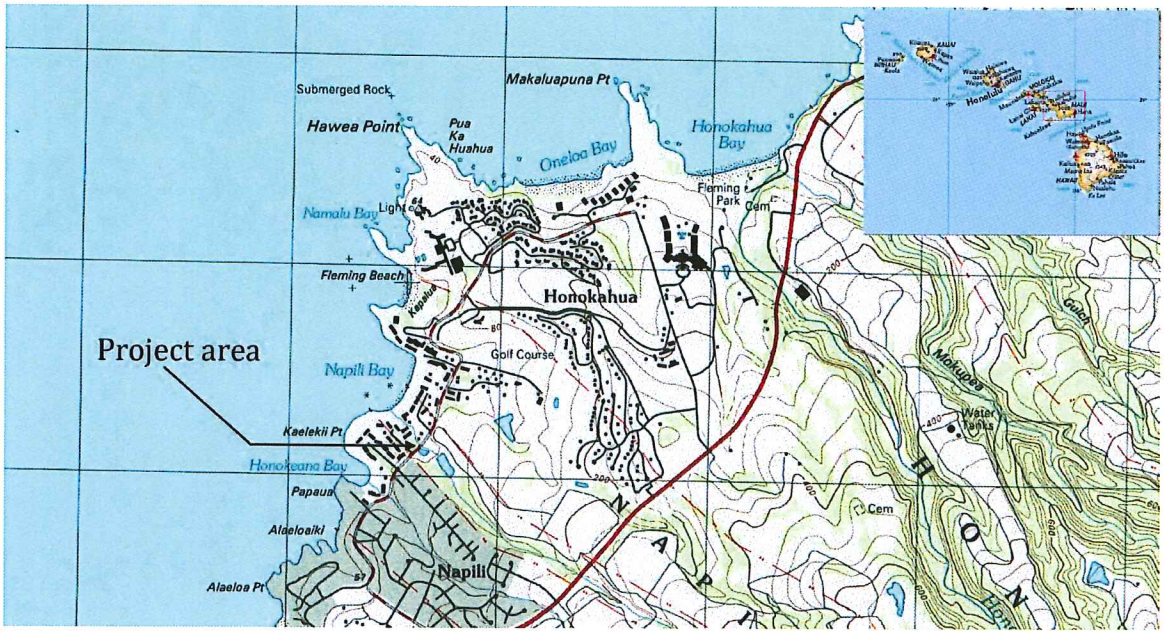


Figure 1. Location of Nāpili Gulch at Lower Hono-a-Pi'ilani Road in the Lahaina District of West Maui.

Pu'u Kukui, at the top of West Maui Mountains, is one of the wettest places on earth with an average annual rainfall of 9,296 mm (366 in; Giambelluca et al., 2013). Lower elevations of the Lahaina District lie in the rain shadow and experience a relatively dry climate—average annual rainfall in the project area at the coast is only 908 mm (36 in). Rainfall in the Lahaina District for 2015 was below average and was only six percent of the monthly average for December (NOAA-NWS, 2016).

Under natural average conditions, most stream reaches of West Maui are dry below about the 245-m (800-ft) elevation ASL (Group 70, 2015). Nāpili appears to flow intermittently throughout the length of the gulch. The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit, 1990) does not include Nāpili Gulch in the inventory of perennial streams and Nāpili Gulch is not included in the Atlas of Hawaiian Watersheds (DLNR-DAR, 2009). The latest U.S. Geological Survey (USGS) map (USGS, 2013) depicts the entire gulch with a combination of dashes and dots—indicating Nāpili is mapped as an intermittent stream.

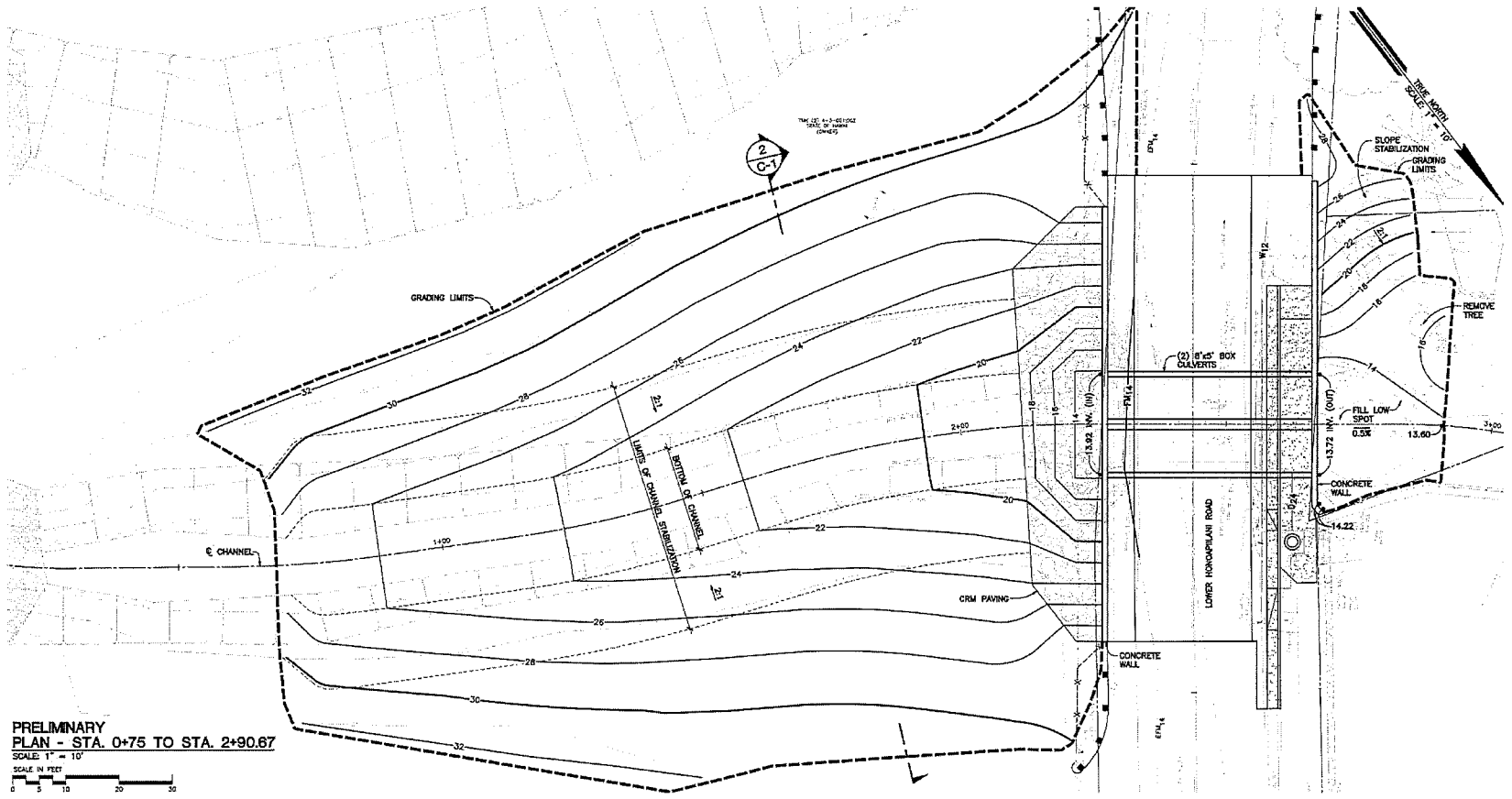


Figure 2. Project plans in Nāpili 4-5 Gulch located between desilting basin and Lower Hono-a-Pi'ilani Road.

Several "desilting basins" are located throughout West Maui watersheds (Group 70, 2015). Most desilting basins were constructed during the sugar cane and pineapple era to reduce the amount of eroded sediment from agricultural fields reaching nearshore reefs. A desilting basin (Figure 4) is located in Nāpili 4-5, just upstream of the project area. In 2010 and 2011, an outlet valve was constructed in the basin. The segment between the basin and Lower Hono-a-Pi'ilani Road was seeded with grass, and Maui County ceased mowing the gulch between the basin and the road (NBBF, 2011). Recent community efforts have focused on planting and maintaining native species in the riparian zone of Nāpili Kahawai downstream of Lower Hono-a-Pi'ilani Road.

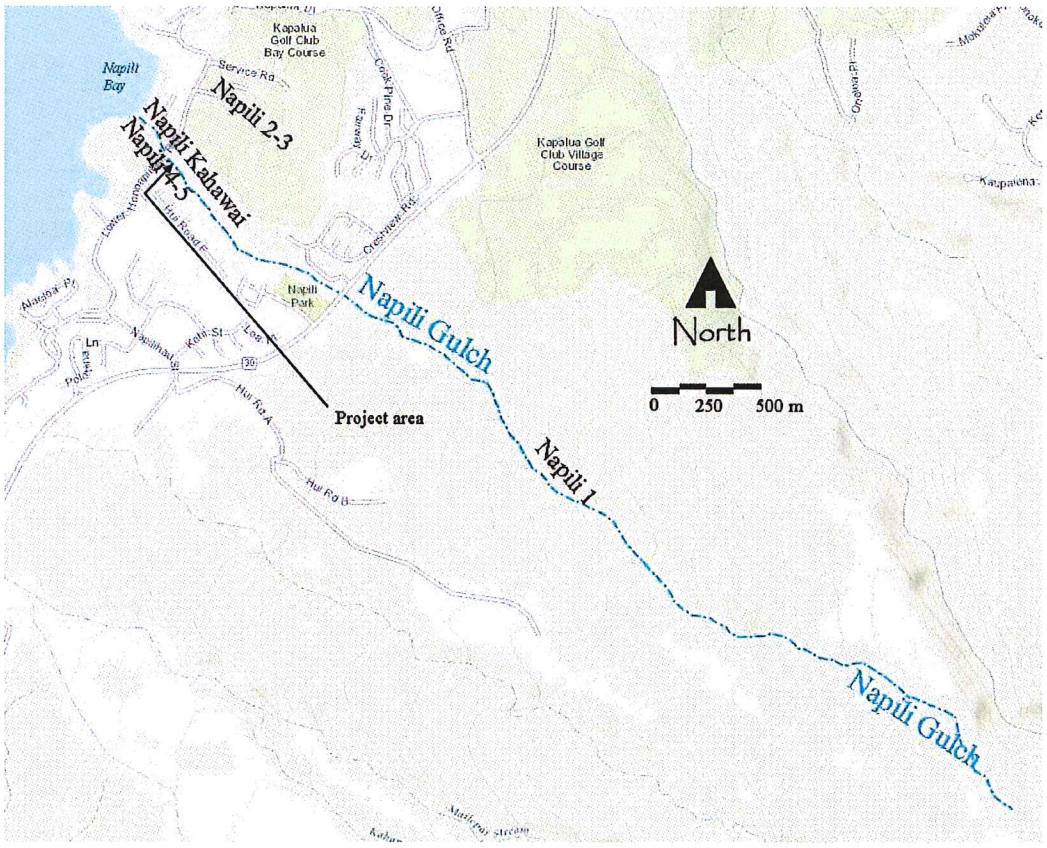


Figure 3. Within project area, Nāpili Gulch is called Nāpili 4-5 or Nāpili Kahawai.

NBBF (2011) reported that, prior to installation of the basin outlet valve, the desilting basin overflowed during a storm in January 2011 and sediment-laden runoff reached Nāpili Bay. A rain gage on Pu'u Kukui at 1760 m (5,771 ft)

recorded 285 mm (11.21 in) of rainfall from this storm between January 10 and 13, 2011 (USGS, 2015).

Figure 4. Desilting basin in Nāpili 4-5 located upstream of project area.

The outlet of Nāpili Gulch at the ocean shore is usually blocked by a wide deposit of sand (Nāpili Beach), forming a *muliwai* (brackish water pond or estuary) extending inland from the beach approximately 25 m (82 ft).

Site Description

Approximately 0.3 m (1 ft) of standing water was present in the lower end of the desilting basin during our site visit on December 15, 2015. The desilting basin appears to have been recently dredged. A manually-operated valve opens outlets on the levee (note grate in center foreground of Fig. 4) and allows water to exit the basin through a concrete box culvert (Figure 5) when water in the

basin reaches three different levels. The outlet directs flow into the straightened channel of Nāpili Gulch. Both sides of the channel are lined with CRM for approximately 8 m (25 ft) downstream of the outlet. Within the project area, upstream of Lower Hono-a-Pi'ilani Road and downstream of the CRM, the channel is unlined.

Figure 5. Water exits desilting basin through a box culvert.

The margins of the gulch downstream of the basin were mowed on the morning of our site visit. Vegetative growth on the bottom and sides of the central channel is not maintained (with the possible exception of regular removal of woody vegetation). Stream flow under Lower Hono-a-Pi'ilani Road is through two 7.5-ft wide box culverts. Downstream of the road, the right side of the channel is a concrete wall and native plants have been planted in the floodplain to the left side of the channel. An irrigation system waters these plants and appears to be the source of a small amount of standing water in the gulch downstream of the culverts. This was the only water present in the project area during our site visit. The lower segment of Nāpili 4-5 is confined to a

straightened channel between two condominiums. The channel ends as a *muliwai* at Nāpili Beach (Figure 6).

Figure 6. Nāpili Gulch ends as a *muliwai*.
Surface flow to the ocean is blocked by Nāpili Beach.

Methods

OHWM

The OHWM is defined in the federal regulations [33 CFR 328.3(e); USACE, 1986] as:

> "... the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of

> the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

On December 15, 2015, *AECOS* scientists established the OHWM of an approximately 100-m (300-ft) segment of Nāpili Gulch. Within this survey area, we considered the physical characteristics (listed below) as provided in a regulatory guidance letter to establish an OHWM (USACE, 2005).

Natural line impressed on the bank	Leaf litter disturbed or washed away
Shelving	Scour
Changes in the character of the soil	Deposition
Destruction of terrestrial vegetation	Multiple observed flow events
Presence of litter and debris	Bed and banks
Wracking	Water staining

AECOS scientists recorded the OHWM with a handheld GNSS (Trimble Geo-XT) unit. GPS data were differentially corrected and mapped using GPS Pathfinder and ArcView 10 software.

Water Quality

Except for a small amount of ponded water from the irrigation system just downstream of Lower Hono-a-Pi'ilani Road, no water was present in Nāpili Gulch within the project area. The scientists measured field parameters and collected water samples in the *muliwai* and at two ocean stations in Nāpili Bay (Figure 7). Samples were collected just below water surface during a low tide (NOAA, 2016). Temperature, pH, and dissolved oxygen (DO) were measured *in situ*. Water samples were collected, chilled, and returned to the *AECOS* laboratory for analyses (*AECOS* Log No. 31707). The following parameters were measured in the laboratory: salinity, turbidity, total suspended solids (TSS), ammonia, nitrate+nitrite, total nitrogen, total phosphorus, and chlorophyll a. Table 1 lists the instruments and analytical methods used for field and laboratory analyses.

Results

OHWM

The only physical characteristic that could potentially represent the OHWM within the segment of Nāpili Gulch in the project area is a change in bank slope

(at the bottom-of-bank) along the edges of the central channel. No other physical evidence of flow could be located in the survey area.

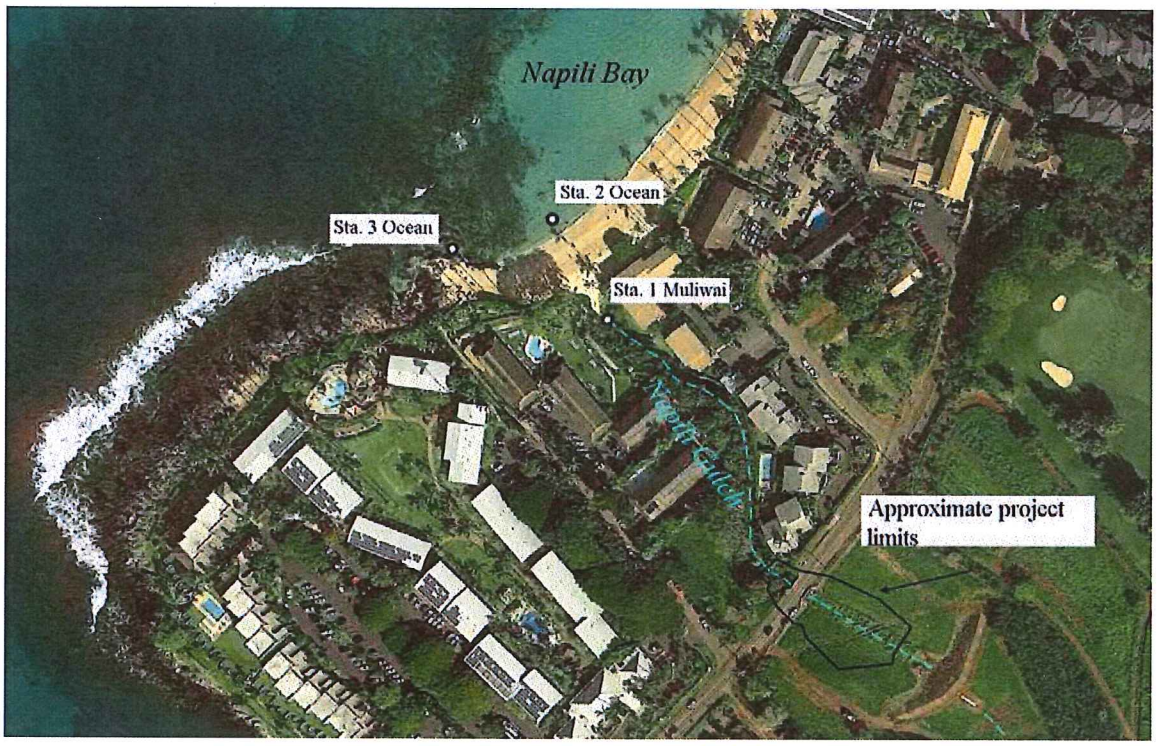


Figure 7. Location of December 15, 2015 water quality sampling stations.

Attachment A presents the OHWM elevation as delineated and recorded in the field by *AECOS*. Photographs (upstream, left and right bank, and downstream) were taken from the center of the gulch in six locations (as shown in Attachment A) to document the OHWM and to characterize the environment. The photographs are provided in Attachment B. Fukumoto Engineering, Inc will include the OWHM on project plans.

Table 1. Analytical methods used for December 15, 2015 water quality analyses.

Analysis	Method	Reference
Temperature	SM 2550B	SM (1998)
Salinity	Bench salinometer	Grasshoff et al. (1999)
pH	SM 4500H+	SM (1998)
Dissolved Oxygen	SM 4500-O G	SM (1998)
Turbidity	EPA 180.1, Rev. 2.0	USEPA (1993a)
Total Suspended Solids	SM 2540D	SM (1998)
Ammonia	SM 4500-NH_3-G	SM (1998)
Nitrate + Nitrite	EPA 343.2	USEPA (1993b)
Total Nitrogen	NCASI-TNTP-W10900	NCASI (2011)
Total Phosphorus	EPA 365.3	USEPA (1993c)
Chlorophyll α	SM 10200H (M)	SM (1998)

Water quality

The results from *in situ* measurements and analyses of water samples collected well downstream from the project area are provided in Table 2. As is typical, waters in the estuarine reach of Nāpili Gulch (*muliwai*) were not flowing over the sand surface into Nāpili Bay, although seepage through the sand would be occurring. Salinity was 20 ppt within the *muliwai*, indicating brackish water composed of a mix of seawater and freshwater. Dissolved oxygen (DO) in the *muliwai* was very low (0.90 mg/L); DO saturation was 12 percent.

Particulates, as measured by total suspended solids (TSS), were high (34 mg/L) in the *muliwai*. Turbidity, an indication of cloudiness of the water, was also high (8.90 ntu), reflecting the turbid condition observed during sampling. Ammonia (NH_3), total nitrogen (TN), and total phosphorus (TP) were high (387 µg N/L, 1670 µg N/L, and 1180 µg P/L, respectively). Chlorophyll α was high (23.9 µg/L), indicating an abundance of phytoplankton in the water column contributing to elevated turbidity. Such conditions are common in blocked estuaries in Hawai'i as nutrients in runoff accumulates in the stagnant water, promoting algal blooms; these blooms may persist until a freshet flow in the gulch breaks through the sand barrier and flushes out the estuarine water.

Nearshore marine waters sampled at Sta. 2 Ocean and Sta. 3 Ocean revealed typical conditions for nearshore waters of West Maui: well-oxygenated

seawater with a pH near 8.0. Values for turbidity, TSS, nutrients, and chlorophyll a were all elevated, although much lower than levels in the *muliwai*.

Table 2. Water quality results from December 15, 2015 sampling event.

Station	Time	Temp (°C)	Salinity (ppt)	DO (mg/l)	DO % sat (%)	pH
Sta. 1 Muliwai	1230	25.8	20.5045	0.90	12	7.39
Sta. 2 Ocean	1300	26.7	34.1117	5.30	80	8.24
Sta. 3 Ocean	1310	26.6	33.4987	7.38	111	8.30

	Turbidity (ntu)	TSS (mg/l)	NH_3 (µg N/l)	NO_3+NO_2 (µg N/l)	Total N (µg N/l)	Total P (µg P/l)	Chl a (µg/l)
Sta. 1 Muliwai	8.90	34	587	26	1670	1180	23.9
Sta. 2 Ocean	1.32	5.8	12	37	157	29	0.75
Sta. 3 Ocean	0.68	3.4	16	63	184	27	0.66

Discussion

OHWM

The purpose of the OHWM delineation is to establish lateral limits of federal jurisdiction within the project area. Our delineated line is not official until accepted by the U.S. Army Corps of Engineers (USACE). Our survey of Nāpili Gulch between the desilting basin and a short distance downstream of Lower Hono-a-Pi'ilani Road found the OHWM to be located at the edge of the channel bottom. Our delineation of the OHWM is based upon best professional judgment; however, federal jurisdiction is solely determined by the USACE and is based upon the USACE accepting our delineation. Acceptance may require a field visit by a USACE representative from the Regulatory Branch. Our delineation is not official until an acceptance letter from the USACE is received by the applicant.

Water quality

During the December 15, 2015 water quality survey, brackish *muliwai* waters of Nāpili Gulch were nutrient-, sediment-, and chlorophyll-laden relative to State of Hawai'i water quality criteria values for estuaries (HDOH, 2014a; Table 3). Values obtained in our survey cannot be directly compared with the values in Table 3 to assess compliance with state standards, because a comparison requires a representative geometric mean calculated from a minimum of three sampling events. The results do indicate that generally poor water quality conditions were present during the survey, although not an unusual situation for a *muliwai*.

Table 3. State of Hawai'i water quality criteria for estuaries from HAR §11-54-05.2(b) (HDOH, 2014a).

Parameter	Total N (µg N/l)	NH_3 (µg N/l)	NO_3+NO_2 (µg N/l)	Total P (µg P/l)	Turbidity (NTU)	Chl a (µg/l)
Geometric mean not to exceed given value	200.00	6.00	8.00	25.00	1.5	2.00
Not to exceed more than 10% of the time	350.00	10.00	25.00	50.00	3.00	5.00
Not to exceed more than 2% of the time	500.00	20.00	35.00	75.00	5.00	10.00

pH – shall not deviate more than 0.5 units from ambient and shall not be < 7.0 nor > 8.6.
Dissolved oxygen – not less than 75% saturation.
Temperature – shall not vary more than 1 °C from ambient.
Salinity – not more than 10% from ambient conditions.

The coastal waters of Nāpili Gulch are also impaired. Nāpili Bay (HI764060) and West Maui Coast-Nāpili Bay (HIW00078) are on the Department of Health list of impaired waters in Hawai'i (HDOH, 2014b) prepared under Clean Water Act, §303(d). The listings indicate the bay may not meet State of Hawai'i water quality criteria for coastal waters with minimal freshwater discharge (Table 4).

HI764060 is listed as impaired for ammonia, nitrate+nitrite, total phosphorus, and chlorophyll and has been assigned a low priority for Total Maximum Daily Load (TMDL) studies. HIW00078 is listed as impaired for nitrate+nitrite, turbidity, and chlorophyll and has been assigned a medium priority for Total Maximum Daily Load (TMDL) studies. The results of our water quality survey support the listing decisions for each listed parameter.

Table 4. State of Hawai'i water quality criteria for dry coastal waters from HAR §11-54-05.2(b) (HDOH, 2014b).

Parameter	Total N (µg N/l)	NH_3 (µg N/l)	NO_3+NO_2 (µg N/l)	Total P (µg P/l)	Turbidity (NTU)	Chl a (µg/l)
Geometric mean not to exceed given value	110.00	2.00	3.50	16.00	0.20	0.15
Not to exceed more than 10% of the time	180.00	5.00	10.00	30.00	0.50	0.50
Not to exceed more than 2% of the time	250.00	9.00	20.00	45.00	1.00	1.00

pH – between 7.6 and 8.6, except at coastal locations where and when freshwater from stream, storm drain, or groundwater discharge may depress pH to 7.0.
Dissolved oxygen – not less than 75% saturation.
Temperature – shall not vary more than 1 °C from ambient.
Salinity – not more than 10% from ambient conditions.

Conclusions and Recommendations

The proposed project is not anticipated to adversely affect the already poor water quality in the *muliwai* of Nāpili Gulch or in the nearshore waters of Nāpili Bay. Unless a large storm occurs during construction, all work should be able to be completed in a dry setting. A best management practices (BMP) plan and an applicable monitoring and assessment plan (AMAP) should be designed and

implemented to minimize and localize adverse environmental impacts and monitor any impacts.

References

Giambelluca, T. W., Q. Chen, A. G. Frazier, J. P. Price, Y. –L. Chen, P. –S. Chu, J. K. Eischeid, and D. M. Delparte. 2013: Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94: 313-316. doi. 10.1175/BAMS-D-11-00228.1. Available online at URL: http://rainfall.geography.hawaii.edu/interactivemap.html; last accessed December 17, 2015.

Grasshoff, K., M. Ehrhardt, and K. Kremling (eds). 1999. Methods of Seawater Analysis (3rd ed). Wiley-VHC. 419 pp.

Group 70 International. 2015. West Maui watershed plan: Kahana, Honokahua and Honolua watersheds, strategies and implementation report. Public review draft, November 2015. Prep. for: U.S. Army Corps of Engineer and State of Hawai'i Department of Land and Natural Resources. 165 pp.

Hawaii Cooperative Park Service Unit. 1990. Hawaii stream assessment. A preliminary appraisal of Hawaii's stream resources. Prep. for State of Hawaii, Commission on Water Resource Management. National Park Service, Hawaii Cooperative Park Service Unit, Rept. No. R84: 294 pp.

Hawai'i Department of Health (HDOH). 2014a. Hawai'i Administrative Rules, Title 11, Department of Health, Chapter 54, Water Quality Standards. November 15, 2014. 110 pp.

Hawai'i Department of Land and Natural Resources, Division of Aquatic Resources (DLNR-DAR). 2009. Atlas of Hawaiian Watershed & Their Aquatic Resources. Island of Maui, Lahaina Watersheds. Department of Land and Natural Resources. State of Hawai'i. Available online at URL: http://www.hawaiiwatershedatlas.com/watersheds/hawaii; last accessed on December 17, 2015.

_____. 2014b. 2014 State of Hawai'i water quality monitoring and assessment report: integrated report to the U.S. Environmental Protection Agency and the U.S. Congress pursuant to §303(3) and §305(b), Clean Water Act (P.L. 97-117). 123 pp.

Napili Bay and Beach Foundation (NBBF). 2011. Coral Reef Conservation Fund Final Programmatic Report. 10 pp.

National Council for Air and Stream Improvement, Inc. (NCASI), 2011. NCASI Methods Manual Method TNTP-W10900. Total nitrogen and total phosphorus in pulp and paper biologically treated effluent by alkaline persulfate. West Coast Regional Center Aquatic Biology Program. 22pp.

National Oceanographic and Atmospheric Administration (NOAA). 2016. NOAA/NOS/CO-OPS, Observed water levels at 1615680, Kahului, Kahului Harbor, HI, from 2015/12/15 00:00 LST to 2015/12/15 23:59 LST. Available online at URL: http://tidesandcurrents.noaa.gov/waterlevels.html?id=1615680&units=standard&bdate=20151215&edate=20151215&timezone=LST&datum=MSL&interval=6&action=; last accessed January 6, 2016.

National Oceanographic and Atmospheric Administration, National Weather Service Forecast Office (NOAA-NWS). 2016. December 2015 precipitation summary. Available online at: www.prh.noaa.gov/hnl/hydro/pages/dec15sum.php; last accessed on January 7, 2016.

Standard Methods (SM). 1998. Standard Methods for the Examination of Water and Wastewater. 20th Edition. 1998. (Greenberg, Clesceri, and Eaton, eds.). APHA, AWWA, & WEF. 1220 pp.

U.S. Army Corps of Engineers (USACE). 1986. Corps of Engineers, Department of the Army, Department of Defense, 33 CFR II, Parts 328 and 329. Navigation and Navigable Waters. *Federal Register*, 51 (41250 and 41251, November 13, 1986).

_____. 2005. Regulatory Guidance Letter 05-05 Ordinary High Water Mark (OHWM) Identification. 4 pp.

U.S. Environmental Protection Agency (USEPA). 1993a. Method 180.1 Determination of turbidity by nephelometry. Revision 2.0. Environmental Monitoring Systems Laboratory Research and Development. Environmental Protection Agency. Cincinnati, OH. 10 pp.

_____. 1993b. Method 353.2. Determination of nitrate-nitrite by automated colorimetry. Revision 2.0. Environmental Monitoring Systems Laboratory Research and Development. Environmental Protection Agency. Cincinnati, OH. 14 pp.

U.S. Environmental Protection Agency (USEPA). 1993c. Method 365.3. Determination of total phosphorus by automated colorimetry. Revision 2.0. Environmental Monitoring Systems Laboratory Research and Development. Environmental Protection Agency. Cincinnati, OH. 4 pp.

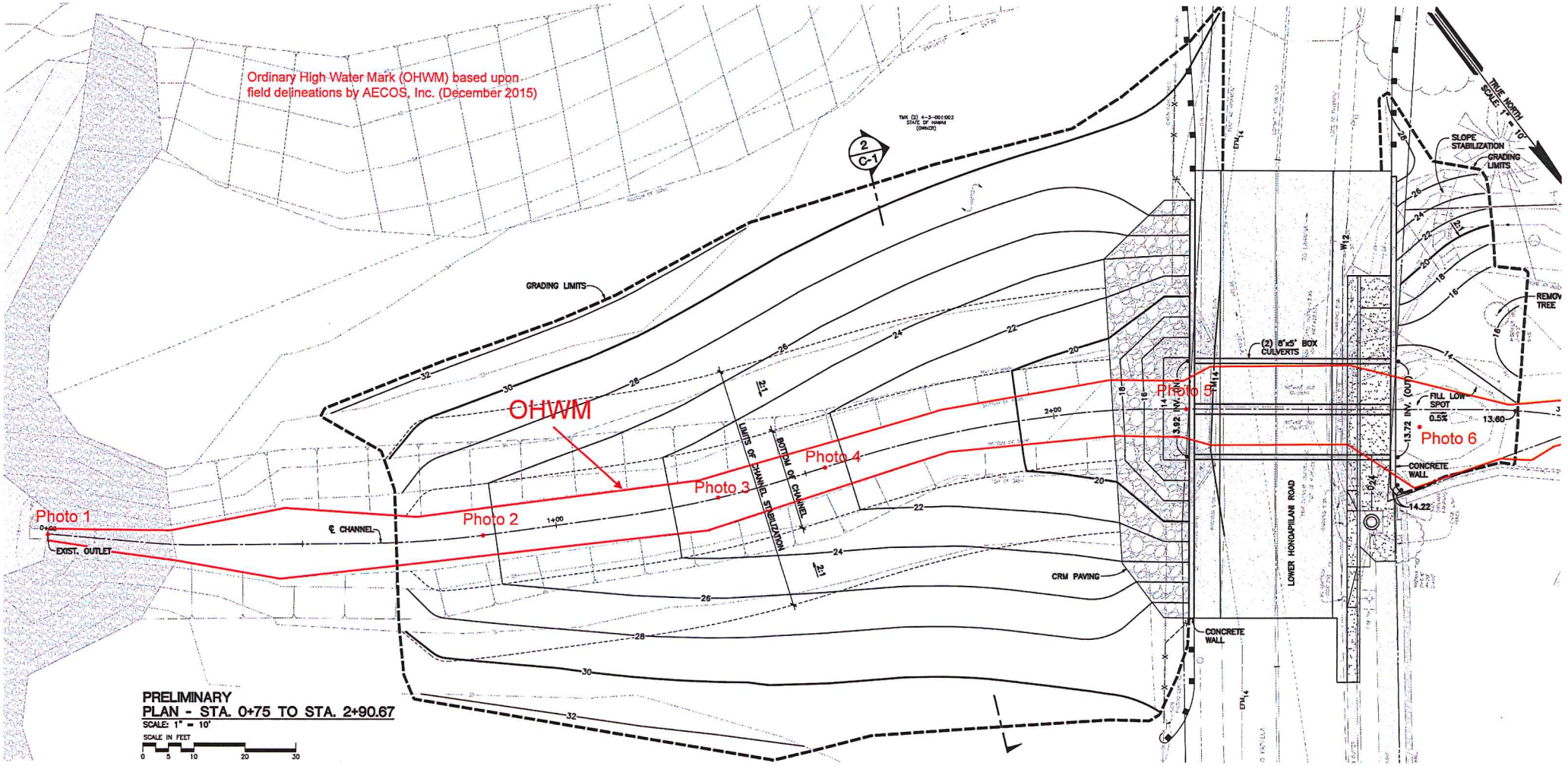
U.S. Geological Survey (USGS). 1997. Napili Quadrangle, Hawaii-Maui Co., 7.5-minute series (topographic).

_____. 2013. Napili Quadrangle, Hawaii-Maui Co., 7.5-minute series (topographic).

_____. 2015. USGS 205327156351102 380.0 Puu Kukui Rain Gage at alt 5,771 ft, Maui, HI. Available online at URL: http://nwis.waterdata.usgs.gov/hi/nwis/dv?cb_00045=on&format=gif_default&site_no=205327156351102&referred_module=sw&period=&begin_date=2011-01-01&end_date=2011-01-31; last accessed December 17, 2015.

Attachment A

Ordinary High Water Mark Map


Ordinary High Water Mark (OHWM) based upon field delineations by AECOS, Inc. (December 2015)
OHWM
Photo 1
Photo 2
Photo 3
Photo 4
Photo 5
Photo 6
GRADING LIMITS
℄ CHANNEL
EXIST. OUTLET
LIMITS OF CHANNEL STABILIZATION
BOTTOM OF CHANNEL
CRM PAVING
(2) 6'x5' BOX CULVERTS
CONCRETE WALL
LOWER HONOAPIILANI ROAD
SLOPE STABILIZATION
GRADING LIMITS
FILL LOW SPOT
0.5%
13.60
13.72 INV. (OUT)
3.92 INV.
14.22
TRUE NORTH
SCALE: 1" = 10'
2
C-1
PRELIMINARY
PLAN - STA. 0+75 TO STA. 2+90.67
SCALE: 1" = 10'
SCALE IN FEET
0 5 10 20 30

Attachment B

Ordinary High Water Mark Photographs

Photo 1 Upstream

Photo 1 Left bank

Photo 1Right bank

Photo 1 Downstream

Photo 2 Upstream

Photo 2 Left bank

Photo 2 Right bank

Photo 2 Downstream

Photo 3 Upstream

Photo 3 Left bank

Photo 3 Right bank

Photo 3 Downstream

Photo 4 Upstream

Photo 4 Left bank

Photo 4 Right bank

Photo 4 Downstream

Photo 5 Upstream

Flag 5 Photo bank

Flag 5 Photo bank

Photo 5 Downstream left culvert

Photo 5 Downstream right culvert

Photo 6 Upstream

Photo 6 Left bank

Photo 6 Right bank

Photo 6 Downstream

APPENDIX D

Flora and Fauna Survey

FLORA AND FAUNA SURVEY

NAPILI 4/5 CULVERT REPLACEMENT PROJECT

NAPILI, WEST MAUI

By

ROBERT W. HOBDY
Environmental Consultant
Kokomo, Maui
October 2015

Prepared for:
Maui County
Department of Public Works

FLORA AND FAUNA SURVEY AND ASSESSMENT FOR NAPILI 4/5 CULVERT REPLACEMENT PROJECT NAPILI, WEST MAUI

The Napili 4/5 Culvert Replacement Project is located along the Lower Honoapiilani Road in Napili Stream, West Maui. It lies within a resort and residential community downstream of a flood control retention basin feature and drains into Napili Bay (see Figure 1). This study was initiated by the Maui County Department of Public Works in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The project area consists of the culvert itself along Lower Honoapiilani Road and small areas both above and below the road that totals a little less than an acre in size (see Figure 2). The project area is located 800feet from the ocean at elevations ranging from 32 feet down to 8 feet above sea level. Rainfall averages about 32 inches per year, with most occurring during the winter months (Armstrong, 1983). Soils are characterized as rough stony land (rRS) (Foote et al, 1972).

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of Napili 4/5 Culvert Replacement project which was conducted in September 2015. The objectives of the survey were to:

1. Document what plant and animal species occur on the property.
2. Document the status and abundance of each species.
3. Determine the presence of any native flora and fauna particularly any that are Federally listed as Threatened or Endangered (USFWS, 2015). If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

BOTANICAL SURVEY REPORT

A walk-through botanical survey was conducted covering all parts of this small project area. Notes were made on plant species, status and abundance. Results were compiled in a flora inventory for analysis.

DESCRIPTION OF THE VEGETATION

The vegetation in the project area is dominated by just one non-native grass, Guinea grass (*Megathyrsus maximus*) which is found in all parts of the area. Much of the area is maintained in a closely mowed condition. More diversity is found with the stream channel above and below the culvert.

A total of 61 plant species were recorded during the course of the survey. Of these, 9 were native species and the remaining 52 were non-native agricultural or roadside weeds that are of no particular concern. The 9 native species included 'uhaloa (*Waltheria indica*), 'ōhi'a (*Metrosideros polymorpha*), 'ākia (*Wikstroemia uva-ursi*), (*Achyranthes splendens* var. *splendens*) no common name, 'ohelo kai (*Lycium sandwicense*), 'a'ali'i (*Dodonaea viscosa*), wiliwili (*Erythrina sandwicensis*), alahe'e (*Psydrax odorata*) and akoko (*Euphorbia celastroides* var. *amplectens*). Only the 'uhaloa was found growing naturally in the project area. The other 8 native species were small plants that had been planted in a small area below the culvert on the south bank of Napili Stream within the project area. None of these native plants are Threatened or Endangered species.

DISCUSSION AND RECOMMENDATIONS

The Napili 4/5 Culvert Replacement project is largely overrun with non-native grasses and a few shrubs. The few native plant species that do occur here are all widespread in Hawaii. No Endangered or Threatened species (USFWS, 2015) were found and none of the native species here are candidates for such status. This disturbed environment was not found to include any special habitats for native plant species or ecosystems.

This culvert replacement project is not expected to result in any significant negative impacts on native plant communities in this part of West Maui.

No recommendations are deemed necessary regarding plant resources for this project area.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within three groups: Ferns, Monocots and Dicots. Taxonomy and nomenclature of the Monocots and Dicots are in accordance with Wagner et al. (1999), while Ferns follow Palmer (2003).

For each species, the following information is provided:

1. Scientific name with author citation.

2. Common English or Hawaiian name.

3. Bio-geographical status. The following symbols are used:

   Endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
   Indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   Polynesian introduction = plants introduced to Hawaii in the course of the Polynesian migrations and prior to western contact.
   Non-native = all those plants brought to the islands intentionally or accidentally after western contact.

4. Abundance of each species within the project area:

   Abundant = forming a major part of the vegetation within the project area.
   Common = widely scattered throughout the area or locally abundant within a portion of it.
   Uncommon = scattered sparsely throughout the area or occurring in a few small patches.
   Rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
FERNS			
NEPHROLEPIDACEAE (Sword Fern Family)			
Nephrolepis brownii (Desv.) Hovencamp & Miyamoto	Asian sword fern	non-native	rare
POLYPODIACEAE (Polypody Fern Family)			
Phymatosorus grossus (Langsd. & Fisch.) Brownlie	*laua'e*	non-native	rare
MONOCOTS			
ARACEAE (Aroid Family)			
Epipremnum pinnatum (L.) Engl.	pothos	non-native	rare
CYPERACEAE (Sedge Family)			
Cyperus gracilis R. Br.	*mau'u hunehune*	non-native	rare
POACEAE (Grass Family)			
Chloris barbata (L.) Sw.	swollen fingergrass	non-native	rare
Digitaria insularis (L.) Mez ex Ekman	sourgrass	non-native	rare
Digitaria violacens Link	*kukaepua'a uka*	non-native	uncommon
Eleusine indica (L.) Gaertn.	wiregrass	non-native	uncommon
Eragrostis pectinacea (Michx.) Nees	Carolina lovegrass	non-native	rare
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	abundant
Setaria vecticillata (L.) P. Beauv.	bristly foxtail	non-native	rare
Urochloa subqudripara (Trin.) R.D. Webster	----------	non-native	uncommon
DICOTS			
AMARANTHACEAE (Amaranth Family)			
Achyranthes splendens Mart. ex Moq. var. *splendens*	----------	endemic	rare
Alternanthera pungens Kunth	khaki weed	non-native	uncommon
Amaranthus spinosus L.	spiny amaranth	non-native	rare
Amaranthus viridis L.	slender amaranth	non-native	uncommon
Dysphania carinatum (R.Br.) Mosyakin & Clements	keeled goosefoot	non-native	uncommon
ASTERACEAE (Sunflower Family)			
Bidens pilosa L.	Spanish needle	non-native	rare
Calyptocarpus vialis Less.	straggler daisy	non-native	rare
Conyza bonariensis (L.) Cronq.	hairy horseweed	non-native	rare
Emilia fosbergii Nicolson	red pualele	non-native	uncommon
Sphagneticola trilobata (L.) Pruski	wedelia	non-native	rare
BIGNONIACEAE (Bignonia Family)			
Spathodea campanulata P. Beauv.	African tulip tree	non-native	rare
BORAGINACAE (Borage Family)			
Heliotropium procumbens Mill.	four-spike heliotrope	non-native	uncommon
BRASSICACEAE (Mustard Family)			
Lepidium virginicum L.	pepperwort	non-native	rare
CARICACEAE (Papaya Family)			
Carica papaya L.	papaya	non-native	rare
CONVOLVULACEAE (Morning Glory Family)			
Ipomoea obscura (L.) Ker-Gawl.	----------	non-native	uncommon
Ipomoea triloba L.	little bell	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
CUCURBITACEAE (Gourd Family)			
Momordica charantia L.	bitter melon	non-native	uncommon
EUPHORBIACEAE (Spurge Family)			
Euphorbia celastroides Boiss. var. *amplectens* Sherff	*'akoko*	endemic	rare
Euphorbia hirta L.	hairy spurge	non-native	uncommon
Euphorbia hypericifolia L.	graceful spurge	non-native	rare
Euphorbia prostrata Aiton	prostrate spurge	non-native	rare
Ricinus communis L.	Castor bean	non-native	rare
FABACEAE (Pea Family)			
Chamaecrista nictitans (L.) Moench	partridge pea	non-native	uncommon
Crotalaria pallida Aiton	smooth rattlepod	non-native	rare
Desmanthus pernambucanus (L.) Thellung	slender mimosa	non-native	rare
Erythrina sandwicensis Degener	*wiliwili*	endemic	rare
Indigofera spicata Forssk.	creeping indigo	non-native	rare
Indigofera suffruticosa Mill.	*inikō*	non-native	rare
Leucaena leucocephala (Lam.) de Wit	*koa haole*	non-native	uncommon
Macroptilium lathyroides (L.) Urb.	wild bean	non-native	rare
Neonotonia wightii (Wight & Arnott) Lackey	glycine	non-native	uncommon
Senna occidentalis (L.) Link	coffee senna	non-native	rare
LAMIACEAE (Mint Family)			
Leonotis nepetifolia (L.) R. Br.	lion's ear	non-native	rare
MALVACEAE (Mallow Family)			
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	non-native	rare
Hibiscus x rosa-sinensis	hybrid hibiscus	non-native	rare
Malvastrum cormandelianum (L.) Garcke	false mallow	non-native	uncommon
Sida rhombifolia L.	arrowleaf sida	non-native	rare
Waltheria indica L.	*'uhaloa*	indigenous	uncommon
MYRTACEAE (Myrtle Family)			
Metrosideros polymorpha Gaud.	*'ōhi'a*	endemic	rare
NYCTAGINACEAE (Four-o'clock Family)			
Boerhavia coccinea Mill.	scarlet spiderling	non-native	uncommon
OXALIDACEAE (Wood Sorrel Family)			
Oxalis corniculata L.	*'īhī'ai*	Polynesian	rare
PHYLLANTHACEAE (Phyllanthus Family)			
Phyllanthus debilis Klein ex Willd.	niruri	non-native	rare
PORTULACACEAE (Purslane Family)			
Portulaca oleracea L.	pig weed	non-native	rare
Portulaca pilosa L.	----------	non-native	rare
RUBIACEAE (Coffee Family)			
Psydrax odorata (G.Forst.) Smith & Darwin	*alahe'e*	indigenous	rare
SAPINDACEAE (Soapberry Family)			
Dodonaea viscosa Jacq.	*'a'ali'i*	indigenous	rare
SOLANACEAE (Nightshade Family)			
Lycium sandwicense A. Gray	*'ōhelo kai*	indigenous	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
THYMELAEACEAE ('Ākia Family)			
Wikstroemia uva-ursi A. Gray	'ākia	endemic	rare
VERBENACEAE (Verbena Family)			
Strachytarpheta jamaicensis (L.) Vahl	Jamaica vervain	non-native	uncommon

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities and locations as well as observations of trails, tracks, scat and signs of feeding. In addition an evening visit was made in the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

Just one non-native mammal, the domestic dog (*Canis familiaris*) was observed in the project area during two site visits. Taxonomy and nomenclature follow Tomich (1986). While not seen, one would expect to also find other non-native mammals such as the domestic cat (*Felis catus*), mongoose (*Herpestes auropunctatus*), rats (*Rattus* spp.) and mice (*Mus domesticus*) in this habitat.

A special effort was made to look for the Endangered *ōpe'ape'a* or Hawaiian hoary bat by making an evening survey in the project area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent. In addition a bat detecting device (Batbox IIID) was used, set to the frequency of 27,000 hertz, which is the frequency these bats are known to use for echo-location. No bats were detected with this device at any of the survey locations.

BIRDS

Birdlife was modest in both species diversity and in total numbers in this dry habitat. Just four species of non-native birds were seen during two site visits. Taxonomy and nomenclature follow American Ornithologists' Union (2014). Two species were common throughout the project area, the zebra dove (*Geopelia striata*), and the common myna (*Acridotheres tristis*). Uncommon species include the spotted dove (*Streptopelia chinensis*) and house finch (*Carpodacus mexicanus*). No native birds were seen.

INSECTS

A good variety of insects were recorded during two site visits. A total of 12 species were recorded in seven insect orders. Taxonomy and nomenclature follow Nishida et al (1992). Just one species was of common occurrence, the beet webworm moth (*Spoladea recurvalis*). Three species were uncommon, the seven-spot lady beetle (*Coccinella septempuncta brucki*), Leucaena psyllid (*Heteropsylla cubana*) and the sleepy yellow butterfly (*Eurema niccipe*). Eight species were rare (see complete insect inventory).

Just one native insect species was found, the green darner (*Anax junius*) which is an indigenous dragonfly that is widespread in Hawaii as well as in North America.

MOLLUSKS

Just two non-native snails were recorded in the project area, the giant African snail (*Achatina fulica*) and the rosy cannibal snail (*Euglandina rosea*). No native snails were seen.

DISCUSSION AND RECOMMENDATIONS

The fauna on this property is strongly dominated by non-native species. Just one indigenous dragonfly, the green darner, was found here. This dragonfly is a common component in many habitats in Hawaii and is widespread in North America. It is of no special conservation concern.

No Endangered animal species were found on this property during the course of this survey, nor were any found that are candidates for such status. There are, however, concerns regarding certain protected species that, while not present, may occur in the project area at other times of the year that need to be addressed.

While no Endangered bats were detected during the evening survey, the *'ope'ape'a* is known to be widespread in many habitats in West Maui. These bats are highly mobile and appear to migrate around in response to flushes in insect activity wherever it may occur. There is likelihood that these bats utilize some habitats on the property during the year. These bats roost in trees and also rear their young in trees during the summer months. Since, however, there are no trees in the project area, any potential for disturbance for bats is not an issue.

Additionally, there are two native seabirds, the Endangered Hawaiian petrel (*Pterodroma sandwichensis*) and the Threatened Newell shearwater (*Puffinus newelli*), that fly over these lowlands on the way to their burrows high in the mountains. These seabirds, and especially the fledglings are attracted to bright lights in the evenings and early dawn hours and can become disoriented and crash. They are then vulnerable to injury, vehicle strikes and predators. It is recommended that any significant outdoor lighting associated with this project be shielded to direct the light downward to minimize disorientation of these protected seabirds.

While this project will result in temporary inconveniences to vehicular traffic, it is not expected to result in any significant negative impacts on biological resources in this part of West Maui.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within four groups: Mammals, Birds, Insects and Mollusks. For each species the following information is provided:

1. Common name

2. Scientific name

3. Bio-geographical status. Following symbols are used:
   Endemic = native only to Hawaii; not naturally occurring anywhere else in the world.
   Indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   Non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.
   Migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.

4. Abundance of each species within the project area:
   Abundant = many flocks or individuals seen throughout the area at all times of day.
   Common = a few flocks or well scattered individuals throughout the area.
   Uncommon = only one flock or several individuals seen within the project area.
   Rare = only one or two seen within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MAMMALS			
Canis familiaris L.	domestic dog	non-native	rare
MOLLUSKS			
Achatina fulica Ferussac	giant African snail	non-native	rare
Euglandina rosea Ferussac	rosy cannibal snail	non-native	rare
BIRDS			
Geopelia striata L.	zebra dove	non-native	common
Acridotheres tristis L.	common myna	non-native	common
Streptopelia chinensis Scopoli	spotted dove	non-native	uncommon
Carpodacus mexicanus Muller	house finch	non-native	uncommon

INSECTS

Order COLEOPTERA - beetles			
COCCINELLIDAE (Lady Beetle Family)			
Coccinella septempunctatum brucki Multsant	seven-spot lady beetle	non-native	uncommon
Curinus coeruleus Multsant	metalic blue lady beetle	non-native	rare
Order DIPTERA - flies			
MUSCIDAE (Housefly Family)			
Musca sorbens Wiedemann	dung fly	non-native	rare
SYRPHIDAE (Hoverfly Family)			
Symosyrphus grandicornis Macquart	Australian hoverfly	non-native	rare
Order HETEROPTERA - true bugs			
PSYLLIDAE (Psyllid Family)			
Heteropsylla cubana Crawford	Leucaena psyllid	non-native	uncommon
Order HYMENOPTERA - bees, wasps			
APIDAE (Honey Bee Family)			
Apis mellifera L.	honey bee	non-native	rare
Order LEPIDOPTERA - butterflies, moths			
CRAMBIDAE (Grass Moth Family)			
Spoladea recurvalis Fabricius	beet webworm moth	non-native	common
PIERIDAE (White and Sulphur Butterfly Family)			
Eurema niccipe Cramer	sleepy yellow butterfly	non-native	uncommon
PTEROPHORIDAE (Plume Moth Family)			
Megalorhipida leucodactyla Fabricius	plume moth	non-native	rare
Order ODONATA - dragonflies, damselflies			
AESHNIDAE (Hawker Dragonfly Family)			
Anax junius Drury	green darner	indigenous	rare
Order ORTHOPTERA - grasshoppers, crickets			
ACRIDIDAE (Grasshopper Family)			
Oxya japonica Thunberg	small rice grasshopper	non-native	rare
TETTIGONIIDAE (Katydid Family)			
Elimaea punctifera Walker	katydid	non-native	rare

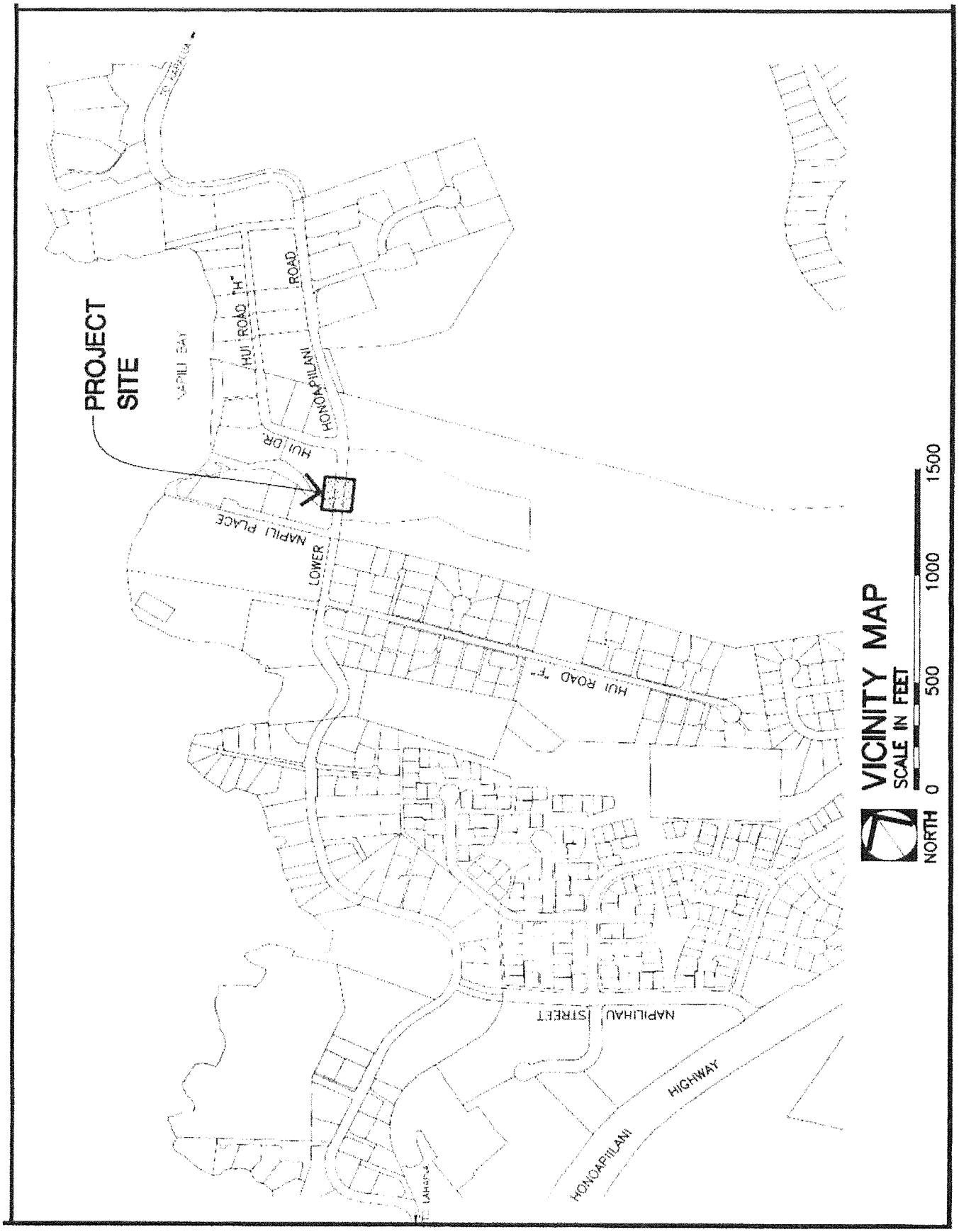


Figure 1. Project Map

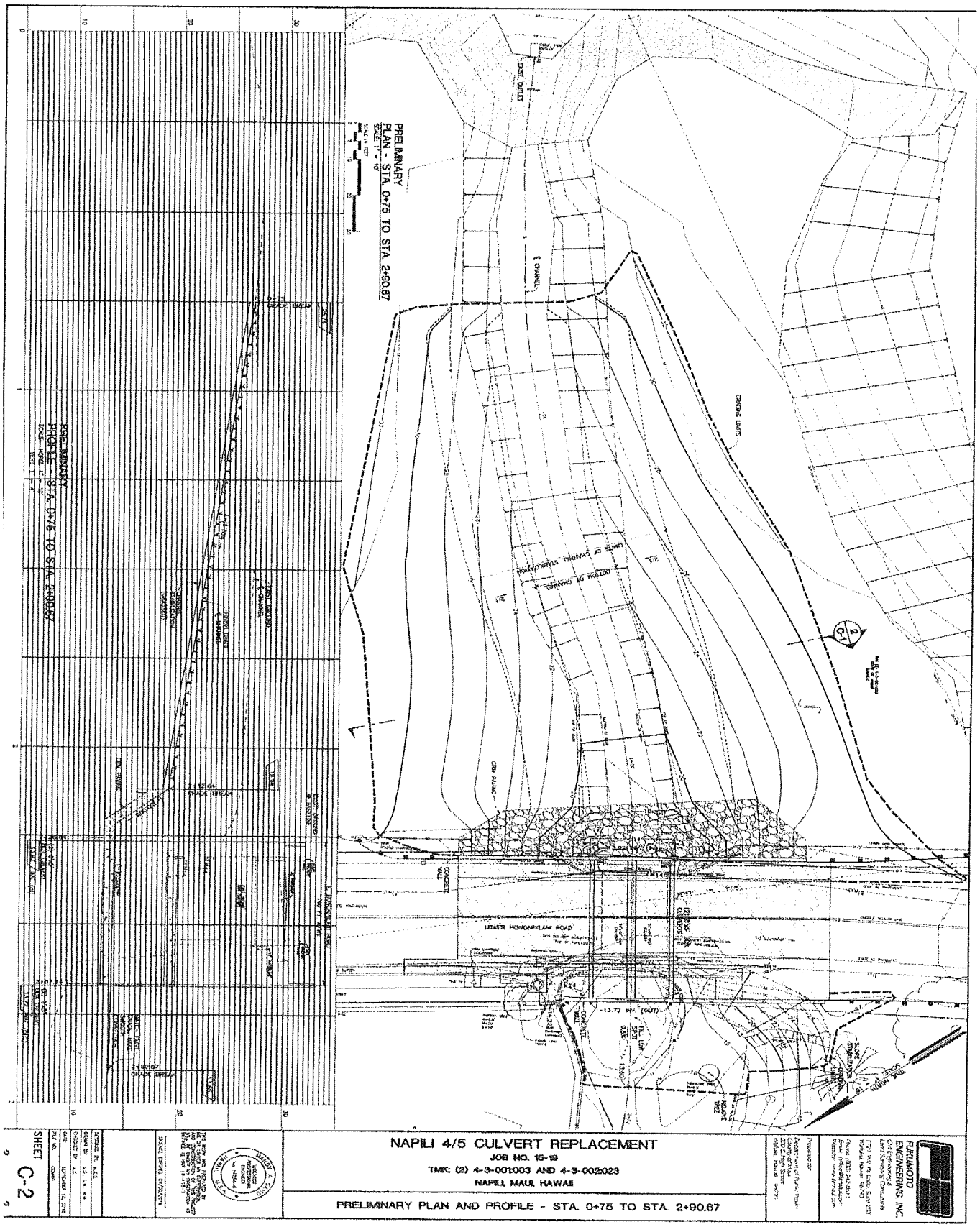


Figure 2. Project Map.

Figure 3. Napili 4/5 Culvert Site – view from above Lower Honoapiilani Road.

Figure 4. View of Napili Stream channel and Lower Honoapiilani Road from above.

Figure 5. Napili 4/5 Culvert Site below Lower Honoapiilani Road.

Figure 6. View downstream from the Napili 4/5 culvert.

LITERATURE CITED

American Ornithologists' Union (2014). Checklist of North American Birds. 7th Edition. American Ornithologists' Union. Washington D.C.

Armstrong, R.W. (ed.) 1983. Atlas of Hawaii. (2nd edition) University of Hawaii Press.

Foote, D.E., E.L. Hill, S. Nakamura, F. Stephens. 1972. Soils Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii. Soil Conservation Service, Department of Agriculture. Washington, D.C.

Nishida, G.M., G.A. Samuelson, J. S. Strazanac and K.S. Kami, 1992. Hawaiian Terrestrial Anthropod Checklist. Hawaiian Biological Survey. Honolulu.

Palmer, D.D. 2003. Hawai'i's Ferns and Fern Allies. Bishop Museum Press. Honolulu.

Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press, Honolulu.

U.S. Fish and Wildlife Service. 2015. Endangered and Threatened Wildlife and Plants. Occurrences and Listings for Hawaii. www.fws.gov/endangered

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1999. Manual of the Flowering Plants Of Hawaii. University of Hawaii Press and Bishop Museum Press. Honolulu.

APPENDIX E

Archaeological Monitoring Plan

SCS Project Number 1783-1 AMP

AN ARCHAEOLOGICAL MONITORING PLAN FOR THE NAPILI CULVERT REPLACEMENT PROJECT NĀPILI 4 AND 5 AHUPUA`A, LĀHAINĀ (KĀ`ANAPALI) DISTRICT, ISLAND OF MAUI, HAWAI`I

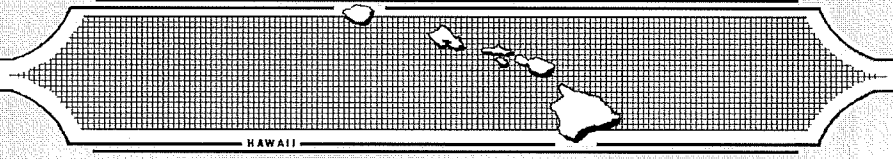
[TMK (2) 4-3-001:003 por., 4-3-002:023 por., 4-3-002:045 por., and County Right of Way]

Prepared by:
Cathleen A. Dagher, B.A.
and
Michael F., Dega, Ph.D.

October 2015
DRAFT

Prepared for:
Mike E. Silva, P.E.
Fukumoto Engineering, Inc.
1721 Wili Pa Loop, Suite 203
Wailuku, Hawai`i 96793

SCIENTIFIC CONSULTANT SERVICES Inc.



1347 Kapiolani Blvd., Suite 408 Honolulu, Hawai`i 96814

Copyright © Scientific Consultant Services, Inc. 2015. All rights reserved.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

At the request of Mike E. Silva, P.E., Fukumoto Engineering, Inc., Scientific Consultant Services, Inc. (SCS) has prepared this Archaeological Monitoring Plan (AMP) in advance of ground-altering activities associated with the 0.56 acre Napili Culvert Replacement project area located in Nāpili 4 and 5 Ahupua`a, Lāhainā (Kā`anapali) District, Island of Maui, Hawai`i [TMK: (2) 4-3-001:003 por., 4-3-002:023 por., 4-3-002:045 por., and the County Right of Way] (Figures 1 through 3). Ground altering activities will also occur directly adjacent to Tax Map Key: (2) 4-3-002:049. Tax Map Key (2) 4-3-001:003 and 4-3-002:023 are both owned by the State of Hawaii, TMK: (2) 4-3-002:045 and 4-3-002:049 are privately owned. According to the County of Maui County Real Property Assessment Division, TMK: (2) 4-3-002:0045 is currently owned by Scott Antone Swoboda and TMK: (2) 4-3-002:049 is owned by Sixty-Five Napili Way, also known as One Napili Way.

The main goal of the current project is to fix the erosion on the *makai* (west) side of the culvert caused by the large elevation drop from the culvert down to the drainage way. The scope of the work includes:

- Complete replacement of two 8-foot wide drainage culverts that pass under Lower Honoapiilani Road;
- Extend the culvert length to allow for a sidewalk to cross over;
- Relocate a County watermain that is currently mounted outside of the existing outlet structure.
- Excavations will extend 10 to 15 feet down to the new culvert.

This AMP covers all ground disturbing subsurface activities associated with the approximately 0.56 acre Napili Culvert Replacement project area. A program of Archaeological Monitoring is being conducted due to the potential for the inadvertent discovery pre- and post-Contact cultural materials, including human skeletal remains and cultural deposits, in subsurface strata.

This AMP has been written in accordance with the rules of the State Historic Preservation Division(SHPD) and will ensure that if human skeletal remains are identified during subsurface work, appropriate and lawful protocol concerning the inadvertent discovery of human remains (pursuant to Hawaii Administrative Rules (HAR) §13-300-40a, b, c), is followed. This AMP will also ensure that if cultural deposits are identified, the work will satisfy reporting

requirements outlined in HAR §13-279-5(5) through (6). The following text provides more detailed information on the reasons for monitoring, potential site types to be encountered during excavation, monitoring conventions, and methodology.

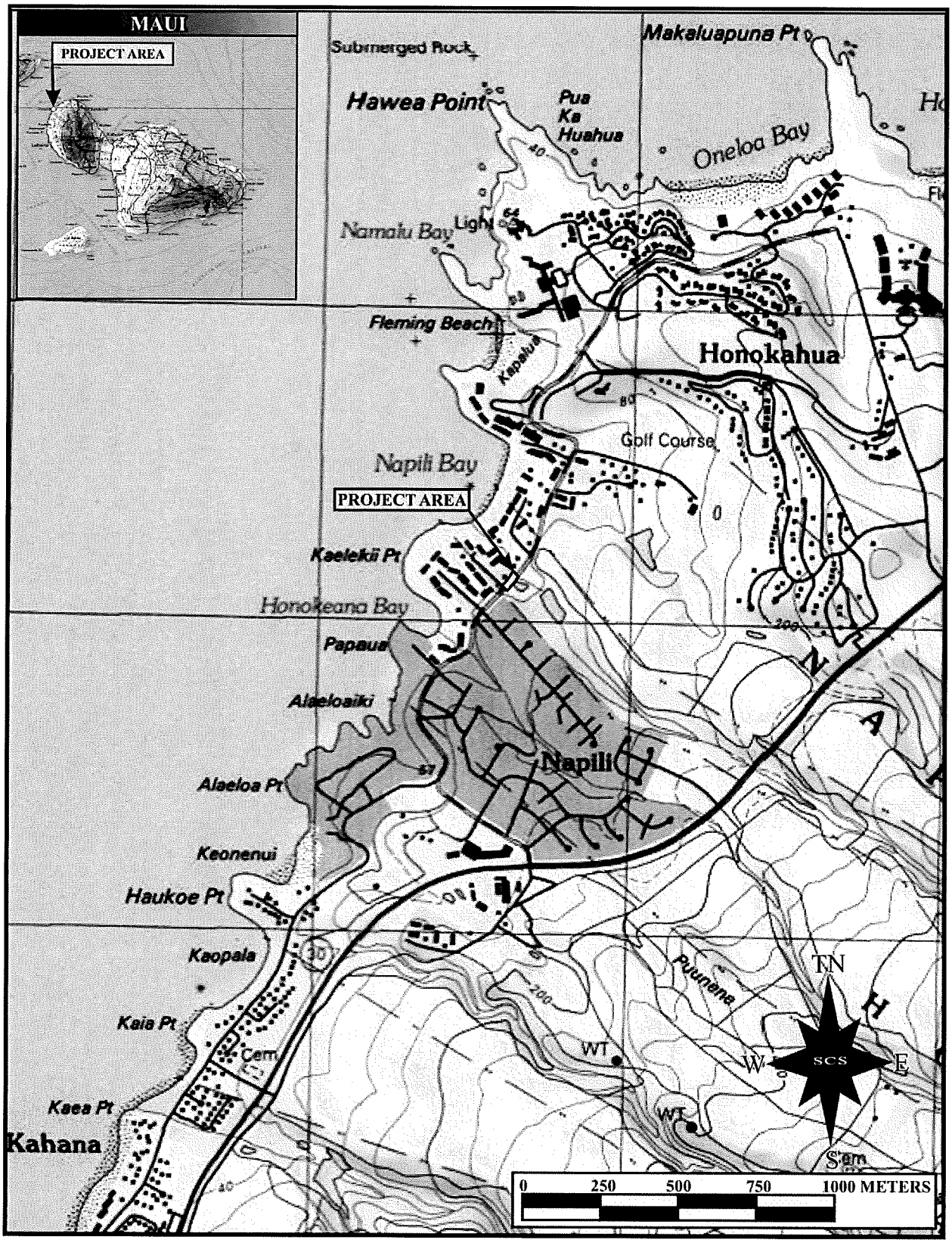


Figure 1: USGS Topographic (Napili 1997; 1:24,000) Map Showing Project Area Location.

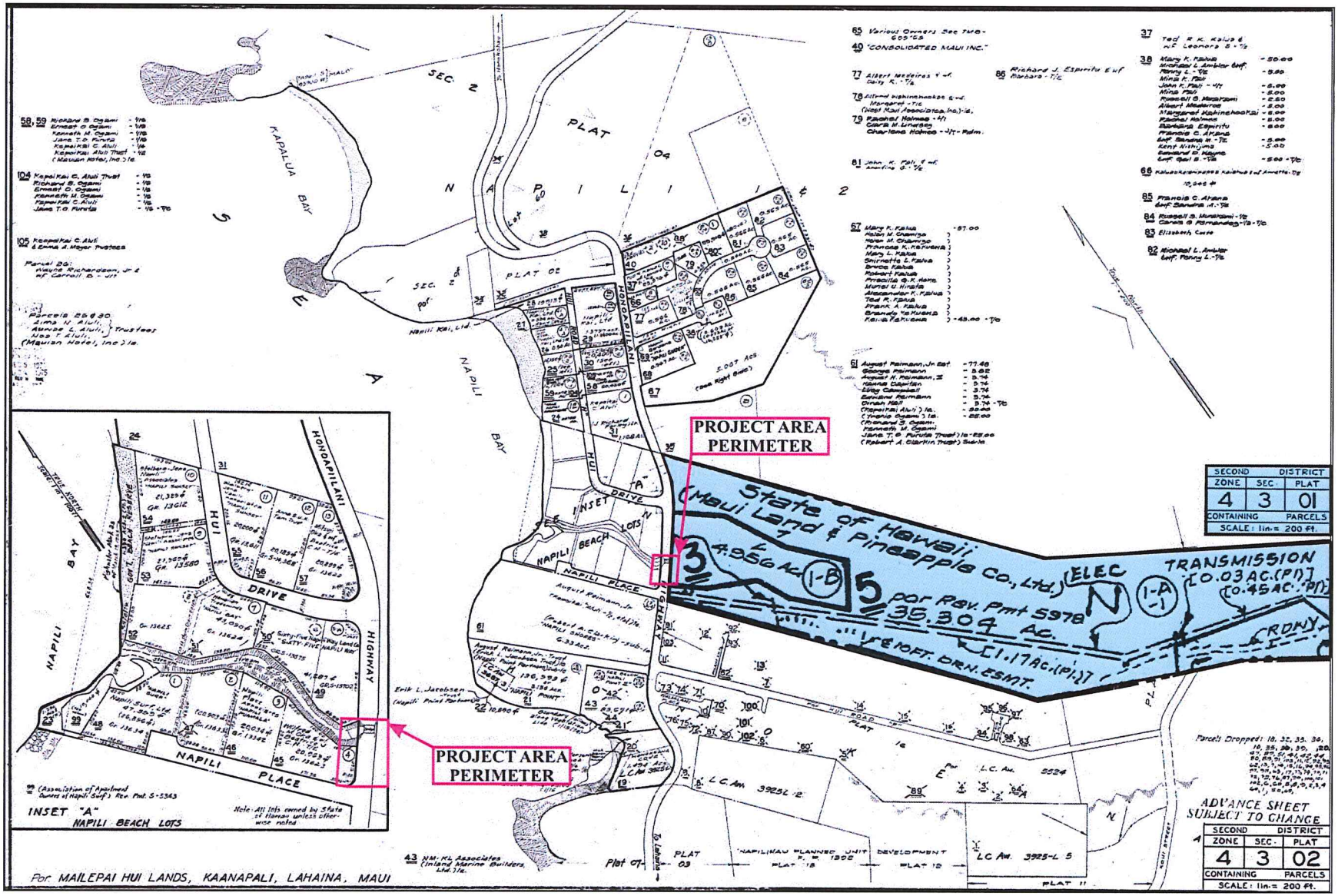


Figure 2: Tax Map Key [TMK: (2) 4-3-001 and 4-3-002) Showing Project Area Location.

Figure 3: Google Earth Satellite Image (Dated 1/12/2013) Showing Project Area Location.

ENVIRONMENTAL SETTING

PROJECT AREA LOCATION

The project area is located along the northwestern coast of the island of Maui, approximately 210 feet (64 meters) inland. More specifically, the project area is located approximately 40 feet above mean sea level (amsl) on portions of lands adjacent to the east and west sides of Lower Honoapiilani Road, between Napili Place and Hui Road, Nāpili 4 and 5 Ahupua`a, Lāhainā (Kā`anapali) District, Island of Maui, Hawai`i [TMK: (2) 4-3-001:003 por., 4-3-002:023 por., 4-3-002:045 por., and the County Right of Way].

PROJECT AREA SOILS

According to Foote *et al.* (1972: Map 92) the project area is located in rough broken and stony land (rRS; Figure 4). Typically, rRS lands are comprised of steep, stony gulches with soil deposits less than 20 inches thick overlying bedrock and stones covering 3 to 2 percent of the ground surface. The rRS soil type occurs between sea level and 3,000 feet amsl in areas receiving 20 to 40 inches of annual rainfall. These areas are known to have rapid run off and active erosion hazard. Rough broken and stony lands are frequently used as ranchlands, wild life habitats, and as watersheds (Foote *et al.* 1972:119).

CLIMATE

Temperatures in this portion of Maui range from the high 50 degrees Fahrenheit, during the winter months, to the high 90 degrees Fahrenheit in the summer (Armstrong *et al.* 1980: 64). According to Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte (2013: Online Rainfall Atlas of Hawai`i. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1), the mean annual rainfall in the project area averages 41.4 inches annually. Typically, most with most of this rainfall occurs during the winter months, between November and March (Armstrong *et al.* 1980: 62).

VEGETATION

As the project area is located within the Lower Honoapi`ilani Road right of way and on adjacent lands. The vegetation within the project area primarily consists of secondary growth. Plants within the project area include *koa haole* (*Leucaena leucocephala*), coconut (*Cocos*

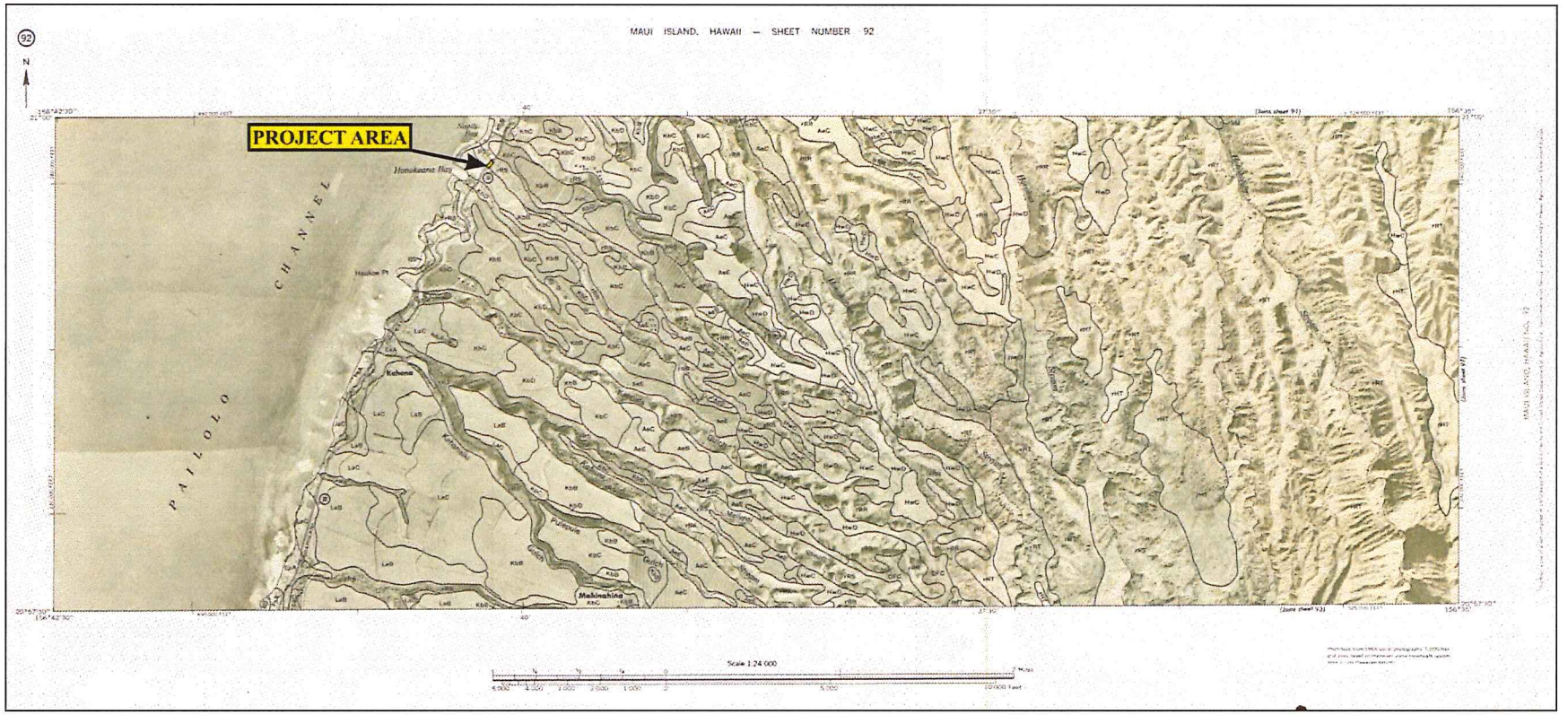


Figure 4: USDA Soil Survey Map (Foote et al. 1972: Sheet 92) Showing Soil Type within Project Area.

nucifera), papaya (*Carica* sp.), *Pothos* sp., *Hibiscus rosa-sinensis*, banana (*Musa* sp.), Octopus tree (*Schefflera actinophylla*), Cook's pine (*Araucaria columnaris*), and various grasses.

CULTURAL HISTORICAL CONTEXT

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu`u Kukui, forming the west end of the island (1,215m above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems that watered fertile agricultural lands extending to the coast. The deep valleys of West Maui Mountains and their associated coastal regions have been witness to many battles in ancient times and were coveted productive landscapes.

PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui's lands into districts (*moku*) and sub-districts was performed by a *kahuna* (priest, expert) named Kalaiha`ōhia, during the time of the *ali`i* Kaka`alaneo (Beckwith 1940:383; Fornander places Kaka`alaneo at the end of the 15th century or the beginning of the 16th century [Fornander 1919-20, Vol. 6:248]). Land was considered the property of the king or *ali`i `ai moku* (the *ali`i* who eats the island/district), which he held in trust for the gods. The title of *ali`i `ai moku* ensured rights and responsibilities pertaining to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka`āinana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku*, *ahupua`a*, *`ili* or *`ili`āina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili `āina* or *`ili* were smaller land divisions next to importance to the *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (*ibid*:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa `āina* residing in a *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located in the *ahupua`a* of Nāpili, which translated literally means "the joinings or *pili* grass" (Pukui *et al.*:163).

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various *ahupua`a*. Traditionally, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*) and *mai`a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *`uala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Between A.D. 600 and A.D. 1100, sometimes referred to as the Developmental Period, the major focus of permanent settlement continued to be the fertile and well-watered windward valleys, such as those in the West Maui Mountains (Kirch 1985).

A general settlement model based on archaeological evidence has been suggested for the Kā`anapali District (Chapman and Kirch 1979; Kirch 1985). This model includes coastal marine foraging and fishing with more upland agricultural pursuits. In typical native Hawaiian fashion, dating at least from the later pre-Contact period (if not earlier), people in this area would have moved between the coast and the upland agricultural fields, exploiting the full range of resources available within their *ahupua`a.* Semi-permanent and permanent habitation probably occurred in both coastal and upland settings.

There are six bays located on Maui's west shore whose names begin with the word *hono*. These bays and coves are collectively known as *Hono a Pi`ilani* (the bays beginning with Hono, ruled by Kihapi`ilani), which referred to a vision predicting the prominence of Kihapi`ilani over his brother, Lonoapi`ilani in ruling Maui in the early 1600s (Clark 1980; Cordy 2000; Manu 1884 in Sterling 1998). Kapalua is situated along this coast between Honokahua and Honokeana. The coastal and marine environments adjacent to the project area would have provided rich resources for traditional subsistence foragers and fishermen in ancient times.

Early archaeological surveys identified seven religious shrines (*heiau*) from Mahinahina to Honokōhau Ahupua`a (Thrum 1909; Walker 1931). No *heiau* were documented in the project area (Nāpili 2–3 Ahupua`a), nor in the adjacent (to the southwest) Honokeana Ahupua`a. The closest *heiau* reported by these early surveys was located in the adjacent (to the east) Honokahua

Ahupua`a (Kahauiki Heiau, Walker Site No. 16), just over 1.0 km northeast of the project area. *Heiau* indicate the presence of political power and the appropriate population to support it.

Traditionally, trails extended from the coast to the mountains, linking the two for both economic and social reasons. Kā`anapali District is noted for an *alaloa* (a path or trail) that reportedly encircled the entire island. Traditional accounts attribute the construction of this trail to the *ali`i* Pi`ilani in the early 1500s. Following the death of Pi`ilani, the construction of the trail was completed by Kiha-a-Pi`ilani, son of Pi`ilani (Ashdown 1970:5). Walker (cited in Sterling 1998:46) wrote:

> The north end of Maui also is traversed by a paved trail. Sections of it can be seen fom Honolua to Honokohau to Kahakuloa. It is paved with beach rocks and has a width of four to six feet...This trail is also spoken of as the Kihapiilani Trail.

A large *luakini heiau* (*heiau* for human sacrifice) that was only built by paramount chiefs, was reportedly located on a cliff on the east side of Honokōhau Valley, some 60 m above the seashore (Honokōhau Ahupua`a, east of the Honokahua Burial Site). Most significantly, Kamakau (in Sterling 1998:55) reported oral history accounts of a 'death pit' at 'Waiuli' (also Honokōhau Ahupua`a), near Honokōhau and Honolua, into which dead commoners from Lahaina to Kahakuloa, as well as Moloka`i, were thrown. He said:

> Waiuli was a death pit wherein the dead bodies of commoners were thrown. . . .At Waiuli directly back of Honkohau, Honolua, and Honokahua is a deep pit which was used as a burial place for bodies of the common people from Lahaina to Kahakuloa. The body of anyone from those regions who died on Moloka`i [*and Lanai*] was brought back and thrown into that pit. . .

A *ko`a* (fishing shrine, Walker Site No. 17), located "[*makai*] to Honolua Park along the shore" (Honolua Ahupua`a), was described by Walker (Sterling 1998:53). He also reported oral history accounts of a *hōlua* (slide or sledding ramp) at Honolua Ahupua`a that was destroyed by the time of his survey (1920s–30s) by commercial agriculture.

Kamakau recounts the results of a war between Kauhi-pumai-kahoaka (or Kauhi-`aimoku-a-Kama) and Kamehameha-nui in 1735, both children of Kekaulike. Alapa`i of Hawai`i Island had joined forces with Kamehameha-nui and a year was spent preparing for the war "which swept the country" (Kamakau 1961:74). Alapa`i tactics included drying up some of

the main streams, which in turn dried up the brooks and taro patches. This reduced food not only for Kahui's forces, but also the *maka`āinana.* His fighting force consisted of 8,440 warriors from all of the six districts of Hawai`i Island (*ibid*). Honokahua and Honolua Bays north of the project area became the gathering place for the forces of Peleioholani who had arrived from O`ahu with only 640 men to assist Kauhi. While attempting to unite its warriors with those of Kauhi, Peleioholani became surrounded by the army of Alapa`i. Kamakau (1961:73-74) recorded:

> The hardest fighting, even compared with that of Napili and at Honokahua in Ka`anapali, took place on the day of the attack at Pu`unēnē [in Honolua]. Pele-io-holani was surrounded on all sides, *mauka* and *makai*, by the forces of Alapa`i, let by Ka-lani-`opu`ū and Keoua. The two ruling chiefs met there again, face to face, to end the war and became friends again, so great had been the slaughter on both sides.

Fornander (1969:142) stated:

> The fortune of the battle swayed back and forth from Honokawai to near into Lahaina; and to this day heaps of human bones and skulls, half buried in various places in the sand, attest the bitterness of the strife and the carnage committed...

EARLY HISTORIC

The traditional district of Kā`anapali, where the project area is located, consisted of five major stream valleys (Honokōwai, Kahana, Honokahua, Honolua, and Honokōhau), all of which were extensively terraced for wet taro (*lo`i*) in early historic and later times (in Honokōhau, well into the 1930s). Honokahua Valley, just east of the project area, was described as having wet taro (*lo`i*) lands, although of no great abundance (according to Handy quoting D.L. Fleming, in Sterling 1998:52). Sweet potatoes were reportedly grown between Honokōhau and Kahakuloa Ahupua`a, presumably on lower *kula* lands and, south of the project area, Kahana Ahupua`a was known as a place of salt gathering for the people of Lāhainā (old spelling for village; Sterling 1998).

Most of the *ahupua`a* on the coast have been overshadowed by the famous roadstead and village that served as the capitol of the Hawaiian Kingdom after the conquest of Kamehameha until 1855. The ethnographic and historic literature, often our only link to the past, reveal that the lands around Lāhainā were rich agricultural areas irrigated by aqueducts originating in well-

watered valleys with permanent occupation predominately on the coast. Crops cultivated included coconut, breadfruit, paper mulberry, banana, taro, sweet potato, sugar cane, and gourds.

THE MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on Western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169–70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners)—if they had been made aware of the procedures—were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and were issued a Royal Patent after which they could take possession of the property (Chinen 1961:16). The *ahupua`a* of Nā pili 1, 2, and 3 were awarded to L. Konia Wahine, the mother of Bernice Pauahi (LCA 05524). There were no other awarded LCAs recorded in the Māhele land books.

HISTORIC LAND USE

An 1831 census estimated the entire population of Kā`anapali District to be 2,982 people, which was reduced to less than half (1,341) only five years later probably due to introduced diseases (Schmitt 1973). Whaling (centered on Lahaina Town) was the first commercial enterprise in West Maui, but it had more or less collapsed by the 1860s. Commercial sugar cane production was the next large capitalist venture in West Maui, starting as early as 1863, and it was focused between Kā`anapali and Lahaina.

The area in and around the project area, which was located at the margins of sugar cane enterprises in West Maui (Dorrance and Morgan 2000), was most important as a center of commercial ranching (cattle raising) and, subsequently, pineapple production.

In the later 19th century, lands in West Maui became part of the Campbell Estate. This was also the time that the Honolua Ranch was first established. Cattle ranching began then and

was continued by Henry Perrine Baldwin, who acquired the lands from the Campbell Estate in 1890 (Fredericksen and Frederickson 2003). In addition to ranching, other early commercial activities included coffee farming.

David T. Fleming became manager of Honolua Ranch in 1911 (or 1912). Fleming was well-versed in pineapple production from the Ha`iku area and gradually began shifting the ranch's initiative to pineapple production. The Honolua Ranch/Baldwin Packers complex shifted from Honolua to Honokahua in 1915, and a pineapple cannery was constructed. A major commercial pineapple industry emerged in West Maui during the 1920s. The plantation communities of Honokahua and Nāpili emerged and developed as Honolua Ranch/Baldwin Packers pineapple operations grew. The population of the Lahaina area increased with the successful economic operations of the pineapple plantation. Baldwin Packers merged with Maui Pineapple Company in 1962 to form Maui Land and Pineapple Company, Inc. After this time, much of the Honolua Ranch lands were converted for resort development, a process that continues to this day. Both the Ritz-Carlton Kapalua and the Residences at Kapalua Bay are part of this ongoing process.

PREVIOUS ARCHAEOLOGY

The following sampling of studies illustrates the types of sites and features that may be encountered in the project area (Figure 5). While not an exhaustive survey of every previous archaeological project in and around the current project area, it does include all major (large-scale) studies. Relevant information from older, classic references can be found above (TRADITIONAL AND HISTORIC SETTING). This section relies on information from the SCS library, Honolulu, and the availability of archaeological reports on file at the State Historic Preservation Division Office, Kapolei.

The first archaeological survey done on Maui was conducted by Winslow Walker in 1930, under the auspices of the Bishop Museum. Walker (1931) focused on monumental sites, mostly coastal *heiau*, during his early survey of Maui. Walker (1931) noted four sites in the general vicinity project area: a destroyed unnamed *heiau* at Kahana point (State Site 50-50-01-12), an unnamed *heiau* that was washed away at Mailepai Point (State Site 50-50-01-13), and the destroyed Hihiho Heiau, which was located along a country road near Kalaeoka`ea Point (State Site 50-50-01-14). Another unnamed *heiau* was located on the bluff between `Alaeloa Point and Papaua Point (State Site 50-50-01-15) (Walker 1931).

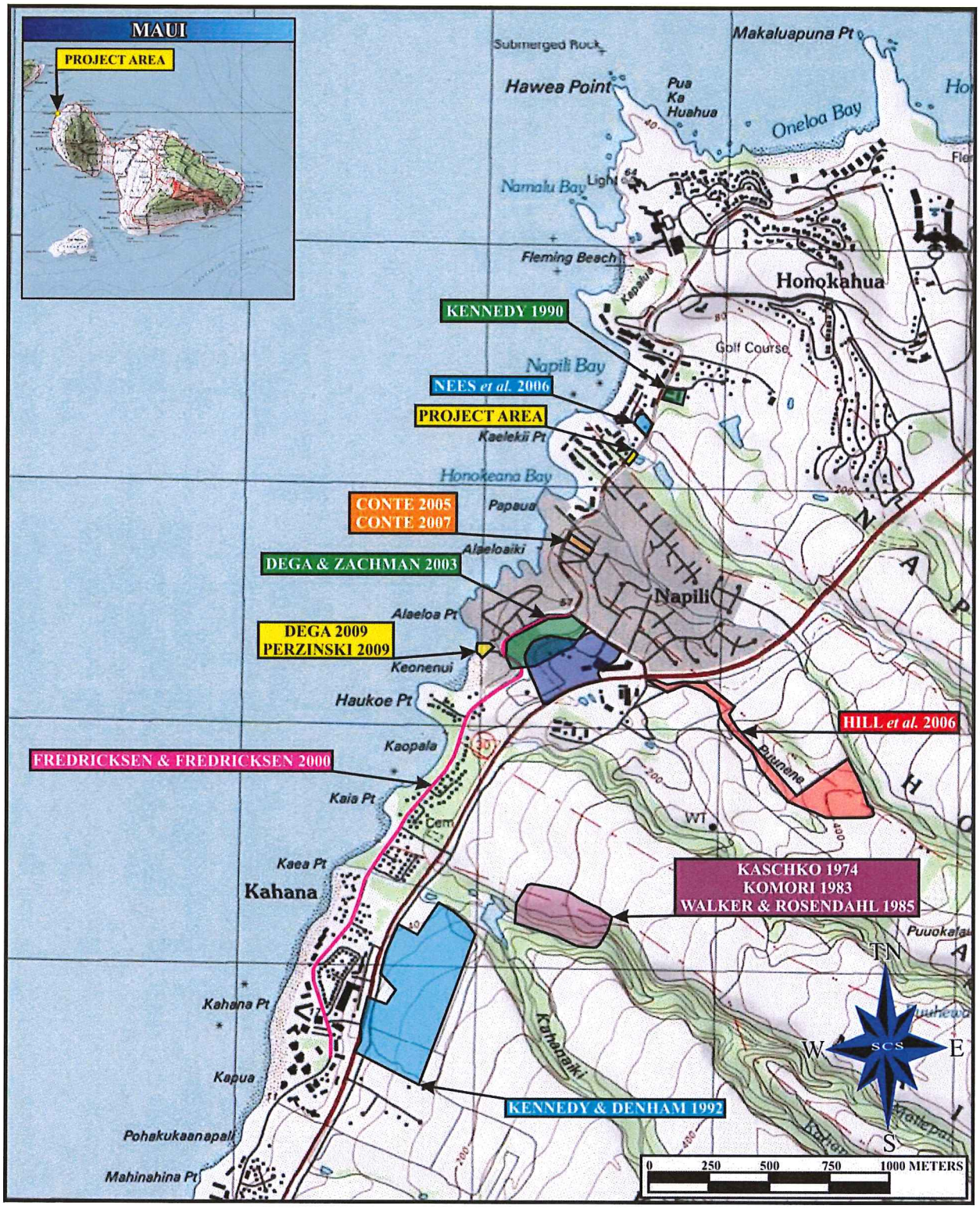


Figure 5: USGS Topographic (Napili 1997; 1:24,000) Map Showing Location of Previous Archaeological Studies.

A fair number of archaeological investigations have been conducted over the years in the Nāpili area,Lāhainā District, island of Maui, resulting almost unanimously in the documentation of both pre- Contact and Historic Period deposits. The majority of these cultural deposits were identified as human burials, habitation plots, and refuse pits. Classes of artifacts and midden found in association with these features included coral abraders, basalt flakes, volcanic glass debitage, and marine shell debris.

In 1973 the Bishop Museum (Kirch 1973a) conducted archaeological research at Hāwea Point, Lāhainā District. A site complex (State Site 50-50-01-1346) comprised of eight features was identified and recorded. State Site 50-50-01-1346 was interpreted as a temporary Hawaiian settlement for marine exploitation and was dated to *c.* A.D. 1500. A total of 4.0 m^2 was excavated State Site 50-50-01-1346. Several formal tools were recovered in excavation, including one unfinished bone fishhook, one bone fishhook blank, one shell adze fragment, ten coral abraders, one sea urchin abrader, and three dog tooth ornaments. Midden was recovered from the surface and from excavation, and consisted of marine shells, sea urchins, fish bone, and *kukui* nut shell (*Aleurites moluccana*). One radiocarbon determination of 327 ± 80 B.P. was obtained for a buried *imu* (cooking pit). Calibration yielded three possible calendric dates, indicating a maximum (*i.e.,* conservative) range for occupation of the site of between roughly A.D. 1400 and 1700.

Bishop Museum conducted a subsequent archaeological survey of the Honolua Development (Kirch 1973b) during which nine archaeological sites were identified, including a cave shelter on the cliff face of Hāwea Point (Site 50-50-01-1347) and a stone terrace platform, which was located on a promontory overlooking Oneloa Bay (Site 50-50-01-1348). During this survey the Honokahua Burial Site (Site 50-50-01-1342) was first recorded. Several additional sites were located by Kirch at Fleming Beach Park along Honokahua Stream; these included a house site, terrace, enclosure, and midden deposits (Site 50-50-01-1345).

Walker and Rosendahl (1985) conducted archaeological testing of 3.7 acres of land located in Kahana Ahupua`a, Lāhainā District [TMK: (2) 4-3-001] prior to the construction of a desilting basin. The scope of the survey included focusing on the previously identified Bishop Museum Sites 50-MA-D10-4, 50-MA-D10-5, and 50-MA-D10-6 (Komori 1983). The survey resulted in the re-interpretation of the function of these sites. Based on their findings, Walker and Rosendahl (1985) re-interpreted the sites as pre-Contact inland agricultural area that had been re-used during the Historic Period for commercial sugarcane and pineapple cultivation

Kennedy (1990) conducted an archaeological inventory survey of TMK: (2) 4-3-002:068 and 069, located at Napili, Lāhainā District, island of Maui. No historic properties were identified

Archaeological Consultants of Hawaii, Hale`iwa (Kennedy and Denham 1992) conducted an archaeological inventory survey, with subsurface testing, of 50 acres located at TMK: (2) 4-3-001; 031, Kahana Ahupua`a, Lāhainā District, Maui Island. Two historic properties were identified during the inventory survey. State Site 50-50-03-2878, a two-tiered platform, which contained a traditional-type burial associated with the late pre-Contact/early-post-Contact Period. State Site 50-50-03-2879, a petroglyph boulder, was interpreted as re-located to its current site at an undetermined time when the sugar cane fields were being cleared.

Archaeological Consultants of Hawaii, Hale`iwa (Kennedy *et al.* 1992) conducted an archaeological inventory survey, with subsurface testing, at TMK: (2) 4-3-003:108 and 110, `Alaeloa Ahupua`a, Lāhainā District, Maui Island. No historic properties were identified.

Xamanek Researches (Fredericksen and Fredericksen 2009) conducted an archaeological inventory survey of approximately 1.4 miles along the Lower Honoapi`ilani Road improvements corridor locate in [TMK: (2) 4-3-003; 4-3-005; 4-3-010; and 4-3-015, Lāhainā District, Maui Island. Three historic properties were identified during the survey. State Site 50-50-03-4797, pre-Contact habitation site which yielded a radiocarbon date of 1420 to 1660AD; -4798, a retaining wall and shoulder barrier wall associated with the construction of Lower Honoapi`ilani Road; and -4799, a retaining wall associated with the construction of Lower Honoapi`ilani Road.

Scientific Consultant Services, Inc. (Dega and Zachman 2003) conducted Archaeological Inventory Survey in advance of residential development on a 2.57-acre parcel in Napili, Alaeloa Ahupua`a, Lāhainā (formerly Ka`anapali) District, Island of Maui, Hawai`i (TMK 4-3-003:025). No historic properties were identified

CRM Solutions Hawai`i, Inc. (Conte 2005) conducted an archaeological inventory survey of 0.779 acres of land located at 5190 Lower Honoapi`ilani Road Mailepai Ahupua`a, Lāhainā District, Maui Island [TMK: (2) 4-3-003:043]. No historic properties were identified. Subsequently, CRM Solutions Hawai`i, Inc. (Conte 2007) conducted a program of archaeological monitoring during off-site construction related to TMK: (2) 4-3-003:043, Mailepai Ahupua`a, Lāhainā District, Maui Island. No historic properties were identified.

Pacific Consulting Services, Inc. (Nees *et al.* 2006) conducted an archaeological inventory survey-level investigation of two adjacent lots in Nāpili, Nāpili 4-5 Ahupua`a, Lāhainā (formerly Ka`anapali) District, Maui. No historic properties were identified.

Cultural Surveys Hawai`i, Inc. (Hill *et al.* 2006) conducted an archaeological inventory survey-level investigation of a 12.26 acre subdivision in `Alaloa and Honokeana Ahupua`a, Lāhainā District, Maui [TMK: (2) 4-3-004:011 and 4-3-001:028]. No historic properties were identified.

Subsequently, CRM Solutions Hawai`i, Inc. (Conte 2007) conducted a program of archaeological monitoring during off-site construction related to TMK: (2) 4-3-003:043 (Mailepai Hui Land Lots 51-C-4-A, B, and C), Lāhainā District, Maui Island. No historic properties were identified.

Following an informal archaeological field inspection, Scientific Consultant Services, Inc. (Dega 2009) conducted a program of archeological monitoring on a 0.29 Acre Parcel in Nāpili, `Alaeloa Ahupua`a, Lāhainā District, Maui Island, Hawai`i [TMK: (2) 4-3-003:096]. No historic properties were identified.

FIELDWORK EXPECTATIONS

In sum, Archaeological Monitoring may lead to the identification of intact or previously disturbed pre- Contact Period cultural deposits associated with temporary or permanent habitation areas, human skeletal remains (isolated find spots or *in situ*, articulated individuals), and Historic Period cultural deposits associated with the Planation Era.

MONITORING RATIONAL

The criteria used for determining the need for Archaeological Monitoring was based on the soil type present in the project area and by the findings of previous Archaeological Monitoring investigations. Based on the findings of previous archaeological studies conducted in the vicinity the current project area has the potential for yielding intact or previously disturbed cultural materials including, human skeletal remains; pre-Contact Traditional-type, and Plantationm Era cultural deposits in subsurface contextd. Thus, a program of Archaeological Monitoring will be conducted of the current project area in order to identify, document, and record any historic propeties inadvertently identified, and to provide appropriate mitigation methods, as necessary.

POTENTIAL SITE TYPES TO BE ENCOUNTERED

Based on all available background information (*i.e.,* project area location, history, and archaeology), expected findings in of this Archaeological Monitoring program include:

(1) There is a low probability of the inadvertent finding of intact or previously disturbed traditional Native Hawaiian burials.

(2) There is a low to moderate probability of finding subsurface evidence of traditional Native Hawaiian activities including: hearths, postholes, midden deposits, and other occupation debris (*e.g.,* stone tool waste, discarded fishing gear).

(3) There is a moderate to high probability of finding subsurface evidence of encountering Historic Plantation Era cultural materials associated with agricultural and habitation activities.

MONITORING CONVENTIONS AND METHODOLOGY

This Archaeological Monitoring Plan has been outlined in accordance with the DLNR/SHPD Administrative rules governing standards for Archaeological Monitoring (HAR §13-279). The CRM firm conducting the archaeological monitoring program will use the following guidelines during monitoring of the Napili Culvert Replacement project:

1. The presence of a qualified archaeologist will be required to monitor construction activities within the project parcel on a full-time/on-site basis. These activities include any disturbance of the original ground surface including subsurface excavations, excavations for utilities, and the like.

2. When cultural materials or isolated features are identified, excavation will cease in the area of the find so that the monitoring archaeologist is able to sample and record all necessary information. Documentation will include stratigraphic profile maps, photos, artifact and sample collections, and locational mapping. In the event that recording has not been completed by the end of the work shift, the area will be temporarily non-accessible until recording is complete.

3. If an archaeological site, or multiple features indicating a site, is encountered within the project corridor, the monitoring archaeologist will consult with the SHPD to determine the necessary course of action. If extensive recording or other intensive tasks are required, additional archaeologists may be brought in to expedite the work.

4. If additional archaeological field personnel are required, the Archaeological Monitor will notify SHPD and the client before the additional field personnel are brought to the project.

5. If human burials are encountered, work will cease in the vicinity and the area will be secured from further activity. The SHPD office will be immediately notified and procedures from Hawai`i Revised Statutes (HRS), Chapter 6e, Section 43 and Administrative Rules Chapter 13-300 shall be followed. HRS 6.E-43.6, Procedures Relating to Inadvertent Discoveries, will be complied with if the remains are to be removed.

6. To ensure that the construction crew is aware of this Monitoring Plan, a coordination meeting will be held with the construction team and monitoring archaeologist prior to initiation of the project. The construction crew will be informed as to the possible presence of human burials, and how to proceed if they observe such remains. The archaeologist shall emphasize that all historic finds, including objects such as bottles, are the property of the landowner and may not be taken or otherwise disposed of without the written consent of the landowner in consultation with the State Historic Preservation Division. At this time it will be made clear that the archaeologist must be on site for all ground disturbance activities.

7. The Archaeological Monitor will provide all coordination with the contractor, State Historic Preservation Division, and other agencies involved in the project.

8. As necessary, the archaeological monitor will provide verbal reports will be made to the SHPD and any other agencies requested.

9. An acceptable report documenting the results of the fieldwork shall be prepared for submittal to the State Historic Preservation Division no later than 180 days after the completion of fieldwork.

LABORATORY ANALYSIS

All retrieved artifact samples collected during the project will be cleaned, sorted, and analyzed in appropriate facilities. Representative artifacts will be photographed, and classified (qualitative analysis), and all metric measurements and weights will be recorded (quantitative analysis). All representative plan view sketches and profiles illustrating the location and morphology of identified sites/features/deposits and stratigraphic profiles will be drafted in the office of the contracted archaeological firm. All data was recorded on standard laboratory forms which also include number and weight (as appropriate) of each constituent category. Collected samples amenable to dating will be submitted for specialized radiocarbon analysis. While primary emphasis for radiocarbon dating is placed on charcoal samples, the use of other materials such as marine shell or non-human bone materials is not precluded.

CURATION

If requested by the landowner, the archaeological consultants will curate all recovered materials in the office of the contracted archaeological firm (except human remains and associated burial items) until a permanent, more suitable curation locale is identified. The landowner(s) may request to curate all recovered materials once analysis has been completed.

REPORTING

An Archaeological Monitoring Report documenting the project findings and interpretation, following SHPD guidelines for Archaeological Monitoring reports, will be submitted within 180 days of the completion of fieldwork. This time line is requested to account for any radiocarbon age determinations (typically 60 days), if necessary.

If cultural features or deposits are identified during fieldwork, the sites will be evaluated for historical significance and assessed under State and Federal Significance Criteria. The Archaeological Monitoring report will be drafted until accepted by SHPD and will be submitted to both SHPD and to the client.

REFERENCES

Armstrong, R.W. (Editor)
1980 *Atlas of Hawaii*, 2nd Edition. The University of Hawaii Press, Honolulu.

Ashdown, Inez
1970 *Ke Alaloa O Maui: The Broad Highway of Maui*. Ulupalakua.

Beaglehole, John, Ed.
1967 *The Journals of Captain James Cook on his Voyages of Discovery*. Vol 3. *The Voyage of the Resolution and Discovery, 1776-1780*. Cambridge: Hakluyt Society, Cambridge University Press: London.

Beckwith, Martha
1940 *Hawaiian Mythology*. The University of Hawaii. Honolulu.

Chapman P.S. and P.V. Kirch
1979 *Archaeological excavations at seven sites, southeast Maui. Hawaiian Islands.* Department of Anthropology Report Series 79-1, Bernice Pauahi Bishop Museum, Honolulu.

Chinen, Jon
1961 Original Land Titles in Hawaii. Copyright 1961 Jon Jitsuzo Chinen. Library of Congress Catalogue Card No. 61-17314.

Clark, John
1980 *The Beaches of Maui County*. A Kolowalu Book, University Press of Hawaii: Honolulu.

Condé, Jesse, and Gerald Best
1973 *Sugar Trains, Narrow Gauge Rails of Hawaii*. Glenwood Publishers: Felton, California.

Conte, Patty J.
2001 2005 Archaeological Assessment Report for TMK: (2) 4-3-003:043 *Mailepai Ahupua`a, Lāhainā District, Island of Maui.* CRM Solutions Hawai`i, Inc., Makawao. On file at the State Historic Preservation Division, Kapolei.

2007 *Archaeological Monitoring Report for Off-Site Construction Related to TMK (2) 4-3-003:043 (Mailepai Hui Land Lots 51 C-4-A, B, and C), Mailepai Ahupua`a, Lāhainā District Island of Maui.* CRM Solutions Hawai`i, Inc., Makawao. On file at the State Historic Preservation Division, Kapolei.

Cordy, Ross
2000 *Exalted Sits the Chief.* Mutual Publishing: Honolulu.

County of Maui i County Real Property Assessment Division
2015 www.qpublic.net/hi/**maui**/index.html. Accessed October 2015.

Daws, G.
1968 *Shoal of Time: History of the Hawaiian Islands.* University of Hawai`i Press. Honolulu.

Dega, Michael F.
2009 *Archaeological Monitoring Report for a 0.29 Acre Parcel in Nāpili, `Alaeloa Ahupua`a, Lahaina District, Maui Island, Hawai`i [TMK (2) 4-3-003:096].* Scientific Consultant Services, Inc., Honolulu.

Dega, Michael F. and John Zachman
2003 *Archaeological Inventory Survey on a Parcel in Napili Alaeloa Ahupua`a, Kaanapali District, Maui Island, Hawai`i [TMK:4-3-003:025].* Scientific Consultant Services, Inc., Honolulu.

Dorrance, W.H., and F.F. Morgan
2000 *Sugar Islands.* Mutual Publishing, Honolulu.

Fornander, Abraham
1969 *An Account of the Polynesian Race, Its Origins and Migrations*. Vol. 1 to 3. Charles E. Tuttle Co. Inc.: Jutland.

1919 *Hawaiian Antiquities and Folklore*. Bishop Museum Press: Honolulu.

Foote, D.E., E.L. Hill, S. Nakamura, and F. Stephens
1972 *Soil Survey of the Islands of Kaua`i, O`ahu, Maui, Molokai, and Lanai, State of Hawai'i.* USDA Soil Conservation Service, GPO, Washington, DC.

Fredericksen, E.M.
2002 *Archaeological Monitoring Report for the Coconut Grove Development (Site 29), Honokahua and Napili 2-3* Ahupua`a, *Lahaina District, Island of Maui (TMK: 4-2-04:26).* Xamanek Researches, Pukalani. On file at the State Historic Preservation Division, Kapolei.

Fredericksen E.M. and D.L. Fredericksen
2003 2000 *An Archaeological Inventory Survey of the Lower Honoapi`ilani Road Improvements Corridor (TMK 4-3-03; 4-3-05; 4-3-10; 4-3-15) Lahaina, Maui Island.* Xamanek Researches, Pukalani. On file at the State Historic Preservation Division, Kapolei.

Fredericksen, D.L. and E.E. Fredericksen
2004 2003 *An Archaeological Inventory Survey of a Portion of Land in Napili 2-3 Ahupua`a, Lahaina District, Island of Maui (TMK: 4-2-07 parcels 07 and 08).* Xamanek Researches, Pukalani. On file at the State Historic Preservation Division, Kapolei.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte
2013 *Online Rainfall Atlas of Hawai`i.* Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1. Accessed October 2015.

Handy, E.S.C.
1940 *The Hawaiian Planter—Volume 1: His Plants, Methods, and Areas of Cultivation.* B.P. Bishop Museum Press, Honolulu.

Hill, Robert R., Colleen P.M. Dagan, and Hallett H. Hammatt
2006 *An Archaeological Assessment of a 12.26 Acre Proposed Subdivision, `Alaeloa and Honokeana Ahupua`a, Lahaina District, Maui Island, Parcel TML: (2) 4-3-004:001, Roadway TMK: (2) 4-3-001:028.* Cultural Surveys Hawai`i, Inc., Kailua.

Kamakau, Samuel
1961 *Ruling Chiefs of Hawaii.* The Kamehameha Schools Press: Honolulu.

Kame`eleihiwa, Lilikalā
1992 *Native Land and Foreign Desires: Pehea La E Pono Ai?* Bishop Museum Press. Honolulu.

Kaschko, Michael W.
1974 *Archaeological Walk-Through Survey of Specified Areas in the Wailuku Flood Prevention Project and the Honolua Watershed, Maui.* Bernice Pauahi Bishop Museum, Honolulu.

Kelly, Marion
1983 *Nā Māla o Kona: Gardens of Kona.* Dept. of Anthropology Report Series 83-2. Bishop Museum. Honolulu.

1998 A Gunboat Diplomacy, Sandalwood Lust and National Debt. In *Ka Wai Ola o OHA,* Vol. 15, No. 4, April 1998.

Kennedy, Joseph
1990 *Archaeological Inventory Survey of TMK: 4-3-02:68 and 69.* Archaeological Consultants of Hawaii, Hale`iwa.

Kennedy, Joseph and Tim Denham
1992 *Archaeological Inventory Survey and Subsurface Testing Report fro TMK: 4-3-01:32, Located at Kahana, Ahupua`a, Island of Maui.* Archaeological Consultants of Hawaii, Hale`iwa.

Kennedy, J., L. Reintsema, P.J. Trimble, and M.A. Maigret
1992 *Archaeological Inventory Survey with Subsurface Testing for a Property Located at TMK: 4-3-03:108 and 110, `Alaeloa Ahupua`a, Lahaina District, On the Island of Maui.* Archaeological Consultants of Hawaii, Hale`iwa.

Kirch, Patrick
1973a *Archaeological Excavations at Site D13-1, Hawea Point, Maui, Hawaiian Islands.* Department of Anthropology Bernice Pauahi Bishop Museum, Honolulu.

1973b *Archaeological Survey of the Honolua Development Area, Maui*. Bernice Pauahi Bishop Museum, Honolulu.

1985 *Feathered Gods and Fishhooks*. University of Hawaii Press: Honolulu.

2011 "When Did the Polynesians Settle Hawai`i? A Review of 150 Years of Scholarly Inquiry and a Tentative Answer." University of California, Berkley. Printed in *Hawaiian Archaeology* 2011.

Kirch, Patrick and Marshal Sahlins
1992 *Anahulu: The Anthropology of History in the Kingdom of Hawaii.* 2 volumes. University of Chicago Press, Chicago.

Komori, Eric
1983 *Archaeological Investigations at Kahana Gulch, Lahaina District.* Bernice Pauahi Bishop Museum, Honolulu.

Kuykendall, R.S.
1938 *The Hawaiian Kingdom*. Vol. 1. University of Hawai`i Press. Honolulu.

Lucas, Paul F. Nahoa
1995 *A Dictionary of Hawaiian Legal Land-terms*. Native Hawaiian Legal Corporation. University of Hawai`i Committee for the Preservation and Study of Hawaiian Language, Art and Culture.. University of Hawai`i Press.

Lyons, C.J.
1875 Land Matters in Hawaii. *The Islander*, Vol. 1. Honolulu.

Pukui, Mary Kawena and Samuel H. Elbert
1986 *Hawaiian Dictionary*. University of Hawaii Press, Honolulu.

Menzies, Archibald
1928 *Hawaii New, 128 Years ago*. W.F. Wilson, ed. New Freedom Publishers: Honolulu.

Moffat, Riley M. and Gary L. Fitzpatrick
1995 *Surveying the Mahele*. An Editions Limited Book. Honolulu.

Nees, R.C., R., Yamasato, S .D. Clark, and D. Gosser
2005 2006 *Archaeological Assessment for Two Adjacent Lots in Nāpili, Nāpili 4 and 4 Ahupua`a, Ka`anapali District, Island of Maui, TMK: 4-3-02:056 and 057.* Pacific Consulting Services, Inc., Honolulu. On file at the State Historic Preservation Division, Kapolei.

Pukui, Mary Kawena, Samuel Elbert, Esther Mookini
1974 *Place Names of Hawaii*. University of Hawai`i Press: Honolulu.

Schmitt, Robert C.
1973 *The Missionary Census of Hawaii*. Pacific Anthropological Records No. 20. Department of Anthropology Bernice Pauahi Bishop Museum, Honolulu.

Speakman, Cummins
1978 *Mowee, An Informal History of the Hawaiian Island*. Cal Central Press: San Francisco.

State Historic Preservation Division
2002a *Hawaii Administrative Rules Title 13 DLNR, Subtitle 13 SHPD Rules Chapter 279 Rules Governing Minimal Standards for Archaeological Monitoring Studies and Reports.*

2002b *Hawaii Administrative Rules Title 13 DLNR, Subtitle 13 SHPD Rules Chapter 300 Rules Governing Inadvertent Discovery of Human Remains.*

Sterling, E.P.
1998 *Sites of Maui*. Bishop Museum Press, Honolulu.

Stoddard, Charles Warren
1894 *Hawaiian Life: Being Lazy Letters from Low Latitudes*. F.T. Neely, 1894: Chicago.

Thrum, T.G.
1909 Heiau and heiau sites throughout the Hawaiian Islands: Hawaiian, Honolulu.

United States Geological Survey
1997 Napili Quadrangle, Hawaii. 1:24,000. 7.5 Minute Series. Washington D.C.

Vancouver, George

1984 *A Voyage of Discovery to the North Pacific Ocean and Round the World 1791-1795*. Kaye Lamb, ed. The Hakluyt Society. Cambridge University Press: London.

Waihona `Aina Corporation
2015 Website: http://www.waihona.com. Accessed October 2015.

Walker, A.T. and P.H. Rosendahl
2006 1985 *Testing of Cultural Remains Associated with the Kahana Desilting Basin, Honolua Watershed, Land of Kahana, Lahaina District, County of Maui, Hawaii (TMK: 2-4-3-01).* Paul H. Rosendahl, Inc. Hilo. On file at the State Historic Preservation Division, Kapolei.

Walker, W.M.
1931 Archaeology of Maui. Manuscript. Department of Anthropology, B.P. Bishop Museum, Honolulu.

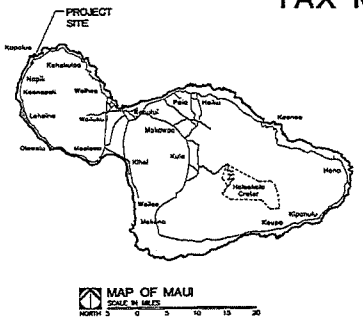
APPENDIX A: CONCEPTUAL SECTION VIEW DRAWINGS

NAPILI 4/5 CULVERT REPLACEMENT

JOB NO. 15-19

TAX MAP KEY (2) 4-3-001:003 AND 4-3-002:023

NAPILI, MAUI, HAWAII

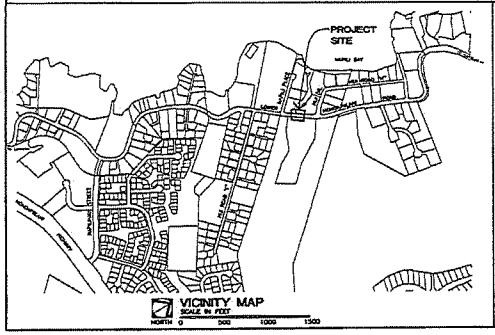


PREPARED FOR:

DEPARTMENT OF PUBLIC WORKS
COUNTY OF MAUI
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

PREPARED BY:

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203 • Wailuku, Hawaii 96793



APPROVALS:

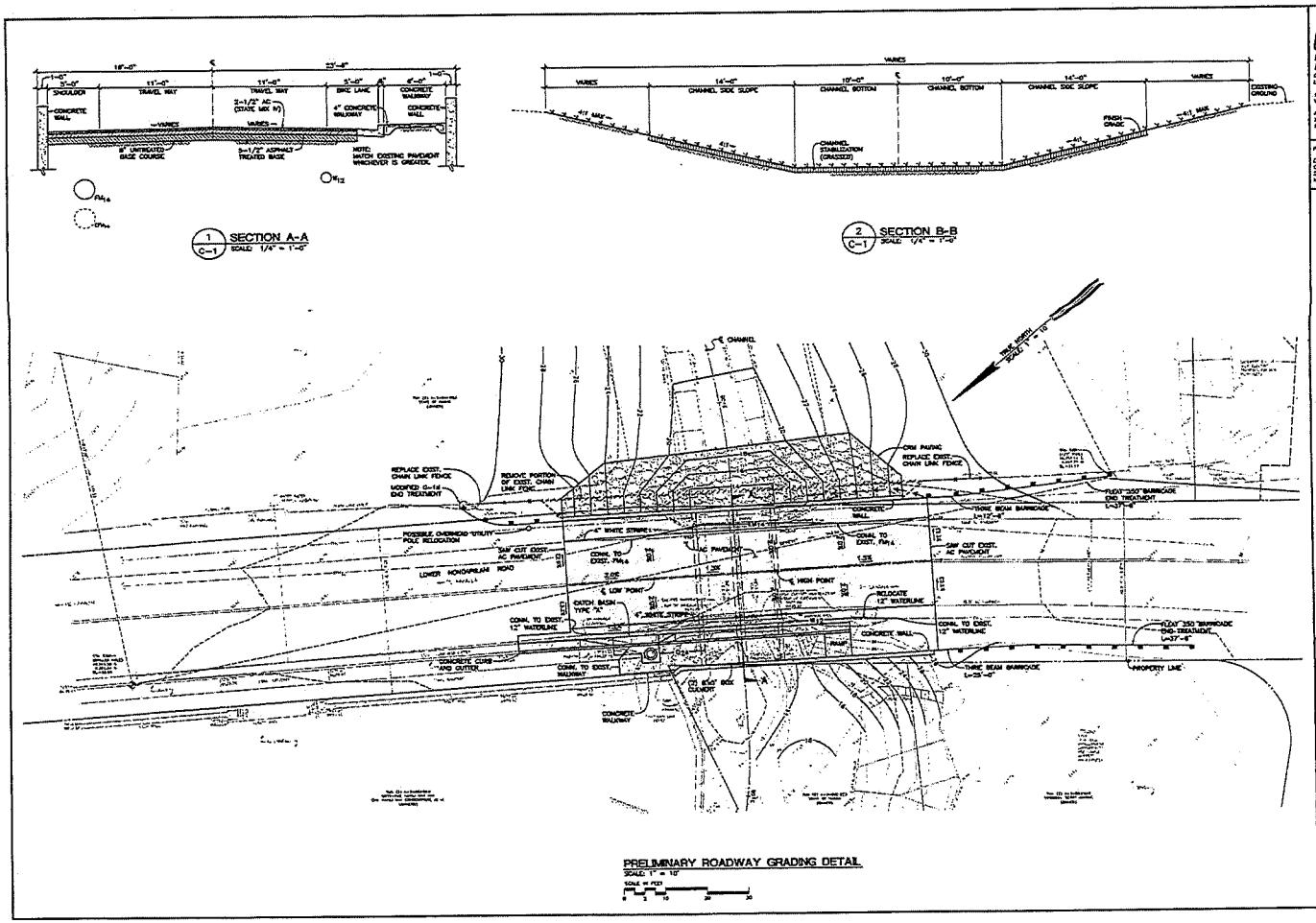
_____ DATE
DIRECTOR,
DEPARTMENT OF PUBLIC WORKS
COUNTY OF MAUI
(APPROVAL GRANTED FOR WORK WITHIN COUNTY RIGHT-OF-WAY)

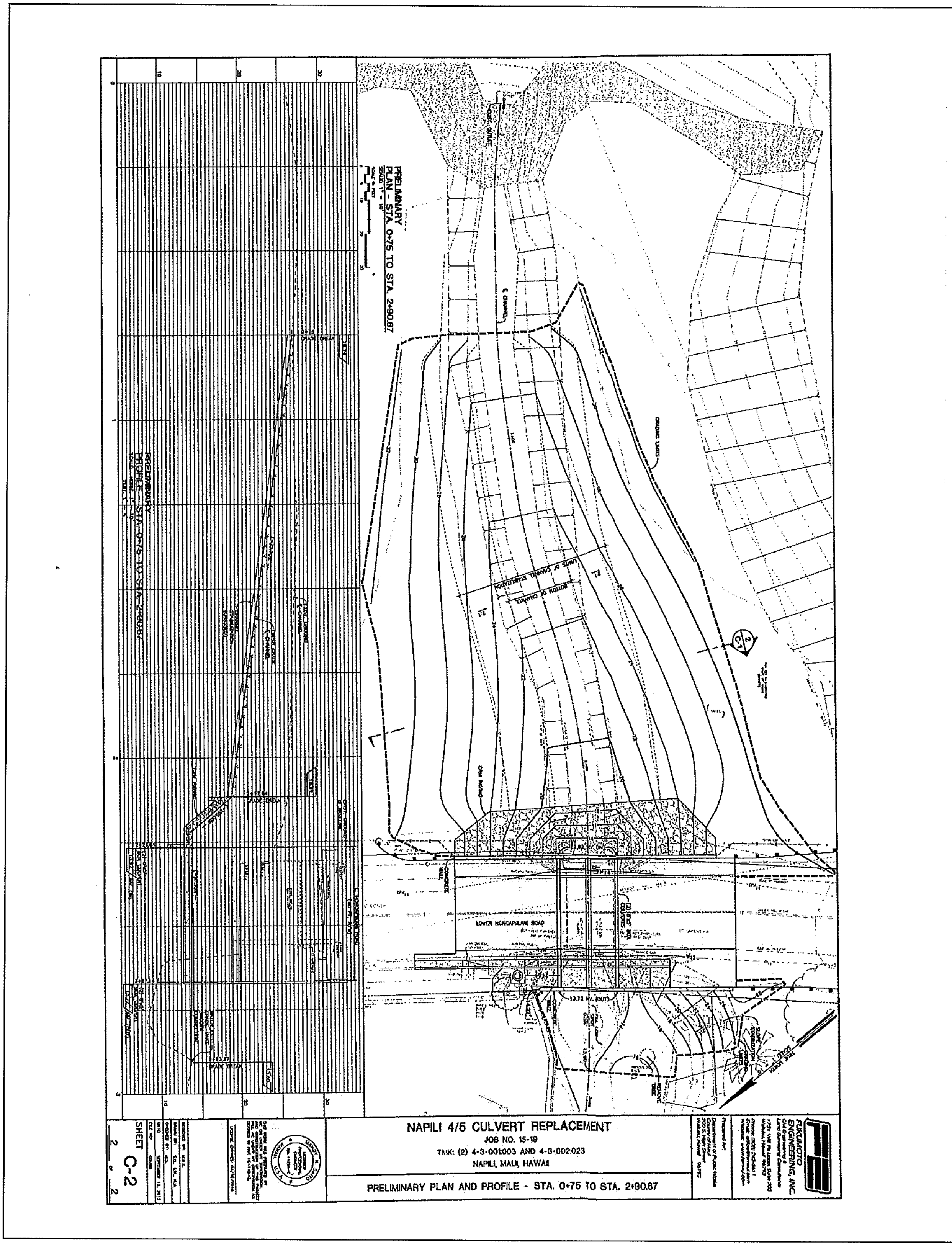
_____ DATE
DIRECTOR, DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
(APPROVAL LIMITED TO WATER IMPROVEMENTS WHICH WILL BE DEDICATED TO THE DEPARTMENT OF WATER SUPPLY)

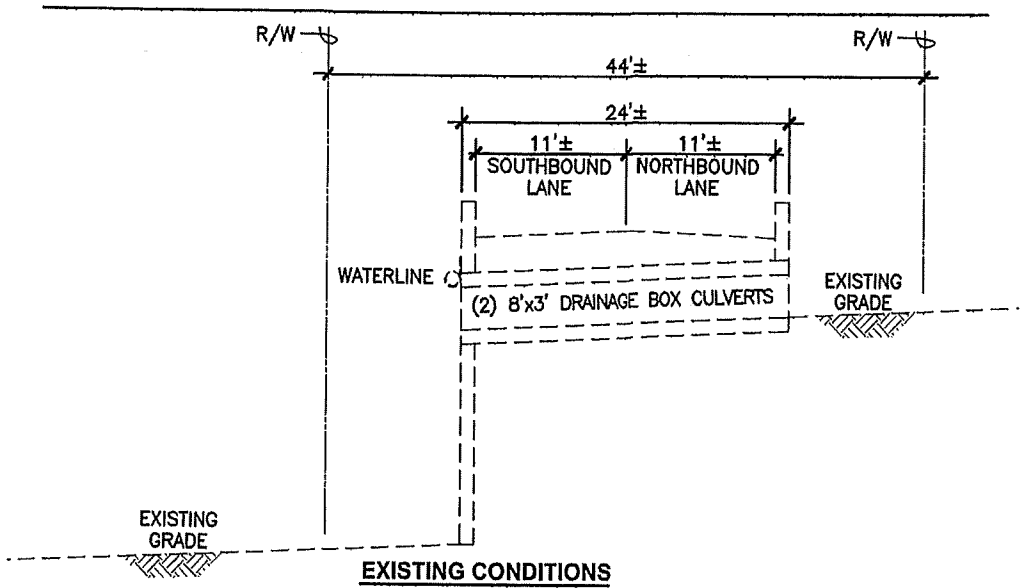
INDEX OF DRAWINGS

SHT.	SHT. NO.	DESCRIPTION
1	T-1	TITLE SHEET
2	C-1	CONSTRUCTION NOTES
3	C-2	GENERAL PLAN
4	C-3	EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN, AND DETAILS – 1
5	C-4	ROADWAY PLAN – 1
6	C-5	ROADWAY PLAN – 2
7	C-6	ROADWAY PLAN – 3
8	C-7	ROADWAY GRADING DETAIL AND SECTIONS
9	C-8	TYPICAL ROAD SECTION AND CULVERT PROFILE
10	C-9	SIGNAGE AND STRIPING PLAN
11	C-10	SCHEMATIC ROAD CLOSURE PLAN
12	C-11	MISCELLANEOUS DETAILS – 1
13	C-12	MISCELLANEOUS DETAILS – 2
14	C-13	MISCELLANEOUS DETAILS – 3

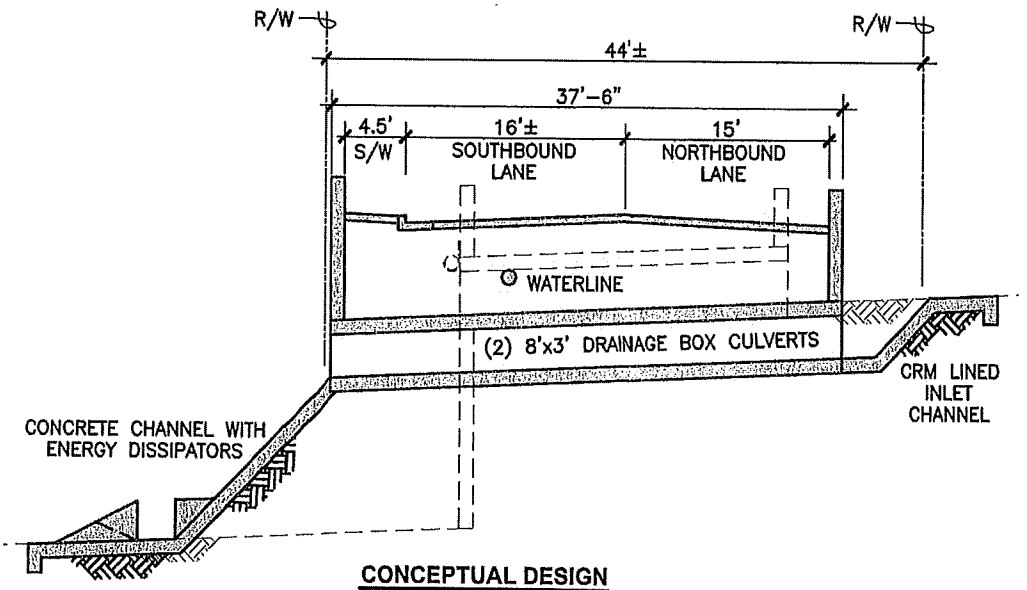
SHEET T-1 OF 9 SHEETS


SECTION A-A
SECTION B-B
PRELIMINARY ROADWAY GRADING DETAIL
NAPILI 4/6 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII
PRELIMINARY ROADWAY GRADING DETAIL AND SECTIONS
FUKUMOTO ENGINEERING, INC.
SHEET C-1


NAPILI 4/5 CULVERT REPLACEMENT
JOB NO. 15-19
TMK: (2) 4-3-001:003 AND 4-3-002:023
NAPILI, MAUI, HAWAII
PRELIMINARY PLAN AND PROFILE - STA. 0+75 TO STA. 2+90.87
FUKUMOTO ENGINEERING, INC.
SHEET
C-2
2 of 2
LOWER HONOAPIILANI ROAD



EXISTING CONDITIONS
SCALE: 1" = 10'



CONCEPTUAL DESIGN
SCALE: 1" = 10'

NAPILI CULVERT CONCEPTUAL DESIGN

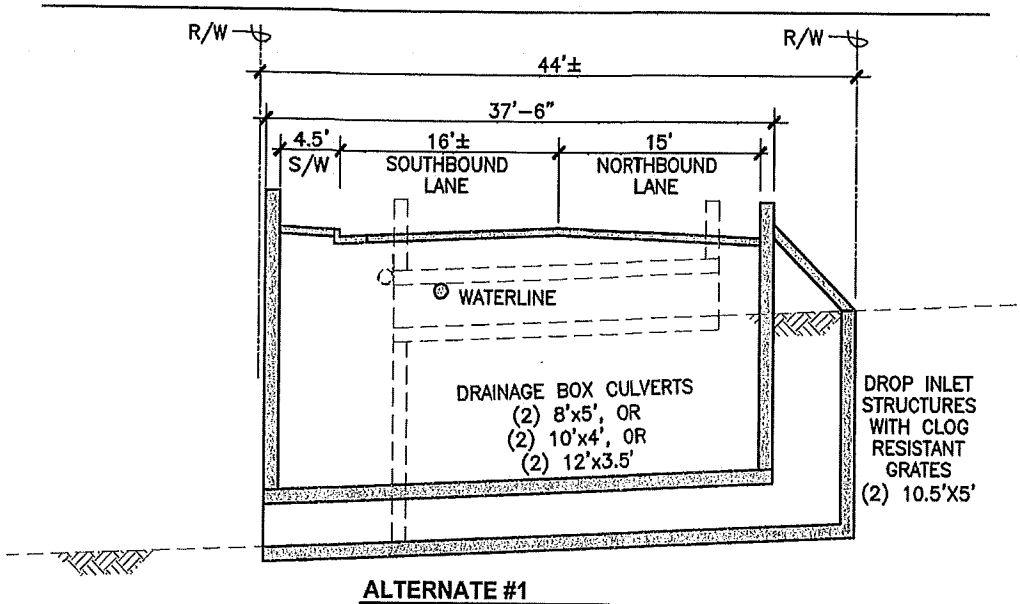
SCALE IN FEET

0 5 10 20 30

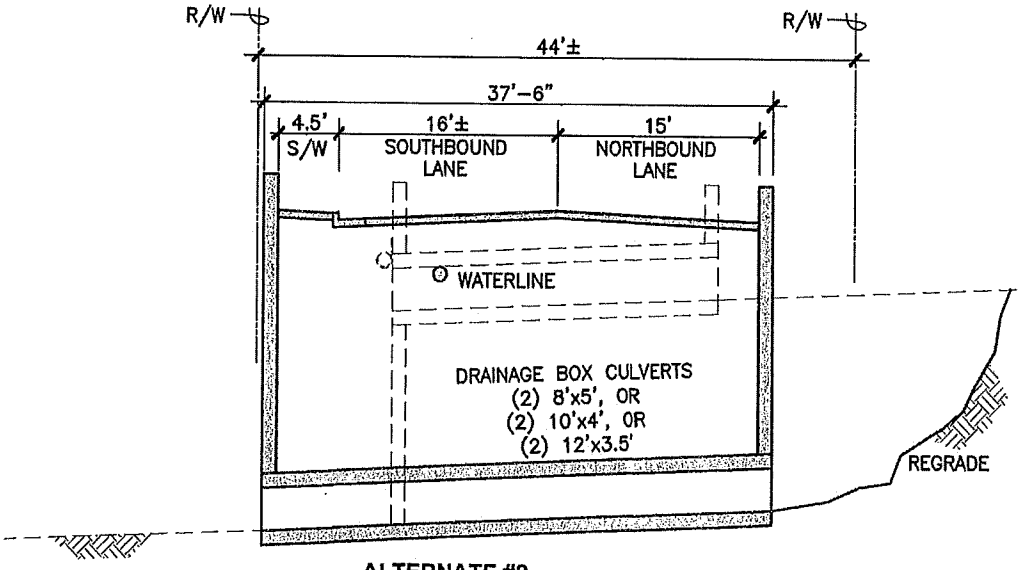
DATE: 03/09/2015

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



ALTERNATE #1
SCALE: 1" = 10'



ALTERNATE #2
SCALE: 1" = 10'

NAPILI CULVERT CONCEPTUAL DESIGN

SCALE IN FEET

0 5 10 20 30

DATE: 04/15/2015

PREPARED FOR: DEPARTMENT OF PUBLIC WORKS, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

State Historic Preservation Division Approval Letter for Archaeological Monitoring Plan

APPENDIX

E-1

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

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

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

December 24, 2015

Michael F. Dega, Ph.D.
Scientific Consultant Services, Inc.
1347 Kapiolani Blvd., Suite 408
Honolulu, Hawaii 96814
Via email to: mike@scshawaii.com

Log No: 2015.04021
Doc No: 1512MD53
Archaeology

Aloha Dr. Dega:

SUBJECT: **Chapter 6E-8 and 6E-42 Historic Preservation Review -**
Draft Archaeological Monitoring Plan for the Napili Culvert Replacement Project
Nāpili 4 and 5 Ahupua'a, Lāhainā District, Island of Maui
TMK (2) 4-3-001:003, 4-3-002:023, 045 and 999 (all, por.)

Thank you for the opportunity to review the draft plan titled *An Archaeological Monitoring Plan for the Napili Culvert Replacement Project, Nāpili 4 and 5 Ahupua'a, Lāhainā District, Island of Maui, Hawai'i [TMK: (2) 4-3-001:003 por., 4-3-002:023 por., 4-3-002:045 por., and County Right of Way]*(Dagher and Dega October 2015), which we received on November 12, 2015. This plan was developed for Fukumoto Engineering, Inc. on behalf of the County of Maui (Job No. 15-19).

The proposed project will entail: ground-altering activities associated with the 0.56 acre culvert replacement project; replacement of two 8-foot wide drainage culverts that pass under Lower Honoapiilani Road; extending the culvert lenth for allow for a sidewalk to cross over; and relocation of an existing County water main that is currently mounted outside of the existing outlet structure.

The draft monitoring plan meets the requirements specified in Hawai'i Administrative Rule §13-279 and is accepted. Please send one hardcopy of the document, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office, attention SHPD Library. Please contact me at (808) 243-4641 or Morgan.E.Davis@hawaii.gov if you have any questions or concerns about this letter.

Mahalo,

Morgan E. Davis
Lead Archaeologist, Maui Section

cc: County of Maui
Department of Planning
Planning@co.maui.hi.us

County of Maui
Department of Public Works – DSA
Renee.Segundo@co.maui.hi.us

County of Maui
Cultural Resources Commission
Annalise.Kehler@co.maui.hi.us

Mike E. Silva, P.E.
Fukumoto Engineering, Inc.
1721 Wili Pa Loop, Ste 203
Wailuku, Hawaii 96793

RECEIVED
DEC 30 2015
FUKUMOTO ENGINEERING, INC.

APPENDIX F

Cultural Impact Assessment Interview Summaries

Proposed Napili Culvert Replacement Project
Cultural Impact Assessment Interview

Interviewee: Wes Nohara

Interviewed by: Cheryl K. Okuma, Senior Associate (in person)
Munekiyo Hiraga

Interview date: December 21, 2015

The cultural impact assessment interview with Wes Nohara took place at the office of Munekiyo Hiraga on December 21, 2015.

Mr. Nohara has spent most of his life on Maui. He was born in Lahaina and raised in Honolua Village which is north of the Napili project area. After living for nearly 48 years in the Honolua area, he moved to Upcountry (Pukalani) where he has been for the last 13 years.

Mr. Nohara's paternal grandfather moved from Lahaina to Honolua around 1921 to work in the pineapple fields. His maternal side of the family relocated to Honolua from Haiku. It was in Honolua where Mr. Nohara's parents met and married and raised four (4) children. His parents lived one (1) house away from his grandfather who was born in Kauula Valley in Lahaina. He grew up in a home that sat between the homes of his maternal and paternal grandparents.

Mr. Nohara served on the board of the State of Hawai'i, Soil and Water Conservation District per Hawai'i Revised Statutes, Chapter 180 for approximately 29 years. During that time, he became very familiar with the drainage system and issues regarding Napili Gulch 4/5. He explained that mauka of the project area is an existing sediment retention basin. The basin design allows the release of stormwater and when the runoff reaches a certain level, it goes under the bridge and meanders to the beach towards Napili Bay where there is a sand bar. The intent of the existing basin is to protect downstream property and capture sediment during stormwater runoff.

Mr. Nohara explained that the existing box culvert is undersized to handle stormwater flow and is not well designed. During peak wet weather events, the runoff over tops Lower Honoapiilani Road and the stormwater drops into the downstream channel, scouring and undermining the structure. He recalled that during storm events, runoff would impact the properties to the north (One Napili Way) as the land slopes to the north. To protect the properties, One Napili Way installed retaining walls in this area. Mr. Nohara recalled that this issue of flooding and the undersized culvert system came to the attention of the Soil and Water Conservation District Board approximately 15 years ago. During that time, the County of Maui was requested to replace this undersized culvert system with a new culvert system which has the capacity to handle stormwater runoff.

Mr. Nohara spoke of the channel below the existing culvert system and noted that the entities in Napili Bay formed a partnership (Napili Bay and Beach Foundation). Due to concerns about the channel, the Napili Bay and Beach Foundation obtained grant monies and he believed an engineer has been hired and that native Hawaiian plants have been planted in the gulch. He noted that the gulch area was vegetated with kiawe trees in the late 50's and 60's and at that time there were only a few residents who lived along this portion of the project area. Mauka of the project area is primarily State lands, and Mr. Nohara recalled there was a land swap between Maui Land & Pineapple Company, Inc. and the State. He explained that Field 30 used to be former pineapple fields, until it was later converted to organic vegetable farms which shut down in 2012.

Mr. Nohara expressed that the proposed project is needed to address the issue of overtopping of the Lower Honoapiilani Roadway during major storm events and wanted the engineering design for a new culvert system sized to have the capacity to handle stormwater in the area. He is not aware of any cultural practices on or in the vicinity of the project area and noted that beach access is from Napili Place and other roadways that are outside of the project area. Maui Land and Pineapple Company, Inc. (MLP) Field 30 (former State Land) to the north of the project site contains a walking path, heading mauka. Mr. Nohara felt that the County of Maui, Department of Public Works (DPW) should communicate with the Napili Bay and Beach Foundation regarding the proposed project and its potential effect on the Foundation's gulch project and that there should be outreach to the One Napili Bay Association regarding the project.

Proposed Napili Culvert Replacement Project
Cultural Impact Assessment Interview

Interviewee: Tim Medeiros

Interviewed by: Cheryl K. Okuma, Senior Associate (in person)
Munekiyo Hiraga

Interview date: January 19, 2016

The cultural impact assessment interview with Tim Medeiros took place at the office of Munekiyo Hiraga on January 19, 2016.

Mr. Medeiros, who is part Hawaiian, has spent most of his life on Maui. On his father's side, the family is extensive and many family members continue to reside in the Napili area. His grandfather gave his land in the Lahaina area to Mr. Medeiros' parents when they married, and this is where Mr. Medeiros was born and grew up. Mr. Medeiros retired in 2006 from the County of Maui, Department of Public Works after over 35 years of service and continues to reside in the Lahaina area where he keeps busy working on his properties.

Mr. Medeiros spoke about his maternal grandparents who were born and resided in Napili, in an area across from Napili Kai. His grandmother had received land from the Queen, which was subsequently subdivided into lots and distributed to various family members. The area contains a family graveyard which is still active today. He spoke of the days that D.T. Fleming would visit his grandparents to help them by lending money to pay their taxes or work the land. Over time, land was given by his grandparents to D.T. Fleming. In those days, the land was cultivated for pineapple, mangoes, and watermelon. Napili Kai used to be a mango orchard owned by the Amarals, with D.T. Fleming's property nearby, as well as Mr. Medeiros' family properties. The area was undeveloped and contained kiawe. Maui Land & Pineapple Company owned the surrounding land around the family properties. Mr. Medeiros recalled that his grandmother drove cattle to Kahului from Napili on horseback for D.T. Fleming.

Mr. Medeiros reminisced about going to the Napili Bay Beach in the past. He liked the area as it was good for fishing all the way up to Napili Point. He spoke of his grandmother "running the Akule gang" and explained how she would catch fish to bring them into the Bay. Folks from the markets would go to the Bay to pick their fish. The remaining fish would be released to the sea. Also, he recalled it being a good area for catching tako (octopus). Mr. Medeiros expressed that today, the bay area does not offer the good fishing he recalled from the past. Today, as he passes the project area he sees many cars parked on both sides of Lower Honoapiilani Road and believed that these are residents and visitors who frequent the beach area. He expressed concern about traffic in the area and commented that there is no parking in the area. Mr. Medeiros wanted to know what the traffic plan would be during project construction.

Mr. Medeiros noted that the existing culvert is small and he recalled in the mid-1960's when there was a golf course development mauka of Lower Honoapiilani Road, a rainfall event caused flooding, runoff came through the family property, wiped out and destroyed Napili Kai. He recalled that his mother's car was swept away by the flood waters. He described how he obtained equipment to remove the car from a stone wall at Napili Kai.

He recalled that a number of years ago, Napili Kai and the State of Hawaii, Soil and Water Conservation District contacted him regarding the installation of a culvert. At the time he expressed concerns and requested that there be other options to address flood impacts. He expressed that before the development occurred in the area, the existing waterways were blocked from carrying stormwater.

For the proposed project, Mr. Medeiros felt that if the replacement culvert protects the area from flood impacts, it is a good thing. He did not have cultural concerns and had not heard of any traditional uses or practices on or in the vicinity of the project area.