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HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-DS
2.5808

'99 OCT 27 A11 :19

October 22, 1999

TO: GENEVIEVE SALMONSON, DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: KAZU HAYASHIDA
DIRECTOR OF TRANSPORTATION

SUBJECT: FINAL ENVIRONMENTAL ASSESSMENT (EA) AND FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR KOLEKOLE BRIDGE AND PAHEEHEE BRIDGE
HAWAII BELT ROAD, SEISMIC RETROFIT OF VARIOUS BRIDGES,
VICINITY OF PEPEEKEO, DISTRICT OF NORTH HILO,
ISLAND OF HAWAII, FEDERAL-AID PROJECT NO. BR-0100(57)

The Department of Transportation has reviewed the comments received during the 30-day public comment period which began on April 23, 1999. We have determined that the projects will not have significant environmental effects and have issued a Finding of No Significant Impact (FONSI) determination for each. Please publish this notice in the next Environmental Notice.

The following documents are enclosed for your use:

1. One copy of OEQC Environmental Notice Publication Form, including a combined summary on disk;

2. Four copies of Final EA for each bridge;

3. One copy of Letter to Participants for each bridge; and

4. One copy of proposed Distribution List for each bridge.

Should you have any questions, please call Emilio Barroga, Jr. of our Highways Division at 692-7546.

Enclosure

1999-11-08-HA-FEA-

Final Environmental Assessment

★PAHEEHEE BRIDGE SEISMIC RETROFIT★

Pepe'ekeo, Hawaii
Adjacent to TMK: 2-8-15: 2,19 and 2-8-17: 1,9

Proposing Agency:

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII
601 Kamokila Boulevard, Room 688
Kapolei, Hawaii 96707

Prepared by:

ENGINEERING CONCEPTS, INC.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

SEPTEMBER 1999

This environmental document has been prepared pursuant to Chapter 343, Hawaii Revised Statutes

Final Environmental Assessment

PAHEEHEE BRIDGE SEISMIC RETROFIT

Pepe'ekeo, Hawaii
Adjacent to TMK: 2-8-15: 2,19 and 2-8-17: 1,9

Proposing Agency:

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII
601 Kamokila Boulevard, Room 688
Kapolei, Hawaii 96707

Responsible Official:

Kazu Hayashida, Director — Date: 9/24/99

Prepared by:

ENGINEERING CONCEPTS, INC.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

SEPTEMBER 1999

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DEVELOPMENT SUMMARY

PROPOSING AGENCY:	Department of Transportation State of Hawaii 601 Kamokila Blvd., Room 688 Kapolei, Hawaii 96707	
Responsible Official:	Kazu Hayashida, Director Department of Transportation	
Contact Person: Phone: Fax:	Emilio Barroga, Jr. 692-7546 692-7555	
PROJECT NAME:	Paheehee Bridge Seismic Retrofit Project No. BR-0100(57)	
PROPOSED ACTION:	Retrofit the existing Paheehee Bridge for seismic stability	
PROJECT LOCATION:	Hawaii Belt Road (Route 19) Pepe'ekeo, Hawaii	
TAX MAP KEY:	Adjacent to: TMK: 2-8-15: 2, 19 TMK: 2-8-17: 1, 9	
LAND OWNER:	State of Hawaii	
STATE LAND USE DESIGNATION:	Conservation, Agricultural and Urban	
FACILITY USE:	Primary Arterial	
HAWAII COUNTY GENERAL PLAN LAND USE:	2-8-15:2, 19 and 2-8-17:1 2-8-17:9	Intensive/Extensive Agricultural Low Density
HAWAII COUNTY ZONING:	2-8-15:2, 19 and 2-8-17:1 2-8-17:9	A-20a (Agricultural) RS-7.5 (Single Family Residential)
EXISTING USE:	Bridge along the Hawaii Belt Road (Route 19), between Hilo and Laupahoehoe.	

CHAPTER 1
INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this Draft Environmental Assessment (EA) is to present potential environmental impacts associated with the seismic retrofit of the Paheehee Bridge on Hawaii Belt Road in the County of Hawaii.

This Draft EA has been prepared in accordance with Chapter 343, Hawaii Revised Statutes (HRS). The State of Hawaii Department of Transportation (DOT) is the proposing agency for this document. Mr. Emilio Barroga, Jr. is the point of contact at DOT for the project.

1.2 BACKGROUND

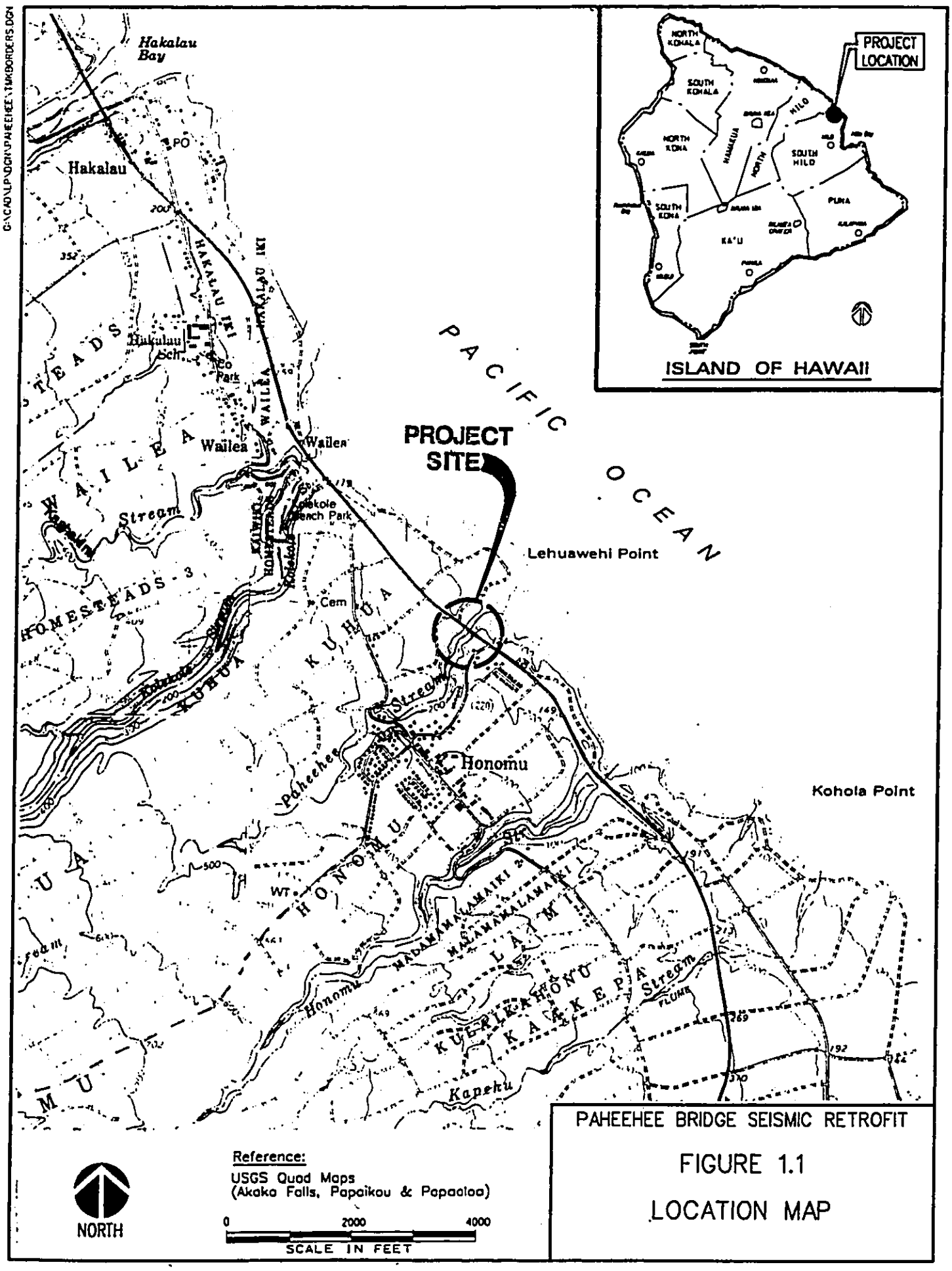
The State of Hawaii Department of Transportation retained KSF, Inc. (KSF), structural engineers, to analyze the Paheehee Bridge for seismic stability. It was determined by a seismic stability analysis that the Paheehee Bridge was inadequate to resist seismic forces. As a result of this finding, several design alternatives were identified to stabilize the bridge structure. Of these alternatives, reinforcing of the footings and steel frame system was chosen as the preferred retrofit alternative.

1.3 OBJECTIVES

The State of Hawaii Department of Transportation proposes to retrofit the existing Paheehee Bridge to comply with the American Association of State Highway and Transportation Officials (AASHTO) specifications for highway bridges. Specifically, the current bridge does not comply with the seismic stability criteria which compromises the safety of the general public. Currently, AASHTO specifications for highway bridges designate the island of Hawaii to be situated in seismic performance category D, a region where seismic forces with maximum ground acceleration can occur. The seismic analysis for the bridge was performed using a 0.42 acceleration coefficient to simulate seismic forces imposed on the bridge structure.

1.4 PROJECT LOCATION

The Paheehee Bridge (adjacent to TMK:2-8-15: 2, 19, TMK:2-8-17:1, 9) is located on the Hawaii Belt Road (Route 19) in the South Hilo district on the island of Hawaii (see **Figure 1.1**). The bridge is located about 13 miles north of the Hilo Airport, just north of Honomu, and about



PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 1.1

LOCATION MAP

700 feet west of the mouth of Paheehee Stream at the Pacific Ocean. Hawaii Belt Road is the only direct major access road between Hilo and the communities to the north. The bridge spans the Paheehee Stream which flows toward the east from the slopes of Mauna Kea to the Hamakua coast.

1.5 ALTERNATIVES CONSIDERED

Two alternatives to the proposed action were considered:

No Action. In the "no action" scenario, use of the existing bridge would continue, despite structural inadequacy to resist seismic forces. Should the bridge fail during an earthquake, loss of life or injury may result. This alternative is not acceptable because of the potential impacts to public safety and welfare.

Scheme to Add Anchor Bolts to Base Plate. This is an unfeasible alternative due to the lack of space at the base plates to accommodate anchor bolts.

1.6 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

Regional Impacts. The project will not stimulate development or result in social or economic changes. Short-term, construction-related impacts include generation of dust, noise, and traffic disturbances.

Soil Erosion. No long-term soil erosion problems will result from seismic retrofit of the bridge. Use of erosion control measures during construction will minimize the short-term impact of soil erosion.

Water Quality. Construction activities will take place near Paheehee Stream. The contractor will be required to implement best management practices to prevent soil and debris from entering the stream as a result of construction activities. No long-term impacts are anticipated.

Flood and Tsunami Hazards. The proposed action should not be adversely affected by flood or tsunami waters. The need for a flood study will be coordinated with the Hawaii County Department of Public Works. No long term impacts are anticipated as a result of the proposed action.

Flora. Approximately 1,800 square feet of vegetation will be removed in order to excavate around the abutments and bridge footings. Upon completion of construction, exposed soil surfaces will be hydromulched to encourage reestablishment of vegetation. None of the plants identified during the botanical survey is threatened or endangered, nor is any a species of concern.

Fauna. Construction activities will not have a significant impact on native or federally protected avian or mammalian species.

Air Quality. Generation of fugitive dust and exhaust emissions during construction will be mitigated by implementation of appropriate best management practices and compliance with DOH regulations. The project will have no long-term impact on air quality.

Archaeological and Historic Resources. No archaeological sites were identified in the project area and therefore, no significant impacts are anticipated. The proposed action will not impact the historic character of the bridge.

Noise. Short-term impacts may result from construction activities. The contractor will be required to comply with all applicable State and County noise regulations. No long-term impacts are anticipated.

Traffic. Traffic impacts may result in the short-term, due to construction vehicles entering and exiting the project site and construction staging areas, possibly along the bridge itself. Also, closure of one lane on the bridge may be required. No long-term traffic impacts are anticipated.

Visual Resources. The appearance of the existing bridge will not be significantly altered.

Lead Paint Removal. Work will be coordinated with DLNR Division of Aquatic Resources to minimize impact to natural resources in the stream.

Utility Infrastructure. Overhead electrical power, cable TV and telephone lines will be avoided during construction. The affected utility company will be contacted to coordinate relocation of their line, if needed.

1.7 PERMITS AND APPROVALS REQUIRED

Permits and approvals which may be required for construction of the proposed project are listed in **Table 1.1**. Permit applications will be prepared as planning and design of the project proceeds.

TABLE 1.1
PERMITS AND APPROVALS

AGENCY	PERMIT/APPROVAL
Hawaii County Building Department	Building Permit
Hawaii County Department of Public Works	Flood Study Construction Plan Approval Grubbing/Grading Permit
Hawaii County Planning Department	Special Management Area Use Permit

The applicability of other environmental permits has been coordinated with various agencies:

Conservation District Use Application (CDUA). The Department of Land and Natural Resources has determined that the proposed seismic retrofit work constitutes repair of an existing, nonconforming structure and does not require a Conservation District Use Permit.

Dept. of the Army Permit. Based on review of the Draft EA, the Army Corps of Engineers has determined that a permit from the Department of the Army (e.g. Section 404, Section 10) will not be required for the project.

Stream Channel Alteration Permit (SCAP). According to the Commission on Water Resource Management, a SCAP will only be required if the proposed construction results in modification of the bed or banks of the stream. The applicant has determined that the project can be constructed without such stream bed or bank modification.

National Pollutant Discharge Elimination System (NPDES) Permits. The proposed action will not involve a discharge that is subject to a NPDES permit.

Refer to **Appendix A** for applicable correspondence.

CHAPTER 2
PROJECT DESCRIPTION

2.1 NEED FOR THE PROJECT

The State of Hawaii Department of Transportation retained KSF, Inc. (KSF), structural engineers, to analyze the Paheehee Bridge (see **Figures 2.1 and 2.2**) for seismic stability. By utilizing a dynamic analysis model, KSF determined that the ability of the bridge to resist seismic forces was inadequate. Due to this finding, corrective action is required.

Use of the existing bridge continues despite its structural inadequacy to resist seismic forces. Should the bridge fail or be deemed unsafe after a seismic event, the potential for loss of life and/or injury exists. Bridge failure would also sever the only direct ground transportation link between Hilo and communities to the north. Such occurrence would prevent or at least severely restrict transport of goods and emergency services to those northern communities, and hence directly impact public safety and welfare. For this reason, the proposed action is retrofit of the bridge to withstand seismic forces and remain serviceable.

2.2 DESCRIPTION OF THE PROPOSED ACTION

Elements of this project include concrete-encased footings, seat extenders, cable restrainers, and lead paint removal. The first three components will improve the seismic stability of the bridge. Lead paint removal is necessary for implementation. The primary elements of this project are described below.

A dynamic analysis was performed on Paheehee Bridge to evaluate behavior of the structure during an earthquake. The results of the analysis indicated that the connections between the columns and the footings were inadequate to resist seismic loads. The capacity of the anchor bolts was exceeded when analyzed for combined shear and tension forces. There is insufficient space on the base plate to simply add bolts.

The terrain surrounding the bridge is prohibitively steep, making the use of construction access roads impractical. Because of this site condition, it is likely that workers and equipment will be lowered from the bridge deck to the footings and other work areas.

2.2.1 Construction Method

Insight on probable construction methodology applicable for this project was obtained from discussions with a contractor experienced in bridge construction. Development of this document

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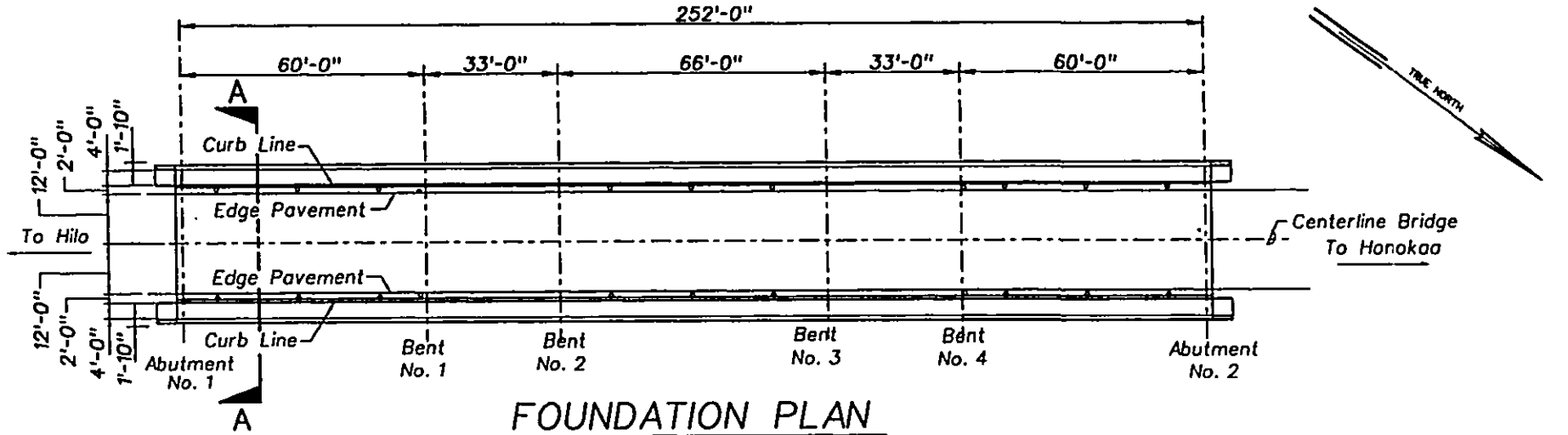
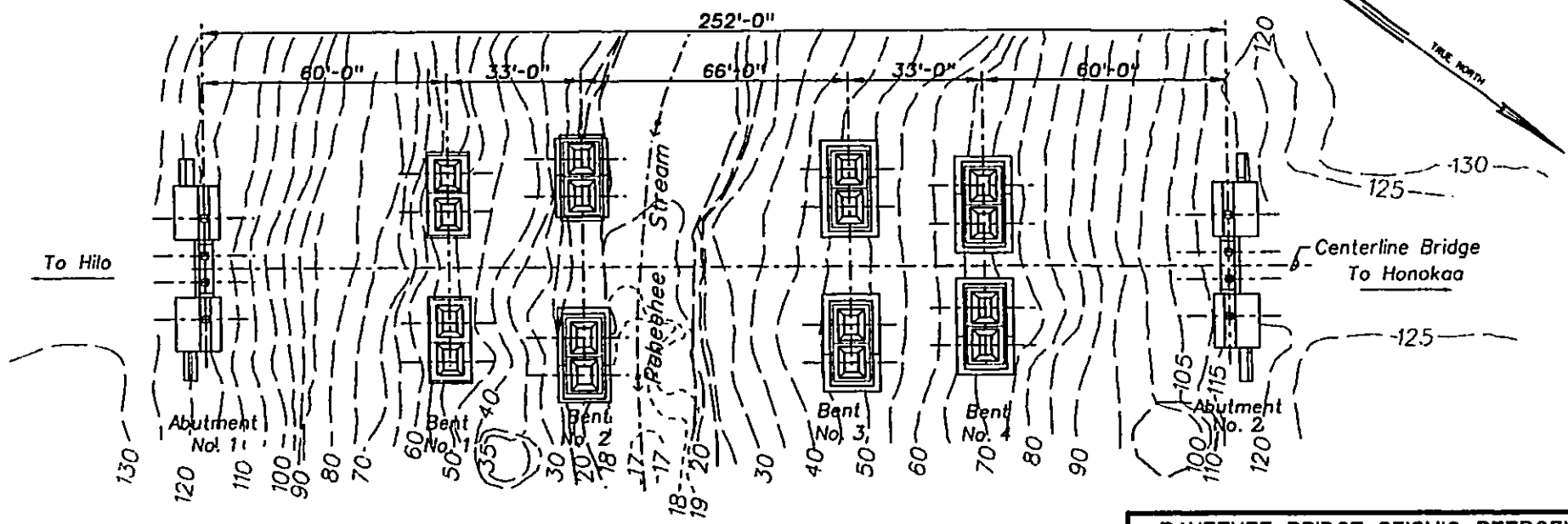


FOUNDATION PLAN

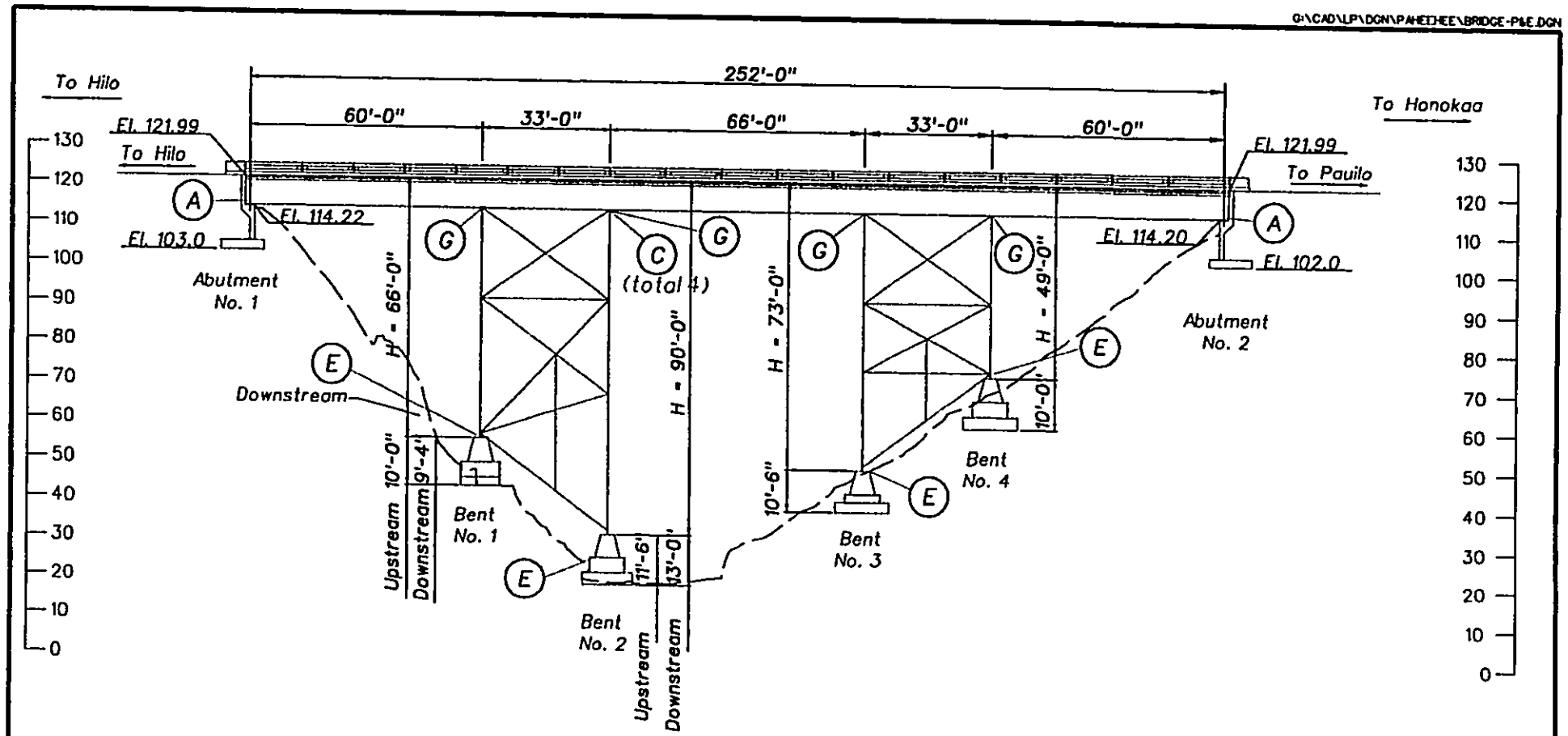


FOUNDATION PLAN

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 2.1

BRIDGE PLAN



ELEVATION

LEGEND

- (A) Seat Extender at abutment
- (C) Seat Extender with Longitudinal Cable Restrainer
- (E) Retrofit Footing
- (G) Replace existing rivets with high strength bolts

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 2.2

BRIDGE ELEVATION

was based on the following concepts provided by the contractor after his inspection of the project site.

1. Access roads are infeasible due to the steep terrain. Materials, equipment, and workers will likely be lowered from the bridge deck to the footings and other work areas.

2. Small, light, easy-to-maneuver equipment will probably be used (e.g. bobcat and/or shovels for excavation, etc.) since construction equipment will likely be lowered from the bridge deck.

3. One lane of the Hawaii Belt Road will need to be closed during working hours and through traffic will be limited to one lane. After working hours, two-way traffic will be reestablished. The lane closure is needed to facilitate lowering of material and equipment from the bridge deck.

2.2.2 Concrete Encased Footings and Base of Columns

The design selected to rectify the structural inadequacy consists of encasing the footings and the base of the columns in concrete (see **Figure 2.3**). This system will be designed to provide a positive connection between the columns and the footings. This concrete encasement will help transfer the forces from the columns to the footings which the anchor bolts were previously designed to accomplish.

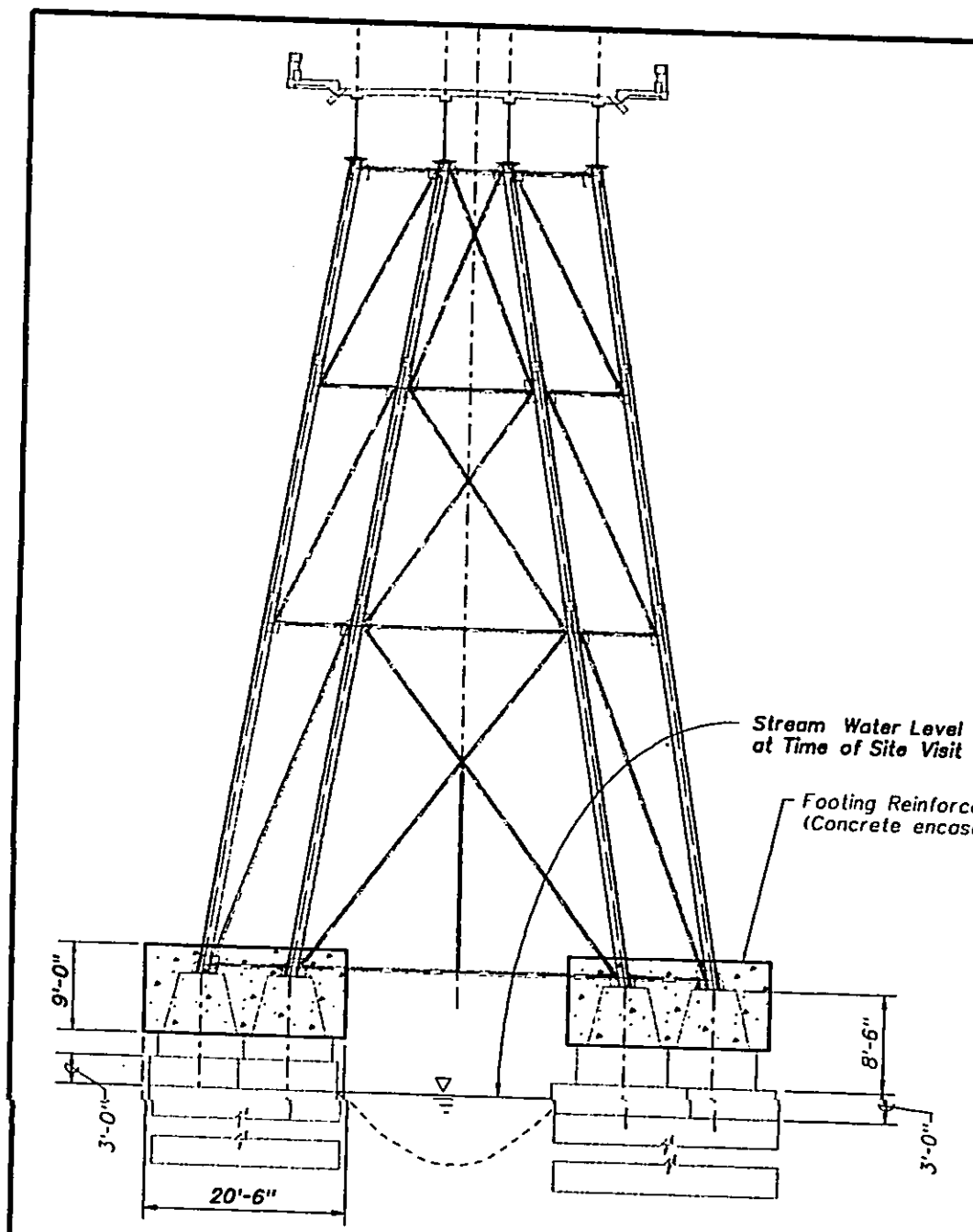
The design will incorporate dowels epoxied into the existing footings. After the dowels are in place, concrete will be poured around the footing and the column to tie everything together.

2.2.3 Seat Extenders and Cable Restrainers

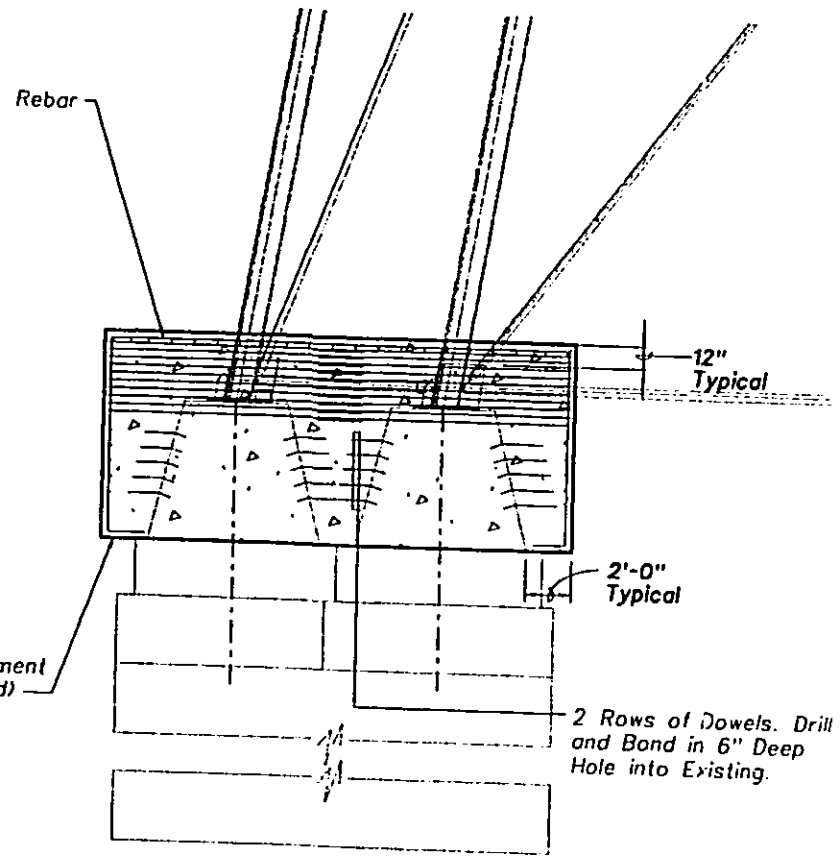
Other seismic upgrades to the structure consist of seat extenders and cable restrainers (see **Figures 2.4, 2.5, and 2.6**). Concrete bearing seat extenders will be designed to accommodate the large anticipated longitudinal displacements at the abutments. These seat extenders will be designed to permit longitudinal translation and should also prevent the steel girders from falling free from the supports. Pier cap restrainers will be designed to prevent plate girders from being displaced from the pier cap supports.

2.2.4 Lead Paint Removal

The steel girders and beams of the existing bridge are coated with a lead-based paint. Removal and containment of the lead paint will be the responsibility of the contractor. Paint will be removed only where required for the retrofit work. Several alternatives for lead paint removal are being considered.



ELEVATION - BENT NO. 2

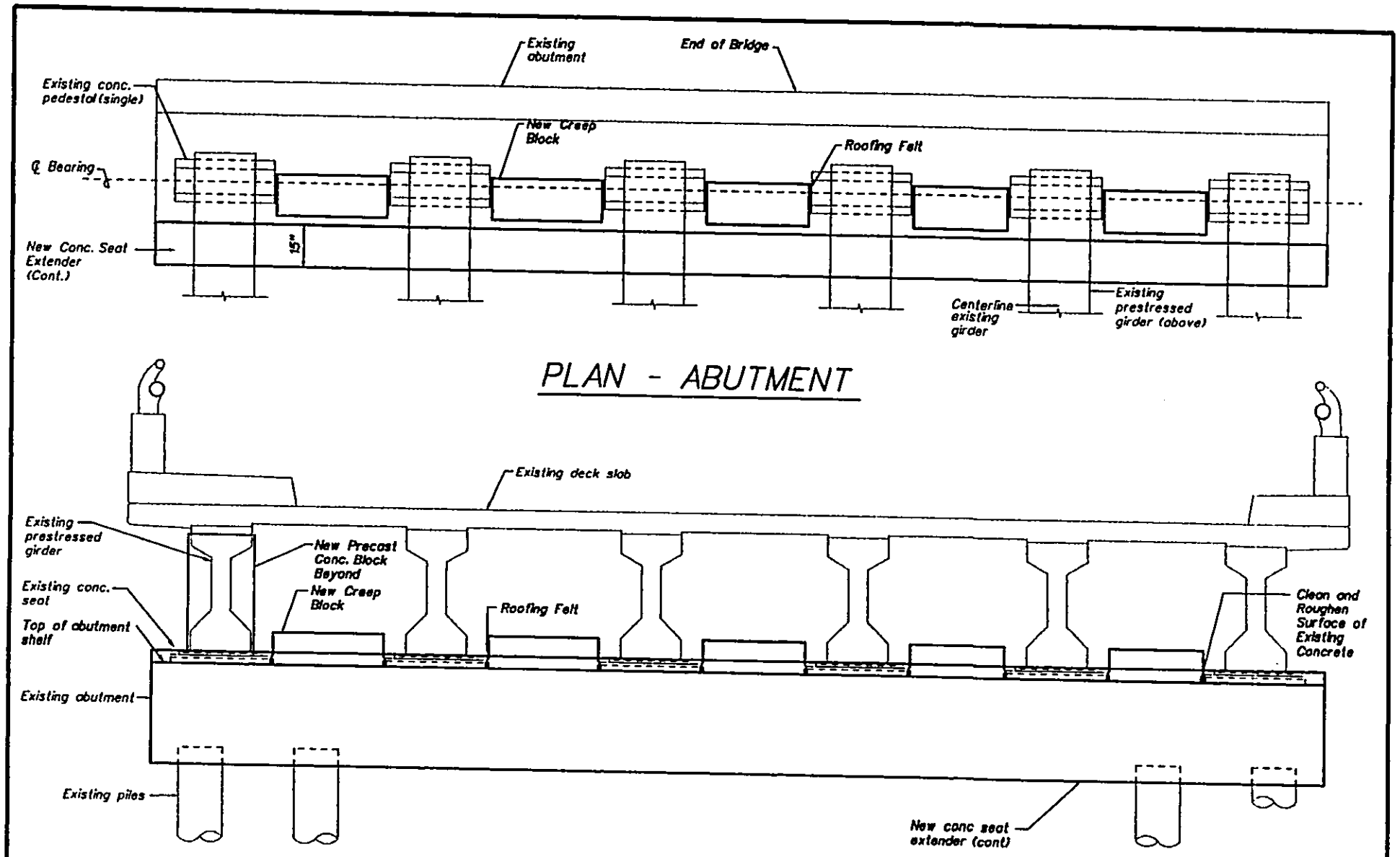


ENLARGED ELEVATION

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 2.3

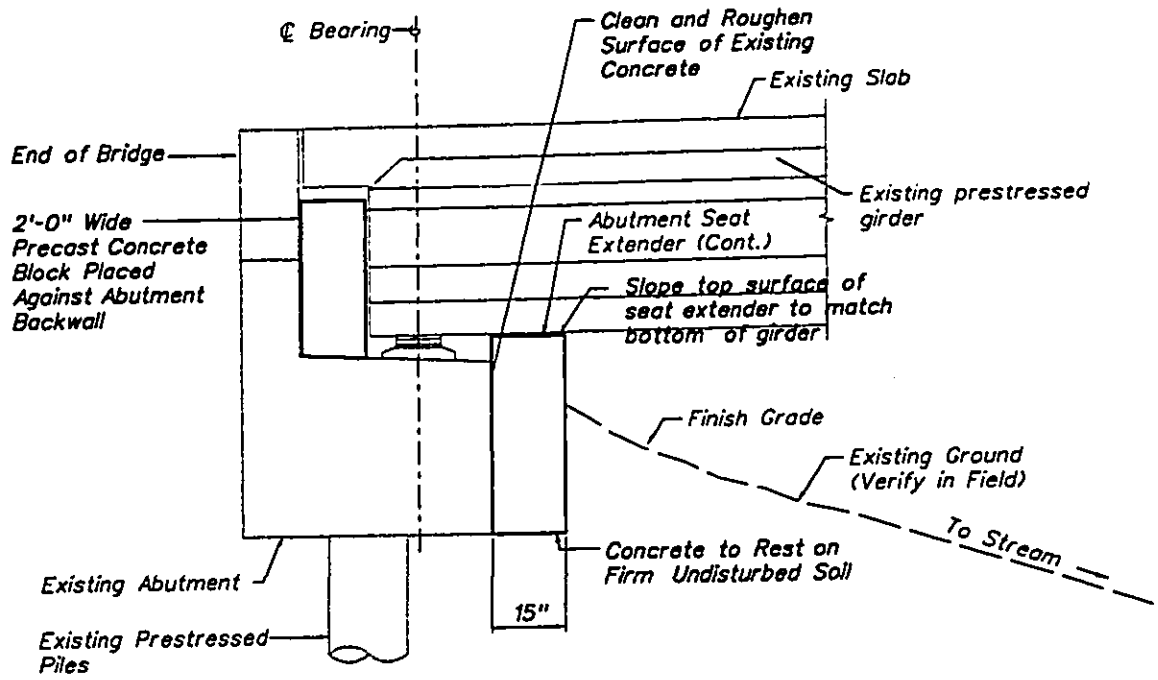
BENT ELEVATIONS



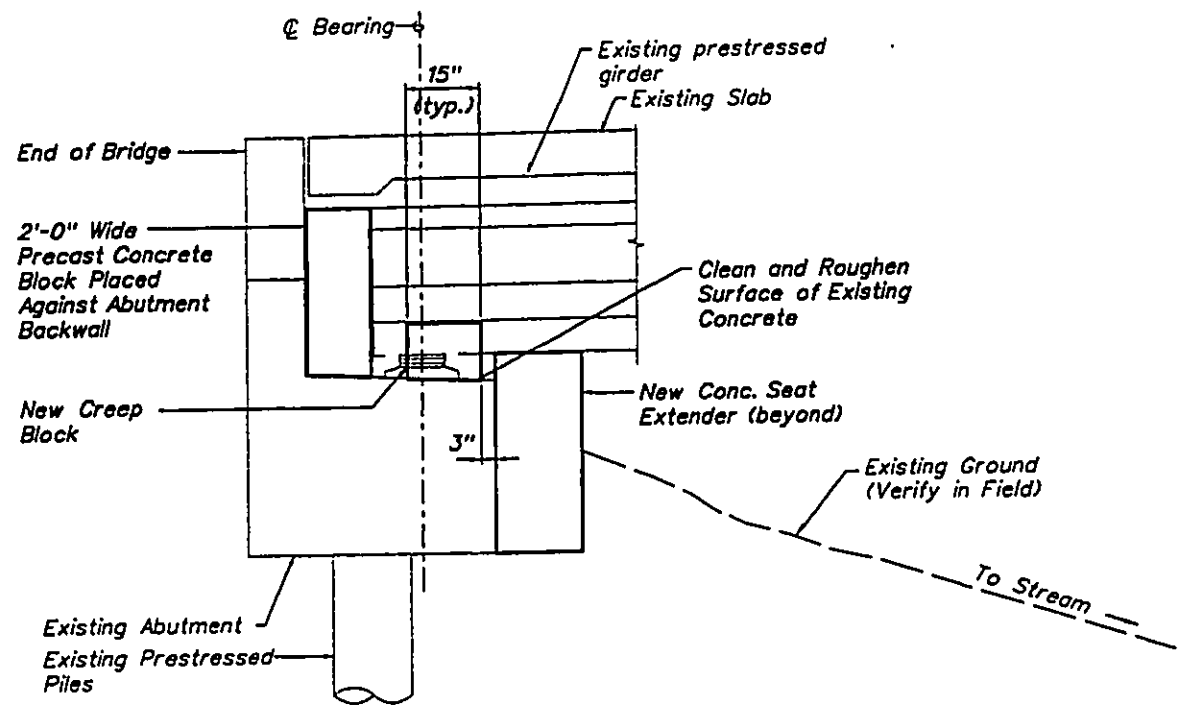
PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 2.4

ABUTMENT PLAN AND ELEVATION



SECTION - ABUTMENT

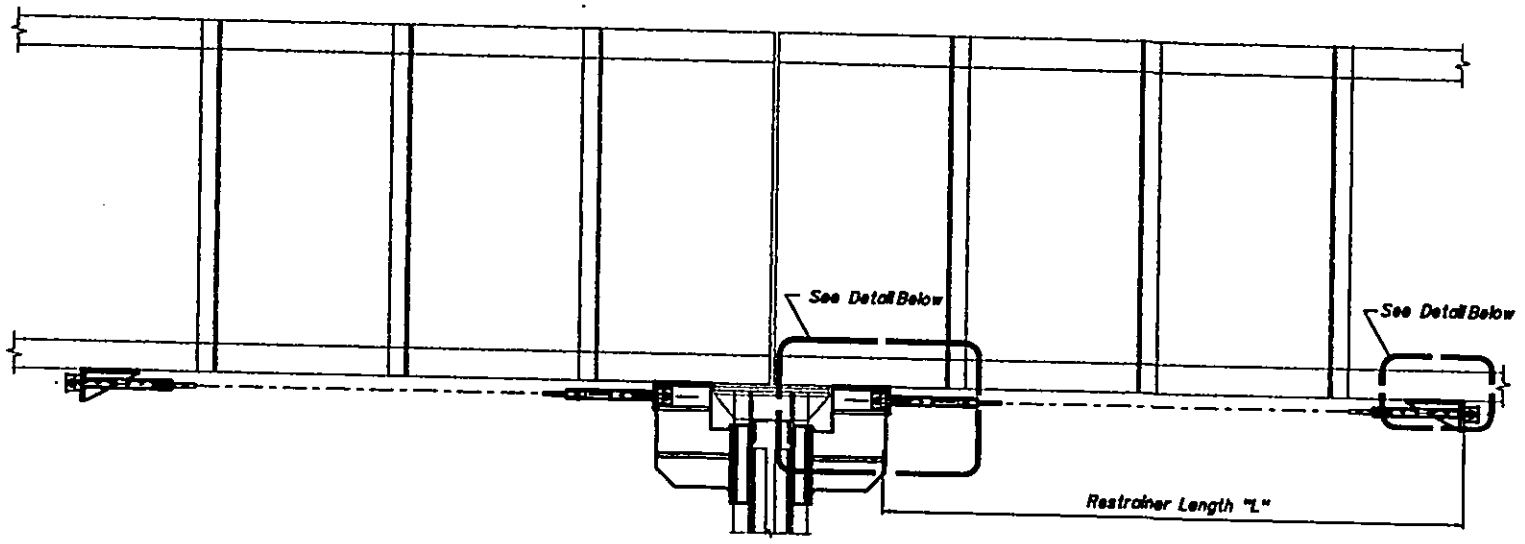


SECTION - ABUTMENT

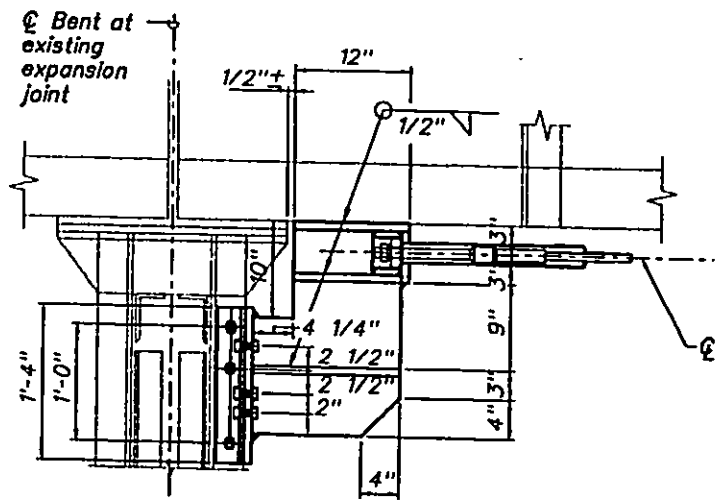
PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 2.5

ABUTMENT SECTION

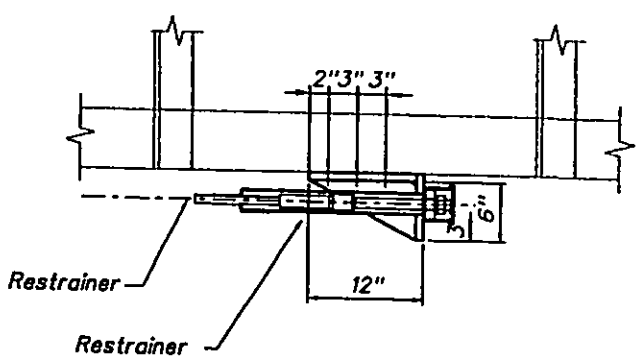


ELEVATION



Note: All Plates 3/4" unless specified otherwise.
All welds 1/2" unless specified otherwise.

DETAIL



Note: All Plates 3/4" unless specified otherwise.
All welds 1/2" unless specified otherwise.

DETAIL

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 2.6

PIER CAP RESTRAINER

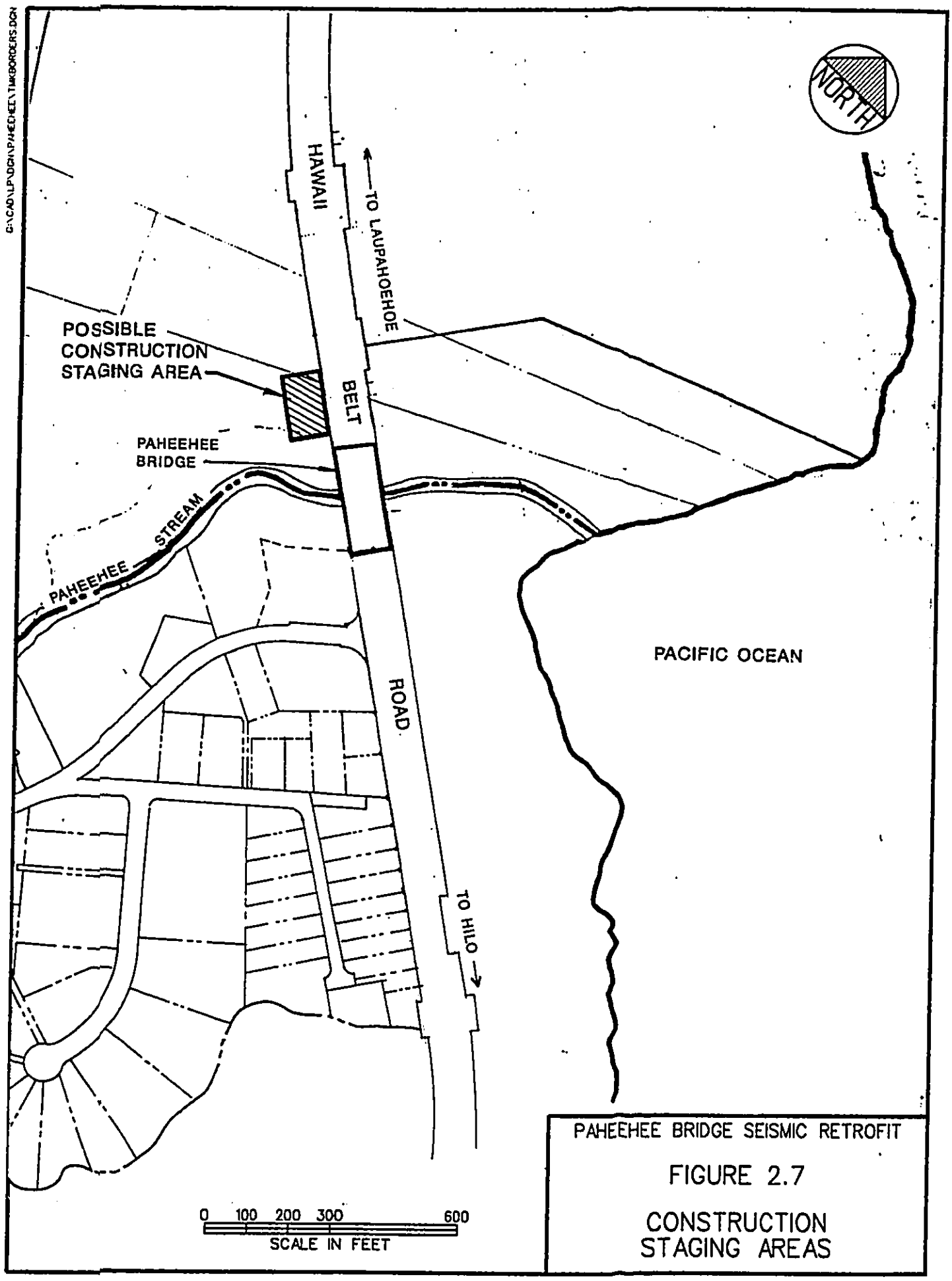
One such alternative involves the application of a glue-like coating to the lead paint. Once the coating has adhered to the paint, it is scraped off, carrying the lead paint with it.

2.2.5 Construction Staging Area

Temporary use of land may be required near the ends of the bridge for construction staging areas to store equipment and materials. Trees and shrubs may be removed to accommodate the staging areas. For a possible staging area site, see **Figure 2.7**. Staging areas will be located outside of the Conservation District.

2.3 PROJECT SCHEDULE AND CONSTRUCTION COST

Construction is anticipated to begin in mid to late 2000, upon receipt of the required permits and approvals. Construction is estimated to last approximately 12 months. The project is estimated to cost about $1 million, funded by the federal government and the State of Hawaii.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NORTH
HAWAII
TO LAUPAHOEHOE
POSSIBLE
CONSTRUCTION
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BRIDGE
PAHEEHEE STREAM
ROAD
TO HILO
PACIFIC OCEAN
0 100 200 300 600
SCALE IN FEET
PAHEEHEE BRIDGE SEISMIC RETROFIT
FIGURE 2.7
CONSTRUCTION
STAGING AREAS

CHAPTER 3
DESCRIPTION OF THE AFFECTED ENVIRONMENT

The intent of this chapter is to describe the existing physical and social environment which is affected by the proposed action. Potential impacts which may result from the proposed action, and mitigative measures to be employed to minimize negative impacts, are described in **Chapter 4**.

3.1 PHYSICAL ENVIRONMENT

3.1.1 Regional Context

The Paheehee Bridge is located on the Hawaii Belt Road (Route 19) about 13 miles north of the Hilo Airport, just north of Honomu (see **Figure 1.1**). The bridge spans Paheehee Stream gulch, which traverses through the Hilo and Mauna Kea forest reserves. Mauna Kea lies about 24 miles west of the Paheehee Bridge. Paheehee Stream flows perpendicular to and under the bridge, discharging to the Pacific Ocean about 700 feet to the east.

The bridge deck is elevated about 95 feet above the stream. The base of the bridge is not readily accessible, as the stream banks are heavily forested and extremely steep.

3.1.2 Climate

Hawaii is located in the tropics, with relatively little seasonal variations. There are only two seasons: summer and winter. The prevailing winds are northeasterly trades, averaging about seven miles per hour, which are stronger in the afternoon and summer and weaker in the evenings and winter.

Average monthly temperatures recorded at Hilo Airport range from 66 to 82 degrees Fahrenheit, with an average annual temperature of 74 degrees. Extreme temperatures of 53 degrees and 94 degrees have been recorded.

The average annual rainfall recorded at the Hilo Airport gage is about 129 inches, with most of the rainfall occurring during the winter months (November to April). In the past ten years, the lowest annual rainfall was about 86 inches in 1995, and the highest annual rainfall was about 211 inches in 1990.

3.1.3 Topography and Soils

Topography

Volcanic activity has shaped the topography of the island. Where volcanic flows have not recently occurred, such as at the project site, the terrain has been eroded by rivers and streams. Wave action has formed the high sea cliffs bordered by narrow strips of land that are found along the Hamakua Coast.

The base of the Paheehee Bridge site is narrow, only as wide as Paheehee Stream. From the stream bed, the side slopes of the gulch rise steeply toward the abutments of the bridge.

Elevations along the gulch wall at the north end of the bridge range from 28 feet to approximately 110 feet above mean sea level (MSL), resulting in a slope of about 65 percent. At the south end of the bridge, elevations range from 28 to 114 feet MSL, resulting in a slope of about 104 percent.

Geology

Geologically, the island of Hawaii is the youngest island in the Hawaiian group. The island was formed by the outpouring of lava from five volcanoes: Mauna Kea, Mauna Loa, Kilauea, Hualalai, and Kohala. The project site has been formed by lava flows from Mauna Kea, resulting in a layered accumulation of olivine basalt and volcanic ash.

Soils

Soil type and classification of the area are reported in *Soil Survey of Island of Hawaii, State of Hawaii* compiled by the U.S. Department of Agriculture Soil Conservation Service (1973). The project site soils are of the Hilo and Rough Broken Land Series.

The Hilo Series soils at the site are Hilo silty clay loam, zero to 10 percent slopes (HoC), and Hilo silty clay loam, 20 to 35 percent slopes (HoE). This series consists of well-drained silty clay loams located on gentle to steep slopes. Permeability is rapid, runoff is slow to medium, and the erosion hazard is slight to moderate. This soil is characterized as having low bearing capacity, high compressibility, low shear strength, high shrinkage, and a high organic matter content. These soils are located at both ends of the bridge, away from the gulch walls.

The Rough Broken Land (RB) soil is a miscellaneous land type that consists of very steep land broken by many intermittent drainage channels. It occurs primarily in gulches, where the slope is predominantly 35 to 70 percent. The soil material ranges from very shallow to deep, and stone and rock outcrops are common is some areas. This type of soil is located within the gulch.

3.1.4 Paheehee Stream

Paheehee Stream flows toward the east to the Hamakua coast from the slopes of Mauna Kea. The headwater is located about six miles up the slope of Mauna Kea at an elevation of about

2,300 feet MSL. The stream slope averages about seven percent. Paheehee Stream discharges into the Pacific Ocean about 700 feet east of the bridge.

Water quality within Paheehee Stream is considered very good, as reported by AECOS, Inc. (see **Appendix B**). Nutrient concentrations are not as low as those found in nearby Kolekole Stream, but are still low compared to other Hamakua Coast streams. Turbidity, conductivity, and total suspended solids (TSS) values were generally good and within the acceptable range established for stream water quality by the State Department of Health.

AECOS, Inc. also measured concentrations of lead (Pb) in the stream to assess if suspected lead paint on the bridge was impacting the stream water quality. Lead was *not* detected in the water sample collected upstream of the bridge (State Route 220 to Akaka Falls), and barely detected at two stations downstream of the bridge structure on the old highway and the Hawaii Belt Road. The source of lead in the stream samples could be from the bridge (paint) or emissions from automobile traffic on the Hawaii Belt Road.

3.1.5 Flood and Tsunami Hazards

The Federal Emergency Management Agency Flood Insurance Rate Map (FIRM), Map Index and Street Index, in the vicinity of the project site is illustrated on **Figure 3.1**. According to the FIRM, the Paheehee Bridge is located in a "minimal tsunami inundation" area. The Paheehee Bridge is adjacent to a region designated as flood hazard Zone X, an area determined to be outside the 500-year flood plain.

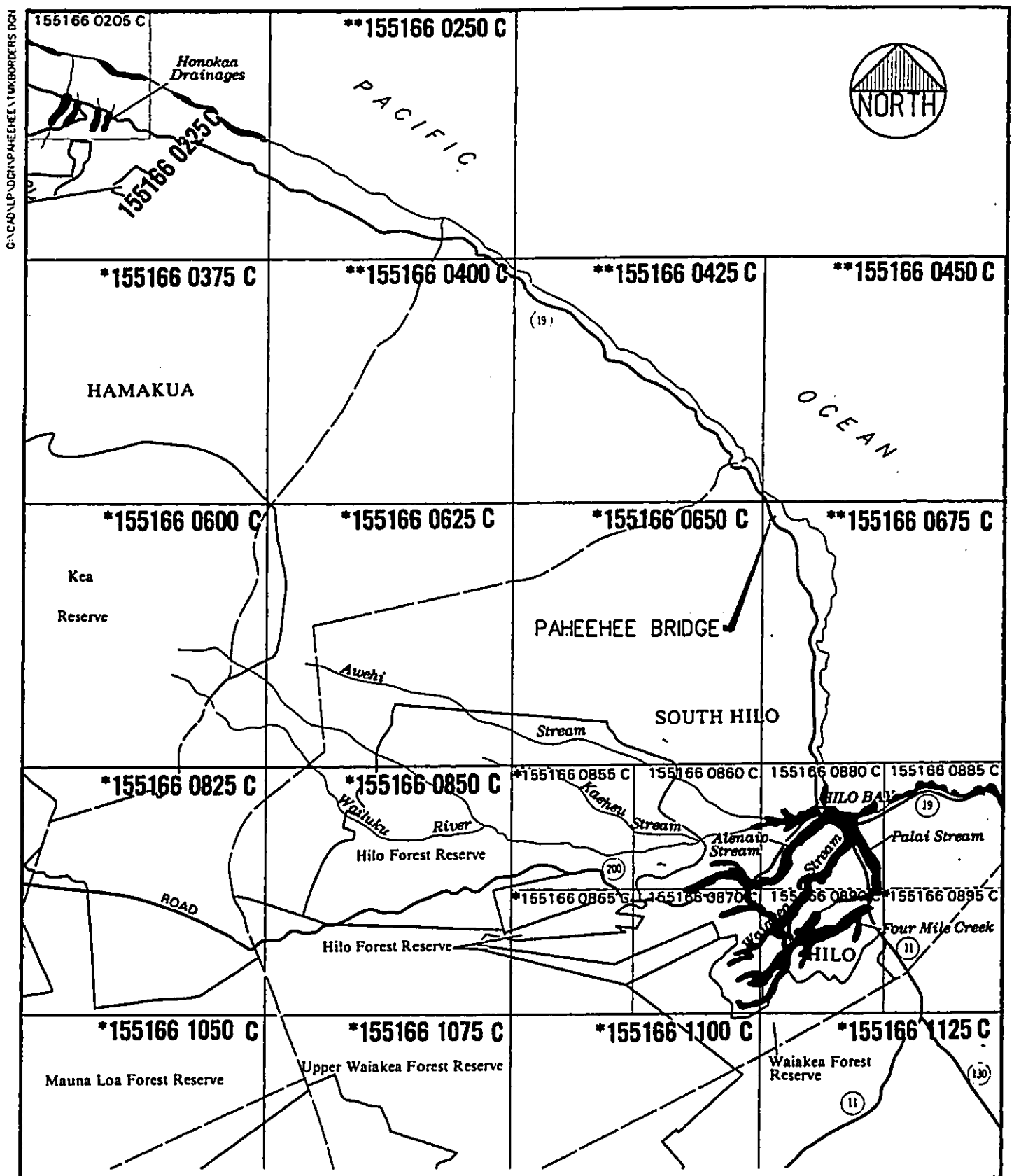
Based on the GTE (Hawaii, June 1996-1997) Civil Defense Tsunami Evacuation Map, the Paheehee Bridge is not in a tsunami evacuation area.

A tsunami runup map (Atlas of Hawaii, 1998) is illustrated on **Figure 3.2**. Runup is defined as the "sloshing" action of the wave (Atlas of Hawaii, 1998). The 1946 tsunami that originated from the Aleutian Islands resulted in a tsunami runup of 37 feet above the mean lower low water datum at the coast. Later tsunamis resulted in runup of 11 feet (from the Aleutians, 1957), 12 feet (from Chile, 1960), and three feet (from Alaska, 1964).

3.1.6 Flora

A botanical survey was conducted by Char & Associates in December 1998. See **Appendix C** for the complete report.

The area under and abutting the bridge contains a variety of introduced species. There are numerous African tulip trees (*Spathodea campanulata*), especially mauka of the bridge. Other trees include the king or Alexandra palm (*Archontophoenix alexandrae*), mango (*Mangifera indica*), bingabing (*Macaranga mappa*), rose apple (*Syzygium jambos*), avocado (*Persea americana*), *Melochia umbellata*, gunpowder tree (*Trema orientalis*), and albizia (*Paraserianthes falcataria*).



* PANEL NOT PRINTED-AREA IN ZONE X
** PANEL NOT PRINTED-MINIMAL TSUNAMI INUNDATION

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 3.1

FEMA
FLOOD INSURANCE RATE MAP
(FIRM)

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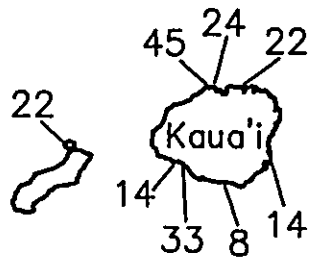
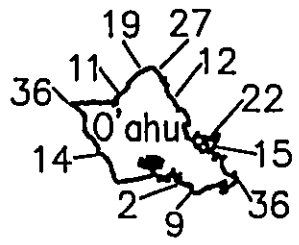
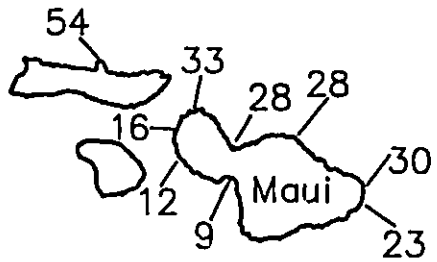
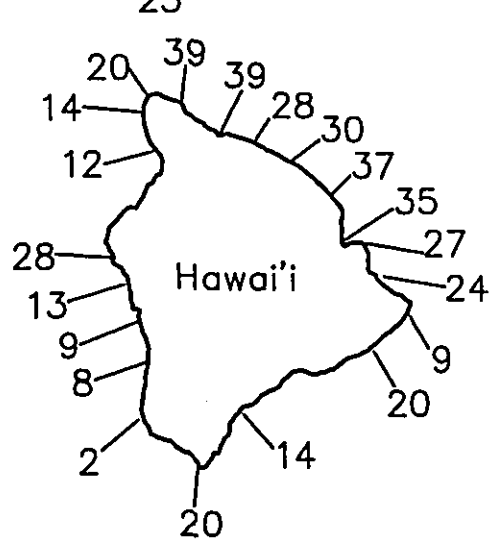
1946 TSUNAMI WAVE RUNUPS IN HAWAI'I









LEGEND:

9 RUNUP HEIGHT (FEET) FOR APRIL 1, 1946 TSUNAMI

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 3.2

1946 TSUNAMI RUNUP HEIGHTS MAP

Two native trees identified are the neleau or neneleau (*Rhus sandwicensis*) and hala (*Pandanus tectorius*). Shrubs of guava (*Psidium guajava*), strawberry guava (*Psidium cattleianum*), and a *Heliconia* species are also common.

On the slopes under the bridge, the growth tends to be less dense and the soil drier. Ground cover consists of scattered mats of swordfern (*Nephrolepis multiflora*), Spanish clover (*Desmodium incanum*), basketgrass (*Oplismenus hirtellus*), molasses grass (*Melinus minutiflora*), and young plants of the tree and shrub species. There are also patches of barren, dry soil under the bridge.

The gulch slopes mauka and makai of the bridge are very steep and consist of groves of bamboo (*Bambusa* ?) and banana (*Musa X paradisiaca*), in addition to those plants mentioned above. There are also patches of species ordinarily found in cultivated situations. These include sanchezia (*Sanchezia speciosa*), pagoda flower (*Clerodendrum burcanani*), torch ginger (*Nicolai elatior*), and painted copperleaf (*Acalypha wilkesiana*). There is also *Heliconia* along the lower slopes.

The bottom of the gulch and lower slopes are heavily shaded, so patches of more shade-tolerant species are found there. These include Hilo grass, maile hohono (*Ageratum houstonianum*), yellow ginger (*Hedychium flavescens*), shampoo ginger (*Zingiber zerumbet*), basketgrass (*Oplismenus hirtellus*), palm grass (*Setaria palmifolia*), maiden hair fern (*Adiantum raddianum*), blechnum fern (*Blechnum occidentale*), impatiens (*Impatiens walleriana*), and false heather (*Cuphea hyssopifolia*).

The vegetation on the project site is dominated by introduced plants, some of which are ornamental species which have spread into the gulch from nearby homes. None of the plants found during the survey is a threatened or endangered plant; nor is any a species of concern (U.S. Fish and Wildlife Service 1997). All of the plants can be found in similar environmental habitats throughout the islands. Four native species were found during the field studies, two of which are indigenous. These are: hala and lepelepe-a-moa (*Seleginella arbuscula*). Two species, the neleau and hapu'u or tree fern (*Cibotium glaucum*), are endemic.

3.1.7 Fauna

A terrestrial and vertebrate species survey was conducted by Rana Productions, Ltd. in November 1998. See **Appendix D** for the complete report.

Mammals

During the field survey, no mammalian species were detected. It is likely that there is incidental usage of the area by Hawaiian hoary bats (*Lasiurus cinereus semotus*) or 'Ope'ape'a. It is also likely that there is usage of the area by most of the established alien mammalian species known from the Hilo area including: the small Indian mongoose (*Herpestes a. auropunctatus*); dog (*Canis f. familiaris*); cat (*Felis catus*); pig (*Sus s. scrofa*); four species of muridae, the house

mouse (*Mus musculus*); as well as three species of naturalized rats found on Hawaii-- roof (*Rattus rattus*), Norway (*Rattus norvegicus*), and Polynesian (*Rattus exulans hawaiiensis*). All of the introduced mammalian species present on the island are deleterious to both the native habitats and species.

Birds

A total of ten bird species representing seven separate families were detected during the survey (see **Table 3.1**). All avian species recorded are considered to be alien. No avian species listed as proposed, threatened or endangered by either the US Fish and Wildlife Service or the State of Hawaii Department of Land and Natural Resources were recorded during the survey.

Three endemic bird species could potentially be impacted by construction activity. These are the threatened Newell's Shearwater (*Puffinus newelli*), the endangered Dark-rumped Petrel (*Pterodroma phaeopygia sandwichensis*), and the endangered Hawaiian Hawk (*Buteo solitarius*). The Newell's Shearwater and the Dark-rumped Petrel are seabirds which return to their nesting colonies on the upper slopes of Mauna Loa and Mauna Kea during twilight and night time hours between April and October. Both species may overfly the bridge on their way to and from their nesting colonies.

Aquatic Biota

Aquatic biota were reported by AECOS, Inc. (see **Appendix B**). There is a large pool, between three to six feet deep, beneath the Paheehee Bridge. During the field survey, large numbers of Pacific prawn (*Macrobrachium lar*) and o'opu nakea (*Awaous stamineus*) were present. Downstream of the large pool, there was an abundance of juvenile prawn. Blue-green alga (*Phormidium* sp.) was also common. None of the native aquatic species is listed as a threatened or endangered species.

3.1.8 Archaeological and Historic Resources

A field survey was conducted in October and November of 1998 by Cultural Surveys Hawaii. See **Appendix E** for the complete report. The survey consisted of a 100 percent ground survey of all accessible areas underneath and surrounding the bridge. Portions of the slopes on both sides of the bridge were inaccessible to pedestrian traffic due to steepness. Photographic documentation of the bridge and surrounding area was also conducted. The survey was conducted to determine the presence or absence of cultural remains that could possibly be impacted by the proposed project.

The areas surveyed at the top of the gulch have been completely altered either by construction of the current bridge or from the cultivation of sugar cane. The sides of the gulch within the project area also seem to have been impacted in the construction of the current bridge. No archaeological sites were found.

On the floor of the gulch beneath the bridge, the stream bed covers about 60 percent of the flood plain surface. No archaeological sites were found.

TABLE 3.1
AVIAN SPECIES DETECTED DURING THE FAUNAL SURVEY

COMMON NAME	SCIENTIFIC NAME
PIGEONS & DOVES - Columbidae	
Rock Dove	*Columba livia*
Spotted Dove	*Streptopeia chinensis*
Zebra Dove	*Geopelia striata*
STARLINGS - Sturnidae	
Common Myna	*Acridotheres tristis*
SILVEREYES - Zosteropidae	
Japanese White-Eye	*Zosterops japonica*
BABBLERS - Timaliidae	
Melodius Laughing Thrush	*Garulax canorus*
Red-billed Leiothrix	*Leiothrix lutea*
WAXBILLS & ALLIES - Estrilididae	
Nutmeg Manikin (Scaly-breasted Munia)	*Lonchura punctulata topela*
FRINGILLIDS - Fringillidae	
House Finch	*Carpodacus mexicanus mexicanus*
EMBERIZIDS - Emberizadae	
Northern Cardinal	*Cardinalis cardinalis*

Reference: Rana Productions, Ltd., November 1998

Remnants of commercial sugar cane infrastructure (i.e. a possible mill and various land alterations) were noted makai and to the east of the project area. These sites will not be affected by the proposed seismic retrofit work.

The State Historic Preservation Division has stated that Paheehee Bridge itself is a historic resource.

3.1.9 Air Quality

There is no known air quality data in the immediate area. The State Department of Health reduced its neighbor island air quality monitoring network in 1985. Consequently, there has been no permanent air monitoring of regulated pollutants in East or West Hawaii after 1985. The latest available data from stations in Hilo and Honokaa indicate that total suspended particulate matter and sulfur dioxide standards in the area are below the standards established by the State Department of Health.

An air quality study was conducted by J.W. Morrow in August 1994 for the Kealakaha Stream Bridge, about 17 miles north of the Paheehee Bridge. Results from the Morrow study are presented due to the similarities between the Kealakaha and Paheehee bridges. Both are located on the east side of the island exposed to the northeasterly tradewinds and located in a rural area.

The investigator concluded that air quality probably continues to be good most of the time based on the historical monitoring data (1972-1985) and given the rural, undeveloped nature of the project site. The results of the modeling suggest that current carbon monoxide levels are well below the federal and state standards and there should only be a slight increase in the future.

3.1.10 Noise

The Paheehee Bridge, on the Hawaii Belt Road immediately north of Honomu, is situated in a rural environment. Existing ambient noise consists of local and distant traffic and background sources including birds, dogs, wind and foliage, and the ocean.

3.1.11 Visual Resources

The Paheehee Bridge spans the width of the Paheehee Stream gulch with a length of more than 250 feet, and consists of two abutments and four bents. The bents are of steel frame construction sitting on reinforced concrete footings. Steel girders sit atop the bents and support the roadway. The longest span between bents is about 66 feet, and the shortest about 33 feet. None of the bents actually contact the stream.

The bridge is 39 feet 8 inches wide, with a pavement width of about 24 feet. The deck contains a gutter and sidewalk on each side of the travel way, with a guardrail bordering the sidewalk.

The Paheehee Gulch is not listed in the Hawaii County General Plan as a site of natural beauty.

3.2 SOCIOECONOMIC ENVIRONMENT

3.2.1 State and County Land Use Designation

The Paheehee Bridge is located within state land use Conservation, Agricultural, and Urban districts (**Figure 3.3**). According to Hawaii County Planning Department maps, a portion of the Paheehee Bridge is also within the state Special Management Area (see **Figure 3.4**). According to the Hawaii County Planning Department, the project site is zoned A-20a (Agricultural) and RS-7.5 (Single Family Residential). The corresponding Hawaii County General Plan Land Use Designations are Intensive/Extensive Agricultural and Low Density, respectively. The proposed project is pursuant to and consistent with the Hawaii County Zoning Code requirements and the Hawaii County General Plan's Important Agricultural Lands land use concept.

3.2.2 Population and Economy

The Paheehee Bridge is located about 13 miles north of Hilo, the population center of the island of Hawaii. In 1990, Hilo had a population of about 38,000, while the entire island had a population of about 120,000. From 1990 to 1997, the island population had grown to about 141,000. The 1990 population of selected towns from Hilo to Honokaa was reported to be:

Town	Population
Papaikou	1,634
Honomu	532
Laupahoehoe	508
Honokaa	2,186

The local economy is influenced by tourism, commercial fishing, forestry (Ohia-Lehua, Koa), construction, the retail industry, farming (cattle, pigs, foul), and agriculture (flowers, vegetables, nuts, etc.).

3.2.3 Neighboring Lands

Neighboring land owners are listed in **Table 3.2**. Refer to **Figure 3.5** for location of these parcels in relationship to the project site.

3.3 INFRASTRUCTURE

3.3.1 Roads

The Hawaii Belt Road is a two lane divided highway that is the primary traffic artery connecting Hilo with outlying districts. The Paheehee Bridge portion of the Hawaii Belt Road (Route 19) has a pavement width of 24 feet, and spans the width of the Paheehee Stream gulch for a length of

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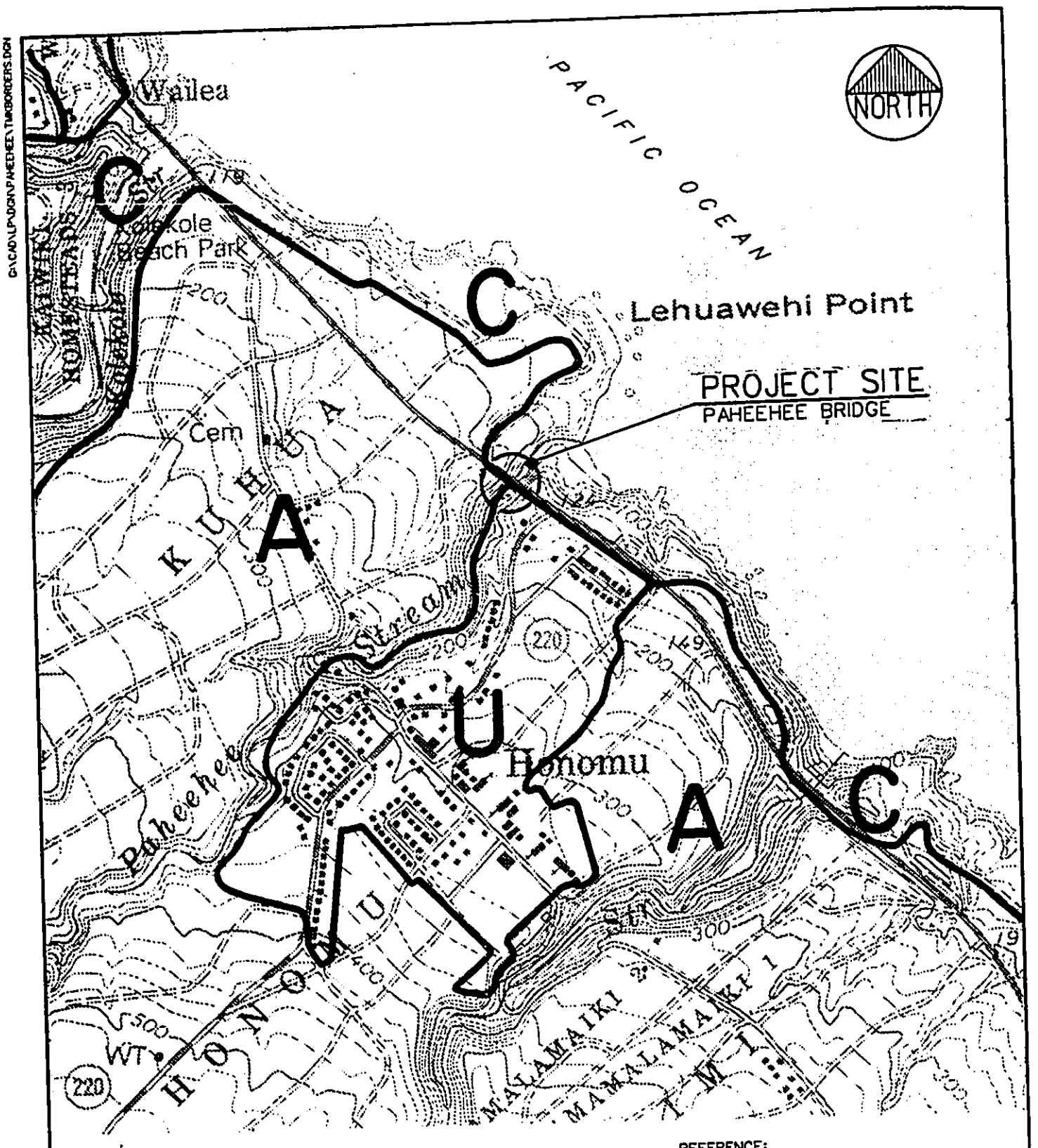

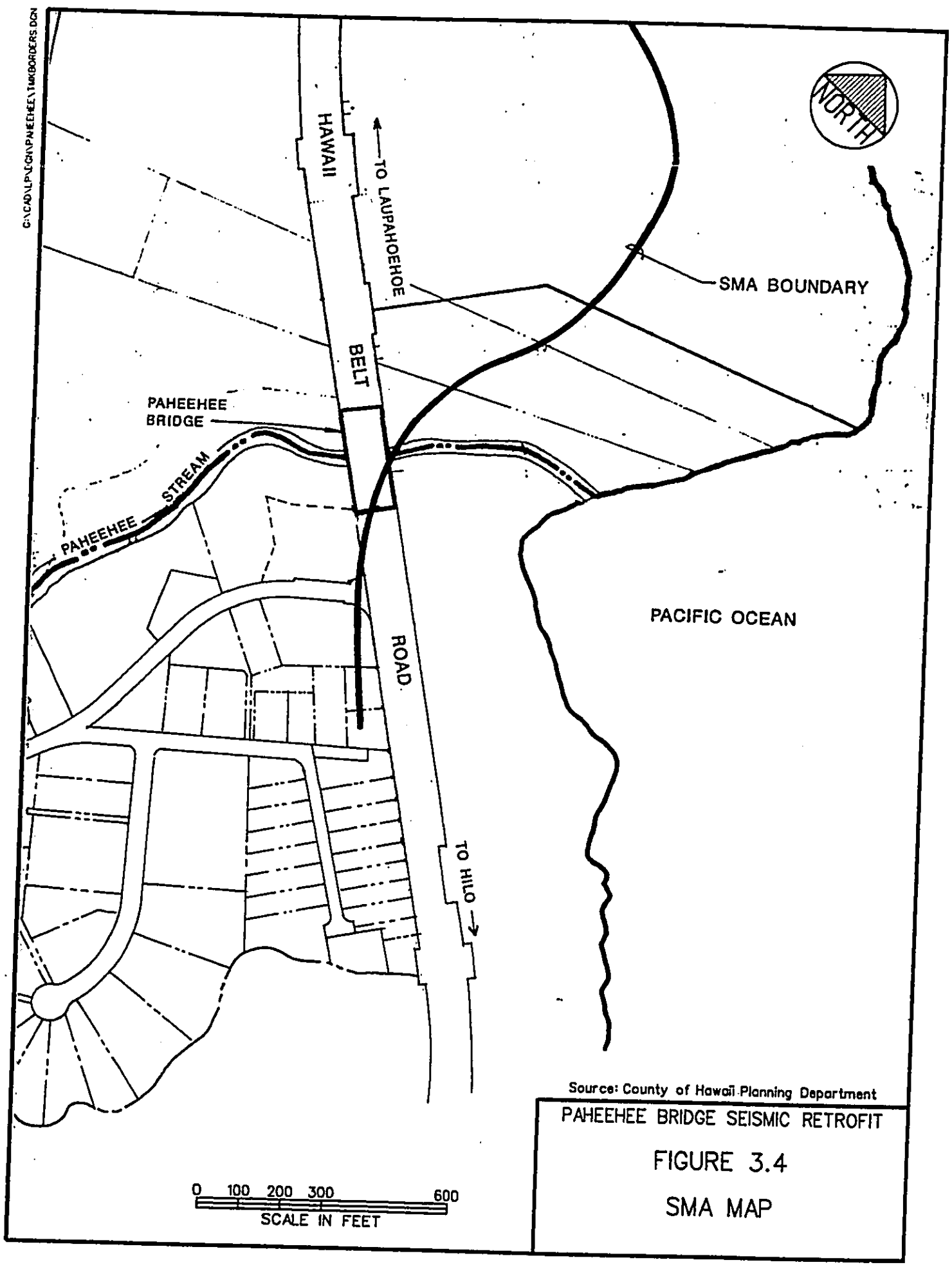

Source: County of Hawaii Planning Department

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 3.4

SMA MAP

TABLE 3.2
NEIGHBORING LAND OWNERS

TMK	LAND OWNER	PROPERTY LOCATION
2-8-15:2	Mauna Kea Agribusiness Co., Inc.	North of gulch, mauka of Hawaii Belt Road
2-8-15:19	Ranch Colony Development Corp. Magoon, Eaton Jr. and Orville lease: Hilo Coast Processing Co.	North of gulch, makai of Hawaii Belt Road
2-8-17:1	Ranch Colony Development Corp. Magoon, Eaton Jr. and Orville	South of gulch, makai of Hawaii Belt Road
2-8-17:9	Rodney Boychuk	South of gulch, mauka of Hawaii Belt Road

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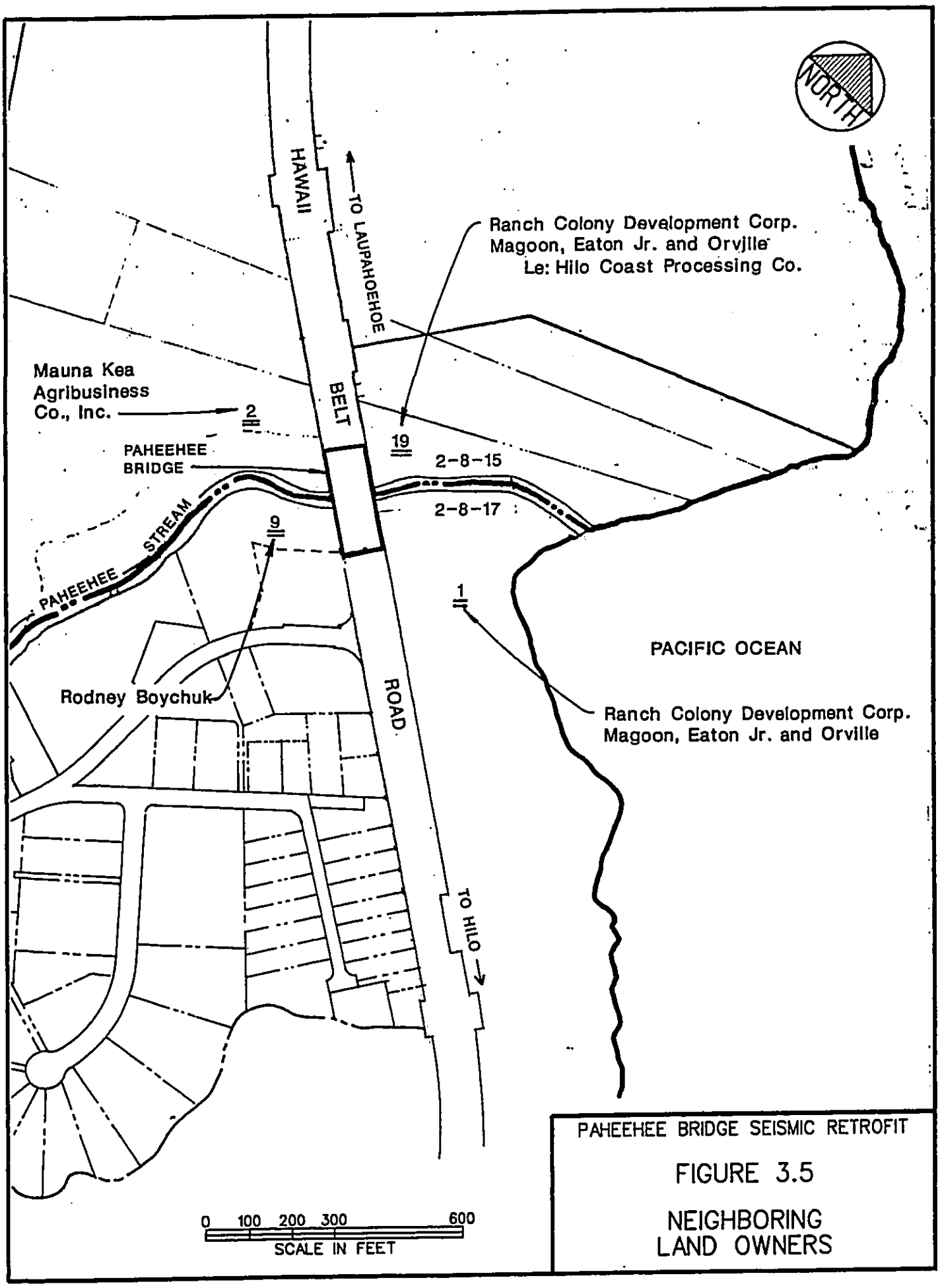


PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 3.5

NEIGHBORING
LAND OWNERS

about 250 feet (see **Figures 2.1** and **2.2**). The bridge deck is about 100 feet above the bottom of the gulch. There is no vehicular or pedestrian access to the bottom of the gulch.

3.3.2 Electrical Power, Telephone and Cable TV Service

Electrical Power
Power lines span the width of the gulch on the mauka side of the bridge. The lines are suspended from single poles at both ends, and are located near the ends of the bridge.

Telephone Service
Telephone lines span the width of the gulch on the makai side of the bridge. The lines are suspended from single poles and, like the electric poles, are located near the ends of the bridge.

Cable TV Service
Hawaiian CableVision of Hilo has a fiber optic line on the power poles located on the mauka side of the bridge. The cable sags low due to the long span between poles.

CHAPTER 4
POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

This chapter identifies the impacts attributable to the proposed project. Impacts are categorized as short-term impacts (normally of short duration and confined to the length of the construction period) and long-term impacts (resulting from operational activities).

4.1 IMPACTS ON THE PHYSICAL ENVIRONMENT

4.1.1 Regional Impacts

Short-term Impacts
Short-term impacts during the construction period will include generation of dust, air pollutant emissions, noise, vibration, and traffic disruptions from construction activities and construction vehicles.

Construction-related impacts will be mitigated by compliance with federal, state, and county laws and the contract documents. More detailed mitigation for specific impacts is described in the sections that follow.

A positive short-term impact would be the creation of jobs in construction and related fields, including suppliers of construction materials.

Long-term Impacts
A major long-term impact of the project is a safer and more earthquake-resistant bridge on Hawaii Belt Road, which is a major artery connecting Hilo with towns to the north.

4.1.2 Soil Erosion

During construction, the following practices and control measures may be employed to minimize impacts associated with soil erosion:

- Conduct grubbing and grading activities during periods with low rainfall to minimize erosion potential.
- Clear only areas essential for construction.
- Protect natural vegetation with fencing, tree armoring, retaining walls or tree wells.
- Cover or stabilize stockpiles of soil or other construction materials.

- Intercept runoff for conveyance around the construction area.
- Establish streamside buffers to protect water bodies and natural drainage systems.
- Properly dispose of sediment and debris from construction activities.
- Replant bare areas as soon as grading or construction is completed, using soil amendments, fertilizers and temporary irrigation as required to establish growth.
- Minimize transport of sediment and associated pollutants in storm runoff by installing fabric filter fences or straw bale barriers and maintaining vegetative strips.

The contractor shall comply with the requirements of Section 639, "Temporary Project Water Pollution Control (Soil Erosion)," of the *Standard Specifications for Road and Bridge Construction,* State of Hawaii.

All earthwork and grading shall be performed in conformance with Chapter 10, "Erosion and Sediment Control", of the Hawaii County Code.

4.1.3 Water Quality

If practical, construction will be scheduled during the drier months of the year in order to reduce adverse water quality impacts resulting from soil erosion and runoff. No construction activity will be conducted in the stream, and the stream bed and banks will not be altered.

According to the aquatic biota consultant, AECOS, Inc., the proposed project should have minimal short-term and no long-term impacts on the Paheehee Stream. The contractor will be responsible for removal of any construction debris which inadvertently falls into the stream.

4.1.4 Flood and Tsunami Hazards

The proposed action should not be adversely affected by flood or tsunami waters. The seat extenders are near the top of the bridge, away from the stream by more than 80 vertical feet. The footing reinforcement should not be detrimental to the bridge structure with regards to tsunami high water levels. The lowest footing elevation is about 20 feet MSL, located 700 feet inland from the Pacific Ocean. The proposed construction shall be performed in accordance with Chapter 27, "Flood Control" of the Hawaii County Code. The need for a flood study to evaluate possible effects to the stream will be coordinated with the Hawaii County Department of Public Works.

4.1.5 Flora

Disturbance and/or removal of vegetation in the gulch will be kept to a minimum. Areas cleared of vegetation will be hydromulched as soon as possible to prevent soil erosion and the discharge of sediment into Paheehee Stream.

Approximately 1,800 square feet of vegetation will need to be removed in order to access the areas in which the abutment seat extenders and concrete footing reinforcements will be installed. The following mitigation measures will be incorporated into the project to minimize impacts to botanical resources.

- All project-related materials shall be placed or stored in ways to avoid or minimize disturbance to the environment.
- All project-related materials shall be free of pollutants.
- No contamination of the aquatic environment (e.g. trash and debris disposal) shall result from project activities.
- A contingency plan to control accidental spills of petroleum products shall be developed. Absorbent pads and containment booms shall be stored onsite to facilitate cleanup of petroleum spills.
- Turbidity and siltation from excavation activities shall be minimized and contained to the immediate vicinity of excavation through the use of effective silt containment devices and the curtailment of excavation during adverse weather conditions.
- Upon completion of the project, all areas cleared for the project shall be hydromulched to cover exposed earth and to minimize soil erosion.

4.1.6 Fauna

Construction activities will not have a significant impact on native or federally protected avian or mammalian species. Although none were observed at the project site, the threatened Newell's Shearwater and the endangered Dark-rumped Petrel may fly over the bridge on the way to and from their nesting colonies. As a precautionary measure, any unshielded construction or equipment maintenance lighting will be kept to a minimum to avoid disorienting these birds. The actual need for lighting is not foreseen due to construction during daylight hours.

Upon review of the Draft EA, the US Fish and Wildlife Service stated that significant adverse impacts to fish and wildlife resources are not anticipated to result from implementation of the proposed action.

4.1.7 Archaeological and Historic Resources

The State Historic Preservation Division (SHPD) has determined that the bridge is a historic resource. However, SHPD has also determined that the proposed seismic retrofit work will not impact the historic character of the bridge. No archaeological sites were identified in the project area during the reconnaissance survey, and therefore, no significant impacts to archaeological resources are anticipated.

4.1.8 Air Quality

Air quality degradation can be expected in the immediate vicinity of construction activity and will be primarily attributable to fugitive dust and exhaust emissions from construction equipment and vehicles. To minimize air quality degradation, the contractor will be required to implement measures such as inspecting construction vehicles for exhaust emissions, and watering to retard airborne dust. Erosion control measures will be employed as soon as possible.

Dust and air pollution control will be governed by Chapter 60.1, "Air Pollution Control", of Title 11, *Hawaii Administrative Rules*, State Department of Health.

4.1.9 Noise

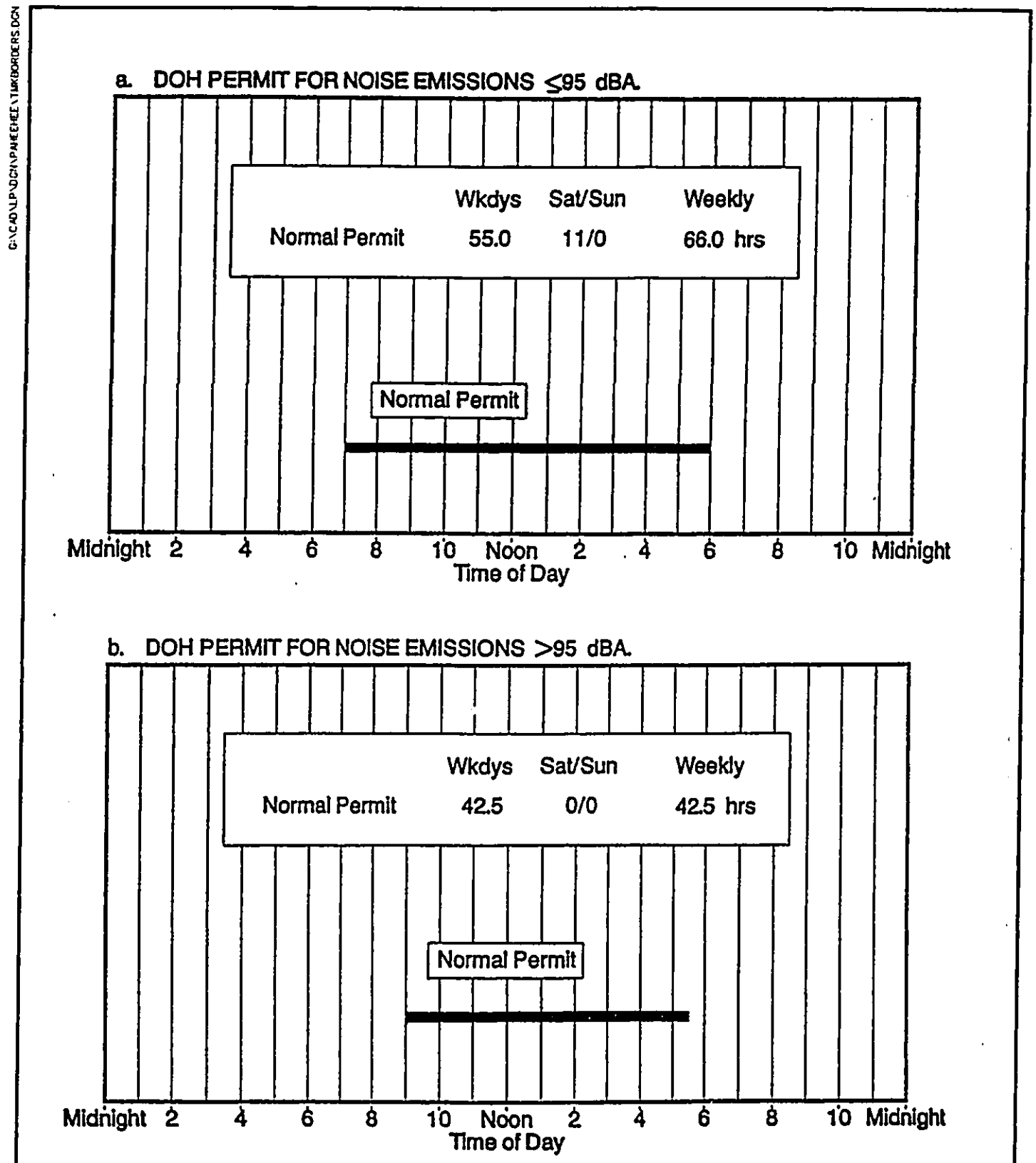
While it is not possible to mitigate noise generated by earthwork and other construction activities to inaudible levels, the contractor will be required to install mufflers on construction equipment and onsite vehicles. Allowable hours of operation for normal construction noise levels (less than or equal to 95 decibels) and for above normal construction noise levels (exceeding 95 decibels) are indicated on **Figure 4.1**. The contractor shall obtain a noise waiver if noise levels from construction activities are expected to exceed the allowable levels. Typical levels of noise from construction activities are shown on **Figure 4.2**.

Noise will be governed by the applicable Hawaii County and State Department of Health regulations, including Chapter 11-42, "Vehicular Noise Control for Oahu" and Chapter 11-46, "Community Noise Control" of Title 11, *Hawaii Administrative Rules*, State Department of Health.

With regard to long-term impacts, the alignment and design speed along Hawaii Belt Road will not change as a result of the seismic retrofit work. Therefore, the traffic noise level should not increase.

4.1.10 Traffic

During construction of the proposed action, motorists using Hawaii Belt Road in the vicinity of the site will experience traffic inconveniences. Traffic will be interrupted periodically by trucks hauling construction material to and from the site. Through traffic may also be limited to one lane on Hawaii Belt Road in the immediate vicinity of construction due to equipment staging. The



Source: Y. Ebisu & Assoc., Acoustic study for the Kealakaha Stream Bridge Replacement, August 1995

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 4.1

AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

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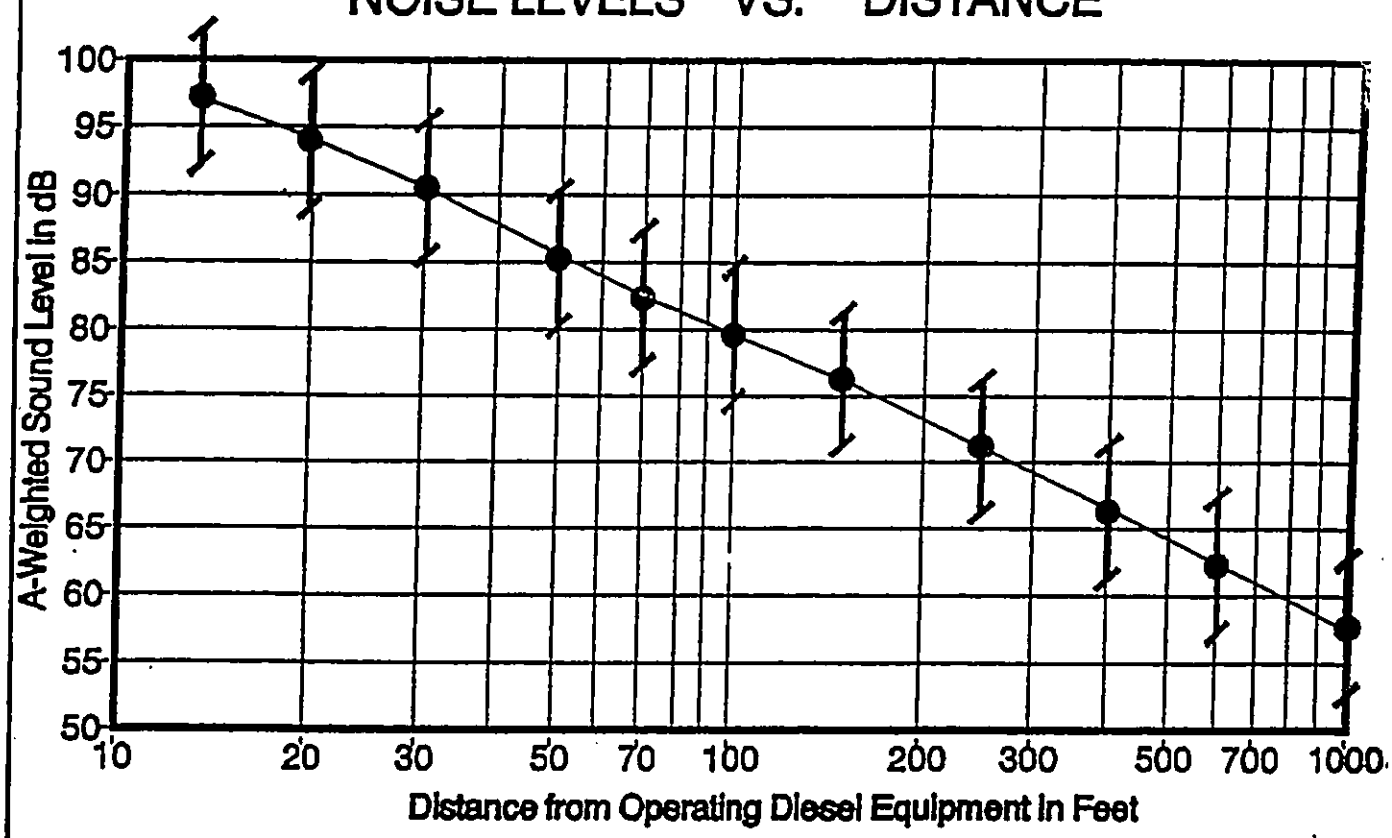
ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE



Source: Y. Ebisu & Assoc., Acoustic study for the Kealakaha Stream Bridge Replacement, August 1995

PAHEEHEE BRIDGE SEISMIC RETROFIT

FIGURE 4.2

CONSTRUCTION NOISE v. DISTANCE

contractor shall comply with Federal and State highway standards for traffic control. The contractor shall conform to the requirements of the Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets and Highways, Part VI*, "Traffic Controls for Highway Construction and Maintenance Operations" and the "Rules and Regulations Governing the Use of Traffic Control Devices at Work Sites on or Adjacent to Public Streets and Highways," of the Highway Safety Coordinator.

Other conditions that may be imposed on the contractor to minimize traffic disruptions include:

- Opening all lanes to traffic during nonworking hours.
- Hiring special duty police officers to direct the flow of traffic.
- Maintaining all accesses to and from driveways and public streets in passable condition.

4.1.11 Visual Resources

The appearance of the existing bridge will not be significantly altered. The reinforced footings, high strength bolts, and seat extenders at the abutments will not be visible from the roadway.

4.1.12 Lead Paint Removal

Removal of paint from steel girders and beams will be necessary at designated areas to prepare the steel for the retrofit work. To prevent paint from entering the environment and creating an impact, several alternatives are being considered. One alternative involves the application of a glue-like coating to the lead paint. Once the glue coating has adhered to the paint, it will be scraped off, carrying the lead paint with it. By utilizing this procedure, scraped paint will not impact the surrounding environment. The contractor will be required to coordinate lead paint removal with Dr. Robert Nishimoto at DLNR Division of Aquatic Resources in Hilo to identify specific means for averting or minimizing adverse effects and provide mitigation for unavoidable damage to natural resource values.

4.2 IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

The proposed project is not expected to have any adverse social or economic impacts. The proposed action will retrofit an existing bridge to resist earthquake forces. The retrofit work will have a positive impact on public safety. The bridge alignment, deck width, and travel lanes will not be altered and, therefore, its carrying capacity will not increase.

Temporary use of land may be required on both sides of the bridge for temporary construction staging areas to store equipment and materials. These staging areas will not be located within the

Conservation District. Should use of Conservation District lands be necessary, the contractor will be responsible for obtaining all permits and approvals.

4.3 IMPACTS ON UTILITY INFRASTRUCTURE

Currently, power lines and a cable TV fiber optic line span the width of the gulch on the mauka side of the bridge. These lines are suspended from single poles at both ends. Telephone lines span the gulch on the makai side of the bridge. These lines are suspended from single poles at both ends as well. Construction activities will avoid these utilities to mitigate any impact. In the event that these overhead lines require relocation, the affected utility company will be contacted to coordinate relocation. The contractor will be liable for any damage to utility lines due to construction operations.

CHAPTER 5
ALTERNATIVES TO THE PROPOSED ACTION

This chapter discusses alternatives against which the proposed action was evaluated. The alternatives were rejected due to their inability to meet the project objectives. Two alternatives to the proposed action were considered. Each alternative is described in the sections that follow.

5.1 NO ACTION

In the "no action" scenario, use of the existing bridge would continue, despite its structural inadequacy to resist seismic forces. Should the bridge fail during an earthquake, loss of life or injury may result. If the bridge is deemed unsafe after a seismic event, the only direct ground transportation link between Hilo and communities to the north would be severed. This would prevent, or severely restrict, the transportation of goods and emergency services to those communities.

This alternative is not acceptable because of the potential impacts to public safety and welfare.

5.2 SCHEME TO ADD ANCHOR BOLTS TO THE BASE PLATE

This alternative was not feasible due to the lack of space at the base plates to accommodate additional anchor bolts.

CHAPTER 6
FINDINGS AND DETERMINATION

6.1 DETERMINATION

The State of Hawaii Department of Transportation has concluded that the proposed project does not have the potential to generate significant environmental impacts, and the need to prepare an environmental impact statement is not evident. This Final Environmental Assessment is submitted with a Finding of No Significant Impact (FONSI) determination.

6.2 FINDINGS AND REASONS SUPPORTING DETERMINATION

The overall and cumulative effects of the proposed action were evaluated with respect to Hawaii Administrative Rules (HAR) Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 11-200-12 "Significant Criteria". The following findings and conclusions can be made in support of the FONSI determination.

(1) *The proposed action will not involve an irrevocable commitment to loss or destruction of any natural or cultural resource.*

The State Historic Preservation Division (SHPD) identifies the Paheehee Bridge as Category I in the latest draft historic bridge inventory. While SHPD states that the bridge is a historic resource, they also conclude that installation of concrete seat extenders and enlargement of the footing pedestals will have "no effect" on the historic character of the bridge (see **Appendix A**).

(2) *The proposed action will not curtail the range of beneficial uses of the environment.*

The proposed action will strengthen the existing Paheehee Bridge against earthquake forces. This work will take place beneath the abutments and within the bridge structure itself. The bridge deck will not be altered, and there will be no permanent encroachment upon previously undeveloped areas.

(3) *The proposed action will not conflict with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*

Development of the proposed action will comply with the environmental policies, goals and guidelines expressed in Chapter 344, HRS.

(4) *The proposed action will not have a substantial negative effect on the economic or social welfare of the community or state.*

The proposed project is not expected to have any adverse social or economic impacts. Rather, seismic retrofit of the existing bridge which is presently inadequate to resist earthquake forces will have a positive impact on social welfare and public safety. The bridge alignment, deck width, and travel lanes will not be altered, and therefore, its carrying capacity will not increase.

(5) *The proposed action will not have a substantial negative effect on public health.*

Construction activities may result in temporary generation of noise and dust. However, these impacts will subside upon completion of construction and there should be no long term effect on public health.

(6) *The proposed action will not involve substantial secondary impacts, such as population changes or effects on public facilities.*

The proposed action will not have a significant effect on population. The bridge will have a positive impact on transportation facilities with regard to public welfare and safety.

(7) *The proposed action does not involve substantial degradation of environmental quality.*

There are no long-term impacts anticipated. Construction activities will primarily be contained within and on the bridge structure itself. Limited removal of vegetation will be required around the footings and abutments. Erosion control measures will be employed to minimize impacts to the stream.

(8) *The proposed action will not have a considerable cumulative effect upon the environment or involve a commitment for larger actions.*

The proposed action is directed at mitigating a potential public safety issue. Specifically, the proposed action is to retrofit an existing bridge deemed inadequate to resist earthquake forces. The bridge alignment and width will not be altered.

(9) *The proposed action will not substantially affect a rare, threatened, or endangered species or its habitat.*

According to the botanical consultant, Char & Associates, the proposed seismic retrofit work is not expected to have a significant negative impact on the botanical resources. None of the plants found during the field survey is a threatened or endangered species; nor is any plant a species of concern.

According to the faunal consultant, Rana Productions Ltd., the construction activity conducted on the bridge structure will not have a significant impact on native or federally protected avian or mammalian species. During the field survey, no avian species listed as proposed, threatened or endangered by either the US Fish and Wildlife Service or the State of Hawaii Department of Land and Natural Resources were recorded.

According to the aquatic biota consultant, AECOS, Inc., the project should have minimal short-term and no long-term impacts on the Paheehee Stream. While the aquatic environment in the project area supports several native species, none are listed as threatened or endangered.

(10) *The proposed action will not detrimentally affect air or water quality or ambient noise levels.*

Air quality and ambient noise levels may be temporarily impacted during construction activities. However, these impacts will terminate upon completion of construction.

The project should have minimal short-term and no long-term impacts on the Paheehee Stream.

(11) *The proposed action will not affect, nor is it 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 water.*

The project site is located about 700 feet inland from the shoreline, where the Paheehee Stream discharges to the Pacific Ocean. None of the seismic retrofit work will take place in or impact the stream or ocean. During a site visit in September 1998, the water level was below the lowest footing (Bent No. 2). The site is not located in a tsunami evacuation area.

(12) *The proposed action will not substantially affect scenic vistas or viewplanes identified in county or state plans or studies.*

The appearance of the existing bridge will not be significantly altered. The proposed addition of reinforced footings, high strength bolts, and seat extenders at the abutments is considered minor and barely discernible to most observers. Furthermore, the reinforced footings, high strength bolts, and seat extenders at the abutments will not be visible from the roadway or the ocean.

(13) *The proposed action will not require substantial energy consumption.*

No substantial changes in energy consumption are anticipated.

CHAPTER 7
CONSULTATION

7.1 LIST OF PREPARERS

This Final Environmental Assessment (EA) was prepared for the State of Hawaii Department of Transportation (DOT) by Engineering Concepts, Inc. The following organizations were also involved in the preparation of this document.

Organization	Area of Expertise
AECOS, Inc.	Water Quality and Aquatic Biota
Rana Productions, Ltd.	Fauna
Char & Associates	Botanical Resources
Cultural Surveys Hawaii	Archaeology, Cultural/Historical Significance
Geolabs Hawaii	Geotechnical Engineer
KSF, Inc.	Structural Engineer

7.2 PARTIES CONSULTED DURING PREPARATION OF THE DRAFT EA

The following agencies were contacted for pre-assessment consultation during the preparation of the Draft EA.

7.2.1 State Government

Department of Land and Natural Resources:
- State Historic Preservation Division
- Land Division

7.2.2 County of Hawaii

Planning Department

7.3 PARTIES CONSULTED DURING PREPARATION OF THE FINAL EA

Thirty five (35) copies of the Draft EA were mailed to agencies, organizations and other interested parties. A complete listing of these consulted parties is included in **Sections 7.3.1** through **7.3.5**.

Availability of the Draft EA was published in the April 23, 1999 edition of *The Environmental Notice* by the Office of Environmental Quality Control. A total of nine comment letters and one telephone call were received as of June 10, 1999 (the public review period ended on May 24, 1999). Agencies, organizations and interested parties responding to the request for comments are marked with an asterisk (*) on the lists which follow. Those parties responding with "no comments" are marked with a plus (+).

7.3.1 Federal Government

* U.S. Army Corps of Engineers
* U.S. Fish and Wildlife Service

7.3.2 State Government

State Legislature:
Senator Lorraine Inouye, District 1
Representative Dwight Takamine, District 1
Department of Business, Economic Development and Tourism:
\+ Land Use Commission
\+ Office of Planning
Energy, Resources and Technology Division
* Department of Health, Environmental Planning Office
* Department of Land and Natural Resources:
* State Historic Preservation Division
Commission on Water Resource Management
Land Division
Office of Environmental Quality Control

7.3.3 County of Hawaii

Council Member Dominic Yagong
* Planning Department
Department of Parks and Recreation
* Department of Public Works
Department of Water Supply

7.3.4 Other Interested Parties

Office of Hawaiian Affairs
American Lung Association
Mauna Kea Agribusiness Co., Inc.
Ranch Colony Development Corp.
Magoon, Eaton Jr. and Orville
Hilo Coast Processing Co.

Rodney Boychuk
Hawaii Electric Light Company, Inc.
GTE Hawaiian Telephone Company
Oceanic Cablevision
* Hawaiian CableVision of Hilo

7.3.5 Libraries

Hawaii State Library
University of Hawaii, Hilo
Hilo Public Library
Laupahoehoe Public and School Library

7.4 COMMENTS ON THE DRAFT EA

Comment letters received during public review of the Draft EA and responses prepared by the applicant have been included in **Appendix A**.

REFERENCES

Hawaii County, Land Use Pattern Allocation Guide Map, *County of Hawaii General Plan*, November 1989.

Hawaii County, Facilities Map, *County of Hawaii General Plan*, November 1989.

Hawaii County, *County of Hawaii General Plan*, November 1989.

Hawaii State, Department of Health, *Hawaii Administrative Rules*, "Chapter 42: Vehicular Noise Control for Oahu", October 24, 1981.

Hawaii State, Department of Health, *Hawaii Administrative Rules*, "Chapter 46: Community Noise Control", September 23, 1996.

Hawaii State, Department of Health, *Hawaii Administrative Rules*, "Chapter 60.1: Air Pollution Control", October 29, 1993.

Hawaii State, Department of Health, *Hawaii Administrative Rules*, "Chapter 200: Environmental Impact Statement Rules", August 20, 1996.

Morrow, J.W., Environmental Management Consultant, *Air Quality Impact Report (AQIR), Kealakaha Stream Bridge Replacement*, August 1994.

U.S. Dept. of Agriculture Soil Conservation Service, *Soil Survey of Island of Hawaii, State of Hawaii*, December 1973.

U.S. Federal Emergency Management Agency, National Flood Insurance Program, "Flood Insurance Rate Map, Hawaii County, Hawaii", July 16, 1990.

University of Hawaii, Dept. of Geography, *Atlas of Hawaii, third edition*, 1998.

Appendix A

CORRESPONDENCE

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

May 20, 1999

RECEIVED
MAY 24 1999
ENGINEERING CONCEPTS

Civil Works Technical Branch

Mr. Emilio Barroga, Jr.
Department of Transportation
State of Hawaii
601 Kamokila Boulevard, Room 688
Kapolei, Hawaii 96707

Dear Mr. Barroga:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the Paheehee Bridge Seismic Retrofit, South Hilo, Hawaii (TMKs 2-8-15: 2, 19 and 2-8-17: 1, 9). The following comments are provided in accordance with U.S. Army Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. As noted in our previous letter dated February 5, 1999 (enclosed), a DA permit will not be required for the project.

b. The flood hazard information provided on page 3-2 of the DEA is correct.

Sincerely,

Paul Hizue, P.E.
Acting Chief, Civil Works
Technical Branch

Enclosure

Copy Furnished:

Mr. Kenneth Ishizaki
Engineering Concepts
250 Ward Avenue, Suite 206
Honolulu, Hawaii 96814

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

February 5, 1999

Operations Branch

Mr. Kenneth T. Ishizaki, P.E.
Engineering Concepts, Inc.
250 Ward Avenue, Suite 206
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

This letter responds to your request for a determination concerning Department of the Army (DA) permit requirements for the Paheehee Bridge seismic retrofit, Pepe'ekeo, Hawaii. Based on the information provided in the draft environmental assessment for the project, I have determined that a DA permit will not be required.

If you have any questions concerning this determination, please contact Mr. Peter Galloway of my staff at 438-9258, extension 15, and refer to File No. 990000144.

Sincerely,

George P. Young, P.E.
Chief, Operations Branch

ENCL

BENJAMIN J. CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 686A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 626
TECHNICAL DESIGN SERVICE, 686

RIGHT-OF-WAY BRANCH, ROOM 691

TRAFFIC BRANCH, ROOM 602

MOTOR VEHICLE SAFETY OFFICE, ROOM 511

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
BRIAN K. MINAAI

IN REPLY REFER TO:

HWY-DS
2.4208

June 22, 1999

Mr. Paul Mizue, P.E., Acting Chief
Civil Works Technical Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Dear Mr. Mizue:

Subject: Draft Environmental Assessment (EA) for Paheehee Bridge Seismic Retrofit of Various Bridges, Vicinity of Pepeekeo
Federal-Aid Project No. BR-0100(57)
District of South Hilo, Island of Hawaii
Adjacent to TMK 2-8-15:2, 19 and 2-8-17:1, 9

Thank you for your letter dated May 20, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and acknowledge your confirmation that a Department of the Army permit will not be required for the project and that the flood hazard information provided in the Draft EA is correct.

A copy of your letter and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Highways Division, or contact him at 692-7546.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

c: Kenneth Ishizaki - Engineering Concepts, Inc. ✓
Les Segundo - Office of Environmental Quality Control

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Ecoregion
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

RECEIVED
JUN 10 1999
ENGINEERING CONCEPTS

In Reply Refer To: MSR

JUN - 3 1999

Mr. Emilio Barroga, Jr.
Department of Transportation
State of Hawaii
601 Kamokila Blvd., Rm. 668
Kapolei, HI 96707

Re: Draft Environmental Assessment for Paheehee Bridge Seismic Retrofit, Hawaii Island, Hawaii

Dear Mr. Barroga:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment for Paheehee Bridge Seismic Retrofit, Hawaii Island, Hawaii (DEA). The project sponsor is the Hawaii State Department of Transportation (HDOT). The applicant proposes to retrofit the existing Paheehee Bridge to comply with the American Association of State Highway and Transportation Officials specifications for highway bridges. Specifically, the project will involve encasing the bridge footings in concrete and installing seat extenders and cable restrainers. The Service offers the following comments for your consideration.

The Service believes the DEA adequately describes the scope of the proposed project and identifies the significant fish and wildlife resources in the proposed project area. The DEA also identifies reasonable alternatives to the preferred action, and we believe that the least environmentally damaging, practicable alternative has been selected as the preferred action. The DEA adequately assesses the impacts anticipated to result from all actions under consideration and includes effective measures to avoid or minimize those impacts that are considered adverse to fish and wildlife resources.

Based on the information contained in the DEA, the Service does not anticipate significant adverse impacts to fish and wildlife resources to result from implementation of the preferred action. Accordingly, the Service would concur with a Finding of No Significant Impact (FONSI) determination for the proposed project.

Finally, we would like to point out an area of informational inconsistency in the DEA. On page 1-3, in section 1.6.4, it is stated that "1,600 square feet" of vegetation would be removed from around the bridge abutments and footings. On page 4-2, in section 4.1.5, it is stated that the amount of proposed vegetation removal is "1,800 square feet." This inconsistency should be rectified in the Final Environmental Assessment.

The Service appreciates the opportunity to comment on the DEA. If you have any questions regarding these comments, please contact Fish and Wildlife Biologist Mike Richardson by telephone at (808) 541-3441 or by facsimile transmission at (808) 541-3470.

Sincerely,

Robert P. Smith

Robert P. Smith
Pacific Islands Manager

cc: DOFAW, Hawaii
DOFAW, Honolulu
OEQC, Honolulu
Engineering Concepts, Inc.

BENJAMIN J CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SERVICE, 688

RIGHT-OF-WAY BRANCH, ROOM 691

TRAFFIC BRANCH, ROOM 608

MOTOR VEHICLE SAFETY OFFICE, ROOM 511

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

June 22, 1999

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
BRIAN H. MINAAI

IN REPLY REFER TO:

HWY-DS
2.4213

Mr. Robert P. Smith, Pacific Islands Manager
Pacific Islands Ecoregion
Fish and Wildlife Service
U.S. Department of Interior
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

Dear Mr. Smith:

Subject: Draft Environmental Assessment (EA) for Paheehee Bridge
Seismic Retrofit of Various Bridges, Vicinity of Pepeekeo
Federal-Aid Project No. BR-0100(57)
District of South Hilo, Island of Hawaii
Adjacent to TMK 2-8-15:2, 19 and 2-8-17:1, 9

Thank you for your letter dated June 3, 1999 (ref. MSR) regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and offer the following response to your comments:

(1) We acknowledge your comment that significant adverse impacts to fish and wildlife resources are not anticipated to result from implementation of the preferred action, and that the Service would concur with a Finding of No Significant Impact determination for the proposed project.

(2) The final EA will consistently state that the construction activity will require removal of approximately 1,800 square feet of vegetation from around the bridge abutments and footings.

A copy of your letter and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Highways Division, or contact him at 692-7546.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

c: Kenneth Ishizaki - Engineering Concepts, Inc.
Les Segundo - Office of Environmental Quality Control

BENJAMIN J. CAYETANO
GOVERNOR

RECEIVED
MAY 3 1999
ENGINEERING CONCEPTS

ESTHER UEDA
EXECUTIVE OFFICER

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

April 29, 1999

Mr. Emilio Barroga, Jr.
Department of Transportation
State of Hawaii
601 Kamokila Boulevard, Room 688
Kapolei, Hawaii 96707

Dear Mr. Barroga:

Subject: Draft Environmental Assessment (DEA) for Paheehee Bridge Seismic Retrofit, Pepeekeo, South Hilo, Hawaii, Adjacent to TMK 2-8-15: 2, 19 and 2-8-17: 1, 9

We have reviewed the DEA for the subject project and confirm that the project site, as represented on Figure 3.3, is designated within the State Land Use Urban, Agricultural and Conservation Districts.

We have no further comments to offer at this time. We appreciate the opportunity to comment on the subject DEA.

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

Sincerely,

ESTHER UEDA
Executive Officer

EU:th

cc: OEQC
Kenneth Ishizaki

BENJAMIN J. CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 609
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SERVICE, 688

RIGHT-OF-WAY BRANCH, ROOM 691

TRAFFIC BRANCH, ROOM 692

MOTOR VEHICLE SAFETY OFFICE, ROOM 511

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
BRIAN K. MINAAI

IN REPLY REFER TO

HWY-DS
2.4207

June 22, 1999

TO: ESTHER UEDA, EXECUTIVE OFFICER
LAND USE COMMISSION
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM

FROM: KAZU HAYASHIDA
DIRECTOR OF TRANSPORTATION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR PAHEEHEE BRIDGE SEISMIC RETROFIT OF VARIOUS BRIDGES, VICINITY OF PEPEEKEO, FEDERAL-AID PROJECT NO. BR-0100(57) DISTRICT OF SOUTH HILO, ISLAND OF HAWAII ADJACENT TO TMK 2-8-15:2, 19 AND 2-8-17:1, 9

Thank you for your letter dated April 29, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and acknowledge your confirmation that the project site is located within the State Land Use Urban, Agricultural and Conservation Districts.

A copy of your letter and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Highways Division, or contact him at 692-7546.

c: Kenneth Ishizaki - Engineering Concepts, Inc.
Les Segundo - Office of Environmental Quality Control

ENGINEERING CONCEPTS, INC.
Consulting Engineers

MEMORANDUM

Date: April 28, 1999

To: Mr. Calvin Miyahara
KSF, Inc.

From: Kenneth Ishizaki

Subject: Paheehee Bridge Seismic Retrofit Draft EA

ECI received a telephone call from Ms. Christina Miller of the Office of Planning (587-2845) on April 28, 1999. The Office of Planning had no comments on the Draft EA.

250 Ward Avenue, Suite 206 Honolulu, Hawaii 96814
Tel: (808) 591-8820 Fax: (808) 591-9010 E-Mail Address: eci@mail.gte.net

BENJAMIN J. CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 506A
BRIDGE DESIGN SECTION, ROOM 511
CADASTRAL DESIGN SECTION, ROOM 509
HIGHWAY DESIGN SECTION, ROOM 509
HYDRAULIC DESIGN SECTION, ROOM 526
TECHNICAL DESIGN SERVICE, 506
RIGHT-OF-WAY BRANCH, ROOM 501
TRAFFIC BRANCH, ROOM 602
MOTOR VEHICLE SAFETY OFFICE, ROOM 511

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

June 22, 1999

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
BRIAN K. MANAI

IN REPLY REFER TO

HWY-DS
2.4206

TO: DAVID BLANE, DIRECTOR
OFFICE OF PLANNING
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM
ATTENTION: MS. CHRISTINA MILLER

FROM: KAZU HAYASHIDA
DIRECTOR OF TRANSPORTATION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR PAHEEHEE BRIDGE SEISMIC RETROFIT OF VARIOUS BRIDGES, VICINITY OF PEPEEKEO, FEDERAL-AID PROJECT NO. BR-0100(57) DISTRICT OF SOUTH HILO, ISLAND OF HAWAII ADJACENT TO TMK 2-8-15:2, 19 AND 2-8-17:1, 9

Thank you for your telephone call to Kenneth Ishizaki of Engineering Concepts, Inc. on April 28, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and acknowledge that you have no comments at this time.

A copy of the memorandum documenting your telephone conversation and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Highways Division, or contact him at 692-7546.

c: Kenneth Ishizaki - Engineering Concepts, Inc.
Les Segundo - Office of Environmental Quality Control

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

RECEIVED
MAY 27 1999
ENVIRONMENTAL CONCERNS

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

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to
File

May 19, 1999 99-080/epo

Mr. Emilio Barroga, Jr.
State of Hawaii
Department of Transportation
601 Kamokila Boulevard, Room 688
Kapolei, Hawaii 96707

Dear Mr. Barroga:

Subject: Draft Environmental Assessment (DEA)
Paheehee Bridge Seismic Retrofit
Pepe`ekeo, South Hilo, Hawaii
Adjacent to TMK: 2-8-15: 2, 19

Thank you for allowing us to review and comment on the subject document. We have the following comments to offer:

Water Pollution

1. The applicant should contact the Army Corps of Engineers to identify whether a federal permit (including a Department of Army permit) is required for this project. If a federal permit is required, then a Section 401 Water Quality Certification is required from the State Department of Health, Clean Water Branch.

2. A National Pollutant Discharge Elimination System (NPDES) general permit is required for the following discharges to waters of the State:

   a. Storm water discharges relating to construction activities, such as clearing, grading, and excavation, for projects equal to or greater than five acres;

   b. Storm water discharges from industrial activities;

   c. Construction dewatering activities;

   d. Noncontact cooling water discharges less than one million gallons per day;

   e. Treated groundwater from underground storage tank remedial activities;

   f. Hydrotesting water;

   g. Treated effluent from petroleum bulk stations and terminals; and

   h. Treated effluent from well drilling activities.

   Any person requesting to be covered by a NPDES general permit for any of the above activities should file a Notice of Intent with the Department's Clean Water Branch at least 30 days prior to commencement of any discharge to waters of the State.

Any questions regarding these comments should be directed to Mr. Denis Lau, Branch Chief, Clean Water Branch at 586-4309.

Polluted Runoff Control

Proper planning, design and use of erosion control measures and management practices will substantially reduce the total volume of runoff and limit the potential impact to the coastal waters from polluted runoff. Please refer to the *Hawaii's Coastal Nonpoint Source Control Plan*, pages III-117 to III-119 for guidance on these management measures and practices for specific project activities. To inquire about receiving a copy of this plan, please call the Coastal Zone Management Program in the Planning Office of the Department of Business and Economic Development and Tourism at 587-2877.

The following practices are suggested to minimize erosion during construction activities:

1. Conduct grubbing and grading activities during the low rainfall months (minimum erosion potential).

2. Clear only areas essential for construction.

3. Locate potential nonpoint pollutant sources away from steep slopes, water bodies, and critical areas.

4. Protect natural vegetation with fencing, tree armoring, and retaining walls or tree wells.

5. Cover or stabilize topsoil stockpiles.

6. Intercept runoff above disturbed slopes and convey it to a permanent channel or storm drain.

7. On long or steep slopes, construct benches, terraces, or ditches at regular intervals to intercept runoff.

8. Protect areas that provide important water quality benefits and/or are environmentally sensitive ecosystems.

9. Protect water bodies and natural drainage systems by establishing streamside buffers.

10. Minimize the amount of construction time spent in any stream bed.

11. Properly dispose of sediment and debris from construction activities.

12. Replant or cover bare areas as soon as grading or construction is completed. New plantings will require soil amendments, fertilizers and temporary irrigation to become established. Use high planting and/or seeding rates to ensure rapid stand establishment. Use seeding and mulch/mats. Sodding is an alternative.

The following practices are suggested to remove solids and associated pollutants in runoff during and after heavy rains and/or wind:

1. Sediment basins.

2. Sediment traps.

3. Fabric filter fences.

4. Straw bale barriers.

5. Vegetative filter strips.

Any questions regarding these matters should be directed to the Polluted Runoff Control Program in the Clean Water Branch at 586-4309.

Sincerely,

GARY GILL
Deputy Director for
Environmental Health

c: CWB
OEQC
Engineering Concepts, Inc.

BENJAMIN J. CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 510
CADASTRAL DESIGN SECTION, ROOM 609
HIGHWAY DESIGN SECTION, ROOM 608
HYDRAULIC DESIGN SECTION, ROOM 638
TECHNICAL DESIGN SERVICE, 688

RIGHT-OF-WAY BRANCH, ROOM 681

TRAFFIC BRANCH, ROOM 602

MOTOR VEHICLE SAFETY OFFICE, ROOM 511

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
BRIAN K. MINAAI

June 22, 1999

IN REPLY REFER TO:

HWY-DS
2.4205

TO: GARY GILL
DEPUTY DIRECTOR FOR ENVIRONMENTAL HEALTH
DEPARTMENT OF HEALTH

FROM: KAZU HAYASHIDA
DIRECTOR OF TRANSPORTATION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR PAHEEHEE BRIDGE SEISMIC RETROFIT OF VARIOUS BRIDGES, VICINITY OF PEPEEKEO, FEDERAL-AID PROJECT NO. BR-0100(57) DISTRICT OF SOUTH HILO, ISLAND OF HAWAII ADJACENT TO TMK 2-8-15:2, 19 AND 2-8-17:1, 9

Thank you for your letter dated May 19, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and offer the following response to your comments.

1. Water Pollution

a) Our consultant has discussed the need for permits with the Army Corps of Engineers. The Corps has determined that the proposed construction will not be subject to a Department of the Army Permit.

b) The proposed project will not involve a discharge which is subject to a NPDES permit.

2. Polluted Runoff Control

The final EA will identify practices that may be employed to minimize erosion during construction. These practices include:

a) Conduct grubbing and grading activities during periods with low rainfall to minimize erosion potential.

b) Clear only areas essential for construction.

c) Protect natural vegetation with fencing, tree armoring, retaining walls or tree wells.

d) Cover or stabilize stockpiles of soil or other construction materials.

e) Intercept runoff for conveyance around the construction area.

f) Establish streamside buffers to protect water bodies and natural drainage systems.

g) Properly dispose of sediment and debris from construction activities.

h) Replant bare areas as soon as grading or construction is completed, using soil amendments, fertilizers and temporary irrigation as required to establish growth.

The final EA will also state that fabric filter fences, straw bale barriers or vegetative filter strips may be used to minimize solids and associated pollutants in storm runoff.

A copy of your comments and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Highways Division, or contact him at 692-7546.

c: Kenneth Ishizaki - Engineering Concepts, Inc.
Les Segundo - Office of Environmental Quality Control

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P.O. BOX 621
HONOLULU, HAWAII 96809

MAY 20 1999

Ref:PS:EH

Mr. Emilio Barroga Jr.
Department of Transportation
State of Hawaii
601 Kamokila Boulevard, Room 688
Kapolei, Hawaii 96707

Dear Mr. Barroga:

Subject: Draft Environmental Assessment (DEA)
For the Paheahee Bridge Seismic Retrofit
Pepe'ekeo, South Hilo, Hawaii
Adjacent to TMK: 2-8-15:2619, and 2-8-17:169

We have reviewed the subject DEA document and have the following comments to offer for your consideration.

Division of Aquatic Resources:

Our Big Island biologist has concerns about the potential short term impacts to aquatic resources during the lead paint removal. We suggest that he be consulted before the project begins to identify specific means for averting or minimizing adverse effects, and provide possible mitigation for unavoidable damage to natural resource values.

Copies of the DEA have been sent to the Big Island for his review and additional comments will be forthcoming.

Contact: Dr. Robert Nishimoto
Division of Aquatic Resources, DLNR
Hilo, Hawaii
Phone: (808) 974-6201

Commission on Water Resource Management:

The Paheahee Stream Bridge modifications include tying the existing bridge footings with concrete caps. If the installation of the concrete ties can be installed without modifying the bed or banks of Paheahee Stream, a stream channel alteration permit will not be required.

Land Division, Engineering Branch:

Our current projects are not effected by the proposed project.

We confirm that the proposed project is located in an area of minimal tsunami inundation (according to FEMA Community Panel Map No. 155166 0675 C). Also the project site is adjacent to a region designated as flood hazard zone X (according to FEMA Community Panel Map No. 155166 0650 C). This is an area determined to be outside the 500-year flood plain.

Land Division: Planning Section:

We note that the proposed project may include development of staging area outside of the existing roadway right-of-way. Please provide more detailed information regarding this aspect of the proposed project so that a determination can be made regarding potential Conservation District Use Permit requirements. In this regard, a land use district boundary determination would be useful to locate the proposed staging area relative to the State Conservation District.

Thank you for the opportunity to review this document. Should you have any questions or require further assistance, please contact staff planner Ed Henry at 587-0380.

Very truly yours,

TIMOTHY E. JOHNS
Chairperson

c.c. OEQC
Engineering Concepts, Inc.
Attn: Mr. Kenneth Ishizaki
DAR
CWRM
Engineering Branch
HDLO

BENJAMIN J. CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 646A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SERVICE, 646
RIGHT-OF-WAY BRANCH, ROOM 541
TRAFFIC BRANCH, ROOM 602
MOTOR VEHICLE SAFETY OFFICE, ROOM 311

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

June 22, 1999

KAZU HAYASHIDA
DIRECTOR
DEPUTY DIRECTORS
GLENN M. OKIMOTO
BRIAN K. MINAAI

IN REPLY REFER TO
HWY-DS
2.4204

TO: TIMOTHY E. JOHNS, CHAIRPERSON
DEPARTMENT OF LAND AND NATURAL RESOURCES

FROM: KAZU HAYASHIDA
DIRECTOR OF TRANSPORTATION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR PAHEEHEE BRIDGE SEISMIC RETROFIT OF VARIOUS BRIDGES, VICINITY OF PEPEEKEO, FEDERAL-AID PROJECT NO. BR-0100(57) DISTRICT OF SOUTH HILO, ISLAND OF HAWAII ADJACENT TO TMK 2-8-15:2, 19 AND 2-8-17:1, 9

Thank you for your letter dated May 20, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and offer the following response to your comments.

1. Aquatic Resources Division
The final EA will include a statement that the contractor will be required to coordinate lead paint removal work with Dr. Robert Nishimoto of the Division of Aquatic Resources, DLNR in Hilo to identify specific means for averting or minimizing adverse effects, and provide possible mitigation for unavoidable damage to natural resource values.

2. Commission on Water Resource Management
We have initiated correspondence directly with Mr. David Higa regarding the need for a Stream Channel Alteration Permit for this project. It is our understanding that a permit will only be required if the proposed construction activity, including staging areas, results in modification of the bed or banks of the stream.

3. Land Division, Engineering Branch
We acknowledge confirmation of the flood and tsunami hazard information presented in the Draft EA.

4. Land Division, Planning Section
We have initiated correspondence directly with Mr. Tom Eisen regarding the need for a Conservation District Use Application for the project. It is our understanding that while the proposed seismic retrofit work does not require a permit, a construction staging area within the Conservation District may be subject to one. A land use district boundary determination will be requested from the State Land Use Commission to ensure that the proposed construction staging area will be located outside of the Conservation District.

A copy of your comments and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Highways Division, or contact him at 692-7546.

c: Kenneth Ishizaki - Engineering Concepts, Inc.
Les Segundo - Office of Environmental Quality Control

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

TIMOTHY E. JOHNS
Chairperson

BRUCE S. ANDERSON
RICHARD H. COX
ROBERT G. GIRALD
DAVID A. ROBIRGA
HERBERT M. RICHARDS, JR.

EDWIN T. SAKODA
Acting Deputy Director

MAR - 9 1999

RECEIVED
MAR 1 1 1999
ENGINEERING CONCEPTS

Mr. Ken Ishizaki, Vice President
Engineering Concepts
250 Ward Avenue, Suite 208
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

Request for Determination of Paheehee and Kolekole Streams

This is in response to your request for a determination as to whether stream channel alteration permits are required for modification of bridge structures at Paheehee and Kolekole Streams.

Based on the plans you submitted, the Kolekole Stream modification includes construction of concrete connector blocks within the upper bed and banks of the stream channel. Therefore, a stream channel alteration permit will be required for the proposed bridge modification.

The Paheehee Stream bridge modification includes tieing the existing bridge footing with a concrete cap. If the concrete ties can be installed without modifying the bed of Paheehee Stream channel, a stream channel alteration permit will not be required. Otherwise, if the stream channel must be modified to install the concrete caps, a stream channel alteration permit will be required.

Thank you for your inquiry. We apologize for not responding to you sooner. If you have any questions, please call David Higa at 587-0249.

Sincerely,

Ed Sakoda

EDWIN T. SAKODA
Acting Deputy Director

DH:ss

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

MAR 2 2 1999

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MAR 2 6 1999
ENGINEERING CONCEPTS

Ref:PB:TNE

File: Cor98.202

Mr. Kenneth Ishizaki, P.E.
Engineering Concepts, Inc.
250 Ward Avenue, Suite 206
Honolulu, Hawaii 96809

Dear Mr. Ishizaki,

SUBJECT: Conservation District Use Permit (CDUP) Requirements for Proposed Seismic Retrofit of Kolekole and Paheehee Bridges, South Hilo, Hawaii

We received your correspondence inquiring on the CDUP requirements for the subject projects, and we have the following comments. We apologize for the lateness of our response.

We understand the two existing bridges over streams on the Hawaii Belt Highway are approximately 50 years old, and DOT plans to retrofit them to meet current seismic design criteria. The Kolekole Bridge is located completely within the Conservation District (Resource subzone), while the Paheehee Bridge appears to be located on the boundary of the Conservation District. All lands makai of the Paheehee Bridge and the highway in this area are designated as Conservation District (Resource subzone). The State Land Use Commission (LUC) has the authority to determine whether this bridge is actually located within or outside of the Conservation District. The LUC can be contacted at 587-3822.

Chapter 13-5, Hawaii Administrative Rules provides for the regulation of land uses within the Conservation District through the issuance of discretionary permits. However, Sections 13-5-37 and 13-5-22(b) "Existing Structures" indicate that the repair of existing, nonconforming structures, such as the two bridges, do not require permits.

Construction of "temporary access roads" may require permits, pursuant to Section 13-5-22(b) "Public Purpose Uses." Therefore, should these roads be required and should they be located within the Conservation District, then we suggest that a Conservation District Use Application (CDUA) be submitted. We have enclosed a copy of the rules and two CDUA forms for your use.

Please contact Tom Eisen of our Planning Branch at 587-0439 if you have any questions regarding this matter.

Sincerely,

DEAN UCHIDA, Administrator
Land Division

Enclosures

cc: Hawaii Board member
HDLO

05 18 99 09:53 FAX 808 692 7559 POST-DESIGN BRANCH

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

MARYANN E. JOINER, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JAMES E. EMORY

AQUATIC RESOURCES
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CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

May 5, 1999

MEMORANDUM

LOG NO: 23311
DOC NO: 9904tm07
Architecture

TO: Mr. Emilio Barroga, Jr.
Department of Transportation

FROM: Don Hibbard, Administrator
Historic Preservation Division

SUBJECT: Draft Environmental Assessment for
Paheehee Bridge Seismic Retrofit
Adjacent to TMK: 2-8-15:02.19 and 2-8-17:01,09
Pepeekeo, South Hilo, Island of Hawaii

Thank you for submitting the Draft Environmental Assessment (DEA) for the Paheehee Bridge Seismic Retrofit project. As noted in the DEA, this office has already concurred to the project to retrofit the bridge. The current plan remains similar and will have little visual impact on the historic character of the Paheehee Bridge. It should be noted under Section 3.1.8 Archaeological and Historic Resources, that the bridge is an historic resource.

Thank you for the opportunity to comment. Should you have further questions, please call Tonia Moy at 692-8030.

TM:jk

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

MARYANN E. JOINER, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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Gilbert Coloma-Agaran

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

September 2, 1997

MEMORANDUM

LOG NO: 22046
DOC NO: 9709tm16
Architecture

TO: Mr. Hugh Y. Ono, Administrator
Highways Division
Department of Transportation

FROM: Don Hibbard, Deputy
State Historic Preservation Officer

SUBJECT: Section 106 Compliance
Federal Aid Project BR-019-2(43) and BR-0100(57)
Proposed Seismic Retrofit of Paheehee, Kapue and Hakalau Bridges
Vicinity of Honokaa and Pepeekeo, Island of Hawaii

Thank you for transmitting the proposal to retrofit Paheehee, Kapue and Hakalau Bridges, all identified as Category I in the latest draft historic bridge inventory, to withstand the effects of seismic activity. We concur that the utilization of cable restraints to attach the girders to the pier caps, installation of concrete seat extenders and enlargement of the footing pedestal as shown in the plans submitted will have "no effect" on the historic character of the bridge.

Thank you for the opportunity to comment. Should you have any further questions, please call Tonia Moy at 587-0009.

TM:jk

c: Jamie Ho, Design Branch, Highways Division, DOT

BENJAMIN J. CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 608 &
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SERVICE, 606

RIGHT-OF-WAY BRANCH, ROOM 691

TRAFFIC BRANCH, ROOM 602

MOTOR VEHICLE SAFETY OFFICE, ROOM 511

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
BRIAN K. MINAAI

IN REPLY REFER TO:

HWY-DS
2.4203

June 15, 1999

TO: DON HIBBARD, ADMINISTRATOR
HISTORIC PRESERVATION DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES

FROM: for PERICLES MANTHOS, ADMINISTRATOR
HIGHWAYS DIVISION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR PAHEEHEE BRIDGE SEISMIC RETROFIT OF VARIOUS BRIDGES, VICINITY OF PEPEEKEO, FEDERAL-AID PROJECT NO. BR-0100(57) DISTRICT OF SOUTH HILO, ISLAND OF HAWAII ADJACENT TO TMK 2-8-15:2, 19 AND 2-8-17:1, 9

Thank you for your memorandum dated May 5, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and acknowledge your comment that the proposed seismic retrofit work will have little visual impact on the historic character of the bridge. The Archeological and Historic Resources section of the Final EA will disclose that the bridge is a historic resource.

A copy of your comment and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Design Branch, or contact him at 692-7546.

c: Kenneth Ishizaki - Engineering Concepts, Inc. ✓
Les Segundo - Office of Environmental Quality Control

Stephen K. Yamashiro
Mayor

Virginia Goldstein
Director

Russell Kokubun
Deputy Director

County of Hawaii

PLANNING DEPARTMENT
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-8742

May 14, 1999

Mr. Emilio Barroga, Jr.
Department of Transportation
601 Kamokila Blvd., Rm. 688
Kapolei, HI 96707

Dear Mr. Barroga:

Request for Review & Comments regarding DEA (Draft Environmental Assessment) for Paheehee Bridge Seismic Retrofit
TMK: 2-8-15: 02 & 19, Paheehee Gulch, Kahua, S. Hilo
TMK: 2-8-17: 01 & 09, Honomn, S. Hilo, Hawaii Island

Our comments on the above DEA are stated below pursuant to Hawaii Administrative Rule 11-200-9(a)(1) as the county agency responsible for implementing the Hawaii County General Plan. The following information pertains to the land use laws that apply to this project and that are within the Planning Department's jurisdiction.

This project is adjacent to four separate parcels and the zoning or land use designations that pertain to each lot. A review of the project's consistency with the respective land use designations is also included in the discussion below.

Zoning & Land Use Designations

TMK: 2-8-15: 02:

- County Zoning: A-20a (Agricultural): parcel 02
- SLU (state Land Use): "Agricultural"
- SMA: Special Management Area: n/a
- Shoreline Setback: n/a

TMK: 2-8-15: 19 & 2-8-17: 01:

- County Zoning: A-20a
- SLU: "Conservation"
- SMA: Yes, parcels 19 & 01 are within the SMA Zone
- Shoreline Setback: Yes, parcels 19 & 01 abut the shoreline
- County GP (General Plan) Land Use Designation: *Intensive/Extensive Agricultural:
  *Parcels 02, 19, and 01 share the same GP land use designation.

TMK: 2-8-17: 09

- County Zoning: RS-7.5 (Single Family Residential)
- SLU (State Land Use): "Urban"
- SMA: Special Management Area, a portion of parcel 09 is in the SMA zone
- Shoreline Setback: n/a
- County GP Land Use Designation: Low Density

SMA (Special Management Area), Parcels 01, 09, & 19. Parcel 02 is an inland lot that is not within the county's SMA zone; and consequently, that portion of the project is not subject to the SMA assessment review requirements. Parcels 01, 09, and 19, however, are within the SMA zone and the project will require an assessment application. A copy of the SMA assessment application form is enclosed for that purpose.

Hawaii County Planning Commission SMA Rule 9 provides exemption categories that specifies the kinds of uses or activities that qualifies for an administrative exemption. This project is likely to qualify for an exemption from further SMA rule requirements pursuant to Rule 9-4(10)B(ii) & (vi). The repair or maintenance of roads or highways within an existing right-of-way and the repair or maintenance to existing structures or uses are exempt actions of Rule 9.

Shoreline Setback Rules. The Paheehee Bridge project is not subject to the county's shoreline setback requirements because the site is not a parcel of land, building site or lot consistent with Zoning Code definitions sec. 25-1-5(b)(18) & (68). SMA Rule 9-10B8 only requires a shoreline survey *"...when the parcel abuts the shoreline..."* (emphasis added). Rather, this is a bridge

within an existing road right-of-way that provides access for vehicular and pedestrian traffic to building sites, and it is consistent with the Zoning Code definition of sec. 25-1-5(b)(97).

SLU (State Land Use) "A" ("Agricultural") District, Parcel 02. Where the project site is in the SLU: "A" district, state law provides that the proposed improvements are permitted roadway and accessory uses consistent with Haw. Rev. Stat. secs. 205-4.5(a)(7) & (10).

SLU (State Land Use): "Urban", Parcel 09. The state "Urban" designation indicates that the primary jurisdiction for determining the permitted uses within this district is the county government. Haw. Rev. Stat. sec. 205-2(b).

SLU: "C" ("Conservation") District, Parcels 19 & 01. The portion of this project that is within the SLU: "C" district comes under the jurisdiction of the state DLNR (Department of Land & Natural Resources), according to Haw. Rev. Stat. sec. 205-5.

Hawaii County Zoning Code Requirements: A-20a, Parcel 02. Pursuant to and consistent with county Zoning Code secs. 25-4-11(c), -1-5(b)(86), and -5-72(a)(17) or (c)(13), the proposed seismic retrofit of this bridge qualifies as a public use or structure and is therefore "...a permitted use in any county zone district..." According to the county's Zoning Code PA (plan approval) procedures, secs. 25-2-71(a) & (c)(2), PA requirements do not apply to county agricultural districts. And therefore, a PA application is not required.

Hawaii County Zoning Code Requirements: RS-7.5, Parcel 09. This project is also a permitted public use or structure in the county's RS district, pursuant to sec. 25-5-3(a)(12) and -4-11(c). In the RS district, a PA is also not required.

County GP (General Plan) Land Use Designation: Intensive/Extensive Agricultural, Parcels 02, 19, & 01. The project site location at parcels 02, 19, and 01 is designated either intensive/extensive agricultural, according to the LUPAG (Land Use Pattern Allocation Guide) Map - HI County GP, Ordinance No. 89-142 (effective: November 4, 1989).

The GP's Agriculture land use policy requires Hawaii County to assist in the development of basic resources for the agriculture industry, and these include roads and transportation; consequently, the proposed bridge improvements are deemed consistent with this policy. Moreover, pursuant to the GP Support Document at 82, intensive and extensive agricultural land also include lands designated by county public policy or plans as **Important Agricultural Lands (IAL).** One of the land use classifications of IA lands provides for lands of a unique quality or use. According to the

GP, these lands are designated by county policy or plan to be of greater benefit to the general public in some current or potential nonagricultural use.

The state DOT plans to retrofit a structurally deficient bridge is consistent with the county plan or policy that confirms that the bridge's project area is designated for a current nonagricultural use. And the greater benefit to the public is achieved from the project purpose to improve safe access with bridge improvements that meets current industry standards for seismic stability. From these findings it is determined that this proposal is therefore consistent with the GP's IAL land use concept.

County GP Land Use Designation: Low Density, Parcel 09. The project site is designated low density, according to the LUPAG (Land Use Plan Allocation Guide) Map - HI County GP, Ordinance No. 89-142 (effective: November 14, 1989). The GP's low density designation is for single family residential and ancillary public uses. The scope of this project is deemed consistent with a residential ancillary public use. GP Support Document at 80.

Thank you for including our participation to comment on this proposal. Any follow-up on these comments may be made with Earl Lucero at 961-8288.

Sincerely,

VIRGINIA GOLDSTEIN
Planning Director

EML:pak
[illegible]

Enclosure: SMA Use Permit Assessment Application

c: Office of Environmental Quality Control
235 S. Beretania Street, Suite 702, Honolulu 96813

Mr. Kenneth Ishizaki
Engineering Concepts, Inc.
250 Ward Ave., Suite 206, Honolulu 96814

c: SMA Section
Mr. Jiro Sumada, Deputy Chief Engineer
Department of Public Works

BENJAMIN J. CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 650
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SERVICE, 688

RIGHT-OF-WAY BRANCH, ROOM 691

TRAFFIC BRANCH, ROOM 682

MOTOR VEHICLE SAFETY OFFICE, ROOM 510

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
BRIAN K. MINAAU

IN REPLY REFER TO

HWY-DS
2.4202

June 22, 1999

Ms. Virginia Goldstein, Director
Planning Department
County of Hawaii
25 Aupuni Street, Room 109
Hilo, Hawaii 96720-4252

Dear Ms. Goldstein:

Subject: Draft Environmental Assessment (EA) for Paheehee Bridge Seismic Retrofit of Various Bridges, Vicinity of Pepeekeo
Federal-Aid Project No. BR-0100(57)
District of South Hilo, Island of Hawaii
Adjacent to TMK 2-8-15:2, 19 and 2-8-17:1, 9

Thank you for your letter dated May 14, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and your comments relating to the applicable land use laws that are within the Planning Department's jurisdiction.

The final EA will include the Hawaii County Zoning and General Plan Land Use Designations for the parcels as described in your letter.

We understand that a Special Management Area assessment application will be required for the project, and that the project will likely qualify for an exemption from further SMA rule requirements if the work is confined to the existing right-of-way.

For your information, we are coordinating with the Department of Land and Natural Resources on the CDUA requirements for the project.

A copy of your comments and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Highways Division, or contact him at 692-7546.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

c: Kenneth Ishizaki - Engineering Concepts, Inc.
Les Segundo - Office of Environmental Quality Control

Stephen K. Yamashiro
Mayor

Jiro A. Sumada
Deputy Chief Engineer

County of Hawaii
DEPARTMENT OF PUBLIC WORKS
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252
(808) 961-8321 • Fax (808) 961-8630

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MAY 5 1999
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May 3, 1999

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII
601 KAMOKILA BLVD RM 688
KAPOLEI HAWAII 96707

Attention: Mr. Emilio Barroga, Jr.

SUBJECT : DRAFT ENVIRONMENTAL ASSESSMENT
PAHEEHEE BRIDGE SEISMIC RETROFIT
Pepe'ekeo, South Hilo, Hawaii
TMK: 3 / 2-8-15: 2 & 19 and 2-8-17: 1 & 9

We acknowledge receipt of your letter concerning the subject matter, and provide you with our comments as follows:

1. All earthwork and grading shall be in conformance with Chapter 10, Erosion and Sediment Control, of the Hawaii County Code.

   The bridge's construction plans and possibly the contractor's construction staging area(s), temporary paths, and roadways, may require a grading permit.

2. The subject bridge is found in the FIRM Panel, Not Printed-Minimal Tsunami Inundation Area, according to the FIRM dated September 16, 1988.

   Any construction within known watercourses shall be in conformance with Chapter 27, Flood Control, of the Hawaii County Code. A flood study maybe required to evaluate any possible effects to Paheehee Stream.

Should there be any questions concerning this matter, please feel free to contact Mr. Casey Yanagihara in our Engineering Division at (808)961-8327.

Galen M. Kuba, Division Chief
Engineering Division

CKY

copy: OEQC
Engineering Concepts, Inc. (K. Ishizaki)

BENJAMIN J CAYETANO
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 630
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 616
TECHNICAL DESIGN SERVICE, 688

RIGHT-OF-WAY BRANCH, ROOM 691

TRAFFIC BRANCH, ROOM 602

MOTOR VEHICLE SAFETY OFFICE, ROOM 311

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

June 15, 1999

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTOR
GLENN M. OKIMOTO
BRIAN K. MAEJI

IN REPLY REFER TO:

HWY-DS
2.4199

Mr. Galen M, Kuba, Division Chief
Engineering Division
Department of Public Works
County of Hawaii
25 Aupuni Street, Room 202
Hilo, Hawaii 96720-4252

Dear Mr. Kuba:

Subject: Draft Environmental Assessment (EA) for Paheehee Bridge
Seismic Retrofit of Various Bridges, Vicinity of Pepeekeo
Federal-Aid Project No. BR-0100(57)
District of South Hilo, Island of Hawaii
Adjacent to TMK 2-8-15:2, 19 and 2-8-17:1, 9

Thank you for your letter dated May 3, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and offer the following response to your comments.

1. Section 4.1.2 of the Draft EA included a statement that all work and grading shall be in conformance with Chapter 10, Erosion and Sediment Control, of the Hawaii County Code. In addition, the need for a grading permit was disclosed in Section 1.7.

2. We acknowledge your confirmation that the bridge is located within a minimal-tsunami inundation area according to the Flood Insurance Rate Map. The final EA will include a statement that the proposed construction shall be performed in conformance with Chapter 27, Flood Control, of the Hawaii County Code. The need for a flood study to evaluate possible effects to the stream will be coordinated with your office as planning and design of the project proceeds.

A copy of your letter and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Design Branch, or contact him at 692-7546.

Very truly yours,

for PERICLES MANTHOS
Administrator
Highways Division

c: Kenneth Ishizaki - Engineering Concepts, Inc. ✓
Les Segundo - Office of Environmental Quality Control

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MAY 7 1999
ENGINEERING CONCEPTS

HAWAIIAN CableVision
HAWAIIAN CABLEVISION OF HILO
a TIME WARNER Company

May 4, 1999

Mr. Emilio Barroga, Jr.
Dept. of Transportation
State of Hawaii
601 Kamokila Blvd., Rm 688
Kapolei, HI 96707

RE: EAs for Paheehee Bridge and Kolekole Bridge Seismic Retrofits
Pepeekeo, Hilo, Hawaii

Dear Mr. Barroga:

Our review of the Environmental Assessments dated April 23, 1999, for Paheehee Bridge and Kolekole Bridge has brought forth a major concern. The construction staging area (chapter 2-2.2.5 page 2 – 4 and page 2-9 figure 2.7) will take place on the mauka side of the road and the Hamakua side of Paheehee Bridge. Please be advised that we have fiber optic line on the power poles that service the Hamakua coast. Due to the long power line spans the cable sags low.

Our concern from past experience is that equipment moving in and out of the staging area may damage our fiber lines. The down time and repair costs to splice these lines in the event of damage is extremely high. Hawaiian CableVision of Hilo would require assurance that we would be compensated for all losses suffered due to damage to our system.

If you wish to discuss, please contact me.

Sincerely,

Lorene Hough
General Manager

Cc: Marilyn Yoza
Office of Environmental Quality Control
Kenneth Ishizaki

C:\corp\99\EA_bridges 1257 Kilauea Avenue • Hilo, Hawaii 96720 • (808) 961-0443 • Fax (808) 935-0148

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION AT KAPOLEI
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

IN REPLY REFER TO
HWY-DS
2.4197

June 17, 1999

Ms. Lorene Hough, General Manager
Hawaiian CableVision of Hilo
1257 Kilauea Avenue
Hilo, Hawaii 96720

Dear Ms. Hough:

Subject: Draft Environmental Assessment (EA) for Paheehee Bridge
Seismic Retrofit of Various Bridges, Vicinity of Pepeekeo
Federal-Aid Project No. BR-0100(57)
District of South Hilo, Island of Hawaii
Adjacent to TMK 2-8-15:2, 19 and 2-8-17:1, 9

Thank you for your letter dated May 4, 1999, regarding the Draft EA for the proposed project. We appreciate your effort in reviewing the document and note your comment regarding the location of a fiber optic cable on power poles on the mauka side of the road. The location of the fiber optic cable will be disclosed in the Final EA. In addition, the location of the cable will be included in the construction documents and the contractor will be liable for any damage to the cable due to construction operations.

A copy of your comment and this response will be included in the Final EA. Should you have any questions, please direct them to the attention of Emilio Barroga, Jr. of our Highways Division, or contact him at 692-7546.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

c: Kenneth Ishizaki - Engineering Concepts, Inc.
Les Segundo - Office of Environmental Quality Control

Appendix B

BIOLOGICAL RECONNAISSANCE SURVEY OF PAHEEHEE STREAM

By AECOS, Inc.

Biological reconnaissance survey of Pahe`ehe`e Stream at and above Hawaii Belt Road on the Island of Hawai`i[1]

August 5, 1999 *AECOS* No. 912B

Eric B. Guinther
AECOS, Inc. 970 N. Kalaheo Ave., Suite C311
Kailua, Hawai'i 96734
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Introduction

This report provides a description Pahe`ehe`e Stream at Hawaii Belt Road (State Rte 19), approximately 18 km (11.2 mi) north of Hilo on the Island of Hawai`i. The purpose of this report is to assess biological impacts of a proposed bridge repair across Pahe`ehe`e Gulch. A reconnaissance survey of the bridge site was made by *AECOS* biologists Eric Guinther and Rodger Douglas on December 14, 1998. In addition, two other areas along Pahe`ehe`e Stream, upstream of the bridge crossing, were visited. Water quality samples were collected and biological observations were made at each survey location. Representative specimens of aquatic biota that could not be readily identified in the field were collected. An assessment of the impacts of proposed modifications to an existing bridge are presented in the Discussion section.

Stream Description

Pahe`ehe`e Gulch is one of a number of the large gulches that are conspicuous features on the landscape along the Hāmākua Coast of the Big Island north of Hilo. Pahe`ehe`e Stream empties into the Pacific Ocean about 17 km (10.5 mi) north-northwest of Hilo and just south of Lehuawehi Point. The stream drains the lower slopes of Mauna Kea from about the 700 m (2300 ft) elevation (Figure 1). This part of the Big Island is very wet, with rainfall averaging 5000 to 6300 mm (200-250 inches) in the upper part of the Pahe`ehe`e watershed (Taliaferro, 1959). Even at the coast, annual rainfall exceeds 2500 mm (100 in). Pahe`ehe`e Stream is shown

[1] Report prepared for Engineering Concepts, Inc. for their project: "Seismic Retrofit of Various Bridges, Vicinity of Pepeekeo." This report will become part of the public record.

on the USGS topographic maps (7.5-Minute Series, Akaka Falls and Papaikou quadrangles, 1980-81) as continuous flowing below the 460 m (1500 ft) elevation. The State Perennial Stream ID number is 8-2-34.

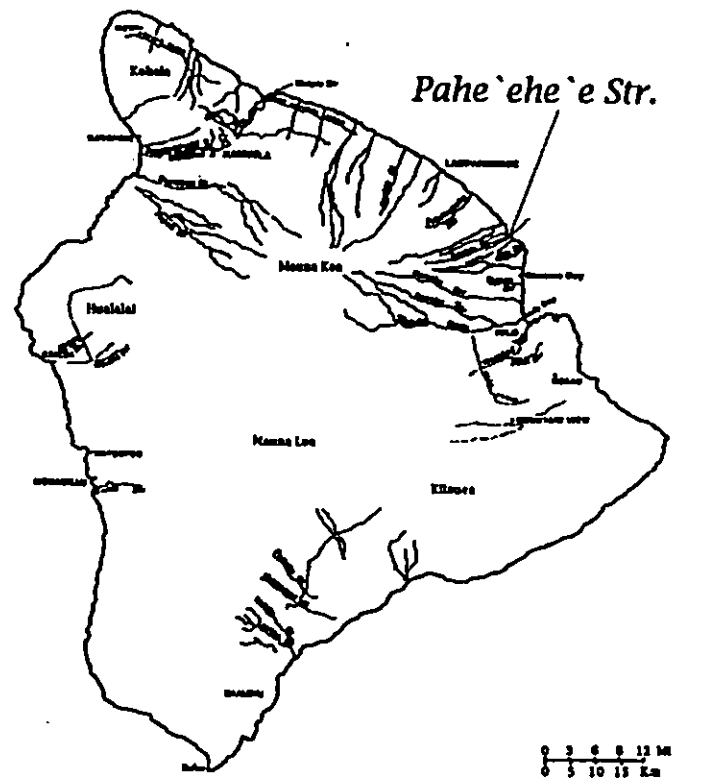

Figure 1. Location of bridge project across Pahe`ehe`e Gulch indicated on a map of the Big Island (Hawai`i) showing distribution of most larger streams and diversion ditches.

Table 1 lists the streams and gulches for a section of the Hilo/Hāmākua Coast (South Hilo District) as an inventory of aquatic features in the project vicinity. For

this table, every stream and gulch that appears as a blue line (solid or dashed) on the USGS, 7.5 minute series topographic maps (Papaikou, Papaaloa, Akaka Falls, and Pua Akala quadrangles, USGS, 1980-81) between Hakalau Stream and Makea Stream (inclusive) is listed. In this wet part of the Big Island, however, many branch streams exist which are not indicated on the USGS maps. 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[2], 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 discharging 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 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 Hawaii 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.

[2] The left or right bank of a stream is determined by facing downstream (in the direction of flow). The left bank is then the shore on the left, the right bank is on the right.

Table 1. Summary of stream relationships, characteristics, and other aquatic features for a portion of the Hilo coast, Island of Hawai`i.

Stream / Gulch		State Code	Stream Class[1]	"Headwaters" Elevation[2] or feature name	F?	F elev.	RANK[3]	Survey Data[4]
Umauma Stream to Laupahoehoe								
Hakalau		8-2-32	P	(470)			0	1980
Kamae`e	*l*		*P*	(1185)				
unnamed	*r*		*I*	1360				
unnamed	*n*		*P*	~1720				
unnamed	*s*		*P*	(1205)				
unnamed	*n*		*P*	~2300				
unnamed (2)	*s*		*P*	~2000				
unnamed	*l*		*I*	1200				
Wa`awa`a	*n*		*P*	(1435)				
unnamed	*n*		*P*	~2800				
Wa`awa`a	*s*		*P*	~3160				
Hakalau			*P*	(2150)				
"	*s*			flume	Do	815		
unnamed	*n*		*P*	~3100				
Hakalau	*s*		*P*	(4520)				
"			*P*	*Kalakao`o*	Do	3035		
Hakalau	*n*		*P*	~8000				
Puu Kahinahina	*s*		*P*	~8000				
HAKALAU								
unnamed			*I*	360				
unnamed			*I*	525				
WAILEA								
Kolekole		8-2-33	P				0	1979
Ka`ahakini	*l*		*P*	1600				
unnamed	*l*		*I*	1380				
unnamed	*l*		*P*	(1530)				
"				*Kahuna*	Wf	1018		
unnamed	*n*		Pi	~2840				
unnamed	*s*		*P*	~1800				
Kolekole			*P*	*(1650)*				DLNR 1967a
"				*Akaka*	Wf	1200		
Kalako`o	*n*		*P*	3035				
"				*Hakalau*	Di	3035		
Kolekole	*s*		*P*	4560				

(Kolekole continues)

Table 1 (continued).

Stream / Gulch	State Code	Stream Class[1]	"Headwaters" Elevation[2] or feature name	F[3]	F elev.	RANK[4]	Survey Data[5]
(Kolekole)	(8-2-33)						
unnamed		*I*	(2270)				
unnamed		*I*	3640				
unnamed		*I*	~2800				
unnamed		*I*	335				
Pāhe'ehe'e	8-2-34	P	~2300			O	DLNR 1967b
unnamed		*I*	1160				
unnamed		*I*	640				
HONOMŪ							
Honomū	8-2-35	P	~2860			O	1980
unnamed		*I*	340				
La'ilmi	8-2-36	*P(I)*	~1700				
Kapehu	8-2-37	P	~1200			O	1980
unnamed		*I*	570				
Kapehu			flume	Do	340		
unnamed		*I*	(490)				
unnamed		*I*	~670				
unnamed		*I*	~780				
unnamed		*I*	~800				
unnamed		*I*	320				
Makea	8-2-38	*P*	~1120				
"			flume	Do	170		
unnamed		*I*	550			O	

to Hilo Ālia Str. ⬇

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, 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, auwai, or other stream (includes overflow from ditch system or stream), Do - diversion out, from a stream into an auwai, flume, or other stream; Gc - USGS crest-stage gaging station; Gp - USGS partial-record gaging station; R - reservoir; RD - reservoir with diversion to a ditch; Wf - waterfall. 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) or type is given in Column 5.

Table 1 (continued).

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 or stream segment. Dates alone represent last DLNR survey years as listed in Hawaii Cooperative Park Service Unit (1990) and not referenced further in our report.

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, in terms of drainage or hydrographic relationship, that Pahe'eh'e is of moderate-size compared with all the stream features between Hakalau and Ālia, draining slopes extending to about 700 m (2300 ft). Nearby Kolekole Stream extends up well into the dry zone above about 1800 m (6000 ft) on the east slope of 4205 m (13796 ft) Mauna Kea. Watershed area given in Geographic Decision Systems International and E. P. Dashiell (1994) is 797 ha (1,970 ac) for Pahe'ehe'e. Adjacent Honomū, at 751 ha (1,856 ac), is of comparable size. However, drainage areas for nearby large watersheds (extending to the summit of Mauna Kea in the case of Kolekole, but not Hakalau or Kapue) are given as 5,430, 2,568, and 2,913 ha (13,417, 6,346, 7,199 ac) for Kolekole, Hakalau, and Kapue, respectively.

The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit, 1990) provides some information on Kolekole Stream, indicating it is a perennial stream of substantial resource value. Nearby Kolekole Stream is listed in that document as a candidate stream for protection. Pahe'ehe'e is listed as "outstanding" with respect to aquatic resources and "moderate" with respect to recreational resources. Under "Riparian Resources" pigs are indicated as a problem (where aren't they?) and a "wetland" is associated with the stream. The latter appears to be a reference to one or more wetland types indicated on USFWS wetland maps, which are

frequently suspected wetlands from aerial photographs. However, no wetland, per se, is present in the Project area.

The elevation in the project area (ravine bottom) is 6 m (20 ft) above sea level. An existing steel bridge presently carries Hawaii Belt Road (State Rte. 19) over Pahe'ehe'e Gulch; the roadway surface on the bridge is 37 m (122 ft) above sea level. The gulch here is over 75 m (250 ft) wide at the bridge and the stream itself only 6 - 8 m (20-25 ft) under the bridge. The sides of the gulch are quite steep.

Pahe'ehe'e Stream was also visited on December 14 at two other locations upstream of the project site: at the old highway bridge and at the State Rte. 220 bridge near Akaka Falls Park. The old highway bridge is located 0.9 km (0.6 mi) upstream from the mouth in Honomū village. The elevation at this location (Sta. 2) is about 60 m (205 ft). The bridge on State Rte 220 is 3.6 km (2.2 mi) upstream, at a stream elevation close to 350 m (1,145 ft). The stream at these surveyed locations is described in somewhat greater detail under the Biota Section below.

Water Quality

At each of the three survey sites, water samples were collected in appropriate containers and taken to the *AECOS* Laboratory on O'ahu for analyses. Stations 1 and 2 were located in Pahe'ehe'e Stream upstream of the project area; Station 3 was located immediately downstream of the Project Site. Table 2 lists the instruments and analytical methods used on these samples. Due to an oversight during mobilization, a meter to measure temperature and dissolved oxygen (DO) in the field was not available to the field team. It is felt that DO values would have been at saturation at all three stations given the adequate flow of water in Pahe'ehe'e Stream at the time.

Results of the laboratory analyses on samples collected from Pahe'ehe'e Stream on December 14 do not reveal any water quality problems (Table 3). Water quality, as indicated by these measurements, is very good. Nutrient values are not so low as those measured in nearby Kolekole Stream (*AECOS*, 1999) on the same date, but are nonethless low compared with Hāmākua Coast streams further north (see *AECOS*, 1998a,b).

Values recorded for conductivity, turbidity, and TSS are generally good and within expected values based upon criteria established for stream water quality by State Department of Health (DOH, 1991). Although pH is slightly on the high side, the values (7.2 to 7.8) are within the 5.5 to 8.0 pH range established as a State water quality criterion.

Table 2. Analytical methods and instruments used for the December 14, 1998 water quality sampling in Pahe'ehe'e Stream, South Hilo District, Hawai'i.

Analyses List	Method	Reference	Instrument
Ammonia	alkaline phenol	Koroleff in Grasshoff et al. (1986)	Technicon AutoAnalyzer II
Conductivity	Method 2510B (EPA 120.1)	Standard Methods 18th Edition (1992; EPA (1979)	Hydach pH/conductivity meter
Nitrate + Nitrite	EPA 353.2	EPA (1993)	Technicon AutoAnalyzer II
pH	EPA 150.1	EPA (1979)	Orion SA 250 pH meter / Ross combination electrode
Total Nitrogen	persulfate digestion /EPA 353.2	D'Elia et al. (1977) / EPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	persulfate digestion /EPA 365.1	Koroleff in Grasshoff et al. (1986) / EPA (1993)	Technicon AutoAnalyzer II
Turbidity	Method 2130B (EPA 180.1)	Standard Methods 18th Edition (1992; EPA (1993)	Hach 2100P Turbidimeter

D'Elia, C.F., P.A. Stendler, & N. Corwin. 1977. *Limnol. Oceanogr.* 22(4): 760-764.
EPA. 1979. Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Protection Agency, EPA 600/4-79-020.
EPA. 1993. Methods for the Determination of Inorganic Substances in Environmental Samples. EPA 600/R-93/100.
EPA. 1994. Methods for Determination of Metals in Environmental Samples, Supplement 1. EPA/600/R-94/111. May 1994.
Grasshoff, K., M. Ehrhardt, & K. Kremling (eds). 1986. Methods of Seawater Analysis (2nd ed). Verlag Chemie, GmbH, Weinheim.
Standard Methods. 1992. Standard Methods for the Examination of Water and Wastewater. 18th Edition. 1992. (Greenberg, Clesceri, and Eaton, eds.). APHA, AWWA & WEF. 1100 p.

Table 3. Water quality characteristics of Pahe'ehe'e Stream, North Hilo District, Island of Hawai'i sampled on December 14, 1998.

	Time sampled	Cond. (µmhos/cm)	pH (pH units)	Turbidity (ntu)	TSS (mg/l)	Ammonia (µg N/l)
12-14-98						
Sta. 1	0935	48.4	7.24	1.66	< 0.1	< 1
Sta. 2	1125	73.4	7.56	1.36	0.8	< 1
Sta. 3	1215	78.2	7.75	1.47	0.8	1

		Nitrate + nitrite (µg N/l)	Total N (µg N/l)	Total P (µg P/l)	Total Lead (µg Pb/l)
12-14-98					
Sta. 1	0935	4	48	7	< 2
Sta. 2	1125	47	91	9	2
Sta. 3	1215	118	155	11	2

Measurements were also made of lead (Pb) in the stream to assess if suspected lead paint on the existing highway bridge was having an impact on stream water quality. The results (Table 3) are that lead was undetected in the water sample collected just below the State Rte. 220 bridge — the road to Akaka Falls (Station 1), and just detected (at 0.002 mg Pb/l) immediately downstream of the bridge structures on the old highway (Station 2) and the Hawaii Belt Road (Station 3). The latter results were both at the detection limit for lead; values for metals at the detection limit are somewhat questionable.

Biota

State Rte. 220 crosses Pahe'ehe'e Stream via a one-lane bridge not far from the entrance to Akaka Falls Park. This is an area of abandoned sugar cane (*Saccharum officinarum*) fields. The gulch here is not particularly deep (about 3-4 m or 10-12 ft), although there are parts of Pahe'ehe'e Gulch in this area where the gulch has entrenched over 25 m (80 ft) into the volcanic slope. Typical vegetation in the riparian zone at Station 1 consists of California grass (*Brachiaria mutica*), Guinea grass (*Paspalum*), sugar cane, yellow ginger (*Hedychium flavescens*), Job's tears (*Coix lachryma-jobi*), common guava (*Psidium guajava*), red banana (*Musa*), rose apple (*Syzigium jambos*), gunpowder tree (*Trema orientalis*), indent. bush, neleau (*Rhus sandwicensis*), and banyan (juv. *Ficus microcarpa*). With the exception of neleau (an endemic), these are all introduced plant species.

Directly downstream from the bridge the stream bed is some 4-5 m (13-16 ft) across and the water is flowing over solid basalt, mostly as riffles on the order of 0.2 m (less than 1 ft) deep. A run and moderately large pool (to 1 m deep) is found under the road bridge. There are numerous small, isolated pools in depressions in the rock beside the stream. Crane flies (Tipulidae) and midges (Chironomidae; larvae in pools and stream) are abundant; other common insects flying around the stream include ephydrid, syrphid, and green-bottle flies. A dragonfly nymph (*Pantala flavescens*) was collected from an isolated pool.

Within the stream, mountain 'opae (*Atyoida bisulcata*) is present, as is Pacific prawn (*Macrobrachium lar*). No fishes of any kind were observed. A single American bullfrog (*Rana catesbeiana*) was sighted. Two types of filamentous algae (*Spyrogyra* sp. and *Phormidium* sp.) were both locally abundant. For the most part, the riparian vegetation does not shade the stream in the vicinity of the road bridge.

The old highway bridge on the north end of Honomū is built on a curve across the stream. The gulch is steep sided here close to the stream but only 25 m (80 ft) deep. Vegetation is thick along the stream and covering the walls of the gulch,

dominated by gunpowder tree, albizia (*Paraserianthes falcataria*), Alexander palm (*Archontophoenix alexandrae*), African tulip (*Spathodea campanulata*), and rose apple, with bingabing (*Macaranga mappa*), Norfolk pine (*Araucaria*), lauae fern (*Phymatosorus scolopendrium*), wood fern (*Christella* sp.), common guava (*Psidium guajava*), kukui (*Aleurites moluccana*), avacado (*Persea americana*), wood rose (*Merremia tuberosa*), and another vine (*Ipomoea*) common in various areas. Other species noted from this general area (Fosberg, 1972) include: banana (*Musa*), breadfruit (*Artocarpus altilis*), ironwood (*Casuarina*), native sumac (*Rhus javanica*), sword fern (*Nephrolepis*) and (*Eupatorium riparium*).

Table 4. Checklist of aquatic biota observed or reported from Pahe'ehe'e Stream.

Species	Common name	Status	OC Code	Abundance
ALGAE				
CYANOPHYTA, HORMOGONALES	(blue green algae)			
OSCILLATORIACEAE				
Phormidium sp.		?ind	20	C
CHLOROPHYTA, ZYGNEMATALES	(green algae)			
ZYGNEMATACEAE				
Spyrogyra sp.			20	C
INVERTEBRATES				
MOLLUSCA, MESOGASTROPODA				
THIARDAE				
Tarebia granifera Lam.		nat	10	R
ARTHROPODA, CRUSTACEA				
ATYIDAE				
Atyoida bisulcata Randall	*'opae kala'ole*	end	21	P
PALAEMONIDAE				
Microbrachium lar (Fabricius)	Pacific island prawn	nat	21	A
ARTHROPODA, INSECTA				
DIPTERA, CHIRONOMIDAE				
indet.	midge, larva	nat	21	A
DIPTERA, CULICIDAE				
Aedes albopictus.(Skuse)	forest day mosquito, adult	nat	10	A
DIPTERA, TIPULIDAE				
indet.	crane fly	nat	21	C
ODONATA, LIBULELLIDAE				
Pantala flavescens (Fabr.)	globe skimmer, nymph	nat	21	P
VERTEBRATA, PICES				
ELEOTRIDAE				
Eleotris sandwicensis (Vaill. & Soul.)	*'o'opu akupa*	end	01	

Table 4 (continued)

Species	Common name	Status	QC Code	Abundance
GOBIIDAE				
Awaous stamineus (Eyd. & Soul.)	`o`opu nakea	end	10	C
Sicyopterus stimpsoni (Gill)	`o`opu nopili	end	01	R
POECILIIDAE				
Poecilia reticulata Peters	guppy	nat	10	P
Xiphophorus helleri Heckel	swordtail	nat	01	R
VERTEBRATA, AMPHIBIA				
RANIDAE				
Rana catesbeiana Shaw	American bullfrog	nat	10	P

KEY TO SYMBOLS USED:

Status:
- 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.

QC Code:
- 01 - Reported in unpublished reports (DLNR, 1967b).
- 10 - Observed and identified in the field on December 14, 1998.
- 20 - Collected; identified in the laboratory; specimen(s) not saved.
- 21 - Collected; identified in the laboratory; voucher specimen(s) saved.

Abundance at survey locations:
- P - present; not common, but unable to assess abundance.
- R - rare; only one or two individuals seen.
- U - uncommon; several individuals seen, in some habitat places visited.
- C - common; numerous individuals seen, or seen in most habitat places visited.
- A - abundant; numerous in most habitat places visited

Close to the stream honobono or day flower (*Commelina diffusa*), false heather (*Cuphea hyssopifolia*), indet. mellastome, primrose willow (*Ludwigia octovalvis*), Job's tears, indet. bush, and indet. hibiscus are all common along the bank. The blue-green alga, *Phormidium* sp. is abundant in the water. The stream here is a sereies of large pools separated by shorter runs and riffles. Pacific prawn (*M. lar*) is abundant in the stream. Several semi-isolated pools occur along the left bank immediately below the bridge. These harbored numerous guppies (*Poecilia reticulata*) and a few thiarid snails (*Tarebia granifera*). Observed around the stream were green-bottle and ephydrid flies.

The stream bed beneath the Hawaii Belt Road (project site) is reached only with some difficulty because of the height and steepness of the gulch at this point. A trail leads part way down from the north end of the highway bridge. The gorge is

heavily forested with large trees such as mango (*Mangifera indica*), kukui, gunpowder tree, albizia, hala (*Pandanus tectorius*), bamboo (*Bambusa vulgaris*), and Alexander palm, and masses of ginger and heliconia. Observed in the survey area were common guava, beefsteak plant, shoebutton ardisia (*Ardisia elliptica*), rose apple, bingabing (*Macaranga mappa*), African tulip, banana, indet. vine, wood fern (*Christella* sp.), swamp cyclosorus (*Cyclosorus interruptus*), lauae fern, pākihakaha (*Pleopeltis thunbergiana*), busy lizzy (*Impatiens wallerana*), blechnum fern (*Blechnum occidental*), common maidenhair fern (*Adiantum raddianum*), and an indet. tree. False heather was abundant on basalt along the stream margins.

A concrete bridge support (Bent No. 2) forms the right bank immediately under the bridge. Elsewhere, the bank is mostly a steep escarpment of basalt some 2 to 4 m (6 to 12 ft) high. The stream bed, 9 - 10 m (30-33 ft) across in places, is a mixture of solid basalt and moderately rounded boulders, with coarse sand in patches on the bottom of a large pool found beneath the bridge. This pool is mostly on the order of 1 to over 2 m (3 to 6+ ft) deep. Within the pool can be seen large numbers of Pacific prawn and `o`opu nakea (*Awaous stamineus*) of various sizes.

Downstream from the large pool is a riffle section through moderately rounded boulders. Juvenile prawn were very abundant in this area at the time of the survey. The blue-green alga, *Phormidium* sp., was common on solid substrata. Craneflies were numerous flying around the stream.

Assessment

Pahe`ehe`e Gulch is a moderately large drainage feature on the landscape of the Hāmākua Coast in the South Hilo District. The gulch can be traced to around the 700 m (2,300 ft) elevation on Mauna Kea. Over most of the length of the gulch below 460 m (1,500 ft) elevation, water flow is continuous and apparently strong, increasing substantially during relatively frequent freshets (high flows during rainy periods). The project site is a steel bridge structure on Hawaii Belt Road crossing downstream from the village of Honomū. This structure is high and supported on massive concrete blocks called "bents." The bridge project entails strengthen the footings or bents with additional concrete and steel reinforcement, and make other structural changes in the steel framework of the bridge to increase resistance to seismic events (earthquakes).

Pahe`ehe`e is listed as an outstanding stream in terms of biological diversity (Hawaii Cooperative Park Service Unit. 1990). Vegetation comprising the riparian zone within the project area is dominated by non-native species. However, the aquatic environment in the project area supports several native species. While none

of these aquatic species is listed as a threatened or endangered species (USFWS, 1994), streams dominated by native species and showing a paucity of introduced species are increasingly uncommon in Hawai'i. Lower Pahe'ehe'e has managed to avoid much of the damage from agricultural runoff, loss of forest cover, and use as a dumping place that characterizes many Hāmākua Coast streams (see *AECOS*, 1998a,b). The uppermost reach of Pahe'ehe'e Stream within the Hilo Forest Reserve was not surveyed, but is indicated on USGS maps as intermittent flowing. Where observed by us upstream of the project area (Stations 1 and 2) — essentially those parts of the stream through the old sugar cane area — the stream was not judged to be as outstanding as rated by the State DLNR. However, the stream reach in the vicinity of the bridge project is deserving of this designation. The large, deep pool located directly under the Hawaii Belt Road bridge is a special feature of this stream with aquatic resource value.

While the proposed project should have minimal short-term and no long-term impacts on Pahe'ehe'e Stream, protection of the stream pool beneath the bridge during construction will present a challenge. It does not appear that concrete would be added to the bent below the water line. However, all precautions should be implemented to minimize particulates and pollutants in runoff from construction areas and no fill should be placed in the pool. Larger debris items must be removed from the pool before completion of the project. This should be accomplished by the contractor or the State Department of Transportation to insure that the long-term resource values of the stream are not compromised. We note that there now remains no evidence of any damage (if there was any) to the stream pool area from when the bridge was first constructed (1950s?).

The proposed improvements to the structural integrity of the existing Hawaii Belt Road bridge over Pahe'ehe'e Gulch should produce no long-term alterations in the existing relationships between human activities on this watershed and the ecology of Pahe'ehe'e Stream. The proposed improvements are designed to strengthen the bridge against seismic activity (earthquakes) for safer transit across the gulch and do not change local land use patterns or traffic flow, but lessen the chance that the entire structure could end up at the bottom of the gulch.

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Appendix C

BOTANICAL RESOURCES ASSESSMENT
By Char & Associates

BOTANICAL RESOURCES ASSESSMENT
PAHE'EHE'E STREAM BRIDGE
SOUTH HILO DISTRICT, HAWAI'I

by

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Prepared for: ENGINEERING CONCEPTS, INC.

December 1998

BOTANICAL RESOURCES ASSESSMENT
PAHE'EHE'E STREAM BRIDGE
SOUTH HILO DISTRICT, HAWAI'I

INTRODUCTION

Pahe'ehe'e Stream Bridge is located just north of the turn off road to Honomu Town. The literal meaning for pahe'ehe'e is slippery (Pukui and Elbert 1975). Pahe'ehe'e Gulch over which the bridge crosses is a narrow and deep gulch.

The blueprint for the bridge has an April 1949 date. Seismic retrofit work is proposed to bring the bridge up to Federal standards. The length of the bridge is approximately 252 feet and the bridge elevation is 130 feet.

Field studies to assess the botanical resources under and immediately adjacent to the bridge were made on 10 and 11 December 1998 by two botanists. Construction materials would probably be lowered down by crane. However, the contractor may decide to build access roads on either side (mauka or makai) of the bridge, thus a study was also made of the vegetation along the slopes of the gulch. The primary objectives of the field studies were to:

1) provide a general description of the vegetation on the study area;
2) search for threatened and endangered plants as well as species of concern; and
3) identify areas of potential environmental problems or concerns and propose apprpriate mitigation measures.

SURVEY METHODS

Prior to undertaking the field studies, topographic maps and the bridge plans were examined to determine terrain characteristics, access, boundaries, and reference points.

Access was from the bridge maintenance foot trails and stairways under the bridge. The stairway on the Honoka'a side of the bridge provides access to the stream area. The start of the foot trails can be found around each of the abutments.

DESCRIPTION OF THE VEGETATION

The flowering plant names used in this discussion follow Wagner et al. (1990) and Evenhuis and Miller (1995-1998) for the naturalized species, and St. John (1973) for the ornamental plants. The names of the ferns and fern allies are in accordance with Lamoureux (1988).

Bridge Area

A forest composed of a variety of introduced species is found under and adjacent to the bridge. African tulip trees(Spathodea campanulata) are common, especially mauka of the bridge. Young trees under the bridge have been cut back by the maintenance crew, but most have sent out new shoots. Other trees found here include king or Alexandra palm (Archontophoenix alexandrae), mango (Mangifera indica), bingabing (Macaranga mappa), rose apple (Syzygium jambos), avocado (Persea americana), Melochia umbellata, gunpowder tree (Trema orientalis), and albizia (Paraserianthes falcataria). Two native trees found here are the neleau or neneleau (Rhus sandwicensis) and hala (Pandanus tectorius). Shrubs of guava (Psidium guajava), strawberry guava (Psidium cattleianum), and a Heliconia species are common.

On the slopes under the bridge, the woody components tend to be less dense and the soil drier. Ground cover consists of scattered mats of swordfern (Nephrolepis multiflora), Spanish clover (Desmodium incanum), basketgrass (Oplismenus hirtellus), molasses grass (Melinus minutiflora), and young plants of the tree and shrub species. There are also large patches of barren, dry soil under the bridge, especially on the Honoka'a side.

Possible Access Roads' Area

The gulch slopes mauka and makai of the bridge are very steep, almost perpendicular in places. The slopes support a forest of mixed introduced species. In addition to the woody components mentioned in the bridge area discussion, there are also groves of bamboo (Bambusa ?) and banana (Musa X paradisiaca) patches on the slopes.

There are rather extensive patches of several species which are ordinarily found in cultivated situations; these have probably escaped from the nearby homes on the mauka, Hilo side of the bridge. They include sanchezia (Sanchezia speciosa), an attractive shrub which has pale yellow veins and bright yellow flowers with red bracts; pagoda flower (Clerodendrum burcanani), a shrub with downy, heart-shaped leaves and scarlet flowers; torch ginger (Nicolai elatior), a large ginger, 10 to 20 feet tall, with large, bright red, conelike flower heads about 5 inches long on erect stems and 2 to 5 feet high or more; and painted copperleaf (Acalypha wilkesiana), a shrub with bronze-green leaves spotted with red. A Heliconia species also forms extensive patches along the lower slopes.

The bottom of the gulch and the lower slopes are heavily shaded, so barren, wet soil is common. Patches of the more shade-tolerant species can be found in areas where the tree cover is somewhat

more open, especially along the stream. These include Hilo grass, maile hohono (Ageratum houstonianum), yellow ginger (Hedychium flavescens), shampoo ginger (Zingiber zerumbet), basketgrass (Oplismenus hirtellus), palm grass (Setaria palmifolia), maiden hair fern (Adiantum raddianum), blechnum fern (Blechnum occidentale), impatiens (Impatiens walleriana), and false heather (Cuphea hyssopifolia).

DISCUSSION AND RECOMMENDATIONS

The vegetation on the project site is dominated by introduced plants, some of which are ornamental species which have spread into the gulch from nearby homes. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's discovery of the islands in 1778.

Only four native species were observed during the field studies. Two of them, the hapu'u or tree fern (Cibotium glaucum) and neleau (Rhus sandwicensis), are endemic, that is, they are native only to the Hawaiian Islands. The other two natives are the hala (Pandanus tectorius) and lepelepe-a-moa (Selaginella arbuscula); these are indigenous, that is, they are native to the islands and also elsewhere.

None of the plants found during the field studies is a threatened and endangered plant; nor is any a species of concern (U.S. Fish and Wildlife Service 1997). All of the plants can be found in similar environmental habitats throughout the islands. Some are escaped ornamental species.

Given the findings above, the proposed seismic retrofit work on the Pahe'ehe'e Stream Bridge should not have a significant

negative impact on the botanical resources. Because of the steep slopes, construction materials would probably be lowered down by crane. However, in the event that access roads are put in, it is recommended that they be grassed over as soon as possible to prevent soil erosion problems. Hilo grass is recommended as it is shade-tolerant and fast growing.

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Appendix D

RECONNAISSANCE SURVEY OF TERRESTRIAL VERTEBRATE SPECIES

By Rana Productions, Ltd.

A RECONNAISSANCE SURVEY OF TERRESTRIAL VERTEBRATE SPECIES FOR THE PAHE'EHE'E BRIDGE SEISMIC RETROFIT PROJECT, NORTH HILO, ISLAND OF HAWAI'I.

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November 21, 1998

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Introduction:

This report summarizes the findings of a one and a half day ornithological and mammalian reconnaissance survey of the Pahe'ehe'e Bridge and its environs. The project is located in the District of North Hilo, Island of Hawai'i. The proposed project is to perform a seismic retrofit to the existing bridge structure. Additionally, it may be necessary to build a construction access road into the bottom of the gulch. The field work was conducted on November the 13th and 14th, 1998.

The primary purpose of the survey was to determine what bird and mammal species occur within the proposed project area, or are likely to occur given the type of habitat available, and to determine the presence of any native species; particularly, any federally listed endangered, threatened, or proposed avian or mammalian species on, or in the immediate vicinity of the proposed project area. Additionally we were asked to assess the potential impacts to the existing habitat in the event that a construction access road is built into the gulch.

General Site Description:

The Pahe'ehe'e Bridge is located on the Hawaii Island Beltway, Highway 190, approximately 11 miles north of the town of Hilo. The bridge spans the Pahe'ehe'e gulch and Pahe'ehe'e stream which passes under the bridge some 90 feet below. The sites of the river wall are extremely steep and are heavily vegetated, so much so that it is difficult to see the stream surface when looking down from the bridge.

The vegetation in the gulch is dominated by a diverse mix of alien species. Trees include Ironwood (*Casuarina equisetifolia*), African Tulip (*Spathodea campanulata*), Monkeypod (*Samanea saman*), Mango (*Mangifera indica*), Coconut(*Cocos nusifera*), *Archontophoenix alexandrae*, and Siris tree (*Albizia lebbeck*) mixed in with stands of guava (*Psidium sp.*) Java plum (*Syzygium cumini*), Christmas berry (*Schinus terebinthifolius*), pandanus (Pandanus tectorius) and Banana (*Musa x parasiiaca*). There are at least two species of Ginger Lilly (*Hedychium sp.*). Mixed in with this assemblage of plants are several species of introduced grasses and on the north side of the gulch small patches of sugar cane (*Saccharum spontaneum*).

The vegetation to the south of the gulch is similar to that within the gulch. The vegetation to the north is however much different. Lands immediately to the north of the gulch are fallow sugar cane fields which have become overgrown with numerous alien graminoid species including, California grass (*Brachiaria mutica*) and other weedy ruderal species, interspersed with patches of banana, Christmas berry and guava.

Previous Surveys:

The first systematic surveys of the avifauna of Hawai'i were not undertaken until 1976. Starting in that year and continuing until 1983 the U.S. Fish & Wildlife Service (USFWS) conducted a state wide survey of the avifauna of Hawai'i (Scott et al. 1986). During the course of the Hawai'i Forest Bird Surveys (HFBS) no survey transects were counted within or close to the Pahe'ehe'e Bridge (Scott et al. 1986). I am not aware of any other recent faunal surveys of the immed ate area other than the Jacobs bat survey discussed below.

Only four comprehensive bat surveys have been conducted on the Island of Hawai'i (Jacobs 1994, Cooper et al. 1995, Cooper and David 1995, David 1997). One of these surveys addressed sites close to the project site. David Jacobs conducted an Island wide survey between 1990-1993 which attempted to ascertain the distribution and abundance of Hawaiian hoary bats by sampling along paved principal roadways around the Island of Hawai'i (Jacobs 1994). The bulk of the remaining published literature relies heavily on anecdotal and incidental information on bat distribution and abundance on the Island (Baldwin 1950, Bryan 1955, Tomich 1986).

Mammalian Survey Methods:

Two stationary remote bat census stations were deployed below the bridge structure on the night of November 13th 1998. Broadband AnaBat II ultrasonic bat detectors, coupled to voice activated cassette recorders and remote timing devices were used to detect bat vocalizations. The use of voice activated tape recorders and remote timing devices allowed the usage of multiple units simultaneously sampling at separate locations. Electronic counts were conducted between 1800 and 0800 hours. Following techniques developed by Krusic et al. (1996), units were calibrated using a pet ultrasonic flea collar. The tapes were reviewed and the number of bat passes, which were defined as ≥ 2 echolocation calls were counted. In addition visual scans were made from the bridge structure for bats between 1800 and 2000 hours on the same night.

The survey of feral mammals was limited to visual and auditory detection, as well as observation of scat, tracks and road kills. No trapping study was conducted in an attempt to quantify the usage of the site by alien mammalian species.

Avian Survey Methods:

Six count stations were sited within the vegetated areas next to the bridge. Due to the steepness of the gulch walls we did not attempt to reach the floor of the valley. Eight minute unlimited distance circular plot counts were made at each of the count stations (Reynolds et al. 1980). Stations were counted once. Counts were concentrated during the early morning hours (between

0600 hr. and 1100 hr.), the peak bird activity time. Field observations were made with the aid of Leitz 10 X 42 binoculars and by listening for vocalizations. A running tally was kept of all bird species observed and heard while walking within the project area. An additional 2 hours were spent on site between 1800 hrs. and 2000 hrs. on the evening of November the 13th 1998, in an attempt to detect the threatened Newell's Shearwater (*Puffinus newelli*), and the endangered Dark-rumped Petrel (*Pterodroma phaeopygia sandwichensis*) over-flying the site.

Avian phylogenetic order used in this report follows *Birds Of The World: A Checklist 4th Edition* (Clements 1991), and the *1st and 2nd Supplements to Birds Of The World: A Checklist 4th Edition* (Clements and Principe, Jr. 1992, Clements 1997); scientific nomenclature follows *The AOU Checklist of North American Birds. 7th Edition* (AOU 1998), Mammal scientific names follow *Mammals in Hawaii* (Tomich 1986), plant names follow *Manual of the Flowering Plants of Hawai'i* (Wagner et al. 1990). Place names follow *Place Names of Hawaii* (Pukui et al, 1976)

Results:

During the course of this survey no mammalian species were detected. It is likely that there is incidental usage of the area by Hawaiian hoary bats (*Lasiurus cinereus semotus*) or 'Ope'ape'a. Hawaiian hoary bats have been recorded close to this site recently (David1998). It is also likely that there is usage of the area by most of the established alien mammalian species known form the Hilo area, including; small Indian mongoose (*Herpestes a. auropunctatus*), dog (*Canis f. familiaris*), cat (*Felis catus*), pig (*Sus s. scrofa*) and four species of *muridae*, the house mouse (*Mus musculus*), as well as all three species of naturalized rats found on Hawai'i ; roof (*Rattus rattus*), Norway (*Rattus norvegicus*), and Polynesian (*Rattus exulans hawaiiensis*). Without conducting a trapping program, it is difficult to assess the population densities of these often hard-to-see mammals. All of the introduced mammalian species present on the Island are deleterious to both native habitats and species.

A total of 10 bird species representing 7 separate families were detected during the course of this survey (Table 1). All avian species recorded are considered to be alien (introduced to Hawai'i by man). No avian species listed as proposed, threatened or endangered by either the USFWS or the State of Hawaii Department of land and Natural Resources (DLNR) were recorded during the course of this survey (USFWS 1996, DLNR 1986).

Discussion:

Although we did not detect Hawaiian hoary bats during the course of this survey, it is probable that this species does utilize resources within the project area, at least occasionally. The implementation of this proposed action will not have a deleterious impact on this species. It is possible that individual bats may be disturbed by construction activity if conducted during

Table 1

Avian Species Detected During the Pahe'ehe'e Bridge Faunal Survey	
Common Name	***Scientific Name***
PIGEONS & DOVES - Columbidae	
Rock Dove	*Columba livia*
Spotted Dove.	*Streptopelia chinensis.*
Zebra Dove.	*Geopelia striata.*
STARLINGS - Sturnidae	
Common Myna.	*Acridotheres tristis.*
SILVEREYES - Zosteropidae	
Japanese White-Eye.	*Zosterops japonica.*
BABBLERS - Timaliidae	
Melodius Laughing Thrush.	*Garulax canorous.*
Red-billed Leiothrix.	*Leiothrix lutea.*
WAXBILLS & ALLIES - Estrildidae	
Nutmeg Manikin (Scaly-breasted Munia)	*Lonchura punctulata topela*
FRINGILLIDS - Fringillidae	
House Finch.	*Carpodacus mexicanus mexicanus.*
EMBERIZIDS - Emberizadae	
Northern Cardinal.	*Cardinalis cardinalis.*

crepuscular hours. Though given that this species readily forages above and close to the existing roadway it is unlikely that construction activity will disturb foraging bats.

That all of the birds detected are alien species is not that surprising, since the avifauna of the coastal area of the windward side of the Island is dominated by alien species. The limited number of avian species detected is due in part to the almost constant noise of heavy traffic moving over the bridge structure. It is likely that in addition to the species we recorded, all of the established alien species found along the windward coast utilize habitat close to the structure at least occasionally.

There are three listed endemic bird species which potentially could be impacted by construction activity. These are the threatened Newell's Shearwater (*Puffinus newelli*), the endangered Dark-

rumped Petrel (*Pterodroma phaeopygia sandwichensis*), and the endangered Hawaiian Hawk (*Buteo solitarius*). The first two species are pelagic seabirds which return to their nesting colonies on the upper slopes of Mauna Loa and possibly Mauna Kea during crepuscular and night time hours between April and October. There are numerous records of Newell's Shearwater being seen, heard or collected close Hilo (Kepler et al. 1979, Banko 1980a, Conant 1980). Sheila Conant recovered a dead bird on Kaumana drive in 1978 (Conant 1980). Newell's Shearwater have been heard along the Wailuku river north of the Saddle Road (Kepler et al 1979), and numerous downed birds have been recovered from different locations in and around Hilo (Kepler et al. 1979, Banko 1980 b, R. David pers. obs.,). Dark-rumped Petrels nest much higher and in lower numbers than do Newell's Shearwater. Several downed birds have been recovered from various locations around Hilo (R. David, pers. obs. , J. Jeffrey, pers. comm.). It is probable that both species over-fly the site between late April and late October.

There is no suitable nesting habitat within the project area for either the Newell's Shearwater or the Dark-rumped Petrel. Both species may over-fly the bridge on their way to and from their nesting colonies. Both species of seabirds, especially fledging birds, can become disoriented by exterior lighting on their way to sea in the fall. When disoriented, seabirds often collide with manmade structures and, if not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals. Construction lighting could therefore pose a potential threat to these seabird species especially in the fall months between August and October.

Although no Hawaiian Hawks were recorded during the course of the survey, it is probable that there is a least occasional usage of habitat within the Pahe'ehe'e Gulch by this species. The project area is well within the normal range of this Hawai'i Island endemic. This species has seemingly adapted better than any other endemic avian species to the alien dominated lowland areas of the island. Hawaiian Hawks occupy a wide variety of habitats, they are found in almost all habitats not lacking trees. They are all but absent from treeless or close to treeless grasslands and lava fields. The current population is estimated to be between 1230 and 1600 birds (Klavitter and Marzluff 1998, Morrison et al. 1994). It is generally thought that the population as a whole is healthy and maintaining itself, unlike many other endemic species. This species is currently under review by the USFWS for down listing from endangered to threatened status (USFWS 1993).

The construction activity conducted on the bridge structure will not have a significant impact on native or federally protected avian or mammalian species. In an attempt to minimize the downing of Newell's Shearwater and Dark-rumped Petrels by their interaction with external construction lighting, no unshielded construction or equipment maintenance lighting should be permitted after dark between the months of April and October.

Should construction access roads be built, care should be taken to avoid runoff and siltation of the Pahe'ehe'e stream and near shore areas immediately adjacent to the project site. Given the steepness of the gulch sides and the generally high rainfall associated with the Hilo area the control of runoff and siltation is a real issue.

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Appendix E

ARCHAEOLOGICAL ASSESSMENT
By Cultural Surveys Hawaii

Archaeological Assessment For Seismic Retrofitting for the Pahe`ehe`e Stream Bridge Honomu, South Hilo District, Hawaii Island

by

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Prepared for

ENGINEERING CONCEPTS, INC.

Cultural Surveys Hawaii
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ABSTRACT

At the request of Engineering Concepts, Inc., Cultural Surveys Hawaii Inc. conducted an archaeological assessment of the proposed seismic retrofitting of the Pahe`ehe`e Bridge site in the vicinity of Pepeekeo, South Hilo District, Hawaii. The assessment consisted of a ground survey of all accessible areas and compilation of historical documentation and previous archaeological research.

The project area consists of the area underneath the existing bridge footings and the area and surrounding them and possible access routes on the slopes along the *mauka* and *makai*. The bridge is located along the Mamalahoa Highway (Hawaii Belt Road) approximately 11 miles northwest of Hilo and just north of the town of Honomu. The project area lies almost entirely within the Pahe`ehe`e Stream Gulch. The present bridge is an iron and concrete structure that is planned to be reinforced to meet seismic standards.

No archaeological sites were found within the project area. *Makai* and to the east of the existing bridge, remnants of commercial sugar cane infrastructure were observed, but these were well outside the project area.

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INTRODUCTION

Project Area Description

The project area is located underneath and adjacent to the Pahe`ehe`e Stream Bridge on Route 19. It lies approximately 11 miles northwest of Hilo (See Figure 1). The project area is located in the South Hilo District of east Hawaii within the *ahupua`a* of Kuhua and Honomu. The bridge is located along the Hawaii Belt ~~Hawaiir~~ just north of the town of Honomu.

The terrain of the *ahupua`a* is characterized by sea cliffs bordering a narrow marine bench on the coast, with gradually ascending uplands above (average 13% grade above the 300 ft. interval). The uplands are broken by the steep and narrow Pahe`ehe`e Stream Gulch which lies along the western boundary of *Kuhua ahupua`a*. The upland slopes are *`ohi`a* forests.

Pahe`ehe`e gulch has very steeply descending sloping sides approximately 120 feet to a narrow stream bed. The stream bed is boulder and cobble lined with some alluvial deposits along the sides. Annual rainfall is between 100 and 125 inches per year and it is expected that this gulch is prone to frequent flooding. Average temperatures are between 62 and 82 degrees Fahrenheit (Armstrong 1973:57).

Scope of Work

The following scope of work was utilized during the project. The scope is based on a September 2, 1997 letter from Don Hibbard stating that the proposed modifications will have no effect on the bridges historic character. Based on this information the assessment focused on the areas around and under the bridge.

1. A brief historical background search including examinations of historic maps, previous archaeological reports and other historic documents to determine if there are actual or potential archaeological sites in the area.

2. A one-day field survey of the bridge and its surroundings, including the bottom and sides of the gulch and any access route to the gulch or other areas which would be used during construction of the bridge improvements. This survey will identify and briefly describe any archaeological sites which may be present.

3. Preparation of a report on the results of the historic background research and the field survey. This report will contain recommendations for protection and avoidance of archaeological or any further studies that are appropriate, if any archaeological sites are encountered. If no sites are encountered within the vicinity of the bridge, which would be impacted by the proposed bridge improvements, no further action will be recommended.

This scope of work also includes full coordination with the State Historic Preservation Division (SHPD), Dr. Patrick McCoy and Hawai`i County relating to archaeological matters.

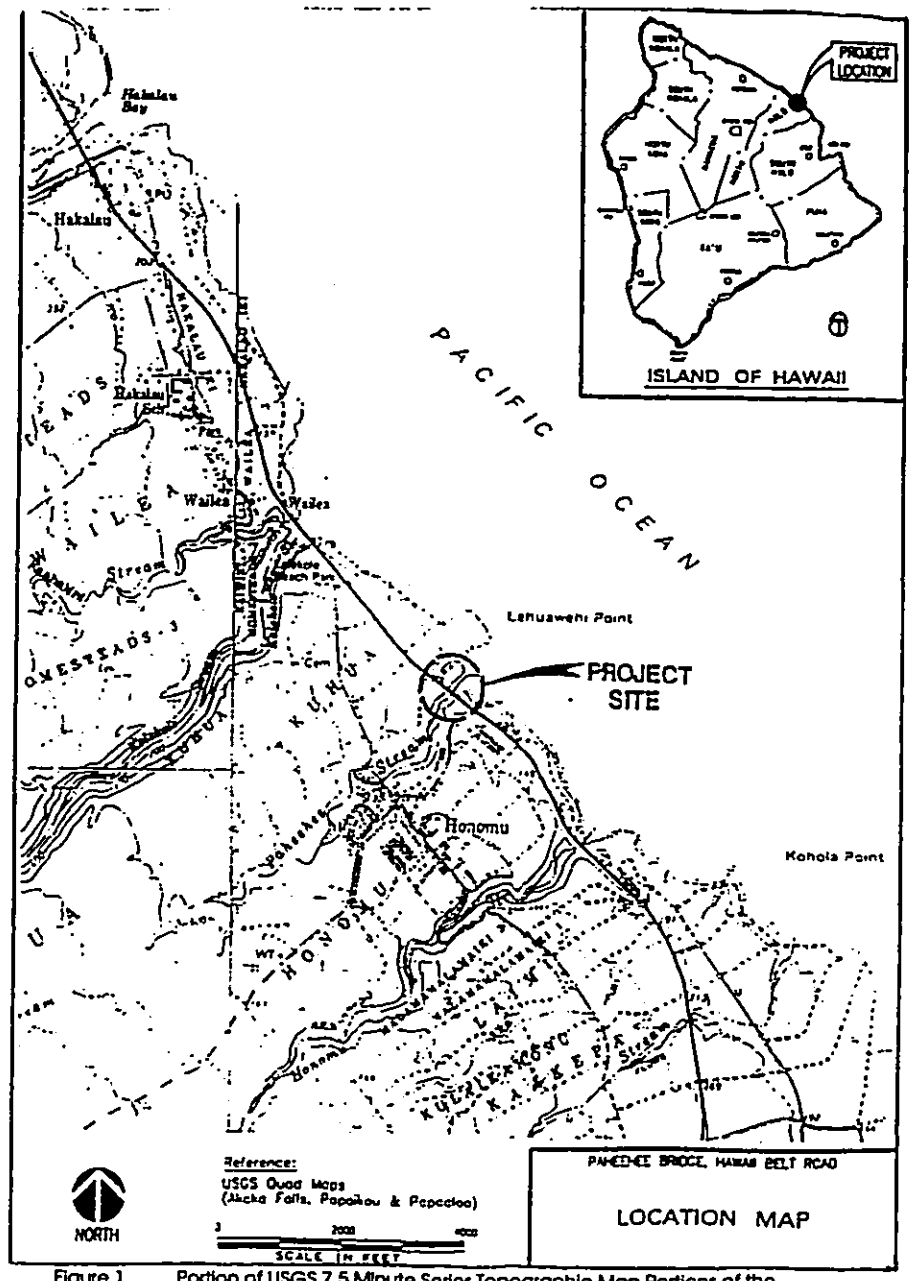

Figure 1 Portion of USGS 7.5 Minute Series Topographic Map Portions of the Papaikou and the Papaaloa Quads received from Engineering Concepts, Inc. Showing Project Area Location

Methods

Field work was conducted on October 23, 1998 by Brian Colin and Anthony Bush and on November 11, 1998 by Tracy Tam Sing and Tyler Campbell. Field work consisted of a 100% ground survey, on foot, of all accessible areas underneath and surrounding the bridge up to 30.0 m. (98.4 ft.) along all sides of the bridge. Portions of the slopes on both sides of the sides of the bridge were unaccessible to pedestrian traffic due to being very steep. Photographic documentation of the bridge and surrounding area was also conducted. The first day of the survey consisted of an evaluation of bridge and accessibility to the structure and surrounding area. The second day consisted of actual ground survey and photographic documentation. The survey was conducted to determine the presence or absence of historic sites that could possibly be impacted by the modifications to the bridge.

HISTORIC BACKGROUND

Bridges of the Island of Hawaii were inventoried, evaluated and their history documented in the late 1980s by Patricia M. Alvarez for the State of Hawaii, Department of Transportation Highways Division in cooperation with the U.S. Department of Transportation federal Highway Administration. The following is taken from the Historic Bridge Inventory and Evaluation, Island of Hawaii (Alvarez 1987:118-121):

> Paheehee Gulch Bridge was built in 1911 as a railroad bridge by the Hilo Railroad Company. It was reconstructed in 1950 as a territorial highway bridge. It has historical significance as a reminder of the railroad which, while bankrupting itself, brought prosperity to Hilo by providing cheap and reliable transportation to harbor for the sugar grown on the slopes of Mauna Kea. The railroad and its numerous bridges together have been called the "greatest engineering feat in Hawaii." Another commentator noted that the completion of the railroad marked nothing less than "an era in the development of the Islands."
>
> The Hilo Railroad Company was incorporated in 1899 by among others, B.F. Dillingham, a noted Hawaiian businessman; Lorrin Thurston, the Minister to Washington of the Republic of Hawaii and a former Interior Minister under the monarchs; and Mark Robinson, Queen Liliuokalani's Minister of Foreign Affairs.
>
> The railroad company's goal was to serve Hawaii's richest sugar lands, the territory between Hilo and Paauilo, with modern transportation facilities. It decided to do this with a daring engineering project - to cross the numerous gorges and streams with large steel bridges at stream mouth near the ocean, and to fill in and cut away earth in its comparatively straight road bed.
>
> The company succeeded in erecting fourteen steel bridges, five wood and steel combination bridges, and twenty-four wooden trestles. However, these, along with two tunnels and expensive grading, gave the Hilo Railroad "one of the highest per-mile construction costs of any railroad under the Stars and Stripes." Burdened with debt and unable to meet its obligations, the railroad was forced into receivership in 1916. Reorganized as the Hawaii Consolidated Railway, the line was in operation until the 1946 Tidal Wave knocked out several of its major bridges and closed it down permanently.

> The bridge's components were ordered from the New York firm of Hamilton and Chambers. It was erected by W. W. Beers, described by the *Hilo Tribune* as a New York engineer. All the steel bridges erected by the railroad were of the same type, with wide steel towers between 66 to 72-foot spans. They were assembled at the Waiakea railroad yards and shipped out to their sites on railroad cars. ... The Pahe'ehe'e Bridge was bought by the Territory of Hawaii after the railroad demise, one of only five railroad bridges left standing. Its top structure was redesigned by a California consultant and executed under the direction of William Bartels, longtime territorial bridge engineer. Steel from the disassembled bridges was used to double up the girders of the existing towers, and the concrete deck was molded like others from the 1950s (Ibid.:120).

The Pahe'ehe'e Bridge was built during "the second phase of construction (Hakalau to Paauilo) of what the railroad called its 'Hamakua Extension'"(Ibid.). The bridge was designed by John Mason Young, the founder of Pacific Engineering Company of Honolulu.

Pahe'ehe'e is a good representative of the Hamakua Coast railroad bridges. It sits on three steel towers between spans 66 feet long.

"Its steel spans are not easily visible and therefore communicate little about the bridge's early days" (Ibid:131).

PREVIOUS ARCHAEOLOGICAL RESEARCH

Previous archaeology within the entire Mauna Kea Windward Slopes subregion is limited to three reconnaissance surveys conducted between 1908 and 1932, two inventory surveys by Paul H. Rosendahl, Inc. (PHRI), conducted in 1990 and 1992 and a regional synthesis of Hamakua by Ross Cordy (1992).

The three early surveys include Stokes (1919), Hudson (1932), and Handy and Handy (1930s). These surveys area characterized by Ross Cordy as, "extremely limited reconnaissances" which took place, "before the advent of modern archaeology and after the major development of the sugar cane industry in this region" (1992:150). "In sum," Cordy continues, "only three archaeological sites appear to have been identified in this subregion. One [the Ka Loa *heiau* identified by Stokes] was destroyed by 1930-1932, and one [a cliff cave at Kukuihaele in which a wooden religious image was found] is unlocated" (1991:150-151). The other site is an irrigated agricultural site located by Handy and Handy in Waiko'eko'e *ahupua'a*.

The more recent inventory surveys within the Mauna Kea Windward Slopes subregion were both within sugar cane lands, one on the western end of the Hamakua coast, near Waipi'o Valley, and one near the town of Paauilo, located approximately five miles to the northwest of the present project area. In the latter survey (Head and Rosendahl 1992), three sites were identified and all were historic, transportation-related and "probably associated with Hamakua Sugar Company agricultural activities" (1992:6). The remainder of the project area was either cane fields which had been extensively plowed, or gulches which contained no evidence of agriculture or habitation-related use. Although there were no LCA's within this PHRI project area, the authors concluded that it was probable there were houses scattered along the *alanui aupuni*, with other trails running *mauka* to the *'ohi'a-koa* forest zone, similar to the land-use pattern of this subregion discussed by Cordy (1992).

FINDINGS AND ARCHAEOLOGICAL INTERPRETATIONS

The project area terrain consisted of three distinct parts, the relatively level area on both sides of the bridge on the top of the gulch; the steep sides of the gulch beneath the bridge; and the floor of the gulch beneath the bridge which consisted of the gently sloping stream bed and adjacent meander bars.

The areas surveyed on the top of the gulch have been completely altered either by the construction of the current bridge or from the cultivation of sugar cane.

The sides of the gulch within the project area also seem to have been impacted in the construction of the current bridge, and were prohibitively steep and largely inaccessible. No archaeological sites were found.

On the floor of the gully within the project area (beneath the bridge) the stream bed covers approximately 60% of the flood plain surface. The stream bed was exposed bedrock with scattered soil and gravel pockets. The meander bars consisted of undulating soil and scattered cobbles and boulders overlying bedrock. No archaeological sites were found.

Remnants of commercial sugar cane infrastructure (i.e. a possible mill and various land alterations) were noted *makai* and to the east of the project area. These remnants will not be affected by any alterations during the proposed seismic retrofitting to the Pahe'ehe'e Bridge.

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