ALAN M. ARAKAWA
Mayor

DAVID C. GOODE
Director

ROWENA M. DAGDAG-ANDAYA
Deputy Director

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

FILE COPY

MAY 23 2016

GLEN A. UENO, P.E.
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

May 3, 2016

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

SUBJECT: KAHAWAIOKAPIA BRIDGE REPLACEMENT
FEDERAL-AID PROJECT NO. BR-3700(001)
DRAFT ENVIRONMENTAL ASSESSMENT

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-AFONSI) for the Kahawaiokapia Bridge Replacement project, situated within the Hana Highway right of way (por.), TMK: (2) 1-4-010:013 (por.) and 1-4-011:055 (por.), in the Hana District on the island of Maui for publication in the next available edition of the Environmental Notice.

Enclosed is a completed OEQC Publication form, two copies 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 me at (808) 270-7845.

Sincerely,

DAVID C. GOODE
Director of Public Works

Enclosures

DG/wykk(ED16-404)
S:\ENG\PROJECTS\01 FAP\BR\BR-3700(001) Kahawaiokapia Bridge Replacement\B Correspondence\Letters\2016.05.03 ED16-404 (EA transmittal ltr to OEQC).doc

xc: Milton Arakawa, Wilson Okamoto Corporation

FILE COPY
MAY 23 2016

AGENCY PUBLICATION FORM

Project Name:	Kahawaiokapia Bridge Replacement
Project Short Name:	Kahawaiokapia Bridge Replacement
HRS §343-5 Trigger(s):	County lands and funds
Island(s):	Maui
Judicial District(s):	Hana
TMK(s):	Hana Highway right-of-way (por.), (2) 1-4-010:013 (por.), (2) 1-4-011: 055 (por.)
Permit(s)/Approval(s):	Section 404 Nationwide Permit Section 10 Permit Compliance with Executive Order 11988, Floodplain Management National Environmental Policy Act Categorical Exclusion Section 7 of the Endangered Species Act Section 106 of the National Historic Preservation Act Section 4(f) of the Department of Transportation Act of 1966 Section 401 Water Quality Certification National Pollutant Discharge Elimination System Permit Noise Permit Chapter 6E, Hawaii Revised Statutes Stream Channel Alteration Permit Coastal Zone Management Federal Consistency Certification Special Management Area Use Permit Special Flood Hazard Area Development Permit Grubbing and Grading Permit Permit to Perform Work within County Right of Way
Proposing/Determining Agency:	County of Maui Department of Public Works
Contact Name, Email, Telephone, Address	David Goode david.goode@mauicounty.gov (808) 270-7845 200 South High Street, 4th Floor Wailuku, Hawai'i 96793
Accepting Authority:	(for EIS submittals only)
Contact Name, Email, Telephone, Address	
Consultant:	Wilson Okamoto Corporation
Contact Name, Email, Telephone, Address	Milton Arakawa marakawa@wilsonokamoto.com (808) 946-2277 1907 South Beretania Street, Suite 400 Honolulu, Hawai'i 96826

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 proposed replacement of Kahawaiokapi'a Bridge is based on the recommendations presented in the *The Final Preservation Plan for County of Maui Bridges within the Hana Highway Historic District*. Like the existing bridge, the proposed bridge will be a one-lane bridge accommodating two-way traffic in consonance with the rural context of the district. The proposed bridge structure will consist of concrete girders and slab which result in a vehicular travelway of 16 feet in width between railings. The railing is envisioned as a solid concrete parapet 43 inches in height above roadway level resembling the original. Concrete slabs topped with asphalt concrete pavement, each approximately 20 feet in length, are proposed to abut both approaches to the bridge. Mauka and makai sides of the approach slab would have a concrete guardwall with stone masonry fascia. The abutting roadway would be resurfaced with the installation of guardrails on both sides of the roadway, with longer lengths of guardrails on the curved Kīpahulu approach. Prior to demolishing the existing bridge, a temporary single lane steel panel bypass bridge is proposed to ensure continuous vehicular access throughout construction. Upon completion of the replacement bridge, the temporary bridge will be removed.

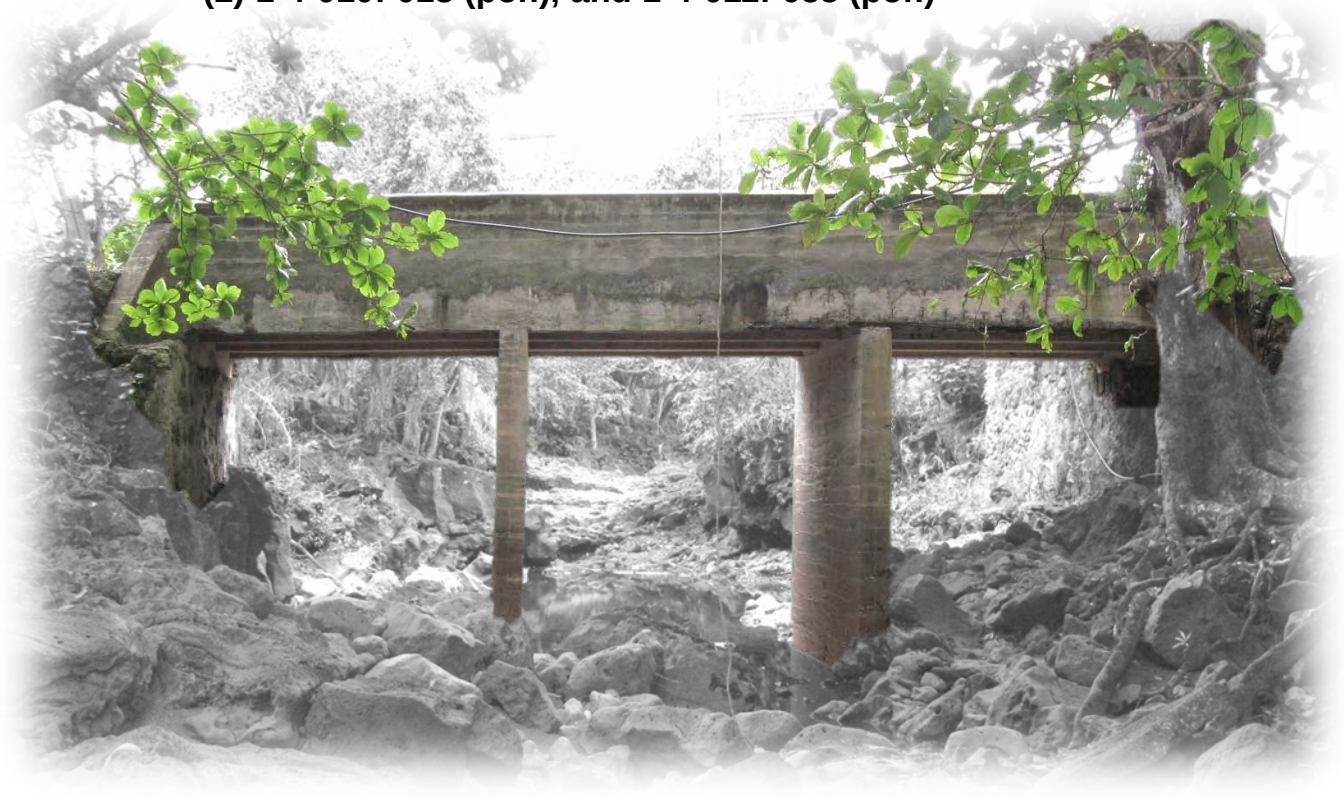
DRAFT
ENVIRONMENTAL ASSESSMENT

KAHAWAIOKAPIA BRIDGE REPLACEMENT

District of Hana, Island of Maui, State of Hawaii

FAP No. BR-3700 (COI)

Tax Map Keys: Hana Highway right-of-way (por.)
(2) 1-4-010: 013 (por.), and 1-4-011: 055 (por.)



Prepared For:

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS

Prepared By:

WILSON OKAMOTO CORPORATION

May 2016

DRAFT
ENVIRONMENTAL ASSESSMENT

KAHAWAIOPIA BRIDGE REPLACEMENT

District of Hana
Island of Maui, State of Hawaii

Tax Map Keys: Hana Highway Right-of-Way
(2) 1-4-010: 013 (por.) and 1-4-011: 055 (por.)

Prepared For:

County of Maui
Department of Public Works
200 South High Street, 4th Floor
Wailuku, Hawaii 96793

Prepared By:

Wilson Okamoto Corporation
Engineers and Planners
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Job No. 6153-01

MAY 2016

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Appendix B An Archaeological Inventory Survey of the Kahawaiokapia Bridge, Ahupuaa of Mokae and Kakio, District of Hana, Island of Maui, TMK: (2) 1-4-009: por., 1-4-010:012 to 014 por., 1-4-011:055 and 063 por. Pacific Legacy. February 2015.

Appendix C Drainage Study Kahawaiokapia Bridge Replacement. Wilson Okamoto Corporation. March 2012.

Appendix D Pre-Assessment Consultation Comment and Response Letters

PREFACE

This Draft Environmental Assessment (EA) is prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS), and Title 11, Chapter 200, Hawaii Administrative Rules (HAR), State Department of Health. Proposed is an agency action by the County of Maui Department of Public Works to replace and upgrade the Kahawaiokapia Bridge located in the Mokae Ahupuaa, Hana District, Island of Maui, Hawaii.

The Kahawaiokapia Bridge Replacement involves the construction of a one-lane bridge accommodating two-way traffic in consonance with the rural context of the district. The bridge incorporates much of the historic character of the existing bridge and complies with the *Final Preservation Plan for County of Maui Bridges within the Hana Highway Historic District*. Prior to demolishing the existing bridge, a temporary bypass bridge is proposed to ensure continuous vehicular access throughout construction.

This EA is required since County lands and funds will be used for the design and construction of the proposed improvements. A Finding of No Significant Impact (FONSI) is anticipated for the proposed Project.

In addition to County funds, Federal Highway Administration (FHWA) funds will also be used for the construction of the Kahawaiokapia Bridge project. Separate environmental review documentation will be prepared for the proposed Project to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, (Pub. L. 91-190, 42 U.S. Code 4321-4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, (40 Code of Federal Regulations 1500-1508), and 23 Code of Federal Regulations Part 771, Environmental Impact and Related Procedures.

SUMMARY

Proposing Agency:	County of Maui Department of Public Works 200 South High Street, 4th Floor Wailuku, Island of Maui, Hawaii 96793
Approving Agency:	County of Maui Department of Public Works 200 South High Street, 4th Floor Wailuku, Island of Maui, Hawaii 96793
Location:	Mokae Ahupuaa, Hana District, Island of Maui, Hawaii
Tax Map Keys (TMKs):	Hana Highway right of way (por.), (2) 1-4-010: 013 (por.), (2) 1-4-011: 055 (por.)
Recorded Fee Owners:	County of Maui (Hana Highway right of way) J. Kalani English Living Trust (TMK: (2) 1-4-010: 013) Mark Steven Sherman Randall Ray Cooley (TMK: (2) 1-4-011: 055)
Existing Use:	Roadway, drainage, passive open space, grassed pasture.
State Land Use Classification:	Agricultural District
Hana Community Plan:	Agriculture, Rural
County Zoning:	Agriculture, Interim
Special Management Area (SMA):	Existing roadway located within the SMA
Proposed Action:	*The Final Preservation Plan for County of Maui Bridges within the Hana Highway Historic District*

Proposed Action: *The Final Preservation Plan for County of Maui Bridges within the Hana Highway Historic District* (Final Preservation Plan) was formulated to guide the management of the County's 14 bridges within the Hana Highway Historic District. The design of the proposed replacement of Kahawaiokapia Bridge is based on the recommendations presented in the Final Preservation Plan. Like the existing bridge, the proposed bridge will be a one-lane bridge accommodating two-way traffic in consonance with the rural context of the district. The proposed bridge structure will consist of concrete girders and slab which result in a vehicular travelway of 16 feet in width between railings. The railing is envisioned as a solid concrete parapet 43 inches in height above roadway level resembling the original. The finish is proposed to be untreated concrete similar to the existing condition.

Concrete slabs topped with asphalt concrete pavement, each approximately 20 feet in length, are proposed to abut both approaches to the bridge. Mauka and makai sides of the approach slab would have a concrete guardwall with stone masonry fascia. This would be a free-standing structure approximately 43 inches in height adjacent to the bridge railing but tapering lower to 32 inches in height as it extends further away from the bridge. The abutting roadway would be resurfaced with the installation of guardrails on both sides of the roadway, shorter lengths on the Hana side with longer lengths of guardrails on the curved Kipahulu approach.

Prior to demolishing the existing bridge, a temporary bypass bridge is proposed to ensure continuous vehicular access throughout construction. A single-lane steel-panel bridge would be installed mauka of the existing bridge. Concrete abutments will be constructed at each end for support. Paved roadway approaches will connect the temporary bridge to the existing roadway. Upon completion of the replacement bridge, the temporary bridge and visible portions of the abutments will be removed.

This Draft EA has been prepared to satisfy the requirements of Chapter 343, HRS, and Title 11,

Chapter 200, HAR, State Department of Health, since County lands and funds will be used for the design and construction of the proposed improvements.

In addition to County lands and funds, Federal Highway Administration (FHWA) funds will also be used for the design and construction of the proposed improvements. Separate environmental documentation will be prepared for the proposed improvements to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, (Pub. L. 91-190, 42 U.S. Code 4321-4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, (40 Code of Federal Regulations 1500-1508), and 23 Code of Federal Regulations Part 771, Environmental Impact and Related Procedures.

Impacts:

Kapia Stream will not be totally blocked at any time during the construction period to not interfere with migration of native amphidromous fauna. Moreover, construction notes will include a prohibition on the introduction of non-native species to the gulch and prohibition of fish feeding. There are two identified archaeological sites makai of the project site. These are outside of the Area of Potential Effect and will not be altered or affected by the proposed project. Archaeological monitoring will be conducted during the initial grubbing and grading. Historic American Engineering Record information has been submitted to the Library of Congress. There are potential short-term impacts to noise, air quality, water quality and stream biota in the immediate project vicinity. With the incorporation of mitigation measures during the construction period, the project will not result in long-term degradation to environmental quality.

No significant impacts are anticipated from the construction and operation of the proposed Project.

Anticipated Determination:

Finding of No Significant Impact (FONSI)

Required Permits & Approvals:

Federal

Department of the Army

- Section 404 Nationwide Permit
- Section 10 Permit

Federal Emergency Management Agency (FEMA)

- Compliance with Executive Order 11988, Floodplain Management

Federal Highway Administration

- National Environmental Policy Act (NEPA) Categorical Exclusion
- Section 7 of the Endangered Species Act
- Section 106 of the National Historic Preservation Act
- Section 4(f) of the Department of Transportation Act of 1966

State of Hawaii

Department of Health

- Section 401 Water Quality Certification
- National Pollutant Discharge Elimination System (NPDES) Permit (Stormwater Associated with Construction Activities)
- Noise Permit

Department of Land and Natural Resources

- Chapter 6E, HRS Historic Preservation
- Stream Channel Alteration Permit

Department of Business, Economic Development & Tourism, Office of Planning

- Hawaii Coastal Zone Management Program Federal Consistency Certification

County of Maui

Department of Planning

- Special Management Area Use Permit
- Special Flood Hazard Area Development Permit

Department of Public Works

- Grubbing and Grading Permit

- Permit to Perform Work within County Right-of-Way

Agencies Consulted In Pre-Assessment Process:

Federal
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Department of Transportation, Federal Highway Administration
U.S. Department of the Interior, National Park Service, Haleakala National Park

State of Hawaii
Department of Accounting and General Services
Department of Education
Department of Business, Economic Development & Tourism
Department of Business, Economic Development & Tourism, Land Use Commission
Department of Business, Economic Development & Tourism, Office of Planning
Department of Health
Department of Health, Office of Environmental Quality Control
Department of Health, Environmental Management Division
Department of Health, Clean Water Branch
Department of Land and Natural Resources
Department of Land and Natural Resources, Land Division
Department of Land and Natural Resources, Historic Preservation Division
Department of Transportation
Office of Hawaiian Affairs

County of Maui
Planning Department
Department of Public Works
Department of Environmental Management
Department of Transportation
Department of Water Supply
Department of Parks and Recreation
Department of Fire and Public Safety
Police Department

Others
Hana Business Council
Alliance for the Heritage of East Maui
Hana Community Association
Kipahulu Community Association
J. Kalani English Living Trust
Mark S. Sherman
Randall R. Cooley
Dolores Soler

1. INTRODUCTION

1.1 Project Background

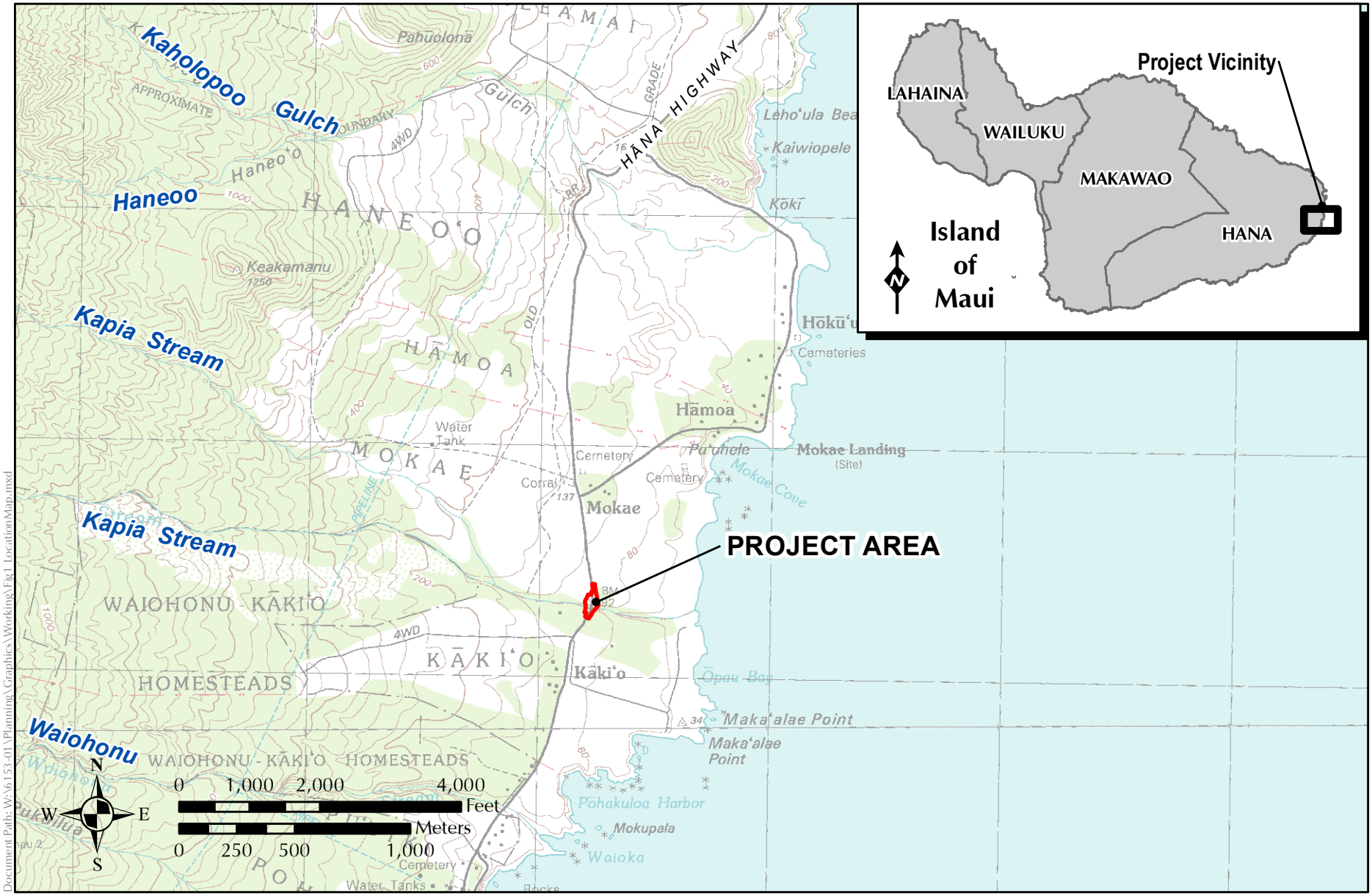
The County of Maui, Department of Public Works (DPW) proposes to replace and upgrade Kahawaiokapia Bridge, which spans Kapia Stream, in the Mokae Ahupuaa, Hana District, Maui, Hawaii (see Figure 1). Kahawaiokapia Bridge, also known as Kapia Bridge, lies in the Hana Highway right-of-way, which is owned by the County of Maui and is not identified by a Tax Map Key (TMK) number (see Figure 2). Prior to the demolition and construction work for the bridge replacement, a temporary bridge and roadway will be constructed on the mauka side of the existing bridge. Two privately owned parcels are affected. These parcels are: TMK (2) 1-4-010:013, with the owner identified as J. Kalani English Living Trust and TMK (2) 1-4-011:055, with owners identified as Mr. Mark Steven Sherman and Mr. Randall Ray Cooley.

Hana Highway provides through vehicular access for residents and visitors to Hana. It is largely a narrow two-lane two-way road, with numerous one-lane bridge and culvert crossings, such as at Kahawaiokapia Bridge. The bridge is one of 74 bridges and culvert structures that lie along the Hana Highway Historic District from Hoalua Bridge near Huelo in the Makawao District to Koukouai Bridge in Kipahulu (see Figure 3). Along its length, the Hana Highway Historic District has segments in three governmental jurisdictions, including the County of Maui, State of Hawaii and the National Park Service. State of Hawaii jurisdiction extends from Hoalua Bridge to Keawa Place in Hana Town. County of Maui jurisdiction extends from Keawa Place to Koukouai Bridge, but is interrupted where the highway passes through federal jurisdiction in Haleakala National Park. In this section, there are 14 bridges under County jurisdiction and two within Haleakala National Park.

To provide the County of Maui with a comprehensive approach to managing their fourteen bridges in consideration of their historic resource value, public safety concerns and Federal funding opportunities for addressing bridge deficiencies, the Department of Public Works (DPW) prepared the *Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (December, 2001). The State Historic Preservation Division of the Department of Land and Natural Resources concurred with the Preservation Plan on December 3, 2001. Since that time, improvements to Kaholopoo, Waiohonu, Paihi and Papahawahawa Bridges have been completed by the County in compliance with the Preservation Plan. The proposed replacement of Kahawaiokapia Bridge, assessed herein, is also based on the recommendations of the plan for this bridge.

1.2 Project Need

The DPW administers a program to modify or replace functionally or structurally deficient bridges to achieve current State of Hawaii standards for transportation facilities as specified by the Statewide Uniform Design Manual for Streets and Highways (October, 1980), as supplemented by the current American Association of State Highway and Transportation Officials' (AASHTO) Policy on Geometric Design of Highways and Streets (6th Edition, 2011), and AASHTO's Standard Specifications for Highway Bridges (17th Edition, 2002). In conjunction with this program, the DPW conducts periodic inspections of all of its bridges in compliance with National Bridge Inspection Standards (Code of Federal Regulations (CFR)



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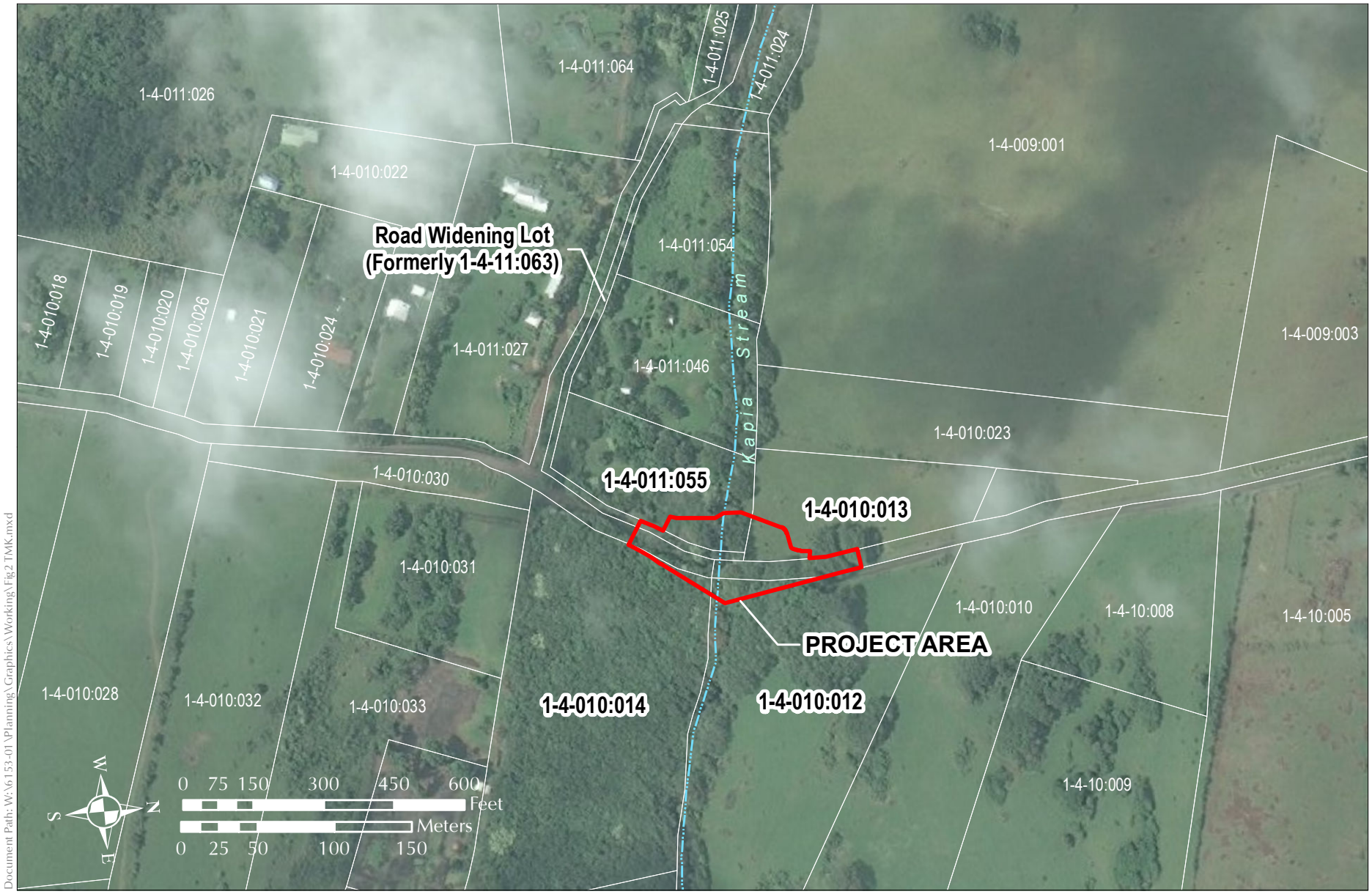
WILSON OKAMOTO CORPORATION

FIGURE 1

LOCATION MAP

KAHAWAIOKAPIA BRIDGE REPLACEMENT



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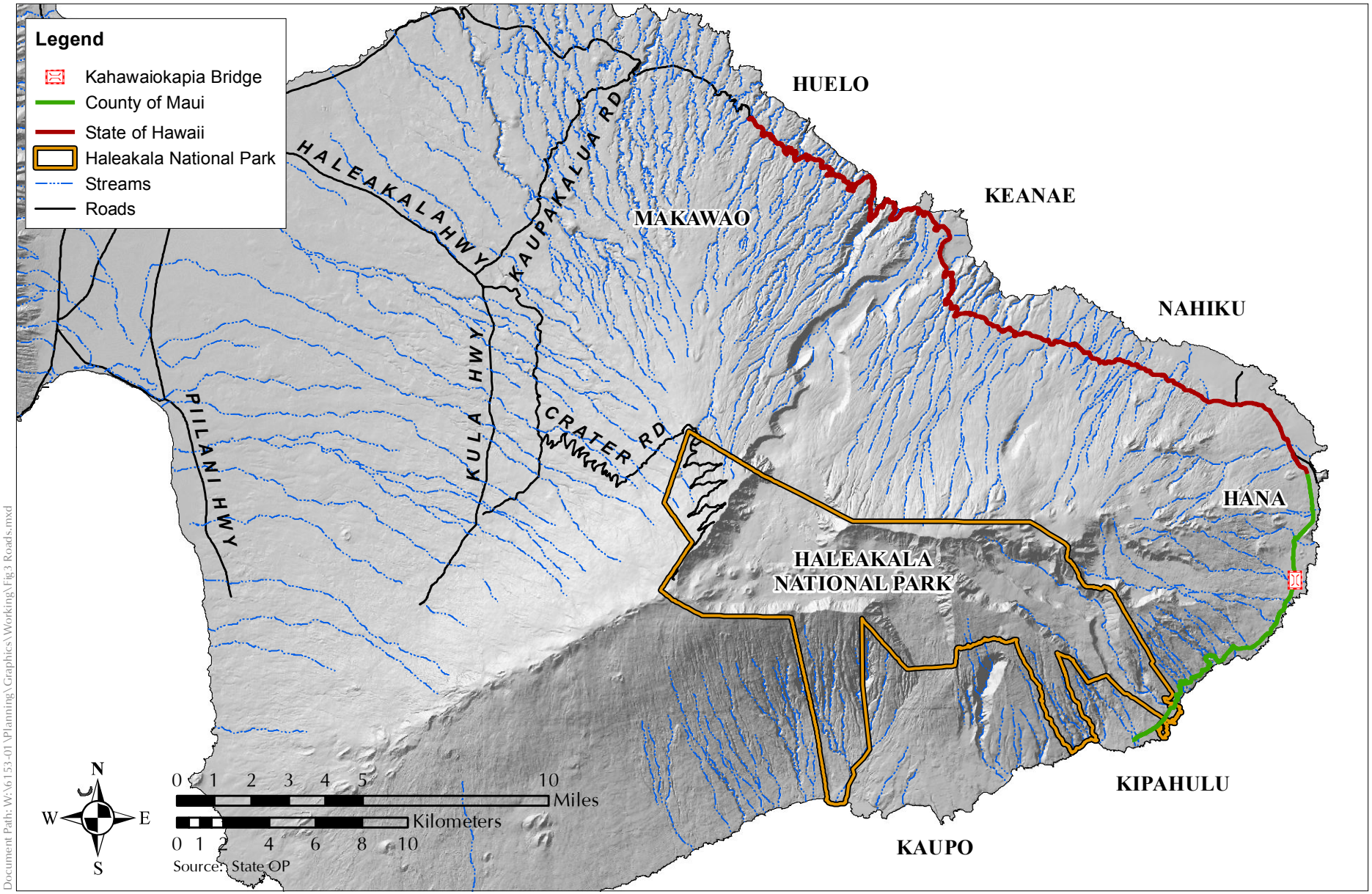
WILSON OKAMOTO CORPORATION

FIGURE 2

TAX MAP KEY

KAHAWAIOKAPIA BRIDGE REPLACEMENT



WILSON OKAMOTO CORPORATION

FIGURE 3

HANA HIGHWAY HISTORIC DISTRICT MAP

KAHAWAIOKAPIA BRIDGE REPLACEMENT

23 Highways - Part 650, Subpart C). The latest bridge inspection report for Kahawaiokapia Bridge, dated April 2013, gives the bridge a Sufficiency Rating of 3. The rating considers both the structural and functional aspects of a bridge based on a scale ranging from a low of 0 to 100 representing a bridge fully meeting current design standards.

The low sufficiency rating for Kahawaiokapia Bridge reflects its functional and structural deficiencies relative to current bridge design standards. Functionally, a major deficiency is that the bridge can accommodate only one lane of traffic although it serves a two-lane roadway. Structurally, the bridge's load rating of 8 tons is well below the minimum standard of 15 tons, based on evidence such as the loss of concrete, exposed and rusted steel reinforcement along girders, heavy water-staining indicating internal rusting of steel reinforcements, and concrete section loss in piers supporting the bridge (see Figures 4 through 7). The replacement bridge has been designed to address structural requirements for a bridge load of 20 tons. To address concerns expressed by the community to accommodate a bridge which complements the rural context of the region and to comply with the *Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District*, however, the replacement bridge design does not meet minimum standards for geometric requirements, such as bridge, roadway and shoulder width. A design exception will be sought by the County of Maui Department of Public Works from the Federal Highway Administration and State of Hawaii Department of Transportation to address these issues.

1.3 Existing Uses

According to record drawings, Kahawaiokapia Bridge was constructed in 1915. It is approximately 57'-6" long and 15'-8" wide, with a roadway width of 14'-2". The bridge deck height above the stream varies, with a maximum height of 16'-6". The bridge deck is supported by two, intermediate reinforced concrete piers within the stream and concrete-rubble-masonry abutment walls at either bank. The three spans between the piers are similar in distance but not exactly equal, extending 19 feet 4 inches, 18 feet 8 inches, and 19 feet 6 inches from north to south. The wing-walls, which extend laterally from abutment walls to retain the banks, also consist of concrete-rubble-masonry. The downstream parapet (bridge railing) is solid flush reinforced concrete with a peaked top originally 43 inches in height. The upstream parapet is of original construction while the downstream parapet was added circa 1931 (see Figure 8 and Figure 9).

The existing roadway at the bridge approaches is approximately 14'-6" wide with no recognizable shoulder area.

1.4 Surrounding Uses

In the immediate vicinity of the existing bridge, lands abutting Kapia Stream are heavily vegetated. Adjacent lands are either in passive open space or in grassed pasture. On the mauka side of the bridge, the surrounding properties include privately owned land, portions of which are within the project area where the proposed temporary bridge will be constructed. These parcels are owned by J. Kalani English Living Trust (TMK: 1-4-10:13), and Mark Steven Sherman and Randall Ray Cooley (TMK: 1-4-11:55). A portion of property formerly owned by Mark Steven Sherman, Randall Ray Cooley and Dolores Soler (TMK: 1-4-11:63)

Photo 1: View of Kahawaiokapia bridge and Kapia Stream looking west.

Photo 2: View of Kahawaiokapia bridge and Kapia Stream looking east.

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FIGURE 4

PHOTOS 1 AND 2

KAHAWAIOKAPIA BRIDGE REPLACEMENT

Photo 3: View of concrete and exposed steel reinforcement under the bridge.

Photo 4: View of rusted 4-inch water line located on mauka side of the bridge.

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FIGURE 5

PHOTOS 3 AND 4

KAHAWAIOKAPIA BRIDGE REPLACEMENT

Photo 5: View of north concrete abutment wall and north pier looking east.

Photo 6: View of south concrete abutment wall looking east.

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FIGURE 6

PHOTOS 5 AND 6

KAHAWAIOKAPIA BRIDGE REPLACEMENT

Photo 7: View of Hana Highway and Kahawaiokapia bridge looking south.

Photo 8: View of Hana Highway and Kahawaiokapia bridge looking north.

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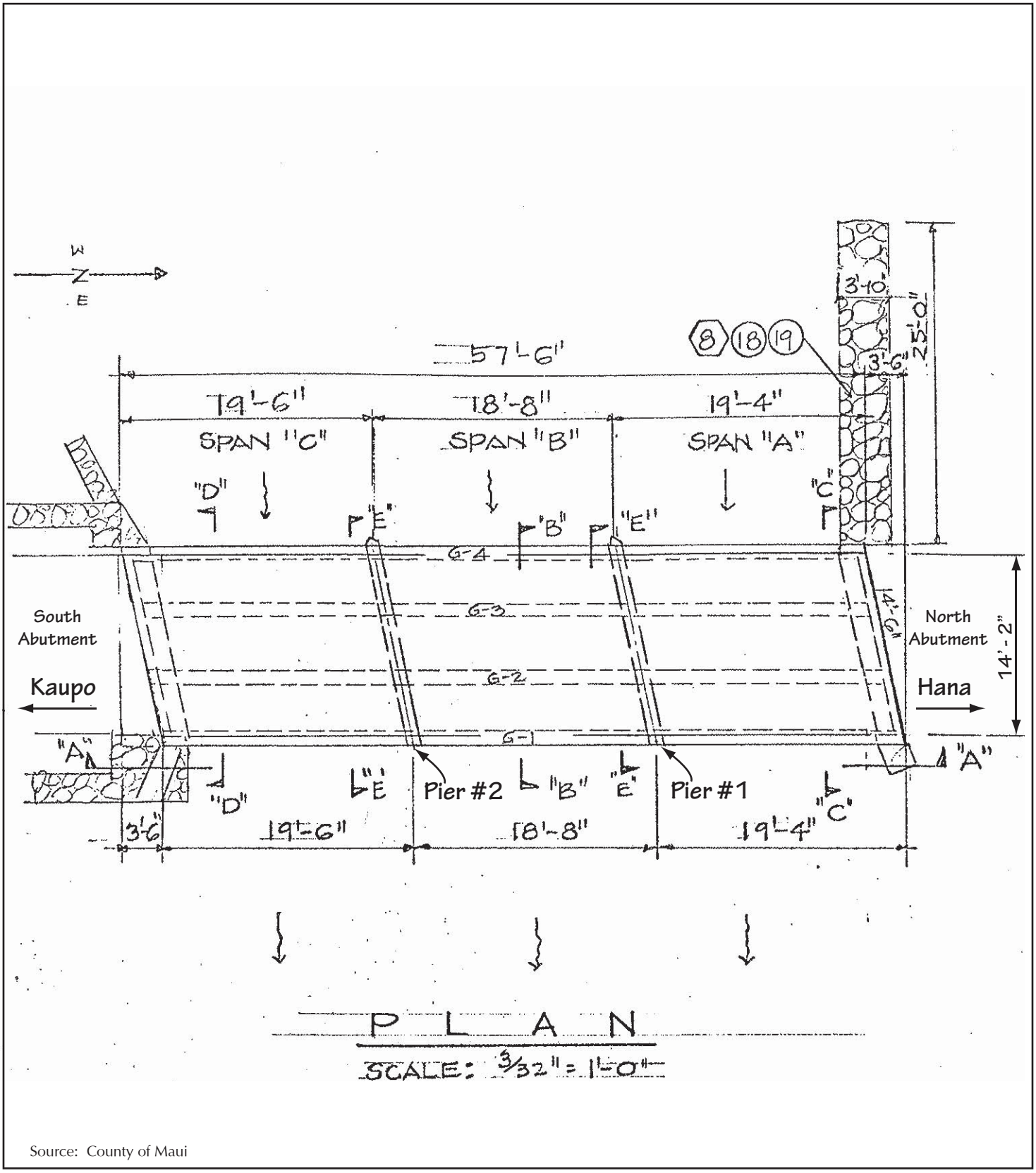
FIGURE 7

PHOTOS 7 AND 8

KAHAWAIOKAPIA BRIDGE REPLACEMENT



Source: County of Maui

W:\6153-01\Planning\Graphics\Working\Fig8 Existing Site Plan.ai

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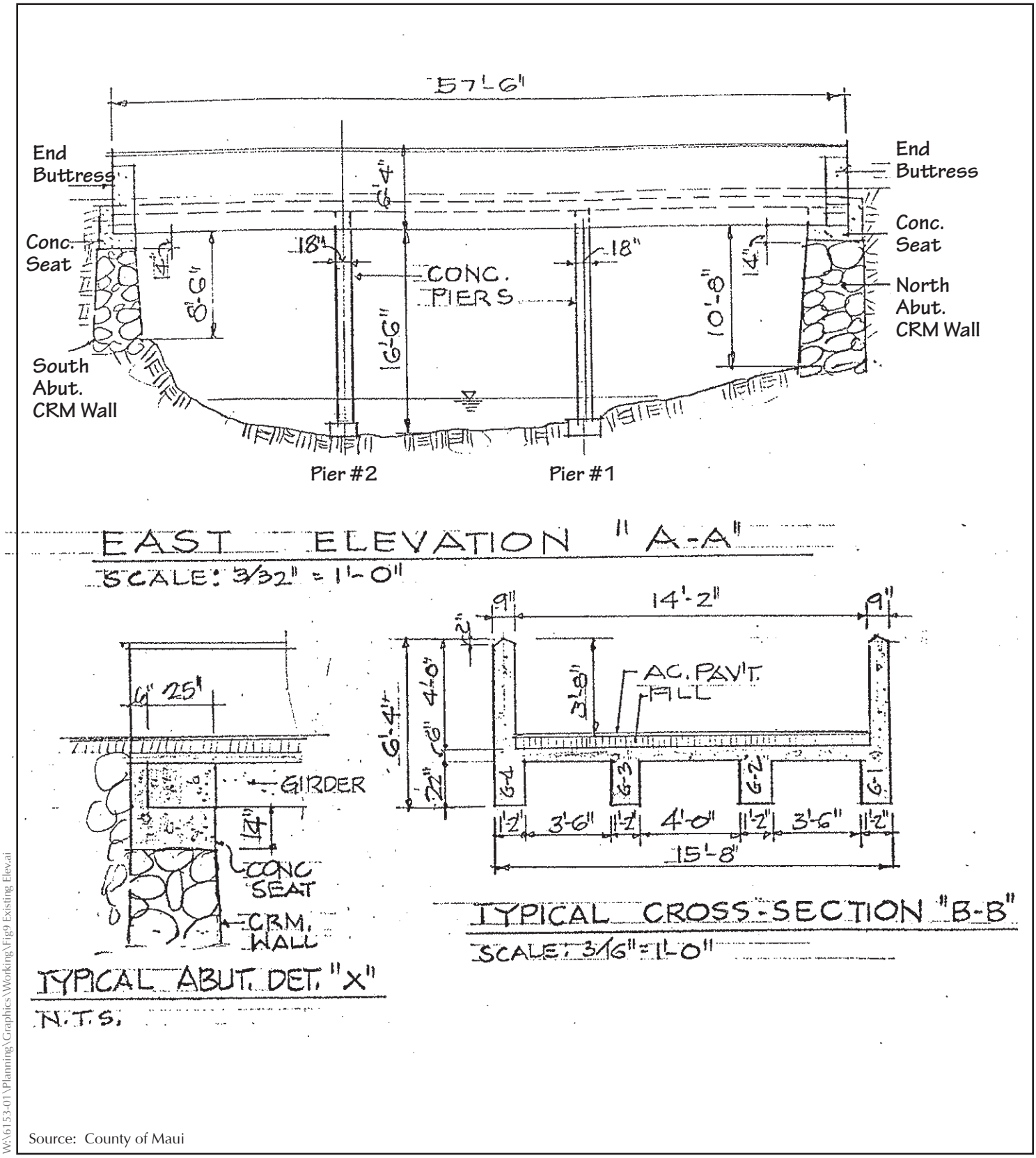
FIGURE 8

PLAN VIEW OF EXISTING BRIDGE

KAHAWAIOKAPIA BRIDGE REPLACEMENT



Source: County of Maui

W:\6153-01\Planning\Graphics\Working\Fig9 Existing Elev.ai

FIGURE 9

ELEVATION, ABUTMENT DETAIL AND TYPICAL CROSS SECTION

KAHAWAIOKAPIA BRIDGE REPLACEMENT

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was deeded to the County of Maui as a road widening lot. On the makai side of the highway are properties owned by Hana Ranch Partners, LLC (TMK: 1-4-010:12, 14) (refer to Figure 2). The properties on the makai side of the bridge are not within the project area.

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2. PROPOSED ACTION

2.1 Proposed Action

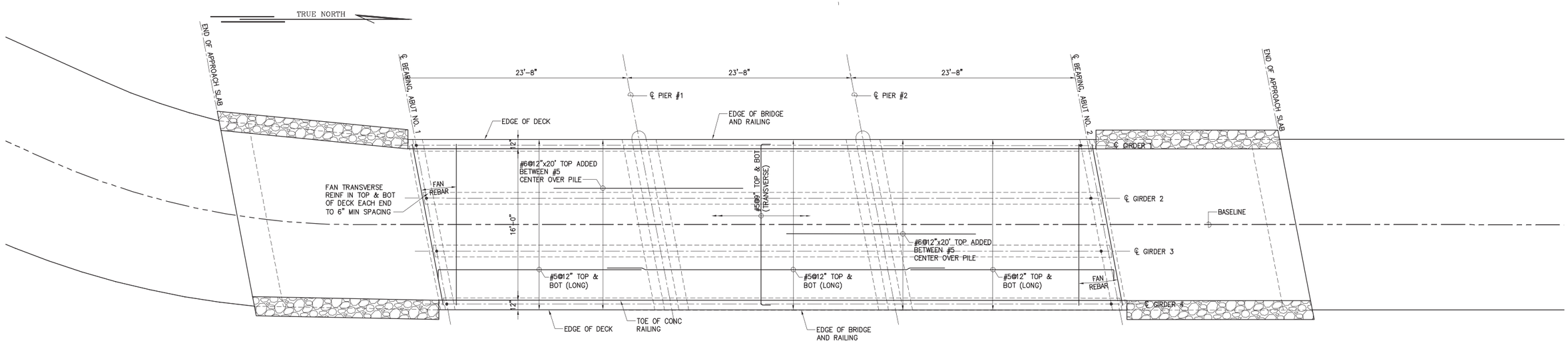
The Final Preservation Plan for County of Maui Bridges within the Hana Highway Historic District (Final Preservation Plan) was formulated to guide the management of the County's 14 bridges within the Hana Highway Historic District. The design of the proposed replacement of Kahawaiokapia Bridge is based on the recommendations presented in the Final Preservation Plan. Like the existing bridge, the proposed bridge will be a one-lane bridge accommodating two-way traffic in consonance with the rural context of the district (See Figure 10). The proposed bridge structure will consist of concrete girders and slab which result in a vehicular travelway of 16 feet in width between railings. The railing is envisioned as a solid concrete parapet 43 inches in height above roadway level resembling the original. The finish is proposed to be untreated concrete similar to the existing condition.

Concrete slabs topped with asphalt concrete pavement, each approximately 20 feet in length, are proposed to abut both approaches to the bridge. Mauka and makai sides of the approach slab would have a concrete guardwall with stone masonry fascia. This would be a free-standing structure approximately 43 inches in height adjacent to the bridge railing but tapering lower to 32 inches in height as it extends further away from the bridge. The abutting roadway would be resurfaced with the installation of guardrails on both sides of the roadway, shorter lengths on the Hana side with longer lengths of guardrails on the curved Kipahulu approach. (See Figure 11 and Figure 12). A representational view of the completed bridge is shown in Figure 13.

The abutments and wing walls would be of concrete construction with rock fascia.

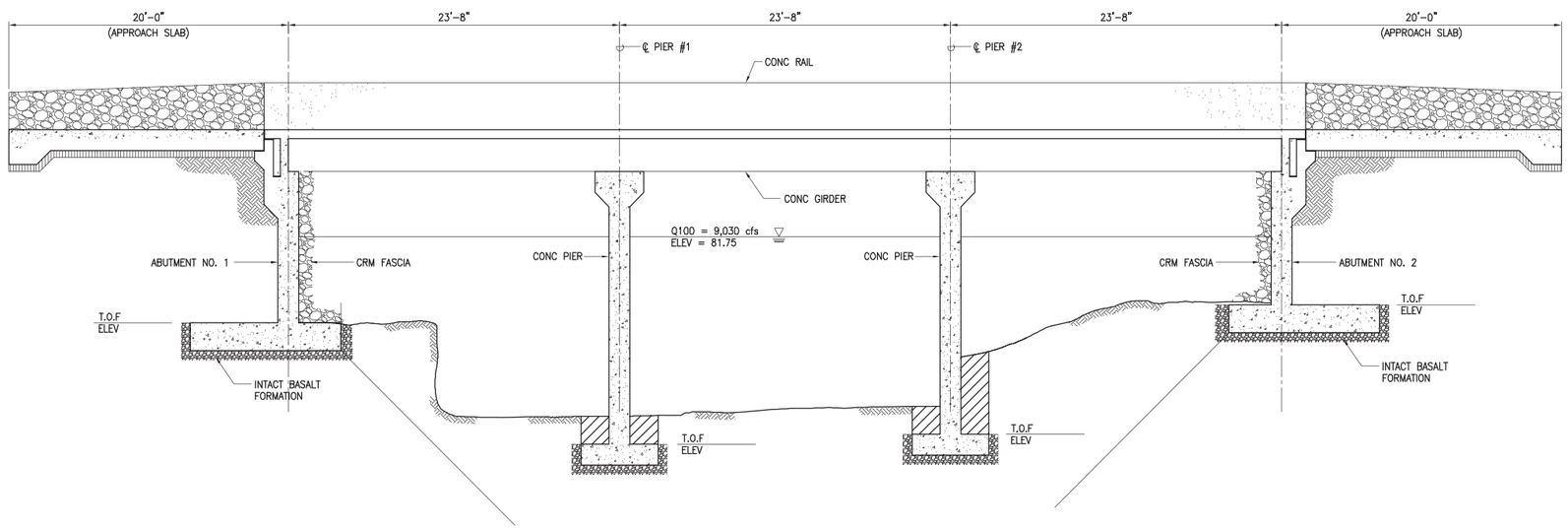
A structural examination of the bridge indicated that the existing abutments have been precariously built on or near the edge of a rock ledge (refer to Figure 6). The permanent abutments are proposed to be set back approximately 6 feet 9 inches on each side of the bridge in order to provide a more secure base for the bridge. This will cause the bridge to be lengthened by approximately 13 feet 6 inches (refer to Figure 10).

Since the preliminary recommendation of the Final Preservation Plan proposes that the existing piers be left in place as non-load bearing features, an option of a single span replacement bridge was considered. However, because the roadway to the project site is narrow and winding, transporting concrete girders long enough to span the entire length of the bridge (57 feet 6 inches) would be logistically infeasible by conventional truck transport. Since the proposed relocation of an abutment would lengthen the proposed bridge to 71 feet, shorter girders supported by replacement piers are proposed. This bridge form would be comparable to the existing bridge. Since the load bearing capability of the two existing bridge piers does not meet current standards, they are proposed to be replaced with two new bridge pier supports resembling the original supports. The shorter girders would then rest on the abutments and piers and the bridge deck would be built atop the girders to carry vehicular traffic. Each of the three spans of the bridge would extend 23 feet 8 inches.



DECK REINFORCING PLAN

SCALE: 3/32" = 1' - 0"



LONGITUDINAL SECTION ALONG BASELINE

SCALE: 3/32" = 1' - 0"

W:\6153-01\Planning\Graphics\Working\Fig10 Deck Plan.ai

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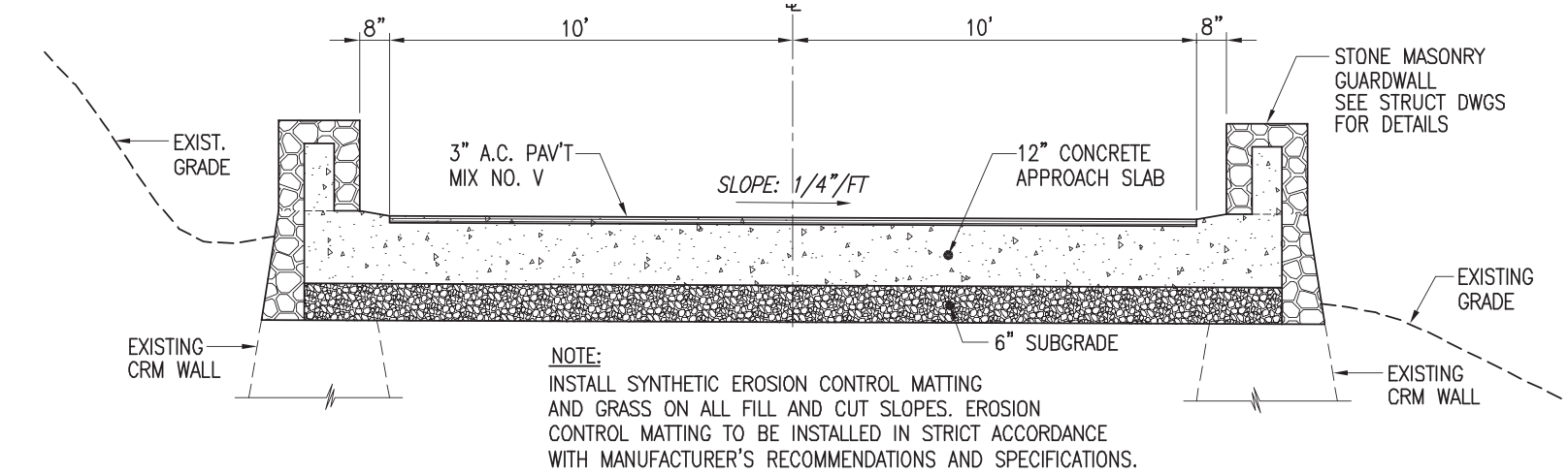
FIGURE 10

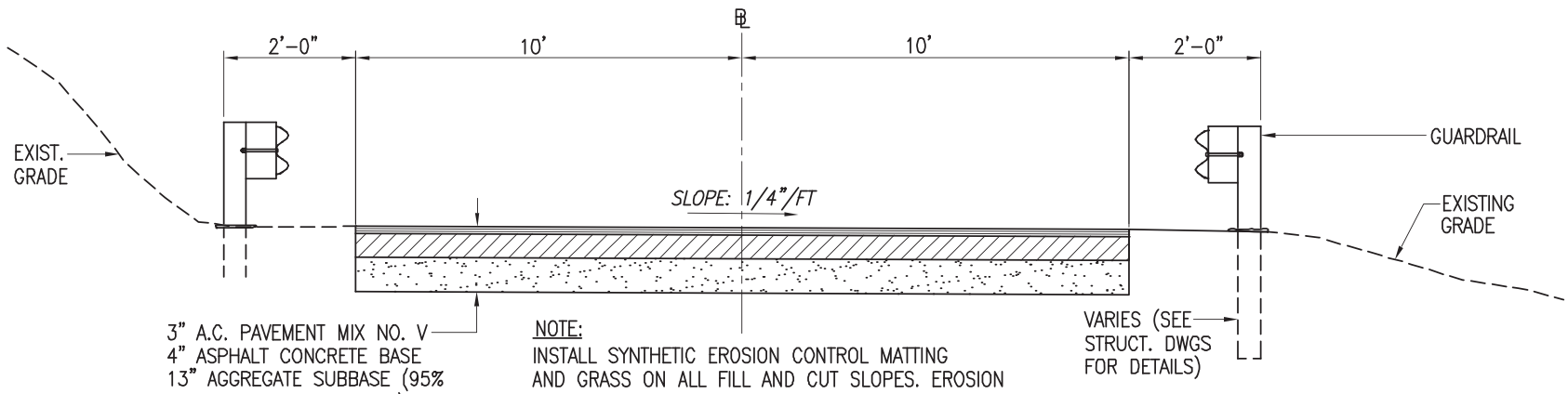
DECK PLAN AND LONGITUDINAL SECTION

KAHAWAIOKAPIA BRIDGE REPLACEMENT



NOTE:
INSTALL SYNTHETIC EROSION CONTROL MATTING AND GRASS ON ALL FILL AND CUT SLOPES. EROSION CONTROL MATTING TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.

TYPICAL APPROACH SLAB SECTION



NOTE:
INSTALL SYNTHETIC EROSION CONTROL MATTING AND GRASS ON ALL FILL AND CUT SLOPES. EROSION CONTROL MATTING TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.

TYPICAL ROAD SECTION WITH GUARDRAIL

W:\6153-01\Planning\Graphics\Working\Fig11 Typical Rd Sec.ai

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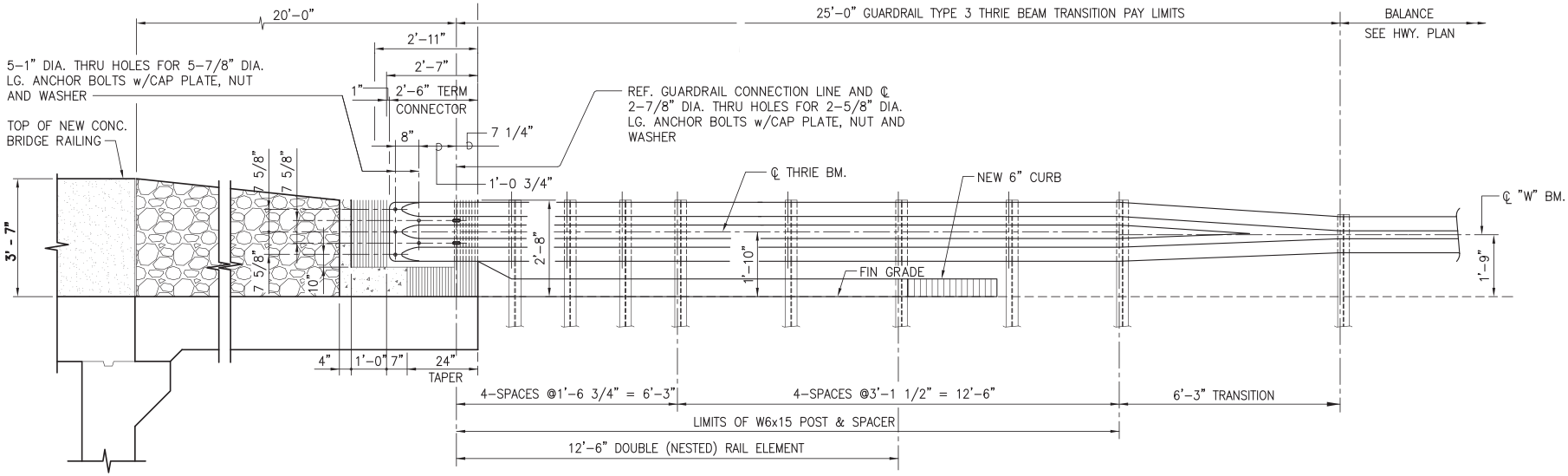
FIGURE 11

TYPICAL APPROACH SLAB AND ROAD SECTION

KAHAWAIOKAPIA BRIDGE REPLACEMENT



GUARDRAIL ELEVATION

SCALE: 1/2" = 1' - 0"

W:\6153-01\Planning\Graphics\Working\Fig12 Guardrail Elev.ai

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FIGURE 12

GUARDRAIL ELEVATION

KAHAWAIOKAPIA BRIDGE REPLACEMENT

W:\6153-01\Planning\Graphics\Working\Fig13 Completed Bridge.ai

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FIGURE 13

REPRESENTATIONAL VIEW OF COMPLETED BRIDGE

KAHAWAIOKAPIA BRIDGE REPLACEMENT

With the proposed improvements, the hydraulic capacity of the stream beneath the bridge would accommodate a 100-year 24 hour storm with adequate freeboard. Moreover, the load rating of the bridge would be increased from the existing 8 ton rating to American Association of State Highway and Transportation Officials (AASHTO) HL-93 standard of 20 tons. This should be sufficient to accommodate road legal heavy vehicles.

Prior to demolishing the existing bridge, a temporary bypass bridge is proposed to ensure continuous vehicular access throughout construction. A single-lane steel-panel bridge would be installed mauka of the existing bridge. Concrete abutments will be constructed at each end for support. Paved roadway approaches will connect the temporary bridge to the existing roadway. Upon completion of the replacement bridge, the temporary bridge and visible portions of the abutments will be removed (see Figure 14).

The Area of Potential Effect for the project includes the areas affected by the permanent and temporary bridge construction (see Figure 15). The total land area affected is 52,855 square feet. Temporary approvals to utilize private property for the project affects two parcels. Table 1 shows the amount of affected property.

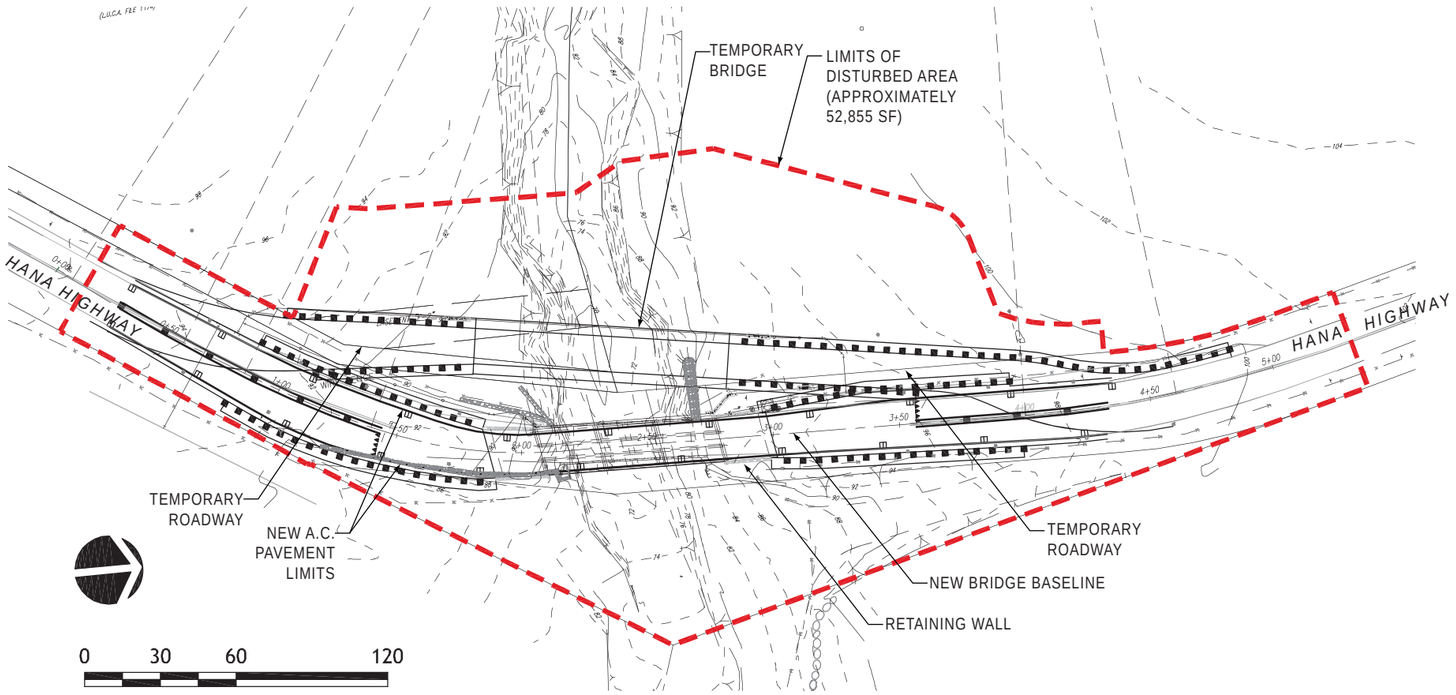
Table 1
Land Affected by Permanent and Temporary Bridge Construction

TMK	Owner	Area	Use
1-4-10:013	J. Kalani English Living Trust	13,078 sf	Temporary Bridge, Construction Buffer
1-4-011:055	Mark Steven Sherman, Randall Ray Cooley	6,517 sf	Temporary Bridge, Construction Buffer
Road Widening Lot (formerly part of TMK: 1-4-011:063)	County of Maui	1,056 sf	Temporary Bridge, Construction Buffer
Existing Roadway (no TMK)	County of Maui	32,204 sf	Permanent Bridge and Roadway

Construction staging is proposed to occur within the existing road right of way with a 10 foot clearance from areas of construction (see Figure 16).

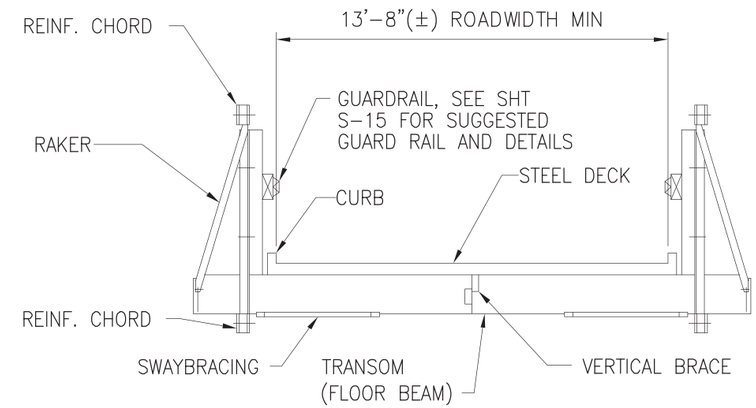
2.2 Project Cost and Schedule

Construction of the proposed project is anticipated to commence by the 4th quarter of 2018, with completion approximately 12 months later. The project cost is estimated at $5.51 million.



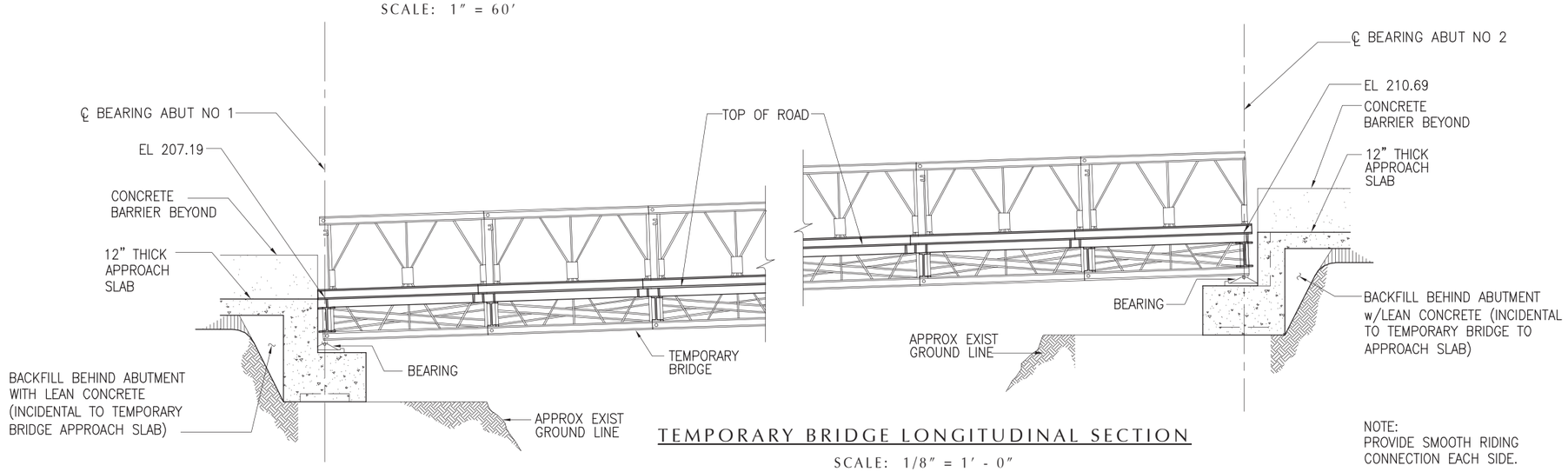
NEW AND TEMPORARY LAYOUT PLAN

SCALE: 1″ = 60′



TYPICAL SECTION - SCHEMATIC

SCALE: 3/16″ = 1′ - 0″



TEMPORARY BRIDGE LONGITUDINAL SECTION

SCALE: 1/8″ = 1′ - 0″

NOTE:
PROVIDE SMOOTH RIDING CONNECTION EACH SIDE.

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FIGURE 14

TEMPORARY BRIDGE

KAHAWAIOKAPIA BRIDGE REPLACEMENT

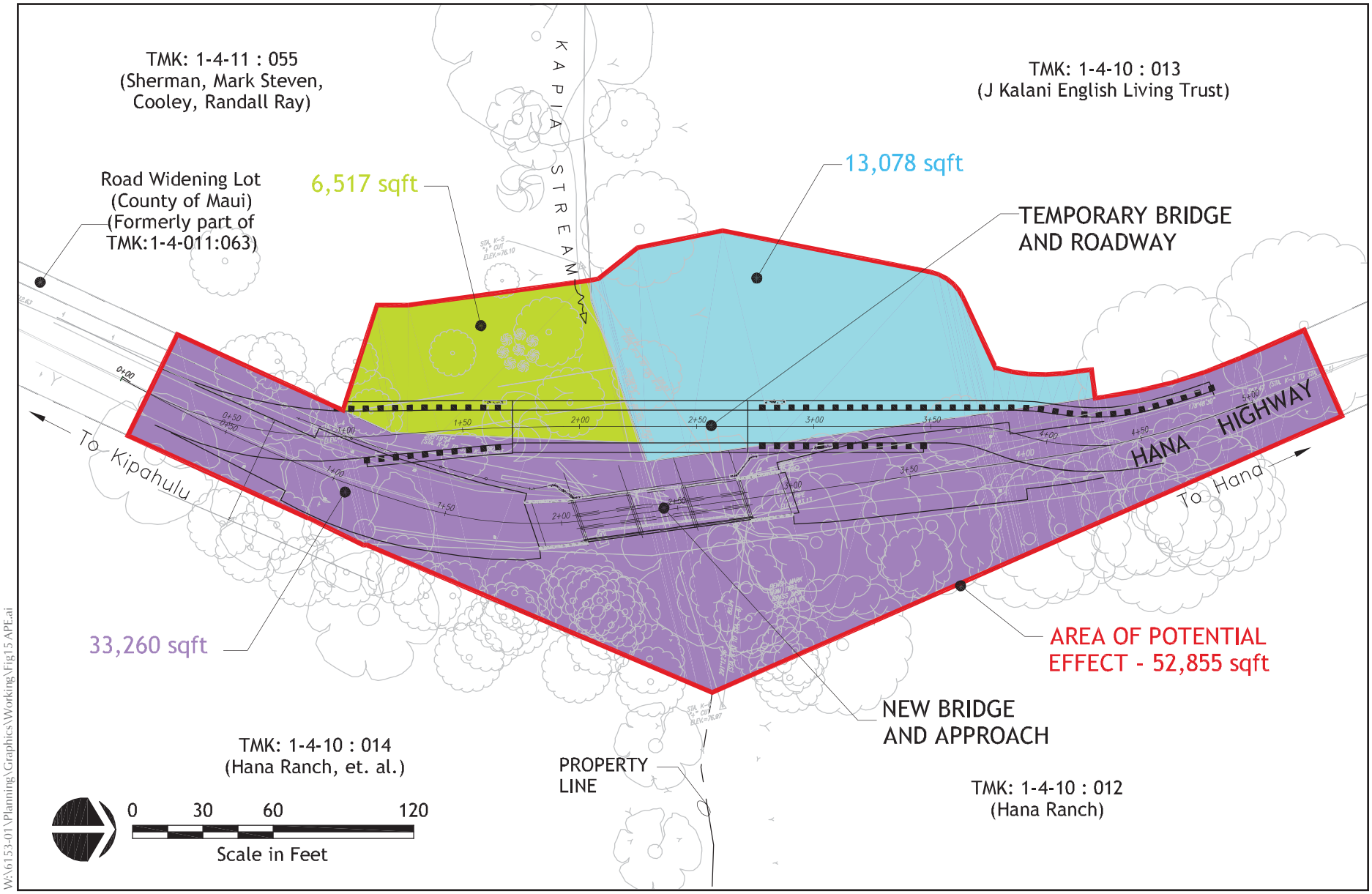

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FIGURE 15

AREA OF POTENTIAL EFFECT

KAHAWAIOKAPIA BRIDGE REPLACEMENT

W:\6153-01\Planning\Graphics\Working\Fig16 Staging Area.dwg Plot Date: April 14, 2016 CAD User: ytanaka

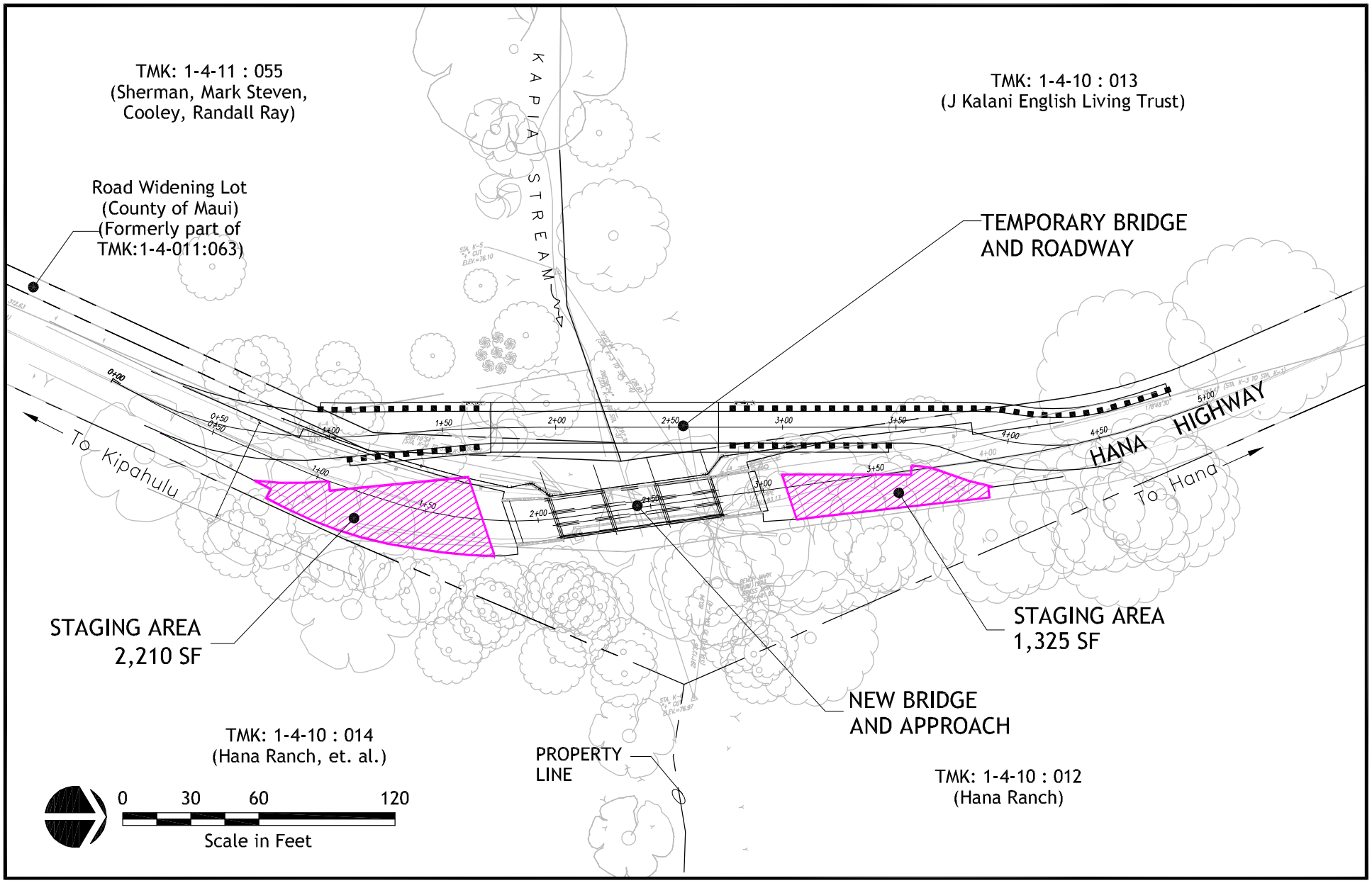

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FIGURE 16

STAGING AREA

KAHAWAIOKAPIA BRIDGE REPLACEMENT

3. DESCRIPTION OF EXISTING ENVIRONMENT, IMPACTS, AND MITIGATION MEASURES

3.1 Climate

Maui's climate varies by terrain but is relatively uniform year round with mild temperatures, moderate humidity, and relatively consistent northeasterly trade winds. Regional topography and exposure to trade winds and sun create a variety of micro-climates found across the island. The project site is located in the cooler windward portion of the island.

Average temperatures at lower elevations such as where the project site is located range from a low of approximately 64 degrees Fahrenheit (°F) in the coolest month, to a high of approximately 84°F in the warmest month.

Average rainfall distribution in the Hana region varies from under 75 inches per year near Hana Town to more than 100 inches per year at higher elevations near Kipahulu. Rainfall in the Hana region is highly seasonal with most of the precipitation occurring during the winter months. The prevailing wind throughout the year is the northeasterly trade wind. In general, trades are more persistent in the summer than in winter (frequencies average 90 percent and 50 percent, respectively) and stronger in the afternoon than at night. The Hana – Kipahulu region is also influenced by trade winds funneled through the Alenuihaha Channel between the coast and the Island of Hawaii. Mean trade wind flow near the project site ranges from approximately 20 to 23 miles per hour.

Impacts and Mitigation Measures

No significant impacts on climate in the project area are anticipated. Construction and operation of the proposed project are not anticipated to affect temperatures, wind, or rainfall levels in the project area.

3.2 Physiography

3.2.1 Geology and Topography

Maui is composed of two major volcanoes; the older West Maui Mountains and Haleakala. The broad, gently sloping plain connecting the two volcanoes was formed when lava from Haleakala banked against the West Maui lavas. East Maui was created from three volcanic series of the Haleakala Volcano; the Honomanu, Kula and Hana volcanic series. The project area lies along the eastern slopes of Haleakala, and is largely underlain by lava flows of the Hana volcanic series.

Small spatter cones and larger cinder cones associated with the Hana eruptions form the prominent hills along the south and east portions of Hana. The project site is located approximately 1,500 feet from the shoreline. The elevation of the roadway traversing Kapia Stream is approximately 93 feet above sea level. The rocky invert (bed) of Kapia Stream at this location ranges from 70 to 73 feet above sea level. Average slopes in the area are approximately 7 percent.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on geology or topography are anticipated during construction or operation of the proposed project.

3.2.2 Soils

According to the Soil Conservation Service's "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii" dated August 1972, soils in the vicinity of the project site include Makaalae silty clay, 7 to 25 percent slopes (MID) and Makaalae extremely stony silty clay, 7 to 25 percent slopes (MJD) (see Figure 17).

Makaalae silty clay, 7 to 25 percent slopes (MID) is located on rough mountain slopes. In a representative profile, the surface layer is very dark brown silty clay about 10 inches thick. Below this is very dark grayish-brown silty clay, about 30 inches thick, that has a subangular blocky structure. The substratum is fragmental Aa lava. The soil is strongly acid in the surface layer and medium to slightly acid in the subsoil. Permeability is moderate. Runoff is slow to medium, and the erosion hazard is slight to moderate.

Makaalae extremely stony silty clay, 7 to 25 percent slopes (MJD) is similar to the MID soils except that stones cover 3 to 15 percent of the surface. In places, outcrops of Aa lava along drainageways are common.

The State of Hawaii Department of Agriculture classification system "Agricultural Land of Importance to the State of Hawaii" (ALISH) classifies lands into four agricultural types, Prime Lands, Unique Lands, Other Lands, and Unclassified. According to the ALISH, the northern portion of the project is classified as Other Lands while the remaining portion is Unclassified (see Figure 18). Other Lands is defined as lands used for the production of food, feed, fiber and forage crops, but not classified as Prime or Unique. Unclassified lands commonly indicate that the land is not suitable for intensive agriculture.

The Detailed Land Classification – Island of Maui, published by the University of Hawaii, Land Study Bureau (LSB), evaluates the quality or productive capacity of certain lands on the island using a five-class productivity rating system, with "A" representing the class of the highest productivity and "E" the lowest. Under this system, the project site and adjacent lands are rated "D" (see Figure 19).

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on soils are anticipated as a result of the construction and operation of the proposed project. The project site is currently used as a County Highway (Route 330). The replacement bridge will be entirely within the existing County right of way. Besides traversing over Kapia Stream, the temporary bridge and roadway would affect portions of property mauka of the road which are vacant or in grassed pasture. The temporary bridge, appurtenant roadway and construction buffer area would affect approximately 19,595 square feet mauka of and abutting the existing County right of way. After the temporary bridge and appurtenant roadway are removed, the land will be restored to pre-construction condition to the extent possible.

Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, may result in impact to the quality of receiving surface and coastal waters downstream of the project site. Various mitigative measures will be incorporated into the project's

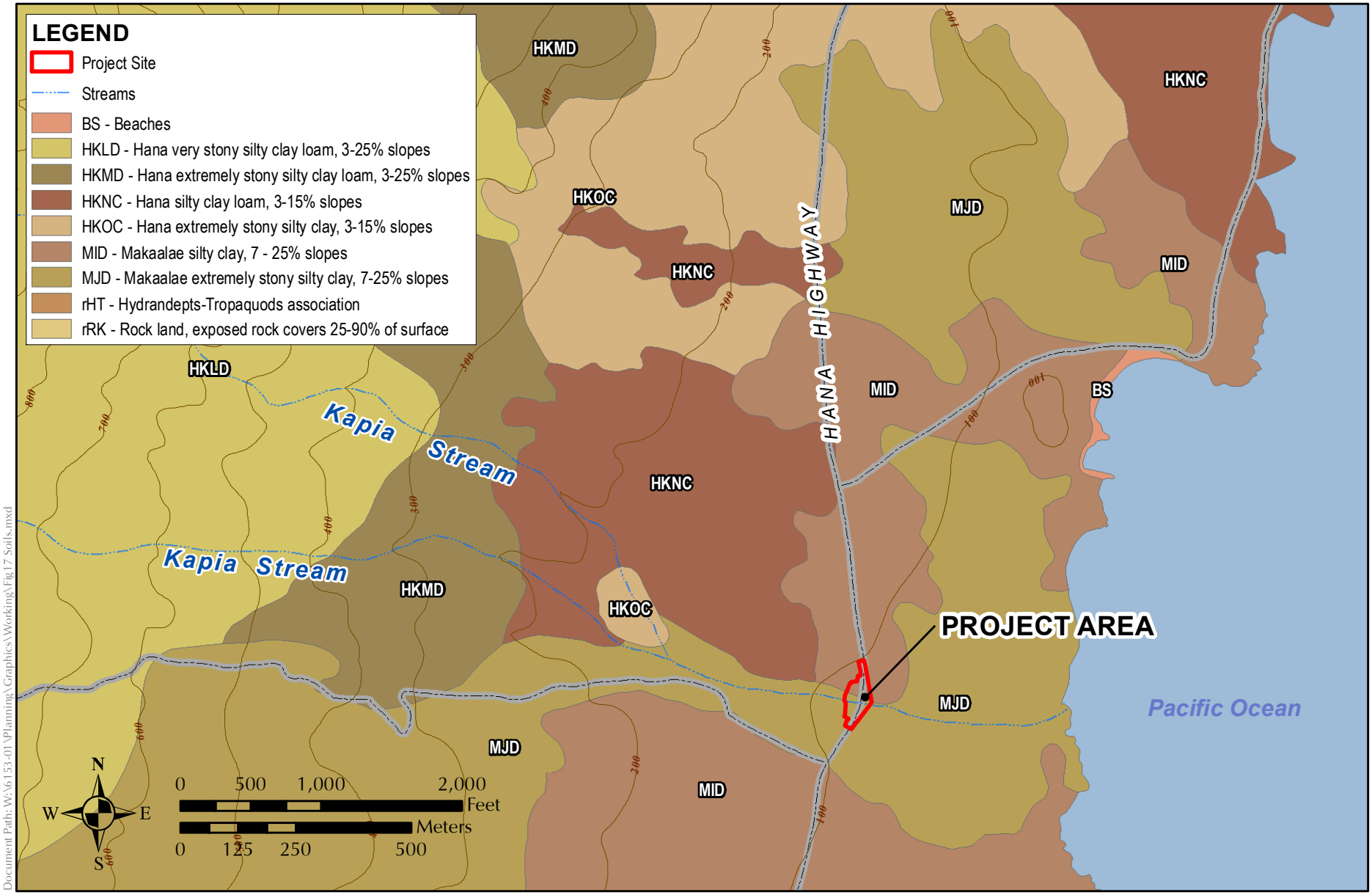

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FIGURE 17

SOILS MAP

KAHAWAIOKAPIA BRIDGE REPLACEMENT

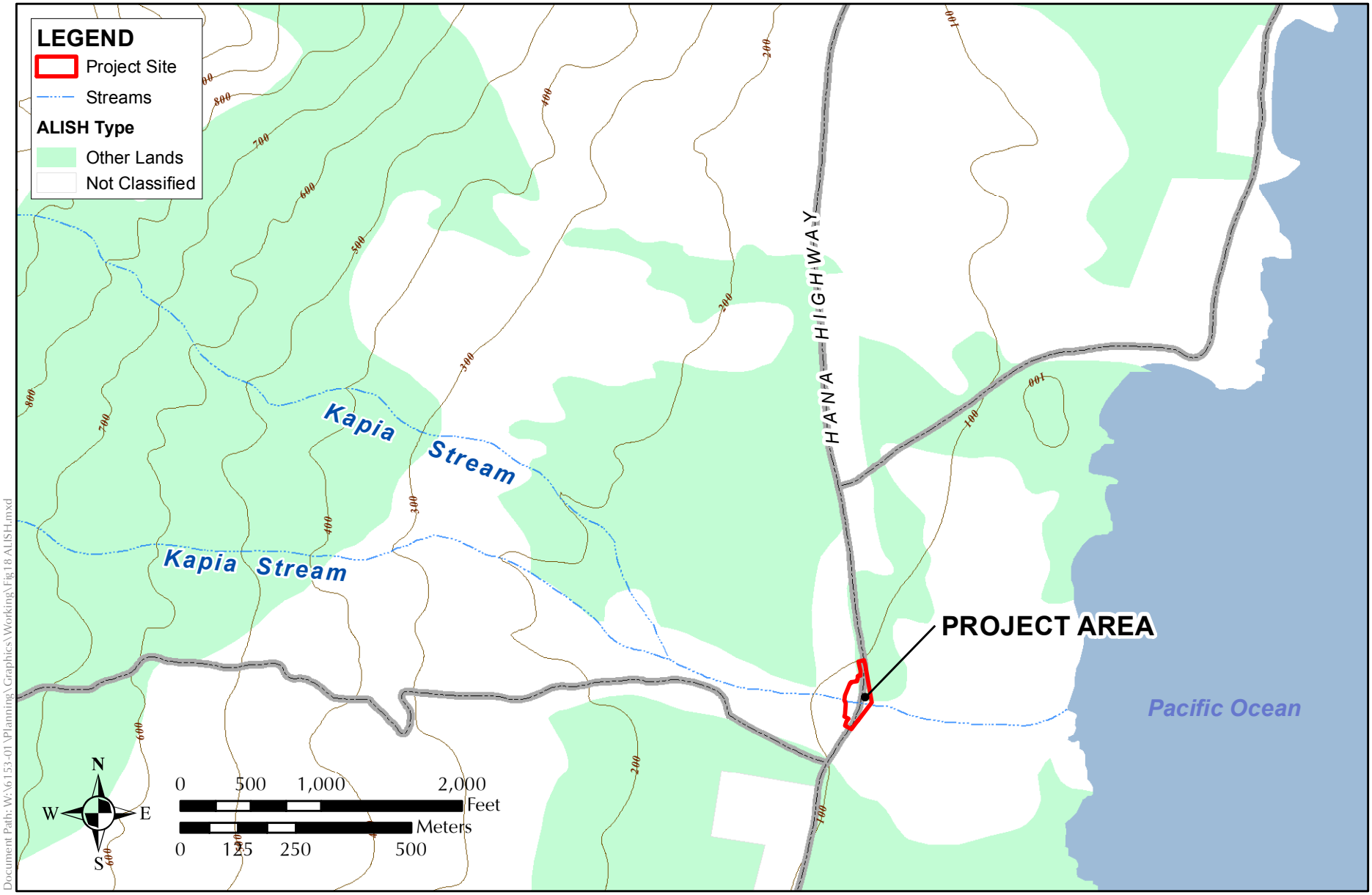

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FIGURE 18

AGRICULTURAL LANDS OF IMPORTANCE TO THE STATE OF HAWAII

KAHAWAIOKAPIA BRIDGE REPLACEMENT

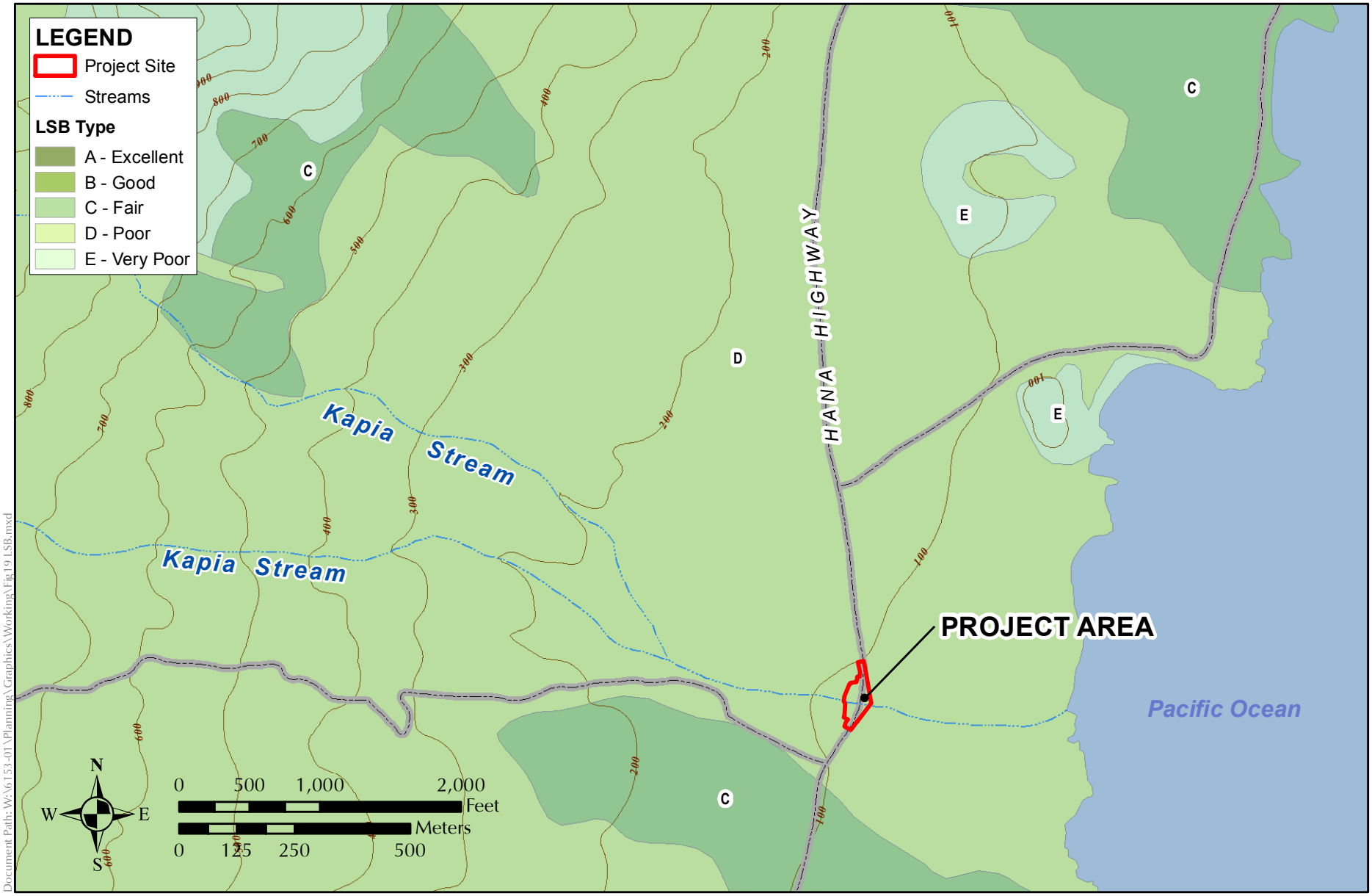

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FIGURE 19

LAND STUDY BUREAU DETAILED LAND CLASSIFICATION

KAHAWAIOKAPIA BRIDGE REPLACEMENT

construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinance.

A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State Department of Health (DOH), pursuant to Section 401 of the Clean Water Act will be required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment. Appropriate structural and/or non-structural BMPs will be instituted such as appropriately stockpiling materials on-site to prevent runoff, covering or stabilizing topsoil stockpiles, using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas.

3.3 Hydrology

3.3.1 Surface Water

The project site traverses Kapia Stream which, according to the Hawaii Stream Assessment, is an interrupted perennial stream (state perennial stream ID No. 6-5-03). The total stream length is approximately 9.4 miles (15.1 kilometers). The area of the watershed is 5.2 square miles (13.6 square kilometers), with a maximum elevation of 4,327 feet (1,319 meters). The Department of Land and Natural Resources (DLNR), Division of Aquatic Resources (DAR) classifies the watershed as medium size, steep in the upper watershed, and with little embayment. DAR has assigned the Kapia Watershed an overall rating of 6 out of 10 based on a combination of land cover rating, shallow waters rating, stewardship rating, size rating, wetness rating, and reach diversity rating. The Hawaii Stream Assessment also ranks it as outstanding ("O") for aquatic resource value and substantial ('S") for recreational value.

The State Department of Health (DOH)'s inland waters classification for Kapia Stream in the portion traversing the project site is class 2. Pursuant to Hawaii Administrative Rules (HAR) Title 11, Chapter 54, Water Quality Standards:

> "The objective of class 2 waters is to protect their use for recreation purposes, the support and propagation of aquatic live, agricultural and industrial water supplies, shipping, and navigation. The uses to be protected in this class of waters are all uses compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters. These waters shall not act as receiving water for any discharge which has no received the best degree of treatment or control compatible with the criteria established for this class." (Section 11-54-3(b)(2), HAR)

A Water Quality and Biological Survey for the project site was prepared by AECOS Inc. in November 2010. The project site was originally visited by AECOS biologists on August 18, 1998 and again in September 10, 2010. The survey extended approximately 50 meters upstream and downstream of the bridge in 1998 and 1,315 meters upstream and 480 meters downstream in 2010. The Water Quality and Biological Survey is included as Appendix A and a summary of the water quality findings are found below.

The lower reach of Kapia Stream flows only during significant rainfall events on the watershed and thus the stream is classified as interrupted. During both site visits, no flow was observed upstream or downstream of the bridge. The stream bed was dry, but the historic occurrence of significant freshet flows was evidenced by the numerous undercut waterfalls and deep plunge pools in the gulch upstream of the bridge.

During the 1998 survey, several small, isolated pools in Kapia Gulch were surveyed. However, as these pools were located in solid basalt and may represent only accumulated rainwater; no water quality measurements were made. In 2010, water quality measurements were taken from the terminal estuarine pool located well downstream of the bridge, adjacent to the ocean. Additionally, samples were collected from a large isolated pool located at the 37 meter elevation. In 1992, a water sample was collected from the stream at the 670 meter elevation where the stream was flowing.

While the pools surveyed in 2010 are not necessarily representative of flowing water in Kapia Stream, the results suggest that Kapia Stream has very good water quality. The low conductivity at the upstream sampling station suggests that rain was the source of water found in the pool. In general, turbidity and total suspended solids (TSS) were low at both the upstream and downstream sampling stations, however, the downstream station had a slightly higher turbidity and TSS, which is an indication of an organic content to the particulates in the water (i.e. phytoplankton). This, in turn, was reflected in the higher total nitrogen levels found at the downstream station. Inorganic nitrogen (nitrate+nitrate) was also low at both stations, but ammonia was high, particularly at the upstream station. This may be due to the somewhat stagnant conditions in the isolated pools at the time of the sampling. The pH at the upstream station was also high, likely the result of photosynthesizing algae.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on surface waters in the project vicinity are anticipated during construction or operation of the proposed project.

Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, could impact the quality of receiving surface and coastal waters downstream of the project site. Various mitigation measures will be incorporated into the project's construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinance.

A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State

Department of Health (DOH), pursuant to Section 401 of the Clean Water Act will be required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment and incorporate appropriate structural and/or non-structural BMPs such as appropriately using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas.

3.3.2 Groundwater

The State Department of Land and Natural Resources (DLNR), Commission on Water Resource Management (CWRM) has established a groundwater hydrologic unit and coding system for groundwater resource management. The proposed project site is located within the Hana Aquifer Sector which is comprised of four Aquifer System Areas identified as Kuhiwa, Kawaipapa, Waihoi, and Kipahulu. The project site is located within the Kawaipapa Aquifer System (60502), which consists primarily of volcanic, unconfined basal aquifers. Basal groundwater reaches at least two miles inland and is protected at the coast by caprock.

Impacts and Mitigation Measures

In the short- or long-term, no significant impacts to groundwater resources associated with the project site are anticipated during construction or operation of the proposed project. Construction activities are not likely to introduce to, nor release from the soils, any materials which could adversely affect groundwater. Construction material wastes will appropriately be disposed of to prevent any leachate from contaminating groundwater resources.

3.3.3 Coastal Waters

The nearest coastal waters downstream of the project site is approximately 0.3 miles to the east. The State Department of Health's marine waters classification for these coastal waters is class AA. Pursuant to Hawaii Administrative Rules (HAR) Title 11, Chapter 54, Water Quality Standards:

> "It is the objective of class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable, the wilderness character of these areas shall be protected." (Section 11-54-3(c)(1), HAR).

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on coastal waters in the project vicinity are anticipated during construction or operation of the proposed project.

Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, could

impact the quality of receiving surface and coastal waters downstream of the project site. Various mitigation measures will be incorporated into the project's construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinance.

A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State Department of Health (DOH), pursuant to Section 401 of the Clean Water Act will be required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment and incorporate appropriate structural and/or non-structural BMPs such as using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas.

3.4 Natural Hazards

3.4.1 Flood and Tsunami Hazard

According to the Flood Insurance Rate Map (FIRM) (Community Panel Number 0192H, prepared by the Federal Emergency Management Agency (FEMA), the project site is located within Zone A and Zone X (see Figure 20). Zone A is the flood insurance rate zone that corresponds to the 100-year floodplain that is determined in Flood Insurance Studies by approximate methods. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones. Zone X is an area determined to be outside of the 0.2% annual floodplain. No base flood elevations or depths are shown in this zone.

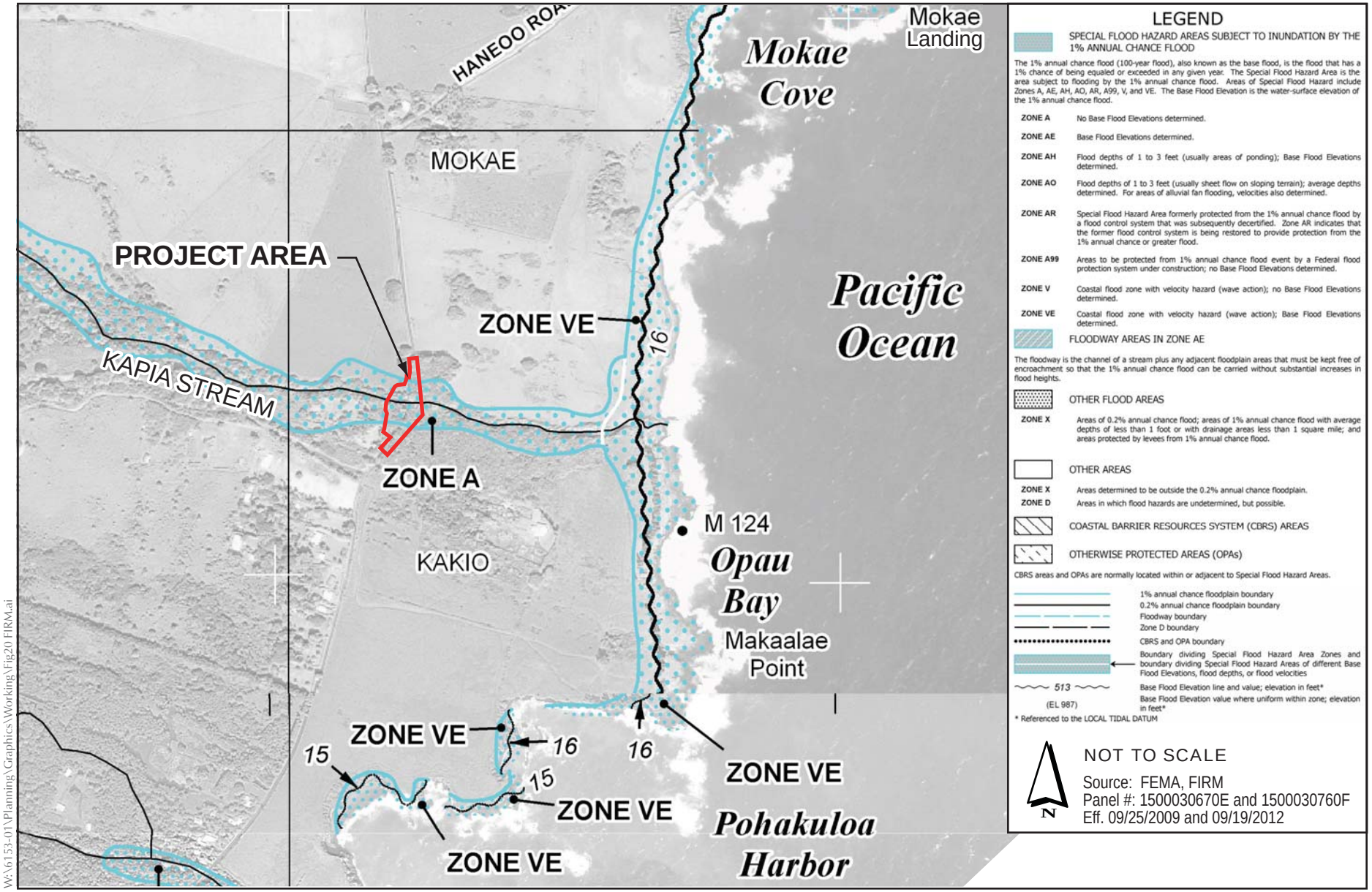
According to the Tsunami Evacuation Zone maps for Maui, the project site does not lie within the tsunami evacuation zone.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on flood hazards in the project area are anticipated as the proposed improvements will be designed and constructed in full compliance with the flood plain management requirements of the County. This will include certification by a registered professional engineer that the Project improvements will not result in any increase in base flood elevations during the occurrence of base flood discharges.

3.4.2 Seismic Activity

Earthquakes in the Hawaiian Islands are primarily associated with volcanic eruptions from the expansion or shrinkage of magma reservoirs. The Island of Maui is periodically subject to episodes of seismic activity of varying intensity, but available historical data indicates that



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WILSON OKAMOTO CORPORATION

FIGURE 20

FLOOD INSURANCE RATE MAP

KAHAWAIOKAPIA BRIDGE REPLACEMENT

the number of major earthquakes occurring on Maui have been generally fewer and of lower intensity compared to the Big Island.

The Uniform Building Code (UBC) provides minimum design criteria to address potential for damages due to seismic disturbances. The UBC has six seismic zones (0, 1, 2A, 2B, 3, 4). Zone 0 is the lowest level on the scale defined as no chance of severe ground shaking to Zone 4 which is the highest level with a 10% chance of severe shaking in a 50-year interval. The County of Maui is designated as Zone 2B.

Impacts and Mitigation Measures

The proposed project will be designed and constructed to meet the requirements of the latest version of the American Association of State Highway and Transportation Officials (AASHTO) load-and-resistance factor design to ensure that potential seismic activities would not adversely affect the bridge structure.

3.5 Flora and Fauna Resources

A Water Quality and Biological Survey for the project site was conducted by AECOS Inc. in November 2010, to ascertain aquatic resources and assess water quality for the proposed project (refer to Appendix A). The biological findings are summarized below.

Flora: The lower reach of Kapia Stream flows through pastureland. A large grove of kamani trees (*Calophyllum inophyllum*) occurs along the makai side of the highway, south of the bridge. The gulch itself, in the vicinity of the bridge, is mostly of solid basalt bottom, but supports various weedy herbaceous species growing in cracks or in soil along the upper banks. Larger shrubs and trees shading parts of the gulch include mango (*Mangifera indica*), *kukui* (*Aleurites moluccana*), Java plum (*Syzigium cumini*), guava (*Psidium guajava*), banana (*Musa x paradisiaca*), avocado (*Persea americana*), and *koa haole* (*Leucaena leucocephala*). Herbs and shrubs in the area include elephant grass (*Pennisetum purpureum*), klu (*Acacia farnesiana*), *lauae* fern (*Phymatosorus scolopendira*), wood fern (*Dryopteris* sp.), wedelia (*Sphagneticola trilobata*), pothos (*Epipremnum pinnatum*), passion fruit (*Passiflora edulis*), Koster's curse (*Clidemia hirta*), undetermined iris-like plant, *Crassocephalum crepidiodes*, little ironweed (*Veronia cinera*), sword fern (*Nephrolepis* sp.), bubble-gum plant (*Polygala paniculata*), lace fern (*Sphenomeris chinensis*), vervain (*Stachytarpheta* cf. *jamaincensis*), bitter gourd (*Momordica charantia*), graceful spurge (*Chamaesyce hypericifolia*), dayflower (*Commelina diffusa*), sourbush (*Pluchea carolinensis*), Job's tears (*Coix lacryma-jobi*), and various other grasses and sedges. These are all common, mostly introduced species, characteristic of lowland areas in the Hawaiian Islands.

Fauna (Stream Biota): Representative specimens of aquatic biota that could not be readily identified in the field, both in 1998 and 2010, were collected for later taxonomic work in the laboratory. The isolated pools in located in Kapia Gulch near the bridge contain much algae and a variety of aquatic insects. No mollusks or fish were observed. Some of the pools surveyed contained clear water, while others were full of leaf litter and highly colored with plant tannins. In 1998, bee-flies (*Syrphidae*), and damselfly (*Ischnura posita*), and two species of dragonfly (*Orthemis ferruginea* and *Pantala flavescens*) were observed around the pools, however, neither the bee-flies nor damselfly were present in 2010.

The pool surfaces support small endemic water striders (*Microvelia vagans*) which were abundant in 1998 and occasional in 2010. Also observed within the pools, both in 1998 and 2010, were backswimmers (*Buenoa pallipes*) and dragonfly nymphs (*Orthemis ferruginea*). In 1998, in a pool filled with leaf litter downstream of the bridge, large numbers of sand-fly larvae (Diptera, Psychodidae) were present. In 2010, the dominant insect in the isolated pools near the bridge that were colored with plant tannins was the mosquito wriggler (Culicidae) which were not reported in 1998. Leaches (*Hirudinean sp.*) were also present in 2010.

On a previous visit to the upper reach of the stream in 1994, an AECOS biologist observed a male oopu alamoo (*Lentipes concolor*) at the 670 meter elevation. The Hawaii Stream Assessment database reports that oopu nakea (*Awaous guamensis*) and oopu nopili (*Sicyopteris stimpsoni*) can also be found in the stream. The Atlas of Hawaiian Watersheds also reports the presence of oopu nakea and also lists oopu akupa (*Eleotris sandwicensis*) as species that can be found in the lower reach of the stream.

The estuarine reach of the gulch, though short, is home to a diverse assemblage of estuarine and marine species and is significant in that no alien aquatic species were observed, which is becoming unusual in the Hawaiian Islands. The estuarine pool is likely fed by groundwater seepage or intermittent stream flow. The high salinity (32 practical salinity units) indicates that freshwater inputs are occurring, but are small in volume. In 2010, schools of *aholehole* or Hawaiian flagtail (*Kuhlia xenura*) were abundant along the margins of the pool and schools of *amaama* or striped mullet (*Mugil cephalus*) were abundant in the deeper waters. Oopu nakea was common, resting on the bottom of the pools. Most *oopu nakea* observed were between 1 and 2 inches long, although one was measured at 4 inches in length. *Oopu naniha* (*Stenogobius hawaiiensis*) were rare in the estuarine pool.

Impacts and Mitigation Measures

No short- or long-term significant impacts on flora or fauna species are anticipated due to the construction and operation of the proposed project. It is not anticipated that the new bridge structure will impact aquatic species, particularly migrating native species, due to the bridge being designed for high freshet flows.

No aquatic species protected by State or Federal endangered species statutes were observed in Kapia Stream within the project vicinity.

Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, could impact the quality of receiving surface and coastal waters downstream of the project site. Various mitigation measures will be incorporated into the project's construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinance.

A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State Department of Health (DOH), pursuant to Section 401 of the Clean Water Act will be

required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment and incorporate appropriate structural and/or non-structural BMPs such as using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas.

3.6 Historic and Archaeological Resources

An "Archaeological Inventory Survey at the Kahawaiokapia Bridge, Ahupuaa of Mokae and Kakio, District of Hana, Island of Maui" was prepared by Pacific Legacy, Inc. dated February 2015 (refer to Appendix B). The current survey builds upon a previous archaeological inventory survey conducted by Cleghorn and McIntosh (1999) for Koukouai, Paihi and Kahawaiokapia Bridges. Pacific Legacy also conducted an archaeological inventory survey dated September 2013. However, the February 2015 survey also included an approximately .5 acre area on the mauka side of the bridge intended to be utilized for the temporary bridge. Thus, the results of the 2015 survey include the findings of the 1999 and the 2013 surveys.

In terms of traditional history, the report recognizes Hana's rich cultural heritage. There are numerous myths and legends associated with this part of East Maui. Stories from Hana show close association with many traditional gods, including Pele, Maui, and Kuula. Additionally, Hana was said to have been a favorite place for many Maui chiefs and many chose Hana as their place of residence.

Kahawaiokapia Bridge is the central historic site in the current study area and is located within and is a contributing element to the Hana Highway Historic District. The original description of the Hana Highway Historic District is provided in the inventory and evaluation study conducted by Spencer Mason Architects:

> The Hana Highway Bridge District includes fifty-nine bridges and eight culverts constructed along the Hana Highway (State Highway 360) between 1908 and 1937. The district covers more than 50 miles of roadway beginning at the Hoalua Stream Bridge near Huelo in the Makawao District and ending immediately after Koukouai Stream Bridge near Oheo in the Kipahulu District. The Hana Highway Historic Bridge District encompasses the highest concentration of unaltered and stylistically consistent historic bridges in the state (Spencer Mason Architects 1996:VII-191).

Kahawaiokapia Bridge was constructed in 1915 by Wilson and McCandless. Wilson and McCandless were employed by Maui County to construct a macadam road towards Keanae (Hawaii Heritage Center 1990:167). Kahawaiokapia Bridge is a concrete flat slab bridge, which extends over Kapia Stream, and has a maximum length of 59 feet. A flat slab bridge is described as:

> Simple reinforced-concrete slab bridges were an alternative to metal or timber stringers structures. Early twentieth century concrete slabs were cast on site, with formwork built by local carpenters. The plain appearance of this functional design

was augmented by a variety of railings, which ranged from solid parapets to open balustrades (Spencer Mason Architects 1996:VI-195).

In 2002, Mason Architects completed an HAER (Historic American Engineering Record) for Kahawaiokapia Bridge and stated that this bridge was a contributing element to the Hana Highway Historic District (HAER HI-72 is housed in the Library of Congress http://www.loc.gov/index.html).

In terms of archaeology, it is noted that the 1999 survey examined a small area of approximately 50 meters around Kahawaiokapia Bridge and outside of the current Area of Potential Effect. Two sites were identified at that time. Site 50-50-13-4684 is identified as a probable habitation site located approximately 17 meters at 110 degrees from the southeast corner of Kahawaiokapia Bridge. The site consists of five features: a platform, three stone alignments and a rock mound.

Also noted outside of the current project area is a complex of stacked stone platforms and mounds. These are located 30 meters to the east of the platform feature. These are possible burial structures but are located well outside of the APE and were not recorded during the surveys.

Site 50-50-13-4685 is located to the north of Kapia Stream approximately 27 meters at 247° to the northeast corner of Kahawaiokapia Bridge. This site consists of three features: an enclosure, a rock wall, and a concrete cistern. The 2015 survey noted that Feature C (cistern) has been severely damaged by cattle grazing and resting in the area.

Impacts and Mitigation Measures

Kahawaiokapia Bridge is a contributing property to the Hana Highway Historic District. This district was placed on the National Register of Historic Places In June 2001. The demolition of this bridge and its replacement in the same location was recommended in the *Final Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (2001).

The 1999 survey (Cleghorn and McIntosh 1999) identified two previously undocumented archaeological sites adjacent to the bridge. The two sites located makai of Kahawaiokapia Bridge (50-50-13-4684 and -4685) are interpreted as habitation sites based upon the types of features (alignments and platforms) identified at each site. These two sites have been assessed as significant because of their information potential (Criterion D).

While these sites are in close proximity to Kahawaiokapia Bridge, both are located on the makai side of Hana Highway and outside of the Area of Potential Effect and, therefore, would not be disturbed by construction activities. An additional complex of stone features that may possibly be traditional burial sites was identified even further makai of the bridge, also outside of the Area of Potential Effect. No archaeological sites were identified on the mauka side of the highway where the Area of Potential Effect includes the temporary bridge, temporary approach road, and construction buffer.

The archaeological investigations indicate that the proposed Kahawaiokapia Bridge replacement will not result in an "adverse effect" to any of the identified archaeological sites. However, the proposed project will result in an "adverse effect" to the existing Kahawaiokapia Bridge. However, the adverse effect has been mitigated by the Historic American Engineering Record (HAER) including photographs and written historical data, prepared by Mason Architects for the bridge replacement project and by compliance with the preservation plan.

While it is highly unlikely that buried cultural deposits are present within the APE, the possibility still exists. Buried cultural deposits could include living surfaces, domestic features such as fire hearths, *imu*, or activity areas, as well as human remains. Given this possibility, it is recommended that archeological monitoring be conducted during the initial grubbing and grading of the project area. After the initial grubbing and grading, an archaeological monitor should be on-call in the event construction activities uncover potentially significant materials. The procedures must be detailed in an archaeological monitoring plan approved by the State Historic Preservation Division prior to the start of any ground altering activities.

3.7 Air Quality

The State of Hawaii Department of Health (DOH), Clean Air Branch, monitors the ambient air in the State for various gaseous and particulate air pollutants. The U.S Environmental Protection Agency (EPA) has set national ambient air quality standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, ozone, and particulate matter (PM_{10} and $PM_{2.5}$). Hawaii has also established a state ambient air standard for hydrogen sulfide associated with volcanic activity. The primary purpose of the statewide monitoring network is to measure ambient air concentrations of these pollutants and ensure that these air quality standards are met.

Air pollution in Hawaii is caused by many different man-made and natural sources. There are industrial sources of pollution, such as power plants and petroleum refineries; mobile sources, such as cars, trucks and buses; agricultural sources, such as sugar cane burning, and natural sources, such as windblown dust and volcanic activity. The DOH Clean Air Branch is responsible for regulating and monitoring pollution sources to ensure that the levels of criteria pollutants remain well below the State and Federal ambient air quality standards.

The State maintains two air monitoring stations on the island of Maui, one in Kihei and one in Paia. Both stations monitor for particulate matter ($PM_{2.5}$) less than or equal to 2.5 micrograms per cubic meter ($\mu g/m^3$). Current readings from the Kihei station indicate that the concentration of $PM_{2.5}$ is well below Federal air quality standards. There are no State standards for $PM_{2.5}$. Although there is no specific information available for the project site, air quality at the project site is generally considered to be good due to the presence of abundant tradewinds throughout most of the year. The current volume of vehicular traffic along Hana Highway at the project site does not generate the level of emissions that could violate Federal or State air quality standards.

Impacts and Mitigation Measures

In the short-term, during construction of the proposed project, two potential types of air pollution emissions will likely occur, resulting in air quality impacts: 1) airborne dust from construction activities such as grading and excavation within the project site; and 2) exhaust emissions from construction vehicles and equipment from the project site.

Potential air quality impacts during construction of the proposed development will be mitigated by complying with the State DOH Administrative Rules, Title 11, Chapter 60 "Air Pollution Control". The construction contractor is responsible for complying with the State DOH regulations which prohibit visual dust emissions at property boundaries. Compliance with State regulations will require adequate measures to control airborne dust by methods such as water spraying and sprinkling of loose or exposed soil or ground surface areas and dust-generating equipment during construction. As may be deemed appropriate, planting of landscaping as soon as possible on completed areas will also help to control dust. Increased vehicular emissions due to disruption of traffic by construction equipment and/or commuting construction workers can be alleviated by moving the equipment and personnel to the site during off-peak hours. Exhaust emissions from construction vehicles are anticipated to have negligible impact on air quality in the project vicinity as the emissions will be relatively small and readily dissipated.

3.8 Noise

Ambient noise in the project area is predominantly attributed to vehicular traffic traveling along Hana Highway and adjacent roadways. Also contributing to the acoustic environment is noise from wind and birds.

Impacts and Mitigation Measures

In the short-term, noise from activities such as excavation, grading, cutting, and paving will be unavoidable. The increase in noise level will vary according to the particular phase of construction. Noise may also increase as a result of operation of heavy vehicles and other power equipment during the construction period.

Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, "Community Noise Control" regulations. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels stated in the DOH Administrative Rules. It shall be the contractor's responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulatory limits. Also, the guidelines for heavy equipment operation and noise curfew times, as set forth by the DOH noise control rules, will be adhered to; or if necessary a noise permit shall be obtained.

In the long-term, no significant noise impacts are anticipated once the construction of the proposed project has been completed. Since the project is not expected to increase roadway capacity or travel demand, ambient noise levels in the vicinity should not change significantly.

3.9 Traffic

Hana Highway provides through vehicular access for residents, visitors, businesses, private and government services, including police, fire, emergency medical transport and refuse collection from the north side of Maui to Hana. Hana Highway is largely a two-lane two-way road, with numerous one-lane bridge and culvert crossings, such as at Kahawaiokapia Bridge. The portion of the highway that runs through Hana Town up to Keawa Place is identified as Highway 360 and is under the jurisdiction of the State of Hawaii. For the next 13 miles, Hana Highway is identified as Route 31 and falls under the jurisdiction of the County of Maui. The 14 County bridges discussed in the *Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (December 2002) are included in this portion of the highway. This portion of Hana Highway traverses from Mile Post 51 to Mile Post 38, at Kalepa Bridge near Kipahulu. Hana Highway then transitions into Piilani Highway but remains under the County's jurisdiction.

The scenic drive to Hana Town is a major visitor attraction, as are Hamoa Beach, Seven Pools, and Kipahulu Falls, which are located further south on the highway. Consequently, tourists comprise a large portion of the traffic on the highway through Hana.

Impacts and Mitigation Measures

Before the existing bridge is demolished, the temporary bridge and detour road mauka of the existing bridge will be constructed. The single lane steel panel bridge would be approximately 13 feet 8 inches wide. During the period of construction for the temporary bridge and detour road, the existing bridge will remain open for use.

After the temporary bridge and detour road are completed, the existing bridge and abutting portions of the road will be closed. The bridge will be demolished and a new bridge and road will be constructed. The new bridge will be a one lane bridge 16 feet in width.

After completion of the new bridge, traffic will be rerouted to the new bridge and the temporary bridge and detour road will be removed.

During and after construction, traffic operations along the Hana Highway are generally expected to remain similar to existing conditions. The existing number of lanes will remain the same during and after construction. The project should not result in a reduction or increase in traffic volumes.

3.10 Visual Resources

Hana Highway from the area before Keanae Town extending to Hana Town transitioning to Piilani Highway all the way to areas beyond Ulupalakua offers scenic views from many locations along its route. This constitutes the coastal highway around the entire eastern portion of the island. The Kahawaiokapia Bridge is part of this corridor and is located approximately 3.5 miles south of Hana Town.

Impacts and Mitigation Measures

The visual character of Kahawaiokapia Bridge is primarily associated with the Hana Belt Highway Historic District. The proposed replacement of Kahawaiokapia Bridge is

consistent with the recommendations of the *Final Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (2001). Kahawaiokapia Bridge contributes to the historic character of the Hana Belt Highway Historic District but does not qualify for individual listing in the National or State Register of Historic Places. For such County bridges that may be eligible for listing due to their age of 50 years or more, but are not historically significant individually, the plan provides recommendations for their replacement. This would allow the replacement bridges to achieve most current design standards for structural integrity and traffic safety while retaining features that contribute to the historic character of the district. These include, for example, retaining their single-lane configuration, replacing bridge railings with a crash-tested design resembling the original and using a faux rock wall approach guardrail.

The alternative of using a single-span bridge deck, which would allow the original mid-span support piers to remain as non-load bearing was considered for Kahawaiokapia Bridge, however, the long girders required for a single span could not be feasibly transported to the project site along the narrow and winding Hana Highway or Piilani Highway.

3.11 Socio-Economic Characteristics

Hana Town serves as the major population center of the Hana area and is situated 55 miles east of the County seat in Wailuku. The economy in Hana is primarily based on diversified agriculture, the visitor industry, government services and subsistence activities. Diversified agricultural activities include ranching, as well as the cultivation of taro and tropical fruits, flowers and foliage. Business, government services and visitor accommodations are centered in Hana Town.

The project site is located within the Hana Census Designated Place (CDP). The following is a comparison of the socio-economic characteristics of the Hana CDP and the County of Maui as shown in Table 1.

Based on 2010 Census data, the Hana CDP contains 1,235 persons or 0.8% of the population within the County of Maui. The age distribution of persons within the Hana CDP is fairly similar to the County of Maui as a whole. In terms of race, there are higher percentages of Hawaiian and Other Pacific Islanders (29.1%) than the County as a whole (10.4%). Individuals reporting two or more races (42.8%) also represent a significantly higher percentage than the County as a whole (23.5%). Whites and Asians represent a lower percentage in the Hana CDP than the County as a whole.

According to 2006-2010 American Community Survey data, the Hana CDP has a lower percentage of persons who are now married, except separated, than the County as a whole. The percentages of high school graduates among those 25 years of age or older are similar between the Hana CDP and the County as a whole. However, percentages of those persons who have attained a bachelor's degree or higher is lower in the Hana CDP (10.2%) when compared to the County as a whole (25.7%).

Rental vacancy rates are significantly lower in the Hana CDP (13.5%) when compared to the County as a whole (26.1%). Average household sizes within the Hana CDP for both owner-occupied units and tenant-occupied units are larger than for the County as a whole.

Per capita income is lower in the Hana CDP ($17,472) than the County as a whole ($29,180). However, median family income is very similar.

Table 1
Selected Demographic Characteristics of the Hana CDP and County of Maui

	Hana CDP	**County of Maui**
POPULATION, 2010	1,235	154,834
AGE		
Persons under 5 years, percent, 2010	8.3%	6.5%
Persons between 5 and 64 years, percent, 2010	78.0%	80.7%
Persons 65 years and over, percent, 2010	13.6%	12.8%
RACE		
White persons, percent, 2010 (a)	22.2%	34.4%
Black persons, percent, 2010 (a)	0.1%	0.6%
American Indian and Alaska Native persons, percent, 2010 (a)	0.1%	0.4%
Asian persons, percent, 2010 (a)	5.0%	28.8%
Native Hawaiian and Other Pacific Islander, percent, 2010 (a)	29.1%	10.4%
Persons reporting two or more races, percent, 2010	42.8%	23.5%
Persons of Hispanic or Latino origin, percent, 2010 (b)	9.8%	10.1%
MARITAL STATUS (15 years and older)		
Now married, except separated, 2006-2010	43.9%	50.7%
Widowed, 2006-2010	8.7%	5.4%
EDUCATIONAL ATTAINMENT		
High school graduate or higher, percent of persons age 25+, 2006-2010	85.0%	88.8%
Bachelor's degree or higher, pct of persons age 25+, 2006-2010	10.2%	25.7%
HOUSING		
Homeowner vacancy rate, percent, 2006-2010	0.0%	2.0%
Rental vacancy rate, percent, 2006-2010	13.5%	26.1%
Average household size of owner-occupied unit, 2006-2010	3.51	3.12
Average household size of tenant-occupied unit, 2006-2010	2.75	2.56
ECONOMIC CHARACTERISTICS		
Per capita income, 2006-2010	$17,472	$29,180
Median family income, 2006-2010	$70,109	$74,465

Impacts and Mitigation Measures

In the short term, construction activities associated with the proposed project will create some short term impacts such as unavoidable noise impacts, and air quality impacts from soil excavation and grading activities in the vicinity of the project. Prior to demolishing the existing bridge, a temporary bypass bridge will be constructed to maintain vehicular access through the area while the replacement bridge is constructed. By providing continuous access through the project site, impacts to socio-economic activities depending on such access will be minimized.

Also, in the short-term, the project will confer positive economic benefits in the local area. Direct economic benefits will result from construction expenditures both through the purchase of material from local suppliers and through the employment of local labor, thereby stimulating that sector of the economy. Indirect economic benefits may include benefits to local retailing businesses resulting from construction activities.

In the long-term, the proposed project will have a beneficial socio-economic impact by providing safer and more reliable access along this section of Hana Highway. This will, in turn, minimize adverse economic impacts that could result from the interruption of roadway access.

No adverse long-term socio-economic impacts are anticipated with the proposed project. The proposed project is not anticipated to induce growth in the Hana region nor spur significant increases or changes in travel behavior.

3.12 Public Services and Facilities

3.12.1 Police and Fire Protection

Police protection in the project area is provided by the County of Maui Police Department (MPD). The project area is a part of Hana Patrol District which is served by the Hana Police Station located at the intersection of Uakea Road and Hana Highway, approximately 3 miles north of the project site. The service region extends from Kaumahina State Park in Keanae to Kaupo.

Fire prevention, protection is provided by the County of Maui, Department of Fire and Public Safety. The project area is served by the Hana Fire Station located at the intersection of Uakea Road and Hana Highway approximately 3 miles north of the project site. The service region includes the area from Honomanū Bay in Keanae to Kaupo Store in Kaupo.

Impacts and Mitigation Measures

Prior to demolishing the existing bridge, a temporary bypass bridge will be constructed to maintain vehicular access through the area while the replacement bridge is constructed. By providing continuous access through the project site, access for police and fire emergency services will be maintained.

In the long-term, the proposed project will have a beneficial impact on police and fire emergency services by providing safer and more reliable access along this section of

Hana Highway, and minimizing the potential for interruption of access due to public safety considerations. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Hence, the project is not anticipated to have secondary impacts such as inducing population growth and associated demand for police and fire services.

3.12.2 Health Care Services

The primary hospital facility on the island is the Maui Memorial Medical Center, which is located in Wailuku. From the project site, it is an approximately 55 mile drive heading north through Hana. The 231 bed facility provides general, acute, and emergency care services.

The closest medical facility to the project site is Hana Medical Center which is a four mile drive north just beyond Hana town. The center provides general health care services including medical and dental care, as well as 24-hour urgent care.

Kula Hospital, in Kula, is a 40 mile drive from the project site, through Kaupo and Ulupalakua Ranch. Affiliated with Maui Memorial Medical Center, Kula Hospital has 113 beds and a 24-hour emergency room.

Impacts and Mitigation Measures

In the short-term, prior to demolishing the existing bridge, a temporary bypass bridge will be constructed to maintain vehicular access through the area while the replacement bridge is constructed. This will provide continuous emergency medical access through the project site.

In the long-term, the proposed project will have a beneficial impact on emergency medical services by providing safer and more reliable access along this section of Hana Highway.

3.12.3 Education

The project site is located within the State Department of Education's (DOE) Hana complex that is served by Hana High and Elementary School, which is located approximately 4 miles north of the project site. Hana High and Elementary serves children from kindergarten to 12th grade. Its service district extends from Keanae along the northern coast to the Kaupo area along the southern coast. There are 45 staff members working at the school. Student enrollment at the school is approximately 360 students.

Impacts and Mitigation Measures

In the short-term, prior to demolishing the existing bridge, a temporary bypass bridge will be constructed to maintain vehicular access through the area while the replacement bridge is constructed. This will provide continuous access through the project site for students commuting along this route.

In the long-term, the proposed project will have a beneficial impact on education by providing safer and more reliable access for students commuting to school along this section of Hana Highway and Piilani Highway. The proposed Kahawaiokapia Bridge

improvements are not anticipated to adversely impact the existing educational facilities in the Hana region.

3.12.4 Recreational Facilities

The County has several parks located in the project vicinity. Recreation facilities within Hana Town range from about three to four miles north of the project site and include the Hana Bay Beach Park, Helene Hall, the Hana Community Center and District Complex and Ball Park, and Paani Mai Park. Hana Bay Beach Park is a 0.5 acre linear park containing picnic facilities, barbeque facilities, parking and restrooms. The Helene Hall community complex is also located within the Hana Bay Beach Park. The Hana Community Center and District Complex and Ball Park contains a baseball stadium, concession stand, playground and tennis courts. Paani Mai Park is approximately 1.1 acres located in Hana Town consisting of picnic areas and playground.

The Haleakala National Park has a visitor center at Oheo, approximately seven miles southwest of the project site. The Park also offers hiking trails and camping facilities.

The Kipahulu Point Light Station comprises about 1.1 acre and is located approximately eight miles to the southwest of the project site. This passive park contains picnic tables. The site adjoins the grounds of the Palapala Honomanu Congregational Church which contains the gravesite of Charles Lindbergh.

Impacts and Mitigation Measures

In the short-term, prior to demolishing the existing bridge, a temporary bypass bridge will be constructed to maintain vehicular access through the area while the replacement bridge is constructed. This will minimize the impact on traffic and provide continuous access through the project site to recreational opportunities in the vicinity.

In the long-term, the proposed project will have a beneficial impact on accessing recreational opportunities by providing safer and more reliable access along this section of Hana Highway. The proposed Kahawaiokapia Bridge improvements are not anticipated to adversely impact the existing recreational facilities in the Hana region.

3.12.5 Solid Waste Collection and Disposal

The County of Maui, Environmental Management Solid Waste Division Refuse Collection Program collects residential solid waste in the project vicinity of the project site. Currently, residential collection services south of Hana extends to Koali, which is approximately two miles south of the project site. On an island-wide basis, solid waste from residential properties is disposed at three landfill locations: Central Maui Sanitary Landfill, Olowalu Residential Recycling & Refuse Convenience Center, and Hana Sanitary Landfill. Construction waste is disposed at privately owned facility called Maui Construction & Demolition Landfill, which is located at Maalaea. Refuse collection for non-single family residential properties are provided by private refuse companies.

Impacts and Mitigation Measures

In the short-term, prior to demolishing the existing bridge, a temporary bypass bridge will be constructed to maintain vehicular access through the area while the replacement bridge is constructed. This will minimize the impact on traffic and provide continuous access through the project site for residential solid waste collection services.

Also in the short-term, the proposed project will generate solid waste typical of roadway construction-related activities. The contractor will be required to remove all debris from the site, and properly dispose of it at the Maui Construction and Demolition Landfill in conformance with County regulations.

In the long-term, the proposed project will have a beneficial impact of providing safer and more reliable access along this section of Hana Highway, including for residential solid waste collection.

3.13 Infrastructure and Utilities

3.13.1 Water and Wastewater Systems

The County of Maui Department of Water Supply (DWS) operates and maintains the water system that serves most of the island. In the vicinity of the project, water service to properties is provided by a DWS 8-inch waterline which is suspended from the existing Kahawaiokapia Bridge.

There are no County wastewater collection and treatment facilities in the Hana region. Properties in the vicinity of the project site are serviced by individual wastewater systems, including cesspools and septic tanks.

Impacts and Mitigation Measures

In the short-term, the existing 8-inch waterline, which is currently attached to the bridge, will be rerouted in the immediate construction area. All bridge improvements will be coordinated with the DWS so as to minimize impacts to neighboring properties and existing water service in the vicinity of the project site. No adverse impact to wastewater or water service is anticipated as a result of the proposed bridge improvements project.

3.13.2 Drainage

A Drainage Report for the existing bridge was prepared by Wilson Okamoto Corporation in March 2012. Based on a 100-year, 24-hour storm event, a peak discharge of 9,030 cfs was determined for existing runoff. The existing bridge is adequately sized to handle peak runoff. (see Appendix C).

There are no other drainage improvements in the vicinity of the project. During rainfalls, runoff sheet flows along the roadway and flows into the stream, gulches and gullies.

Impacts and Mitigation Measures

The proposed improvements will lengthen the bridge slightly and will be able to accommodate the 100-year, 24 hour storm event. The proposed project improvements are not anticipated to adversely impact drainage capacity of Kapia Stream or surrounding properties.

3.13.3 Electrical and Communications Systems

Electrical power on the island of Maui is provided by Maui Electric Company (MECO), a subsidiary of Hawaiian Electric Company, Inc. Telephone service in the Hana area is provided by Hawaiian Telcom.

Impacts and Mitigation Measures

Design and construction of proposed improvements will be coordinated with individual service providers to ensure that existing service levels are not adversely impacted by proposed improvements. The proposed project is not anticipated to require electrical and communication services for its operation.

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4. RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

This section discusses the State of Hawaii and County of Maui use plans, policies and controls relating to the proposed project.

4.1 State Land Use Plans and Policies

4.1.1 Hawaii State Plan

The Hawaii State Plan, Chapter 226, HRS, provides goals, objectives, policies, and priorities for the State. The Hawaii State Plan also provides a basis for determining priorities, allocating limited resources, and improving coordination of State and County Plans, policies, programs, projects, and regulatory activities. It establishes a set of themes, goals, objectives, and policies that are meant to guide the State's long-range growth and development activities. The proposed project is consistent with the following applicable objectives and policies:

Sec. 226-11 Objectives and policies for the physical environment – land-based, shoreline, and marine resources.

(a) 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.

(b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:

(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.

(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.

(8) Pursue compatible relationships among activities, facilities, and natural resources.

Discussion

Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, could

impact the quality of receiving surface and coastal waters downstream of the project site. However, various mitigation measures will be incorporated into the project's construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinances.

A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State Department of Health (DOH) pursuant to Section 401 of the Clean Water Act will be required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment and incorporate appropriate structural and/or non-structural BMPs such as appropriately stockpiling materials on-site to prevent runoff, covering or stabilizing topsoil stockpiles, using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas. Following construction, exposed soils at the project site will have been built over, paved over, re-vegetated or landscaped to control erosion.

Sec. 226-12 Objectives and policies for the physical environment – scenic, natural beauty, and historic resources.

1. *To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:*

   (1) Promote the preservation and restoration of significant natural and historic resources.

   (4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.

Discussion

The historic and aesthetic resource value of Kahawaiokapia Bridge is primarily associated with the historic character of the Hana Highway Historic District. The proposed replacement of Kahawaiokapia Bridge is consistent with the recommendations of the *Final Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (2001). Kahawaiokapia Bridge contributes to the historic character of the Hana Highway Historic District but does not qualify for individual listing in the National or State Register of Historic Places. For such County bridges that may be eligible for listing due to their age of 50 years or more, but are not historically significant, individually, the plan provides recommendations for their replacement. This would allow the replacement bridges to achieve current design standards for structural integrity and traffic safety while retaining features that

contribute to the historic character of the district. These include, for example, retaining their single-lane configuration; replacing bridge railings with a crash-tested design resembling the original; reusing original abutment and wing wall rubble as fascia for new abutments and wing walls, and using a faux rock wall approach guardrail in place of the corrugated steel guardrail. The alternative of using a single-span bridge deck, which would allow the original mid-span support piers to remain as non-load bearing was considered for Kahawaiokapia Bridge, however, the long girders required for a single span could not be feasibly transported to the project site along the narrow and winding Hana Highway or Piilani Highway.

Sec. 226-17 Objectives and policies for facility systems – transportation.

(a) 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. (emphasis added)

(b) To achieve the transportation objectives, it shall be the policy of this State to:

(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment. (emphasis added)

Discussion:

The DPW administers a program to modify or replace functionally or structurally deficient bridges to achieve current State of Hawaii standards for transportation facilities as specified by the Statewide Uniform Design Manual for Streets and Highways (October, 1980), as supplemented by the current American Association of State Highway and Transportation Officials' (AASHTO) Policy on Geometric Design of Highways and Streets (6th Edition, 2011), and AASHTO's Standard Specifications for Highway Bridges (17th Edition, 2002). In conjunction with this program, the DPW conducts periodic inspections of all of its bridges in compliance with National Bridge Inspection Standards (Code of Federal Regulations (CFR) 23 Highways - Part 650, Subpart C). The latest bridge inspection report for Kahawaiokapia Bridge, dated April 2013, gives the bridge a Sufficiency Rating of 3 out of a possible 100.

The low sufficiency rating for Kahawaiokapia Bridge reflects its functional and structural deficiencies relative to current bridge design standards. Functionally, a major deficiency is that the bridge can accommodate only one lane of traffic although it serves a two-lane roadway. Structurally, the bridge's load rating of 8 tons is well below the minimum standard of 15 tons, based on evidence such as the loss of concrete, exposed and rusted steel reinforcement along girders, heavy water-staining indicating internal rusting of steel reinforcements, and loss of concrete in piers supporting the bridge. It is classified as a Structurally Deficient bridge which is one

that has been "restricted to lighter vehicles, requires immediate rehabilitation to remain open or has been closed."

The load rating of the proposed replacement bridge would increase the existing 8 ton rating to the AASHTO HL-93 standard of 20 tons. This should be sufficient to accommodate road legal heavy vehicles.

Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, could impact the quality of receiving surface and coastal waters downstream of the project site. Various mitigation measures will be incorporated into the project's construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinances.

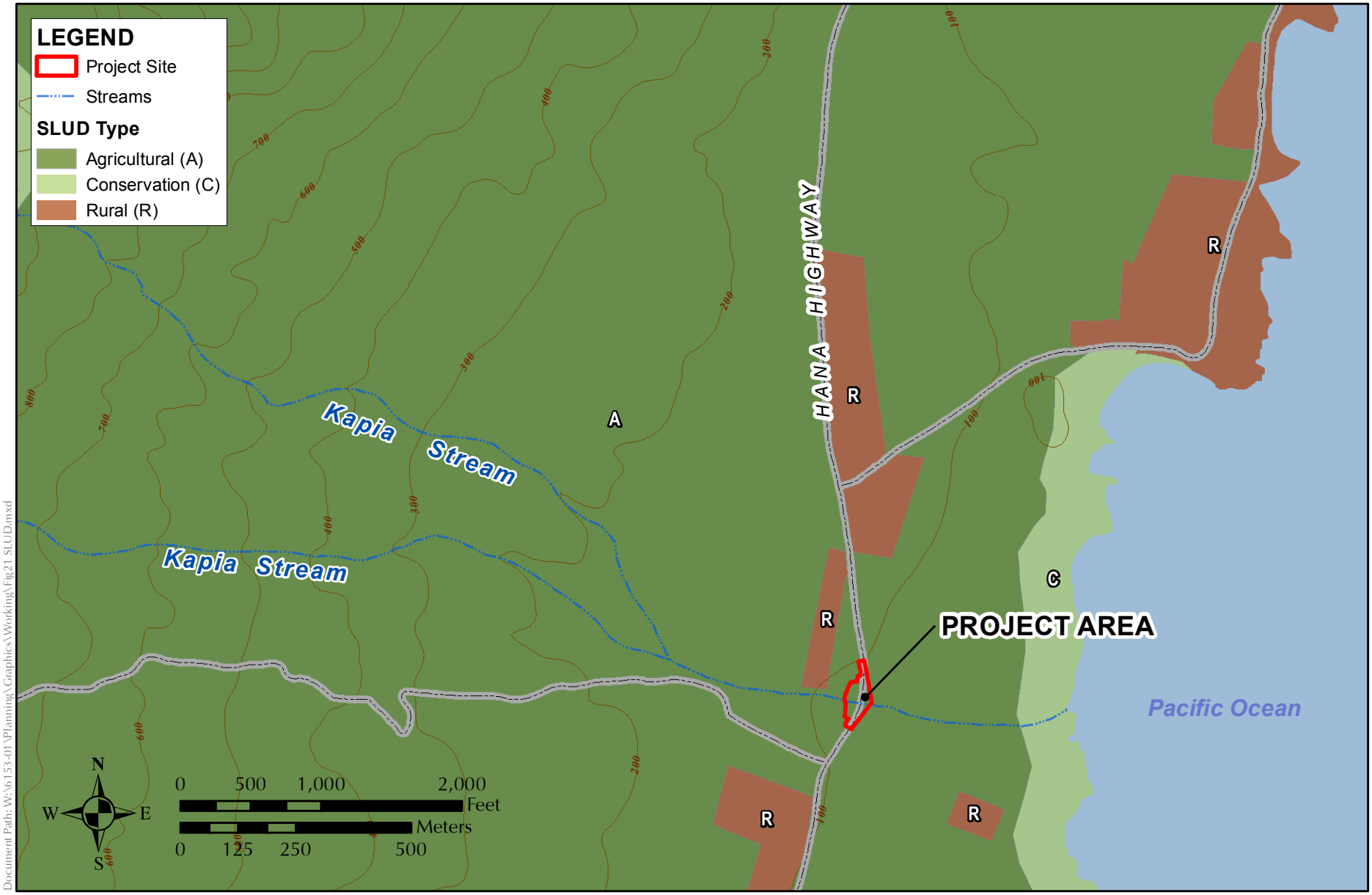
A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State Department of Health (DOH) pursuant to Section 401 of the Clean Water Act will be required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment and will incorporate appropriate structural and/or non-structural BMPs such as appropriately stockpiling materials on-site to prevent runoff, covering or stabilizing topsoil stockpiles, using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas.

4.1.2 State Land Use District

The State Land Use Law, Chapter 205, HRS, is intended to preserve, protect and encourage the development of lands in the State for uses that are best suited to the public health and welfare of Hawai'i's people. Under Chapter 205, HRS, all lands in the State of Hawaii are classified by the State Land Use Commission (LUC) into four major categories referred to as State Land Use Districts. These districts are identified as the Urban District, Agricultural District, Conservation District, and Rural District.

The LUC's Land Use District Boundary map for the Island of Maui depicts the lands within the project area as being designated within the State Agricultural District (see Figure 21). Permitted uses within the State Agricultural District are prescribed under Title 12, Chapter 205 (Land Use Commission), HRS, and Title 15, Subtitle 3, Chapter 15 of the State Land Use Commission's Administrative Rules.

According to Section 15-15-25 HAR, permissible uses within the Agricultural District correspond to the Land Study Bureau's (LSB) detailed land classification, which uses a five-class productivity rating system where "A" represents the class of the highest productivity and "E" the lowest. Section 205-4.5 HRS identifies permissible uses in the Agricultural



WILSON OKAMOTO CORPORATION

FIGURE 21

STATE LAND USE DISTRICTS MAP

KAHAWAIOKAPIA BRIDGE REPLACEMENT

District, regardless of productivity class, while Section 205-2(d), HRS identifies additional permissible uses on lands with an overall productivity rating of C, D, E, or U (Unassigned).

Under the LSB's detailed land classification, the project area has a soil productivity rating of "D." Among uses permitted under Chapter 205-4.5 HRS for all productivity classes are "(p)ublic, private, and quasi-public… roadways" Therefore, the proposed project is a permitted use.

4.1.3 Hawaii Coastal Zone Management Program

Hawaii's Coastal Zone Management (CZM) Program, established pursuant to Chapter 205A, HRS, as amended, is administered by the State Office of Planning (OP) and provides for the beneficial use, protection and development of the State's coastal zone. The objectives and policies of the Hawaii CZM Program encompass broad concerns such as impact on recreational resources, historic and archaeological resources, coastal scenic resources and open space, coastal ecosystems, coastal hazards, and the management of development. The Hawaii CZM area includes all lands within the State and the areas seaward to the extent of the State's management jurisdiction. Hence, the proposed project site is located in the CZM area. A discussion of the project's consistency with the applicable objectives and policies of the CZM Program is provided below.

(2) *Historic Resources*

Objective:

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

Policies:

(A) Identify and analyze significant archaeological resources;

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

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

Discussion

Kahawaiokapia Bridge is the central historic site in the current study area and is located within and is a contributing element to the Hana Highway Historic District. The proposed replacement of Kahawaiokapia Bridge is consistent with the recommendations of the *Final Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (2001). Kahawaiokapia Bridge contributes to the historic character of the Hana Highway Historic District but does not qualify for individual listing in the National or State Register of Historic Places. For such County bridges that may be eligible for listing due to their age of 50 years or more, but are

not historically significant, individually, the plan provides recommendations for their replacement. This would allow the replacement bridges to achieve current design standards for structural integrity and traffic safety while retaining features that contribute to the historic character of the district. These include, for example, retaining their single-lane configuration; replacing bridge railings with a crash-tested design resembling the original; and using a faux rock wall approach guardrail in place of the corrugated steel guardrail. The alternative of using a single-span bridge deck, which would allow the original mid-span support piers to remain as non-load bearing was considered for Kahawaiokapia Bridge, however, the long girders required for a single span could not be feasibly transported to the project site along the narrow and winding Hana Highway.

In 2002, Mason Architects completed an HAER (Historic American Engineering Record) for Kahawaiokapia Bridge and emphasized that this bridge was a contributing element to the Hana Highway Historic District. This documentation is housed in the Library of Congress.

In terms of archaeology, it is noted that the 1999 survey conducted by Cleghorn and McIntosh examined a small area of approximately 50 meters around Kahawaiokapia Bridge and outside of the current Area of Potential Effect. Two sites were identified at that time. Site 50-50-13-4684 is identified as a probable habitation site located approximately 17 meters at 110 degrees from the southeast corner of Kahawaiokapia Bridge. The site consists of five features: a platform, three stone alignments and a rock mound. This site has been assessed as significant in terms of its information potential (Criterion D).

Also noted outside of the current project area is a complex of stacked stone platforms and mounds. These are located 30 meters to the east of the platform feature. These are possible burial structures but are located well outside of the APE and were not recorded during the surveys.

Site 50-50-13-4685 is located to the north of Kapia Stream approximately 27 meters at 247° to the northeast corner of Kahawaiokapia Bridge. This site consists of three features: an enclosure, a rock wall, and a concrete cistern. The 2015 survey noted that Feature C (cistern) has been severely damaged by cattle grazing and resting in the area. This site has also been assessed as significant in terms of its information potential (Criterion D).

The foregoing sites are located outside of the Area of Potential Effect and would not be disturbed by the construction activities.

While it is highly unlikely that buried cultural deposits are present within the APE, the possibility still exists. Buried cultural deposits could include living surfaces, domestic features such as fire hearths, *imu*, or activity areas, as well as human remains. Given this possibility, it is recommended that archeological monitoring be conducted during the initial grubbing and grading of the project area. After the initial grubbing and grading, an archaeological monitor should be on-call in the event construction activities uncover potentially significant materials. The procedures must be detailed

in an archaeological monitoring plan approved by the State Historic Preservation Division prior to the start of any ground altering activities.

(3) *Scenic and Open Space Resources*

Objective:

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

Policies:

(A) 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;

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

Discussion

The visual character of Kahawaiokapia Bridge is primarily associated with the Hana Belt Highway Historic District. The proposed replacement of Kahawaiokapia Bridge is consistent with the recommendations of the *Final Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (2001). Kahawaiokapia Bridge contributes to the historic character of the Hana Belt Highway Historic District but does not qualify for individual listing in the National or State Register of Historic Places. For such County bridges that may be eligible for listing due to their age of 50 years or more, but are not historically significant individually, the plan provides recommendations for their replacement. This would allow the replacement bridges to achieve most current design standards for structural integrity and traffic safety while retaining features that contribute to the historic character of the district. These include, for example, retaining their single-lane configuration, replacing bridge railings with a crash-tested design resembling the original, reusing original abutment and wing wall rubble as fascia for new abutments and wing walls, and using a faux rock wall approach guardrail.

The alternative of using a single-span bridge deck, which would allow the original mid-span support piers to remain as non-load bearing was considered for Kahawaiokapia Bridge, however, the long girders required for a single span could not be feasibly transported to the project site along the narrow and winding Hana Highway or Piilani Highway.

(4) *Coastal Ecosystems*

Objective:

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

Policies:

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

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

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

(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion

The nearest coastal waters downstream of the project site is approximately 0.3 miles to the east. Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, could impact the quality of receiving surface and coastal waters downstream of the project site. Various mitigation measures will be incorporated into the project's construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinance.

A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State Department of Health (DOH) pursuant to Section 401 of the Clean Water Act will be required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment and incorporate appropriate structural and/or non-structural BMPs such as appropriately stockpiling materials on-site to prevent runoff, covering or stabilizing topsoil stockpiles, using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas.

(6) Coastal Hazards

Objective:

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

Policies:

(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.

Discussion

According to the Flood Insurance Rate Map (FIRM) (Community Panel Number 0192H, prepared by the Federal Emergency Management Agency (FEMA), the project site is located within Zone A and Zone X (see Figure 19). Zone A is the flood insurance rate zone that corresponds to the 100-year floodplain that is determined in Flood Insurance Studies by approximate methods. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones. Zone X is an area determined to be outside of the 0.2% annual floodplain. No base flood elevations or depths are shown in this zone.

The project site does not lie within the tsunami evacuation zone.

In the short- and long-term, no significant impacts on flood hazards in the project area are anticipated as the proposed improvements will be designed and constructed in full compliance with the flood plain management requirements of the County. This will include certification by a registered professional engineer that the Project improvements will not result in any increase in base flood elevations during the occurrence of base flood discharges.

(7) Managing Development

Objective:

(A) Improve the development review process, communication, and public participation in the management of coastal resource and hazards.

Policy:

(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.

Discussion

This environmental assessment is being prepared and processed pursuant to Chapter 343, HRS, which provides opportunities for agency consultation and coordination as well as for public notification and participation. The subsequent Special Management Area (SMA) Use Permit process also provides opportunities for

agency and public review of the application and requires a public hearing, including required public notification of the hearing.

(8) *Public Participation*

Objective:

(A) Stimulate public awareness, education, and participation in coastal management.

Policies:

(A) Promote public involvement in coastal zone management processes;

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

Discussion

This environmental assessment is being prepared and processed pursuant to Chapter 343, HRS, which provides opportunities for agency consultation and coordination as well as for public notification and participation. The subsequent Special Management Area (SMA) Use Permit process also provides opportunities for agency and public review of the application and requires a public hearing, including required public notification of the hearing.

(10) *Marine Resources*

Objective:

(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability. (emphasis added)

Discussion

The nearest coastal waters downstream of the project site is approximately 0.3 miles to the east. Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, could impact the quality of receiving surface and coastal waters downstream of the project site. Various mitigation measures will be incorporated into the project's construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinance.

A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State Department of Health (DOH) pursuant to Section 401 of the Clean Water Act will be

required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment and incorporate appropriate structural and/or non-structural BMPs such as appropriately stockpiling materials on-site to prevent runoff, covering or stabilizing topsoil stockpiles, using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas.

4.1.4 Complete Streets, Act 54 Session Laws of Hawaii 2009

Act 54, Session Laws of Hawaii 2009 requires that DOT and county transportation departments ensure the accommodation of all users of the road, regardless of their age, ability, or preferred mode of transportation. It also calls for the creation of a statewide task force to review existing state and county highway design standards and guidelines and requires the DOT and county transportation department to adopt a Complete Streets Policy. Complete streets are defined as "*transportation facilities that are planned, designed, operated, and maintained to provide safe access and mobility for all users, including bicyclists, pedestrians, transit riders, freight, and motorists, and that are appropriate to the function and context of the facility."* Complete streets principles for Hawaii include the following:

- *Safety – Plan, design, and construct transportation facilities and land developments to create an environment that reduces risk and supports the safe movement of people and goods by all modes.*

- *Flexible design – Design transportation facilities using best practices that integrate community values and recognize the importance of the surrounding context and environment.*

- *Accessibility and mobility for all – Plan and design transportation facilities for ease of use and access to destinations by providing an appropriate path of travel for all users, and enhance the ability to move people and goods throughout the state and its counties.*

- *Use and comfort of all users – Ensure all users of all abilities including bicyclists, pedestrians, transit riders, and drivers feel comfortable and safe using the transportation system.*

- *Consistency of design standards and guidelines – Encourage consistent use of national best practices to generate consistency in the application of striping and pavement markings for all users on all islands. References of national best practices include the Manual on Uniform Traffic Control Devices (MUTCD) and A Policy on Geometric Design of Highways and Streets (American Association of State Highway and Transportation Officials [AASHTO] Green Book).*

- *Energy efficient – Plan, design, and construct a transportation system that offers transportation choices for residents and visitors and reduces reliance on single-occupant vehicles to improve energy efficiency in travel, and mitigates vehicle emissions.*

- *Health – Recognize the health benefits in providing alternative mode choices, while acknowledging that some routes may be healthier than others.*

- *Appropriate funding – Support a jurisdiction's ability to secure funding for multimodal facilities and provide a framework to consider and pursue funding sources and opportunities.*

- *Building partnerships with organizations statewide – Build partnerships among the HDOT, the Counties, other governmental agencies, and stakeholders to implement complete streets throughout the state.*

- *Green infrastructure/streets – Use trees and landscaping as integral components of a Complete Street to provide both human and ecosystem benefits, such as shade, to reduce the urban heat island effect, vegetation for carbon sequestration, reducing/filtering non-point source pollution and sediments, retaining stormwater, increasing groundwater storage recharge, and providing wildlife habitat.*

The above policies should be considered on all public highways, roadways, and streets statewide when updating long-term planning documents and/or ordinances and when considering project alternatives. Agency design standards should also be updated to incorporate complete streets principles.

Discussion:

The proposed project is consistent with the intent of the policies set forth by Act 54 Session Laws of Hawaii 2009 pertaining to complete streets. The proposed single-lane replacement bridge will provide safe access and mobility for all users, including bicyclists, pedestrians, transit riders, freight, and motorists in a design that is sensitive to the historic and aesthetic context of the Hana Highway Historic District. Although there will be no exclusive sidewalks or bicycle lanes, approaches to the bridge will have signage for appropriate speed, precautions and awareness for safe operation by the various users.

4.2 County of Maui Plans and Policies

4.2.1 County of Maui General Plan 2030

The Maui County General Plan is a long-term, comprehensive blueprint for the physical, economic, environmental development and cultural identity of the County. The General Plan is comprised of three parts; The Countywide Policy Plan, The Maui Island Plan, and Community Plans.

4.2.1.1 Countywide Policy Plan

As part of the 2030 Maui County General Plan Update, the County adopted a *Countywide Policy Plan* in March 2010, which replaces the *General Plan of the County of Maui 1990 Update.* The *Countywide Policy Plan* provides broad goals, objectives, policies, and implementing actions that portray the desired direction of the County's future. This includes: (1) a vision statement and core values for the County to the year 2030; (2) an explanation of the plan-making process; (3) a description and background information regarding Maui County today; (4) identification of guiding principles; and (5) a list of countywide goals, objectives, policies, and implementing actions related to the following themes:

- Protect the Natural Environment
- Preserve Local Culture and Traditions
- Improve Education
- Strengthen Social and Healthcare Services
- Expand Housing Opportunities for Residents
- Strengthen the Local Economy
- Improve Parks and Public Facilities
- Diversify Transportation Options
- Improve Physical Infrastructure
- Promote Sustainable Land Use and Growth Management
- Strive for Good Governance

The proposed project is consistent with the following *Countywide Policy Plan* goal, objective and policies relating to diversifying transportation options:

H. Diversify Transportation Options

<u>Goal:</u> *Maui County will have an efficient, economical, and environmentally sensitive means of moving people and goods.*

<u>Objective:</u>

1. *Provide an effective, affordable, and convenient ground-transportation system that is environmentally sustainable.*

<u>Policies:</u>

e. *Ensure that roadway systems are safe, efficient, and maintained in good condition.*

g. *Design new road and roadway improvements to retain and enhance the existing character and scenic resources of the communities through which they pass.*

Discussion:

The proposed project will replace a functionally and structurally deficient bridge that continues to deteriorate. The proposed single-lane replacement bridge will provide safe access and mobility for all users, including bicyclists, pedestrians, transit riders, freight, and motorists in a design that is sensitive to the historic and aesthetic context of the Hana Highway Historic District. Although there will be no exclusive sidewalks or bicycle lanes, approaches to the bridge will have signage for appropriate speed, precautions and awareness for safe operation by the various users..

4.2.1.2 Maui Island Plan

As part of the 2030 Maui County General Plan Update, the County adopted the *Maui Island Plan* in December 2012. The *Maui Island Plan* establishes a pro-active planning process by designating urban and rural growth areas where development is intended and will be supported. It is comprised of goals, policies, programs, and actions based on an assessment of current and future needs and available resources.

The purpose of the *Maui Island Plan* is to:

- Assess existing conditions, trends, and issues specific to Maui;
- Provide policy direction for the use and development of land, the extension and improvement of transportation services and infrastructure, the development of community facilities, the expansion of the island's economic base, the provision of housing, and the protection of natural and cultural resources;
- Establish policies to manage change and to direct decision about future land use and development; and
- Provide the foundation to set capital improvement priorities, revise zoning regulations, and develop other implementation tools.

The proposed project is consistent with or promotes the following *Maui Island Plan* goal, objective and policy relating to transportation:

Goal:
6.4 An interconnected, efficient, and well maintained, multimodal transportation system.

Objective:
6.4.2 Safe, interconnected transit, roadway, bicycle, equestrian, and pedestrian network.

Policy:

6.4.2.d Identify and improve hazardous and substandard sections of roadways, drainage infrastructure, and bridges, provided that the historical integrity of the roads and bridges are protected.

Discussion:

The proposed project will replace a functionally and structurally deficient bridge that continues to deteriorate. The proposed single-lane replacement bridge will provide safe access and mobility for all users, including bicyclists, pedestrians, transit riders, freight, and motorists in a design that is sensitive to the historic and aesthetic context of the Hana Highway Historic District. Although there will be no exclusive sidewalks or bicycle lanes, approaches to the bridge will have signage for appropriate speed, pre-cautions and awareness for safe operation by the various users.

4.2.1.3 Hana Community Plan

The Hana Community Plan, one of the nine Community Plans for Maui County, reflects current and anticipated conditions in the Hana region for which it was prepared in 1994. It advances planning goals, objectives, policies and implementation considerations to guide decision making in the region through the year 2010, although the plan has yet to be updated as of this writing. The Hana Community Plan provides specific recommendations to address the goals, objectives, and polices contained in the General Plan, while recognizing the values and unique attributes of Hana in order to enhance the region's overall living environment.

The proposed project is consistent with the following Hana Community Plan goals, objectives and policies:

Environment

Goal

Protection and management of Hana's land water and ocean resources to ensure that future generations can enjoy the region's exceptional environmental qualities.

Objectives and Policies

1. *Protect, preserve and increase the Hana region's natural marine, coastal and inland resources, encouraging comprehensive resource management*

7. *Protect, restore and preserve native aquatic habitats and resources within and along all streams within the Hana District by (1) protecting existing instream flows, and (2) regulating diversions of stream waters.*

Discussion:

Construction activities will involve land disturbing activities such as grubbing, clearing, grading, and excavation that may result in some soil erosion which, in turn, could impact the quality of receiving surface and coastal waters downstream of the project site. Various mitigation measures will be incorporated into the project's construction plans to minimize soil disturbance and potential short-term erosion and siltation impacts during construction. Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinances.

A Department of the Army (DOA) Nationwide Permit, pursuant to Section 404 of the Clean Water Act and a Water Quality Certification (WQC), issued by the State Department of Health (DOH) pursuant to Section 401 of the Clean Water Act will be required for construction work in waters of the U.S. For such work in Kapia Stream, which is non-tidal at the project site, waters of the U.S. is defined as portions of the stream bed and banks below the ordinary high water mark (OHWM). In conjunction with the Section 404 permit and WQC, a best management practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control measures will be instituted in accordance with a site specific assessment and incorporate appropriate structural and/or non-structural BMPs such as appropriately stockpiling materials on-site to prevent runoff, covering or stabilizing topsoil stockpiles, using sediment basins and traps, and re-establishing vegetation or landscaping as early as possible on completed areas.

Cultural Resources

Goal

Identification, preservation, protection, and where appropriate, restoration of significant cultural resources and practices, that provide a sense of history and identity for the Hana region

Objectives and Policies

1. *Identify, preserve and protect historically, archaeologically and culturally significant areas, sites, and features within the Hana District and cultural sites.*

Discussion:

Kahawaiokapia Bridge is the central historic site in the current study area and is located within and is a contributing element to the Hana Highway Historic District. The proposed replacement of Kahawaiokapia Bridge is consistent with the recommendations of the *Final Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (2001). Kahawaiokapia Bridge contributes to the historic character of the Hana Highway Historic District but does not qualify for

individual listing in the National or State Register of Historic Places. For such County bridges that may be eligible for listing due to their age of 50 years or more, but are not historically significant, individually, the plan provides recommendations for their replacement. This would allow the replacement bridges to achieve current design standards for structural integrity and traffic safety while retaining features that contribute to the historic character of the district. These include, for example, retaining their single-lane configuration; replacing bridge railings with a crash-tested design resembling the original; and using a faux rock wall approach guardrail in place of the corrugated steel guardrail. The alternative of using a single-span bridge deck, which would allow the original mid-span support piers to remain as non-load bearing was considered for Kahawaiokapia Bridge, however, the long girders required for a single span could not be feasibly transported to the project site along the narrow and winding Hana Highway.

In 2002, Mason Architects completed a HAER (Historic American Engineering Record) for Kahawaiokapia Bridge and emphasized that this bridge was a contributing element to the Hana Highway Historic District. This documentation is housed in the Library of Congress.

In terms of archaeology, it is noted that the 1999 survey conducted by Cleghorn and McIntosh examined a small area of approximately 50 meters around Kahawaiokapia Bridge and outside of the current Area of Potential Effect. Two sites were identified at that time. Site 50-50-13-4684 is identified as a probable habitation site located approximately 17 meters at 110 degrees from the southeast corner of Kahawaiokapia Bridge. The site consists of five features: a platform, three stone alignments and a rock mound. This site has been assessed as significant in terms of its information potential (Criterion D).

Also noted outside of the current project area is a complex of stacked stone platforms and mounds. These are located 30 meters to the east of the platform feature. These are possible burial structures but are located well outside of the APE and were not recorded during the surveys.

Site 50-50-13-4685 is located to the north of Kapia Stream approximately 27 meters at 247° to the northeast corner of Kahawaiokapia Bridge. This site consists of three features: an enclosure, a rock wall, and a concrete cistern. The 2015 survey noted that Feature C (cistern) has been severely damaged by cattle grazing and resting in the area. This site has also been assessed as significant in terms of its information potential (Criterion D).

The foregoing sites are located outside of the Area of Potential Effect and would not be disturbed by the construction activities.

While it is highly unlikely that buried cultural deposits are present within the APE, the possibility still exists. Buried cultural deposits could include living surfaces, domestic features such as fire hearths, *imu*, or activity areas, as well as human remains. Given this possibility, it is recommended that archeological monitoring be conducted during the initial grubbing and grading of the project area. After the initial grubbing and

grading, an archaeological monitor should be on-call in the event construction activities uncover potentially significant materials. The procedures must be detailed in an archaeological monitoring plan approved by the State Historic Preservation Division prior to the start of any ground altering activities.

Physical Infrastructure

Goal

Timely and environmentally sensitive development and maintenance of infrastructure systems which protect and preserve the safety and health of the Hana region's residents and visitors, including the provision of domestic water, utility and waste disposal services, and effective transportation systems which meet the needs of residents and visitors while protecting the region's rural character.

Transportation

Objectives and Policies

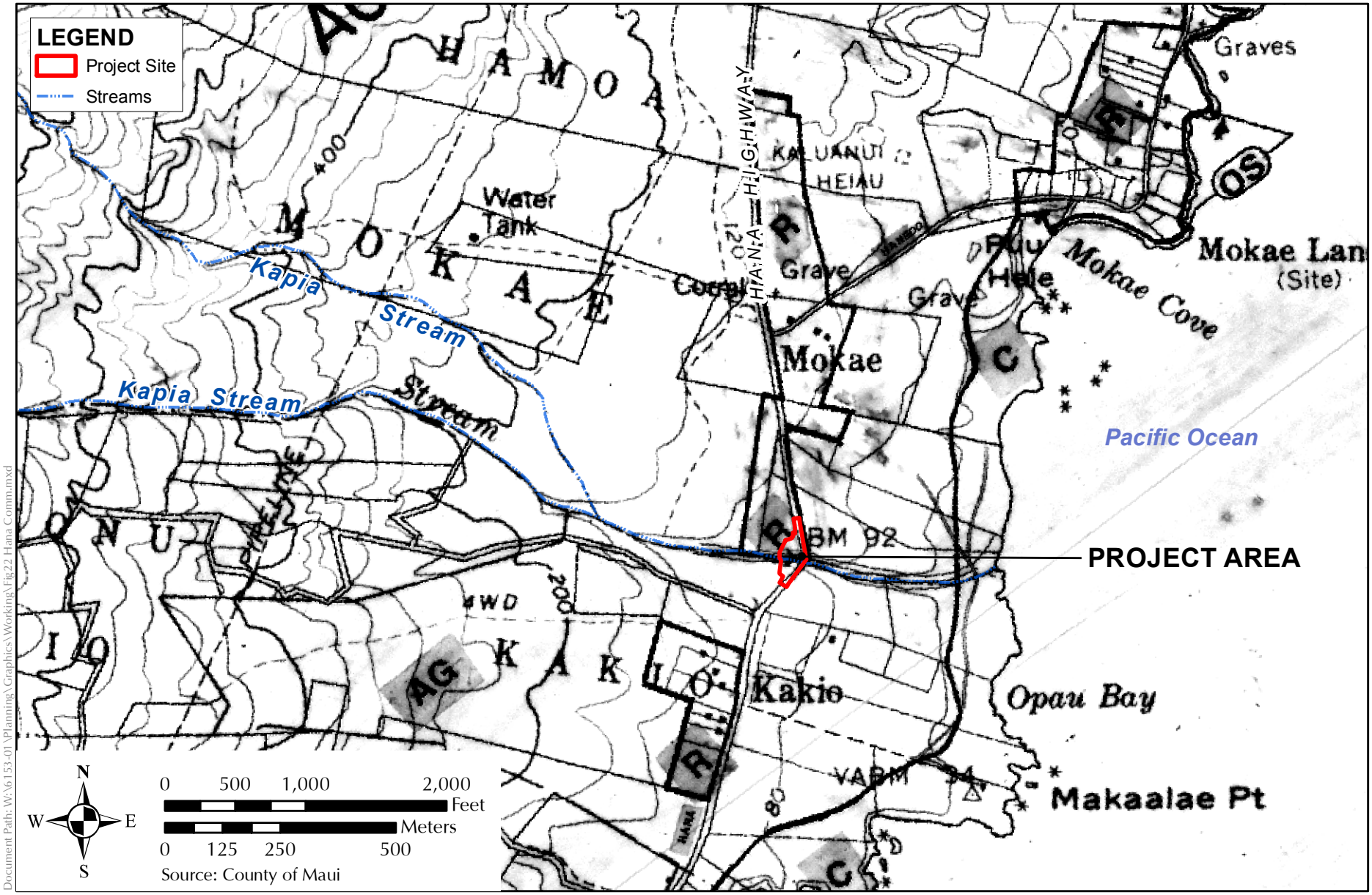
1. *Encourage a program of roadway safety improvements, including shoulder widening, pull-over spots and installation of new signage and guardrails that do not detract from the region's scenic and rural character.*

Discussion:

The proposed project will replace a functionally and structurally deficient bridge that continues to deteriorate. The proposed replacement of Kahawaiokapia Bridge is consistent with the recommendations of the *Final Preservation Plan for County of Maui Bridges Within the Hana Highway Historic District* (2001). Kahawaiokapia Bridge contributes to the historic character of the Hana Highway Historic District but does not qualify for individual listing in the National or State Register of Historic Places. For such County bridges that may be eligible for listing due to their age of 50 years or more, but are not historically significant, individually, the plan provides recommendations for their replacement. This would allow the replacement bridges to achieve most current design standards for structural integrity and traffic safety while retaining features that contribute to the historic character of the district. These include, for example, retaining their single-lane configuration, replacing bridge railings with a crash-tested design resembling the original, and using a faux rock wall approach guardrail in place of the corrugated steel guardrail.

4.2.1.4 Hana Community Plan Land Use Map

According to the Hana Community Land Use Map, the portion of the project site along Hana Highway as well as a portion on the Kipahulu and mauka side of the highway is designated agriculture (AG). Another portion on the Hana and mauka side of the highway is designated rural (R) (see Figure 22). The proposed project is consistent with these designations as the proposed project is a roadway which is considered to be an incidental use by the County.



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WILSON OKAMOTO CORPORATION

FIGURE 22

HANA COMMUNITY PLAN MAP

KAHAWAIOKAPIA BRIDGE REPLACEMENT

4.2.1.5 County of Maui Zoning

The purpose and intent of the County of Maui Comprehensive Zoning Ordinance (Title 19, Article II), is to regulate the utilization of land in a manner encouraging orderly development in accordance with the land use directives of Hawaii Revised Statutes, the Revised Charter of the County, and the general plan and the community plans of the County.

According to the County of Maui Planning Department, the project site is zoned Agriculture and Interim. However, roadways, such as the proposed project, are considered an incidental use that is permitted in each of the County's zoning districts. Thus the proposed project is consistent with the County zoning districts.

4.2.2 County of Maui Special Management Area

Pursuant to the Hawaii CZM Program, Chapter 205A, HRS, the counties have enacted ordinances establishing Special Management Areas (SMA). Any "development" within the SMA requires an SMA Use Permit administered by the County of Maui Planning Department. Through the SMA permit system, the County assesses and regulates developments proposed for areas located within the SMA and the proposed developments are evaluated for compliance with the CZM objectives and policies and SMA guidelines set forth in Chapter 205A, HRS. As shown in Figure 23, areas makai of and including the existing roadway are within the SMA. Since the project has a total cost fair market value greater than $500,000 in value and is considered a "development," an SMA Use Permit will be required for the proposed project. The consistency of the proposed project with the CZM objectives and policies was previously discussed in Section as described in Section 4.1.3. The proposed project's compliance with applicable SMA guidelines is discussed below:

Special Management Area Guidelines. (Section 205A-26)

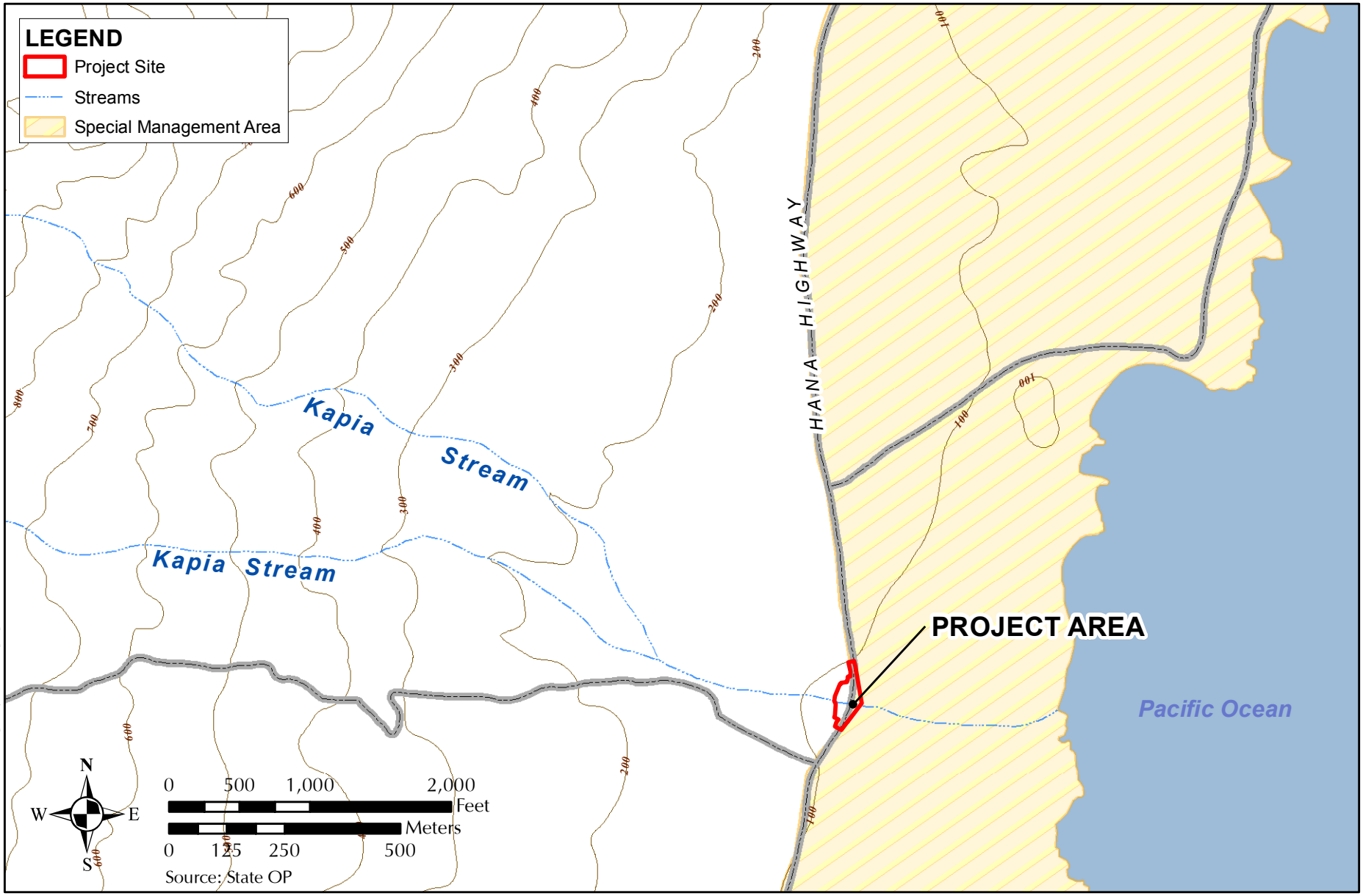
In implementing this part, the authority shall adopt the following guidelines for the review of developments proposed in the special management area:

(1) All development in the special management area shall be subject to reasonable terms and conditions set by the authority in order to ensure:

(A) Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles;

(B) Adequate and properly located public recreation areas and wildlife preserves are reserved;

(C) Provisions are made for solid and liquid waste treatment, disposition, and management which will minimize adverse effects upon special management area resources; and



WILSON OKAMOTO CORPORATION

FIGURE 23

SPECIAL MANAGEMENT AREA MAP

KAHAWAIOKAPIA BRIDGE REPLACEMENT

(D) Alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, wind damage, storm surge, landslides, erosion, siltation, or failure in the event of earthquake.

Discussion:

The proposed project is consistent with the preceding SMA guidelines. Please refer to the discussion of the applicable Hawaii CZM Program Objectives and Policies in Section 4.1.3 pertaining to Scenic and Open Space Resources, Coastal Ecosystems, and Coastal Hazards. The proposed project is subject to conditions that may be imposed on through the SMA Use Permit process.

(2) No development shall be approved unless the authority has first found:

(A) That the development will not have any substantial adverse environmental or ecological effect, except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interests. Such adverse effects shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect, and the elimination of planning options;

(B) That the development is consistent with the objectives, policies, and special management area guidelines of this chapter and any guidelines enacted by the legislature; and,

(C) That the development is consistent with the county general plan and zoning. Such a finding of consistency does not preclude concurrent processing where a general plan or zoning amendment may also be required.

Discussion:

The proposed project is consistent with the preceding SMA guidelines. Please refer to the discussions of the applicable Hawaii CZM Program Objectives and Policies in Section 4.1.3, and discussion in Sections 4.2.1 County of Maui General Plan 2030 and 4.2.2 County of Maui Zoning.

(3) The authority shall seek to minimize, where reasonable:

(A) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;

(B) Any development which would reduce the size of any beach or other area usable for public recreation;

(C) Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management areas and the mean high tide line where there is no beach;

(D) Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and,

(E) Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

Discussion:

The proposed project is consistent with the preceding SMA guidelines. Please refer to the discussion of the applicable Hawaii CZM Program Objectives and Policies in Section 4.1.3 pertaining to Scenic and Open Space Resources, and Coastal Ecosystems.

4.3 Permits and Approvals

The following is a list of permits, approvals, and reviews that may be required prior to construction and operation of the proposed project.

Federal

Department of the Army
- Department of the Army, Nationwide Permit, Section 404, Clean Water Act
- Department of the Army, Section 10 Permit, Rivers and Harbors Act

Federal Emergency Management Agency
- Compliance with Executive Order 11988, Floodplain Management

Federal Highway Administration
- National Environmental Policy Act (NEPA) Categorical Exclusion
- Section 7 of the Endangered Species Act
- Section 106 of the National Historic Preservation Act
- Section 4(f) of the Department of Transportation Act of 1966

State of Hawaii

Department of Health
- Section 401, Clean Water Act, Water Quality Certification
- National Pollutant Discharge Elimination Permit (Stormwater Associated with Construction)
- Noise Permit

Department of Land and Natural Resources

- Chapter 6E, HRS, State Historic Preservation Law
- Stream Channel Alteration Permit

Office of Planning

- Coastal Zone Management (CZM) Federal Consistency Certification

County of Maui

Planning Department

- Special Management Area Use Permit
- Special Flood Hazard Area Development Permit

Department of Public Works

- Grading/Grubbing Permit
- Permit to Perform Work within County Right-of-Way

5. ALTERNATIVES

5.1 No Action Alternative

Under the no action alternative, the replacement of the deteriorating bridge would not be pursued. Environmental impacts would be avoided, construction costs spared, and the need for permits precluded.

The existing bridge would continue to deteriorate and its use under substandard conditions would continue until the County of Maui determines that is unsafe and closes it to traffic. As the bridge is structurally deficient, should the failure or imminent failure of a structural component such as a girder or pier be determined, it would likely result in its immediate closure. If the bridge is closed, there is no available roadway detour around it. Therefore, unless and until a temporary bridge over Kapia Stream could be constructed, traffic from the Hana side heading toward Kipahulu would need to be rerouted through upcountry Maui to approach from Ulupalakua. All traffic to and from Hana would be confined to Hana Highway. This would increase traffic along Hana Highway and severely inconvenience residents and businesses who depend on that portion of Hana Highway as a through road between Hana and Kipahulu.

5.2 Alternative 1: Bridge Replacement Meeting Current Design Standards

Prior to the designation of the Hana Highway Historic District in June, 2001 and the preparation of the *Final Preservation Plan for County of Maui Bridges within the Hana Highway Historic District* in December, 2001, the general policy had been to replace bridges which could achieve current design standards. An example of this policy is the replacement of the Manawainui Bridge. Formerly a single-lane wooden bridge that was destroyed by flood waters, its replacement was designed and built as a two-lane bridge with widened two-lane roadway approaches along a remote and narrow stretch of Piilani Highway between Kaupo and Ulupalakua. Although the bridge itself met applicable urban bridge standards of the time, the adjoining roadway is rural and non-standard for many miles in both directions. Moreover, while the bridge design and function may have been appropriate in a more urban setting, many in the community felt that the two lane bridge did not consider the region's historical, cultural and rural context. In response to these concerns, the State Historic Preservation Division (SHPD) required the County of Maui to prepare the aforementioned preservation plan for their concurrence before any subsequent bridge in the district could be replaced. The plan provides design recommendations for 10 of the 14 County bridges that are structurally deficient, including Kahawaiokapia Bridge. The plan does not recommend replacement of Kahawaiokapia Bridge with a bridge meeting current design standards. Therefore, the alternative of replacing Kahawaiokapia Bridge as a two lane bridge meeting current standards was dismissed from consideration.

5.3 Alternative 2: Historic Context

The *State of Hawaii Historic Bridge Inventory and Evaluation (Draft Report, May, 1996)* was prepared by Spencer Mason Architects with the intent of providing a comprehensive list of Federal, State and County bridges, statewide, that are eligible for listing in the National Register of Historic Places (NRHP). Bridges statewide were evaluated on various criteria

including: integrity, events, persons, distinctive characteristics, early engineering structure, and representative example. Category I bridges were categorized as eligible for the NRHP while Category III was considered ineligible. Category II, which was initially created for potentially eligible sites, was subsequently eliminated, so sites placed in this category were moved to either Category I or III.

The Hana Highway Historic District was proposed as Category I within which all the inventoried bridges are regarded as contributing resources to the District. However, only one bridge, Koukouai Bridge received a score that placed it in Category I and eligible for individual nomination.

The report also provides Detailed Preservation and Rehabilitation Guidelines for individually historic bridges as well a category of recommendations specifically for bridges in Historic Districts. The latter applies to Kahawaiokapia Bridge, which did not warrant individual nomination to the NHRP. The three sub-categories of guidelines for bridges in a historic district include:

> Identify Important Characteristics of the District – In consultation with the SHPD, identify the features that are important in defining the overall historic character of the district and the character-defining features of the historic bridge and its relationship to the district.
>
> Treatment of Bridges in Historic Districts – This guideline ties back to two guidelines for individually significant bridges including:
>
>> Continued use for vehicular purposes through structural upgrading, geometric modification, materials repair and maintenance or removal (relocation) to a less demanding site, and,
>>
>> Continued use for non-vehicular purposes by retaining the bridge in a transportation or transportation-related use, consideration of non-transportation uses, or retention as a historical ruin or monument.
>
> When a bridge cannot be upgraded or the site precludes other uses, then it may need to be replaced with mitigation, including documentation. The design of the replacement bridge should consider its compatibility within the historic district.
>
> Design of New Bridges, Including Replacement Bridges – These guidelines pertain to the design and selection of materials for new bridges to preserve the historic relationship of the bridge to its site.

The *Final Preservation Plan for County of Maui Bridges within the Hana Highway Historic District* is essentially a documentation of the process used to develop recommendations for the 14 County bridges based, in consideration of the preceding guidelines, as well as other factors such as the public safety, availability of federal funding and agency and community input. The documented process involved the following:

Review Historic Bridge Inventories and Evaluation Studies (1990 and 1996) for the County bridges;

Review Preservation and Rehabilitation Guidelines for historic bridges;

Prepare an inventory of Historic Character Defining Features of the County bridges;

Review Public Safety considerations, including applicable Design Standards, National Bridge Inspection Program ratings for the County bridges and Tort Liability issues;

Review Federal Funding Alternatives;

Conduct Community and Agency Consultation; and,

Develop Recommendations in consideration of historic preservation, public safety, funding alternatives and community and agency input.

Regarding the four bridges that were not rated as structurally deficient, the recommendation was for maintenance and continued vehicular use. For the ten structurally deficient bridges, six, including Kahawaiokapia Bridge, were recommended for demolition and construction of a new bridge in the same location. The remaining four bridges included alternative recommendations, ranging from demolition and replacement to preservation of key features, preservation in place with a new bridge on the mauka side, widening, and structural rehabilitation.

The most significant recommendation for the ten structurally deficient bridges is to maintain their operation as single-lane bridges with a minimum roadway width of 16 feet. This recommendation, along with other design features for each bridge replacement or rehabilitation that do not comply with current design standards, would be allowed through “design exceptions” on case-by-case basis by HDOT and the FHWA, for projects receiving Federal funding. The design exception process is seen as a way to distribute the tort liability risk associated with a sub-standard design.

The overall design recommendations of the plan include the following:

1. Replace or widen bridge decks to meet the 16-foot railing-to-railing width being considered for design exception on a case-by-case basis by the State DOT-Hawai‘i and FHWA;

2. For bridge railings to be replaced, use a crash-tested railing design that has been cosmetically modified to resemble the existing railing;

3. Replace bridge understructures if they are not visible in the primary view from the highway;

4. Preserve or reconstruct understructures to resemble the downstream side view (elevation view) of bridges for which this is the primary view from the highway;

5. Evaluate the use of composite materials for preserving the understructure of bridges for which such technology may be applicable;

6. Reserve rubble from demolished CRM walls and abutments for use in re-facing replacement structures;

7. Preserve existing mid-span supports in place as non-load bearing structures unless they limit the hydraulic capacity of the bridge to pass the design flow;

8. Provide new rock wall guardrails along the approaches to the bridges, terminating as freestanding structures adjacent to the bridge railings;

9. Provide all required signage, including those for single lane operations;

10. Provide temporary bypass measures, if feasible, to maintain traffic flow during construction; and

11. Prepare photographic documentation of all bridges prior to demolition or modification in accordance with the standards of the Historic American Engineering Record (HAER) and the Historic American Building Survey (HABS).

The Final Preservation Plan recommendations for Kahawaiokapia Bridge incorporate many of the foregoing criteria. The Plan recommends that Kahawaiokapia Bridge be built as a replacement bridge resembling the existing bridge. This is the preferred alternative. The load rating of the bridge is expected to conform to current standard of 20 tons. The width between railings is proposed to be 16 feet intended for single lane operation. The railings are proposed to be solid untreated concrete parapets resembling the original. The guardrail is recommended as a rock wall design which is free standing adjacent to the railing. The abutments and wing walls are recommended to be concrete with the original rubble utilized as the face.

A temporary bypass bridge is also recommended to facilitate access during the period of construction.

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6. ANTICIPATED DETERMINATION

Based on the significance criteria set forth in Chapter 200, Title 11, State of Hawaii Department of Health Administrative Rules, it is anticipated that the proposed Project will not have a significant effect on the environment, and that a Finding of No Significant Impact (FONSI) will be filed with the State Office of Environmental Quality Control following the public consultation period. The reasons supporting this anticipated determination are described below according to these significance criteria.

1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

Development of the proposed Project will require an irrevocable commitment of energy, labor, capital, and materials for construction. Land has been utilized for roadway and drainage purposes for decades and will continue to be used for those purposes for an indefinite period of time.

Kapia Stream will not be totally blocked at any one time during the construction phase in order to allow for migration of native amphidromous fauna. Moreover, construction notes will include a prohibition on the introduction of non-native species to the gulch and prohibition of fish feeding. This is in order to not adversely affect native aquatic species within the estuarine reach of Kapia Stream. With the implementation of these measures, no listed, candidate, or proposed threatened or endangered botanical, fauna, and aquatic species under either the Federal or State endangered species statutes will be disturbed as a result of the project.

The two archaeological sites makai of the project site and outside of the Area of Potential Effect will not be altered or affected by the proposed project. Archaeological monitoring will be conducted during the initial grubbing and grading.

There is no reported ongoing traditional gathering or hunting practices occurring within the Project area itself. The Project has been in use as a bridge since 1915. Access to traditional resources will not be affected by the replacement bridge. It is anticipated that the proposed Project will have no adverse impact on traditional cultural properties or practices, gathering rights, or access. However, there will be ongoing Section 106 consultation with Native Hawaiian organizations and other organizations and individuals.

2) Curtails the range of beneficial uses of the environment;

The intention of the proposed Project is to commit the Project Site to the proposed use over the long-term. Beneficial uses of the Project Site and

environment would not be curtailed since the site had been utilized for roadway and drainage uses for almost a century.

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 does not conflict with long-term environmental policies, goals, and guidelines of the State of Hawaii. As presented in this EA, the project's potential adverse impacts are associated only with short-term construction-related activities and can be mitigated through adherence to standard construction mitigation practices.

4) Substantially affects the economic, social welfare, or cultural practices of the community or State;

In the short term, the Project will confer positive benefits in the local area. Direct economic benefits will result from construction expenditures both through the purchase of material from local suppliers and through the employment of local labor, thereby stimulating that sector of the economy. Indirect economic benefits may include benefits to local retailing businesses resulting from construction activities.

There are no significant adverse long term socio-economic impacts anticipated with the proposed Project. The proposed Project is not expected to increase traffic or induce growth in the Hana region.

There is no reported ongoing traditional gathering or hunting practices occurring within the Bridge project area. The proposed Project is not anticipated to have an adverse impact on traditional cultural properties or practices, gathering rights, or access.

5) Substantially affects public health;

An efficient roadway and drainage system supports the public health of residents and visitors of Hana. The proposed project provides a reliable roadway facility which also accommodates the 100-year 24-hour storm.

6) Involves substantial secondary impacts, such as population changes or effects on public facilities;

No secondary effects are anticipated with the construction and operation of the proposed project. The proposed project is not anticipated to induce growth beyond that which is anticipated for the region and should not have a major influence on future population and land use patterns in Hana. Rather, the facility

is proposed to fulfill an essential community need to provide safe access to and from the region.

7) Involves a substantial degradation of environmental quality

The proposed Project is not anticipated to involve a substantial degradation of environmental quality.

There are potential short-term impacts to noise, air quality, water quality, and stream biota in the immediate project vicinity. With the incorporation of mitigation measures during the construction period, the project will not result in long-term degradation to environmental quality.

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

No cumulative effects are anticipated, inasmuch as the proposed project involves the replacement of an existing bridge within a rural area with uses that are consistent with the County land use plans and designations. The cumulative impact of the bridge replacement project in the Hana Highway Historic District was addressed in the Preservation Plan.

9) Substantially affects a rare, threatened or endangered species, or its habitat;

Riparian vegetation in the vicinity of the project area are all common, mostly introduced species, characteristic of lowland areas in the Hawaiian Islands. No aquatic species protected by State of Hawaii Administrative Rules nor Federal endangered species statutes were observed in Kapia Stream within the project area. Best management practices implemented during construction will help to mitigate possible adverse water quality impacts. The entire stream will not be blocked at any one time to allow for migration of diadromous native Hawaiian stream fauna. Construction notes will include the prohibition of non-native species to the gulch and prohibit fish feeding during construction in order to not adversely affect the estuarine reach of Kapia Stream. The project will not adversely affect any rare, threatened or endangered species, or its habitat.

10) Detrimentally affects air and water quality or ambient noise levels;

Operation of construction equipment would temporarily elevate ambient noise and concentrations of exhaust emissions in the immediate vicinity of the project site. Operation of the proposed project will have no significant long-term impact on air quality or ambient noise levels in the vicinity.

Potential water quality impacts to Kapia Stream during construction of the Project will be mitigated by adherence to Federal, State and County water quality

regulations governing grading, excavation and stockpiling. Appropriate best management practices will be implemented to prevent significant degradation of water quality.

Mitigation measures will be instituted incorporating appropriate structural and/or non-structural BMPs such as silt fences, diversion berm/ditches and minimizing time of exposure between construction and re-vegetation.

Following construction, the Project improvements will produce no adverse effects from storm runoff to adjacent and downstream areas.

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 FIRM prepared by FEMA, the Project Site is located within Zone A and X. Zone A is an area which corresponds to the 100-year floodplain that is determined in Flood Insurance studies by approximate methods. Because detailed analyses are not performed in these areas, no depths or base flood elevations are shown within these zones. Zone X is an area determined to be outside of the 0.2% annual chance floodplain. No base flood elevations or depths are shown in this zone.

The Kapia Stream estuary, contains only native aquatic species. Construction notes will contain prohibitions on introduction of non-native species to the gulch and prohibition of fish feeding during construction in order to not adversely affect the estuarine reach of Kapia Stream.

Applicable BMPs will mitigate against potential effects to coastal waters during construction. Compliance with Maui County Code provisions related to grading, Section 404 Corps Permit, Section 401 Water Quality Certification and Stream Channel Alteration Permit would be required.

The project should not adversely impact beaches, erosion-prone areas, geologically hazardous land, or fresh water.

12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies;

The temporary bridge which will provide access around the existing bridge will have a temporary impact on views from and toward the project site. After construction, the temporary bridge will be removed. After construction is completed, the proposed bridge and maintenance access road will not substantially affect views. The new bridge is a replacement of the existing bridge and will have a very similar profile to the existing bridge.

13) Requires substantial energy consumption;

Construction and operation of the proposed Project will not require substantial increases in energy consumption.

7. CONSULTATION

7.1 Pre-Assessment Consultation

The following agencies and organizations were consulted during the preparation of the Draft EA. Those who formally replied are indicated by an asterisk (*). All written comments and responses are included in Appendix D.

Federal

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Department of Transportation, Federal Highway Administration
U.S. Department of the Interior, National Park Service, Haleakala National Park

State of Hawaii

* Department of Accounting and General Services
Department of Education
Department of Business, Economic Development & Tourism
Department of Business, Economic Development & Tourism, Land Use Commission
Department of Business, Economic Development & Tourism, Office of Planning
* Department of Health
* Department of Health, Office of Environmental Quality Control
Department of Health, Environmental Management Division
Department of Health, Clean Water Branch
Department of Land and Natural Resources
* Department of Land and Natural Resources, Land Division
* Department of Land and Natural Resources, Historic Preservation Division
Department of Transportation
Office of Hawaiian Affairs

County of Maui

* Planning Department
* Department of Public Works
* Department of Environmental Management
* Department of Transportation
* Department of Water Supply
* Department of Parks and Recreation
* Department of Fire and Public Safety
* Police Department

Others

Hāna Business Council
Alliance for the Heritage of East Maui
Hāna Community Association

Kipahulu Community Association
J. Kalani English Living Trust
Mark S. Sherman
Randall R. Cooley
Dolores Soler

8. REFERENCES

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U.S. Census Bureau, *2006-2010 American Community Survey*, last revised January 17, 2012, http://quickfacts.census.gov/qfd/states/15000.html.

U.S. Department of Agriculture Soil Conservation Service in cooperation with the University of Hawaii Agricultural Experiment Station, *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, Issued August 1972.

APPENDIX A

Water Quality and Biological Surveys of Kapia Stream for the Kahawaiokapia Bridge Replacement Project near Hana Maui

AECOS, Inc.

November 4, 2010

AECOS No. 906A

Water quality and biological surveys of Kapia Stream for the Kahawaiokapia Bridge Replacement Project near Hāna Maui

Prepared by:

AECOS Inc.
45-939 Kamehameha Hwy, Suite 104
Kāneʻohe, Hawaiʻi 96744-3221

November 4, 2010

Water quality and biological survey of Kapia Stream for the Kahawaiokapia Bridge Replacement Project near Hāna Maui [1]

March 5, 1999
Rev. November 4, 2010

DRAFT

AECOS No. 906A

Eric B. Guinther and Susan Burr
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāneʻohe , Hawaiʻi 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: aecos@aecos.com

Introduction

Hāna Highway crosses Kapia Stream approximately 4.8 km (3 mi) south of Hāna on East Maui. The County of Maui, Department of Public Works is planning to replace the existing bridge crossing the stream. *AECOS*, Inc. was contracted by Wilson Okamoto and Associates (now Wilson Okamoto Corporation) to ascertain biological resources and assess water quality of Kapia Stream for permitting of the construction project.

The project site was visited by *AECOS* biologists on August 18, 1998 and (for the revised report) again on September 10, 2010. The purpose of the 2010 survey was to update the original (draft) report prepared in 1999. The 1998 survey was a reconnaissance survey of the mostly dry stream bed around the existing road bridge, extending approximately 50 m (164 ft) up and down the stream. In 2010, biologists extended the survey area to the stream mouth at the ocean shore and, in the upstream direction some 2330 m (7640 ft) to the 290-m (970-ft) elevation above sea level (ASL) on the main branch and approximately 1315 m (4315 ft) to 110 m (365 ft) ASL on the northern tributary.

[1] Report originally prepared on March 5, 1999 and updated for Wilson Okamoto Corporation for the Kahawaiokapia Bridge Replacement Project. This report will become part of the public record.

Stream Description

Kapia Stream (state perennial stream ID No. 6-5-03) arises at around the 1200-m (4000-ft) elevation on the East Maui slopes above Hāna and drains the slopes above the north wall of Waihoʻi Valley. The upper tributaries of Kapia Stream drain areas near tributaries of Kawaipapa Gulch, which flow eventually into the north part of Hāna Bay (Fig. 1). Total area of the watershed is estimated at 13.6 km^2 (5.2 mi^2; DLNR-DAR, 2008).

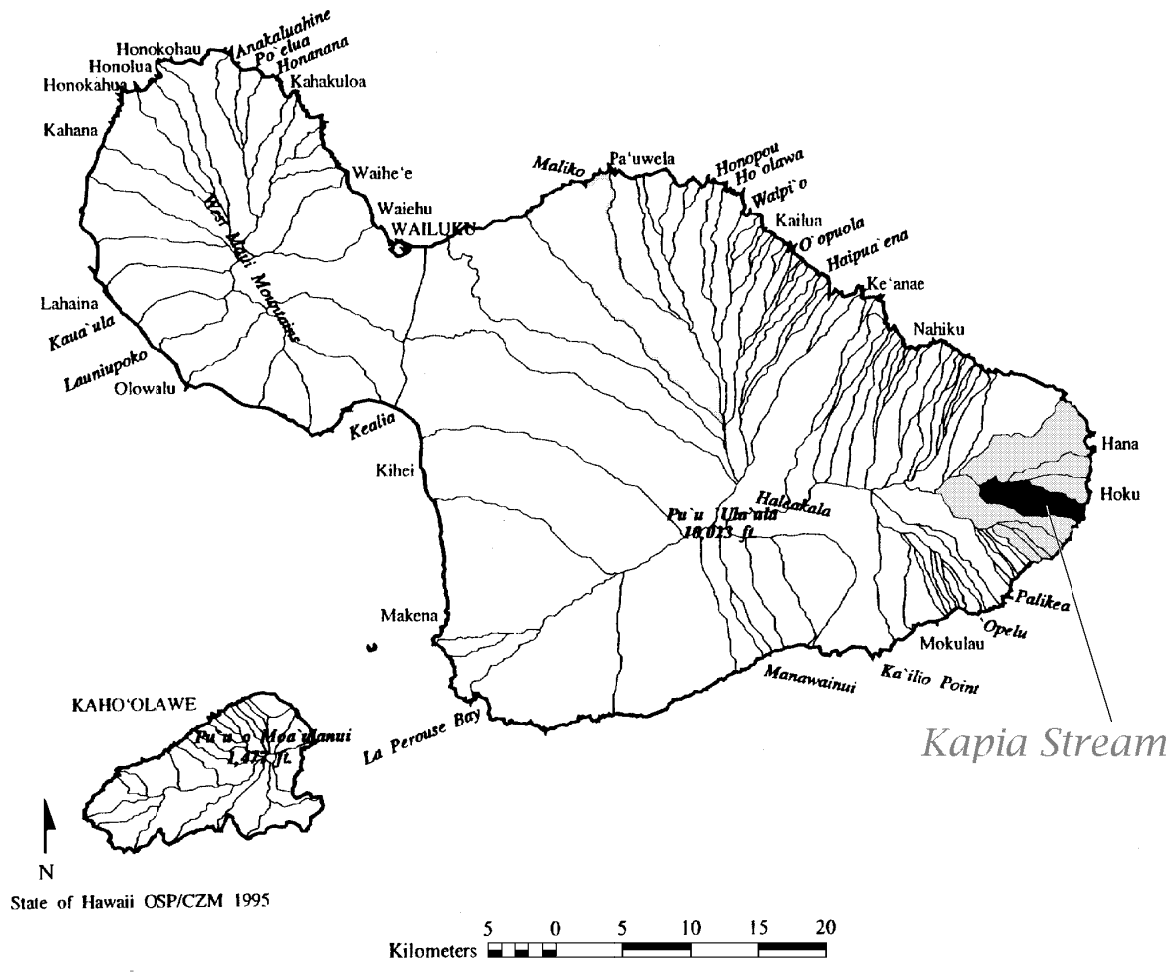

Figure 1. Map of Maui watersheds with Kapia Stream watershed indicated. Stippled watersheds are all those in the stream inventory of Table 1.

Table 1 shows the relationships between the various streams and gulches and provides additional information on each for watersheds between Kawaipapa and Wailua, inclusive. Every stream and gulch that appears as a blue line on the USGS topographic map (Hāna Quadrangle) is listed. In the first column of the table, streams appear in italics and gulches appear in regular type (a style adapted from USGS topographic maps). Although gulches and ravines are generally considered dry much of the time, whereas streams might be flowing much or all of the time, the distinction here is simply one established by USGS in mapping and is not meant to imply a particular class (see Column 4). A sans serif font (TrueType® "Arial") is used to indicate non-aquatic features, such as towns and place names. The listing of aquatic and non-aquatic features is from west to east (clockwise around the island). The letters "*l*" or "*r*" appear in Column 2 to indicate a branch entering on the left or right bank, respectively. Segments representing the confluence of two branches account for stream or gulch names being repeated (different segments represented).

Column 2 provides vertical and horizontal bars that show the relationships between tributaries. A vertical double line identifies the root stream that discharges into the sea. Tributaries are then joined by a solid or dotted vertical line. A dotted line indicates that more tributaries of a particular branch or segment are listed further down in the table. Column 3 (State Code) lists the State code for perennial streams. Codes have been assigned by Hawaiʻi Department of Land and Natural Resources (DLNR) only to perennial streams and not to intermittent streams.

Column 4 (Stream Class) presents the type of stream feature: "P" for perennial stream and "I" for intermittent stream. A lower case "i" (as in Pi) indicates an interrupted stream, usually one which is perennial at higher elevations but intermittent at lower elevations. A lower case "c" (as in Pc) indicates a stream continuous flowing to the sea. Class designation comes from the Hawaiʻi Stream Assessment (Hawaii Cooperative Park Service Unit, 1990) or field observation in most cases (see Table 1 footnotes).

Column 5 gives the elevation of headwaters in feet above sea level. The value is estimated by examination of the topographic map, and represents an attempt to determine the highest elevation at which a distinct channel for the stream is probably present. Where this value is particularly difficult to determine from the map, the value is preceded by a "~" meaning "about." A number in parentheses indicates the upper elevation of the particular segment, the stream continuing as two or more branches to headwaters at a higher elevation.

Table 1. Summary of stream relationships, characteristics, and other aquatic features for a portion of the Hāna coast, Island of Maui.

Stream / Gulch		State Code	Stream Class[1]	"Headwaters" Elevation[2] or feature name	F[3]	F elev.	RANK[4]	Survey Data[5]
Honomaele Gulch ↑ to Nahiku								
Kawaipapa		6-4-34		(1030)				
Kawaipapa	*n*			~4600				
unnamed	*r*			~2600				
unnamed	*r*			3080				
unnamed	*s*			(1860)				
unnamed	*n*			~4080				
unnamed	*s*			~3460				
Holoinawawae		6-4-35	I	~1400				
Hana								
Mo'omo'o nui		6-5-01	Pi	~3200				DAR 1991 *AECOS* 1992
Mo'omo'o iki	*l*		*P*	440				
Haneo'o		6-5-02	Pi	2280				DAR 1991 *AECOS* 1992
Kaholopo'o	*l*		*I*	1480				
Hamoa								
Kapia		**6-5-03**	Pi	⇒		90	O	***This report***
unnamed	*l*		*I*	2920				
Kapia			*Pi*	(3040)				DAR 1979, 1980, 1991 *AECOS* 1992
unnamed	*n*		*I*	4260				
unnamed	*s*		*I*	3760				
Waiohonu		6-5-04	Pi	(1990)				
north fork	*n*		*I*	4480				
south fork	*s*		*I*	(3090)				
unnamed	*n*		*I*	~4400				
unnamed	*s*		*I*	3600				
Pukuilua			*I*	1740				
Papahawahawa		6-5-05	Pi	~2100				*AECOS* 1995
Ala'alaula		6-5-06		2440				
Wailua		6-5-07		~3150			O	DAR 1979, 1980, 1990-1992, 2003
Paihi	*l*			~2280				
to Kipahulu Honolewa Str. ↓								

Table 1 (continued)

FOOTNOTES:

1 - P= perennial; I = intermittent; c = continuous; i = interrupted. Where given in *italics*, the class is inferred from topographic sheet by solid, dash-dotted, or no blue line. Otherwise, class is inferred from observation or as indicated in the Hawaii Stream Assessment. P,I indicates a stream segment that is intermittent above a perennial part.

2 - In feet, above sea level (ASL) estimated (from topographic maps) upper elevation of stream channel; generally somewhat higher than headwaters shown on topographic map, but may be lower than drainage basin boundary. Elevation in () indicates top of stream segment and point of significant branch or name change to tributary in next row.

3 - **F**: Natural or man-made aquatic features, such as wetlands, reservoirs, and irrigation ditch systems, which capture flow from the natural stream or feed water into the natural stream. The following codes are used: Di - diversion in; discharge into stream from a ditch or auwai (includes overflow from ditch system), Do - diversion out, from a stream into an auwai, flume, or ditch; Gc - USGS crest-stage gaging station; Gp - USGS partial-record gaging station; M - marsh; R - reservoir; RD - reservoir with diversion to a ditch. The actual or estimated elevation (in feet) of the feature is provided in Column 7. Multiple features are listed from lowest to highest on branch. The feature name (if known) is given in Column 5.

4 - Summary from the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit, 1990); aquatic rankings: M = moderate; O = outstanding; S = substantial; U = unknown. If blank, then stream was not ranked.

5 - Lists any references which provide biological or water quality data for the indicated stream segment. State government surveys as listed in DLNR-DAR (2008).

Natural or man-made aquatic features (Column 5, 6, and 7), such as wetlands, reservoirs, and irrigation ditch systems, which capture flow from, or feed water into, the natural stream, are each given a line under the associated stream branch. Multiple features are listed from lowest to highest on a branch. The feature name (if known) is given in Column 5 and the feature type in Column 6 (see Table 1 footnotes). Column 7 gives the approximate elevation (usually on the stream branch) of the feature.

Column 8 provides ranking information (see Table 1 footnote). Column 9 gives references to other studies on each stream, stream segment, or branches. Complete references are given in the bibliography at the end of the report. Water quality station locations and other information about a particular branch may also appear in this column. Horizontal, dashed lines divide watersheds.

From Table 1 it is evident that in terms of watershed area or hydrographic relationship, Kapia is one of the larger drainages in the Hāna area, extending nearly to the top of the 1500-m (4000-ft) ridge north of Waihoʻi Valley on the east end of Haleakalā. All of the stream above about the 300-m (1000-ft) elevation is within the Hāna Forest Reserve. However, only 10% of Kapia Stream is in native forest according to the Hawaiʻi Stream Assessment (Hawaii Cooperative Park Service Unit, 1990). That document also provides information

that the stream is designated[2], has one or more wetlands associated with it, and has one or more historic sites associated with it. Recreational resource value is ranked substantial with hunting and hiking the opportunities listed.

The Hawaiʻi Stream Assessment (Hawaii Cooperative Park Service Unit, 1990) provides some information on Kapia Stream, indicating it is an interrupted, perennial stream of substantial resource value, ranked in that document as outstanding ("O") for resource value and substantial ("S"; above moderate and limited) for recreational value. DLNR-Division of Aquatic Resources assigns Kapia watershed an Overall Rating of 6 out of 10 (DLNR-DAR, 2008). The stream was assigned the highest score of 10 for the metric that considered the number of introduced genera in the watershed (none).

The elevation at the project site is approximately 27 m (90 ft) ASL. An existing bridge is present on Hāna Highway (State Route 31) at this location. The bottom of the gulch here is about 6 m (20 ft) across (Fig. 2). In 1998, much loose material (small boulders and coarse sediment) and vegetation was present. In 2010, there was not much loose material in the stream bed and the vegetation was sparse. Areas of smooth basalt dominate a short distance upstream of the bridge. Water was flowing in this latter part of the stream channel on June 29, 1998, but not on August 18, 1998 or September 10, 2010.

Figure 2a (left): View of Kapia Stream looking downstream from the bridge.
Figure 2b (right): View of Kapia Stream looking upstream from the bridge.

[2] This would seem to be a reference to its ranking of "outstanding" for aquatic (biological) resource value, as discussed under Stream Biota in this report.

Water Flow and Water Quality

The lower reach of Kapia Stream flows only during significant rainfall events on the watershed and thus the stream is classified as interrupted[3]. No flow was observed directly under the bridge, nor upstream or downstream (surveyed for some 50 m (160 ft) in both directions in 1998 and 480 m (1580 ft) downstream 1315 m (4315 ft) upstream in 2010. Numerous undercut waterfalls and deep plunge pools are present in the gulch upstream of the bridge (Fig. 3). The stream bed was dry at the time of the surveys, but significant freshet flows are apparent from the presence of these features.

Figure 3. Dry waterfall and plunge pool upstream from bridge.

[3] Meaning a stream that is perennial (flows all of the time), but only at higher elevations. Flow is limited or interrupted close to the coast (Timbol and Maciolek, 1978).

AECOS biologists surveyed several small, isolated pools in Kapia Gulch. These pools are located in solid basalt and might well represent only accumulated rainwater. In 1998, because only small, isolated pools were observed in the area, no water quality measurements were made. In 2010, water quality measurements were made in the terminal estuarine pool adjacent to the ocean (well downstream of the bridge; Fig. 4a) and in a large isolated pool located at the 37-m (120-ft) elevation (Fig. 4b). A water sample was collected from this stream in 1992 at an elevation of 670 m (2200 ft) where the stream was flowing (*AECOS*, 1992).

Figure 4a (left): Terminal estuarine pool of Kapia Stream; Downstream Station.
Figure 4b (right). Isolated pool upstream from Bridge; Upstream Station.

The 2010 samples were collected from just below the surface of the pools and taken to the *AECOS* laboratory in Kāneʻohe (*AECOS* Laboratory Log No. 26613) for analyses. Table 2 lists the field instruments and analytical methods used to evaluate these samples. Results are summarized in Table 3.

Although these pools are not necessarily representative of flowing water in Kapia Stream, the results suggest Kapia Stream has very good water quality. The higher stream temperature at Sta. "Upstream" was likely due to solar heating of this isolated pool. Both the "Upstream" and "Downstream" stations were super- saturated with oxygen. The low conductivity at Sta. "Upstream" suggests rain as the source of the water in the pool. The high pH (9.5) measured at Sta. "Upstream" is likely the result of photosynthesizing algae. Turbidity and total suspended solids (TSS) were low at both stations. Inorganic nitrogen as nitrate+nitrite was low, although ammonia was high, particularly at Sta.

"Upstream, " perhaps reflecting somewhat stagnant conditions at the time of sampling in the isolated pools. The higher total nitrogen levels at Sta. "Downstream" correspond to similarly higher turbidity and TSS, an indication of an organic content to the particulates in the water (i.e., phytoplankton).

Table 2. Analytical methods and instruments used for September 10, 2010 water quality analysis of Kapia Stream, Maui.

Analysis	Method	Reference	Instrument
Ammonia	EPA 350.1	USEPA (1993)	Technicon AutoAnalyzer II
Conductivity	SM 2510-B	Standard Methods (1998)	Hydach pH/conductivity meter
Dissolved Oxygen	SM 4500-O G	Standard Methods (1998)	YSI Model 550A Dissolved Oxygen Meter
Nitrate + Nitrite	EPA 353.2 Rev 2.0	USEPA (1993)	Technicon AutoAnalyzer II
pH	SM 4500 H+	Standard Methods (1998)	Hannah pocket pH meter
Salinity	SM 2520 B	Standard Methods (1998)	Refractometer
Temperature	thermister calibrated to NBS. Cert. thermometer SM 2550 B	Standard Methods (1998)	YSI Model 550A Dissolved Oxygen Meter
Total Nitrogen	persulfate digestion/EPA 353.2	Grasshoff et al. (1986)/ USEPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	EPA 365.3	USEPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids	Method 2540 D	Standard Methods (1998)	Mettler H31 balance
Turbidity	EPA 180.1 Rev 2.0	USEPA (1993)	Hach 2100N Turbidimeter

Table 3. Water quality characteristics of lower Kapia Stream.

	Time sampled	Temp. (°C)	DO (mg/l)	DO sat. (%)	Salinity (psu)	Cond. (µmhos/cm)	pH
February19, 1992							
Sta. 1 (670 m elev.)	~0800	---	---	---	---	---	7.0
September 10, 1010							
Upstr. (37 m elev.)	1615	32.9	8.37	116	---	88	9.51
Downstr. (0 m elev.)	1145	29.6	8.38	133	32	---	8.09

		Turbidity (ntu)	TSS (mg/l)	Ammonia (µg N/l)	Nitrate + nitrite (µg N/l)	Total N (µg N/l)	Total P (µg P/l)
02-19-92							
Sta. 1 (670 m elev.)	~0800	0.6	0.33	6	64	110	< 1
9-10-10							
Upstr. (37 m elev.)	1615	0.54	1.8	30	5	371	16
Downstr. (0 m elev.)	1145	1.71	7.6	22	7	413	11

Riparian Vegetation

The lower reach of Kapia Stream flows through pastureland. A large grove of kamani trees (*Calophyllum inophyllum*) occurs along the *makai* side of the highway south of the Kahawaiokapia Bridge. The gulch itself in the vicinity of the bridge is mostly of solid basalt bottom, but supports various weedy herbaceous species growing in cracks or in soil along the upper banks. Larger shrubs and trees shading parts of the gulch include mango (*Mangifera indica*), *kukui* (*Aleurites moluccana*), Java plum (*Syzigium cumini*), guava (*Psidium guajava*), banana (*Musa* x *paradisiaca*), avocado (*Persea americana*), and *koa haole* (*Leucaena leucocephala*). Herbs and shrubs in this area include elephant grass (*Pennisetum purpureum*), klu (*Acacia farnesiana*), *lau'ae* fern (*Phymatosorus scolopendria*), wood fern (*Dryopteris* sp.), wedelia (*Sphagneticola trilobata*), pothos (*Epipremnum pinnatum*), passion fruit (*Passiflora edulis*), Koster's curse (*Clidemia hirta*), undetermined iris-like plant, *Crassocephalum crepidiodes*, little ironweed (*Veronia cinerea*), sword fern (*Nephrolepis* sp.), bubble-gum plant (*Polygala paniculata*), lace fern (*Sphenomeris chinensis*), vervain (*Stachytarpheta* cf. *jamaicensis*), bitter gourd (*Momordica charantia*), graceful spurge (*Chamaesyce hypericifolia*), dayflower (*Commelina diffusa*), sourbush (*Pluchea carolinensis*), Job's tears (*Coix lacryma-jobi*), and various

other grasses and sedges. These are all common, mostly introduced species, characteristic of lowland areas in the Hawaiian Islands.

Stream Biota

Representative specimens of aquatic biota that could not be readily identified in the field in 1998 and 2010 (particularly algae and insects) were collected for later taxonomic work in the laboratory. The isolated pools located in Kapia Gulch near the bridge contain much algae and a variety of aquatic insects; no mollusks or fishes were observed (Table 4). Some of the pools contained clear water (Fig. 5a), while others were full of leaf litter and highly colored with plant tannins (Fig. 5b). Observed around the pools in 1998 were bee-flies (Syrphidae), a damselfly (*Ischnura posita*), and two species of dragonfly (*Orthemis ferruginea* and *Pantala flavescens*). In 2010, neither bee-flies nor damselflies were observed, but the same two species of dragonfly (*O. ferruginea* and *P. flavescens*) were present. Additionally, in the gulch upstream from the bridge, two giant Hawaiian darner (*Anax strenuus*) individuals were observed.

Pool surfaces support small endemic water striders (*Microvelia vagans*), abundant in 1998 and occasional in 2010. Observed within the pools in both 1998 and 2010 were numerous backswimmers (*Buenoa pallipes*) and dragonfly nymphs (*Orthemis ferruginea*). In 1998, in a pool filled with leaf litter downstream of the bridge, large numbers of sand-fly larvae (Diptera, Psychodidae) were present. In 2010, the dominant insect in the isolated pools near the bridge that were colored with plant tannins (see Fig. 5b), was the mosquito wriggler (Culicidae); these were not reported in 1998. Leaches (*Hirudinean* sp.) were also present in 2010.

On a previous visit to the upper reach of this stream (*AECOS*, 1992), an *AECOS* biologist observed a male *ʻoʻopu ʻalamoʻo* (*Lentipes concolor*) at an elevation of 670 m (2200 ft) ASL. The Hawaiʻi Stream Assessment database (DLNR-DAR, var. dates) reports *ʻoʻopu nākea* (*Awaous guamensis*) and *ʻoʻopu nopili* (*Sicyopteris stimpsoni*) in the stream (DLNR-DAR, var. dates); the Atlas of Hawaiian Watersheds (DLNR-DAR, 2008) reports *ʻoʻopu akupa* (*Eleotris sandwicensis*) and *ʻoʻopu nākea* from the lower reach.

Table 4. Checklist of aquatic biota observed or reported from Kapia Stream.

Species	Common name	Status	2010	1998
PLANTS				
CHROMISTA, BACILLARIOPHYTA	diatoms			
unidentified		unk	O	---
FRAGILARIALES, FRAGILARIACEAE				
Synedra ulna		unk	O	--
CHLOROPHYTA	green algae			
CLADOPHORALES, CLADOPHORACEAE				
Rhizoclonium sp.		unk	O	--
OEDOGONIALES, OEDOGONIACEAE				
Oedogonium sp.		unk	O	A
ULOTRICHALES, ULOTRICHACEAE				
Klebsormidium sp.		unk	O	--
INVERTEBRATES				
ARTHROPODA, INSECTA				
DIPTERA, CHIRONOMIDAE				
unidentified larva	non-biting midge	unk	O	--
DIPTERA, SYRPHIDAE				
unidentified	bee-fly		--	P
DIPTERA, PSYCHODIDAE				
unidentified larva	sand-fly	unk	--	A
HEMIPTERA,VELIIDAE				
Microvelia vagans	water strider	**end**	O	A
TRICHOPTERA,HYDROPSYCHIDAE				
Cheumatopsyche analis larva	little sister sedge caddisfly	nat	O	--
HEMIPTERA, NOTONECTIDAE				
Buenoa pallipes	backswimmer	nat	C	C
ODONATA, COENAGRIONIDAE				
Ischnura posita	damselfly	nat	--	P
ODONATA, AESHNIDAE				
Anax strenuus	giant Hawaiian darner	**end**	R	--
Orthemis ferruginea (nymph & adult)	roseate skimmer	nat	U	P
ODONATA, LIBELLULIDAE				
Pantala flavescens	globe skimmer	**ind**	R	P
ARTHROPODA, CRUSTACEA				
Macrobrachium lar	Pacific prawn	nat	--	note 1
ANNELIDA, CLITELLATA				
HIRUDINEA				
unidentified	leech	unk	U	--
MOLLUSCA, BIVALVIA				
PTEROIDA, ISOGNOMONIDAE				
Isognomon californicum	black purse shell	**end**	O	--

Table 4 (continued).

VERTEBRATES

Species	Common name	Status	2010	1998
VERTEBRATA, PISCES				
KUHLIIDAE				
Kuhlia sp.	*āholehole*	**ind** or **end**	--	note 1
Kuhlia xenura	*āholehole*	**end**	A	--
MUGILIDAE				
Mugil cephalus	*ʻamaʻama*	**ind**	A	--
ELEOTRIDAE				
Eleotris sandwicensis	*ʻoʻopu akupa*	**end**	--	note 1
GOBIIDAE				
Awaous guamensis	*ʻoʻopu nākea*	**ind**	C	note 1
Bathygobius sp.	goby	**ind**	R	--
Lentipes concolor	*ʻoʻopu ʻalamoʻo*	**end**	--	note 2
Sicyopterus stimpsoni	*ʻoʻopu nopili*	**end**	--	note 1
Stenogobius hawaiiensis	*ʻoʻopu naniha*	**end**	R	--
ACANTHURIDAE				
Acanthurus triostegus	*manini, convict tang*	**ind**	R	--
AMPHIBIA,				
ANURA, BUFONIDAE				
Rhinella marina tadpole	cane toad	nat	U†	--

KEY TO TABLE SYMBOLS:

Status column:

unk. - unknown.
nat. - naturalized. An introduced or exotic species.
ind. - indigenous. A native species also found elsewhere in the Pacific.
end. - endemic - A native species found only in the Hawaiian Islands.

Abundance column:

note 1: reported in Hawaiʻi Stream Assessment database (1967, 1980, or 1991) or Atlas of Hawaiian Watersheds from elsewhere in this stream (DLNR-DAR, var. dates; 2008)
note 2: reported in *AECOS* (1992) as occurring well upstream from bridge
† - abundant in a single pool upstream from the bridge.
P - present; not common, but unable to assess abundance.
R - rare; only one or two individuals seen.
U - uncommon; several to a dozen individuals seen, in some habitat places visited.
O - occasional; seen irregularly in small numbers.
C - common; numerous individuals seen, or seen in most habitat places visited.
A - abundant; numerous in most habitat places visited

Figure 5a (left): Isolated pool with clear water. Figure 5b (right): Isolated pool with water heavily colored by plant tannins.

The estuarine reach of the gulch, though short, is home to a diverse assemblage of estuarine and marine species and is significant in that no alien aquatic species were observed, which is becoming unusual in the Hawaiian Islands. The estuarine pool is likely fed by groundwater seepage or intermittent stream flow. The high salinity (32 psu) indicates that freshwater inputs are occurring, but small in volume. In 2010, schools of *āholehole* or Hawaiian flagtail (*Kuhlia xenura*) were abundant along the margins of the pool and schools of *ʻamaʻama* or striped mullet (*Mugil cephalus*) were abundant in the deeper waters. *ʻOʻopu nākea* (*Awaous guamensis*) was common, resting on the bottom of the pools. Most *ʻoʻopu nākea* observed were between 2 and 5 cm (1 and 2 in) long, although one was measured at 10 cm (4 in) in length. *ʻOʻopu naniha* (*Stenogobius hawaiiensis*) was rare in the estuarine pool.

Assessment

Kapia Stream, like nearly all of the streams at the extreme east end of Maui, is characterized by a wide stream bed of well-worn basalt rock that suggests occasional periods of very substantial stream flow (i.e., freshets). In places on the steeper slopes, these streams have braided channels, another indication of the torrential flows occur. For many of the streams, the only permanent water present is that confined to pools of various sizes. These pools include both plunge pools and shallow pools in the basalt bedrock. The latter tend to increase in number with elevation, and become interconnected within the cloud zone (*AECOS*, 1992).

Much of the native Hawaiian stream fauna is diadromous: eggs are laid in the stream and the larvae that hatch from these eggs move down stream and out into the ocean, where they develop for a time before migrating back into fresh water to grow to maturity (Ford and Kinzie, 1982; Kinzie, 1988). The native stream fauna is adapted to the flashy nature of Hawaiian streams and the steep topography, particularly to the conditions found in East Maui watersheds. Because of this life style, all of the length of a stream may be habitat in the support of these native species, even where the lower reaches lack water flow for much of the time.

Although Kapia Stream is an important resource, as demonstrated by the presence of *ʻoʻopu ʻalamoʻo* in the upper reaches, the stream in the project area is a dry gulch most of the time. Aquatic habitat that is present (isolated pools in depressions in the basalt bedrock) may be temporary, and thus suitable primarily for aquatic insects. At these low elevations, the insects (like the riparian plants) tend to be non-native species.

No aquatic species protected by State of Hawaiʻi Administrative Rules (DLNR, 1998 and DLNR, 2007) nor federal endangered species statutes (USFWS, 2005, 2010) were observed in Kapia Stream within the project area. In 1994, *ʻoʻopu ʻalamoʻo*, which was observed by *AECOS* at 607 m (1990 ft) ASL (*AECOS*, 1992), was listed as a Category 1 candidate species (USFWS, 1994), meaning the US Fish and Wildlife Service (USFWS) had studied the species and concluded that it should be proposed for addition to the federal endangered and threatened species list. The USFWS has since discontinued the categorization of species prior to listing and *ʻoʻopu ʻalamoʻo* is not a listed species nor is it a candidate species (meaning that sufficient information is on file to support issuance of a rule to list, but issuance of the rule is precluded; USFWS, 1996).

Megalagrion pacificum, an endemic damselfly, is known to occur in the lower reaches of streams on East Maui (Mazzacano, 2008) and was recently-listed (June 24, 2010) as endangered (USFWS, 2010). Kapia Stream is not one of the East Maui streams from which *M. pacificum* was reported and no damselfly nymphs or adults were found in the gulch in either 1998 or 2010. Although critical habitat has not been designated for *M. pacificum*, the species is restricted almost exclusively to seepage-fed pools along overflow channels in the terminal reaches of perennial streams, usually in areas surrounded by thick vegetation (Polhemus and Asquith, 1996), a habitat which is not present in lower Kapia Gulch.

It is not expected that a new bridge structure will cause problems for aquatic species—and particularly not for migrating native species—because of the clear

need to design a new structure compatible with high freshet flows. If designed properly, the new structure will have no significant impact on water quality in Kapia Stream. Water quality impacts generated by construction should be minimal and construction plans should incorporate Best Management Practices (BMP) to prevent degradation of the quality of the water during construction. An Applicable Monitoring and Assessment Plan (AMAP) could be developed to monitor the effectiveness of the BMPs, although construction during drier months should see no or very infrequent water flow in this part of the gulch.

The estuarine reach of Kapia Stream is somewhat unusual in that only native aquatic species compose the fauna. Construction plans should include a strict prohibition on the introduction of non-native species to the gulch and should prohibit fish-feeding during construction. Additionally, the construction should be phased such that the entire stream is not blocked at one time to prohibit the migration of the native amphidromous fauna.

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APPENDIX B

An Archaeological Inventory Survey at the Kahawaiokapia Bridge, Ahupuaa of Mokae and Kakio, District of Hana, Island of Maui

TMK: (2) 1-4-009 por., 1-4-010:012 to 014 por., 1-4-011:055 and 063 por.

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ARCHAEOLOGICAL INVENTORY SURVEY AT THE KAHAWAIOKAPIʻA BRIDGE, AHUPUAʻA OF MOKAE AND KĀKIʻO, DISTRICT OF HĀNA, ISLAND OF MAUI

[TMK: (2) 1-4-009 por., 1-4-010:012 to 014 por., 1-4-011:055 and 063 por.]

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DRAFT

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[TMK: (2) 1-4-009 por., 1-4-010:012 to 014 por., 1-4-011:055 and 063 por.]

Prepared by:
James McIntosh, B.A.
and
Paul L. Cleghorn, Ph.D.

Pacific Legacy, Inc.
30 Aulike Street, Suite 301
Kailua, HI 96734
(808) 263-4800

Prepared for:
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

February 2015

ABSTRACT

At the request of Wilson Okamoto Corporation, Pacific Legacy, Inc., conducted an archaeological inventory survey for a proposed bridge replacement at the Kahawaiokapiʻa Bridge situated between the *ahupuaʻa* of Mokae and Kākiʻo in the district of Hāna, island of Maui. Located on Piʻilani Highway, Kahawaiokapiʻa Bridge is approximately 0.29 miles south of the road to Hāmoa and consists of a narrow two-lane concrete bridge constructed in 1915 that spans Kapiʻa Stream and extends between Mokae and Kākiʻo *ahupuaʻa*. Kahawaiokapiʻa Bridge, part of the Hāna Highway Historic District, has been previously recorded and the district was placed on the NRHP in June 2001 (Wilson Okamoto 2001:1). The demolition of this bridge and its replacement in the same location was recommended in Maui County's final preservation plan (Wilson Okamoto 2001).

A previous archaeological survey conducted by Cleghorn and McIntosh 1999, in the area adjacent to the bridge identified two previously undocumented archaeological sites. These sites (50-50-13-4684 and -4685), located *makai* of Kahawaiokapiʻa Bridge, were interpreted as habitation sites based upon the types of features (alignments and platforms) identified at each site. Both of the sites have been assessed as being significant because of their information potential (criterion D). They are however, well outside of the APE and will not be affected by the proposed project. No additional archaeological sites were identified during the current survey.

The proposed bridge replacement project will result in an "adverse effect" to Kahawaiokapiʻa Bridge but has been mitigated by the by the preparation of a Historic American Engineering Record (HARE) including photographic and written historical data, previously prepared for the bridge replacement project and by the Final Preservation Plan for County of Maui Bridges within the Hāna Highway Historic District (Wilson Okamoto 2001).

Archaeological monitoring is recommended for the initial grubbing and ground disturbing activities. On-call monitoring is recommended for the subsequent earth-moving associated with the bridge replacement.

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Frontispiece: view of Kahawaiokapiʻa Bridge from Kapiʻa Stream.

1.0 INTRODUCTION

Pacific Legacy, Inc., at the request of Wilson Okamoto Corporation, conducted an archaeological inventory survey (AIS) for a proposed bridge replacement at the Kahawaiokapiʻa Bridge situated between the *ahupuaʻa* of Mokae and Kākiʻo in the district of Hāna, island of Maui [TMK: (2) 1-4-009 por., 1-4-010:012 to 014 por., 1-4-011:055 and 063 por.]. Kahawaiokapiʻa Bridge is located south of Hāna along Piʻilani Highway, approximately 0.29 miles south of the road to Hāmoa (Figure 1). Kahawaiokapiʻa Bridge is a two-lane concrete bridge that spans Kapiʻa Stream and extends between Mokae and Kākiʻo *ahupuaʻa*.

These investigations satisfy Historic Preservation requirements found in Hawaiʻi Revised Statutes (HRS) Chapter 6E. The State Historic Preservation Division (SHPD) requires an AIS as part of the permitting process. An AIS is the necessary first step in treating archaeological resources that may be present in a project area. The purpose of an AIS is to determine if potentially significant archaeological resources are present on a specific parcel of land prior to development activities.

The bridge replacement project will be funded by Federal Highway Administration (FHWA) making it an "undertaking" as defined in the National Historic Preservation Act (NHPA) Section 106 (16 USC § 470 (f)), which requires Federal agencies to take into account the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP). An "undertaking," is defined as "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval (36 CFR § 800.16(y)). The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency officials and other parties with an interest in the effects of the undertaking on historic properties during the early stages of project planning under the Code of Federal Regulations (36 CFR § 800.1(a)). The present report will be instrumental in providing information for this process.

1.1 PROJECT BACKGROUND

The current survey builds upon a previous AIS conducted by Cleghorn and McIntosh (1999) for the same bridge replacement project. The 1999 archaeological survey report covered three bridges Koukouai (aka Kaukauai) Stream Bridge, Paihi Bridge, and Kahawaiokapiʻa Bridge. This report was produced, but never formally submitted or reviewed by the SHPD. The 1999 archaeological survey report was appended to the Environmental Assessment for the replacement of the Paihi Bridge in 2002. The SHPD, as part of a Section 106 review of the Paihi Bridge Replacement Project, cited the Pacific Legacy 1999 survey and concluded that the project would have no adverse effect on the Paihi Bridge.

The 1999 Pacific Legacy survey identified two sites (Site 50-50-13-4684 and -4685) located on the *makai* side of Kahawaiokapiʻa Bridge. The current report includes the descriptions of these two sites and makes a determination on whether or not they are within the current Area of Potential Effect (APE) as now defined for this project (Figure 2). In addition, the current survey also included a ca. 5 acre parcel on the *mauka* side of the bridge which will be used for the construction of a temporary bridge to be utilized during the project (Figure 2). Thus the results of the both the 1999 survey and recent 2013 survey are presented in the current report.

1.2 ENVIRONMENT

Geologically, Maui was created when the lava from two separate volcanic eruptions (West Maui and Haleakalā) were joined together over time by an isthmus. The first and the oldest of the volcanoes formed the West Maui Mountains. The lava from Haleakalā (a giant dome volcano) formed East Maui (Macdonald and Abbott 1977), where the current project was undertaken.

Soils in the project area are described by Foote et al. (1972) as being Makaalae silty clay (MID), Makaalae extremely stoney clay (MJD) and Rough mountainous land (rRt). Each is described in detail below.

Soils in the Makaalae series consist of well-drained soils on the uplands that were developed in volcanic ash. They are moderate to steep sloping and range in elevation from sea level to nearly 1,500 feet (Foote et al. 1972:87). Soils in this series are commonly used for pastureland, water supply, and wildlife habitat.

> Makaalae silty clay is found on rough low mountain slopes with 7 to 25 percent slopes. The soil is strongly acidic in the surface layer and medium to slightly acidic in the subsoil. Permeability is moderate and runoff is slow to medium with a slight to moderate erosion hazard (Foote et al. 1972:87).
>
> Makaalae extremely stoney clay is similar to the silty clay with 7 to 25 percent slopes, except that stones cover 3 to 15 percent of the surface. Aa lava is common in places along drainages. This soil is used for water supply, pasture land and wildlife habitat (Foote et al. 1972:87).
>
> Rough mountainous land occurs in mountainous areas and consists of very steep land broken by intermittent drainage channels; in most places it is not stony. Elevations range from nearly sea level to 6,000 feet. Over much of the area, the soil is very thin and ranges from 1 inch to 10 inches. This type of land is typically used for water supply, recreation and wildlife habitat (Foote et al 1972:119).

The vegetation within the project area consists mainly of alien plant species. Flora observed include mango (*Mangifera indica*); Christmasberry (*Schinus terebinthefolius*); guava (*Psidium guajava*); ti (*Cordyline terminalis*); false *kamani* (*Terminalia catappa)*; Java plum (*Eugenia* sp.), guava (*Psidium guajava*), *awapuhi* or wild ginger (*Zingiber zerumbet*), and various ferns and grasses.

Rainfall in the area averages approximately 66 inches per year with the wettest months being January and March with the driest being June through August (Giambelluca et al. 2013).

Elevation in the project area ranges from 80 feet to 220 feet above mean sea level (amsl). Temperature in the project area ranges from approximately 62° F to 83° F with the coolest temperatures occurring in December and the warmest occurring in August (Armstrong 1983:64).

Figure 1. Project location shown on National Geographic TOPO map.

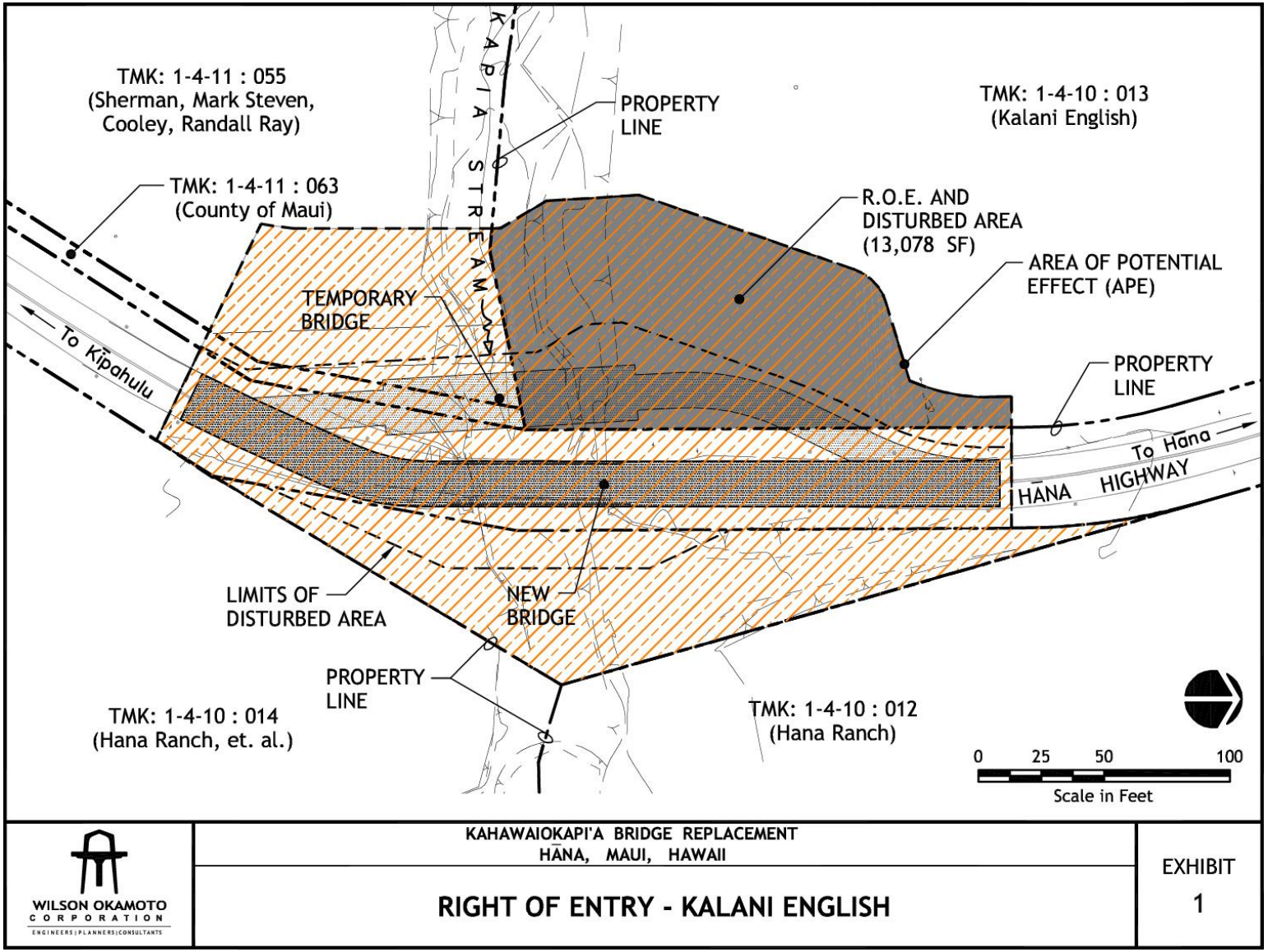

Figure 2. Detail plans of proposed bridge replacement (courtesy of Wilson Okamoto). Area archaeologically surveyed in orange.

2.0 METHODS

The initial fieldwork was conducted on 23 April 1998. Paul Cleghorn, Ph.D. served as the Principal Investigator and main point of contact, while Tom Cleghorn assisted in the survey and site recording.

The project area was surveyed by pedestrian transects. Approximately 50 m around the bridge (including the stream) was surveyed. Spacing between the two surveyors ranged from 10-20 m depending on the density of the vegetation (spacing was closer in areas of dense vegetation, and further apart in areas of sparse vegetation).

All encountered surface cultural remains were recorded with notes, sketch maps, and black-and-white photographs. No subsurface testing was undertaken. SHPD site numbers were assigned for the two sites recorded.

Subsequent field investigations were conducted on 25 July 2013. James McIntosh, B.A. and Caleb Fechner, B.A. conducted the field survey, while Paul L. Cleghorn, Ph.D. served as Principal Investigator.

The second survey focused on attempting to document the location of the previously recorded sites with a Trimble GeoXT. Vegetation on the *makai* or east side of the highway prevented satellite linking thus prohibiting the use of the GPS technology. Location information in this area was limited to more traditional methods using metric tape measures and a magnetic compass. The team documented the location of the previously identified sites with a tape and compass. The distance and bearing between site features and the Piʻilani Highway and Kahawaiokapiʻa Bridge was recorded and documented on site maps.

A pedestrian survey was also conducted on *mauka* (west) side of the bridge examining a ca. 0.5 acre area which will involve the construction of a temporary bridge to be utilized during the bridge replacement. The survey team conducted the pedestrian survey moving in a north/south direction. Spacing between the archaeologists was between 10-20 m apart. GPS technology worked in this area because of the lack of overhead vegetation. No subsurface test excavations were conducted.

A third survey was conducted on 14 January 2015. Again, James McIntosh, B.A. and Caleb Fechner, B.A. conducted a one-day survey of an additional 50'x 125' area located on the south east side of Kahawaiokapiʻa Bridge within TMK (2) 1-4-011:055 (Figure 3). In addition, the area located to the east of the bridge was also re-examined. On this occasion, the Trimble GeoXT was able to obtain enough satellites to record the locations of the archaeological sites previously identified.

Figure 3. Project area on TMK Map.

3.0 TRADITIONAL HISTORY

Archival research consisting of background and literature searches was conducted at the State Historic Preservation Division's library, the State of Hawaiʻi Main Library, the Department of Land and Natural Resources Survey Office, Bureau of Conveyances, State of Hawaiʻi Archives, and the Hawaiian Historical Society.

Reports detailing previous archaeological studies both within and adjacent to the current project area were reviewed. Landownership, as illustrated by Land Commission Awards (LCA) was researched. Other historical sources were reviewed in order to provide a brief summary of the history and land use of the general area.

3.1 LEGENDARY HISTORY

Hāna, Maui is rich in cultural heritage. Indeed, there are numerous myths and legends associated with this part of East Maui. However, there are too many to be discussed in length, here. Included below is a brief discussion of the history and legends associated with the east coast of Maui. An excellent summary of the history and legends of the area can be found in Cleghorn and Rogers (1987). The reader is referred to this document for more information.

Stories from Hāna show close association with many traditional gods, including: Pele, Māui, and Kuʻula (Cleghorn and Rogers 1987:4). Additionally, Hāna was said to have been a favorite place of many Maui chiefs, many of whom chose Hāna as their residence (Cleghorn and Rogers 1987:8).

Beckwith (1976) writes that the goddess Pele was pursued by her older sister Na-maka-o-kahaʻi:

> "until the two sisters encounter each other at Kahiki-nui on the island of Maui and Pele's body is torn apart and the fragments heaped up to form the hill called Ka-iwi-o-Pele (The bones of Pele) near Kauiki, while her spirit takes flight to the island of Hawaii" (Beckwith 1976:170).

Kahikinui is a traditional district located on the southern side of Haleakalā, and Ka-iwi-o-Pele is a prominent *puʻu* or cinder cone located along the coast in Hāna.

Beckwith also relates tales of "Maui the Trickster" and some of the myths and legends associated with him. In the legend below, Māui attempts to unite the islands into one.

> While Maui was still a child, he goes fishing with his brothers and gets them to go far out to the fishing ground called Poʻo directly seaward from Kapahulu and in line with the hill called Ka-iwi-o-Pele. Here with his hook called Manai-a-ka-lani (Come from heaven) he catches the big ulua of Pimoe. For two days they pull at it before it comes to the surface and is drawn close to the canoe. The brothers are warned not to look back. They do so. The cord breaks, and the fish vanishes. That is why the [Hawaiian] islands are not united into one (Beckwith 1976:230).

Another god associated with Hāna is Kuʻula. Kuʻula gave the octopus lure (*lūheʻe*), the fishpond *(loko iʻa*), and the fishhook (*makau*) to humans by way of his son Aiʻai (Beckwith 1976:19-20). It was Aiʻai who went to the different islands and established the first fishing shrines (*koʻa*) and fishing grounds (*koʻa ʻāina*). He also constructed altars (*kūʻula*) upon which the first fish from each catch would be offered.

Pukui et al. (1976) writes that Kīpahulu was the home of Laka, the god worshipped by canoe makers and that it literally means "to fetch from [exhausted] gardens" (Pukui et al. 1976:112).

After Kamehameha I conquered the island of Maui, some of the Hawaiʻi Island chiefs came to live at Hāna and Kīpahulu. Kamehameha's brother, Ka-lani-malokuloku-i-Kepoʻo-o-ka-lani, was one of these chiefs. He looked over the commoners and protected their rights.

> ...while he lived in Kipahulu and Hana there was no sugar cane broken off, no potatoes dug up, no pigs roasted. The common people loved him and called him "The good chief" (Ke-aliʻi-maikaʻi) in praise of his deeds, and that is why his life was spared when he was about to be made prisoner of war... Now chiefs from Hawaii often made their home in Kipahulu...This is how the Kipahulu people came to know the chiefs of Hawaii and why "The good chief" lived at Kapoʻookalani (Kamakau 1992:143-144).

3.2 LAND COMMISSION AWARDS

Private land ownership was introduced into Hawaiʻi during the Māhele ʻĀina (land division) of 1848. Crown and *aliʻi* lands were awarded in 1848 and *kuleana* titles were awarded to the general populace in 1850 (Chinen 1958). The awarded lands are referred to as Land Commission Awards (LCAs). A review was made of the LCAs located in the vicinity of the current project areas. The review of the LCAs was conducted to determine previous documented land use (both pre-Contact and historic) of the area, which in turn may indicate the types of sites present in the area.

A review of the LCAs for the project area identified a single LCA within the project area. LCA 4876 is located to the northeast of Kahawaiokapiʻa bridge and was awarded to Ikua (Figure 4). A check of the testimony for this LCA did not indicate what the land was used for, or whether a house structure or *loʻi* were present.

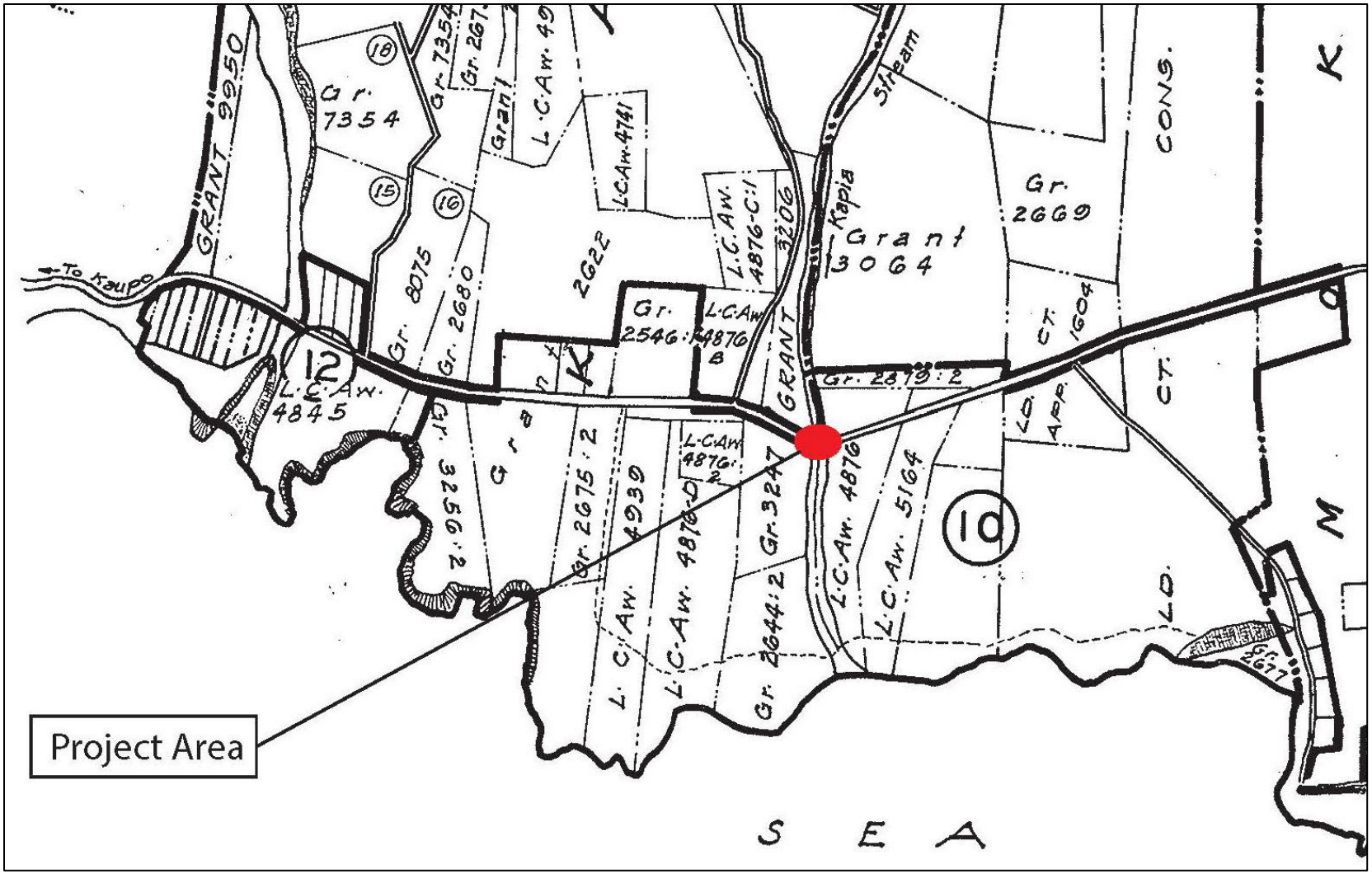

Figure 4. Location of LCA No. 4876 adjacent to project area [enlargement of TMK map (2) 1-4].

4.0 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

A review of available literature from the State Historic Preservation Division (SHPD) indicates that no previous studies have been undertaken in the current project area. The literature review indicated that numerous studies have been undertaken in and around Hāna Town. However, the amount of studies decreases outside of Hāna proper. Below is a brief summary of studies that have occurred in the vicinity of Kahawaiokapiʻa Bridge (Figure 5).

The earliest documentation of archaeological sites on Maui was performed by Thomas G. Thrum in the early 1900s. His findings, originally published in Thrum's Hawaiian Annual (1909), revealed the existence of 118 *heiau* (temple) sites on the island. During his time on Maui, Thrum was able to visit most of, but not all of the structures. Three of the *heiau* he described were located in the district of Hāna: Kaiapuni, Kaniomoku, and Wānanalua.

Winslow Walker, of the Bishop Museum conducted an island-wide survey of Maui Island between 1929 and 1930. Walker identified and recorded archaeological sites across the island including 228 *heiau* sites referred to as "Walker *heiau* sites" (Sterling 1998:viii). Although his findings have never been published by the Bishop Museum, his manuscript (MS) provides a glimpse of the archaeological sites still existing on Maui after the widespread expansion of areas cultivated for sugarcane. Walker recorded 34 *heiau* in the district of Hāna including Piʻilanihale Heiau (Walker's Site 102), the largest *heiau* on the island of Maui.

Between 1969 and 1970, Lynn Nakkim (1970) conducted an independent archaeological survey at various parcels in and around Hāna. Nakkim identified numerous previously unknown sites and relocated a number of sites that had been formerly identified. She provides a rather frank discussion of the state of archaeological sites in Hāna and their destruction.

In January of 1987, State Archaeologist Agnes Griffin conducted a field inspection at Site 50-50-13-1795, Mokae Cove (Griffin 1987). Griffin identified an area along the beach that had undergone previous construction of park facilities. While there she talked with an informant who had worked on the construction project. He notified her that numerous burials were uncovered during construction activities, two years earlier. Apparently, SHPD was not notified of the inadvertent finds. While inspecting a push-pile, she recovered numerous bone fragments.

Also in 1987, the Bishop Museum undertook archaeological and historical investigations for the Hāna Ranch Lands (Cleghorn and Rogers 1987). They re-identified 32 sites that had been previously recorded. "The majority of these are *heiau* or religious structures (N=20; 62.5%), many of which are now destroyed" (Cleghorn and Rogers 1987:i). Previously identified sites included five fishponds, various habitation sites, pictographs, and the fortress of Kaʻuiki. An additional 16 archaeological sites were recorded during the subsequent survey and are associated with agricultural or habitation activities (Cleghorn and Rogers 1987:ii). Of the 48 sites identified on Hāna Ranch Lands, approximately 20 have been destroyed. Recommendations included a full survey of all 4,500 acres of Hāna Ranch Lands, excavation in selected areas and the recording of oral histories for the area.

In 1991, State Archaeologist Theresa Donham, conducted archaeological investigations at the Koholaiki Burial Site (50-13-2835), Mokae, Hāna, Maui (Donham 1991). The investigations centered on a group of remain eroding out of an embankment along the beach. Burial 1 was a single burial which was uncovered and determined to be a secondary bundle burial. Burials 2 and 3 were located approximately 10 m north of Burial 1 and were in poor condition (Donham 1991:4). Donham speculates that more burials may be present in the dune and recommends that the dune and embankment be preserved.

In 1992, Cultural Surveys Hawaiʻi (Borthwick et al. 1992), conducted an archaeological inventory survey with limited subsurface testing for the proposed Hāna Ranch Country Club, Hāna, Maui. The survey covered approximately 400 acres of former sugar cane lands and identified 51 sites. "The majority of sites observed are of probable historic age and are site remnants" (Borthwick et al. 1992:i). Site types identified were a religious feature (Koahaepali Heiau, Site 117, originally recorded by Walker [1931] in the 1920s), two probable burials, agricultural terraces and walls, a historic railroad grade and road system, and habitation sites. Subsurface testing conducted at 13 sites resulted in the recovery of three radiocarbon samples, two of which resulted in modern dates (1425-1950 and 1648-1950) and one with the prehistoric range of 1345-1650 (Site 50-50-13-2712, a remnant of a habitation terrace).

Xamanek Researchers conducted an archaeological inventory survey on a half-acre portion of a 2.597 acre parcel (TMK: 1-4-010:016) in Kākiʻo, Maui (Fredericksen et al. 1996a). The parcel contains a previously recorded site (50-50-13-3528) comprised of C-shapes, a historic burial, possible burial mounds, and historic features. A total of eight agricultural features (clearing piles and low-rock alignments) were recorded on the parcel (Fredericksen et al. 1996a). Xamanek also conducted data recovery procedures on a second area within the same parcel (Fredericksen and Fredericksen 1996b). Data recovery centered on a northern boundary rock wall which is part of Site 50-50-13-3528. It was concluded that the wall is of post-contact construction (core-filled, stacked on both sides). Preservation and reconstruction of the wall were recommended.

In 2003, Scientific Consulting Services, Inc. (Sullivan and Dega 2003), conducted an archaeological inventory survey at a 0.432 acre parcel in the *ahupuaʻa* of Hāmoa, Hāna [TMK: (2) 1-4-008:012]. A single site was identified (50-50-13-5448) consisting of a platform and four walls interpreted as historic-modern. In addition, four backhoe trenches were excavated and failed to identify any subsurface cultural remains. Site -5448 was assessed as significant under Criterion "D" and no further work was recommended.

In 2005, Cultural Surveys Hawaiʻi (Dockall et al. 2005) conducted an archaeological inventory survey for a ca. 129 acre parcel located in the *ahupuaʻa* of Mokae, situated northwest of the current project area. They relocated two previously identified sites (50-50-13-2742, a railroad bed and 50-50-13-4008, an agricultural complex) and recorded three new sites (50-50-13-5681, an enclosure and sealed lava tube; 50-50-13-5682, an agricultural complex; and 50-50-13-5683, a complex).

In 2005, Scientific Consultant Services (Johnson et al. 2005), conducted an archaeological inventory survey at a 1.78 acre parcel in the *ahupuaʻa* of Kākiʻo, immediately to the south of the

current project area. They identified a single site complex (50-50-13-5700) comprising 24 features. The features consisted of eight mounds, eight terraces/alignments, five enclosures, one platform, one refuse pit, and one modified boulder (Johnson et al. 2005:ii). Excavations uncovered a single charcoal sample, which returned a historic period date. However, Johnson et al. (2005) argue this date merely documents the use of the site in the historic period and not the creation of the site. Site 5700 was assessed as significant under Criterion "D." No further work was recommended for 15 features but data recovery was recommended for the remaining nine features.

Again in 2005, Scientific Consultant Services (Drennan and Dega 2006), conducted an archaeological inventory survey of a 9.83 parcel in the *ahupuaʻa* of Waiohonu [TMK (2) 1-4-011:012]. A total of 13 archaeological sites were identified most of which were associated with "early and/or historic agriculture" (Drennan and Dega 2006: ii). All of the sites were assessed as significant under Criterion "D" with Site 50-50-13-5809 (a pre-Contact habitation complex) also significant under Criterion "E". Preservation was recommended for Site -5809 and data recovery and/or preservation was recommended for Site -5820 (a rockshelter). No further work was recommended on the remaining sites.

In 2008, CRM Solutions Hawaiʻi, Inc. (Conte 2009), conducted an archaeological survey on three adjacent parcels, totaling ca. 23 acres in size located within the *ahupuaʻa* of Kākiʻo of Hāna, Maui [TMK: (2) 1-4-011:014, 059, 060]. Nine sites comprised of 11 features were identified during the survey. The sites (50-50-13-6613 thru 6621) consisted of three rockshelters, two rock mounds, a modified outcrop (a possible burial), planting areas, and a terrace. All of the sites were assessed as significant under Criterion "D". No further work was recommended, however, a preservation plan was recommended for site -6613, -6614, -6615, -6617, and -6618. In addition, any future ground altering activities should be archaeologically monitored.

In 2011, Archaeological Services Hawaiʻi, LLC (O'Claray-Nu et al. 2011) conducted an archaeological inventory survey at a 16.6 acre parcel in Mokae *ahupuaʻa*, Hāna [TMK (2) 1-4-010:005). Eight historic properties (Site -1638 and 7152-7158) were identified during the survey. Features recorded included: both historic and pre-Contact walls, enclosures, a C-shape, soil; and rock terraces, soil and rock platform, rock piles and mounds. Portions of three sites were recommended for preservation (Sites -7156, -7157 and -7158).

Figure 5. Approximate locations of previous archaeological investigations in the vicinity.

4.1 TRADITIONAL SITES

Although traditional sites have been recorded near and around the current project area, no traditional Hawaiian sites have been recorded within the current study area.

4.2 HISTORIC SITES

The Kahawaiokapiʻa Bridge, which is the central historic site in the current study area is located within and is a contributing element to the Hāna Highway Historic District. [Note: several different names have been used to designate this district – Hāna Highway Historic District, the Hāna Highway Historic Bridge District, and the Hāna Historic Bridge (SHPD letter dated 13 September 2005). We will use the designation Hāna Highway Historic District as this is the most common version encountered in documents reviewed.]

The original description of the Hāna Highway Historic District is provided in the inventory and evaluation study conducted by Spencer Mason Architects:

> The Hāna Highway Historic Bridge District [sic] includes fifty-nine bridges and eight culverts constructed along the Hāna Highway (State Highway 360) between 1908 and 1937. The district covers more than fifty miles of roadway beginning at the Hoalua Stream Bridge near Huelo in the Makawao District and ending immediately after Koukouʻai Stream Bridge near ʻOheʻo in the Kīpahulu District. The Hāna Highway Historic Bridge District [sic] encompasses the highest concentration of unaltered and stylistically consistent historic bridges in the state (Spencer Mason Architects 1996:VI-191).

Kahawaiokapiʻa Bridge (Figures 2 and 3), was constructed in 1915 by Wilson and McCandless. Wilson and McCandless were employed by Maui County to construct a macadam road towards Keʻanae (Hawaiʻi Heritage Center 1990:167). Kahawaiokapiʻa Bridge is a concrete flat slab bridge, which extends over Kapiʻa Stream, and has a maximum length of 59 feet. A flat slab bridge is described as:

> Simple reinforced-concrete slab bridges were an alternative to metal or timber stringers structures. Early twentieth-century concrete slabs were cast on site, with formwork built by local carpenters. The plain appearance of this functional design was augmented by a variety of railings, which ranged from solid parapets to open balustrades (Spencer Mason Architects 1996:VI-195).

Kahawaiokapiʻa Bridge has been studied, inventoried, and evaluated on many occasions. The following is a summary of these studies:

- It was first inventoried and evaluated in 1990 by the Hawaiʻi Heritage Center for the State of Hawaiʻi, Department of Transportation – Highways Division. This study concluded the Kahawaiokapiʻa Bridge had little local, state, or national significance (Wilson Okamoto 2001:7).
- A subsequent study by Spencer Mason Architects in 1996 resulted in the formation of the Hāna Highway Historic District, which includes Kahawaiokapiʻa Bridge. The

Kahawaiokapiʻa Bridge was listed on the National Register of Historic Places on 15 June 2001 (Wilson Okamoto 2001:1).

- In 2001, the County of Maui issued the Final Preservation Plan for County of Maui Bridges within the Hāna Highway Historic District (Wilson Okamoto 2001). Because of structural deficiencies and safety concerns, this Plan recommended that the Kahawaiokapiʻa Bridge be demolished and that a replacement bridge be constructed in the same location (Wilson Okamoto 2001:40).
- In 2002, Mason Architects completed an HAER (Historic American Engineering Record) for Kahawaiokapiʻa Bridge and stated that this bridge was a contributing element to the Hāna Highway Historic District (HAER HI-72 housed in the Library of Congress http://www.loc.gov/index.html).

The HAER photographs documenting the Kahawaiokapiʻa Bridge are presented in Appendix A.

5.0 RESULTS

Neither the 2013 nor the 2015 archaeological surveys identified any new archaeological sites. In fact, the area northeast of the bridge is completely cleared and serves as active pasture land. The area southeast of the bridge is densely over grown grass indicating it has been cleared at some time in the past. This area also has numerous fruit tress such as chili pepper, bananas, papaya, mango, *noni*, and avocado indicating its use as a modern garden area.

However, the 1999 survey examined a small area of ca. 50 m around Kahawaiokapiʻa Bridge and outside of the current APE. Two sites were identified and recorded at that time (Figure 6). Site 50-50-13-4684 was identified as a probable habitation site located on the south side of Kapiʻa Stream and Site 50-50-13-4685 was identified as a habitation site located on the north side of Kapiʻa Stream. Precise GPS locational data recorded in 2015 show that none of the features of these two sites areas are within the project APE, thus they will not be impacted by the project.

Site 50-50-13-4684 is located on the south side of Kapiʻa Stream approximately 17 m at 110° from the south east corner of the Kahawaiokapiʻa Bridge. The site measures approximately 50.0 m northeast-southwest by 30.0 m southeast-northwest and consists of five features: a platform, three stone alignments, and a rock mound (Figure 7).

> **Feature A** (Figure 8) is a rectangular piled platform, constructed of waterworn and rough basalt boulders. The platform measures 6.7 m long, 3.6 m wide and between 0.5 m (on the north side) and 1.5 m (on the south side) high.
>
> **Feature B** is a multi-stone alignment constructed of waterworn basalt cobbles and boulders. The alignment measures 26.5 m long, 1.0 m wide and 0.2 m high.
>
> **Feature C** is a multi-stone alignment constructed of waterworn basalt cobbles and boulders. The alignment measures 23.3 m long, 1.0 m wide and 0.2 m high.
>
> **Feature D** (Figure 9) is a low circular stone mound constructed of waterworn cobbles. The mound measures 2.5 m long, 2.5 m wide and 0.5 m high. This feature is 21.0 m at 280° to the south edge of Hāna Highway.
>
> **Feature E** is a short rock alignment constructed of waterworn cobbles and small boulders. Over all, the alignment measures 7.0 m long (4.0 m NE/SW and 3.0 m N/S) 0.3m wide and 0.3 m high. This feature is 17m at 110° to the south edge of Hāna Highway/Kahawaiokapiʻa Bridge.

Approximately 30 m east of Feature A, on the east side of a drainage, a complex of roughly 10 to 15 stone platforms and mounds was noted. Most are approximately 2.0 m wide and 1.5 m high. Some are rectangular in plan view. These features are possible burial structures but are located well outside of the APE and were not recorded during the surveys.

Figure 6. Locations of identified during the AIS investigations.

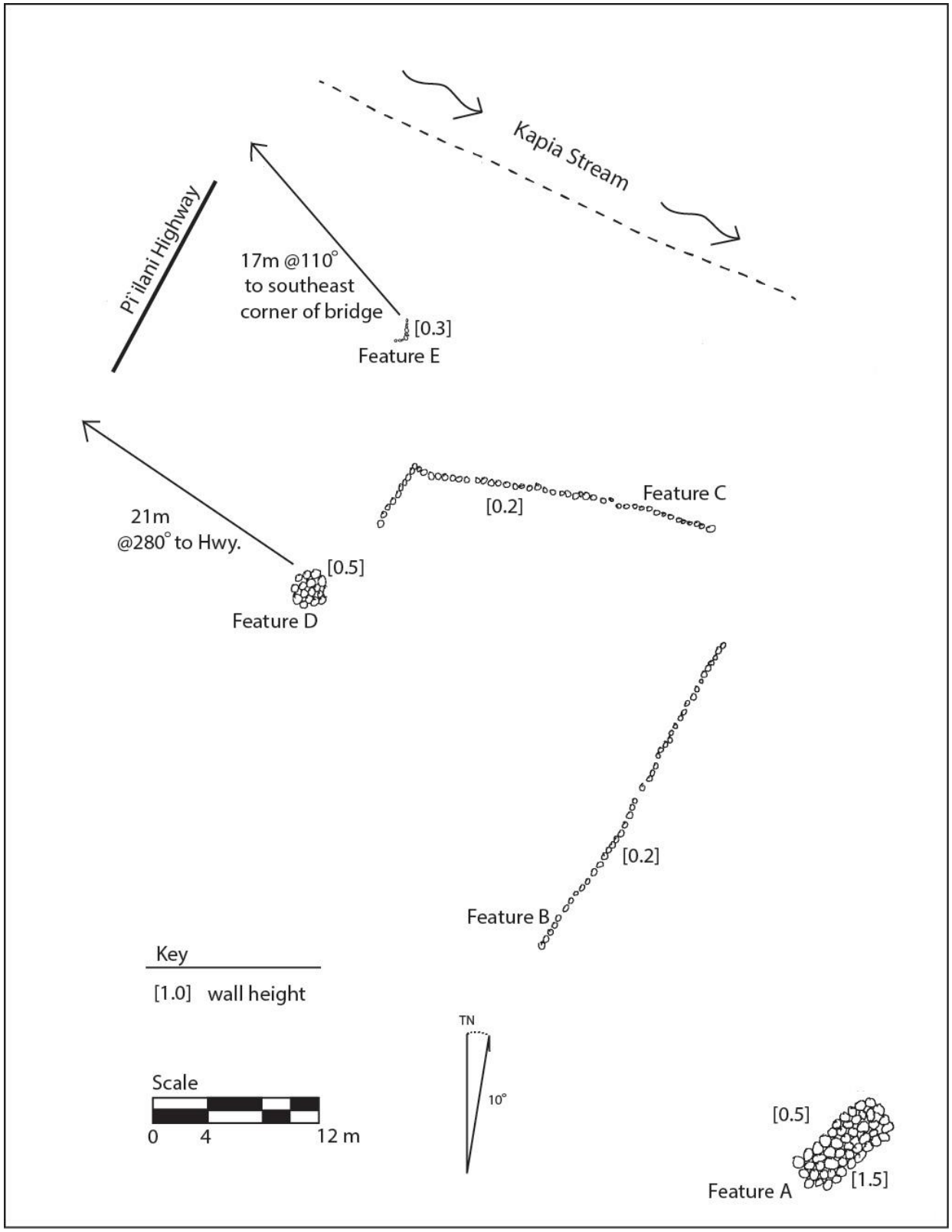

Figure 7. Plan map of Site 4684.

Figure 8. Site 4684, Feature A, platform.

Figure 9. Site 4684, Feature D, mound.

Site 50-50-13-4685 is located to the north of Kapiʻa Stream and approximately 27 m at 247° to the northeast corner of Kahawaiokapiʻa Bridge. The site measures approximately ca. 55 m (E-W) by 40 m (N-S) and consists of three features: an enclosure, a rock wall, and a concrete cistern (Figures 10 - 15). The 2015 survey noted that Feature C (cistern) has been severely damaged by cattle grazing and resting in the area.

Feature A is an enclosure measuring 7.6 m long and 5.8 m wide (Figures 10 and 11). The walls of the enclosure range between 0.5 m and 1.0 m thick. The heights of the walls range between 0.0-0.2 m (north wall) and 1.0-1.6m (south wall).

Feature B is a rock wall that extends over 60 m in length and is ca. 1.0 m wide and 0.2 to 1.0 m high (Figures 12 and 13). This wall is built along the north edge of Kapiʻa gulch and a portion forms the south wall of Feature A.

Feature C is a concrete cistern (Figures 14 and 15). It measures ca. 3.5 m in diameter and is 1.0 m high. Additional stone walls were observed between 50 to 70 m to the north and northeast of Feature C.

Figure 10. Site 4685, Feature A enclosure (from 1999 survey).

Figure 11. Site 4685, Feature A (from the 2015 survey).

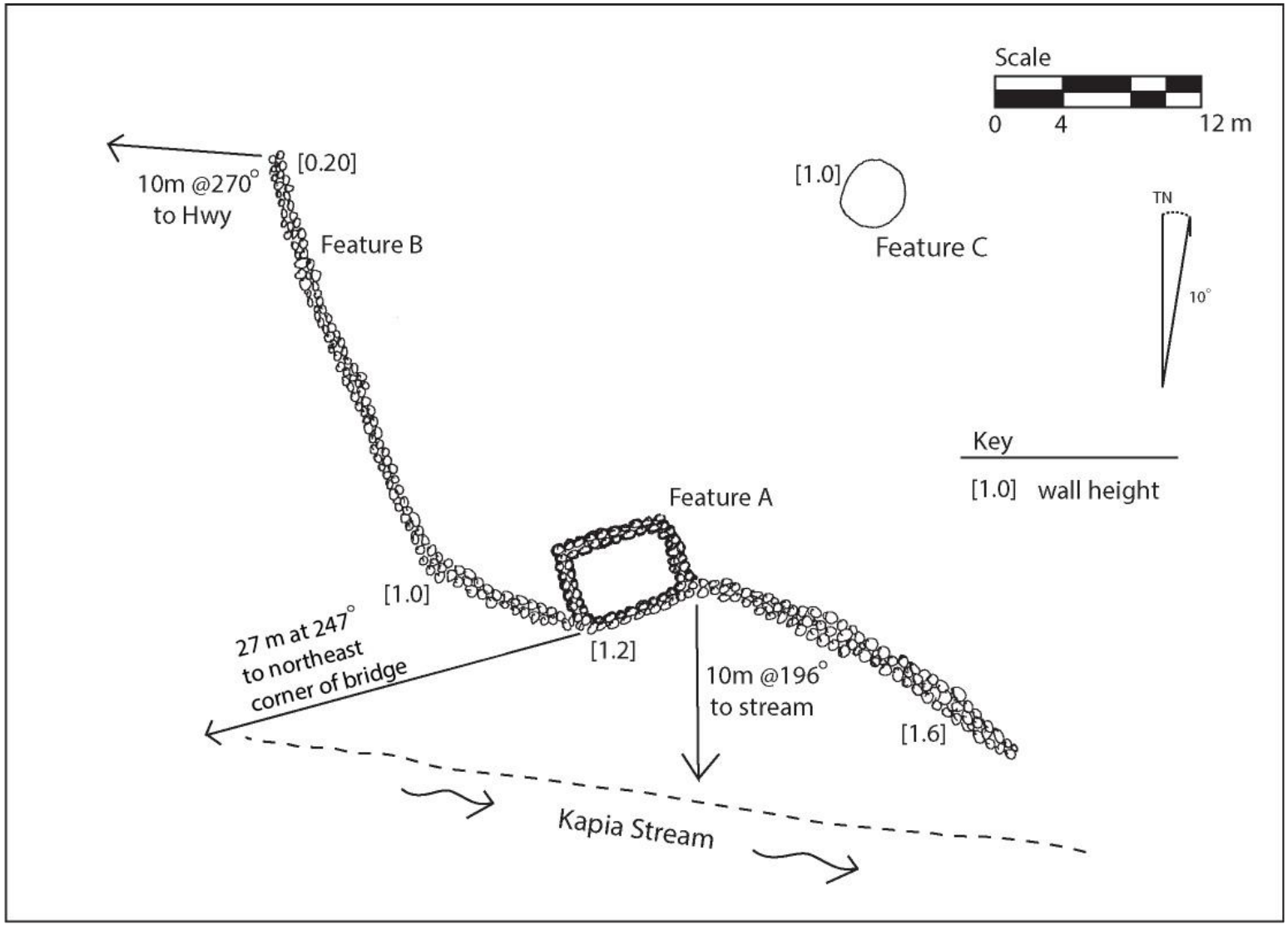

Figure 12. Plan map of Site 4685.

Figure 13. Site 4685, Feature B wall.

Figure 14. Site 4685, Feature C cistern (from 1999 survey).

Figure 15. Site 4685, Feature C (from the 2015 survey), note damage from cattle.

The most recent pedestrian surveys examined the proposed APE (see Figure 2) which included a small area (ca. 0.5 acres) north of Kahawaiokapiʻa Bridge (Figure 16) on the *mauka* or west side of the highway for the proposed construction area and temporary bridge. The survey area consists of an open grassy area adjacent to the highway. The survey determined that the relatively flat area is void of rock indicating that area has been cleared for ranching or other agricultural pursuits. No archaeological sites were observed in this area.

In addition, a second smaller area to the south of Kahawaiokapiʻa Bridge also on the *mauka* side of the highway was also surveyed for the temporary bridge. This area contained thicker vegetation consisting of tall California grass along with plants commonly associated with a garden: chili pepper, mango, bananas and papaya. There is a scatter of rock in this area but no archaeological sites or features were identified in the area.

5.1 SUMMARY

Two small archaeological complexes were recorded *makai* or east side of the existing Kahawaiokapiʻa Bridge. Both of these sites are well outside the APE (Figure 17) and will not be impacted by construction activities. An additional complex of possible traditional burial mounds was noted another 30 m east of recorded Site 4684; this complex of features will not be impacted as they are well outside of the APE. No archaeological resources were identified on the *mauka* or west side of Kahawaiokapiʻa Bridge.

Figure 16. Survey area located on the west side of the highway.

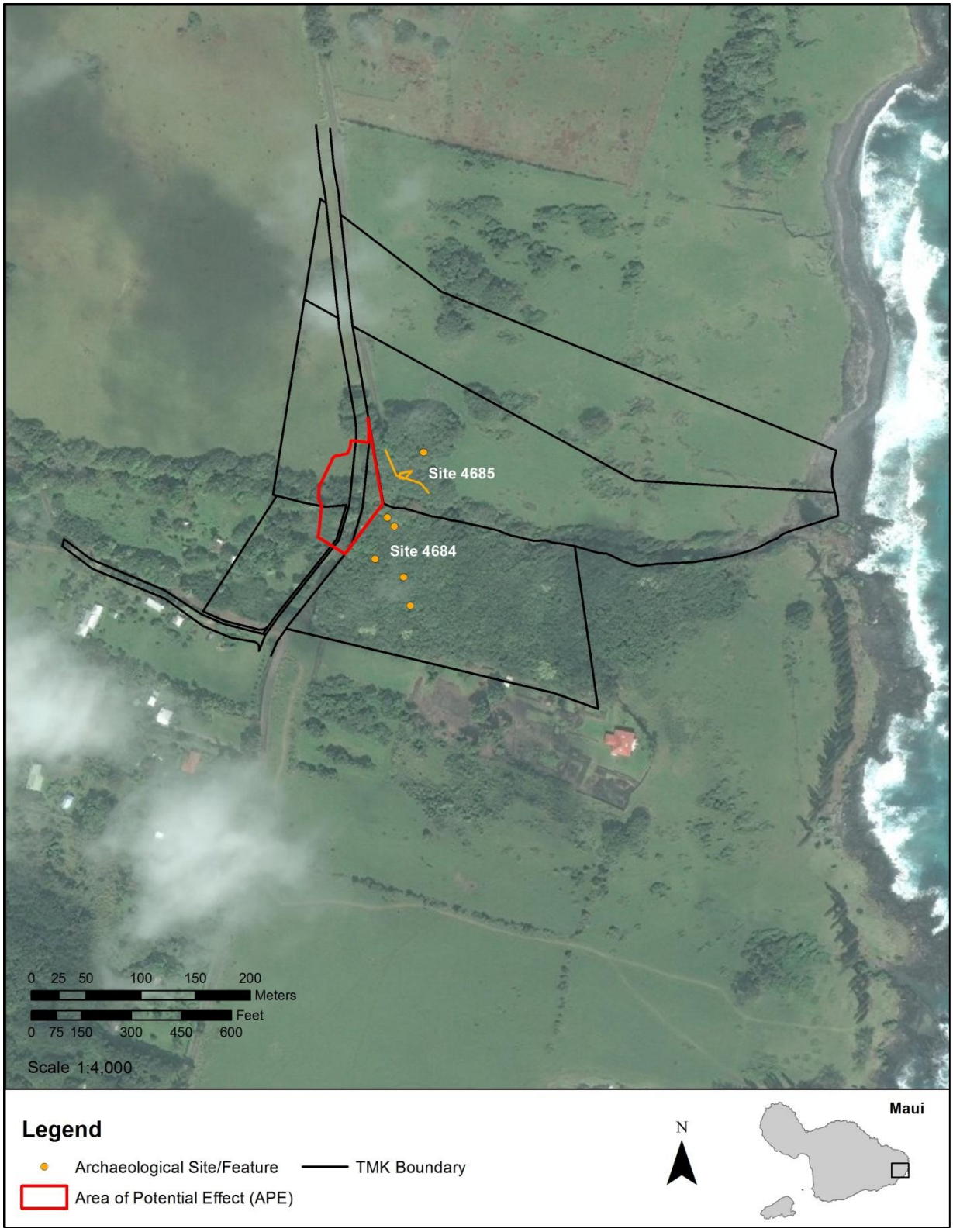

Figure 17. Aerial image showing Project APE and documented archaeological sites.

6.0 SIGNIFICANCE

The National Historic Preservation Act of 1966 (as amended) authorizes the Secretary of Interior to expand and maintain the NRHP that contains a listing of districts, sites, buildings, structures and objects significant in American history, architecture, archaeology, engineering and culture. A property may be listed in the NRHP if it meets criteria for evaluation defined at 36 CFR §60.4:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and
>
> A That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B That are associated with the lives of persons significant in our past; or
>
> C That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D That have yielded, or may be likely to yield, information important in prehistory or history.

The State of Hawaiʻi recognize the above criteria under HRS §13-275-6, and has also added a fifth significance criterion to the evaluation process:

> E That have an important value to the Native Hawaiian people or to another ethnic group of the State due to associations with cultural practices once carried out or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts – these associations being important to the group's history and cultural identity.

Based upon the above stated criteria, both Sites 4684 and 4685 appear to be significant based upon criterion "D." These sites have the potential to yield important information of traditional activities occurring in this portion of Hāna as well as possible chronological information regarding settlement of this area that would be valuable to Native Hawaiians and the historic period in Hāna.

7.0 DISCUSSION AND RECOMMENDATIONS

Pacific Legacy, Inc., at the request of Wilson Okamoto Corporation, conducted an archaeological inventory survey for a proposed bridge replacement at the Kahawaiokapiʻa Bridge situated between the *ahupuaʻa* of Mokae and Kākiʻo in the district of Hāna, island of Maui [TMK (2) 1-4-009 por.]. Specifically, Kahawaiokapiʻa Bridge is located along Piʻilani Highway, south of Hāna, approximately 0.29 miles south of the road to Hāmoa and is a narrow two-lane concrete bridge that spans Kapiʻa Stream and extends between Mokae and Kākiʻo *ahupuaʻa*.

Kahawaiokapiʻa Bridge, is a contributing property to the Hāna Highway Historic District. This district was placed on the NRHP in June 2001 (Wilson Okamoto 2001:1). The demolition of this bridge and its replacement in the same location was recommended in Maui County's final preservation plan (Wilson Okamoto 2001).

The 1999 survey (Cleghorn and McIntosh 1999) of the area adjacent to the bridge resulted in the identification of two previously undocumented archaeological sites. Site documentation has been provided in the current report. The two sites located *makai* of Kahawaiokapiʻa Bridge (50-50-13-4684 and -4685) are interpreted as habitation sites based upon the types of features (alignments and platforms) identified at each site. These two sites have been assessed as being significant because of their information potential (criterion D).

While these sites are close to the Kahawaiokapiʻa Bridge, both are located on the *makai* side of the Hāna Highway and well outside of the APE. An additional complex of stone features that may possibly be traditional burial sites was noted (but not recorded) further *makai*. These features are not within the APE and will not be affected by the proposed construction activities. The current surveys did not identify any archaeological sites within the APE.

The archaeological investigations indicate that the proposed Kahawaiokapiʻa Bridge replacement will not result in an "adverse effect" to any of the identified archaeological sites. However, the proposed project will result in an "adverse effect" to the existing Kahawaiokapiʻa Bridge. Conversely, the "adverse effect" has been mitigated by the Historic American Engineering Record (HARE) including photographic and written historical data, prepared by Mason Architects (http://www.loc.gov/pictures/item/hi0782/) for the bridge replacement project and by compliance with the preservation plan (Wilson Okamoto & Associates 2001).

While it is highly unlikely that buried cultural deposits are present within the APE, the possibility still exists. Buried cultural deposits could include living surfaces, domestic features such as fire hearths, *imu*, or activity areas, as well as human remains. Given this possibility, it is recommended that archaeological monitoring be conducted during the initial grubbing and grading of the project area. After the initial grubbing and grading, an archaeological monitor should be on-call in the event construction activities uncover potentially significant materials.

The archaeological monitoring program needs to be detailed in the archaeological monitoring plan (AMP) that must be written and accepted by SHPD prior to the start of any ground altering activities regarding the bridge replacement. These actions will ensure that any findings are treated appropriately.

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APPENDIX A

HAER Photographs from the Library of Congress
for the Kahawaiokapiʻa Bridge

Prepared by:
Mason Architects (Sept. 2004)

Photographs by:
David Franzen (2002)

HAER No. HI-72-1

HAER No. HI-72-2

HAER No. HI-72-3

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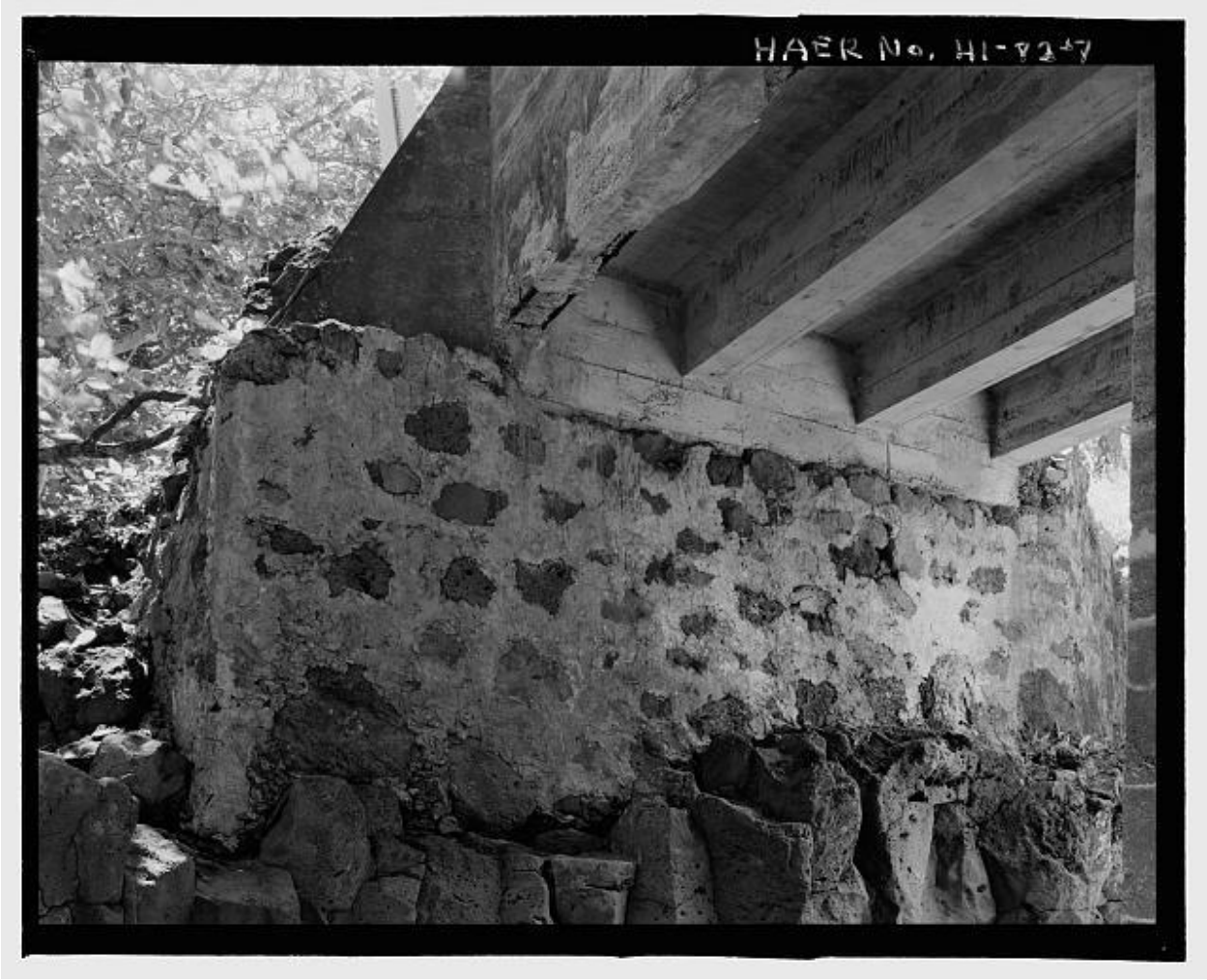
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APPENDIX C

Drainage Study Kahawaiokapia Bridge Replacement

Wilson Okamoto Corporation

March 2012

Drainage Study

Kahawaiokapia Bridge Replacement

Hana, Maui, Hawaii

Prepared for:

Department of Public Works and Environmental Management
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

Prepared by:

Wilson Okamoto Corporation
Engineers and Planners
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Job No. 6153-01

March 2012

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I. INTRODUCTION

A. Purpose

This hydrology study was conducted to:

1. Calculate hydrology of stream at the existing Kahawaiokapia bridge.

2. Perform hydraulic analysis of the existing Kahawaiokapia Bridge.

B. Project Location

The project site spans Kapi'a Stream on Hana Highway (county Route 31) 0.29 miles south of Hamoa Road in Waiohonu-Kakio Homesteads, Hana District, Maui County, Hawaii. (See Figures 1 and 2)

KAHAWAIOKAPIA BRIDGE REPLACEMNT

HANA, MAUI, HAWAII

VICINITY MAP

Figure 1

WILSON OKAMOTO CORPORATION
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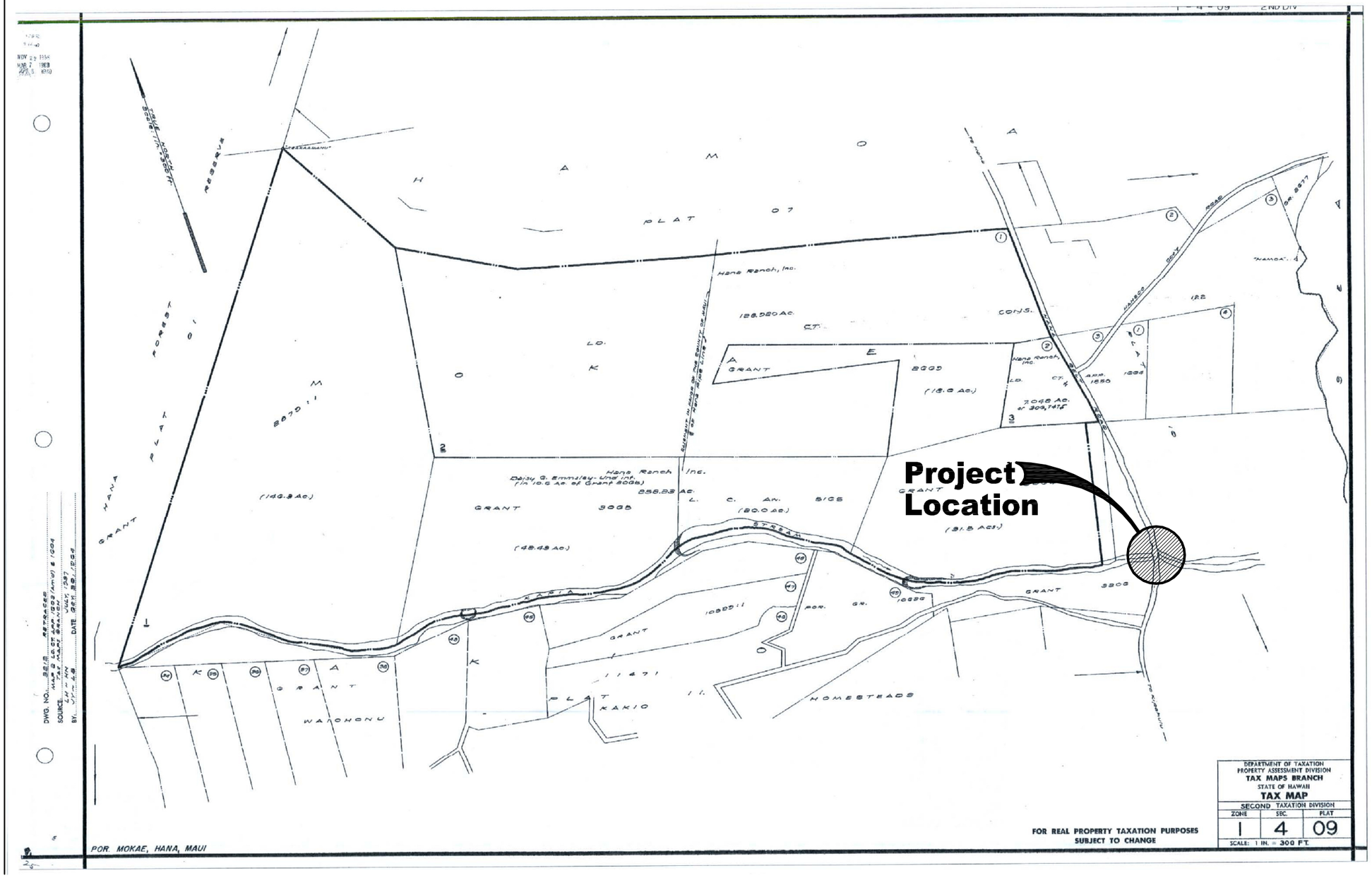

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KAHAWAIOKAPIA BRIDGE REPLACEMNT

HANA, MAUI, HAWAII

TMK: 1 - 4 - 09

Figure 2

C. Existing Conditions

The overall dimension of existing Kawaiokapia Bridge is approximately 15'-8" wide with a roadway width of 14'-2". The bridge has three spans with a reinforced-concrete deck girder. The total length of roadway is approximately 57'-6". The height above the existing grade varies to a maximum height of 16'-6".

The substructure of the bridge consists of a reinforced cast-in-place concrete deck and abutments. The wing-walls consist of concrete rubble masonry.

The superstructure consist a multi-span reinforced-concrete girder structure. There four parallel girders, each 14" wide by 22" deep.

The floor and decking consist of a 6" thick layer of asphalt concrete on the reinforced concrete deck.

The existing roadway pavement at the bridge approaches is approximately 14'-6" wide. Vegetation lines both sides of the roadway. There is no recognizable shoulder area.

The existing stream bed consists mainly of weeds and boulders of varying sizes. The stream and overbanks are vegetated with weeds, bushes, trees, and boulders.

D. Soils

Soil series and mapping units for the island of Maui are found in maps in the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii" dated August 1972, prepared by the U.S. Department of Agricultural, Soil Conservation Service (currently Natural Resources Conservation Services).

Based on the soil survey map of Maui, the underlying soil along Kapia Stream consists of Makaalae Series soils. This series consist of well-drained soils that are moderately sloping to steep. There are two types of Makaalae Series soils along the project site. The types are as follows:

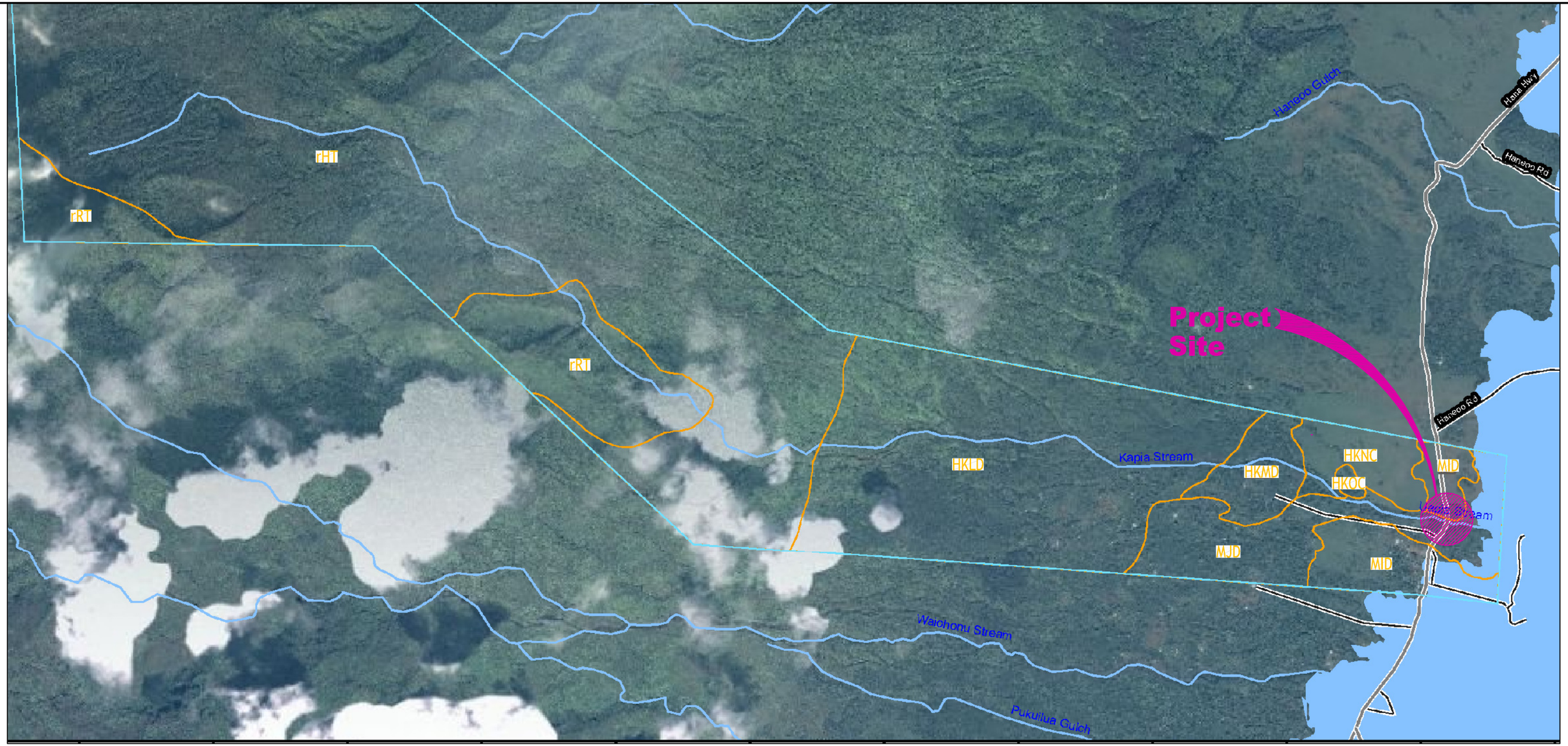
1. Makaalae silty clay, 7 to 25 percent slope (MID), permeability is moderate and runoff is slow to medium. The erosion hazard is slight to moderate.

2. Makaalae extremely stony silty clay, 7 to 25 percent slopes (MJD) consist of 3 to 15 percent stones that cover the surface.

See Figure 3 for the Soil Classification Map.

E. Vegetation

Vegetation is present on the stream banks of the river with weeds, bushes, and trees. Each side of the road approaches are highly vegetated.



SOIL CLASSIFICATION ALONG PROJECT SITE

1. MJD: MAKAALAE EXTREMELY STONY SILTY CLAY, 7 TO 25 PERCENT SLOPES.
2. MID: MAKKAALAE SILTY CLAY, 7 TO 25 PERCENT SLOPES.

REFERENCES:

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WEBSITE: http://websoilsurvey.nrcs.usda.gov/

WILSON OKAMOTO CORPORATION

KAHAWAIOKAPIA BRIDGE REPLACEMNT

HANA, MAUI, HAWAII

SOIL CLASSIFICATION MAP

Figure 3

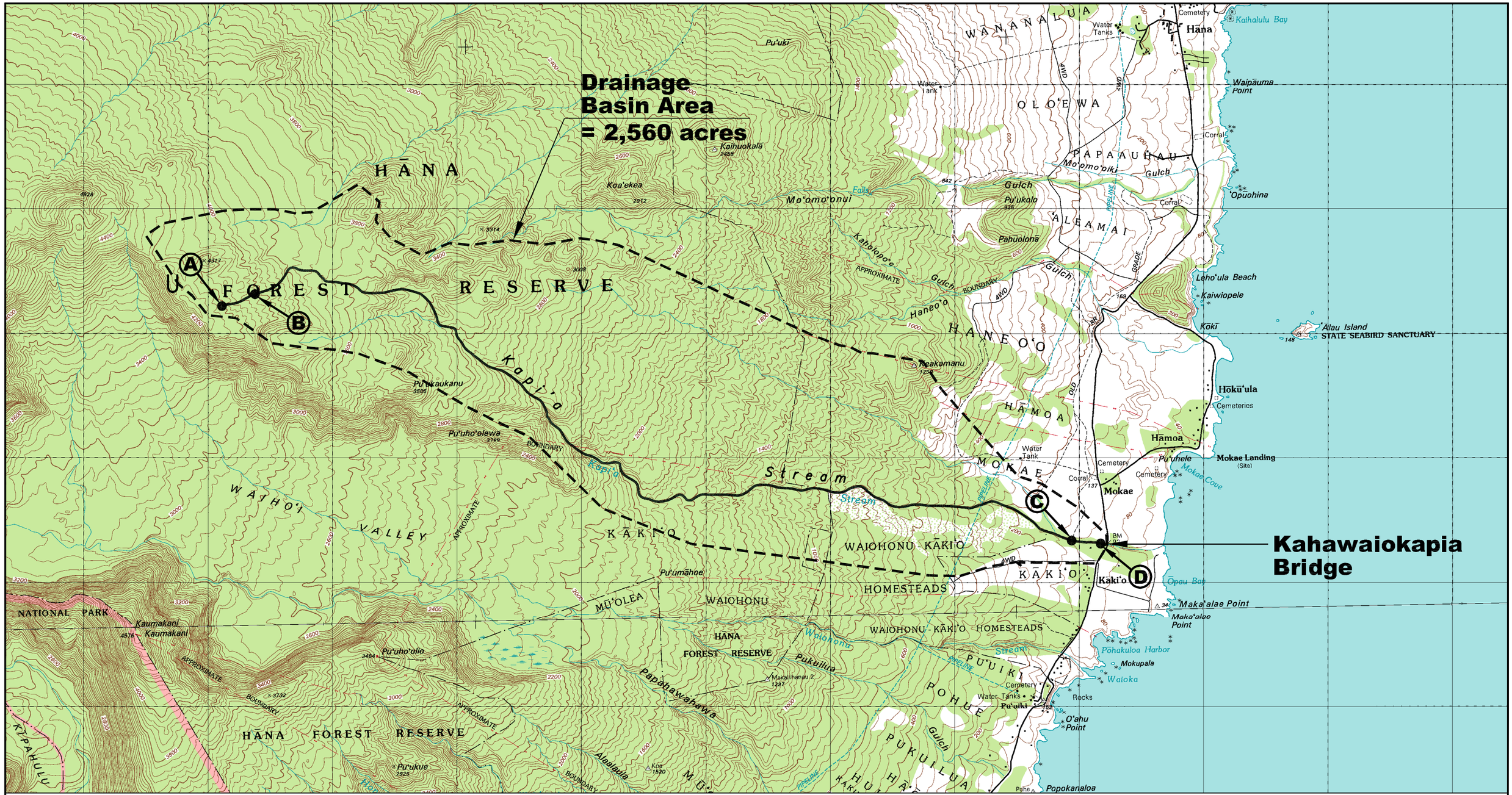
II. EXISTING DRAINAGE CONDITIONS

A. Drainage

The drainage tributary area for the hydrology analysis at the Kahawaiokapia Bridge is approximately 2,560 acres. Elevations range from 5,200 feet toward Haleakala to 73 feet mean sea level at Kahawaiokapia Bridge. (See Figure 4 Existing Drainage Area)

B. Flood Hazard

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for City and County of Maui, Hawaii, Panel Number 1500030670E dated September 25, 2009 shows that the project site is located within Zone A (See Figure 5). According to the Flood Insurance Rate Map, Zone A is an area within the 100-year flood zone where base flood elevations and flood hazard factors are not determined.



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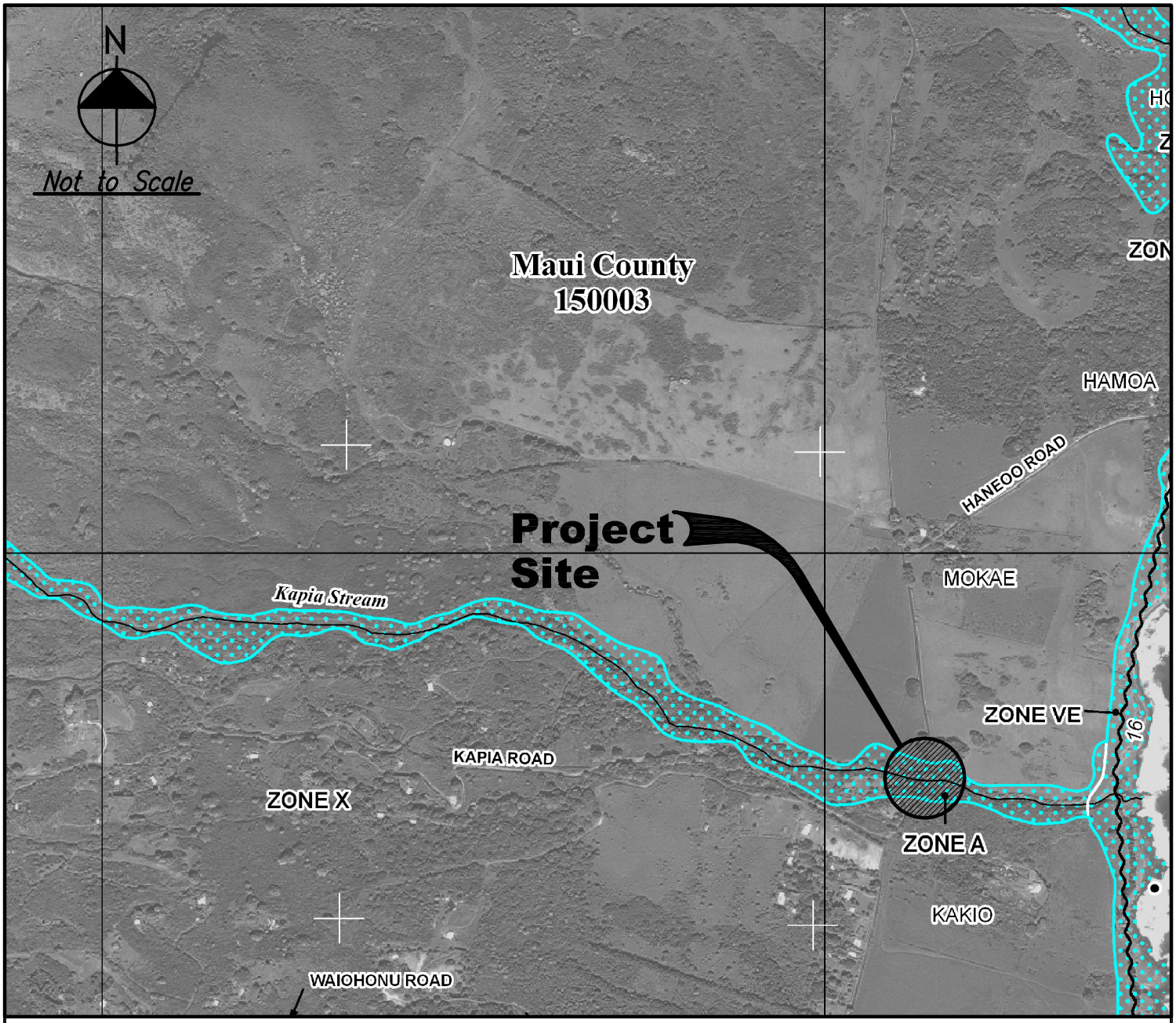
KAHAWAIOKAPIA BRIDGE REPLACEMNT

HANA, MAUI, HAWAII

EXISTING DRAINAGE AREA

Figure 4



ZONE LEGEND:

Zone A — CORRESPONDS TO THE 100-YEAR FLOOD PLAINS THAT ARE DETERMINED IN THE FIS BY APPROXIMATE METHODS. BECAUSE DETAILED HYDRAULIC ANALYSES ARE NOT PERFORMED FOR SUCH AREAS, NO BASE FLOOD ELEVATIONS OR DEPTHS ARE SHOWN WITHIN THIS ZONE.

Zone X — AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD PLAIN. NO BASE FLOOD ELEVATIONS OR DEPTH ARE SHOWN WITHIN THIS ZONES.

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KAHAWAIOKAPIA BRIDGE REPLACEMENT

HANA, MAUI, HAWAII

FLOOD INSURANCE RATE MAP

Figure 5

III. HYDROLOGY ANALYSIS

Hydrologic calculations were based on the "Urban Hydrology for Small Watersheds, Natural Resources Conservation Service, USDA, Washington DC, 1986." The hydrologic analysis is based on a 100-year storm runoff with a 24-hour rainfall intensity.

Results

Based on a 100-year, 24-hour storm event, a discharge of 9,030 cfs was determined for the existing runoff.

See Appendix "A" for Hydrologic Calculations.

IV. HYDRAULIC ANALYSIS

The U.S. Army's Corps of Engineers HEC-RAS version 4.1 program was used to determine the adequacy of Kaholopo'o Bridge opening. Based on a 100-year, 24-hour storm, the hydraulic analysis determined the existing bridge is capable of conveying this storm. With the existing bridge geometry, the 100-year, 24-hour storm water surface elevation upstream and downstream of the bridge is 80.48 and 81.75 feet mean sea level respectively.

According to the U.S. Department of Interior Bureau of Reclamation's empirical formula, the freeboard in feet for open channels is expressed as:

$$\text{Freeboard} = 2.000 + 0.025 \times v \times d^{1/3}$$

where:

v = velocity (feet per second)

d = flow depth (feet)

A table comparison of the 100-year storm water surface elevations and freeboard are as follows:

Stream Station	Centerline Ground Elevation of Stream	Water Surface Elevation of Stream	Depth of Stream (ft)	Velocity of Stream (ft/s)	Required Freeboard (ft)	Minimum Bottom Bridge Elevation to meet Required Freeboard	Existing Bottom Bridge Elevation	Difference Between Existing and Minimum Bottom Bridge Elevation (ft)
214.54	70.08	79.52	9.44	30.55	2.16	--	--	--
201.61 (Bridge Upstream)	70.08	80.48	10.40	28.51	2.16	82.64	90.32	7.68
201.61 (Bridge Downstream)	70.74	81.75	11.01	24.45	2.14	83.89	90.32	6.43
191.83	70.66	80.99	10.33	25.26	2.14	--	--	--

See Appendix “A” for Hydrologic Calculations.

V. CONCLUSION

The existing Kahawaiokapia Bridge is capable of conveying the 100-year, 24-hour storm with the inclusion of required freeboard under the bridge.

VI. REFERENCES

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2. "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii", United States Department of Agriculture Soil Conservation Service in cooperation with University of Hawaii Agricultural Experiment Station, August 1972.

3. "Urban Hydrology for Small Watersheds Technical Release 55", United States Department of Agriculture, Natural Resources Conservation Services, Conservation Engineering Division, June 1986.

APPENDIX A: HYDROLOGIC CALCULATIONS

Worksheet 2: Runoff curve number and runoff

Project	By	Date
KAHAWAIOKAPIA BRIDGE REPLACEMENT	WOC	5-9-11
Location	**Checked**	**Date**
HANA, MAUI, HAWAII		

Check one: ☒ Present ☐ Developed

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Figure 2-3	CN 1/ Figure 2-4	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
HANA, A	PASTURE, GOOD CONDITION	39			2,560	99,840
	Totals ➡				2,560	99,840

1/ Use only one CN source per line

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{99{,}840}{2{,}560} = 39$; **Use CN** ➡ 40

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr	100		
Rainfall, P (24-hour)	in	20		
Runoff, Q	in	9.03		

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

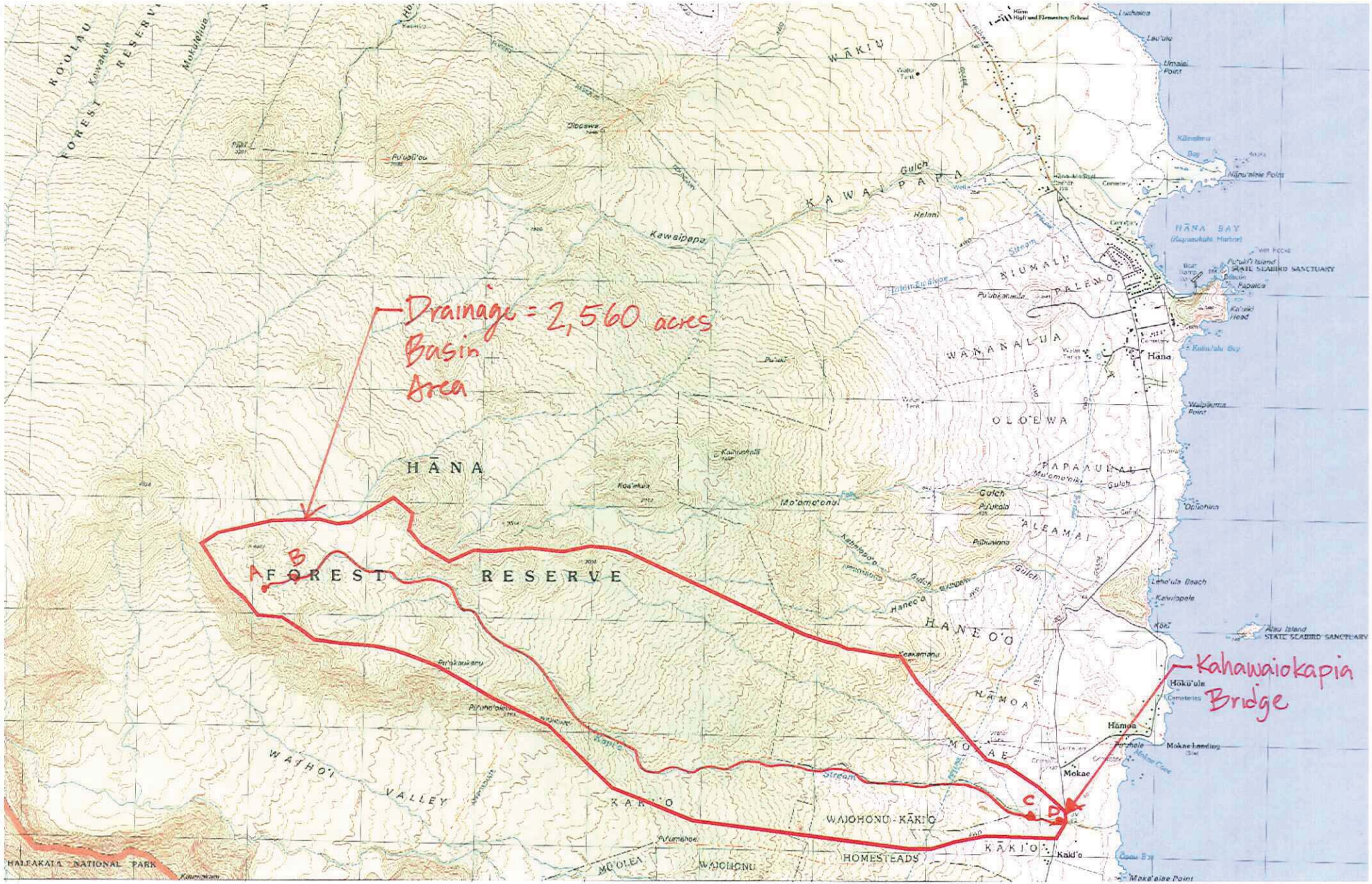
Exhibit A: Hydrologic Soil Groups for the United States

GOVEY	C
GOWDY	B
GOWEN	B
GOWKER	C
GOWTON	B
GOZEM	D
GRACOT	A
GRADCO	C
GRADON	C
GRAFF	D
GRALIC	B
GRAN	D
GRANATH	B
GRANBUL	D
GRAND	C
GRANDAD	B
GRANDBEND	B
GRANDFIELD	B
GRANDJEAN	D
GRANDMESA	C
GRANDMORE	B
GRANDPON	B
GRANDVIEW	B/C
GRANDWASH	D
GRANER	B
GRANFLAT	A
GRANGE	C
GRANGEMONT	C
GRANGEVILLE	C
GRANIPEAK	B
GRANITEPASS	B
GRANMOUNT	C
GRANSHAW	B
GRANTCENTER	B
GRANTFORK	D
GRANTHAM	D
GRANTSBURG	C
GRANTSDALE	B
GRANTURK	D
GRANVILLE	B
GRANYON	B
GRANZAN	B
GRAPELAND	A
GRASMERE	B
GRASSHOPPER	B
GRASSTON	B
GRASSVAL	D
GRASSVALLEY	D
GRASSYCAN	D
GRASSYCONE	A
GRASSYKNOB	B
GRASSYLAKE	C
GRASSYTRAIL	B
GRAUFELS	C
GRAVELTON	B/D
GRAVES	D
GRAVEYA	B
GRAVEYARD	B
GRAYBERT	B
GRAYFORD	B
GRAYLOCK	B
GRAYMONT	B
GRAYPOINT	B
GRAYROCK	C
GRAYSILL	C
GRAYSTONE	B
GRAYWOLF	B
GRAZANE	C
GRAZER	C
GREANEY	C
GREDGE	D
GREEN BLUFF	B
GREEN CANYON	B
GREENBRIAR	B
GREENCREEK	B
GREENDALE	B
GREENE	C
GREENFIELD	C
GREENGULCH	C
GREENHORN	D
GREENLEE	B
GREENMAN	C
GREENOUGH	B
GREENSCOMBE	B
GREENTIMBER	C
GREENVILLE	B
GREENVINE	D
GREENWAY	B
GREENWICH	B
GREGGO	D
GREGORY	D
GREGSON	C
GRELL	D
GREMMERS	D
GRENET	A
GRENNAN	B
GRENOBLE	D
GRESHAM	C
GRETDIVID	B
GRETOR	C
GRETTUM	A
GREWINGK	C
GREYBEAR	C
GREYBO	B
GREYBROOK	B
GREYCLIFF	C
GREYLOCK	B
GREYS	B
GREYSTOKE	B
GRIBBLE	D
GRIDELL	D
GRIDLEY	C
GRIER	D
GRIFFITH	D
GRIFTON	D
GRIMM	B
GRINDALL	D
GRINDSTONE	C
GRINK	D
GRISDALE	B
GRISMAR	A
GRISWOLD	B
GRITNEY	C
GRIVER	B/D
GRIZZLE	D
GRIZZLY	B
GRIZZLYBLUFF	B
GROESBECK	B
GROMES	B
GROOM	C
GROSS	C
GROSSCHAT	D
GROTON	A
GROTTO	A
GROUNDHOUSE	B
GROUSECREEK	B
GROUSEHAVEN	D
GROUSEVILLE	C
GROUSLOUS	D
GROVE	A
GROVENA	B
GROVETON	B
GROWDEN, Shaly Substratum	B
GROWDEN	C
GROWLER	B
GROWLER, Sandy Substratum	C
GROWSET	D
GRUBBS	D
GRUBE	B
GRUBROB	B
GRUBSTAKE	B
GRUENE	D
GRULLA	D
GRUMBLEN	D
GRUNDELEIN	B
GRUVER	C
GRYTAL	B
GSCHWEND	B
GUADALUPE	B
GUAM	D
GUAMANI	B
GUANABANO	C
GUANAJIBO	C
GUANICA	D
GUANO	D
GUARDLAKE	A
GUAYABO	A
GUAYABOTA	D
GUAYAMA	D
GUAYNAKA	D
GUBE	C
GUDGEL	C
GUDGREY	B
GUERIN	D
GUERO	C
GUERRERO	A
GUEST	C
GUEYDAN	D
GUFFIN	D
GUGUAK	D
GUIJARRAL	B
GUISER	B
GULCH	B
GULF	B/D
GULKANA	B
GULLIED LAND	D
GULLION	C
GULLROCK	B/D
GULNARE	D
GUMBOOT	C/D
GUNCLUB	C/D
GUNDY	C
GUNNEL	D
GUNNINGS	B
GUNNUK	C
GUNSONE	D
GUNSTOCK	C
GUNTER	B
GURDANE	C
GURDON	C
GURLEY	C
GURNEY	B
GUSTIN	D
GUSTSPRING	B
GUTPORT	D
GUVO	D
GUYAN	C
GUYANDOTTE	B
GWENA	D
GWINNER	C
GWINNETT	B
GYBERG	C
GYPLA	C
HAAR	D
HAARVAR	D
HACCKE	C
HACHITA	C
HACKBERRY	B
HACKERS	B
HACKNEY	D
HACREEK	B
HADAR	B
HADENCREEK	C
HADLEY	B
HADSELVILLE	D
HAFLINGER	A
HAGATA	D
HAGEN	B
HAGENSVILLE	C
HAGER	B
HAGERMAN	B
HAGGA	C
HAGGARD	D
HAGSTADT	C
HAGUE	A
HAIG	C/D
HAIGHT	C
HAIGHTS	B
HAIGLER	C
HAIKU	B
HAILESBORO	C
HAINES	C
HAIRE	D
HAKKER	C
HAL	B
HALACAN	D
HALAWA	B
HALBERT	D
HALDER	C
HALE	C/D
HALEY	B
HALF MOON	B
HALFADAY	A
HALFCIRCLE	B
HALFOSS	B
HALFWAY	D
HALII	B
HALIIMAILE	B
HALLCREEK	A
HALLECK	B
HALLENTON	D
HALLETTSVILLE	D
HALLIHAN	B
HALLISON	C
HALLORAN	C
HALLSBLUFF	D
HALSO	D
HALVERSON	B
HALVERT	D
HAMACER	A
HAMAKUAPOKO	B
HAMBLEN	C
HAMBONE	B
HAMBROOK	B
HAMBURG	B
HAMBURN	B
HAMBY	C
HAMDEN	B
HAMEL	B/D
HAMILTON	B
HAMLET	B
HAMMACK	B
HAMMAHAMMA	C
HAMMERSLEY	C
HAMMOND	C
HAMPLAIN	B
HAMPSHIRE	C
HAMPSON	C
HAMRE	C/D
HAMRUB	B
HANA	A
HANAGITA	D
HANAKER	C
HANAMAULU	B
HANCEVILLE	B
HAND	B
HANDKE	A
HANDOFF	B
HANDSBORO	D
HANEY	B
HANGAARD	A/D
HANGDO	B
HANGROCK	D
HANGTOWN	B
HANIPOE	C
HANIS	C
HANKS	B
HANKSVILLE	C
HANLON	B
HANN	B
HANNA	B
HANNAHATCHEE	B
HANNAWA	D
HANNEGAN	D
HANNON	D
HANS	B
HANTHO	B
HAOZOUS	B
HAPJACK	D
HAPNEY	D
HAPPLE	B
HAPPUS	A
HAPPYHOME	C
HAPUR	D
HARAHILL	C
HARBESON	D
HARBOR	C
HARBORD	B
HARCO	B
HARCOT	B/D
HARDEMAN	B
HARDESTY	B
HARDHART	B
HARDISTER	B
HARDOL	B
HARDSCRABBLE	D
HARDTRIGGER	B
HARDWICK	C
HARDY	C
HARDZEM	C

Table 2-2c Runoff curve numbers for other agricultural lands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4]	48	65	73
Woods—grass combination (orchard or tree farm). [5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.
2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.
3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.
4 Actual curve number is less than 30; use CN = 30 for runoff computations.
5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.
6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.


Drainage = 2,560 acres
Basin
Area
Kahawaiokapia
Bridge
A
B
C
D
HĀNA
FOREST RESERVE
KAWAIPAPA
Gulch
Kawaipapa
WĀKIU
AIUMALU
PALENO
WANANALUA
OLO'EWA
PAPAAULAI
ALEAMAI
HANEO'O
HAMOA
MO'AE
WAJOHONU-KĀKI'O
KĀKI'O
HOMESTEADS
WAIHO'I
VALLEY
MO'OLEA
WAJOHONU
HĀNA BAY
Hāna
Mokae
Hāmoa
Kaki'o
HALEAKALA NATIONAL PARK
KOOLAU
FOREST RESERVE

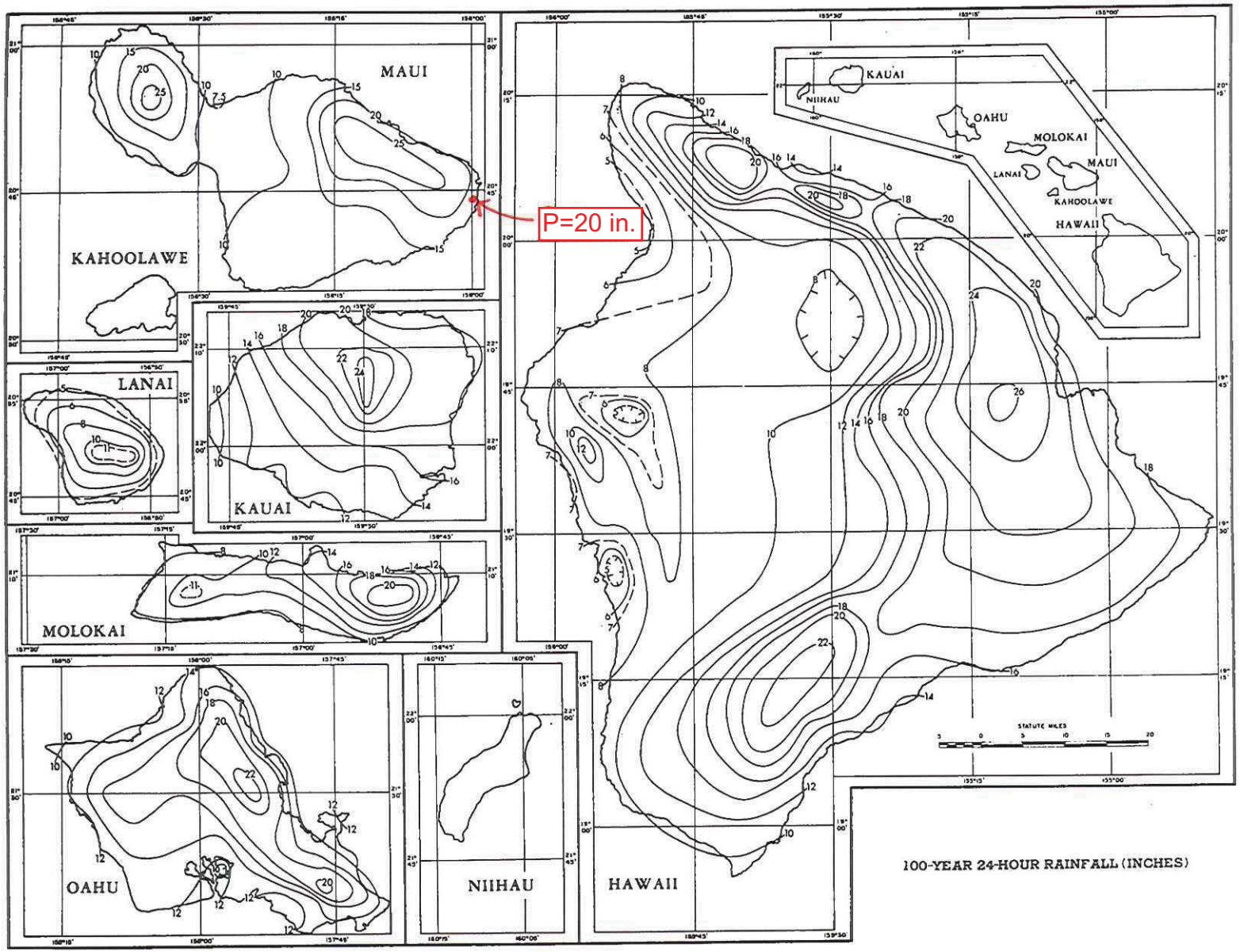


FIGURE 56.—100-yr. 24-hr. rainfall (in.)

Rainfall - Frequency Atlas of the Hawaiian Islands

Chapter 2 Estimating Runoff

SCS runoff curve number method

The SCS Runoff Curve Number (CN) method is described in detail in NEH-4 (SCS 1985). The SCS runoff equation is

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \text{[eq. 2-1]}$$

where

Q = runoff (in)
P = rainfall (in)
S = potential maximum retention after runoff begins (in) and
I_a = initial abstraction (in)

Initial abstraction (I_a) is all losses before runoff begins. It includes water retained in surface depressions, water intercepted by vegetation, evaporation, and infiltration. I_a is highly variable but generally is correlated with soil and cover parameters. Through studies of many small agricultural watersheds, I_a was found to be approximated by the following empirical equation:

$$I_a = 0.2S \qquad \text{[eq. 2-2]}$$

By removing I_a as an independent parameter, this approximation allows use of a combination of S and P to produce a unique runoff amount. Substituting equation 2-2 into equation 2-1 gives:

$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)} \qquad \text{[eq. 2-3]}$$

S is related to the soil and cover conditions of the watershed through the CN. CN has a range of 0 to 100, and S is related to CN by:

$$S = \frac{1000}{CN} - 10 \qquad \text{[eq. 2-4]}$$

Figure 2-1 and table 2-1 solve equations 2-3 and 2-4 for a range of CN's and rainfall.

Factors considered in determining runoff curve numbers

The major factors that determine CN are the hydrologic soil group (HSG), cover type, treatment, hydrologic condition, and antecedent runoff condition (ARC). Another factor considered is whether impervious areas outlet directly to the drainage system (connected) or whether the flow spreads over pervious areas before entering the drainage system (unconnected). Figure 2-2 is provided to aid in selecting the appropriate figure or table for determining curve numbers.

CN's in table 2-2 (*a* to *d*) represent average antecedent runoff condition for urban, cultivated agricultural, other agricultural, and arid and semiarid rangeland uses. Table 2-2 assumes impervious areas are directly connected. The following sections explain how to determine CN's and how to modify them for urban conditions.

Hydrologic soil groups

Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSG's (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. Appendix A defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of interest may be identified from a soil survey report, which can be obtained from local SCS offices or soil and water conservation district offices.

Most urban areas are only partially covered by impervious surfaces: the soil remains an important factor in runoff estimates. Urbanization has a greater effect on runoff in watersheds with soils having high infiltration rates (sands and gravels) than in watersheds predominantly of silts and clays, which generally have low infiltration rates.

Any disturbance of a soil profile can significantly change its infiltration characteristics. With urbanization, native soil profiles may be mixed or removed or fill material from other areas may be introduced. Therefore, a method based on soil texture is given in appendix A for determining the HSG classification for disturbed soils.

Worksheet 3: Time of Concentration (T_c) or travel time (T_t)

Project KAHAWAIOKAPIA BRIDGE REPLACEMENT	By WOC	Date 5-9-11
Location HANA, MAUI, HAWAII	Checked	Date

Check one: ☒ Present ☐ Developed

Check one: ☒ T_c ☐ T_t through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

	Segment ID			
1. Surface description (table 3-1)	AB			
2. Manning's roughness coefficient, n (table 3-1)	DENSE WOODS			
3. Flow length, L (total L † 300 ft) ..... ft	0.80			
4. Two-year 24-hour rainfall, P_2 ..... in	300			
5. Land slope, s ..... ft/ft	7.0			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t ..... hr	0.20			
	0.40	+		= 0.40

Shallow concentrated flow

	Segment ID			
7. Surface description (paved or unpaved)	BC			
8. Flow length, L .....ft	UNPAVED			
9. Watercourse slope, s ..... ft/ft	439.34			
10. Average velocity, V (figure 3-1) ..... ft/s	0.29			
11. $T_t = \frac{L}{3600\ V}$ Compute T_t ..... hr	8.9			
	0.014	+		= 0.014

Channel flow

	Segment ID			
12. Cross sectional flow area, a ..... ft^2	CD			
13. Wetted perimeter, p_w ..... ft	223			
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ..... ft	41			
15 Channel slope, s ..... ft/ft	5.43			
16. Manning's roughness coefficient, n	0.15			
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V .....ft/s	0.035			
18. ~~Flow~~ length, L ..... ft	50.94			
19. $T_t = \frac{L}{3600\ V}$ Compute T_t ..... hr	27,657			
	0.15	+		= 0.15

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... Hr **0.56**

Sheet flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These n values are for very shallow flow depths of about 0.1 foot or so. Table 3-1 gives Manning's n values for sheet flow for various surface conditions.

Table 3-1 Roughness coefficients (Manning's n) for sheet flow

Surface description	n [1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods:[3]	
Light underbrush	0.40
Dense underbrush	0.80

1 The n values are a composite of information compiled by Engman (1986).

2 Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

3 When selecting n , consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overtop and Meadows 1976) to compute T_t:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \qquad \text{[eq. 3-3]}$$

where:

T_t = travel time (hr),
n = Manning's roughness coefficient (table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

This simplified form of the Manning's kinematic solution is based on the following: (1) shallow steady uniform flow, (2) constant intensity of rainfall excess (that part of a rain available for runoff), (3) rainfall duration of 24 hours, and (4) minor effect of infiltration on travel time. Rainfall depth can be obtained from appendix B.

Shallow concentrated flow

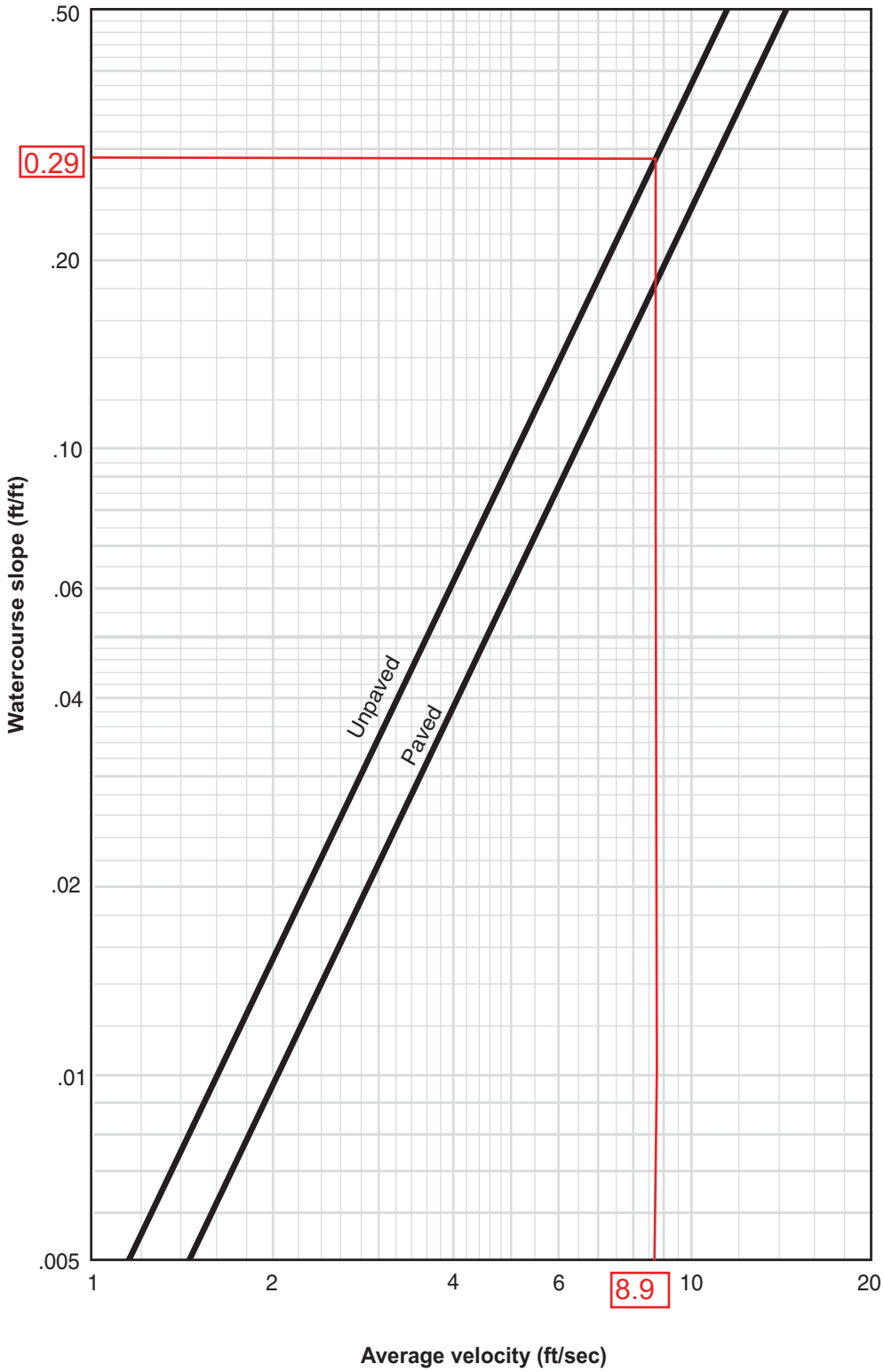
After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from figure 3-1, in which average velocity is a function of watercourse slope and type of channel. For slopes less than 0.005 ft/ft, use equations given in appendix F for figure 3-1. Tillage can affect the direction of shallow concentrated flow. Flow may not always be directly down the watershed slope if tillage runs across the slope.

After determining average velocity in figure 3-1, use equation 3-1 to estimate travel time for the shallow concentrated flow segment.

Open channels

Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle sheets. Manning's equation or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bankfull elevation.

Figure 3-1 Average velocities for estimating travel time for shallow concentrated flow



Worksheet 4: Graphical Peak Discharge method

Project	By	Date
KAHAWAIOKAPIA BRIDGE REPLACEMENT	WOC	5-9-11
Location	**Checked**	**Date**
HANA, MAUI, HAWAII		

Check one: ☒ Present ☐ Developed

1. Data

Drainage area ..... A_m = 4.0 mi^2 (acres/640)

Runoff curve number .....CN = 40 (From worksheet 2)

Time of concentration ..... T_c = 0.56 hr (From worksheet 3)

Rainfall distribution ..... = I (I, IA, II III)

Pond and swamp areas sprea
throughout watershed ..... = -- percent of A_m (-- acres or mi^2 covered)

	Storm #1	Storm #2	Storm #3
2. Frequency ..... yr	100		
3. Rainfall, P (24-hour) ..... in	20		
4. Initial abstraction, I_a ..... in (Use CN with table 4-1)	3.0		
5. Compute I_a/P	0.15		
6. Unit peak discharge, q_u ..... csm/in (Use T_c and I_a/P with exhibit 4– _____)	250		
7. Runoff, Q ..... in (From worksheet 2) Figure 2-6	9.03		
8. Pond and swamp adjustment factor, F_p ..... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond ans swamp area.)	1.0		
9. Peak discharge, q_p ..... ft^3/s	9,030		

(Where $q_p = q_u A_m Q F_p$)

Preliminary Drainage Study

Chapter 4 Graphical Peak Discharge Method

This chapter presents the Graphical Peak Discharge method for computing peak discharge from rural and urban areas. The Graphical method was developed from hydrograph analyses using TR-20, "Computer Program for Project Formulation—Hydrology" (SCS 1983). The peak discharge equation used is:

$$q_p = q_u A_m Q F_p \qquad \text{[eq. 4-1]}$$

where:

q_p = peak discharge (cfs)
q_u = unit peak discharge (csm/in)
A_m = drainage area (mi²)
Q = runoff (in)
F_p = pond and swamp adjustment factor

The input requirements for the Graphical method are as follows: (1) T_c (hr), (2) drainage area (mi²), (3) appropriate rainfall distribution (I, IA, II, or III), (4) 24-hour rainfall (in), and (5) CN. If pond and swamp areas are spread throughout the watershed and are not considered in the T_c computation, an adjustment for pond and swamp areas is also needed.

Peak discharge computation

For a selected rainfall frequency, the 24-hour rainfall (P) is obtained from appendix B or more detailed local precipitation maps. CN and total runoff (Q) for the watershed are computed according to the methods outlined in chapter 2. The CN is used to determine the initial abstraction (I_a) from table 4-1. I_a / P is then computed.

If the computed I_a / P ratio is outside the range in exhibit 4 (4-I, 4-IA, 4-II, and 4-III) for the rainfall distribution of interest, then the limiting value should be used. If the ratio falls between the limiting values, use linear interpolation. Figure 4-1 illustrates the sensitivity of I_a / P to CN and P.

Peak discharge per square mile per inch of runoff (q_u) is obtained from exhibit 4-I, 4-IA, 4-II, or 4-III by using T_c (chapter 3), rainfall distribution type, and I_a / P ratio. The pond and swamp adjustment factor is obtained from table 4-2 (rounded to the nearest table value). Use worksheet 4 in appendix D to aid in computing the peak discharge using the Graphical method.

Figure 4-1 Variation of I_a / P for P and CN

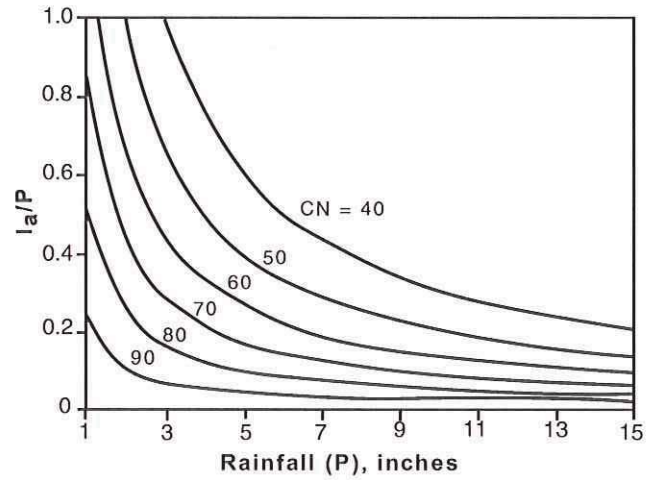
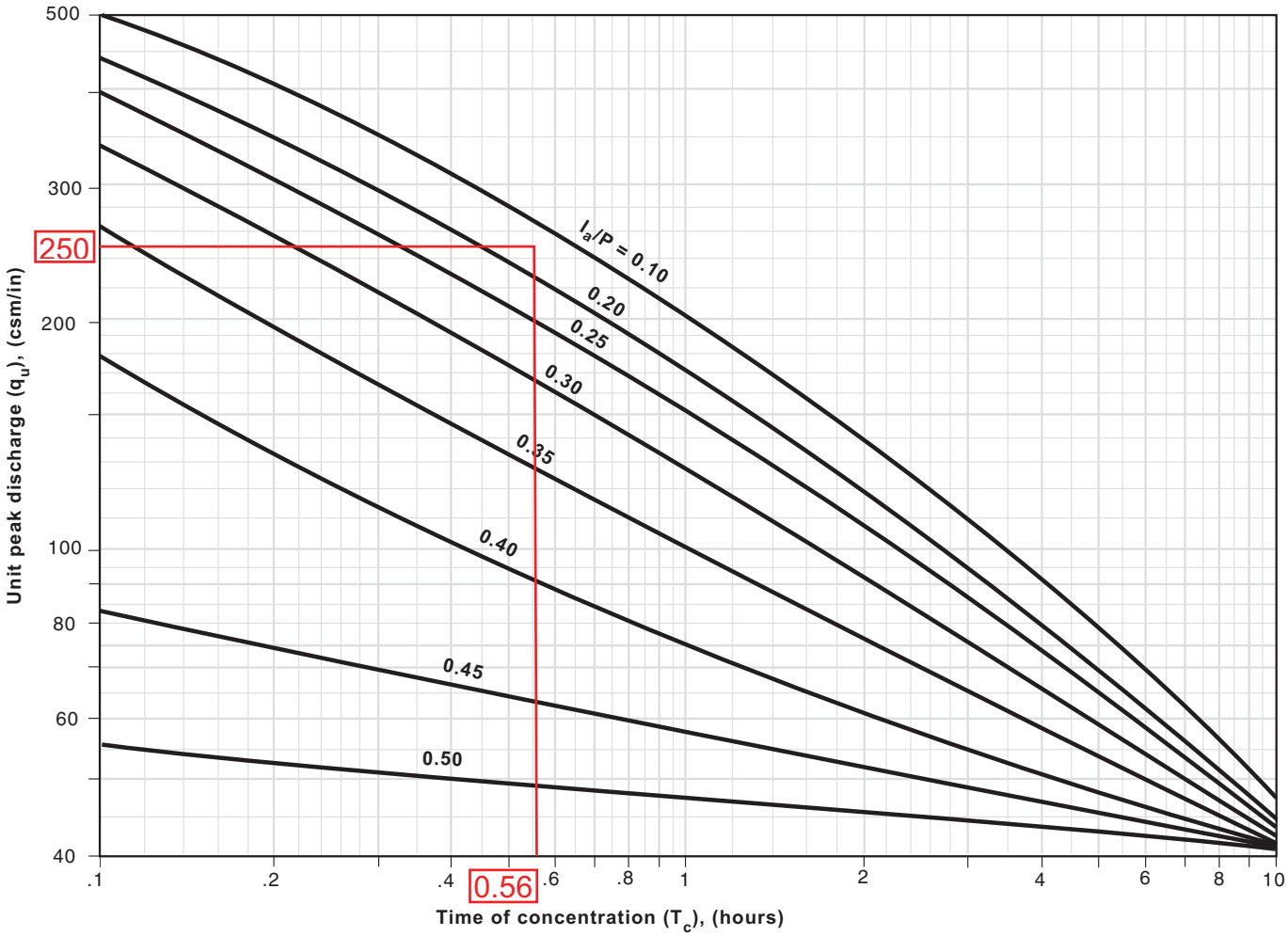


Table 4-1 I_a values for runoff curve numbers

Curve number	I_a (in)	Curve number	I_a (in)
40	3.000	70	0.857
41	2.878	71	0.817
42	2.762	72	0.778
43	2.651	73	0.740
44	2.545	74	0.703
45	2.444	75	0.667
46	2.348	76	0.632
47	2.255	77	0.597
48	2.167	78	0.564
49	2.082	79	0.532
50	2.000	80	0.500
51	1.922	81	0.469
52	1.846	82	0.439
53	1.774	83	0.410
54	1.704	84	0.381
55	1.636	85	0.353
56	1.571	86	0.326
57	1.509	87	0.299
58	1.448	88	0.273
59	1.390	89	0.247
60	1.333	90	0.222
61	1.279	91	0.198
62	1.226	92	0.174
63	1.175	93	0.151
64	1.125	94	0.128
65	1.077	95	0.105
66	1.030	96	0.083
67	0.985	97	0.062
68	0.941	98	0.041
69	0.899		

Exhibit 4-I Unit peak discharge (q_u) for NRCS (SCS) type I rainfall distribution



Preliminary Drainage Study

Table 4-2 Adjustment factor (F_p) for pond and swamp areas that are spread throughout the watershed

Percentage of pond and swamp areas	F_p
0	1.00
0.2	0.97
1.0	0.87
3.0	0.75
5.0	0.72

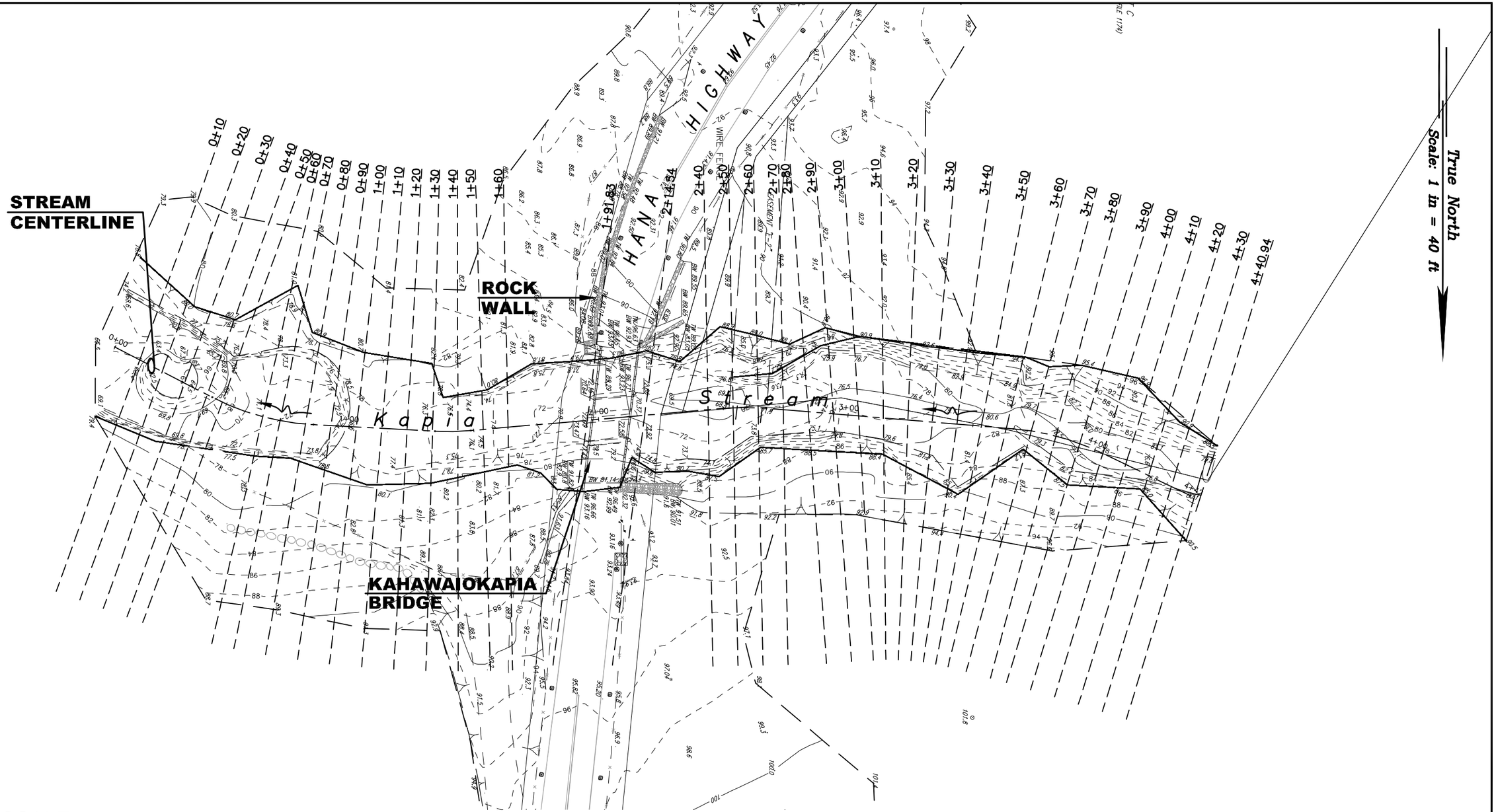
Limitations

The Graphical method provides a determination of peak discharge only. If a hydrograph is needed or watershed subdivision is required, use the Tabular Hydrograph method (chapter 5). Use TR-20 if the watershed is very complex or a higher degree of accuracy is required.

- The watershed must be hydrologically homogeneous, that is, describable by one CN. Land use, soils, and cover are distributed uniformly throughout the watershed.
- The watershed may have only one main stream or, if more than one, the branches must have nearly equal T_C' s.
- The method cannot perform valley or reservoir routing.
- The F_p factor can be applied only for ponds or swamps that are not in the T_c flow path.
- Accuracy of peak discharge estimated by this method will be reduced if I_a / P values are used that are outside the range given in exhibit 4. The limiting I_a / P values are recommended for use.
- This method should be used only if the weighted CN is greater than 40.
- When this method is used to develop estimates of peak discharge for both present and developed conditions of a watershed, use the same procedure for estimating T_c.
- T_c values with this method may range from 0.1 to 10 hours.

Example 4-1

Compute the 25-year peak discharge for the 250-acre watershed described in examples 2-2 and 3-1. Figure 4-2 shows how worksheet 4 is used to compute q_p as 345 cfs.



GRAPHIC SCALE:

40' 20' 0 40' 80'

SCALE: 1" = 40'

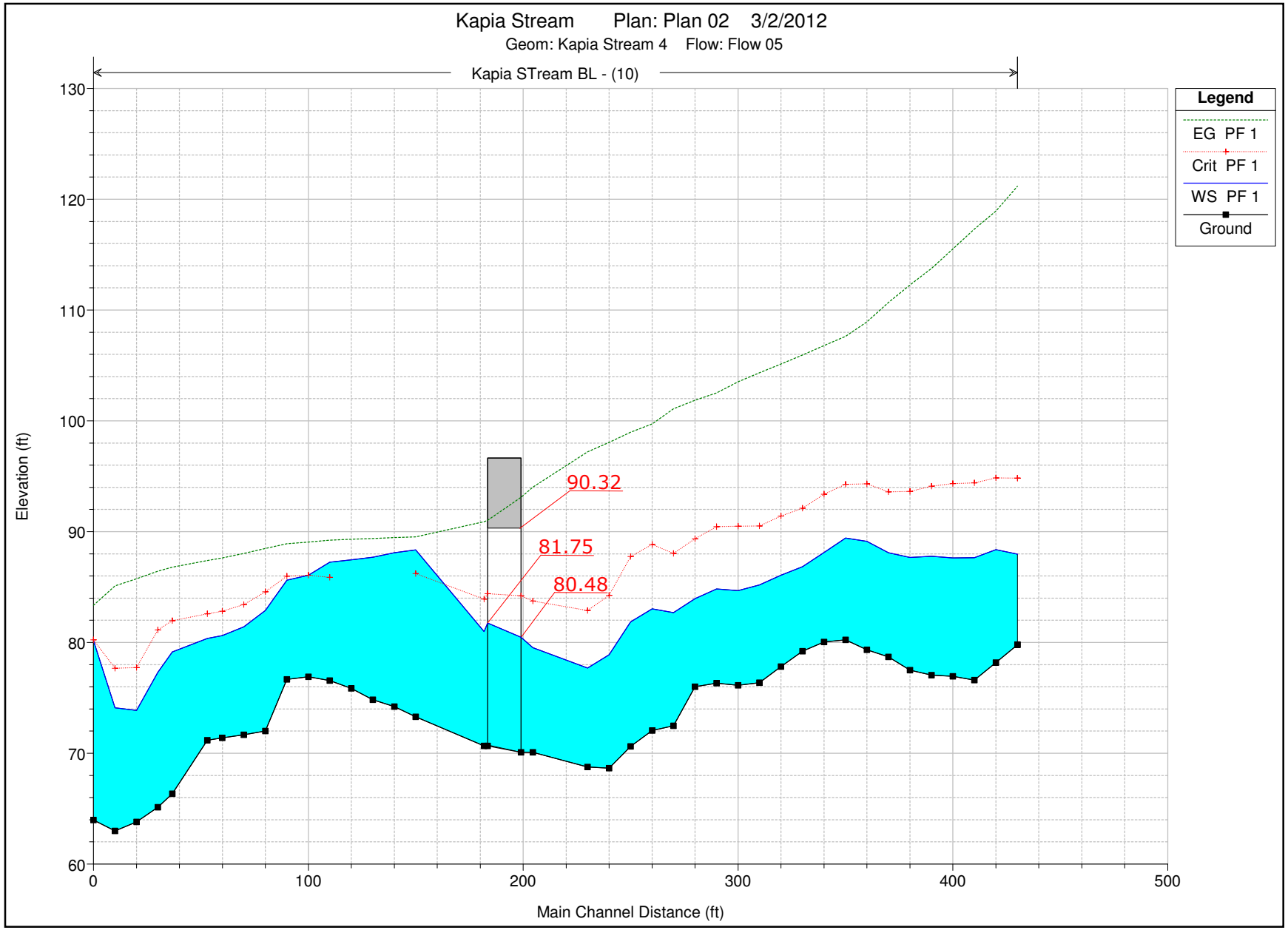
WILSON OKAMOTO CORPORATION

KAHAWAIOKAPIA BRIDGE REPLACEMNT

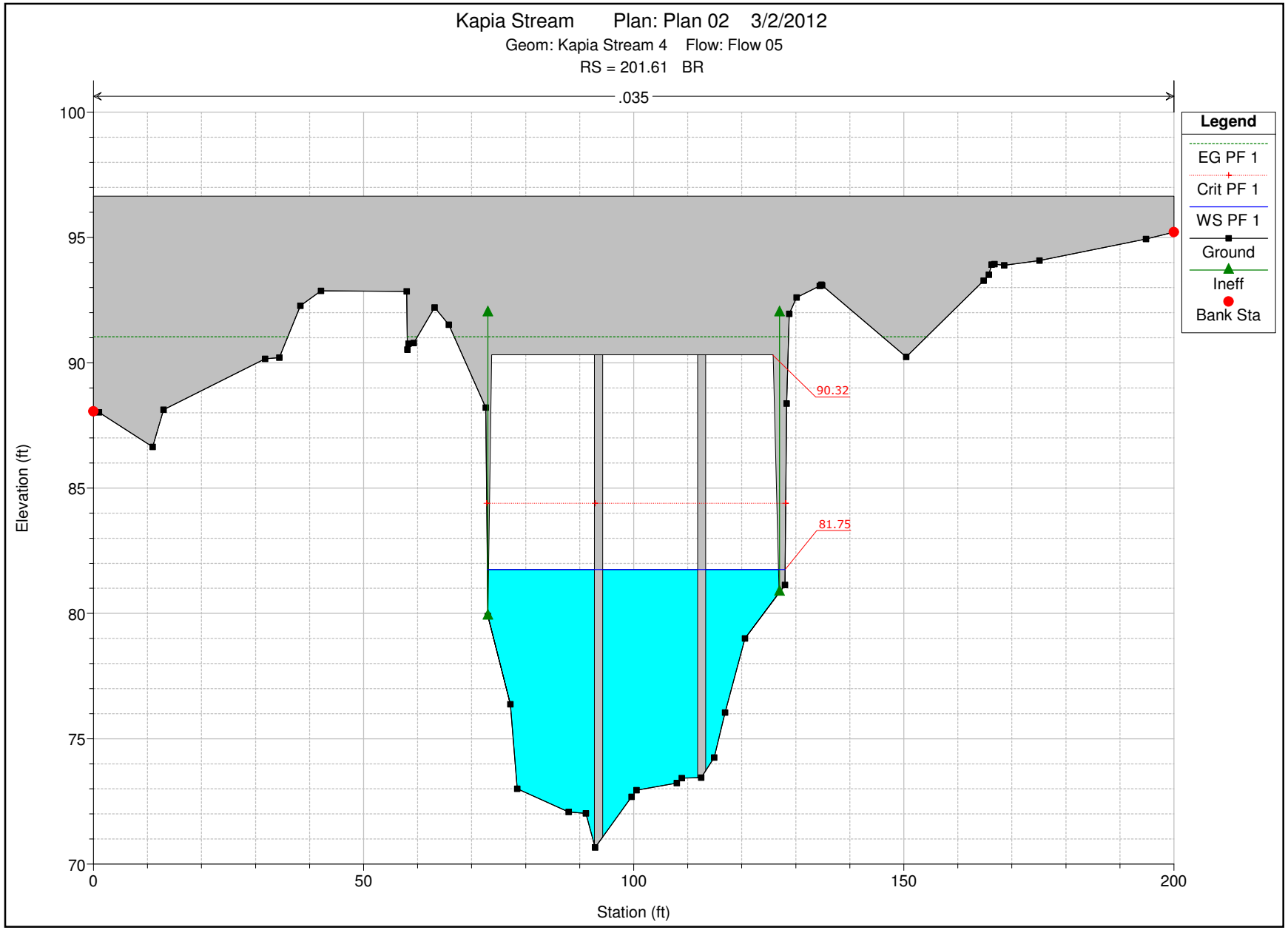
HANA, MAUI, HAWAII

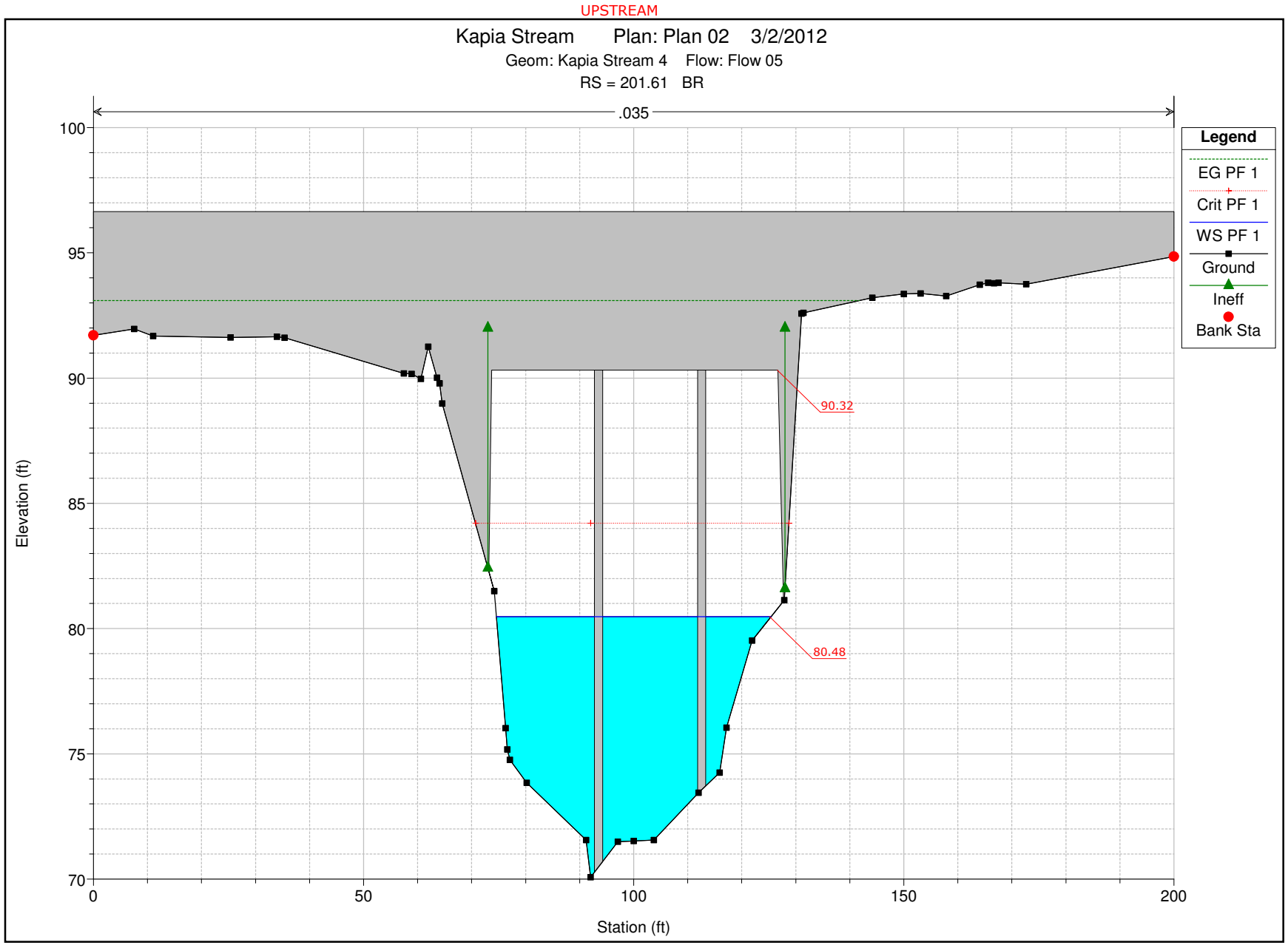
SITE SECTIONS

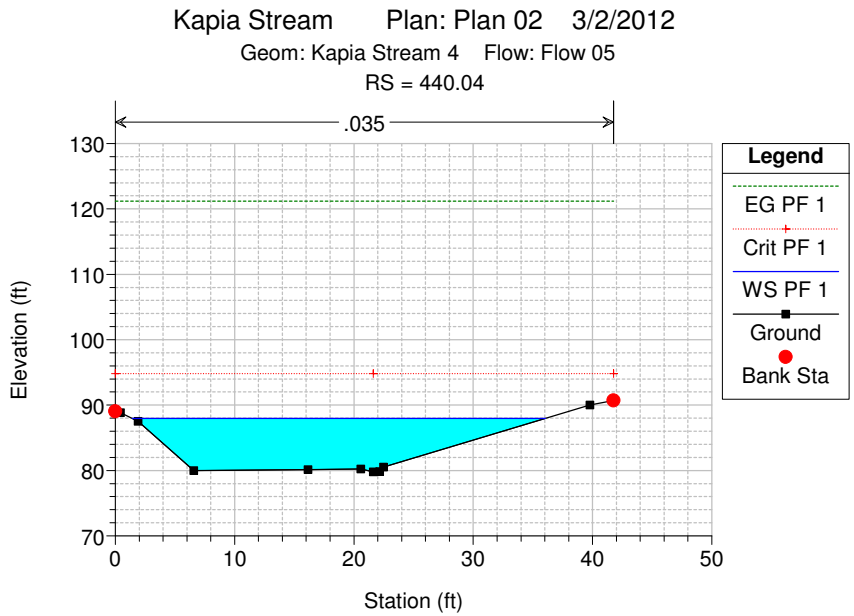
Figure 6


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
Kapia STream BL - (10)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
90.32
81.75
80.48
Elevation (ft)
Main Channel Distance (ft)
130
120
110
100
90
80
70
60
0
100
200
300
400
500

DOWNSTREAM


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 201.61 BR
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
90.32
81.75
Elevation (ft)
Station (ft)
100
95
90
85
80
75
70
0
50
100
150
200


UPSTREAM
Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 201.61 BR
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
90.32
80.48
Elevation (ft)
Station (ft)
100
95
90
85
80
75
70
0
50
100
150
200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Geom: Kapia Stream 4 Flow: Flow 05
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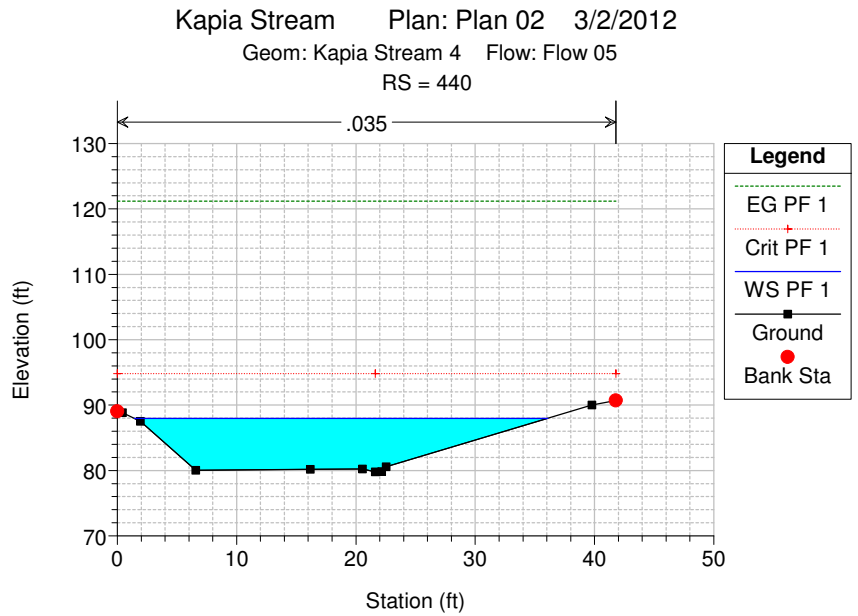
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Geom: Kapia Stream 4 Flow: Flow 05
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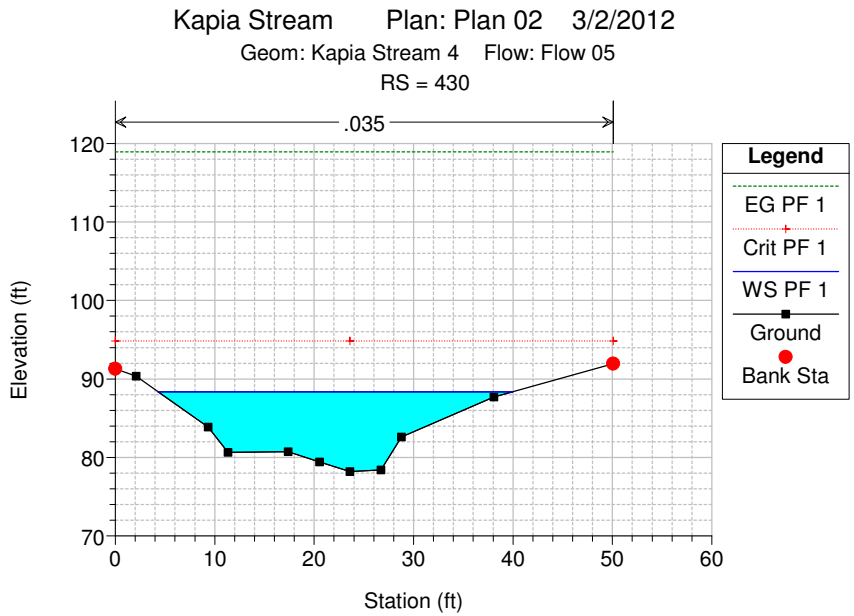
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Geom: Kapia Stream 4 Flow: Flow 05
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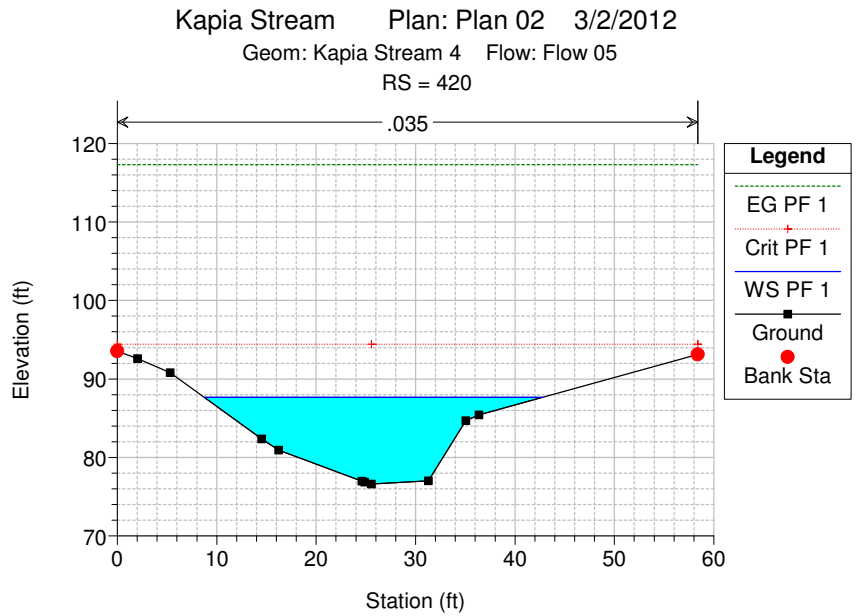
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
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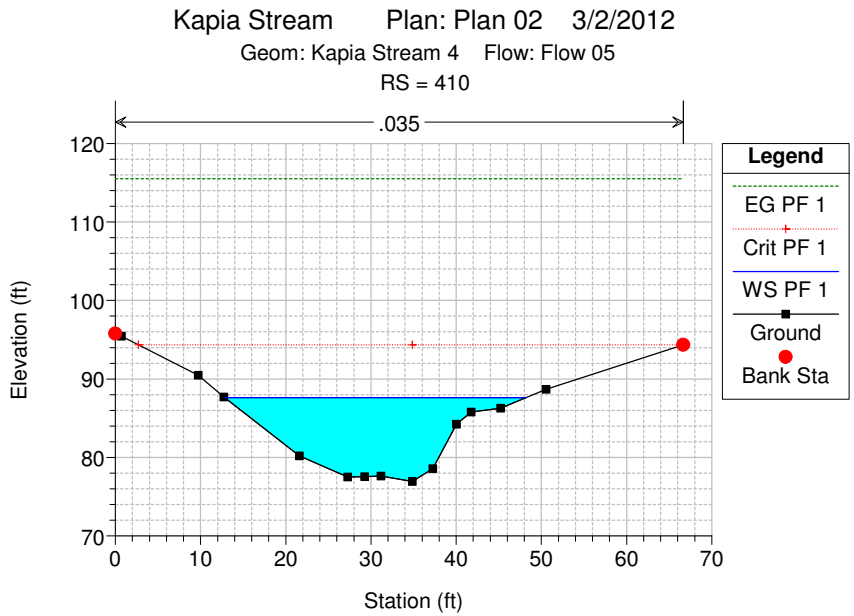
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Geom: Kapia Stream 4 Flow: Flow 05
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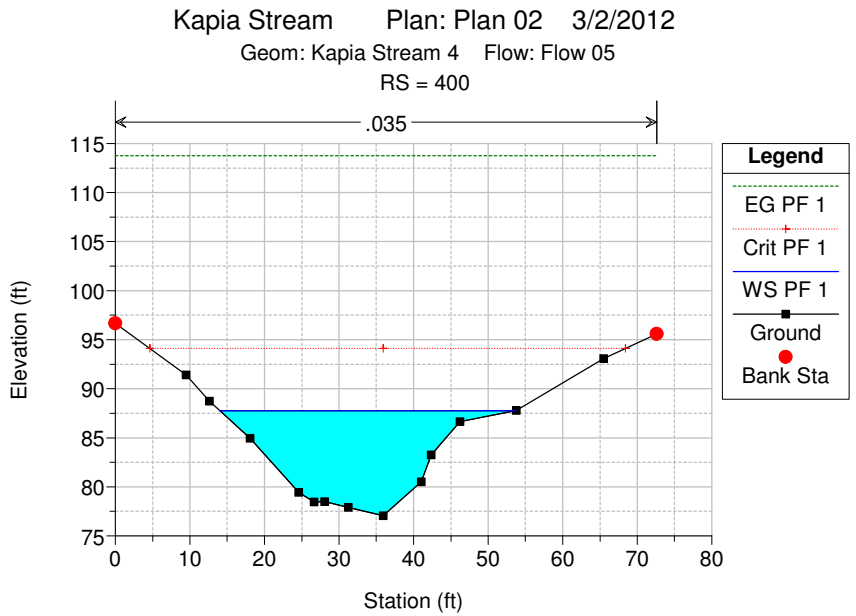
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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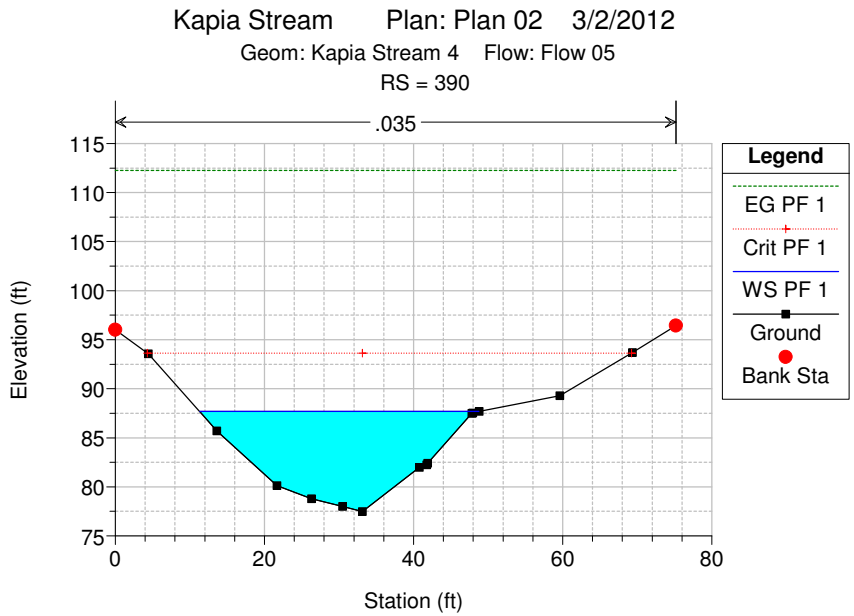
Geom: Kapia Stream 4 Flow: Flow 05
RS = 400
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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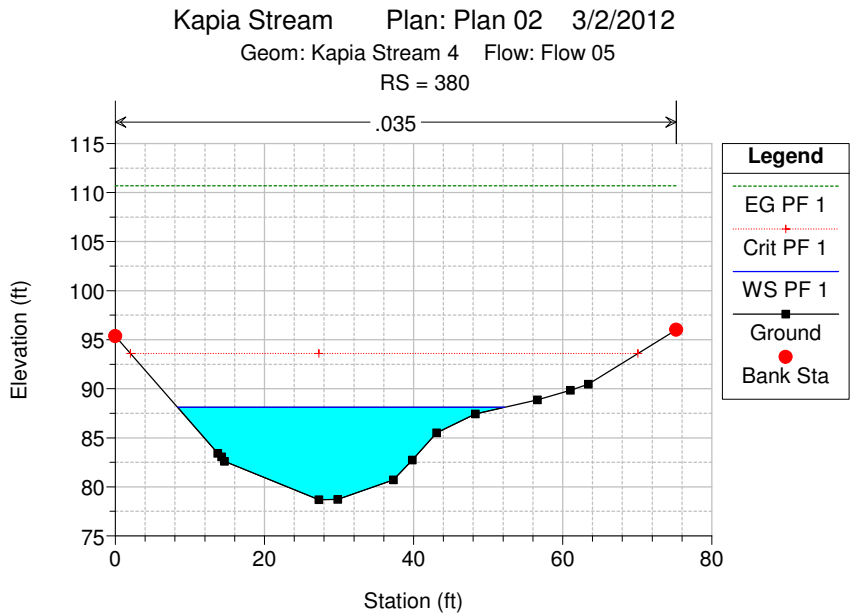
Geom: Kapia Stream 4 Flow: Flow 05
RS = 390
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Geom: Kapia Stream 4 Flow: Flow 05
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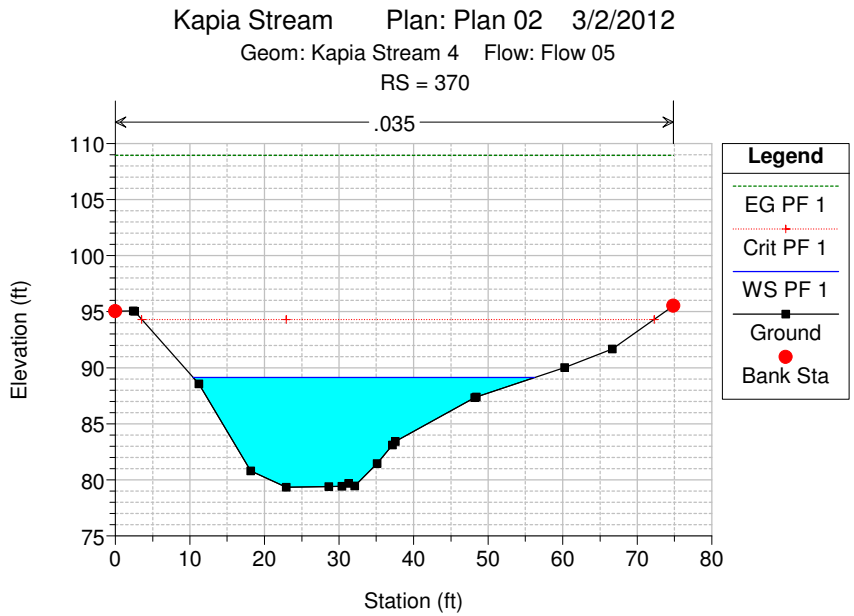
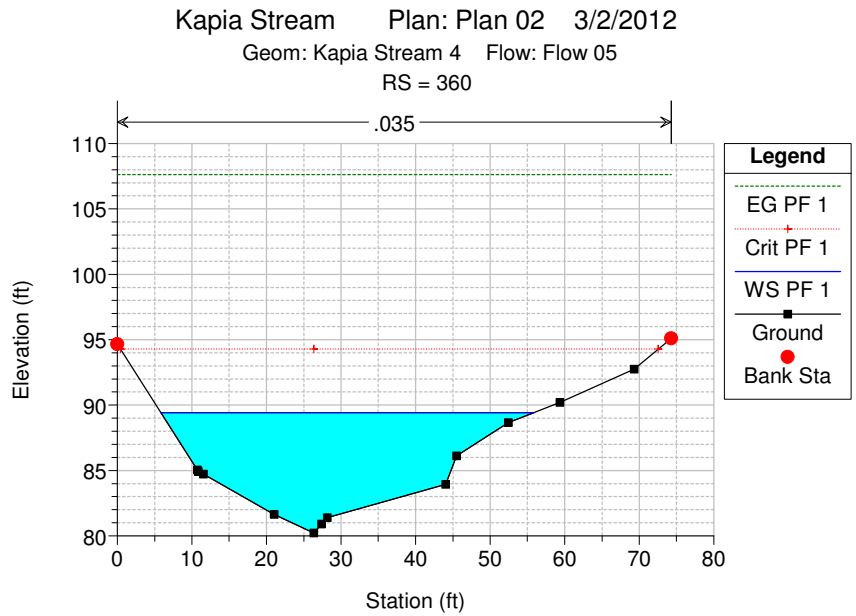
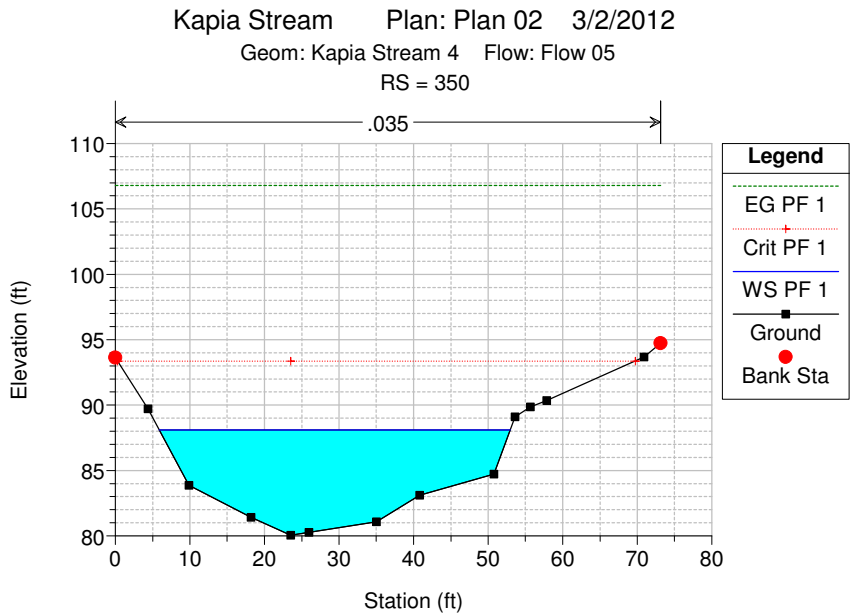
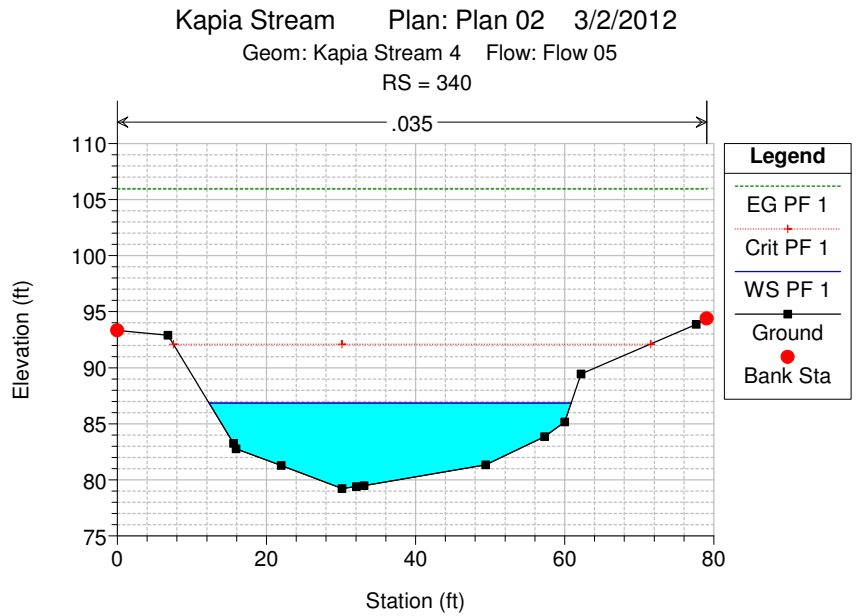
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 370
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 360
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 350
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
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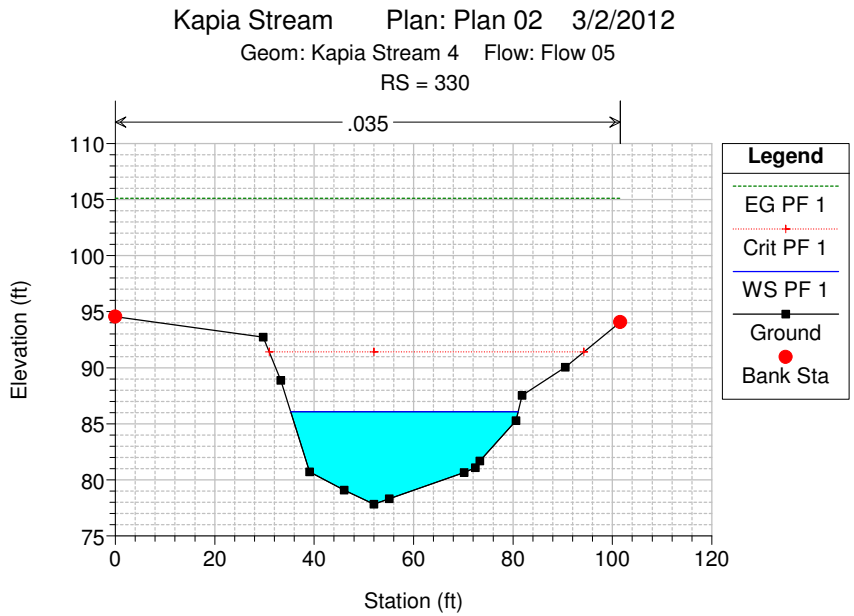
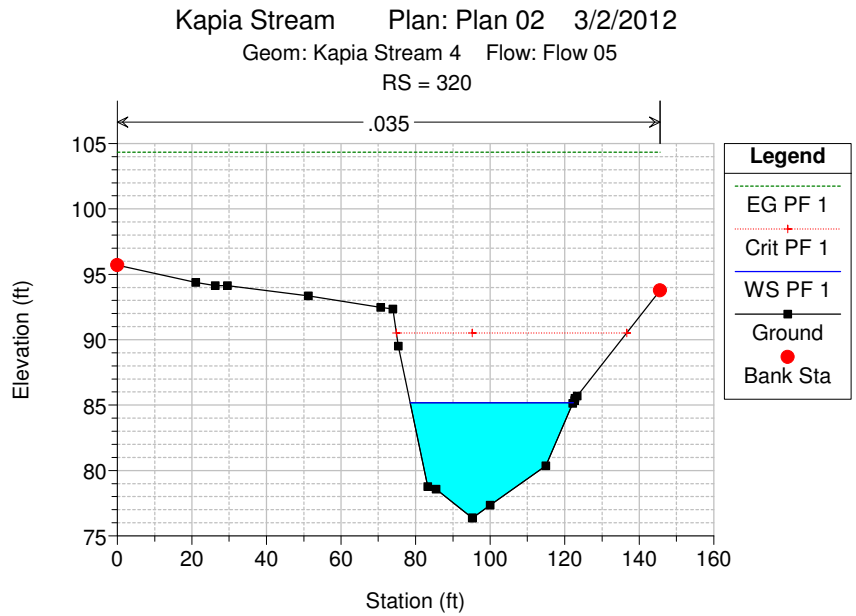
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 330
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Geom: Kapia Stream 4 Flow: Flow 05
RS = 320
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Legend
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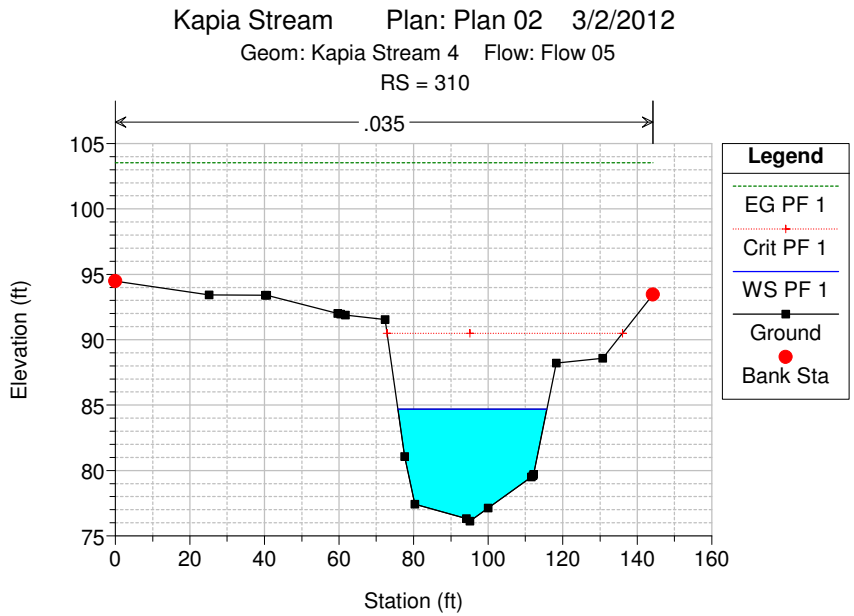
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Geom: Kapia Stream 4 Flow: Flow 05
RS = 310
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WS PF 1
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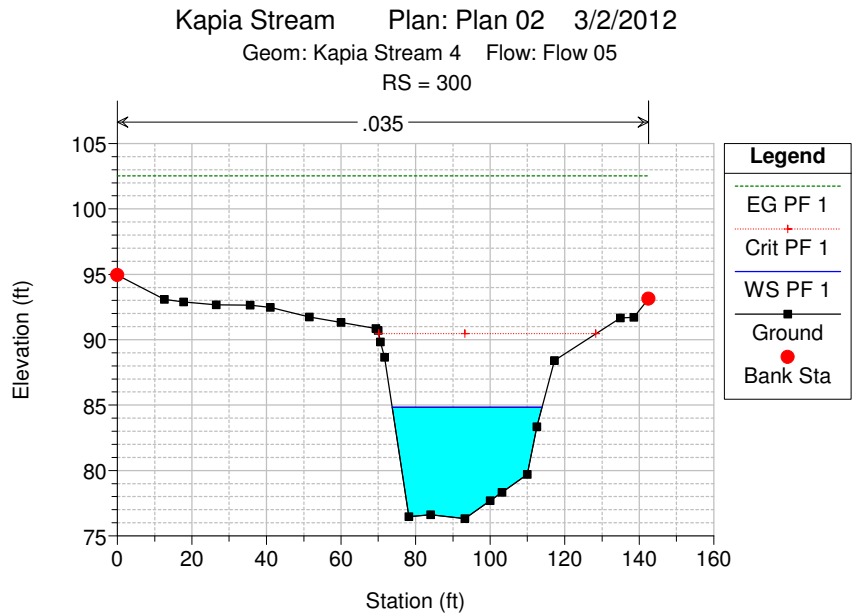
Bank Sta
Elevation (ft)
Station (ft)


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 300
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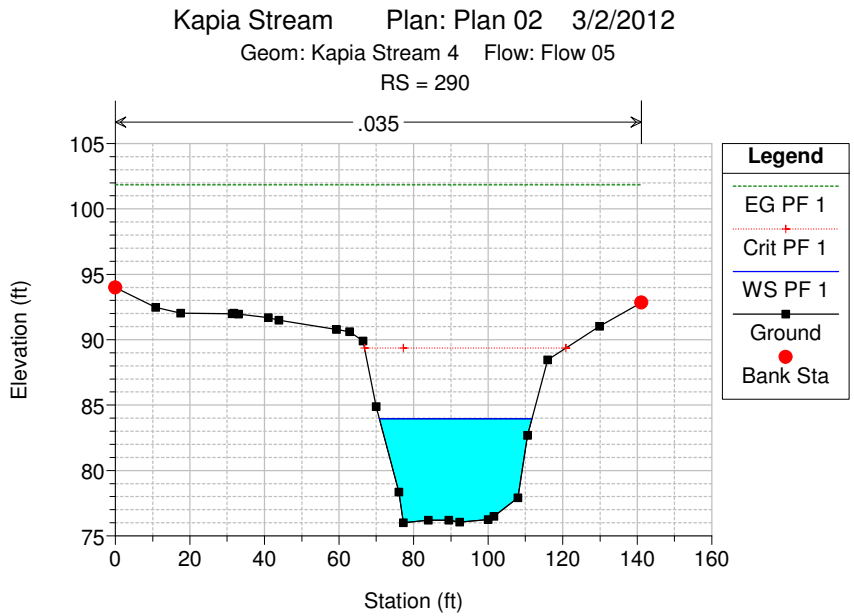
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 290
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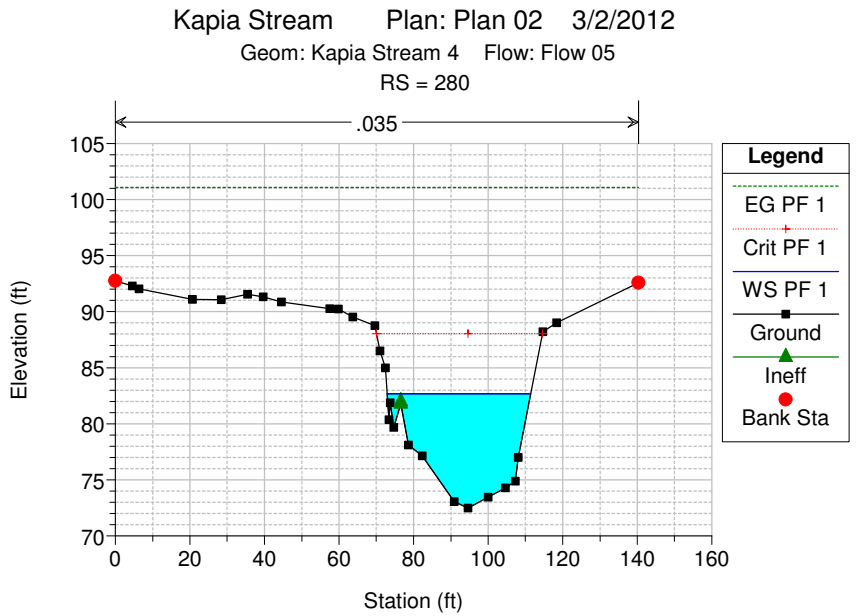
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 280
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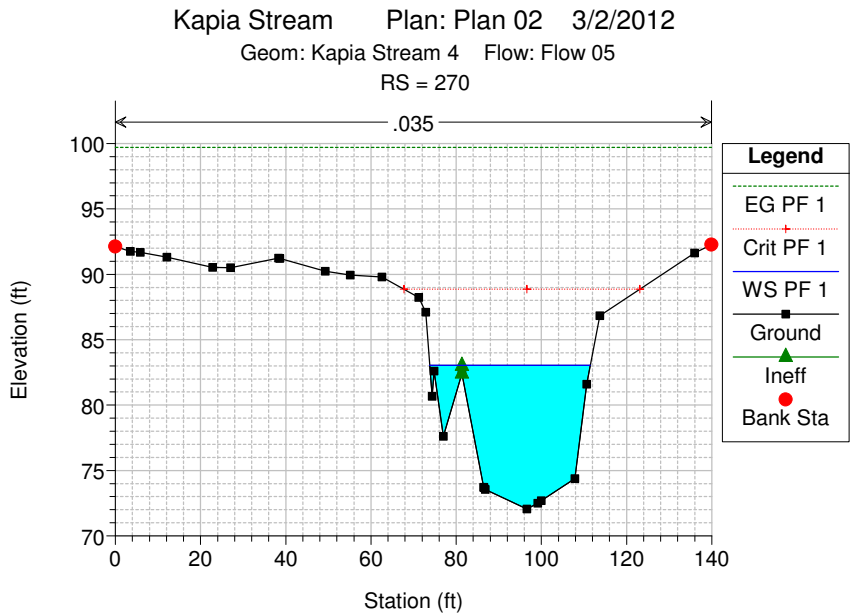
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta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Geom: Kapia Stream 4 Flow: Flow 05
RS = 270
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Elevation (ft)
Station (ft)
Legend
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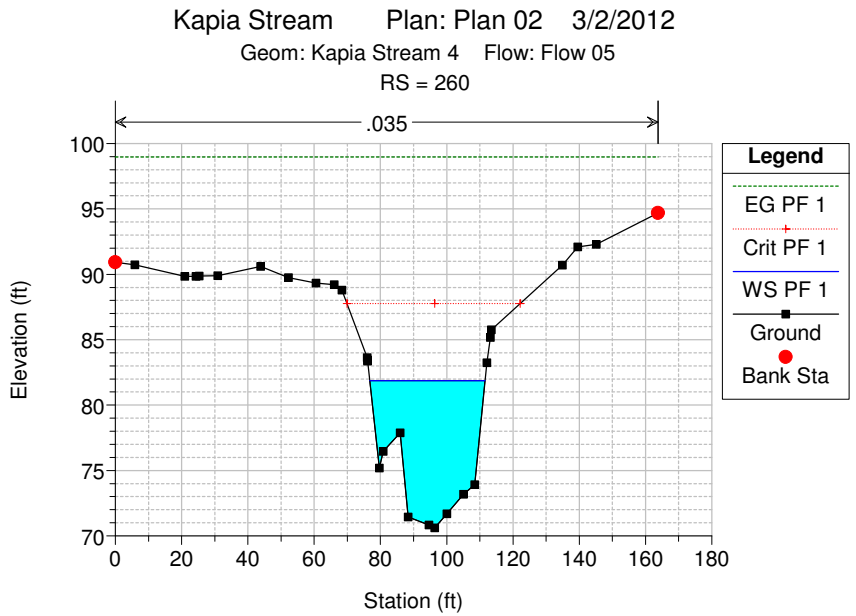
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta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RS = 260
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Elevation (ft)
Station (ft)
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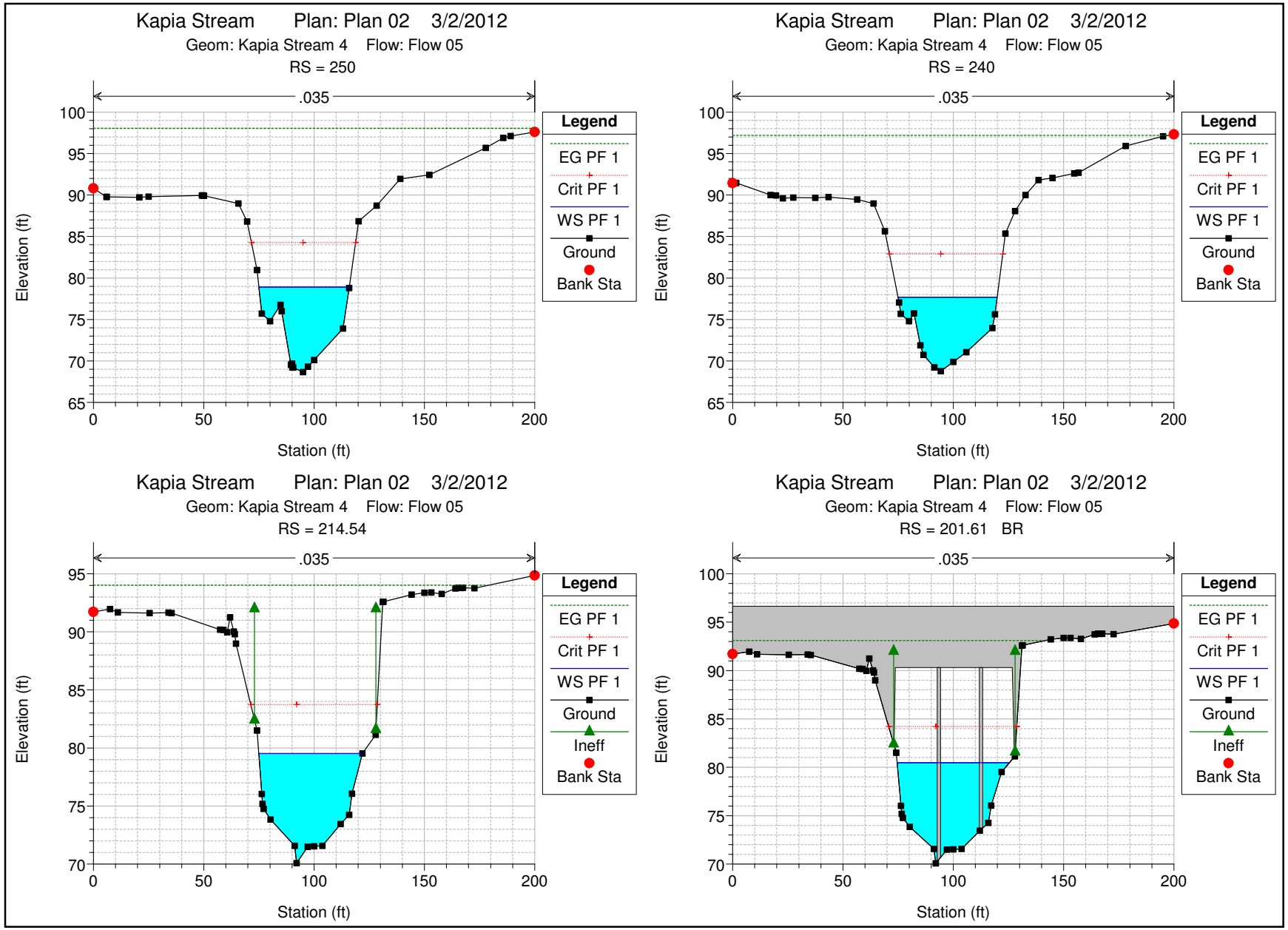
Ground
Bank Sta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Geom: Kapia Stream 4 Flow: Flow 05
RS = 250
.035
Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 240
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 214.54
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 201.61 BR
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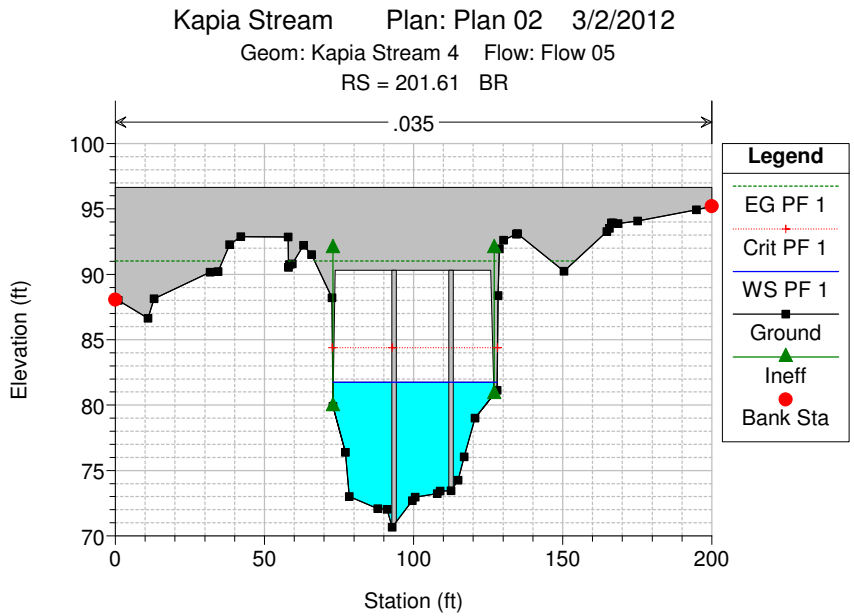
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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Geom: Kapia Stream 4 Flow: Flow 05
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.035
Legend
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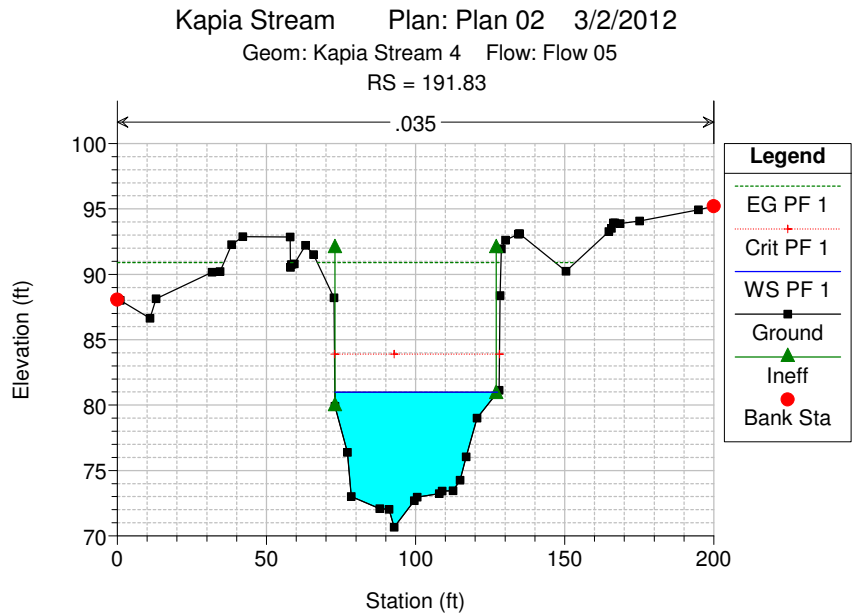
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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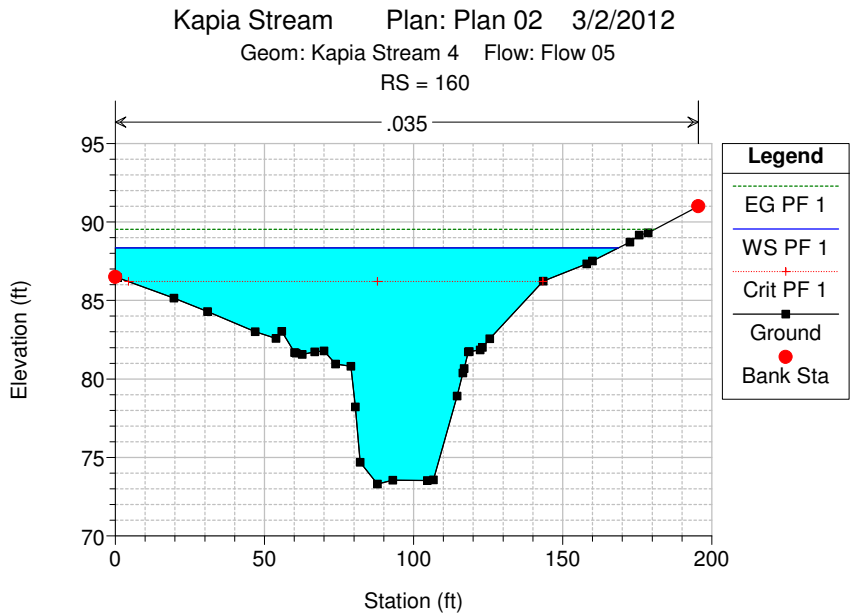
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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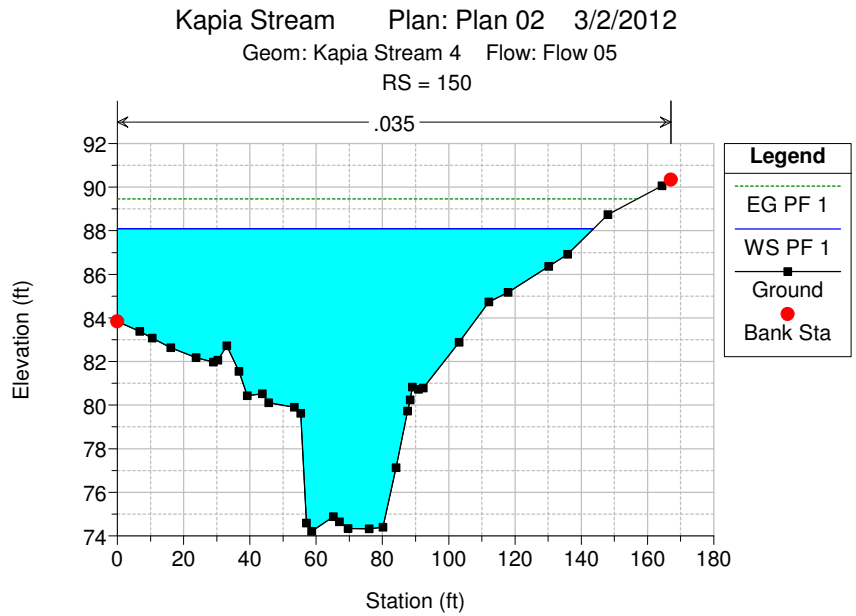
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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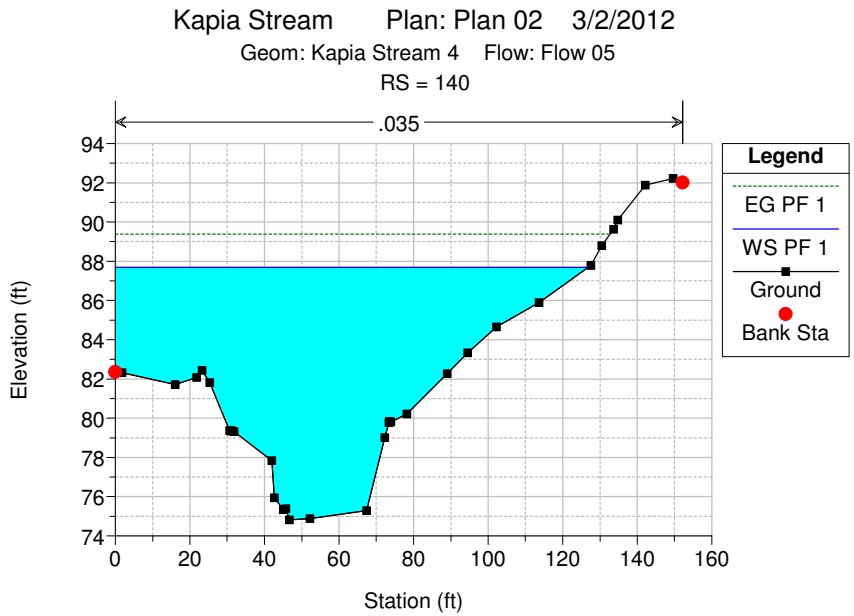
Bank Sta
Elevation (ft)
Station (ft)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Legend
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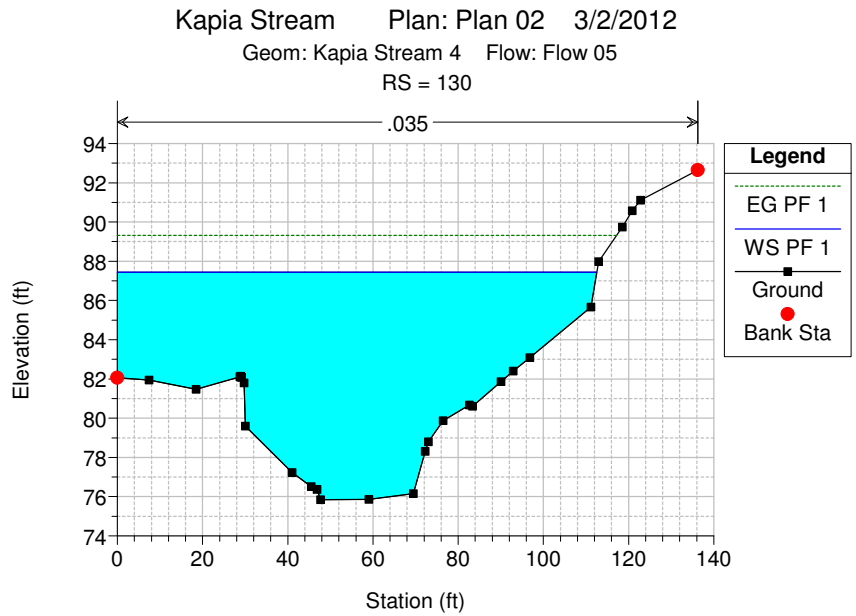
Ground
Bank Sta
Elevation (ft)
Station (ft)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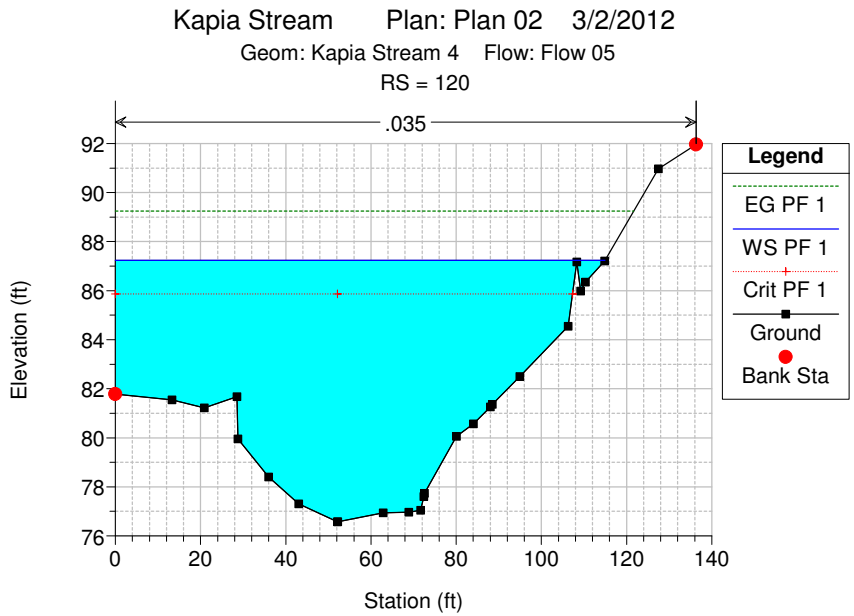
Bank Sta
Elevation (ft)
Station (ft)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Geom: Kapia Stream 4 Flow: Flow 05
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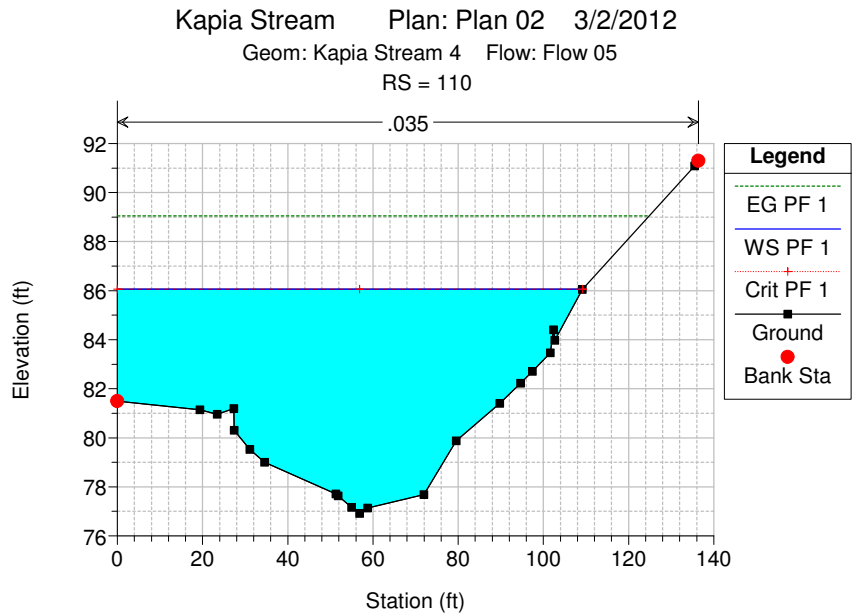
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = 110
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Legend
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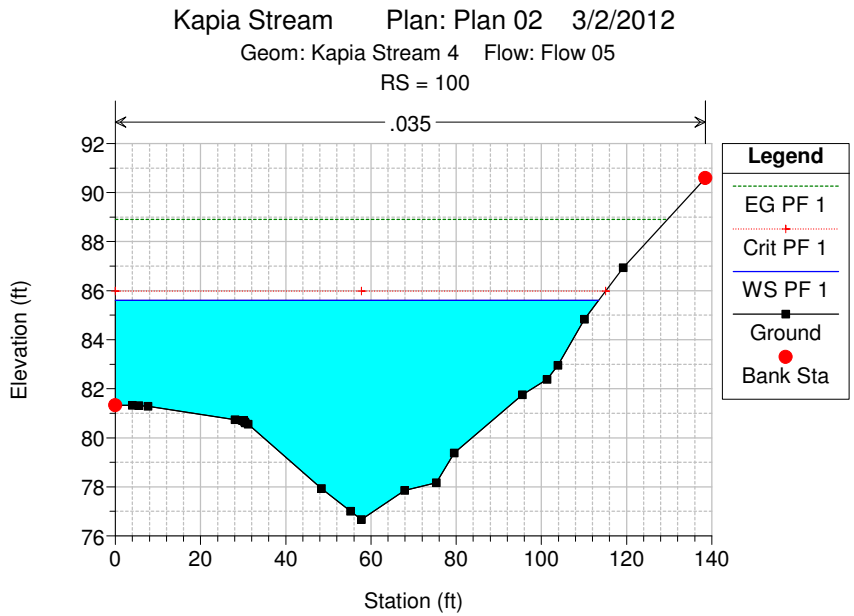
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Geom: Kapia Stream 4 Flow: Flow 05
RS = 100
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Elevation (ft)
Station (ft)
Legend
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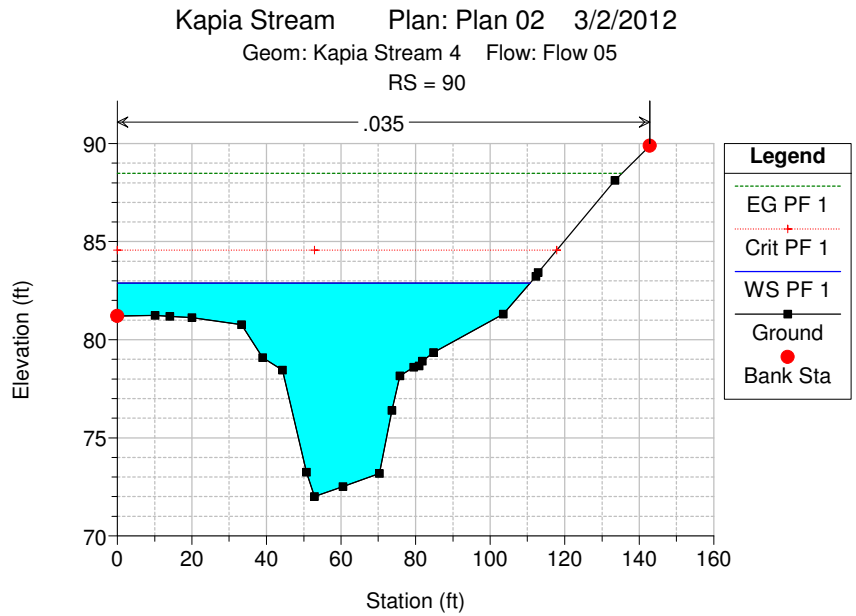
Crit PF 1
WS PF 1
Ground
Bank Sta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Geom: Kapia Stream 4 Flow: Flow 05
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Elevation (ft)
Station (ft)
Legend
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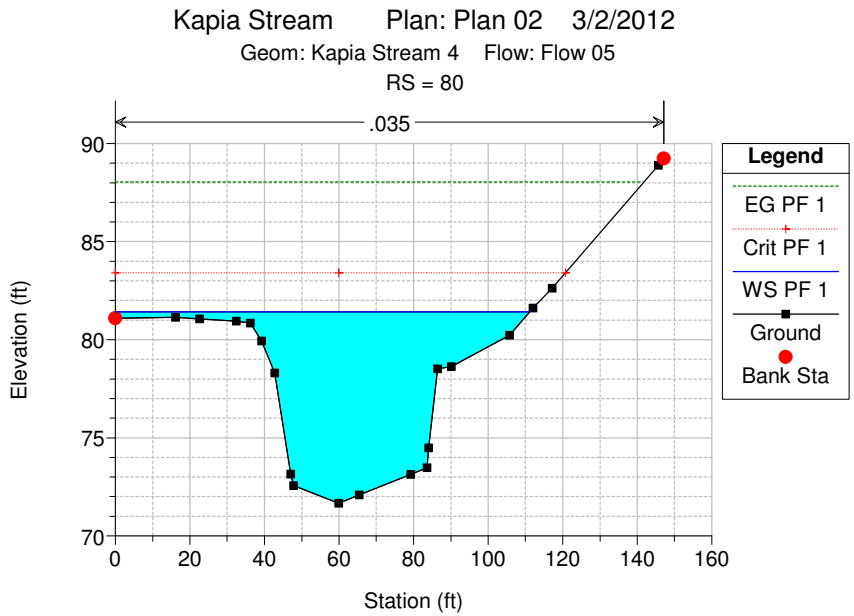
Crit PF 1
WS PF 1
Ground
Bank Sta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Station (ft)
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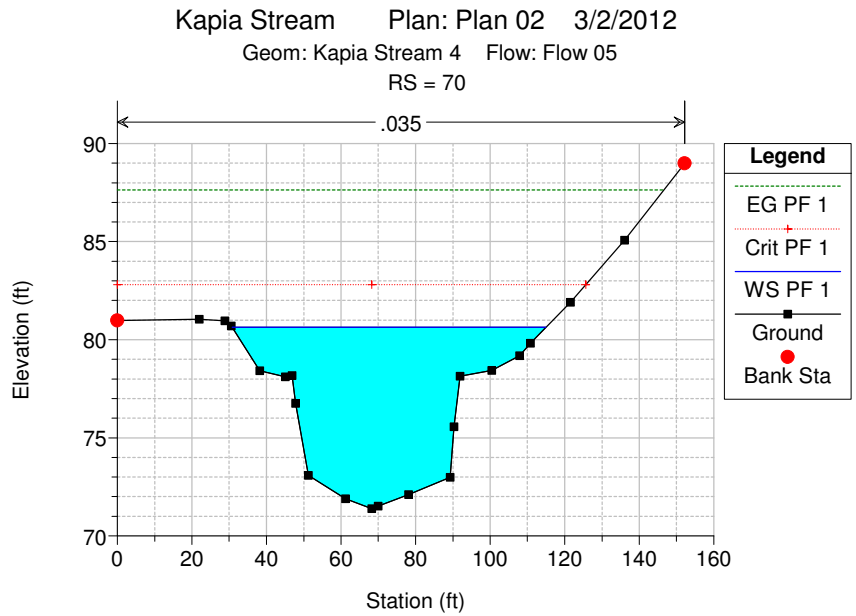
Crit PF 1
WS PF 1
Ground
Bank Sta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Station (ft)
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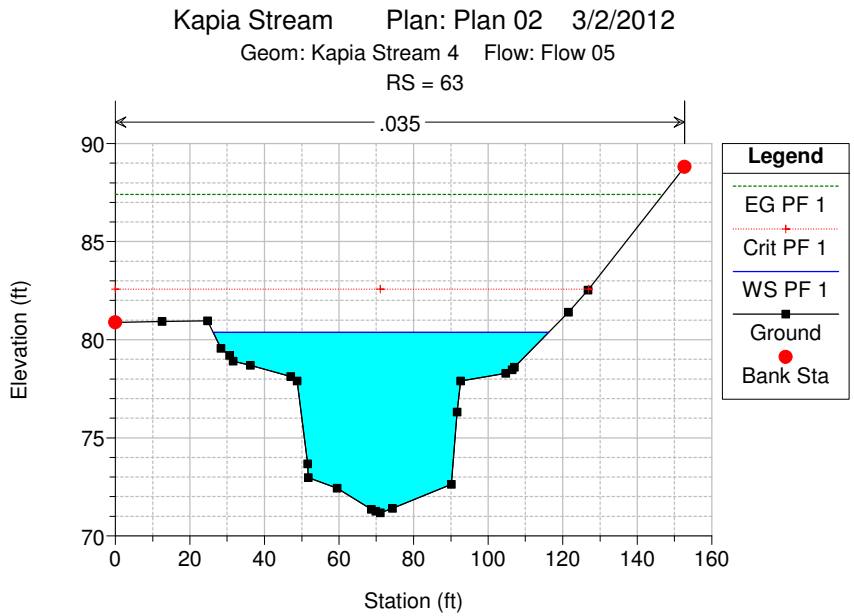
Bank Sta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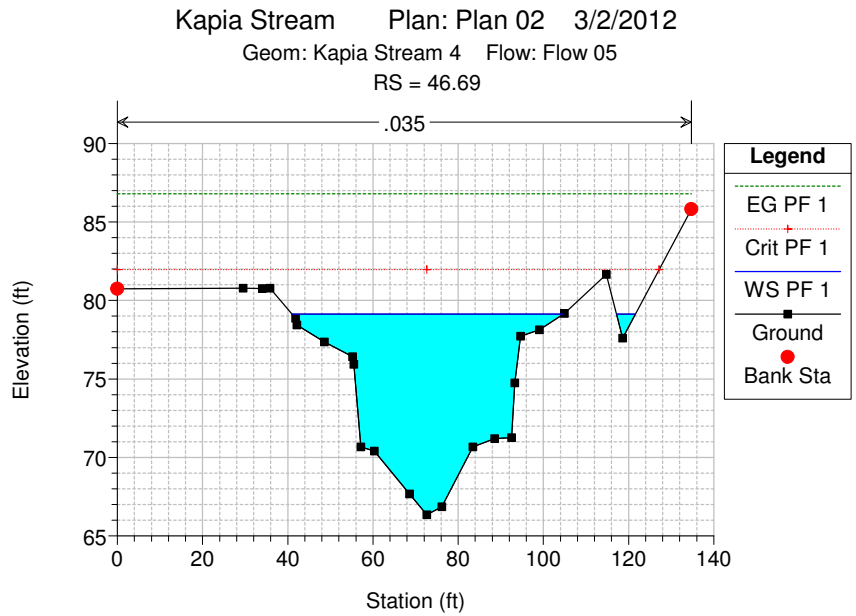
Station (ft)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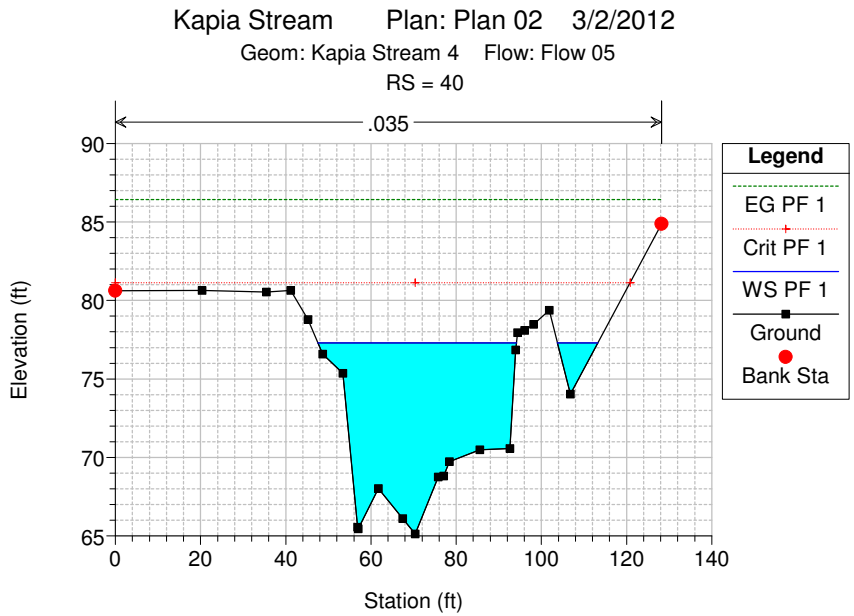
Bank Sta
Elevation (ft)
Station (ft)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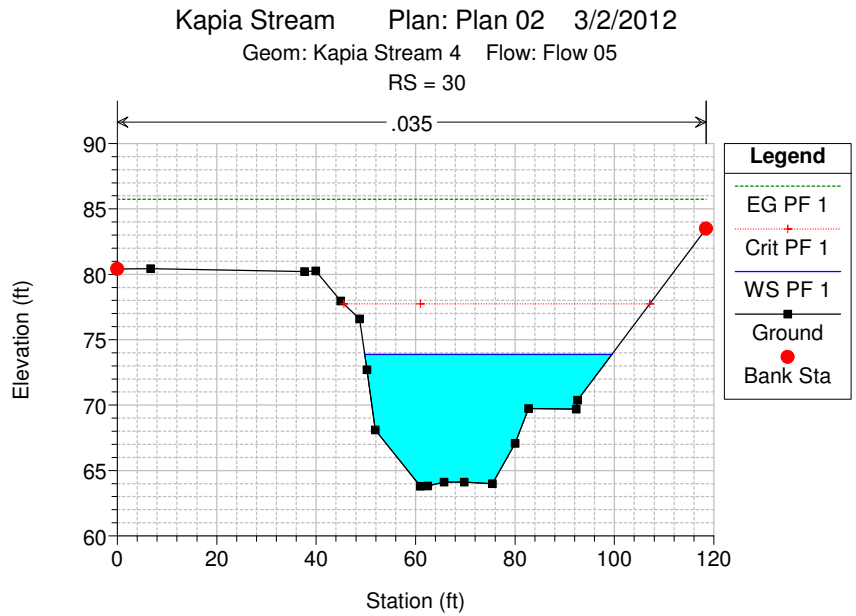
Elevation (ft)
Station (ft)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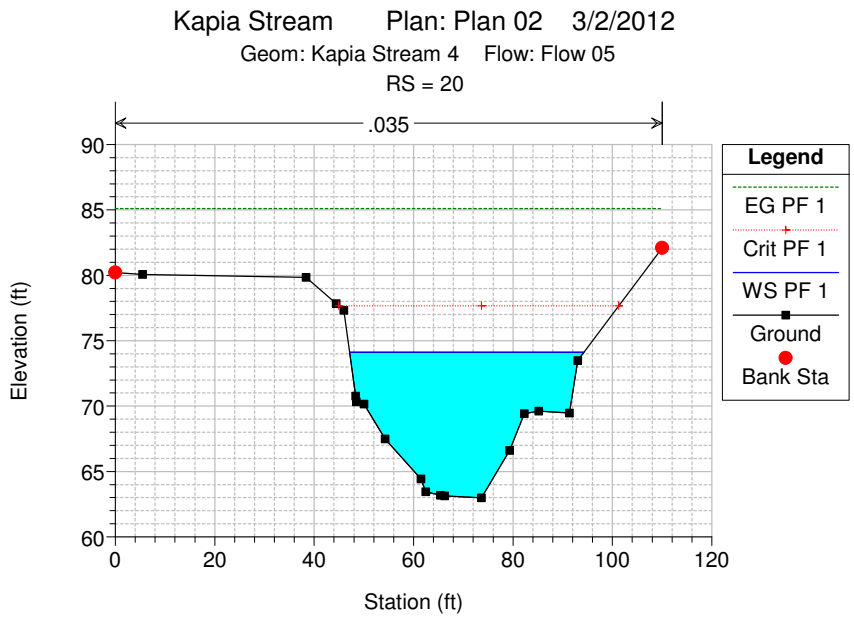
Bank Sta
Elevation (ft)
Station (ft)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Station (ft)
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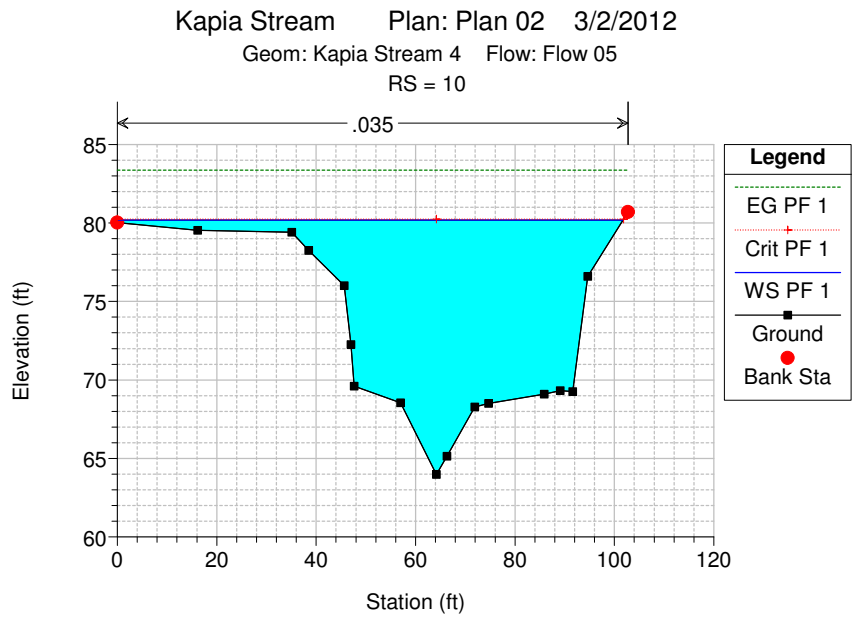
Ground
Bank Sta


Kapia Stream Plan: Plan 02 3/2/2012
Geom: Kapia Stream 4 Flow: Flow 05
RS = 10
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

APPENDIX D

Pre-Assessment Consultation Comment and Response Letters

NEIL ABERCROMBIE
GOVERNOR

DEAN H. SEKI
ACTING COMPTROLLER

JAN S. GOUVEIA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

MAR 22 2012

(P)1057.2

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAR 26 2012
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hana, Maui, Hawaii
Project No. 97-23

Thank you for the opportunity to provide comments for the subject project. The project does not impact any of the Department of Accounting and General Services' projects or existing facilities in the general area, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Mr. Alva Nakamura of the Public Works Division at 586-0488.

Sincerely,

DEAN H. SEKI
Acting Comptroller

c: Mr. Cary Yamashita, County of Maui DPW

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
April 25, 2012

Mr. Dean H. Seki
Acting Comptroller
State of Hawai'i
Department of Accounting and General Services
P.O. Box 119
Honolulu, Hawai'i 96810

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Mr. Seki:

Thank you for your letter dated March 22, 2012 indicating that as the project does not impact any Department of Accounting and General Services projects or existing facilities in the general area, you have no comments to offer at this time.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:12-048

March 12, 2012

RECEIVED
MAR 14 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawai'i 96826

Dear Mr. Matsukawa;

SUBJECT: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter, dated **March 9, 2012.** Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time, but reserve the right to future comments. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this application should be adhered to.

The same website also features a Healthy Community Design Smart Growth Checklist (Checklist). The Hawaii State Department of Health, Built Environment Working Group, recommends that State and county planning departments, developers, planners, engineers and other interested parties apply the healthy built environment principles in the Checklist whenever they plan or review new developments or redevelopments projects. We also ask you to share this list with others to increase community awareness on healthy community design.

If there are any questions about these comments please contact the Environmental Planning Office at 586-4337.

Sincerely,

Laura McIntyre AICP
Manager
Environmental Planning Office

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
April 25, 2012

Ms. Laura McIntyre
Manager
Environmental Planning Office
State of Hawai'i
Department of Health
P.O. Box 3378
Honolulu, Hawai'i 96813

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Ms. McIntyre:

Thank you for your letter dated March 12, 2012 indicating that you have no comments at this time but reserve the right to future comments.

We appreciate your recommendation to review the Standard Comments on your website as well as the Healthy Community Design Smart Growth Checklist. These will be reviewed and applicable provisions will be included in the forthcoming Draft EA.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

EM
MA
LA
615302

NEIL ABERCROMBIE
GOVERNOR OF HAWAI'I

GARY L. HOOSER
DIRECTOR

STATE OF HAWAI'I
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET, SUITE 702
HONOLULU, HAWAI'I 96813

In reply, please refer to:
File:

April 4, 2012

RECEIVED
APR 05 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawai'i 96826

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hana, Maui, Hawai'i
Project No. 97-23

Dear Mr. Matsukawa,

Thank you for the opportunity to review and comment on proposed Kahawaiokapi'a Bridge Replacement EA pre-assessment consultation. The Office of Environmental Quality Control offers these comments:

1. Please include the temporary bridge impacts and mitigation in the Draft EA.

2. Please include a discussion of the construction staging area(s), impacts and mitigation.

Feel free to email me at herman.tuiolosega@doh.hawaii.gov or contact me at (808) 586-4185 if you have any questions.

Aloha,

Herman Tuiolosega
Planner

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
April 25, 2012

Mr. Herman Tuiolosega
Planner
State of Hawai'i
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Mr. Tuiolosega:

Thank you for your letter dated April 4, 2012 regarding the proposed project.

The forthcoming Draft EA, a copy which will be submitted for your review, will discuss temporary bridge impacts and mitigation. The Draft EA will also discuss construction staging, impacts and mitigation, as appropriate.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
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

April 10, 2012

Wilson Okamoto Corporation
Attention: Mr. Earl Matsukawa, AICP
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

via email: ematsukawa@wilsonokamoto.com

SUBJECT: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hana, Maui, Hawaii
Project No. 97-23

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, enclosed are comments from (a) Office of Conservation & Coastal Lands, (b) Land Division – Maui District, and (c) Division of Aquatic Resources 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)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

MA-12-211

WILLIAM J. AILA, JR.
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

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2012 MAR 29 P 3:33
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

March 20, 2012

MEMORANDUM

RECEIVED
LAND DIVISION
2012 APR -2 P 3:01
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
___Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Pre-Assessment Consultation for the Kahawaiokapi'a Bridge Replacement at Kapia Stream
LOCATION: Hana, Island of Maui
APPLICANT: Wilson Okamoto Corporation on behalf of County of Maui, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by April 5, 2012.

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 (808) 587-0410. Thank you.

Attachments

Not in CD lands
1000' from shoreline

( ) We have no objections.
(X) We have no comments.
( ) Comments are attached.

Signed: [signature]
Date: 4/2/2012

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

2012 MAR 22 PM 12: 49
MAUI DISTRICT
LAND DIVISION

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 20, 2012

RECEIVED
LAND DIVISION
2012 APR -2 A 9:23
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Pre-Assessment Consultation for the Kahawaiokapi'a Bridge Replacement at Kapia Stream
LOCATION: Hana, Island of Maui
APPLICANT: Wilson Okamoto Corporation on behalf of County of Maui, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by April 5, 2012.

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 (808) 587-0410. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed: [signature]
Date: 3/30/12

cc: Central Files

Attached information does not provide ownership info in regards to location and abutting landowners along Hana Hwy @ bridge.

AMX
SH

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
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

March 20, 2012

DAR4278

RECEIVED
LAND DIVISION
2012 APR -5 A 10:16
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

RECEIVED
APR 2 2012
IC RESOURCES

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Pre-Assessment Consultation for the Kahawaiokapi'a Bridge Replacement at Kapia Stream
LOCATION: Hana, Island of Maui
APPLICANT: Wilson Okamoto Corporation on behalf of County of Maui, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by April 5, 2012.

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 (808) 587-0410. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed: Skippy Hau
Date: 4/3/2012

cc: Central Files

DIVISION OF AQUATIC RESOURCES - MAUI
DEPARTMENT OF LAND & NATURAL RESOURCES
130 Mahalani Street
Wailuku, Hawai'i 96793
April 3, 2011

To: Alton Miyasaka, Aquatic Biologist

From: Skippy Hau, Aquatic Biologist

Subject: EA Pre-Assessment Consultation for the Kahawalokapi'a Bridge Replacement at Kapia Stream (DAR 4278) (Lydia Morikawa, Land – Due April 5, 2012)

Although this is an intermittent stream, I have conducted lower elevation surveys during episodes of high flows. Cattle were present around the stream.

Post larvae 'o'opu alamo'o (*Lentipes concolor*) and opae (*Atyoida bisulcata*) were identified from several streams around Hana.

WILSON OKAMOTO
CORPORATION

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
March 11, 2015

Mr. Russell Tsuji, Land Administrator
State of Hawai‘i
Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawai‘i 96809

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai‘i

Dear Mr. Tsuji:

Thank you for your memorandum dated March 20, 2012 regarding the subject project. The following responds to your letter.

Regarding comments from the Office of Conservation and Coastal Lands, we acknowledge that the subject project is not within the State Conservation District.

The Land Division – Maui District noted that ownership information of property was not included in the early consultation package. Consequently, this information is included in the Draft EA.

Regarding aquatic resources, we appreciate the information that ‘o‘opu ‘alamo‘o and opae were identified from several streams around Hāna. This information will be taken into consideration as the project moves forward into the Draft EA stage.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
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

HISTORIC PRESERVATION DIVISION
KAHUHIHEWA BUILDING
601 KAMOKILA BLVD, KAPOLEI HI 96707

EM
LM

DATE: April 04, 2012

LOG: 2012.0799
DOC: 1204RS02

TO: Earl Matsukawa
Wilson, Okamoto Corporation
1907 South Beretania Street, Unit 400
Honolulu, HI 96826

RECEIVED
APR 11 2012
WILSON OKAMOTO CORPORATION

SUBJECT: **National Historic Preservation Act (NHPA) Section 106 Consultation**
Project: Bridge Replacement
Permit # (None)
Owner: County of Maui
Location: Hana Highway Kahawaiokapia Bridge
Tax Map Key: (2) 1-4-010:013 and (2) 1-4-011:055 and :056

This letter is in response to materials dated March 20, 2012, received by SHPD on March 22, 2012, regarding the proposed replacement of the Hana Highway's Kahawaiokapia Bridge. The County and State are in the process of undertaking an Environmental Assessment/Pre-Assessment Consultation. The existing structure is reinforced deck girder construction, one lane, with a solid 44 inches parapet above the roadway surface. The Area of Potential Effect (APE) would be the bridge footprint, approaches, and during construction, a temporary bypass route.

Records show a construction date of 1915, with downstream parapet circa 1931. The bridge is part of the Hana Highway Historic District [50-06, -07, 12, 13, 16, 17-1638, Hawaii National Register of Historic Places, 2001].

The Final Preservation Plan for County of Maui Bridges Within the Hana Historic District (Preservation Plan) by Wilson, Okamoto & Associates, December 2001, recommended that the existing bridge be demolished with a new one erected on the existing site. Included in the plan would be a 20 ton limit, 16 foot width, solid concrete parapet resembling the original, untreated concrete color, rock wall approach guardrails, concrete faced abutments employing original rubble, existing bridge supports be retained in a non-load bearing capacity, wing walls of concrete faced with original rubble, and signage reflecting single lane operations.

The proposal would follow the Preservation Plan and include parapets 44 inches in height. Concrete girders would be used, but short in length due to road topography and thus necessitating two new supports (made to match the original supports). The shorter girders would then rest on the bridge supports with the deck placed on top of the girders to carry vehicular traffic.

SHPD requires additional information, including drawings, in order to provide a determination of effect.

Any questions should be addressed to Ross W. Stephenson, SHPD Historian, at (808) 692-8028 (office), (808) 497-2233 (cell) or ross.w.stephenson@hawaii.gov.

Mahalo for the opportunity to comment.

AWestfall

Angie Westfall
Architecture Branch Chief, Hawaii Historic Preservation Division

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
May 4, 2012

Ms. Angie Westfall
Architecture Branch Chief
Hawai'i Historic Preservation Division
State of Hawai'i
Department of Land and Natural Resources
Historic Preservation Division
Kakuhihewa Building
601 Kamokila Boulevard
Kapolei, Hawai'i 96707

Attention: Mr. Ross Stephenson

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Ms. Westfall:

Thank you for your letter dated April 4, 2012 (Ref. Log: 2012.0799, Doc: 120RS02) regarding the proposed project. Your comments have noted that the Area of Potential Effect would be the bridge footprint, approaches, and during construction, a temporary bypass route.

The intent of the bridge design is to comply with the recommendations in the "Final Preservation Plan for County of Maui Bridges Within the Hāna Highway Historic District" which sets forth design guidelines for the 14 bridges under County jurisdiction. In keeping with the existing bridge design, the proposed bridge design will incorporate to the extent possible, design guidelines recommended in the Preservation Plan. The forthcoming Draft EA will include additional information such as preliminary design plans and will be transmitted to SHPD for review and comment.

The project will be funded in part by the Federal Highway Administration (FHWA) and, as such, is subject to consultation pursuant to Section 106 of the National Historic Preservation Act, as amended. Therefore, FHWA will be initiating consultation with SHPD and other Native Hawaiian organizations. Based on the results of consultation, FHWA will subsequently prepare the Determination of Effect for SHPD's concurrence.

Your letter, along with this response, will be included in the Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

ALAN M. ARAKAWA
Mayor

WILLIAM R. SPENCE
Director

MICHELE CHOUTEAU McLEAN
Deputy Director

RECEIVED
COUNTY OF MAUI
2012 APR 10 AM 9: 10
ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS

COUNTY OF MAUI

DEPARTMENT OF PLANNING

RECEIVED
2012 APR -5 PM 2: 47
COUNTY OF MAUI
PUBLIC WORKS

April 5, 2012

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

SUBJECT: KAHAWAIOKAPIA BRIDGE REPLACEMENT, ENVIRONMENTAL ASSESSMENT PRE-ASSESSMENT CONSULATION, HANA, MAUI, HAWAII; PROJECT NO. 97-23 (RFC 2012/0041)

The Department of Planning has reviewed the proposed action and has this comment to offer:

1. The bridge may be on the National and/or State Historic Register. As such, the new design should emulate as close as possible the design characteristics of the present bridge.

Thank you for your cooperation. If additional clarification is required, please contact Staff Planner Paul Fasi at paul.fasi@mauicounty.gov or at (808) 270-7814.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

for WILLIAM SPENCE
Planning Director

☐ RUSH

DEPT. OF PUBLIC WORKS	INFO	ACTION	SEE ME	COMMENTS	COPY	FILE
DIRECTOR	✓					
DEPUTY DIR.						
PERS.						
DSA						
ENGR.						
HWY.						
SECTY.						

Return to_____ Due_____
By:_____ Date:_____

xc: Paul F. Fasi, Staff Planner (PDF)
Department of Public Works
Project File
General File

WRS:CIY:PFF:nst
K:\WP_DOCS\PLANNING\RFC\2012\0041_KahawaiokapiaBridge\LTR1.doc

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
April 25, 2012

Mr. William Spence
Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawai'i 96793

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Mr. Spence:

Thank you for your letter dated April 5, 2012 (RFC 2012/0014) regarding the proposed project. Your comments have noted that the Kahawaiokapi'a Bridge may be on the National and/or State Historic Register. As such, the design should emulate as close as possible the design characteristics of the present bridge.

The intent of the bridge design is to comply with the recommendations in the "Final Preservation Plan for County of Maui Bridges Within the Hāna Highway Historic District" which sets forth design guidelines for the 14 bridges under County jurisdiction. In keeping with the existing bridge design, the proposed bridge design will incorporate to the extent possible, design guidelines recommended in the Preservation Plan.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

ALAN M. ARAKAWA
Mayor

DAVID C. GOODE
Director

ROWENA M. DAGDAG-ANDAYA
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET, ROOM NO. 434
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

EM

March 29, 2012

Mr. Earl Matsukawa, AICP
WILSON OKAMOTO CORPORATION
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
APR 03 2012
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

SUBJECT: ENVIRONMENTAL ASSESSMENT PRE-ASSESSMENT CONSULTATION FOR THE KAHAWAIOKAPI`A BRIDGE REPLACEMENT; PROJECT NO. 97-23

We reviewed the subject application and have the following comments from the Department's Highways Division:

1. The replacement bridge needs to be able to allow heavy construction equipment such as wheel loaders, motor graders, 14 cubic yard dump trucks, etc. used in the maintenance of Hana Highway and Piilani Highway. The bridge must also be able to support truck/trailers loaded with heavy equipment that needs to be transported to Central Maui for repairs.

2. Bridge inspectors often require the Highways Division to clean the channel under bridges. In order to accomplish this, access into the stream channel needs to be provided for our equipment/personnel.

Please call Rowena M. Dagdag-Andaya at (808) 270-7845 if you have any questions regarding this letter.

Sincerely,

DAVID C. GOODE
Director of Public Works

xc: Highways Division
Engineering Division

S:\LUCA\CZM\kahawaiokapia_bridge_replacement_ec_ls.wpd

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
April 25, 2012

Mr. David C. Goode
Director
County of Maui
Department of Public Works
200 South High Street, Room No. 434
Wailuku, Hawai'i 96793

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Mr. Goode:

Thank you for your letter dated March 29, 2012 with comments from the Department's Highways Division.

In response to the concerns, it is noted that the proposed bridge will be designed to American Association of State Highway and Transportation Officials (AASHTO) HL-93 standard. This is the same load standard which was utilized in the replacement of Paihī, Papahawahawa, and Kaholopo'o Bridges. This should be sufficient to accommodate road legal heavy vehicles.

Issues of maintenance access will be assessed in consonance with the overall project design in the Draft EA.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

ALAN M. ARAKAWA
Mayor

KYLE K. GINOZA, P.E.
Director

MICHAEL M. MIYAMOTO
Deputy Director

TRACY TAKAMINE, P.E.
Solid Waste Division

ERIC NAKAGAWA, P.E.
Wastewater Reclamation Division

EM

RECEIVED
APR 27 2012
WILSON OKAMOTO CORPORATION

COUNTY OF MAUI
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
2200 MAIN STREET, SUITE 100
WAILUKU, MAUI, HAWAII 96793

April 25, 2012

Mr. Earl Matsukawa
Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826

SUBJECT: **KAHAWAIOKAPI'A BRIDGE REPLACEMENT**
EARLY CONSULTATION OF ENVIRONMENTAL ASSESSMENT
HANA, MAUI, HAWAII

We reviewed the subject application and have the following comments:

1. Solid Waste Division comments:

   a. Include a plan for construction waste management.

2. Wastewater Reclamation Division (WWRD) comments:

   a. None. The County does not have a wastewater system in the area of the subject project.

If you have any questions regarding this memorandum, please contact Michael Miyamoto at 270-8230.

Sincerely,

KYLE K. GINOZA, P.E.
Director of Environmental Management

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
May 17, 2012

Mr. Kyle K. Ginoza
Director
County of Maui
Department of Environmental Management
250 South High Street
Wailuku, Hawai'i 96793

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Mr. Ginoza:

Thank you for your letter dated April 25, 2012 responding to our request for pre-assessment consultation comments on the Kahawaiokapi'a Bridge Replacement project. Our responses are as follows.

Prior to project construction, a plan for construction waste management will be submitted to DEM for review and approval.

We acknowledge that the County of Maui does not have a wastewater system in the project area.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

ALAN M. ARAKAWA
Mayor

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

RECEIVED
MAR 26 2012
WILSON OKAMOTO CORPORATION

March 19, 2012

Mr. Earl Matsukawa
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Subject: Kahawaiokapi'a Bridge Replacement

Dear Mr. Matsukawa,

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

Please feel free to contact me if you have any questions.

Sincerely,

JoAnne Johnson Winer
Director

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
April 25, 2012

Ms. JoAnne Johnson Winer
Director
Department of Transportation
County of Maui
200 South High Street
Wailuku, Hawai'i 96793

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Ms. Johnson Winer:

Thank you for your letter dated March 19, 2012 indicating that you have no comments at this time on the proposed project.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

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

EM

RECEIVED
APR 11 2012
WILSON OKAMOTO CORPORATION

April 3, 2011

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Re: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Project No. 97-23

Dear Mr. Matsukawa:

Thank you for the consulting with the Department of Water Supply (DWS) in preparation of this Environmental Assessment.

A DWS 8-inch ductile iron waterline runs along this section of Hana Highway and across the Kahawaiokapi'a bridge. This line and appurtenances will need to be relocated outside the construction area. Construction plans need to be reviewed by the DWS engineering division. Water valve covers must be lifted to match the finished grade of the roadway.

For questions on construction plans, please contact our Engineering Division at (808) 270-7835. For any water resources questions, please contact Staff Planner Eva Blumenstein at (808) 463-3102 or eva.blumenstein@co.maui.hi.us.

Sincerely,

David Taylor, Director
emb

cc: engineering

"By Water All Things Find Life"

Printed on recycled paper

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
May 4, 2012

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

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Mr. Taylor:

Thank you for your letter dated April 3, 2012 regarding the proposed project. Your comments have noted that a DWS 8-inch ductile iron waterline extends across the Kahawaiokapi'a Bridge. You have noted that the line and appurtenances would need to be relocated outside the construction area and that construction plans need to be reviewed by the DWS Engineering Division. Further, water valve covers must be lifted to match the finished grade of the roadway.

Your comments on the relocation of the waterline and appurtenances as well as lifting of the valve covers provide important information during the design phase. The proposed construction plans for the bridge improvements will be transmitted to the DWS for review and comments. Further, all water-related improvements will be coordinated with the DWS so as to ensure minimal impacts to neighboring properties and existing water service in the vicinity of the project site.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

PATRICK T. MATSUI
Deputy Director

(808) 270-7230
FAX (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

March 19, 2012

Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

SUBJECT: Kahawaiokapi'a Bridge Replacement, Environmental Assessment Pre-Assessment Consultation, Hana, Maui, Hawaii. Project No. 97-23

Thank you for the opportunity to review the subject Environmental Assessment Pre-Assessment Consultation. We have no comment or objection at this time.

Should you have any questions or concerns, please feel free to contact me, or Steve Grogan, Capital Improvements Project Coordinator, at stephen.grogan@co.maui.hi.us or 808-270-6158.

Sincerely,

GLENN T. CORREA
Director of Parks & Recreation

c: Robert Halvorson, Chief of Planning & Development

GTC:RH:sg

S:\PLANNING\Steve G\No Objections\No Comment - Kahawaiokapia Bridge replacement doc

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6153-01
April 25, 2012

Mr. Glenn T. Correa
Director
Department of Parks and Recreation
County of Maui
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawai'i 96793

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Mr. Correa:

Thank you for your letter dated March 19, 2012 indicating that you have no comment or objection at this time on the proposed project.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

ALAN M. ARAKAWA
MAYOR

JEFFREY A. MURRAY
CHIEF

ROBERT M. SHIMADA
DEPUTY CHIEF

EM

COUNTY OF MAUI

DEPARTMENT OF FIRE AND PUBLIC SAFETY
FIRE PREVENTION BUREAU

313 MANEA PLACE • WAILUKU, HAWAII 96793
(808) 244-9161 • FAX (808) 244-1363

RECEIVED
APR 20 2012
WILSON OKAMOTO CORPORATION

April 17, 2012

To : Wilson Okamoto Corporation
Attn: Earl Matsukawa, AICP
1997 South Beretania Street, Suite 400
Honolulu, HI 96826

Re : **Kahawaiokapi'a Bridge Replacement**
Hana, Maui, HI
Project 97-23

Dear Candace:

Thank you for the opportunity to comment on the proposed project's draft EA. At this time, our office has no comment to provide in regards to this subject's draft EA.

If there are any questions or comments, please feel free to contact me at 244-9161 ext. 23. Thank you for your attention to fire prevention and public safety.

Sincerely,

Paul Haake
Captain, Fire Prevention Bureau
Department of Fire & Public Safety
313 Manea Place
Wailuku, HI 96793

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Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
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6153-01
May 17, 2012

Mr. Paul Haake
Captain, Fire Prevention Bureau
Department of Fire and Public Safety
County of Maui
313 Manea Place
Wailuku, Hawai'i 96793

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Mr. Haake:

Thank you for your letter dated April 17, 2012 indicating that you have no comment at this time on the proposed project.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director Planning

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

POLICE DEPARTMENT

COUNTY OF MAUI

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE

YOUR REFERENCE

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

GARY A. YABUTA
CHIEF OF POLICE

CLAYTON N.Y.W. TOM
DEPUTY CHIEF OF POLICE

April 13, 2012

EM

LM

AA

RECEIVED
APR 19 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

SUBJECT: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Project No. 97-23

Thank you for your letter of March 9, 2012, requesting comments on the above subject.

We have reviewed the report. Please refer to the enclosed copy of the communication from Officer Adam Hickman of our Hana District. Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Assistant Chief Victor K. Ramos
for: GARY A. YABUTA
Chief of Police

Enclosure

c: Cary Yamashita, Maui County Department of Public Works

Forward to Wilson cc: Co. Maui, Dept. Public Works, Engineering
J Kamoto Corp.

A5

TO	:	**GARY YABUTA, CHIEF OF POLICE, MAUI COUNTY POLICE DEPARTMENT**
VIA	:	**CHANNELS**
FROM	:	**ADAM HICKMAN, P.O. II, DISTRICT III, HANA PATROL DIVISION**
SUBJECT	:	**KAHAWAIOKAPIA BRIDGE REPLACEMENT**

Chief Yabuta 4/16/12

OUR RECOMMENDATION IS TO WORK ON ONE BRIDGE AT A TIME BECAUSE OF PROXIMITY.
A.N.P. 04/09/12

Sir, this To/From is in regards to the above mentioned matter.

I was assigned to respond to the Wilson Okamoto Corporation's request for comments and requirements from the Maui County Police Department with regards to their proposed bridge replacement project.

KAHAWAIOKAPIA BRIDGE

The Kahawaiokapia Bridge is 14' 2" wide and with one way traffic permitted. While it is being replaced a temporary bridge will be put in place allowing for traffic to flow one direction at a time.

Checks made revealed that the Waiohonu Bridge replacement is scheduled to commence on March 12, 2012 with a completion date of March 6, 2013. The Kaholopoo Bridge is also scheduled to be replaced with construction beginning on April 16, 2012 with a completion date of January 4, 2013.

WAIOHONU BRIDGE

The Waiohonu Bridge is located approximately .6 miles East of The Kahawaiokapia Bridge. There is currently a temporary bridge in place which will allow traffic to continue to flow once construction begins on the existing bridge. However, traffic can only flow one direction at a time on the temporary bridge.

KAHOLOPOO BRIDGE

The Kaholopóo Bridge is located approximately 1.2 miles West of the Kahawaiokapia Bridge. Once Construction begins on the Kaholopoo Bridge, traffic will be forced to divert onto Haneoo Road, which is a residential area. Haneoo Road is also narrow, only allowing for traffic to flow one direction at a time on many portions of the road. The East most intersection with Haneoo Road is located approximately .25 miles from the Kahawaiokapia Bridge.

NOTED

CONCLUSION

I recommend that the replacement of the Kahawaiokapia Bridge be allowed to proceed as long as traffic flow is not affected by the construction. Traffic flow in this area is significant due to its proximity to Hamoa Beach, Koki Beach, Hana Town, Venus Pools (Waioka Falls), and several other locations. If traffic will be impacted by the bridge replacement, I recommend that work be delayed until the other bridge replacement projects have been completed to minimize impact on the local and tourist traffic.

Respectfully Submitted,

Adam HICKMAN E#15177
Police Officer II/Hana Patrol
04/02/2012 @ 0730 hours

I concur with Officer HICKMAN'S recommendation, this replacement project should be started after the completion of either the Waiohonu Bridge or the Kaholopoo Bridge replacement projects. Starting this project at the same time as the other bridge projects will cause additional traffic delays to Hana Highway.

LT- 4/2/12

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6153-01
May 17, 2012

Mr. Gary A. Yabuta
Chief of Police
Police Department
County of Maui
55 Mahalani Street
Wailuku, Hawai'i 96793

Subject: Kahawaiokapi'a Bridge Replacement
Environmental Assessment Pre-Assessment Consultation
Hāna, Maui, Hawai'i
Project No. 97-23

Dear Chief Yabuta:

Thank you for your letter dated April 13, 2012 commenting on the subject project. We acknowledge your concerns regarding potential traffic impacts should construction of the Kahawaiokapi'a Bridge project proceed prior to completion of the Kaholopo'o and Waiohonu Bridge projects, which are scheduled for completion in January and March 2013, respectively.

Construction on the Kahawaiokapi'a Bridge is anticipated to start no sooner than early 2014, contingent on the authorization of required permits and approvals. Based on the current schedule, it is anticipated that the Waiohonu and Kaholopo'o Bridge projects will be completed prior to commencement of the Kahawaiokapi'a Bridge project. Therefore, we do not anticipate cumulative impacts on traffic along Hāna Highway due to concurrent construction activity on these bridges. The Department of Public Works will continue to coordinate with your office to minimize the potential for traffic disruptions during construction of the proposed project.

Your letter, along with this response, will be included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

EM/jm

cc: Mr. Cary Yamashita, County of Maui Department of Public Works

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