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GLENN M. OKIMOTO
DIRECTOR

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JADE T. BUTAY
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IN REPLY REFER TO:

HWY-K 4.110580

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

November 10, 2011

RECEIVED
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OFC. OF ENVIRONMENTAL QUALITY CONTROL

Mr. Gary Hooser, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Hooser:

SUBJECT: Draft Environmental Assessment for: Kuhio Highway Bypass Road at Lumahai, Kauai

The Department of Transportation has reviewed the Draft Environmental Assessment for the subject project, and anticipates a Finding of No Significant Impact. Please publish notice in the next available OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form and one (1) copy of the document in pdf format on a CD; and one (1) hardcopy of the Draft EA. Please call Raymond J. McCormick, Highways Division District Engineer, Kauai at 808-241-3006, or email Raymond.J.McCormick@hawaii.gov if you have any questions.

Sincerely,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

Enclosures

Publication Form
The Environmental Notice
Office of Environmental Quality Control

Instructions: Please submit one hardcopy of the document along a with determination letter from the agency. On a compact disk, put an electronic copy of this publication form and a PDF of the EA or EIS. Mahalo.

Name of Project:	Kuhio Highway Bypass Road at Lumahai, Kauai
Applicable Law:	Chapter 343, HRS
Type of Document:	Draft Environmental Assessment
Island:	Kauai
District:	Hanalei
TMK:	(4)5-7-03 (highway right of way)
Permits Required:	Conservation District Use Permit, Work within State Highway Right-of-Way, Special Management Area Permit, National Pollutant Discharge Elimination System permit
Name of Applicant or Proposing Agency:	State of Hawaii, Department of Transportation, Highways Division
Address	869 Punchbowl Street
City, State, Zip	Honolulu, Hawaii 96813
Contact and Phone	Raymond McCormick, Kauai District Engineer, 808-241-3000
Approving Agency or Accepting Authority:	State of Hawaii, Department of Transportation
Address	869 Punchbowl Street
City, State, Zip	Honolulu, Hawaii 96813
Contact and Phone	Glenn Okimoto, Director, 808-587-2150
Consultant	EKNA Services, Inc.
Address	615 Piikoi Street, Suite 300
City, State, Zip	Honolulu, Hawaii 96814
Contact and Phone	Elaine Tamaye, 808-591-8553 ext. 204

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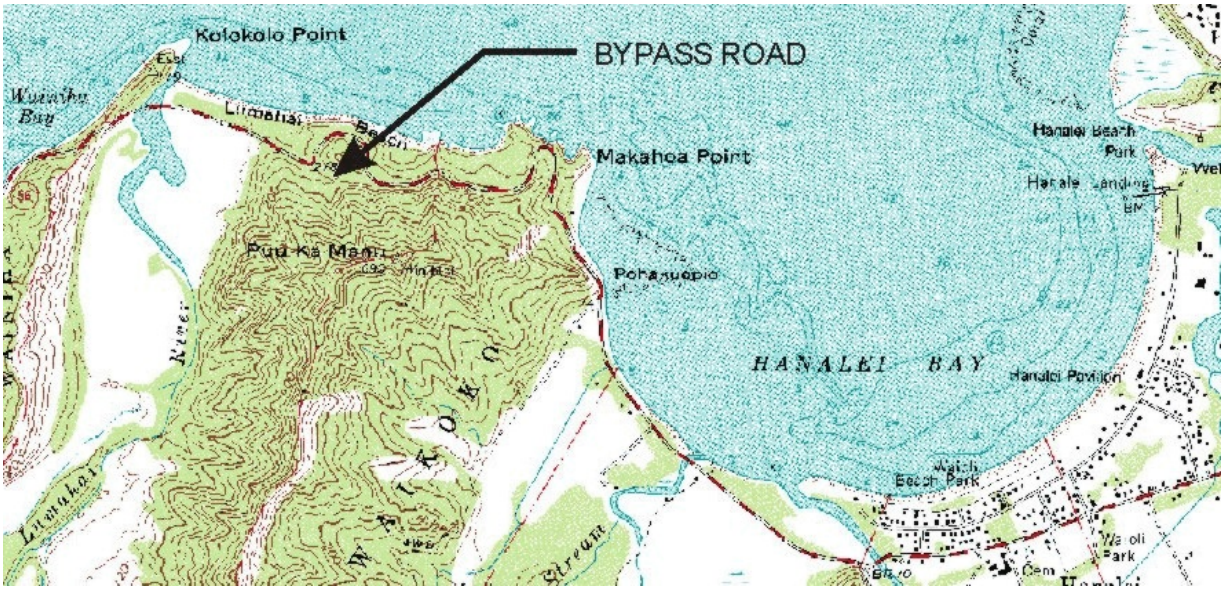
OFC. OF ENVIRONMENTAL QUALITY CONTROL

Project Summary: Summary of the direct, indirect, secondary, and cumulative impacts of the proposed action (less than 200 words).

The 900 linear feet of new road will bypass a section of the existing highway (Route 560) that winds around the seaward side of a knoll or *pu'u* in the Lumahai area on the north shore of Kauai. The bypass road corridor is narrow with steep side slopes and vegetated with trees and shrubs such as ironwood, Java plum, *hala*, *ohi'a*, and strawberry guava. No threatened or endangered species was observed at the site. Trees will be removed within the 40 feet wide road corridor and on side slopes that require grading and/or stabilization measures to prevent landslides. Disturbed areas along the bypass road alignment will become quickly re-vegetated after construction. An archaeological survey found no traditional archaeological sites or resources. The view plane from the bypass road will be one of steep mountain sides on both sides of the road. The only non-natural view features will be the retaining walls and guard rails. The metal guardrails are required for safety purposes and will be coated with brown epoxy to blend with the foliage. The concrete retaining walls will have rock textured finish (either sculpted rock faces or form-lined textured rock faces). There will be no long-term effects on traffic because the bypass road does not increase highway capacity. After the new bypass road is completed, the existing road that winds around the makai side of the *pu'u* will be closed to vehicular traffic.

DRAFT
ENVIRONMENTAL ASSESSMENT

Kuhio Highway Bypass Road at Lumahai, Kauai



Proposing Agency:

State of Hawaii
Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, Hawaii 96813

November 2011

This document is prepared pursuant to Chapter 343, HRS.

Summary Sheet:
Kuhio Highway Bypass Road at Lumahai, Kauai

Project: The project is the construction of approximately 900 feet of highway between milepost (MP) 5.32 and 5.54, on the north shore of Kauai. This new section of highway will bypass the Loop Road section of the existing highway that winds around the seaward side of a knoll or *pu'u*, east of Lumahai River. The new roadway section will be built with an asphalt concrete base overlain with asphalt paving, 2-foot wide paved shoulders, grassed swales to convey runoff, drainage structures, retaining walls and metal guardrails. Eroded mountain slopes above the highway will be stabilized by lowering the gradients and installing erosion control matting. Where lower slope gradients are not feasible, soil nails with shotcrete facing or permanent erosion control mats will be installed.

Location	Kuhio Highway, Route 560, north shore of Kauai, between MP 5.32 and 5.54 in vicinity of Lumahai, island of Kauai
Tax Map Keys	TMK (4) 5-7-03 Kuhio Highway right-of-way
Project Site Area and Elevation	Site area approx. 1.25 acre Elevation approx. 90 to 150 feet above mean sea level
State Land Use District & Zoning	Conservation (State Land Use District); Open (County Land Use Zoning)
Ownership	State of Hawaii
Approving Agency	Department of Transportation, Highways Division, 869 Punchbowl Street, Honolulu, Hawaii 96813.
Applicant	Department of Transportation, Highways Division, 869 Punchbowl Street, Honolulu, Hawaii 96813. Contact: Raymond McCormick, Kauai District Engineer, 808-241-3000 (telephone), 808-241-3011 (fax).
Consultant	Mitsunaga & Associates, Inc., 747 Amana Street, Suite 216, Honolulu, HI 96814, Contact: Chad McDonald, 945-7882 (telephone), 946-2563 (fax)
Associated Consultant	EKNA Services Inc., 615 Piikoi Street, Suite 300, Honolulu, HI 96814, Contact Elaine Tamaye, 591-8553 (telephone), 593-8551 (fax)
Required Permits and Approvals	Conservation District Use Permit (CDUP) (DLNR, Office of Conservation and Coastal Lands), Work Within State Highway Right-of-Way (State Department of Transportation), Special Management Area (SMA) Permit (Kauai County), National Pollutant Discharge Elimination System (NPDES) Permit (Department of Health).

Contents

1. Description of the Proposed Action

1.1 **Technical characteristics.** This section describes the location and purpose of the project and how it would be accomplished.

1.1.1 **Project background and purpose of this environmental assessment.** The DOT-HWY (State of Hawaii, Department of Transportation, Highways Division) proposes to build about 900 feet of new road on Kuhio Highway, Route 560, on the north shore of Kauai in the vicinity of Lumahai, between milepost (MP) 5.32 and 5.54, as shown on Exhibit 1. The new road section will bypass a section of the existing highway that winds around the seaward side of a knoll or *pu'u*. The existing road that circles the *pu'u* (herein referred to as the Loop Road) has experienced erosion of the highway shoulder embankment and cracking of the highway pavement. The potential for catastrophic failure of a section of the Loop Road due to slip-out has prompted DOT-HWY to initiate emergency repairs under Governor's proclamation which allows expedited design and construction of the repairs.

Kuhio Highway is believed to have been constructed by the County of Kauai in about 1930 and transferred along with its real property in 1968 to the State of Hawaii for ownership, maintenance and operation. The highway lies along steep coastal cliffs. It is a major collector road and is the only vehicular link for the communities along the north shore of the island. Because of this, it is subject to heavy local and tourist traffic. The Loop Road section of the highway is not within the highway right-of-way. The Loop Road was conveyed to B.P. Bishop Estate (now Kamehameha Schools/Bishop Estate or KSBE) in 1938 in exchange for the lands within the current highway right-of-way that passes through the saddle on the mauka side of the *pu'u*. The State (or County) apparently constructed roadway improvements subsequent to the land exchange, but abandoned the road after problems with landslides and has continued to use and maintain the

Loop Road to this day. Construction of the bypass road would address the safety and liability issues associated with continued use of the Loop Road.

This environmental assessment is required because State DOT funds will be used for construction of this project. The project also requires a Conservation District Use Permit and a Special Management Area permit. The project, therefore, is subject to preparation of environmental documentation in accordance with the requirements of Chapter 343, Hawaii Revised Statutes. This Environmental Assessment addresses the limited environmental impacts anticipated to be caused by this project.

1.1.2 **Location and purpose of the project.** The project is located on the north shore of Kauai in the Lumahai area. Approximately 900 feet of highway is proposed to be built to bypass a section of the existing highway, identified on Exhibit 1. The project seeks to provide a safe roadway for continuous access to communities lying beyond the Loop Road section of highway that is being bypassed.

1.1.3 **Description of the project.** The project consists of building a total length of approximately 900 feet of highway between MP 5.32 and 5.54. The existing roadway is a narrow (about 20 feet wide) two lane asphalt paved road with little or no shoulders in the vicinity of the bypass road. The existing highway is at elevation about 90 feet above mean sea level (MSL) at the west (Haena) end where the bypass road will connect to the existing road (Exhibit 2 photos), and at about 150 feet above MSL at the east (Hanalei) end where the bypass road connects to the existing road (Exhibit 3 photos). Slopes along the inland or mauka side of the existing roadway at both ends of the bypass corridor are vegetated, steep to near-vertical slopes extending to the ridgeline. Seaward (makai) slopes average about 45% and are near vertical in some areas. Slopes on both sides of the bypass corridor saddle on the mauka side of the *pu'u* are also steep (Exhibit 4 photos). Mountain side slopes will need to be cut and stabilized to widen the corridor

for the new highway. Upper slopes are likely unstable and will also need to be stabilized to prevent future landslides. Overhead utility lines will need to be relocated to follow the new road alignment.

The new bypass road will have two 10-foot travel lanes. The new section of highway will be built with an asphalt concrete base overlain with asphalt paving, 2-foot wide paved shoulders, grassed swales to convey runoff, drainage structures, retaining walls and metal guardrails. The total width of the road corridor will be 40 feet to accommodate the road and the 10 feet wide clear zone (shoulder and swale) on both sides of the highway. In order to prevent landslides from impacting the new road, the mountain slopes above the highway will be stabilized by lowering the gradients and installing erosion control matting. Where lower slope gradients are not feasible, soil nails with shotcrete facing or permanent erosion control mats will be installed. Exhibit 5 provides the typical sections showing the proposed work, and Exhibit 6 shows the overall site plan for the new highway alignment. Except for the 2-foot wide paved shoulder, the roadway section conforms to the community's Kuhio Highway Historic Roadway Corridor Plan for Hanalei. The paved shoulder matches the existing condition of the road and is proposed to allow for provisions of possible pedestrians/bicyclists through the corridor.

Exhibit 7 shows the plan and profile for the bypass road. The finish grade is steep (10% average) for much of the bypass road because of the elevation difference where the bypass road connects to the existing road at both ends. To mitigate the concern for speeding through the narrow corridor, proposed traffic calming devices include grooved rumble strips.

After the new bypass road is completed, the existing Loop Road that winds around the makai side of the *pu'u* will be closed to vehicular traffic. Gates would close off the existing Loop Road, which would revert back to Kamehameha Schools/Bishop Estate (KSBE) as the current land owner after the revocable right of entry agreement expires in August 2013.

1.1.4 **Project schedule and estimated cost.** Construction funding has not yet been programmed for this project. The estimated construction period is 10 months. The estimated construction cost is $4.5 million, and will be funded entirely from State monies.

1.1.5 **Importance of Kuhio Highway to the community.** Kuhio Highway is the only link to the main urban facilities of Kauai for residents westward beyond the project area on the north shore. Residents, the community and businesses depend entirely on the highway for access for the transportation of goods, visitors, travel to and from schools, stores, the airport, hospitals and places of work.

1.2 **Socio-economic characteristics.** This section discusses the impacts of the proposed project on the community at large in terms of both social and economic effects.

1.2.1 **Economic impacts on the community at large.** The project will have a beneficial economic effect on the communities lying westward beyond the project site because it maintains the only reliable transportation route, a public health and safety purpose. The highway is essential for access and economic activity, as Wainiha and Haena are significant visitor destinations on the island of Kauai.

1.2.2 **Provision of income for county or state and creation of employment opportunities in areas with high unemployment rates.** The project provides benefits both through jobs related to its implementation, jobs maintained by the access provided by the highway, and maintenance and enhancement of businesses which are employers.

1.2.3 **Targeted segment of the population.** The Wainiha and Haena communities receive important and significant benefits from this project.

Kauai County and the State of Hawaii also benefit from visitor interest in the Wainiha to Haena area.

1.2.4 **Population density.** The project does not affect population density because it does not provide for a traffic level of service greater than presently afforded.

1.2.5 **Recreational facilities.** There are no recreational facilities at the project site. Visitors and residents seeking recreation at Lumahai Beach, Wainiha and Haena (and other areas of Kauai for the Wainiha and Haena residents) will benefit from safer access to these areas due to the new bypass road. There are no sites identified by the County of Kauai Public Access, Open Space and Natural Resources Preservation Fund Commission (Open Space Commission) within the project area that are identified as having unresolved public access issues or that are recommended for acquisition.

1.2.6 **Child care provisions.** There are no child care provisions in relation to the proposed project.

1.2.7 **Relocation of residences.** There are no residence relocations proposed by the project. The nearest residences are located about one mile beyond the far ends of the project.

1.2.8 **Costs of the proposed project and economic analysis.** The estimated total cost of construction of the project is approximately $4.5 million.

1.3 **Environmental characteristics.** This section discusses the potential effects of the proposed project on the physical environment.

1.3.1 **Aesthetics and view planes.** The view plane will be changed from having a mountain slope on one side only to having tall steep mountain slopes on both sides of the bypass corridor. Disturbed areas along the bypass road

alignment will become quickly re-vegetated after construction. There are two scenic pull-out areas on the existing Loop Road that will be bypassed by the new road. However, the view plane is substantially blocked by vegetative growth on the makai side of the highway. The Lumahai Beach Lookout situated on the Hanalei side of the bypass road will not be affected.

New retaining walls will change the aesthetics and view plane through a 200 foot stretch of the road corridor. The new retaining walls will have either rock-sculptured shotcrete facing or formlined textured rock faces. The upper slope stabilization will be designed to blend the proposed solutions into the existing environment. The erosion control matting will allow hydro-mulch applied grass and native vegetation to grow through. If soil nails and shotcrete will be required, then they can be designed to look like a natural rock slope face. This rock-sculptured shotcrete facing is being used for highway repairs being conducted in the vicinity of the Lumahai Beach Lookout. The new metal guardrails will be coated with brown epoxy to blend with the surrounding foliage, and are substantially the same as new railings being used along Kuhio Highway in the vicinity of the project area.

1.3.2 **Air quality.** There will be limited short term effects on air quality during construction, arising from operation of construction equipment, which would be mitigated per state and county regulations. Additionally, trade winds will quickly disperse equipment exhaust. There would be no long term effect because the project includes no air pollution sources and is not anticipated to generate additional vehicular traffic along the highway.

1.3.3 **Traffic.** There will be no significant long-term effects on traffic because the proposed project does not increase highway capacity. Area residents have voiced concerns about speeding on the bypass road due to its straight alignment and steep grade. The Loop Road discourages speeding due to its curvilinear alignment. There will be effects on traffic during construction and during delivery of construction materials to the site. Such effects are

temporary and most of the construction of the new road will take place away from the existing highway. Temporary lane closures will occur only during the tie-in of the new road with the existing road. Construction traffic will consist of trucks and trailers (limited by severe weight restrictions of the Waipa, Waikoko, Waioli and Hanalei River bridges). Truck traffic associated with construction may be restricted to off-peak hours as necessary to provide adequate and safe access through the construction area. Construction trucks and associated vehicles will follow best management practices (BMPs) regarding roadway clean up resulting from their tracking.

1.3.4 **Noise levels.** No significant or long-term impacts to ambient noise levels will occur. There will be some local noise increase during construction, but there are no residential communities in the immediate vicinity of the project site. Contractor equipment is required to comply with Department of Health noise regulations. Passengers and pedestrians/bike riders may experience short-duration higher noise levels when vehicles are passing through the short section with the retaining walls on both sides of the road.

1.3.5 **Effects on water quality.** Because of the potential for stormwater runoff from the bypass corridor to reach coastal waters, an individual National Pollutant Discharge Elimination System (NPDES) permit will be obtained. There are no known aquifers within the extent of the site, from which a discharge could occur. There will be temporary discharges of rainfall runoff from the site during construction, but this will be controlled by the contractor's operational and erosion control practices.

1.3.6 **Other environmental effects.** The project site is located in a flood hazard area identified as Zone X, wherein there is less than 0.2% annual chance of flooding (e.g. outside the 500-year floodplain), as delineated by the Federal Emergency Management Agency (FEMA).

2. Affected Environment, Anticipated Effects and Proposed Mitigative Measures

2.1 **Location.** The proposed bypass road is located on the north shore of the island of Kauai, within the highway right-of-way on Kuhio Highway between MP 5.32 and 5.54 in the vicinity of Lumahai.

2.2 **Land ownership and tenancy**. The bypass road will be constructed in the highway right-of-way (TMK: (4) 5-7-03) (Exhibit 8). The adjoining mauka and makai landowner is B.P. Bishop Estate (now KSBE) (TMKs 5-7-03:10 and :3 respectively). Some upper slope stabilization work could encroach into KSBE lands, thus requiring right-of-entry for construction and slope easements.

2.3 **County zoning, State Land Use District**. The project reach is in the State Conservation District, Resource subzone (Exhibit 9). A Conservation District Use Permit will be required from the Department of Land and Natural Resources. Kauai County zoning is Open as shown on the Kauai North Shore Planning District Land Use Map (Exhibit 10).

2.4 **Special Management Area, Coastal Zone Management Consistency**. The project reach is in the Special Management Area (Exhibit 11). A Special Management Area (SMA) permit is required from the County of Kauai Planning Department.

2.5 **Land and related water use plans.** Following is a discussion of land and water use plans which are related to the proposed project.

2.5.1 **County of Kauai General Plan**. The proposed project conforms to the Community Values ideals of the *Kauai General Plan* by enabling access to the Lumahai-Wainiha-Haena area, which enhances enjoyment of open spaces, natural beauty, rural lifestyle, outdoor recreation and parks; access to and along shorelines, economic growth promoting jobs and a strong

economy, and safety for all citizens and visitors. The General Plan also imbues responsibility with the County to provide, maintain and improve shoreline access from public roads.

2.5.2 **County of Kauai, North Shore Development Plan**. The North Shore Planning Area is defined by the Hanalei Judicial District boundaries, extending from Moloaa Bay, west to Puanaiea Point. The development plan is a physical plan intended to guide the physical development of the community - describing how, why, when, and where to build, rebuild, or preserve. The proposed project conforms to the plan objectives to provide a safe road and bridge system to and within the North Shore.

2.5.3 **State of Hawaii.** The *Hawaii State Plan* provides long-range planning objectives and policies for the State. The proposed project conforms to the State objectives to preserve scenic views and historic resources, and reduce threats to life or property from erosion. The State Land Use Law classifies all state lands as urban, rural, agricultural or conservation. The site of the proposed project is designated in the Conservation district, Resource subzone, in which a highway and repairs to it are permissible uses.

2.5.4 **Federal.** There are no federal plans for the area.

2.6 **Flora.** A botanical survey (provided in Appendix A) was conducted for anticipated repairs along the existing road in the vicinity of Lumahai and Wainiha. The survey found that “Aside from naupaka and hala trees, which may be early Polynesian introductions, no endemic or indigenous plants were found at these sites. Otherwise the vegetation found during this survey is all introduced and can be found in many places throughout the Hawaiian Islands and will quickly regenerate if disturbed.” As for threatened or endangered species, the botanical report notes “No candidate, proposed, or listed threatened or endangered species as set forth in the Endangered Species Act of 1973 as amended (16 USC 1531-1543) are known from this site and none were found during this survey.” A second botanical

survey (provided in Appendix B) was conducted for the saddle area along the alignment of the proposed bypass road. This survey noted that "The saddle floor and north slope harbor mostly open forest of non-native trees (ironwood and Java plum), shrubs, vines and herbs. The south slope is an open forest of many native plants, primarily *hala* and *ohi'a*, with native sedges and ferns, but heavily invaded by strawberry guava." As for threatened or endangered species, the report states that "No species that is listed by the state or federal governments or considered a candidate species, or is especially rare, or is of any special concern was observed at the site." Trees will be removed within the 40 feet wide road corridor, and on side slopes that require grading and/or stabilization measures to prevent landslides. These trees are primarily ironwood and lauhala.

Mitigative Measures: No mitigation is required.

2.7 **Fauna.** A faunal survey (provided in Appendix C) was conducted for anticipated repairs along the existing road in the vicinity of Lumahai and Wainiha. The survey detected two mammal species and observed 12 bird species at or around the proposed sites. No threatened or endangered fauna are resident at the project sites. However, one endangered endemic bird species (the Hawaiian Petrel, *Pterodroma sandwichensis)* and one threatened endemic subspecies (Newell's Shearwater, *Puffinus auricularis newelli*) were found to traverse the highway corridor en route to inland nesting sites.

Mitigative Measures: To reduce the possibility that the nocturnally flying Hawaiian Petrels and Newell's Shearwaters may be disoriented and downed by construction lighting, nighttime construction will be allowed between January and July, but prohibited between August and December. This mitigation would minimize the threat of disorientation and downing of both species, especially fledgling birds which are at particular risk during the fledging period which is concentrated between mid-August and mid-December each year.

2.8 **Soils.** Soil in the vicinity of the project site is classified by the U.S. Department of Agriculture, Natural Resources Conservation Service as being Type HMMF, Hihimanu Series silty clay loam, 40 to 70 percent slopes (Exhibit 12). The Hihimanu Series consist of well-drained soils on uplands on the island of Kauai. These soils developed in material weathered from basic igneous rock and colluvium at the base of slopes. They are very steep, and elevations range from 100 to 2,000 feet. The annual rainfall amounts to 70 to 120 inches. Hihimanu Series silty clay loam, 40 to 70 percent slopes (HMMF) soils are specifically described as very steep and occupying uplands. In a representative profile, the surface layer is dark-brown silty clay loam and silty clay about 15 inches thick. The subsoil, 24 to more than 57 inches thick, is brown, dark-brown, and reddish-brown silty clay and clay that has subangular blocky structure. The substratum is soft, weathered rock. The soil is very strongly acid in the surface layer and subsoil. Permeability is moderately rapid. Runoff is medium, and the erosion hazard is moderate. In places roots penetrate to a depth of 5 feet or more.

The proposed project will occur within the saddle area on previously disturbed soils. The soils along the road alignment will be excavated and replaced with granular structural fill, to provide a better foundation for the new pavement section. Eroding mountain slopes above the highwaywill be stabilized by lowering the gradients and installing erosion control matting. Where lower slope gradients are not feasible, soil nails with shotcrete facing or permanent erosion control mats will be installed.

Mitigative Measures: Best Management Practices will be implemented during construction to prevent erosion of soils and to prevent muddy runoff from entering coastal waters.

2.9 **Water quality, water resources, hydrology**. There are no perennial streams, wetlands or groundwater resources (aquifers) within the project reach. Coastal waters offshore the site are Class AA. It is the objective of Class AA marine waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused

source or actions. Lumahai River is a Class 2a perennial stream, and is located about 1,500 feet west of the tie-in of the new road section to the existing highway. Because of the potential for stormwater runoff from the bypass corridor to reach coastal waters, an individual National Pollutant Discharge Elimination System (NPDES) permit will be obtained. Stormwater runoff from construction sites that may enter Class AA waters must obtain individual NPDES permit coverage instead of receiving coverage under General Permit C. No new discharges from the proposed project will be discharged to Lumahai River. Grassed swales will filter the runoff from the highway prior to conveyance to a drainage culvert that will discharge on the makai side of the highway.

Mitigative Measures: Best Management Practices will be implemented during construction to prevent erosion of soils and to prevent muddy runoff from entering coastal waters.

2.10 **Historical, archaeological sites, traditional practices and cultural impacts**. Kuhio Highway, Route 560, is listed on the State and National registers of Historic Places. The highway westward of Waioli Bridge in Hanalei is identified as a scenic roadway corridor on the Kauai County North Shore Heritage Resources Map (Exhibit 13). There are no registered archaeological sites, historic buildings or structures, or other known historic or cultural features affected by the project. The closest cultural feature is a heiau site located at the mouth of the Lumahai River. Because the highway is cut into steep shoreline topography, there is little likelihood that cultural sites or archaeological features will occur in the immediate vicinity of the highway. Further, within the right-of-way and limits of proposed new highway improvements, most of the ground has been substantially disturbed by prior roadway construction.

An archaeological survey was conducted within the right-of-way on the mauka side of the *pu'u* and also on the makai side of the *pu'u* where emergency repairs are presently under construction (provided in Appendix D). The survey found no traditional archaeological sites or resources. However, two historic sites were documented within the bypass corridor, that appear to be associated with the

original roadway construction through this saddle area. Both are drainage structures - the larger structure at the west end of the bypass extends beneath the existing road to the ocean side of the highway.

A cultural impact assessment (provided in Appendix E) was conducted for anticipated repairs along the existing road in the vicinity of Lumahai and Wainiha. The purpose was to investigate the project area for possible traditional practices that would be disturbed by anticipated work along the existing road. The results of the study indicate that gathering, hunting, and fishing continue to be conducted by Native Hawaiians in the vicinity of the project. Plants collected on the makai edge of the highway may be impacted by the construction activities. The botanical survey conducted for this project indicated that the plants that were identified for gathering are not uncommon in the project area. According to the botanist who conducted the survey, those plants are common members of the roadside community of plants. All work will be conducted with the highway right-of-way and in areas previously disturbed by the construction of the road (that was subsequently abandoned). The project will not affect the hunting trails on the mauka side of the highway nor the fishing trails on the makai side.

Route 560 is a 10-mile rural road that was part of the first completed belt road in the Hawaiian Islands (constructed in early 1900s), and has retained a significant portion of its original characteristics and features. In recognition of Route 560's historic stature, a Rural-Historic Road Corridor Plan was drafted to provide design guidelines for the DOT-HWY that reflect a community consensus for future work on the highway. The design of the proposed bypass road is consistent with this plan, except for the proposed 2-foot wide paved (instead of grassed) shoulder.

Because Kuhio Highway is on the State and National registers of Historic Places, approval from the State Historic Preservation Division (SHPD) is required for the proposed construction.

Mitigative Measures: If previously unknown cultural or historic resources, including human skeletal remains, are discovered during construction, the Contractor will

stop work immediately in the immediate vicinity of the find and will protect the find from further damage. The Contractor will immediately contact the Historic Preservation Division (808-692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

2.11 **Sensitive habitats or bodies of water adjacent to the proposed project**. There are no sensitive habitats or bodies of water adjacent to the project site. Coastal waters offshore the project area are designated Class AA. Because of the potential for stormwater runoff from the bypass corridor to reach coastal waters, an individual National Pollutant Discharge Elimination System (NPDES) permit will be obtained.

Mitigative Measures: Best Management Practices will be implemented during construction to prevent erosion of soils and to prevent muddy runoff from entering coastal waters.

2.12 **Flood zone.** The project site is located in a flood hazard area identified as Zone X, wherein there is less than 0.2% annual chance of flooding (outside the 500-year flood plain), as delineated by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Map (FIRM) Panel Number 1500020035 E, revision dated September 16, 2005 (Exhibit 14). Coastal areas seaward of the highway are located in Zone VE, with base flood elevations between 17 and 23 feet in the vicinity of the project reach.

Mitigative Measures: No mitigation is required.

2.13 **Topography and geology.** The highway grade in the vicinity of the site slopes westward towards Lumahai River. The existing highway is at elevation about 90 feet above mean sea level (MSL) at the west (Haena) end where the bypass road will connect to the existing road, and at about 150 feet above MSL at the east (Hanalei) end where the bypass road connects to the existing road. Slopes along the inland or mauka side of the existing roadway at both ends of the corridor are vegetated, steep to near-vertical slopes extending to the ridgeline. Seaward

(makai) slopes average about 45% and are near vertical in some areas. Slopes on both sides of the bypass corridor saddle on the mauka side of the *pu'u* are also steep. Eroding mountain slopes will be stabilized by lowering the gradients and installing erosion control matting. Where lower slope gradients are not feasible, soil nails with shotcrete facing or permanent erosion control mats will be installed.

Geotechnical borings were conducted during preparation of an engineering report describing conditions and possible solutions to the observed distressed sections of roadway in the vicinity of Lumahai and Wainiha. Sixteen exploratory borings were advanced to depths between 15 and 50 feet. Soils beneath the roadway consist generally of completely weathered rock, defined as rock which has completely disintegrated into soil, but retaining relic structure and texture. This material may also be defined as mottled brown to brown clayey silt, medium stiff to stiff, and which becomes less weathered and stiffer with increasing depth. Weathered rock extended to the maximum depths drilled at MP 5.22, and was underlain by hard basalt at depths ranging from 38 feet at MP 5.5 to 14 feet at MP 6.4. No groundwater was encountered during the exploratory drilling, but some seepage was observed.

Mitigative Measures: No mitigation is required.

2.14 **Seismic activity**. Kauai County is classified in lowest earthquake risk Zone 4 in the Uniform Building Code. In comparison, the island of Hawaii has the most severe risk and is classified in Zone 1; Maui is in Zone 2A, Oahu has a lesser risk in Zone 2B.

Mitigative Measures: No mitigation is required.

2.15 **Climate.** Monthly average temperature along the Kuhio Highway in the vicinity of the site is between 70 and 75 degrees Fahrenheit. Predominant winds are moderate northeast trades at speeds of 10 to 20 miles per hour. The mean annual

rainfall at the site is 78 inches per year. The project will not affect the climatic conditions in the area.

Mitigative Measures: No mitigation is required.

2.16 **Noise levels.** No significant or long-term impacts to ambient noise levels will occur. There will be some local noise increase during construction but the communities of Wainiha and Hanalei are at sufficient distance from the project sites and the terrain is such that construction noise levels will not be audible in residential areas. Contractor equipment is required to meet DOH noise regulations (Title 11, Chapter 46, "Community Noise Control"). Passengers and pedestrians/bike riders may experience short-duration higher noise levels when vehicles are passing through the short section with the retaining walls on both sides of the road.

Mitigative Measures: No mitigation is required.

2.17 **Air quality.** There are no existing air pollution sources at the site and no stationary sources of air pollution in the area. Operation of construction equipment, and construction activities, will create temporary dust and exhaust emissions, which impacts will cease upon completion of construction. The contractor will be required to mitigate dust during construction using measures such as water sprinkling. Construction equipment exhaust emissions will be controlled by adherence to the requirements of the Department of Health Administrative Rules (Title 11, Chapters 59 and 60 regarding Air Pollution Control). There will be no long term effects because the proposed project does not include permanent sources of air pollution, and will create no significant difference in traffic numbers from existing conditions.

Mitigative Measures: No mitigation is required.

2.18 **Aesthetics and view planes.** The view plane will be changed from having a mountain slope on one side only (existing road) to having tall steep mountain slopes on both sides of the bypass corridor. Non-natural view features resulting

from the project will be the retaining walls and guard rails. The metal guardrails are required for safety purposes and will be coated with brown epoxy to blend in with the foliage. This type of guardrail is substantially the same as new guardrails being used along Kuhio Highway in the vicinity of the project site. The concrete retaining walls will have rock textured finish (either sculpted rock faces or form-lined textured rock faces). The new retaining walls will change the aesthetics and view plane through a 200 foot stretch of the road corridor, compared to the existing Loop Road.

Disturbed areas along the bypass road alignment will become quickly re-vegetated after construction. Eroding upper slopes will be stabilized by lowering the gradients and installing erosion control matting, which will allow the native vegetation and/or hydro-mulched grassing to re-establish. Where lower slope gradients are not feasible, soil nails with rock-sculptured shotcrete facing or permanent erosion control mats will be installed. The rock-sculptured shotcrete facing is being used for highway repairs being conducted in the vicinity of the Lumahai Beach Lookout.

There are two scenic pull-out areas on the Loop Road that will be bypassed by the new bypass road. However, the view plane is substantially blocked by vegetative growth on the makai side of the highway. The Lumahai Beach Lookout situated on the Hanalei side of the bypass road will not be affected.

Mitigative Measures: No mitigation is required.

2.19 **Transportation facilities.** The bypass road is only accessible along Kuhio Highway. Kuhio Highway is the only link to the main urban facilities of Kauai for residents westward beyond the project area on the north shore. The DOT conducts 24-hour traffic counts, and from the data estimates the average daily traffic (ADT) for various highway segments. ADT data for Kuhio Highway on the Wainiha side of the project are tabulated below.

Average Daily Traffic (ADT) Data		
Year	Station B730560005290 MP 5.65 (near Lumahai Bridge)	Station B73100000033 MP 6.8 (near Wainiha Rd)
2006	5500	3900
2007	5555	3940
2008	3784	3258
2009	2800	3322

Traffic counts indicate reduced traffic along this highway from 2006 to 2009. There will be no significant long-term effects on traffic because the proposed project does not increase highway capacity. Area residents have voiced concerns about speeding on the bypass road due to its straight alignment and steep grade. The existing Loop Road discourages speeding due to its curvilinear alignment.

Construction of the bypass road will take place within the saddle on the mauka side of the *pu'u*. Therefore, traffic on the existing highway should not be impacted by construction activities except when connecting the new road to the existing road at the east and west ends. However, trucks hauling materials to and from the construction site will add to the vehicular traffic. Construction traffic will consist of trucks and trailers (limited by severe weight restrictions of the Waipa, Waikoko, Waioli and Hanalei River bridges). Truck traffic associated with construction may be restricted to off-peak hours as necessary to provide adequate and safe access through the construction area. Construction trucks and associated vehicles will follow best management practices (BMPs) regarding roadway clean up resulting from their tracking.

Mitigative Measures: Flagmen will be used for traffic control during construction. If both lanes of the road are required to be closed, the Highways Division will coordinate with police, fire and ambulance. As necessary, arrangements will be made to station emergency vehicles and equipment on the Haena-side of the

closure. To mitigate speeding through the narrow bypass road corridor, proposed traffic calming devices include grooved rumble strips.

2.20 **Population**. According to the *State of Hawaii Data Book 2010*, the population of Kauai County was 67,091 based on the 2010 census, an annual average growth of 1.1% from the 2000 census. The median age of the resident population was 41, and over 30% of the population was between the age of 45 and 64. There were 23,213 households in 2010, with an average household size of 2.83. The Hanalei District census tract 401 had a population of 6,348 in 2000, an increase of 37% from 1990 (updated data not available for the 2010 census).

Mitigative Measures: No mitigation is required.

2.21 **Environmental Justice.** Federal Executive Order 12898 requires federal agencies to take necessary steps to identify and avoid any disproportionate negative effects on minority and low-income population. Because there is no federal participation (funding or sponsorship) for this project, compliance with EO 12898 is not required for this EA. Nevertheless, this project will not disproportionately affect low-income or minority populations. Any short-term construction impacts will affect the entire population of the north shore districts served by the highway.

3. Alternatives Considered

3.1 **No action alternative.** This alternative involves the continued use of the existing highway (Loop Road) that winds around the makai side of the *pu'u* between MP 5.32 and 5.54. There is minimal to no initial cost for this alternative, however the existing highway will continue to experience erosion and damage to the road surface; liability of the DOT will increase, costs of maintenance will continue to mount, continued monitoring and maintenance will be necessary, and the public should be informed of the conditions.

Advantages: No capital construction cost, although the DOT-HWY would still be mandated to maintain safe transportation use of this highway. The visual integrity of the historic road will be retained, as will the historic alignment. The two scenic pull-out areas situated along the Loop Road would continue to be accessible.

Disadvantages: Continued deterioration of the existing roadway embankment along the Loop Road will increase maintenance costs; increase health and safety issues; increase liability exposure; and will require continued monitoring for public safety. Also, because the Loop Road is not on State lands, DOT will need to acquire the right-of-way, or obtain a perpetual easement, from KSBE.

3.2 **Repair existing highway and acquire Loop Road.** A short section of the Loop Road is in a state of distress that could lead to catastrophic failure, necessitating emergency repairs by DOT-HWY. The emergency repair will consist of excavation of a portion of the *pu'u* on the mauka side of the existing road section and relocation of the road away from the cliff edge. A shotcrete wall will stabilize the lower slope on the makai side of the road and the upper mauka slope will be stabilized with soil nails and wire mesh anchored to the slope to allow vegetation to re-establish. This emergency repair is currently under construction and will enable the Loop Road to be used safely until the bypass road is constructed. A right-of-entry has been obtained from KSBE to enable the DOT's contractor to construct the emergency repairs. However, the permanent acquisition of the Loop

Road from KSBE and DOT-HWY's commitment to continued maintenance is a viable alternative to the construction of the bypass road.

Advantages: The visual integrity of the historic road will be retained, as will the historic alignment. The two scenic pull-out areas situated along the Loop Road would continue to be accessible, and additional pull-out area would be created at the location of the emergency repairs. Acquisition cost for the Loop Road and the commitment to future long-term maintenance would likely be less than the capital construction cost of the new bypass road. Ground surface areas to be impacted by repairs to the existing highway will be much less than the land area affected by the new bypass road on the mauka side of the *pu'u*.

Disadvantages: Until the land transfer is completed, KSBE will have concerns about potential liability from continued use of Loop Road for Kuhio Highway traffic.

4. Expected Determination

4.1 **Finding of No Significant Impact (FONSI)**. In accordance with Chapter 343, Hawaii Revised Statutes, this Environmental Assessment characterizes the technical, social and environmental issues related to improvements of Kuhio Highway in the vicinity of Lumahai. It is anticipated that the project will not have significant effect on the environment, and therefore preparation of an environmental impact statement is not required. The Department of Transportation intends to render a Finding of No Significant Impact (FONSI) based on review and analysis of the "Significance Criteria" in Section 11-200-12 of the Hawaii Administrative Rules as documented below.

4.2 **Findings and Reasons Supporting the Determination Including Justifying Evidence.**

4.2.1 *No irrevocable commitment to loss or destruction of any natural or cultural resource would result.* Although Kuhio Highway is listed on the State and National registers of Historic Places, the proposed project would not significantly alter the site or view planes from the existing highway and there will be no effect. The view plane from the new bypass road would be changed from having a mountain slope on one side only (existing road) to having tall steep mountain slopes on both sides of the bypass corridor. The new bypass road will be constructed in substantial accordance with the Historic Road Corridor Plan. If previously unknown resources are uncovered during the course of construction, the Contractor will stop work immediately and notify the Historic Preservation Division which will determine the appropriate treatment.

4.2.2 *The proposed project will not curtail the range of beneficial uses of the environment.* The proposed project will not affect the beneficial use of the existing highway and surrounding environment.

4.2.3 *The proposed project will not conflict with the state's long-term environmental policies or goals and guidelines.* The state's environmental policies and guidelines as set forth in Chapter 344, HRS, "State Environmental Policy", encompass two broad policies: conservation of natural resources, and enhancement of the quality of life. The proposed project would not significantly conflict with the state's environmental policies, and quality of life would be maintained or enhanced through availability of reliable and safe transportation system.

4.2.4 *The proposed project will improve the economic and social welfare of the community and the state.* Kuhio Highway is the only highway access to the north shore of Kauai. Maintaining safe transportation access along this highway contributes to the economic and social welfare of the community and of the state. The project will have no effect on the number of vehicles using the highway, and would not change the rural character of the communities.

4.2.5 *The proposed project does not affect public health.* The proposed project will facilitate provision of emergency and other public health services and will benefit public health by maintaining a reliable and safe highway.

4.2.6 *No substantial secondary impacts, such as population changes or effects on public facilities, are expected.* The project will not alter the present capacity of the highway, and will not cause substantial secondary impacts.

4.2.7 *No substantial degradation of environmental quality is expected due to the proposed project.* Construction activities will have some effect on traffic and temporary mitigation will be implemented to minimize disruption. In the long term, the project will improve the environmental quality by providing a new bypass route.

4.2.8 *No cumulative effect on the environment or commitment to larger actions will be involved.* The project has no cumulative effect on the environment and

will not involve a commitment to larger actions. The project entails replacing an existing section of highway with a new bypass road within the existing highway right-of-way.

4.2.9 *No rare, threatened or endangered species or their habitats are affected.* No impacts are anticipated on any candidate, proposed or listed endangered species or their habitats. There are no known threatened/endangered species or their habitats within the project limits.

4.2.10 *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* Construction activities may cause short-term impacts to air and noise quality, although there are no residences near the project area. BMPs will be utilized to prevent project site runoff from impacting coastal waters. All state and county rules regarding construction practices will be adhered to. Upon completion of construction activities, air and ambient noise levels will revert to prior levels.

4.2.11 *The proposed project will not detrimentally affect environmentally sensitive areas such as flood plains, tsunami zones, beaches, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters.* The project area is not located in a flood plain, tsunami zone, beach, geologically hazardous lands, estuary, fresh water or coastal water. The project area is subject to erosion from rainfall runoff, and the new road section will be designed to mitigate the existing problems. There will be no detrimental impacts to environmentally sensitive areas.

4.2.12 *The proposed project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* A major factor in designation of Kuhio Highway as a historic site was because of the scenic vistas from the roadway. The proposed project will bypass a section of highway which provides two scenic pull-out areas. However, the view plane is substantially blocked by vegetative growth on the makai side of the

highway. The Lumahai Beach Lookout situated on the Hanalei side of the bypass road will not be affected.

4.2.13 *There will be no requirement for substantial energy consumption.* Construction and maintenance of the proposed project will not require substantial energy consumption.

5. Identification of Agencies, Organizations and Individuals Consulted and Permits or Approvals Required

The following agencies, organizations and individuals were provided copies of the draft environmental assessment for review and comment.

5.1 **State of Hawaii**.

Department of Agriculture
Department of Accounting & General Services (DAGS)
Department of Business, Economic Development and Tourism (DBEDT)
- Office of Planning
Department of Hawaiian Home Lands (DHHL)
Department of Health (DOH)
Department of Land and Natural Resources (DLNR)
DLNR - Historic Preservation Division
Office of Hawaiian Affairs (OHA)
Department of Transportation (DOT)
Office of Environmental Quality Control (OEQC)

5.2 **County of Kauai**.

Department of Planning
Department of Parks & Recreation
Department of Public Works
Police Department
Fire Department
Transportation Agency
Department of Water

5.3 **United States Government**.

U.S. Fish and Wildlife Service (USFWS)
U.S. Army Engineer District, Honolulu (Corps)
National Park Service (NPS)

5.4 **Community, Organizations and Individuals**.

Hanalei Roads Committee
Kauai North Shore Business Council
Kauai Island Utility Cooperative
Hawaiian Telcom
County Council Chair (Jay Furfaro)
State Representative (Derek Kawakami)
State Senator (Ronald Kouchi)
Public Libraries:
- Hawaii State Library
- Princeville Public Library
- Kauai Community College Library

5.5 **Public Involvement Prior to Preparation of the Draft Environmental Assessment**.

A public information meeting was held on August 11, 2011 at the Hanalei Community Center to discuss the bypass road preliminary design alternatives. A conceptual roadway plan was presented that included two 10-foot wide travel lanes, 2-foot wide paved shoulders, 10-foot wide clear zone (that provides for 8-foot wide grassed swales), and concrete retaining walls. Drainage structures, guardrails, utility pole relocation, and upper slope stabilization were also discussed. The 2-feet wide paved shoulder is not in accordance with the Kuhio Highway (Route 560) Historic Roadway Corridor Plan, but was proposed to allow for provisions of possible pedestrians/bicyclists through the corridor. Gates would close off the existing Loop Road, which would revert back to KSBE as the current land owner.

Alternative longitudinal grades of 8% and 10% were discussed. To help mitigate the concern of speeding through the narrow corridor, traffic calming devices such as raised pavement markers, signage, and textured pavement were described. The question was raised about the “straight” alignment and steep grade that would encourage speeding. The response was that, due to the topography and elevation

difference at both ends of the corridor, a curvilinear alignment and flatter grade could not be practicably achieved.

The issue of stability of the upper mountain slopes was discussed, as it was noted that landslides were the reason that the original bypass road was abandoned many years ago. The scope of the potential slope stabilization was not yet known, but possible measures could include using erosion control matting or soil nail system. It was also pointed out that portions of the slope that require stabilizing may be outside the State right-of-way, and agreements would be required with the adjacent land owner (KSBE).

The section of highway which requires immediate repair because of potential catastrophic failure was also discussed and alternatives were presented for emergency repairs. The three repair options were (1) stabilize the existing road embankment with micropiles and tiebacks + soil nails (shotcrete facing on retaining walls), (2) excavate the mauka side and relocate the road away from the cliff edge + shore under the existing pavement (shotcrete facing on the mauka side retaining wall or wire mesh option), and (3) install an Acrow bridge as the temporary road spanning the distressed section of pavement. Estimated construction cost for the three options ranged from $3.3 to $3.8 million, with option 2 being the least costly. The general consensus was to initiate the emergency repairs on the existing Loop Road using option 2, and to utilize a wire mesh instead of shotcrete to allow vegetation to re-establish on the cut slope. The community noted that there may be a good opportunity to provide additional pull-out area in the stabilized Loop Road section, which would be consistent with the Historic Roadway Corridor Plan. The representatives of the Hanalei Roads Committee also expressed the need to maintain the historic and scenic character of the roadway, and the preference to maintain the existing route (Loop Road). The Kauai District Engineer for DOT (HWY-K) noted that the emergency repairs would be exempt from permitting requirements and could be initiated immediately, as emergency funding was available (confirmed by Senator Kouchi who was also in attendance).

HWY-K indicated that the emergency repair (option 2) could be considered a long-term solution for the failing section of the Loop Road. In preliminary discussions with KSBE, the transfer of the Loop Road to DOT-HWY was a viable option to maintain use of this section of roadway by the public. HWY-K indicated that this was the preferred plan of action, and general agreement was obtained from the meeting attendees. However, it was intended to complete the environmental documentation for the bypass road, as the land transfer was not guaranteed.

5.6 **Permits or Approvals Required.**

State of Hawaii - DOT: A permit for "Work Within State Highway Right-of-Way" is required from the Department of Transportation, Highways Division.

State of Hawaii - DLNR: A determination from DLNR is needed regarding the requirement for a Conservation District Use Permit (CDUP). The work will be conducted within the existing highway right-of-way.

State of Hawaii - DOH: An individual National Pollutant Discharge Elimination System (NPDES) permit is required from the Department of Health. Stormwater runoff within the bypass road corridor will discharge to coastal waters which are Class AA.

County of Kauai: The project site is located within the Special Management Area (SMA). A determination from the County of Kauai, Planning Department is needed regarding the requirement for a Special Management Area Permit.

References

Draft Environmental Assessment For Kuhio Highway Improvements at Lumahai and Wainiha, prepared for State of Hawaii Department of Transportation, Highways Division by Kwock Associates, Inc., November 2000 (unpublished draft).

Engineering Report For Kuhio Highway, Vicinity of Lumahai and Wainiha, prepared for State of Hawaii Department of Transportation, Highways Division, Kauai District Office by Kwock Associates, Inc., July 21, 2000.

Final Project Assessment Report For Kuhio Highway Improvements at Lumahai and Wainiha, prepared for State of Hawaii Department of Transportation, Highways Division by Okahara and Associates, Inc., May 8, 2002.

Final Environmental Assessment for Kuhio Highway Retaining Walls at Lumahai, Kauai, prepared for State of Hawaii Department of Transportation, Highways Division by EKNA Services, Inc., July 2006.

Flood Insurance Rate Map, Federal Emergency Management Agency.

Kauai County web site

Kauai General Plan, County of Kauai Planning Department, November 2000.

North Shore Development Plan Update, Dec 1980, County of Kauai Planning Department.

Public Access, Open Space & Natural Resources Preservation Fund Commission, 2005 Report to the Kauai County Council, Final Report May 12, 2005.

Rainfall Atlas of Hawaii, Report R76, University of Hawaii Water Resources Research Center, June 1986.

Soils Investigation, Kuhio Highway Improvements at Lumahai and Wainiha, Lumahai, Kauai, for Kwock Associates by Ernest K Hirata and Associates, August 30, 1999.

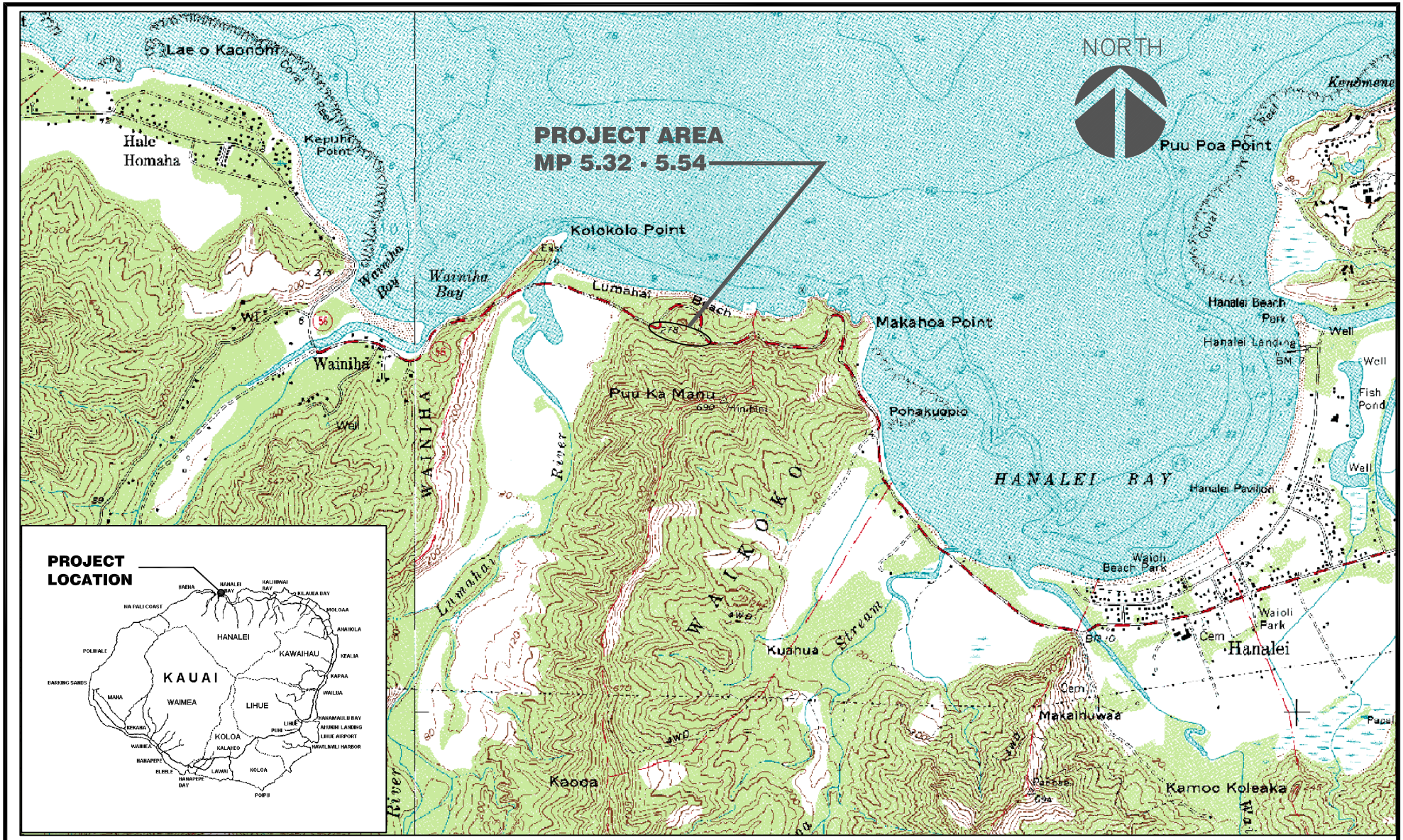
State of Hawaii Data Book 2010, State of Hawaii Department of Business, Economic Development & Tourism.

Supplemental Environmental Assessment for Kuhio Highway Retaining Walls at Lumahai, Kauai, prepared for State of Hawaii Department of Transportation, Highways Division by EKNA Services, Inc., April 2011.

Topographic survey maps prepared by Portugal and Associates.

Kuhio Highway (Route 560) Historic Roadway Corridor Plan, Hanalei, Kauai, Hawaii, prepared by Belt Collins Hawaii, Ltd. for the State of Hawaii, Department of Transportation, 2005.

EXHIBITS



Approx. Scale 1" = 2000'

EKNA 2367

EKNA SERVICES, INC.

LOCATION MAP

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 1

West end of bypass corridor – views to east.

Photos by Pacific Legacy – June 9, 2011.

EKNA 2367

EKNA SERVICES, INC.

PHOTOS – VICINITY OF MP 5.54

ENVIRONMENTAL ASSESSMENT FOR
KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT
2

View northwest.

Bypass corridor starts on left side of photo.

View west.

Overhead lines pass through the corridor.

East end of bypass corridor.

Photos by EKNA Services – May 6, 2011.

EKNA 2367

EKNA SERVICES, INC.

PHOTOS – VICINITY OF MP 5.32

ENVIRONMENTAL ASSESSMENT FOR
KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 3

View west.

Note steep slopes on both sides of corridor.

View east.

Steep slope on mauka side of corridor beyond overhead lines.

Central portion of bypass corridor.

Photos by Pacific Legacy – June 9, 2011.

EKNA 2367

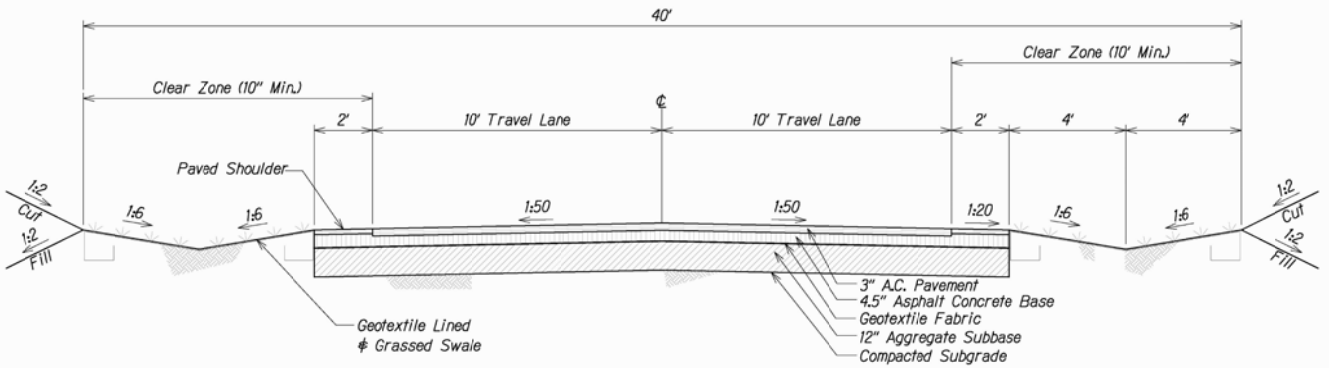
EKNA SERVICES, INC.

PHOTOS ALONG BYPASS ROAD ALIGNMENT

ENVIRONMENTAL ASSESSMENT FOR
KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 4

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
KAUAI	HAWAII	560A-03-96	2012	9	18



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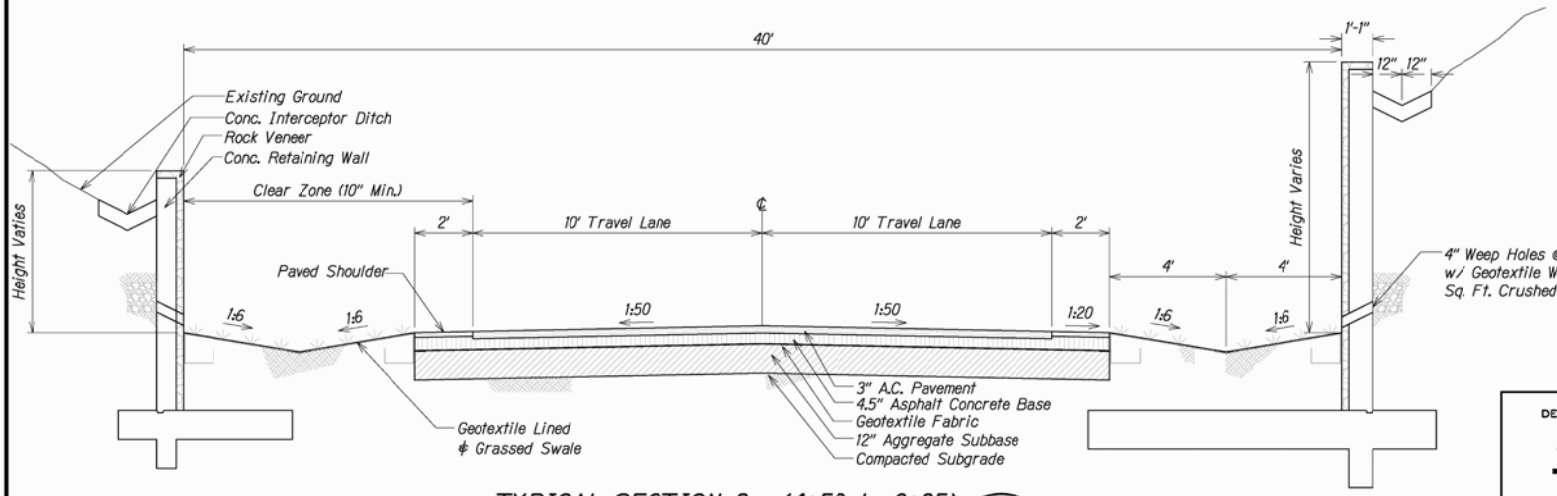


TYPICAL SECTION 2 - (4+50 to 6+25) 2 C-4 C-7
Scale: 1/2"= 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS

KUHIO HIGHWAY
LUMAHAI BYPASS ROAD
Project No. 560A-03-96

Scale: As Noted Date: October 2011

SHEET No. C-7 OF 18 SHEETS

Source: Mitsunaga & Associates

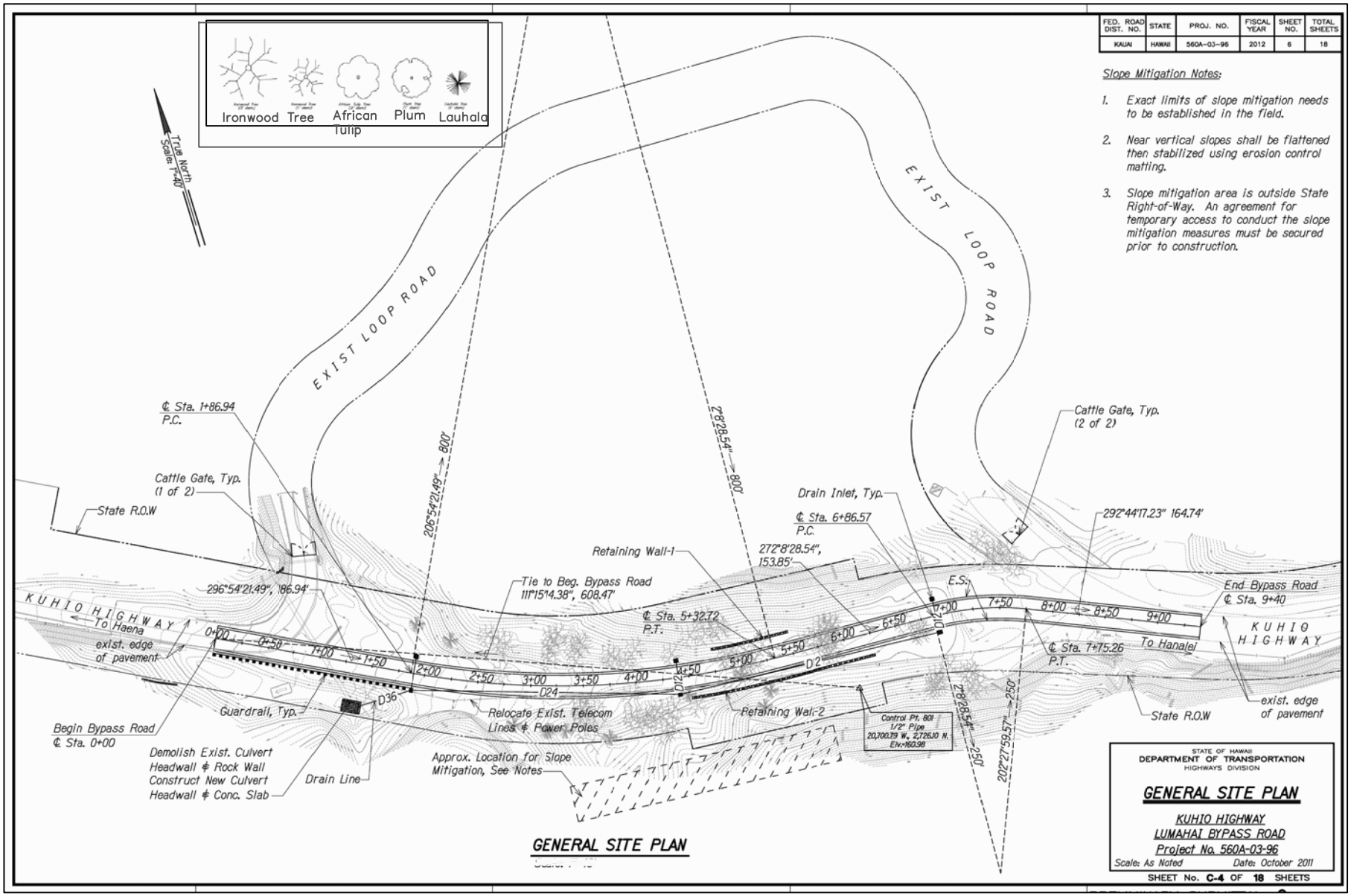
EKNA 2367

EKNA SERVICES, INC.

TYPICAL SECTIONS FOR BYPASS ROAD

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 5



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
KAUAI	HAWAII	560A-03-96	2012	6	18

Slope Mitigation Notes:

1. *Exact limits of slope mitigation needs to be established in the field.*
2. *Near vertical slopes shall be flattened then stabilized using erosion control matting.*
3. *Slope mitigation area is outside State Right-of-Way. An agreement for temporary access to conduct the slope mitigation measures must be secured prior to construction.*

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL SITE PLAN

KUHIO HIGHWAY
LUMAHAI BYPASS ROAD
Project No. 560A-03-96

Scale: As Noted Date: October 2011

SHEET No. C-4 OF 18 SHEETS

Source: Mitsunaga & Associates (Approx. scale 1" = 140')

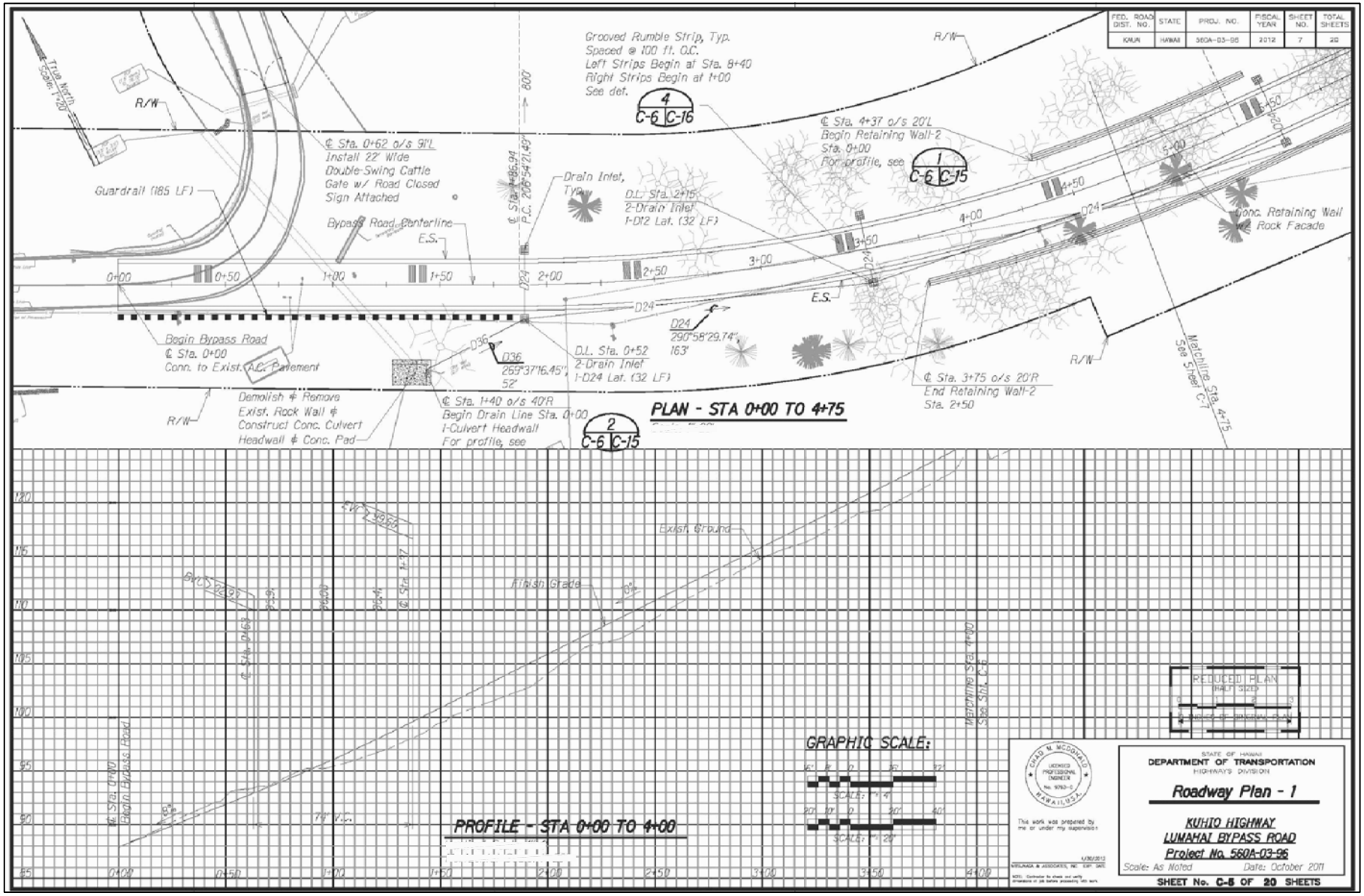
EKNA 2367

EKNA SERVICES, INC.

GENERAL SITE PLAN

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT
6



Source: Mitsunaga & Associates

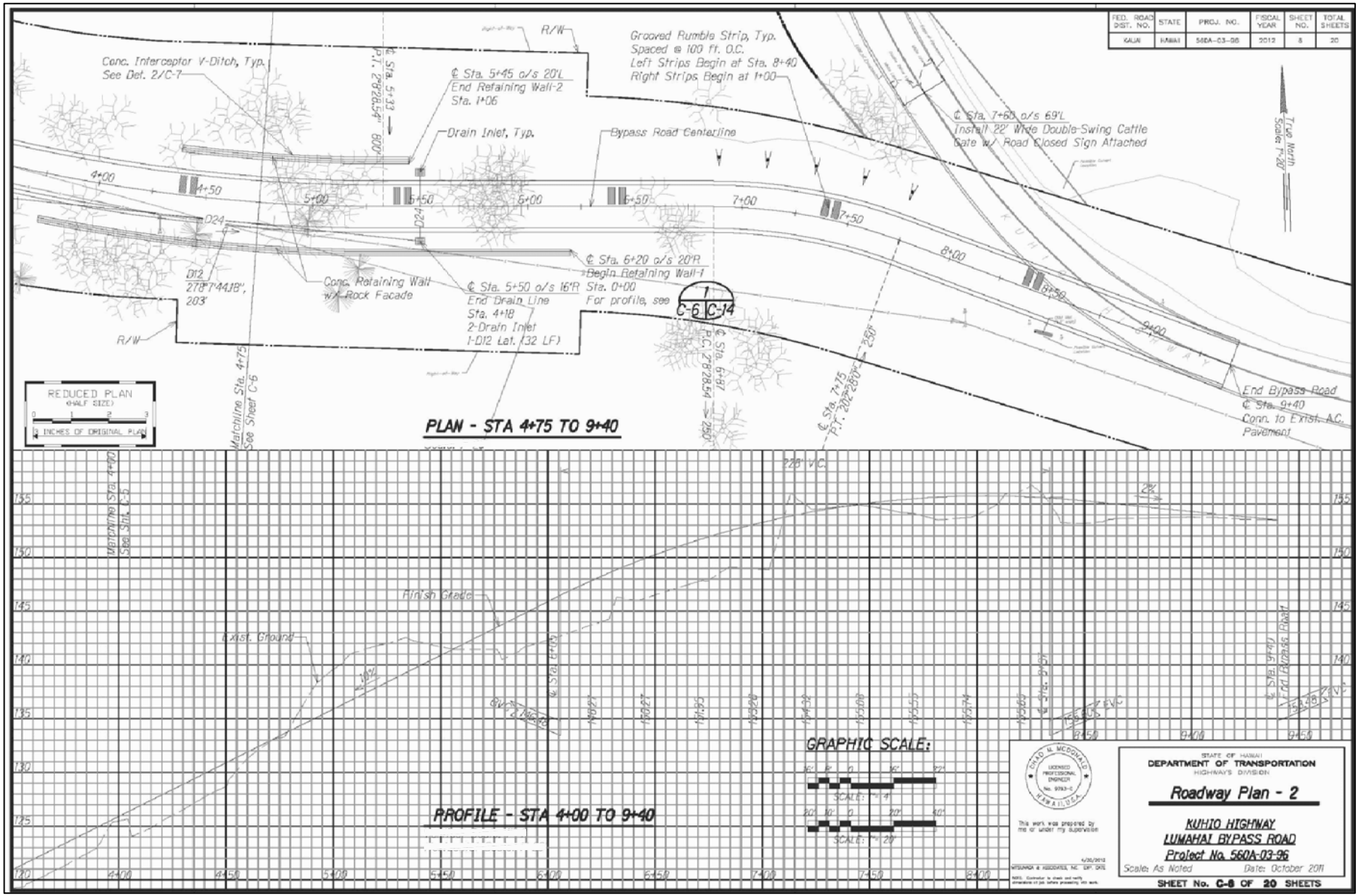
EKNA 2367

EKNA SERVICES, INC.

PLAN AND PROFILE (STA. 0+00 TO 4+50)

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 7a



Source: Mitsunaga & Associates

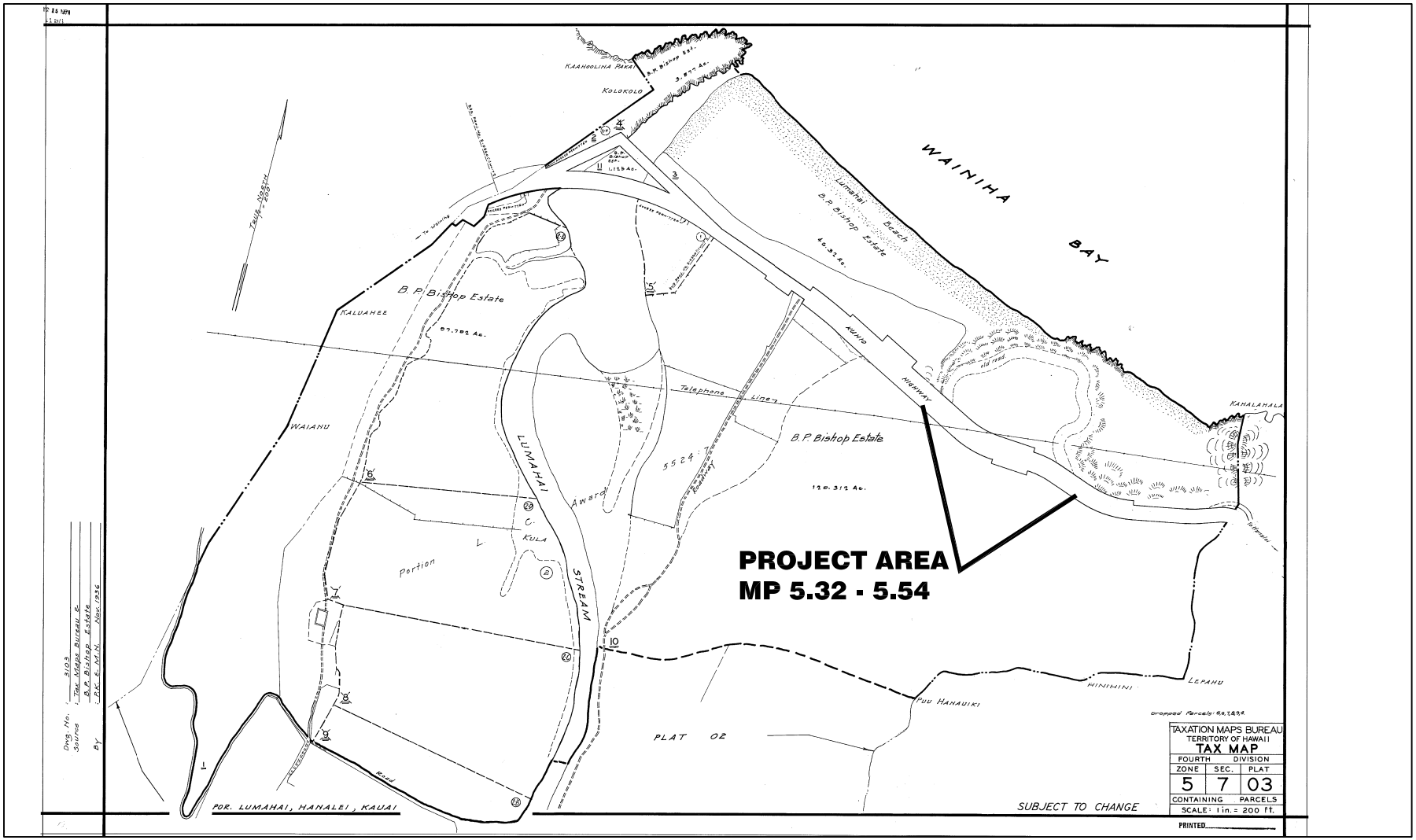
EKNA 2367

EKNA SERVICES, INC.

PLAN AND PROFILE (STA. 4+50 TO 9+40)

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 7b



Approx. Scale 1" = 800'

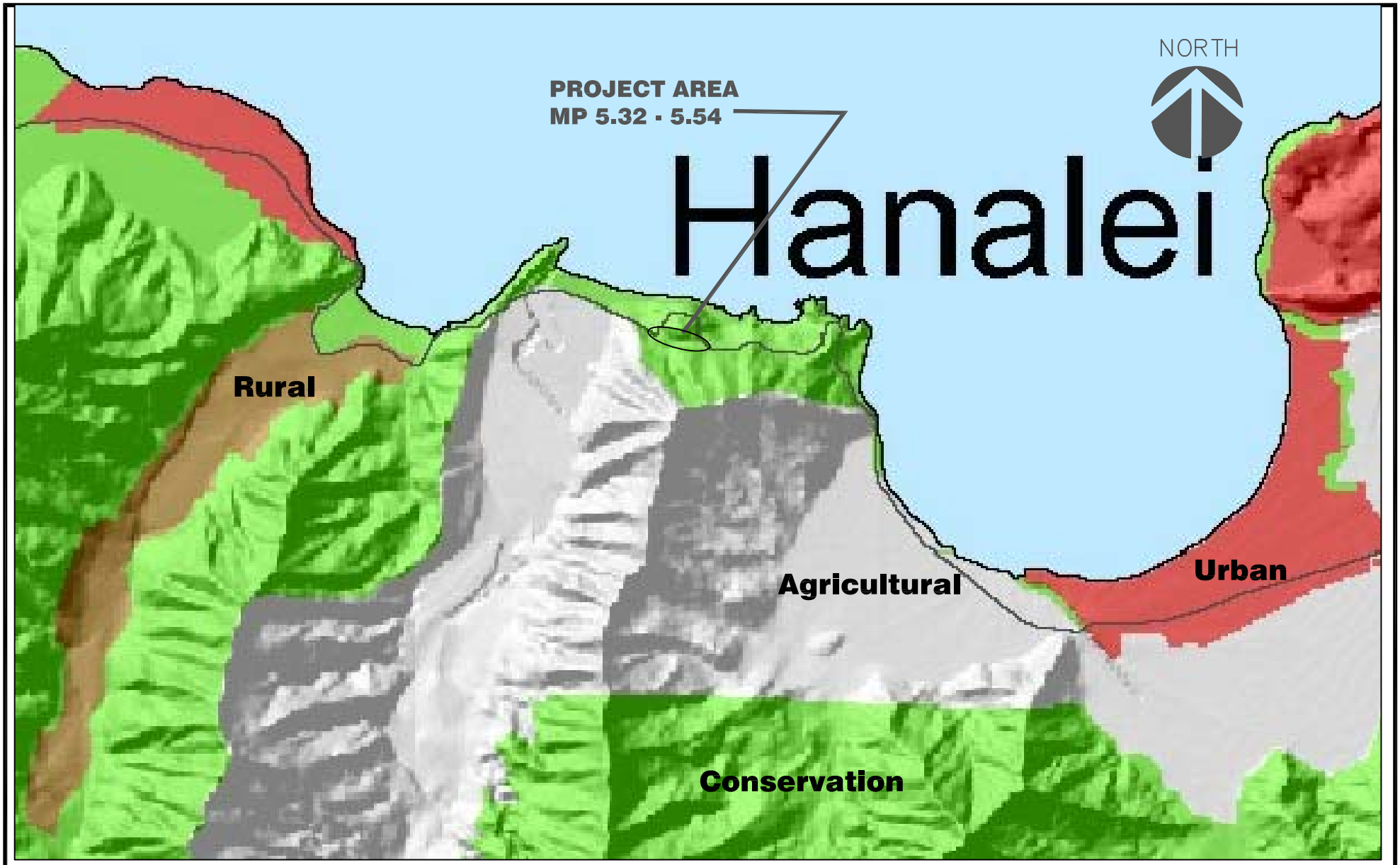
EKNA 2367

EKNA SERVICES, INC.

TAX MAP TMK:(4) 5–7–03

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 8



SOURCE: Office of State Planning (Approx. Scale 1" = 2000')

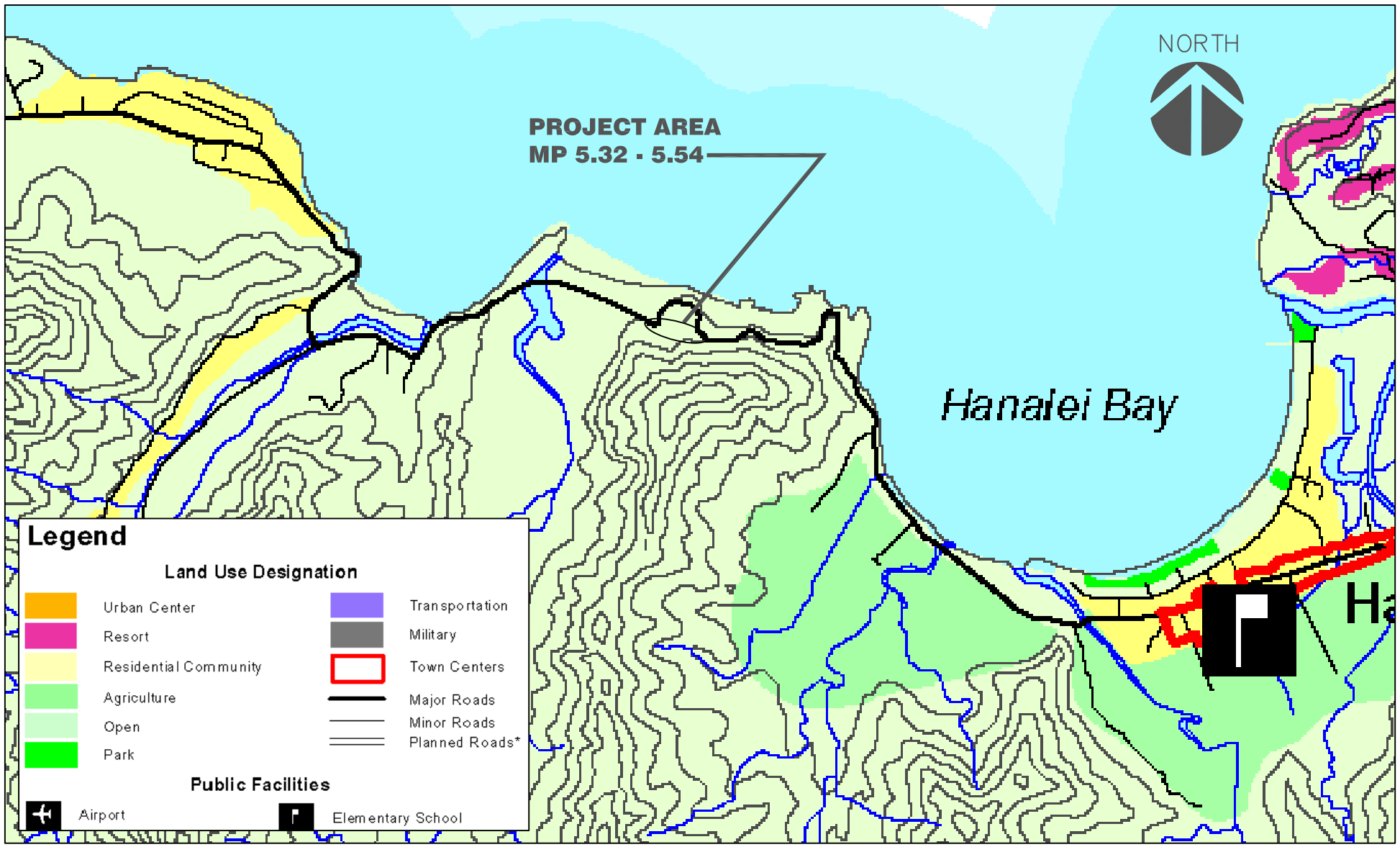
EKNA 2367

EKNA SERVICES, INC.

STATE LAND USE DISTRICTS

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 9



SOURCE: The Kauai General Plan (County of Kauai web site) (Approx. Scale 1" = 2000')

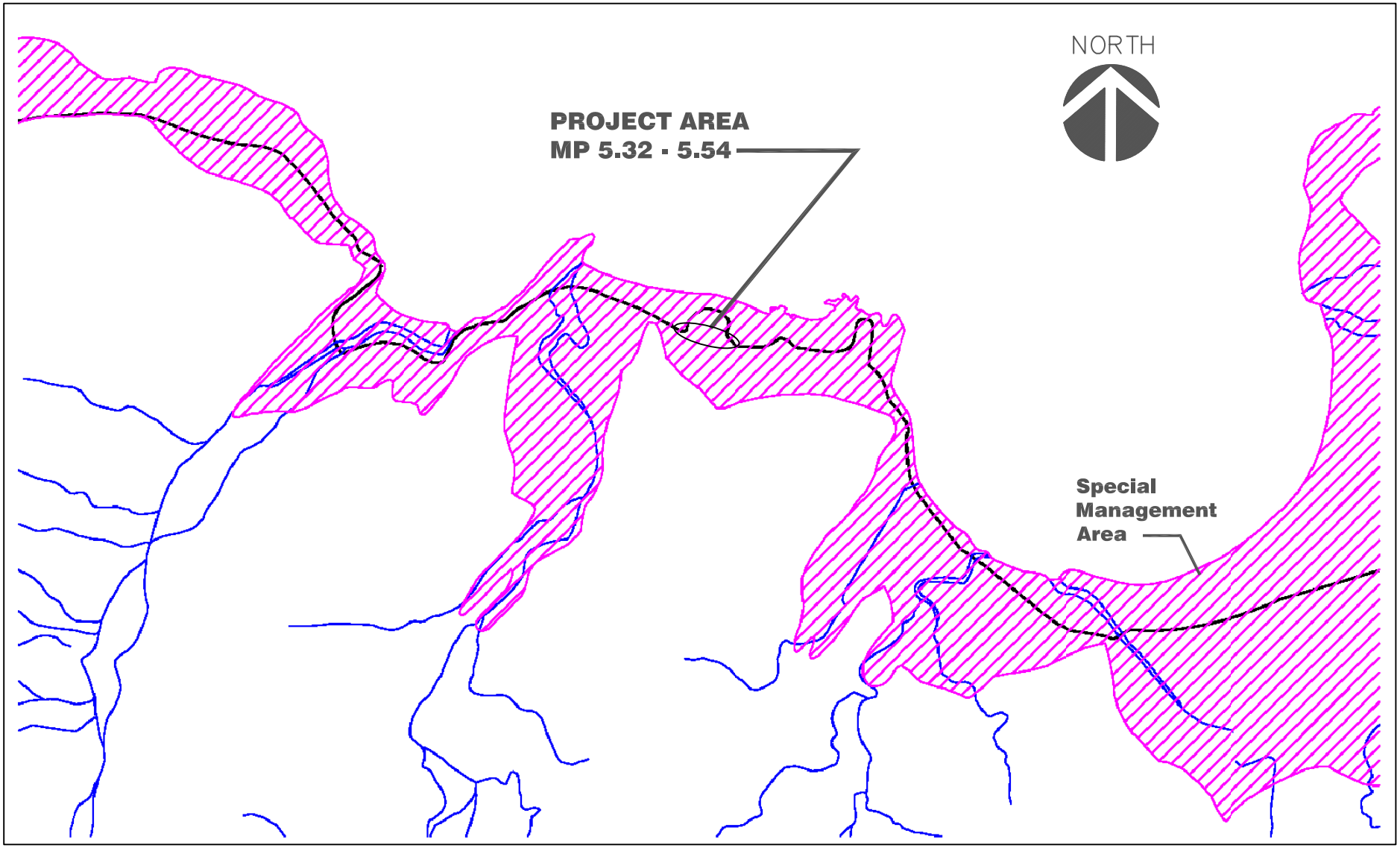
EKNA 2367

EKNA SERVICES, INC.

KAUAI NORTH SHORE PLANNING DISTRICT LAND USE MAP

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 10



SOURCE: State GIS (DBED&T web site) (Approx. Scale 1" = 2000')

EKNA 2367

EKNA SERVICES, INC.

SPECIAL MANAGEMENT AREA (SMA)

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT
11

Source: Natural Resources Conservation Service website (Approx. scale 1" = 1000')

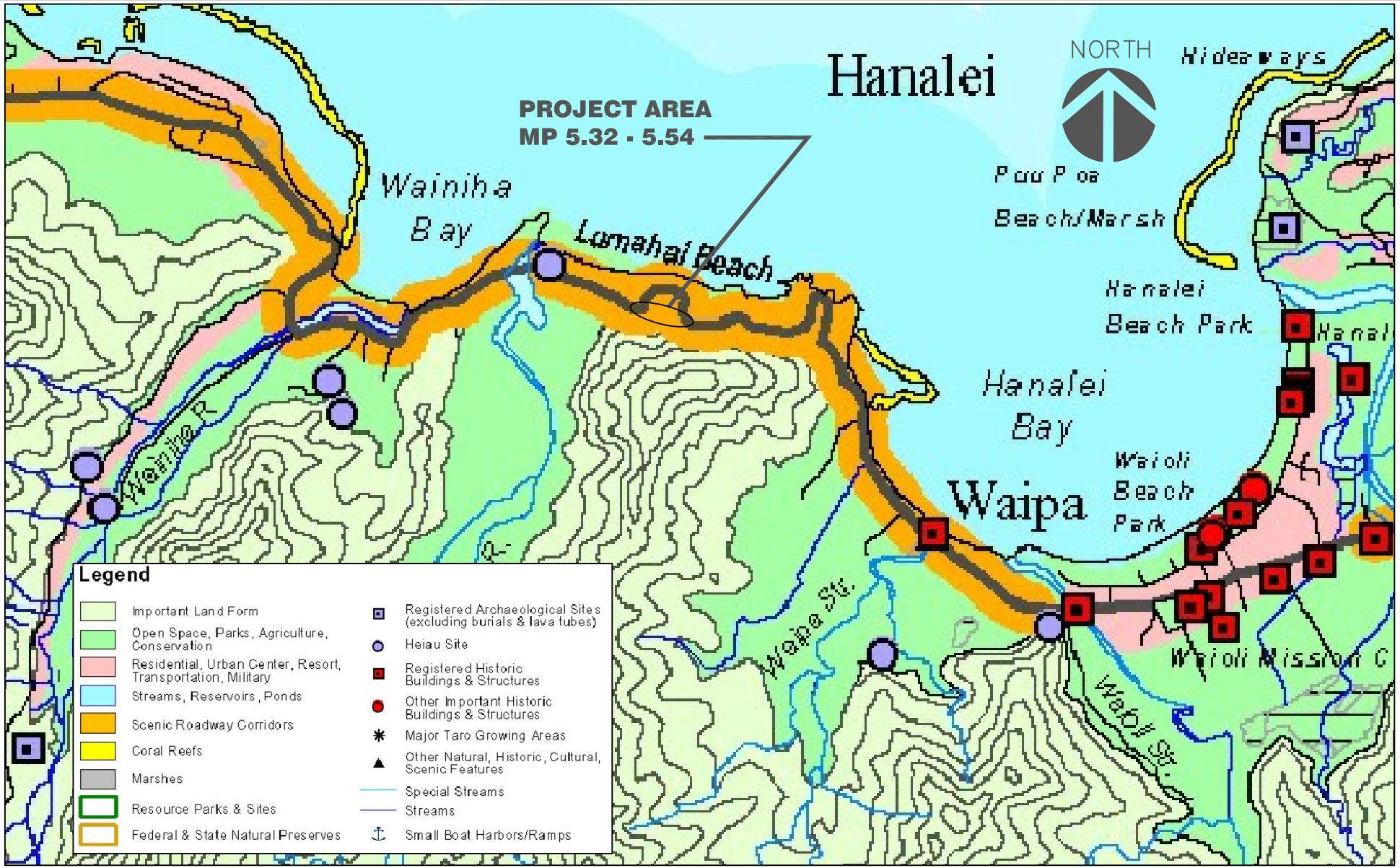
EKNA 2367

EKNA SERVICES, INC.

SOILS MAP

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 12



SOURCE: The Kauai General Plan (County of Kauai web site) (Approx. Scale 1" = 2000')

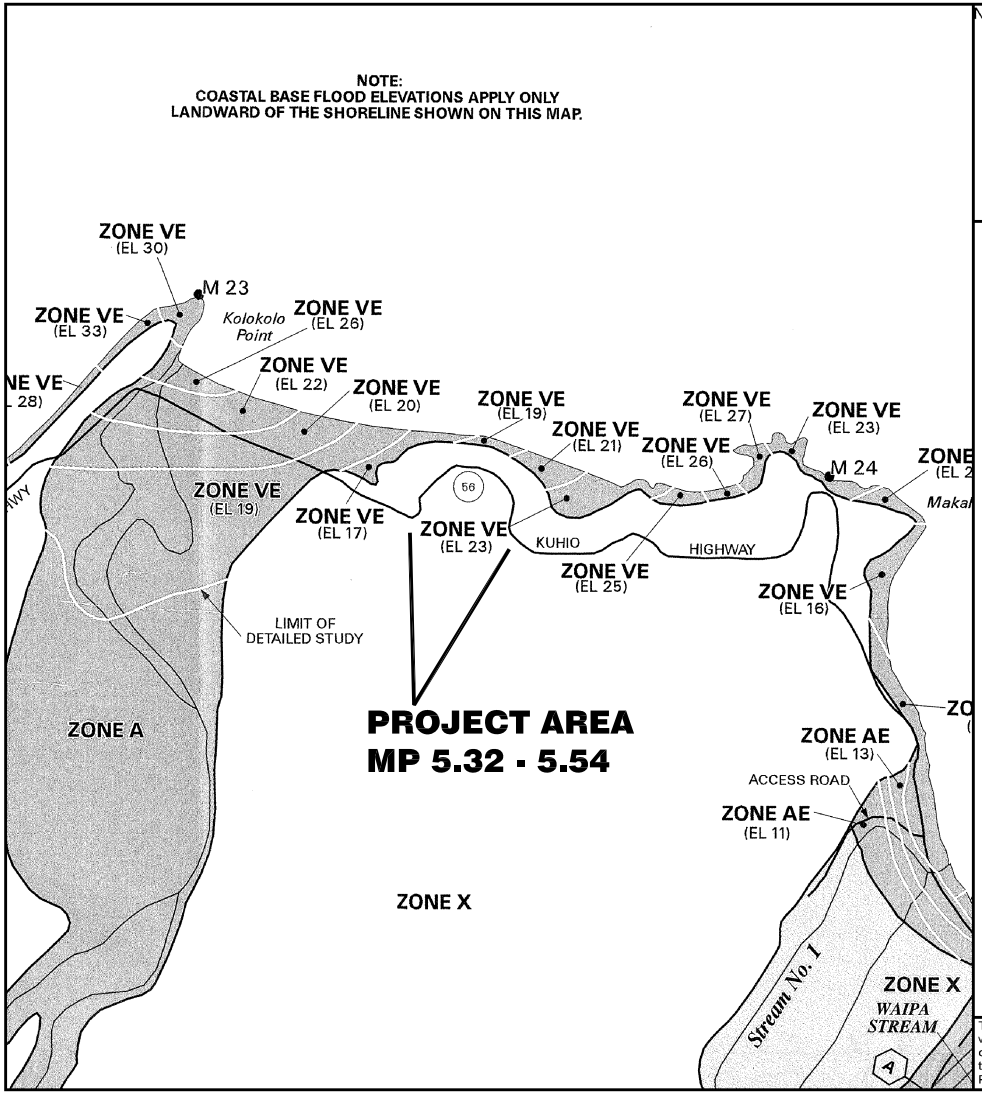
EKNA 2367

EKNA SERVICES, INC.

HERITAGE RESOURCES MAP

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 13



National Flood Insurance Program at (800) 638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0335 D

FIRM

FLOOD INSURANCE RATE MAP

KAUAI COUNTY,
HAWAII
(UNINCORPORATED AREAS)

PANEL 335 OF 675

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KAUAI COUNTY, UNINCORPORATED AREAS	150002	0335	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
1500020335 D

MAP REVISED:
OCTOBER 18, 2002

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NORTH

EKNA 2367

EKNA SERVICES, INC.

FLOOD INSURANCE RATE MAP

ENVIRONMENTAL ASSESSMENT FOR: KUHIO HIGHWAY BYPASS ROAD AT LUMAHAI, KAUAI

EXHIBIT 14

APPENDIX A

Botanical Survey Report

BOTANICAL SURVEY REPORT FOR THE PROPOSED KUHIO HIGHWAY IMPROVEMENTS AT LUMAHAI AND WAINIHA, KAUAI, HAWAII

FOR
EKNA SERVICES, INC.
615 PIIKOI STREET, SUITE 300
HONOLULU, HAWAII 96814

BY
EVANGELINE J FUNK, PhD
BOTANICAL CONSULTANTS
HONOLULU, HAWAII 96815
AUGUST 2004

TABLE OF CONTENTS

INTRODUCTION AND METHODS

The proposed Kuhio Highway Improvements at Lumahai and Wainiha, Kauai, Hawaii project sight consists of four heavily vegetated, small, steep areas on both sides of the highway. Sites One, Two and Three overlook Lumahai Beach (Figure 1.) and Site Four overlooks Wainiha Bay A botanical survey of all four sites was carried out in August 2004. Data were collected by a two-person team from the edge of the cliffs and from the base of the steep uphill or mauka banks. All parts o these sites were surveyed. The results of the survey are presented below.

RESULTS

Site One

Site One, like Sites Two, Three, and Four, measures approximately one thousand feet along Kuhio Highway. It includes the face of the uphill or mauka cliff from the highway to the cliff edge and the makai or seaward cliff face from the edge of Kuhio Highway to the beach.

On the mauka cliff of Site One the vegetation is patchy. Some of the old road cut is free of all vegetation. The vegetation that does exist includes such species as a mango sapling (*Mangifera indica* L.), a sea grape (*Coccoloba uvifera* (L.) L.), yellow guava (*Psidium guajava* L.), Koa haole (*Leucaena leucocephala* (Lam.) de Wit), Sourbush (*Pluchea symphytifolia* (Mill.) Gillis), *Schizachyrium condensatum* (Kunth) Nees and others.

The vegetation of the makai slope is dominated by a variety of large trees such as Java plum (*Syzygium cumini* (L.) Skeels), tropical almond (*Terminalia catappa* L.), Hau (*Hibiscus tiliaceus* L.), yellow guava, and Koa haole.

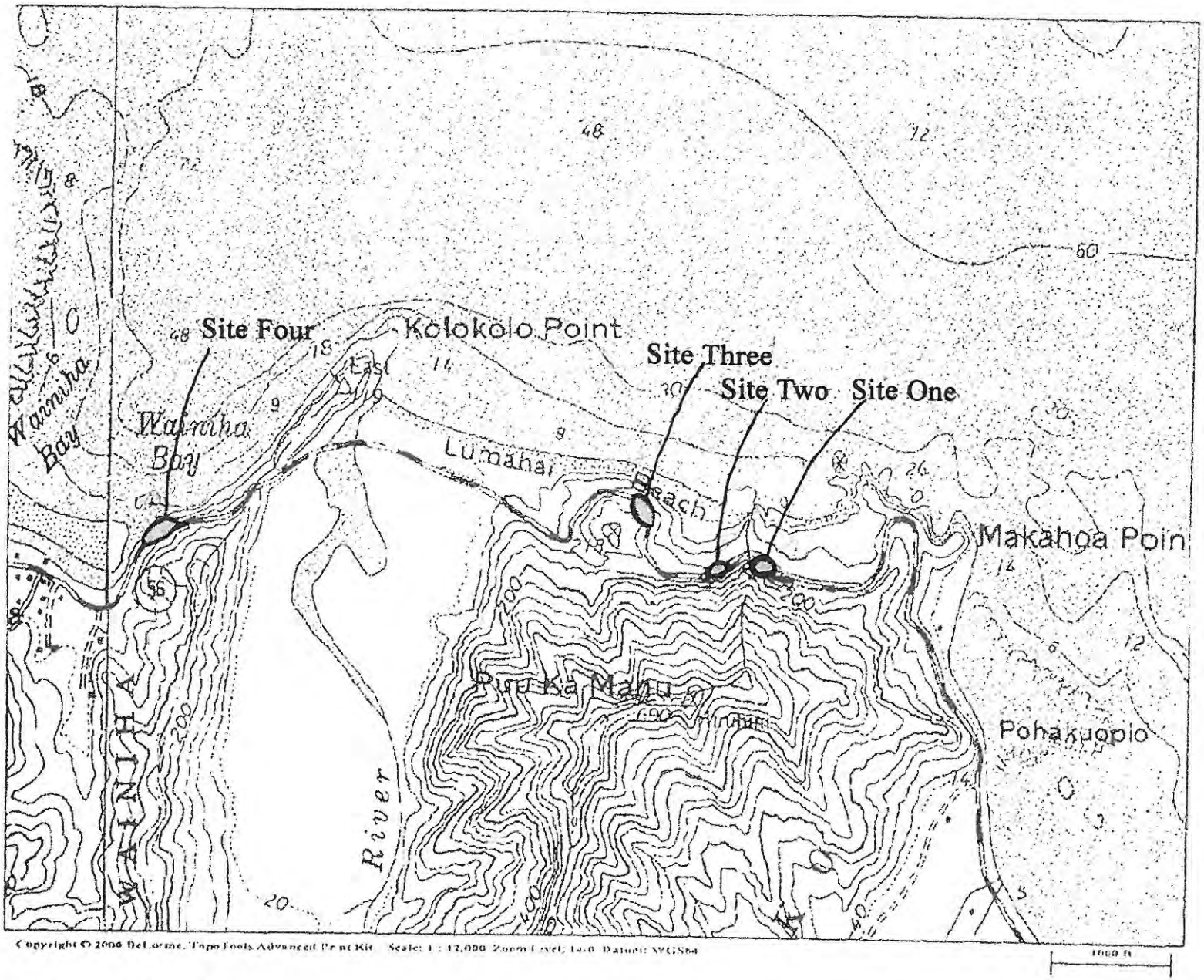


Figure 1. Kuhio Highway Improvements Sites.

There is an abundance of herbaceous taxa such as sword fern (*Nephrolepis exaltata* (L.) Schott.), several species of Crotalaria and such grasses as Indian dropseed (*Sporobolus diander* (Retz.) P. Beauv.), Henry's crabgrass (*Digitaria ciliaris* (Retz.) Koeler, and Hilo grass (*Paspalum conjugatum* Bergius). Near the verge of the highway low growing plants such as Wedelia (*Wedelia trilobata* (L.) Hitchc., *Desmodium triflorum* (L.) DC and one leaf clover (*Alysicarpus vaginalis* (L.) DC) form a regularly mowed ground cover.

Site Two

The vegetation of the mauka slope of Site Two is less robust than that of Site One. There is some evidence of wind erosion in the form of bare exposed areas and pockets of wind blown, silty soil. Some plants are beginning to become established on this steep slope. These include ironwood saplings (*Casuarina equisetifolia* L.), Hala (*Pandanus tectorius* S. Parkinson ex Z.), Koa haole, Sourbush and Ti (*Cordyline fruticosa* (L.) A. Chev.). Grasses such as Guinea grass, Stargrass (*Chloris divaricata* R. Br.) and *Schizachyrium condensatum* (Kunth) Nees are thinly scattered across this face.

The makai slope of Site Two supports a much denser vegetative cover. It includes more mature ironwood, Hau (*Hibiscus tiliaceus* L.), strawberry guava (*Psidium cattleianum* Sabine), yellow guava (*Psidium guajava* L.) and octopus trees (*Schefflera actinophylla* (Endl.) Harms). The herb layer includes laua'e (*Polypodium scolopendria* Burmanm f.) and sword ferns as well as the same grasses as those found on Site One.

Site Three

The vegetative cover found on the mauka slope of Site Three is dominated by ironwood trees forty-five to fifty feet in height. There are also mature Hala trees and a scattering of

beach Naupaka (*Scaevola sericea* Vahl) shrubs. Hilo grass, Kikuyu grass (*Pennisetum clandestinum* Choiv., *Sida rhombifolia* L. and others make up the herb layer.

On the Makai slope of Site Three there are Hau, ironwood, octopus, tropical almond and Hala trees. This site supports a greater variety of herbs than do Sites One and Two. There is green tea (*Chamaecrista nictitans* (L.) Moench), *Bidens alba* (L.) DC, sleeping grass (Mimosa pudica L.), *Polygala paniculata* L., Flora's paintbrush (Emilia sonchifolia (L.) DC, Desmodium, Wedelia and *Stachytarpheta urticifolia* (Salisb.) Sims. There are the usual grasses plus Henry's crabgrass and India dropseed.

Site Four

On the uphill slope of Site Four there are mature ironwood, Hala, and Java plum trees. The shrub community is similar to that found on the other three sites – Ti, Koa haole, beach Naupaka, Sourbush (*Pluchea symphytifolia* (Mill.) Gillis, Sword fern, Guinea grass and Wedelia are also present.

The makai slope of Site Four is very steep and here can be found ironwood trees some fifty to sixty feet in height. The tropical almond, Java plumb and octopus trees are also of impressive heights. Here beach Naupaka, sword fern, Wedelia, yellow wood sorrel (*Oxalis corniculata* L.) and a large mauna-loa vine (*Canavalia cathartica* Thouars) can be found in the shade of the big trees.

CONCLUSIONS

Aside from the naupaka and hala trees, which may be early Polynesian introductions, no endemic or indigenous plants were found on these sites. Otherwise, the vegetation found during this survey is all introduced and can be found in many places in the Hawaiian Islands and will quickly regenerate if it is disturbed.

ENDANGERED SPECIES

No candidate, proposed, or listed threatened or endangered species as set forth in the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) are known from this site and none were found during this survey.

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Haselwood, E. L. and G. G. Motter. (eds.) 1976. Handbook of Hawaiian Weeds. Lyon Arboretum Association.

Neal, M. C. 1965. In Gardens of Hawaii. Bishop Museum Special Publication #65. Bis. Mus. Press.

Wagner, W. L., D. R. Herbst, & S. H. Sohmer. 1990. Manual of the Flowering Plants of Hawaii. Bishop Museum Special Publication #83. Univ. Of Hawaii Press. Vols 1 & 2.

SPECIES LIST OF THE PLANTS FOUND ON THE PROPOSED KUHIO HIGHWAY IMPROVEMENTS PROJECT SITE, LUMAHAI AND WAINIHA, KAUAI, HAWAII

The plant list presented here is the result of our survey conducted in August, 2004. The plant families in the species list have been alphabetically arranged within three groups, Ferns and Fern Allies, Monocotyledons, and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of Wagner, Herbst, and Sohmer (1990). For each taxon the following information is provided:

1. An asterisk before the plant name indicates a plant introduced to the Hawaiian Islands since Cook or by the aborigines.
2. The scientific name of the plant.
3. The Hawaiian name or the most widely used common name of the plant.
4. Abundance ratings are for this site only and they have the following meanings:
   Uncommon = a plant that was found less than fine times.
   Occasional = a plant that was found between five and ten times.
   Common = a plant considered an important part of the vegetation.
   Locally abundant = plants found in large numbers over a limited area. For example the plants found in grassy patches.

This species list presented here is the result of a survey conducted in August, 2004. It reflects the vegetative composition of the flora during a single season. Minor changes to the vegetation will occur due to introductions and losses and a slightly different species list would result from a survey conducted during a different growing season.

Scientific Name	Common Name	Abundance
FERNS AND FERN ALLIES		
POLYPODIACEAE - Common Fern Family		
**Nephrolepis exaltata* (L.) Schott.	Sword fern	Locally abundant
**Polypodium scolopendria* Burmann f.	Laua'e	Common
**Sphenomeris chusana* (L.) Copel.	Lace Fern	Locally abundant
MONOCOTYLEDONS		
AGAVACEAE – Agave Family		
Cordyline fruticosa (L.) A. Chev.	Ti	Common
COMMELINACEAE - Spiderwort Family		
**Commelina diffusa* N. L. Burm.	Honohono	Locally abundant
PANDANACEAE – Pandanus Family		
Pandanus tectorius S. Parkinson ex Z	Hala	Common
POACEAE - Grass Family		
**Chloris divaricata* R. Br.	Stargrass	Locally abundant
**Digitaria ciliaris* (Retz.) Koeler	Henry's crabgrass	Common
**Panicum maximum* Jacq.	Guinea grass	Common
**Paspalum conjugatum* Bergius	Hilo grass	Locally abundant
**Pennisetum clandestinum* Chiov.	Kikuyu grass	Common
**Sporobolus diander* (Retz.) P. Beauv.	Indian dropseed	Common
**Schizachyrium condensatum* (Kunth) Nees		Common
DICOTYLEDONES		
ANACARDIACEAE – Mango Family		
**Mangifera indica* L.	Mango	Uncommon
ARALIACEAE – Ginseng Family		
**Schefflera actinophylla* (Endl.) Harms	Octopus tree	Uncommon

Scientific Name	Common Name	Abundance
ASTERACEAE – Sunflower Family		
**Bidens alba* (L.) DC		Common
**Emilia sonchifolia* (L.) DC	Flora's paint brush	Occasional
**Conyza bonariensis* (L.) Cronq.	Hairy horseweed	Occasional
**Pluchea symphytifolia* (Mill.) Gillis	Sourbush	Common
**Sonchus oleraceus* L.	Pualele	Uncommon
**Wedelia trilobata* (L.) Hitchc.		Common
CASUARINACEAE – She-oak Family		
**Casuarina equisetifolia* L.	Ironwood	Common
COMBRETACEAE – Indian Almond Family		
**Terminalia catappa* L.	Tropical almond	Common
EUPHORBIACEAE – Spurge Family		
**Chamaesyce hypericifolia* (L.) Millsp.	Grace spurge	Occasional
FABACEAE – Bean Family		
**Alysicarpus vaginalis* (L.) DC	One leaf clover	Uncommon
**Canavalia cathartica* Thouars	Maunaloa vine	Uncommon
**Chamaecrista nictitans* (L.) Moench	Partridge pea	Occasional
**Crotalaria incana* L.	Fuzzy rattlepod	Occasional
**Crotalaria* spp.		Occasional
**Desmodium triflorum* (L.) DC		Occasional
**Leucaena leucocephala* (Lam.) de Wit	Koa haole	Common
**Mimosa pudica* L.	Sensitive plant	Occasional
GOODENIACE – Goodenia – Family		
Scaevola sericea Vahl.	Naupaka kuhakai	Common
MALVACEAE – Mallow Family		
**Hibiscus tiliaceus* L.	Hau	Common
**Sida rhombifolia* L.		Occasional
MELASTOMATACEAE – Melastoma Family		
**Clidemia hirta* (L.) D. Don	Koster's curse	Uncommon

Scientific Name	Common Name	Abundance
MYRTACEAE – Myrtle Family		
**Psidium cattleianum* Sabine .	Strawberry guava	Occasional
**Psidium guajava* L.	Common guava	Uncommon
**Syzygium cumini* (L.) Skeels	Java plum	Common
OXALIDACEAE – Wood sorrel Family		
Oxalis corniculata L.	Yellow wood sorrel	Locally abundant
PLANTAGINACEAE – Plantain Family		
**Plantago lanceolata* L.	Narrow-leaved plantain	Locally abundant
**Plantago major* L.	Common plantain	Locally abundant
POLYGALACEAE – Milkwort Family		
**Polygala paniculata* L.		Uncommon
POLYGONACEAE – Buckwheat Family		
**Coccoloba uvifera* (L.) L.	Sea grape	Uncommon
URTICACEAE – Nettle Family		
**Pilea microphylla* (L.) Liebm.	Artillery plant	Locally abundant
VERBENACEAE – Verbena Family		
**Lantana camera* L.	Lantana	Occasional
**Stachytarpheta urticifolia* (Salisb.) Sims		Occasional

APPENDIX B

Supplemental Botanical Survey Report

Supplemental botanical survey for proposed Kuhio Highway improvements at Lumahai and Wainiha, Kaua‘i.

September 25, 2008 *AECOS* No. 1187

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Kane‘ohe, Hawai‘i 96744
Phone: (808) 234-7770 Email: guinther@aecos.com

Introduction

This report describes the results of a botanical survey for an Environmental Assessment (EA) of proposed Kuhio Highway improvements at Lumahai which may involve the construction of a bypass road. Kuhio Highway between Hanalei Bay and Lumahai River winds along the seaward face of a ridgeline (Fig. 1), whose peak near the coast is known as Pu‘u Ka Manu. This report concerns that part of the project where a horseshoe curve of the highway passes around a small hill above Lumahai Beach.

The original botanical survey for the project (Funk, 2004) covered “four heavily vegetated, small, steep areas on both sides of the highway”. However, since completion of that effort in 2004, the Kauai District of the State Department of Transportation, Highways Division (HWY-K) is considering a relocation of the road at Site 3 (approximate Mile Point 5.3, where the existing road winds around the makai side of a hill). A bypass road alignmentis proposed to pass through a saddle on the mauka side of the hill, a route identified on a TMK map as the actual highway right-of-way. Apparently, acquisition of the highway right-of-way from B. P. Bishop Estate in the 1930s intended for the road to pass mauka of the hill. However, according to HWY-K personnel, grading was undertaken but the road was never completed. Because of existing and potential future problems at Site 3, HWY-K desires to consider undertaking the permanent relocation of the road as part of the overall effort to address highway shoulder and pavement problems along Kuhio Highway in Lumahai.

Methods

The site was visited on September 1, 2008 by Eric Guinther of *AECOS* Inc. The botanical survey involved walking over all areas likely to be impacted by the proposed new roadway (both the existing saddle and slopes above the saddle) and noting the names and relative abundance of all ferns, fern allies, and flowering plants growing there. Field notes were translated into a flora listing, presented herein as Table 1.

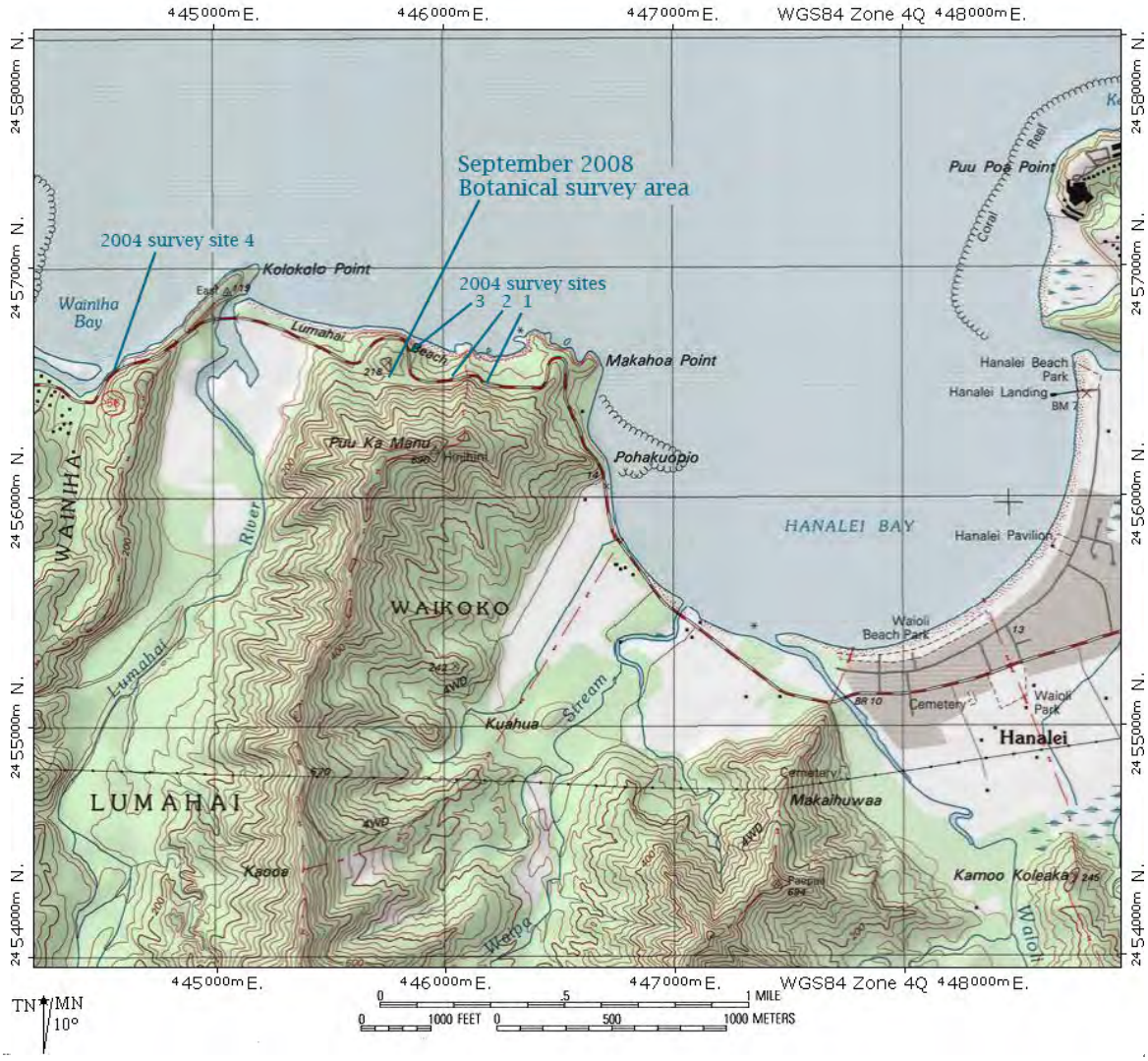

Figure 1. Windward coast of the Island of Kaua'i between Wainiha Bay and Hanalei Bay showing the locations of the 2004 and 2008 botanical surveys.

Site Description

The survey area is a partly natural saddle and partly man-made cut through a portion of the ridgeline above Lumahai Beach. Overall, there is a slight downward slope from east to west through the saddle. Some evidence of grading through the saddle is present, although in recent decades, grading has been confined to relatively short distances in from both ends, perhaps to provide access to the utility poles; the track passing from one end to the other is blocked by large, placed boulders (east end), concrete barriers (west end), and by trees and shrubs through the middle. The northern slope of the saddle supports mostly ironwood trees (*Casuarina equisetifolia*), with an area of ferns and Java plum (*Syzigium cumini*) at the western end. The southern side is a steep hillslope dominated by *hau* (*Hibiscus tiliaceus*) at the eastern end, a severely eroded bank along most of the middle length of the saddle, and a natural forest and gulch towards the west end. The natural forest is dominated by *hala* (*Pandanus tectorius*) and strawberry guava (*Psidium cattleianum*), with several other native plants, such as *pala'ā* (*Sphenomeris chinensis*), *'ohi'a* (*Metrosideros polymorpha*), and *ama'u* (*Sadleria* sp.). This forest continues up the slope above the eroding face of the southern slope (Figs. 2 and 3), and represents remnants of the original, lowland, coastal vegetation.

Figure 2. View of the eastern aspect of the saddle showing telephone cables with erosion slope behind and ironwood trees in the saddle.

Results

The results of the survey includes a flora listing (Table 1) of all the species identified during the walk about survey and a description of the vegetation. The nature of the vegetation suggests several vegetation types. Areas of recently disturbed vegetation occur at either end of the saddle and these areas are dominated by ruderal plants. The relative abundance of these species are given in Table 1 under the column marked "RD". The eroding face of the south slope is largely barren, although some parts are supporting the introduced grass, tufted beardgrass (*Schizachyrium condensatum*). The saddle floor and north slope harbor a mostly open forest of non-native trees (ironwood and Java plum), shrubs, vines, and herbs. The south slope is an open forest of many native plants, primarily *hala* and *'ōhi'a*, with native sedges and ferns, but heavily invaded by strawberry guava. *Hau* forms a dense stand along the south slope at the very east end of the area, and is present along an intermittent drainage at the west end. In Table 1, all of these forested areas are lumped under the column headed "FO".

Table 1. Listing of plants (flora) for a proposed Kuhio Highway Improvements Project at Lumahai, Kaua'i, September 1, 2008.

Species	Common name	Status	Abundance RD	Abundance FO	Notes
FERNS and FERN ALLIES					
BLECHNACEAE					
Blechnum appendiculatum Willd.	---	Nat.	--	A	
Sadleria cf. *cyatheoides* Kaulf.	*'ama'u*	**End.**	--	R	
GLEICHENIACEAE					
Dicranopteris linearis (Burm. f.) Underw.	*uluhe*	**Ind.**	--	R	(1)
LINDSAEACEAE					
Sphenomeris chinensis (L.) Maxon	*pala'ā*	**Ind.**	--	A	
NEPHROLEPIDACEAE					
Nephrolepis multiflora (Roxb.) F.M. Jarrett ex C.V. Morton	---	Nat.	--	C	(2)
POLYPODIACEAE					
Phlebodium aureum (L.) J. Sm.	rabbit's-foot fern	Nat.	--	U	
Phymatosorus scolopendria (Burm.) Pic.-Ser.	*lauaʻe*	Nat.	--	R	
THELYPTERIDACEAE					
Christella dentata (Forssk.) Brownsey & Jermy	oak fern	Nat.	--	U	
Christella parasitica (L.) Lev.	oak fern	Nat.	--	C	

Table 1 (continued).

Species	Common name	Status	Abundance RD	Abundance FO	Notes
FLOWERING PLANTS					
DICOTYLEDONE					
ACANTHACEAE					
Sanchezia sp.	---	OaoA	R	--	(3)
ASTERACEAE (COMPOSITAE)					
Ageratum houstonianum Mill.	*maile honohono*	Nat.	O	--	
Bidens alba (L.) DC	Spanish needle	Nat.	R	--	
Conyza bonariensis. (L.) Cronq.	hairy horseweed	Nat.	R	--	
Elephantopus mollis Kunth	elephant's foot	Nat.	O	C	
Emilia fosbergii Nicolson	Flora's paintbrush	Nat.	U	--	
Pluchea carolinensis (Jacq.) G. Don	sourbush	Nat.	R	U	
Sphagneticola trilobata (L.) Pruski	wedelia	Nat.	A	A	
BIGNONIACEAE					
Spathodea campanulata P. Beauv.	African tulip tree	Nat.	--	U	
CARICACEAE					
Carica papaya L.	papaya	Nat.	--	R	
CARYOPHYLLACEAE					
Silene gallica L.	small-flowered catchfly	Nat.	O	--	
CASUARINACEAE					
Casuarina equisetifolia L.	common ironwood	Nat.	--	C	
COMBRETACEAE					
Terminalia catappa L.	tropical almond	Nat.	--	R	
ERICACEAE					
Leptecophylla tameiameiae (Cham. & Schlecht.) C. M. Weiller	*pukiawe*	**Ind.**	R	R	
EUPHORBIACEAE					
Ricinus communis L.	castor bean	Nat.	R	R	
Phylanthus debilis Klein ex Willd.	niruri	Nat.	C	--	
FABACEAE					
Alysicarpus vaginalis (L.) DC	Alyce clover	Nat.	U	--	
Canavalia cathartica Thouars	maunaloa	Nat.	O	O3	
Chamaecrista nictitans (L.) Moench	partridge pea	Nat.	O		
Crotalaria incana L.	fuzzy rattlepod	Nat.	U	--	
Desmodium sp.		Nat.	U	--	(3)
Desmodium triflorum (L.) DC	---	Nat.	U3	--	
Leucaena leucocephala (Lam.) deWit	*koa haole*	Nat.	U	U	
Macroptilium lathyroides (L.) Urb.	cow pea	Nat.	O	--	
Mimosa pudica L.	sensitive plant	Nat.	U		

Table 1 (continued).

Species	Common name	Status	Abundance RD	Abundance FO	Notes
LAURACEAE					
Persea americana Mill.	avocado	Nat.	R	--	(3)
MALVACEAE					
Hibiscus tiliaceus L.	*hau*	**Ind.**	--	C	
MELASTOMATACEAE					
Clidemia hirta (L.) D. Don	Koster's curse	Nat.	--	A	
MYRTACEAE					
Metrosideros polymorpha Gaud.	*'ōhi'a*	**End.**	--	O	
Psidium cattleianum Sabine	strawberry guava	Nat.	--	A	
Psidium guajava L.	guava	Nat.	--	O	
Syzygium cumini (L.) Skeels	Java plum	Nat.	--	O	
PASSIFLORACEAE					
Passiflora laurifolia L.	yellow granadilla	Nat.	--	R	
PLANTAGINACEAE					
Plantago major L.	common plantain	Nat.	R	--	
Plantago lanceolata L.	nrw-leaved plantain	Nat.	U	--	
POLYGALACEAE					
Polygala paniculata L.	milkwort	Nat.	O	--	
RUBIACEAE					
Spermacoce assurgens Ruiz & Pavon	buttonweed	Nat.	R	--	
VERBENACEAE					
Stachytarpheta cayennensis (Rich.) Vahl	---	Nat.	U	--	
MONOCOTYLEDONES					
AGAVACEAE					
Cordyline fruticosa (L.) A. Chev.	*ki*, ti	Pol.	U	O	
Dracaena fragrans (L.) Ker Gawl.	fragrant dracaena	OaoA	R	--	
ARACEAE					
Epipremnum pinnatum (L.) Engler	pothos	Nat.	O	C	
ARECACEAE					
Cocos nucifera L.	*niu*, coconut	Pol.	--	U	(3)
COSTACEAE					
Costus woodsonii Maas	---	Nat.	--	R	
CYPERACEAE					
Cyperus meyenensis Kunth	Meyen's flatsedge	Nat.	R	--	
Cyperus polystachyos Rottb.	---	**Ind.**	R	--	
Gahnia cf. *beecheyi* H. Mann		**End.**	--	R	
Machaerina mariscoides meyenii (Kunth) T. Koyama	*'ahanui*	**End.**	--	R	

Table 1 (continued).

Species	Common name	Status	Abundance RD	Abundance FO	Notes
ORCHIDACEAE					
Arundina graminifolia (D. Don) Hochr.	bamboo orchid	Nat.	O	U	
Spathoglottis plicata Blume	Malayan ground orchid	Nat.	--	U	
MUSACEAE					
Musa hybrid	banana	OaoA	R1	--	
PANDANACEAE					
Pandanus tectorius Parkinson ex Z	*hala*	**Ind.**	--	A	
POACEAE (GRAMINEAE)					
Axonopus compressus (Swartz) P. Beauv.	brd-lvd carpet grass	Nat.	O	--	
Chloris divaricata R. Br.	star grass	Nat.	R	--	
Eleusine indica (L.) Gaertn.	beach wiregrass	Nat.	O2	--	
Eragrostis pectinacea (Michx.) Nees	Carolina lovegrass	Nat.	R	--	
Oplismenus hirtellus (L.) P. Beauv.	basket grass	Nat.	--	O3	
Paspalum conjugatum Bergius	Hilo grass	Nat.	C	C	
POACEAE (continued)					
Paspalum cf. *dilatatum* Poir.	Dallis grass	Nat.	R	--	
Paspalum urvillei Steud.	Vasey grass	Nat.	C	--	
Paspalum sp.		Nat.	O	--	
Pennisetum clandestinum Choiv.	Kukuyu grass	Nat.	--	U	(3)
Sacciolepis indica (L.) Chase	Glenwood grass	Nat.	U	U	
Schizachyrium condensatum (Kunth) Nees	tufted beardgrass	Nat.	--	C	
Setaria gracilis Kunth	yellow foxtail	Nat.	U	--	
Sporobolus cf. *diander* (Retz) P. Beauv.	dropseed	Nat.	U2	--	
Urochloa maxima (Jacq.) Webster	Guinea grass	Nat.	A	O3	
Urochloa mutica (Forsk.) Webster	para grass	Nat.	U	--	
ZINGIBERACEAE					
Alpinia cf. *zerumbet* (Pers.) Burtt & Smith	shell ginger	OaoA	--	R	(3)
Zingiber zerumbet (L.) E. Smith	'awapuhi	**Pol.**	--	R	

Legend to Table 1

Status = distributional status

- **End.** = endemic; native to Hawaii and found naturally nowhere else.
- **Ind.** = indigenous; native to Hawaii, but not unique to the Hawaiian Islands.
- Nat. = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.
- OaoA = Ornamental and/or Agricultural, exotic plant not well-established outside of cultivation.
- **Pol.** = Polynesian introduction before 1778.

Abundance = occurrence ratings for plants by area in September 2008 (Area RE =recently disturbed areas and highway verge; Area FO = forested areas of saddle and side slopes.

- R – Rare - only one or two plants seen.
- U - Uncommon - several to a dozen plants observed.
- O - Occasional - found regularly, but not abundant anywhere.
- C - Common - considered an important part of the vegetation and observed numerous times.
- A - Abundant - found in large numbers; may be locally dominant.
- AA - Abundant - abundant and dominant; a defining vegetation type.

Table 1 (continued).

A number following an abundance rating adjusts the occurrence to account for plants that are more numerous within a small or local area. Thus, R1 reflects a plant species seen in only one or two locations, but each location had several individuals; U2 is a plant seen several to perhaps a dozen times, but usually in clusters of many individuals; R3 is a plant seen in perhaps only one localized place, but very abundant at that local.

Table notes:

(1) Fern very abundant on mauka slope just east of the survey area.
(2) Although *N. exaltata* reported by Funk (2004) may occur here as well, all plants examined closely by us were *N. multiflora*.
(3) Vegetative tissues only; no mature flowers or fruit observed in September2008.

Figure 3. View down into the saddle from the eroding south slope.

A total of 78 fern and flowering plant species were observed in the survey area. Of these 78 species, only ten (10) are considered native to the Hawaiian Islands (12.8%).

Polynesian introductions made before the arrival of Capt. James Cook numbered only one. If we add these to the count of native plant species, then species representing "Hawaiian" plants comprise 14.1% of the total species. Only *pala'a*, *hala* and *hau* are at all common; all the other "natives" are uncommon or rare or (in the case of *'ōhi'a*) occasional at the site. These low values for natives are typical for most lowland, disturbed sites in the Islands. No species that is listed by the state or federal governments or considered a candidate species, or is especially rare, or is of any special concern was observed at the site. Therefore, no mitigations measures are proposed based upon specifics of the flora.

The eroding south face of the saddle (Fig. 3, above) is a very steep, exposed laterite. Presently small ironwoods and tufted beardgrass grow scattered over the surface. This type of habitat should support native *uluhe* (*Dicranopteris linearis*) fern, as is the case of the steep road cut just east of the survey area. The reason that little or no *uluhe* is growing on the erosion face is the unstable nature of the soil. Presumably, the slope will be recontoured to a more stable aspect by the proposed road construction through the saddle, allowing native *uluhe* to establish and reclaim this disturbed ground, reducing soil runoff to the nearby ocean.

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APPENDIX C

A Survey of Avian and Terrestrial Mammalian Species

A Survey of Avian and Terrestrial Mammalian Species for the Kūhiō Highway Improvements at Lumaha'i & Wainiha Project, Kaua'i.

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HDOT-HWY Project No. 560A-03-96

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Table of Contents

Figures & Tables

Introduction:

The Hawai'i State Department of Transportation, Highways Division (HDOT-HWY) is proposing to undertake highway improvements at four sites along Kūhiō Highway located between Lumaha'i Beach and Wainiha Bay on the north shore of the Island of Kaua'i (Figure 1). This report summarizes the findings of an ornithological and mammalian survey of the four specific sites and the general project area. Fieldwork was conducted on September 1st and 2nd, 2004.

The primary purpose of the survey was to determine if there were any federally listed endangered, threatened, proposed, or candidate avian or mammalian species on, or in the immediate vicinity of the four sites. Federal and State of Hawai'i listed species status follows (DLNR, 1998, Federal Register, 1999a, 1999b, 2001, 2002, 2004).

Avian phylogenetic order and nomenclature follows *The American Ornithologist's Union Checklist of North American Birds 7th Edition* (American Ornithologist's Union, 1998), and the 42nd through the 45th supplements to *Check-list of North American Birds* (American Ornithologist's Union, 2000; Banks et al., 2002, 2003, 2004). 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., 1974).

Hawaiian and scientific names are italicized in the text. A glossary of technical terms and acronyms used in the document which may be unfamiliar to the reader are included at the end of the narrative text on Page 10.

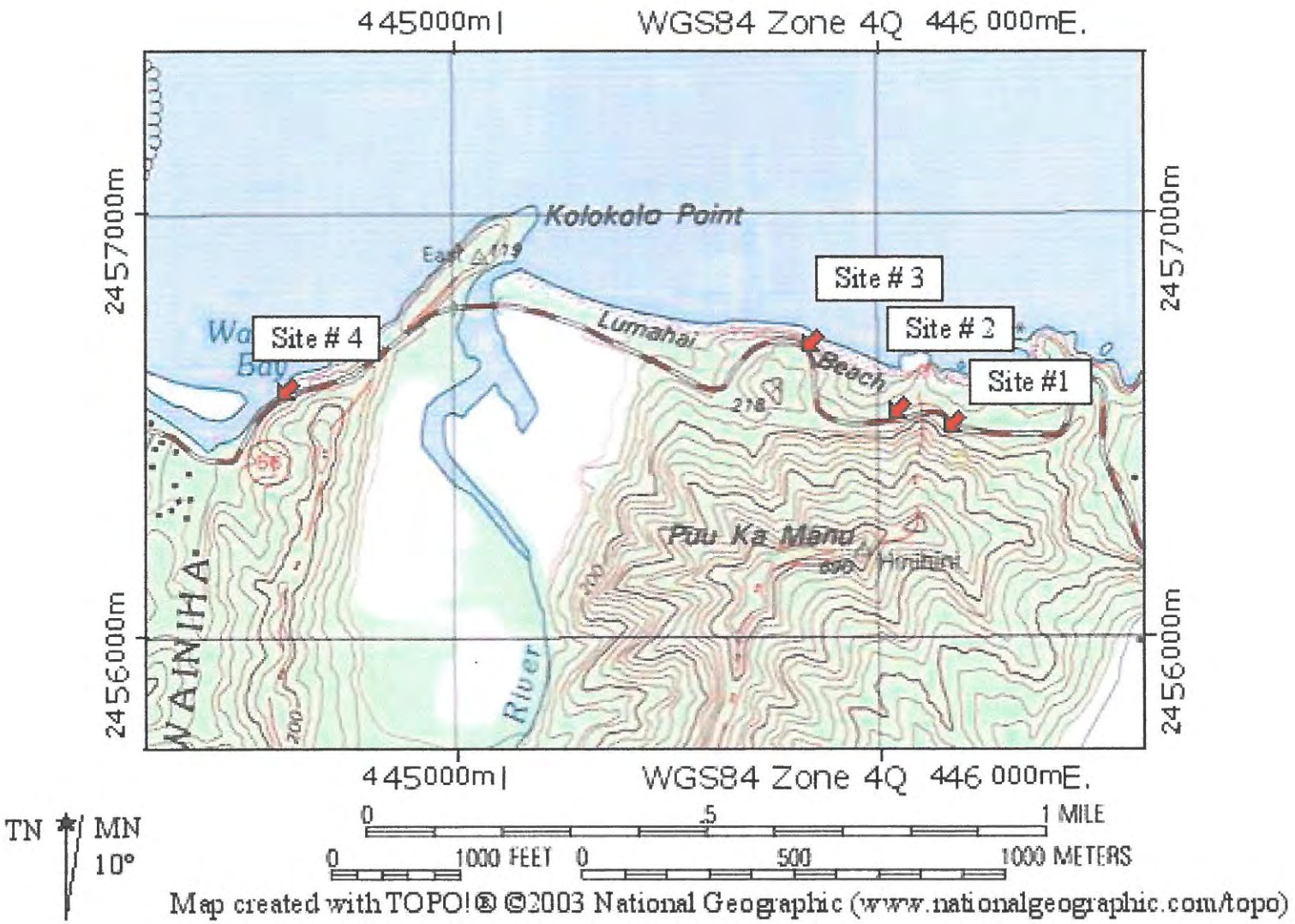
Project and Site Descriptions:

HDOT is planning on constructing improvements at four separate locations along Kūhiō Highway between Lumaha'i Beach and Wainiha Bay. They are planning on: (1) repairing the deteriorating concrete reinforced masonry (CRM) wall between milepost (MP) 5.008 and 5.03, (2) repair embankment erosion on the down-slope (*makai*) side of the road at MP 5.12 and repairs to the inlet/culvert at MP 5, (3) repair settlement in the roadway between the turnout at MP 5.32 and MP 5.355 and finally (4) repair the slide at the turn in the road above the Wainiha River at MP 6.116 (Figure 1).

The habitat present along this portion of Kūhiō Highway is comprised of a mix of alien and indigenous species including: *'uluhe* (*Dicranopteris linearis*), *naupaka-kahakai* (*Scaevola sericea*), wedelia (*Wedelia trilobata*), *hala* (*Pandanus tectorius*), *ti* (*Cordyline fruticosa*), *hau* (*Hibiscus tiliaceus*), *koa haole* (*Leucaena leucocephala*), Chinese banyan (*Ficus microcarpa*), ironwood (*Casuarina equisetifolia*), coconut (*Cocos nucifera*), Java plum (*Syzgium cumini*), mango (*Mangifera indica*), avocado (*Persea americana*) and numerous other alien grasses and weedy species typically found in disturbed areas on Kaua'i.

Figure 1

Study Sites



Mammalian Survey Methods:

With the exception of the Hawaiian hoary bat (*Lasiurus cinereus semotus*), or *'āpe'ape'a* as it is know locally, all terrestrial mammals found on the island of Kaua'i are alien species. Most are ubiquitous; no trapping program was proposed or undertaken to quantify the use of the study site by alien mammalian species. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all vertebrate species observed and heard within the project area. Visual and electronic scans, using a Broadband AnaBat II® ultrasonic bat detector were made for bats, during crepuscular periods on the evening of September 1st and the morning of September 2nd, 2004.

Avian Survey Methods:

Three avian count stations were sited within the project corridor. One each at MP 5, MP 5.35, and MP 6.2. Six-minute variable circular plot (VCP) counts were made at each station. Stations were each counted once. Field observations were made with the aid of Leitz 10 X 42 binoculars and by listening for vocalizations. Counts were concentrated in the early morning hours, the peak of daily bird activity. An additional two hours were spent on site on the evening of 1st and the morning of the 2nd of September, 2004, in an attempt to detect nocturnally flying seabirds and owls over-flying the area. Time not spent counting was used to search the surrounding area for species and habitats not detected during count sessions.

Mammalian Survey Results

Up to four Hawaiian hoary bats were recorded flying over the general project area on the night of September 1st, 2004. Tracks and sign of at least one domestic dog (*Canis f. familiaris*) was encountered at several locations along the roadway bear MP 5.35.

Avian Survey Results

A total of 114 individual birds of 12 species, representing 11 separate families, were recorded during station counts (Table 1). All of the species detected during station counts are alien to the Hawaiian Islands (Table 1). Two additional species; Hawaiian Petrel (*Pterodroma sandwichensis*), or *'ua'u* and Newell's Shearwater (*Puffinus auricularis newelli*), or *'a'o* were seen and heard respectively as they flew inland over the general project site during crepuscular and nocturnal surveys. Both of these seabirds are listed as endangered and threatened respectively under both the federal and the State of Hawaii's endangered species programs (Federal Register 1999a, DLNR 1998).

Table 1.

Avian Species Detected: Kūhiō Highway Improvement Project

Common Name	*Scientific Name*	*ST*	*RA*
PHEASANTS & ALLIES – Phasianidae			
Red Junglefowl	*Gallus gallus*	A	2.00
PETRELS & SHEARWATERS - Procellarridae			
Hawaiian Petrel	*Pterodroma sandwichensis*	**EE**	IN
Newell's Shearwater	*Puffinus auricularis newelli*	**TS**	IN
PIGEONS & DOVES - Columbidae			
Spotted Dove	*Streptopelia chinensis*	A	1.33
Zebra Dove	*Geopelia striata*	A	2.33
OLD WORLD WARBLERS – Sylviidae			
Japanese Bush-Warbler	*Cettia diphone*	A	0.67
THRUSHES - Turdidae			
White-rumped Shama	*Copsychus malabaricus indicus*	A	0.67
BABBLERS - Timaliidae			
Hwamei	*Garrulax canorus*	A	1.33
WHITE-EYES – Zosteropidae			
Japanese White-Eye	*Zosterops japonicus*	A	11.67
STARLINGS – Sturnidae			
Common Myna	*Acridotheres tristis*	A	1.33
EMBERIZIDS – Emberizidae			
Red-crested Cardinal	*Paroaria coronata*	A	1.33
SALTATORS, CARDINALS & ALLIES – Cardinalidae			
Northern Cardinal	*Cardinalis cardinalis*	A	2.00
CARDULINE FINCHES & ALLIES – Fringillidae			
House Finch	*Carpodacus mexicanus frontalis*	A	13.00
WAXBILLS & ALLIES – Estrildidae			
Nutmeg Mannikin	*Lonchura punctulata topela*	A	2.33

Key to Table 1.

ST Status
A Alien species
EE Endangered endemic species
TS Threatened endemic sub-species
RA Relative Abundance = Number of birds detected divided by the number of count stations (3)
IN Incidental observation, seen or heard at times other than during VCP counts

Avian diversity and densities were relatively low. Two species, Japanese White-eye (*Zosterops japonicus*) and House Finch (*Carpodacus m. mexicanus*) accounted for 65% of the total of all birds recorded during station counts. The most common avian species detected was the House Finch, which accounted for 34% of the total number individual birds recorded. We recorded an average of 38 birds per station count.

Discussion:

A one-time survey cannot provide a total picture of the wildlife using any given area. Certain species will not be detected for one reason or another. Seasonal variations in populations, coupled with seasonal availability and use of resources, will cause different use patterns throughout a year and, in fact, over a number of years. Coupling the results of a one time survey with the results of previous surveys conducted in similar habitats and locations, greatly expands the value of the information gathered.

The findings of the mammalian survey are consistent with the results of other recent surveys conducted within the lowland areas of north and east Kaua'i (David, 1995, 1998, 1999, 2001, 2002, 2003a, 2003b, 2004). That endangered Hawaiian hoary bats were detected during this survey was not surprising; Hawaiian hoary bats are regularly seen in and around both Lumaha'i and Wainiha Valleys as well as most of the lowland areas on the Island of Kaua'i (Tomich, 1986; David, 1995, 1999, 2001, 2002, 2003, 2004; R. David, pers. obs. 1980-2004). It is highly unlikely that the construction of any of the proposed improvements would have any impact, deleterious or otherwise on this endemic species.

Although no rodents were detected during the course of this survey, it is likely that roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*), European house mice (*Mus domesticus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use various resources found within the project area. Without conducting a trapping program, it is difficult to assess the population densities of these often hard-to-see mammals. All of these introduced rodents are deleterious to native ecosystems and their dependant faunal components.

The findings of the avian survey are consistent with the findings of other recent surveys conducted within the lowland areas of north and east Kaua'i (David, 1995, 1998, 1999, 2001, 2002, 2003a, 2003b, 2004; Day and Cooper, 1999, 2001; Day et al., 2000, 2001, 2002). That we detected both the endangered Hawaiian Petrel (*Pterodroma sandwichensis*) and the threatened Newell's Shearwater (*Puffinus auricularis newelli*) flying over the project area on their way inland to their nesting colonies was to have been expected. Both of these species are pelagic seabirds which do not return to their breeding colonies until late April. Both species cross the northern, eastern and southern coastline of Kaua'i across a broad front and in relatively large numbers during the breeding season, and both have regularly been recorded over-flying the general project area and other areas

on the north and east shores of Kaua'i (Cooper and Day, 1995, 1998; Day and Cooper, 1995, 1999, 2001; Day et al., 2000, 2001; David 2002, 2003a, 2003b; Morgan et al., 2003; White et al., 2004).

The primary cause of mortality in both these species is thought to be predation by alien mammalian species at the nesting colonies (Telfer et al., 1987; Ainley et al. 2001, Cooper and Day 1995, 1998; Day and Cooper 1997; Day et al., 2003; Hue et al., 2001). Collision with man-made structures is considered to be the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Telfer et al., 1987; Ainley et al., 1995, 1997, 1998, 2001; Cooper and Day 1995, 1998; Day and Cooper 1997; Day et al. 2003). There is no suitable nesting habitat for either of these listed seabird species within or close to the project site.

Recommendations

To reduce the possibility that nocturnally flying Hawaiian Petrels and Newell's Shearwaters may be disoriented and collide with man-made structures, it is recommended that any external lighting be shielded (Reed et al. 1985, Telfer et al., 1987). Although no permanent lights i.e., street lights, are planned in conjunction with this project, nighttime construction may be required if it is necessary to close both lanes of the roadway simultaneously during construction activities. Nighttime construction would require the use of unshielded lights during the hours of darkness. Therefore, it is recommended that nighttime construction be allowed between January and July, and prohibited between August and December. This mitigation would minimize the threat of disorientation and downing of both species, especially fledgling birds which are at particular risk during the fledging period which is concentrated between mid-August and mid-December each year.

To maintain the water quality in near-shore waters that support listed aquatic reptiles and mammals it is imperative that any spoil created by construction activity not be allowed to enter near-shore waters below the construction sites. It is recommended that Best Management Practices be developed and implemented during the construction phase of this project to ensure that construction spoils, and any petroleum, oils and lubricant spills which may be associated with construction equipment does not enter the ocean.

Glossary:

Alien - Introduced to Hawai'i by humans.
Crepuscular – Twilight hours either in the evening or the morning.
Endemic – Native and unique to the Hawaiian Islands.
Endangered – Listed and protected under the ESA as an endangered species.
Indigenous - Native to Hawai'i, but also found elsewhere naturally.
Volant – Flying, capable of flight - as in flying insect.
Threatened - Listed and protected under the ESA as a threatened species.

CRM - Concrete reinforced masonry, as in a retaining wall,
DLNR – Hawaii State Department of Land & Natural resources.
ESA - Federal Endangered Species Act of 1973, as amended.
MP – Mile Post.
VCP – Variable Circular Plot, method of censusing birds.

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APPENDIX D

Archaeological Survey

Pacific Legacy

Historic Preservation

ARCHAEOLOGICAL INVENTORY SURVEY IN THE VICINITY OF LUMAHA'I: OLD LOOP ROAD AND BYPASS ROAD CORRIDOR LUMAHA'I AHUPUA'A, HANALEI DISTRICT, ISLAND OF KAUA'I [TMK (4) 5-7-003]

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ARCHAEOLOGICAL INVENTORY SURVEY IN THE VICINITY OF LUMAHA'I: OLD LOOP ROAD AND BYPASS ROAD CORRIDOR LUMAHA'I AHUPUA'A, HANALEI DISTRICT, ISLAND OF KAUA'I [TMK (4) 5-7-003]

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Frontispiece: Proposed Lumaha'i Bypass road corridor, west side of corridor.

1.0 INTRODUCTION

Pacific Legacy, Inc., at the request of EKNA Services, Inc. conducted an archaeological inventory survey in the vicinity of Lumahaʻi along Kūhiō Highway (Figure 1) for the proposed Lumahaʻi Bypass road and emergency repair work, Lumahaʻi *ahupuaʻa*, Island of Kauaʻi (TMK: (4) 5-7-03). In conjunction with the by-pass, Pacific Legacy also examined an area along the existing "Old Loop Road" (the area that fronts an unnamed *puʻu* along Kūhiō Highway). The "Old Loop Road" area is proposed for emergency repairs due to the roadway's having been destabilized by the slow erosion downslope of the highway. The purpose of the archaeological survey is to determine if significant archaeological resources are present within the project area.

1.1 PROJECT LOCATION AND ENVIRONMENTAL SETTING

The proposed Lumahaʻi Bypass roadway (Figures 2 and 3) is ca. 20 feet wide (6.1 meters), ca. 800 feet long (243 meters) extends from Kūhiō Highway behind an unnamed *puʻu* (hill) and reconnects back to Kūhiō Highway. The intent is to divert this portion of Kūhiō Highway from the ocean side (*makai*) of the *puʻu* to the mountain side (*mauka*) behind it. The Old Loop Road section extends from the Hanalei side of the *puʻu* for ca 700 feet and ends on the *makai* side of the *puʻu*. The proposed changes to this section of the road are shown on Figure 4.

Rainfall within this area of Kauai ranges between 80 to 100 inches per year with the wettest months being November through February (Juvik and Juvik 1998: 56).

Soils within the project area consist of Hihimanu Series, specifically, silty clay loam, 40 to 70 percent slopes.

> This series consists of well-drained soils on uplands on the island of Kauai. These soils developed in material weathered from basic igneous rock and colluviums at the base of the slopes. They are very steep. Elevations range from 100 to 2,000 feet…These soils are used for water supply, pasture, wildlife habitat, and woodland…the surface layer is brown silty clay loam and silty clay about 15 inches thick. The subsoil, 24 to more than 57 inches thick, is brown, dark-brown, and reddish-brown silty clay and clay…The substratum is soft, weathered rock. Permeability is moderately rapid. Runoff is medium, and erosion hazard is moderate. (Foote et al. 1972: 40).

1.2 PROJECT BACKGROUND

The current investigations are part of a long-term improvement plans formerly proposed for the Kūhiō Highway between Princeville and Hāʻena (Schideler et al. 2004). AhSam and Cleghorn (2005) conducted a Cultural Impact Assessment (CIA) for the improvements between Lumahaʻi and Wainiha.

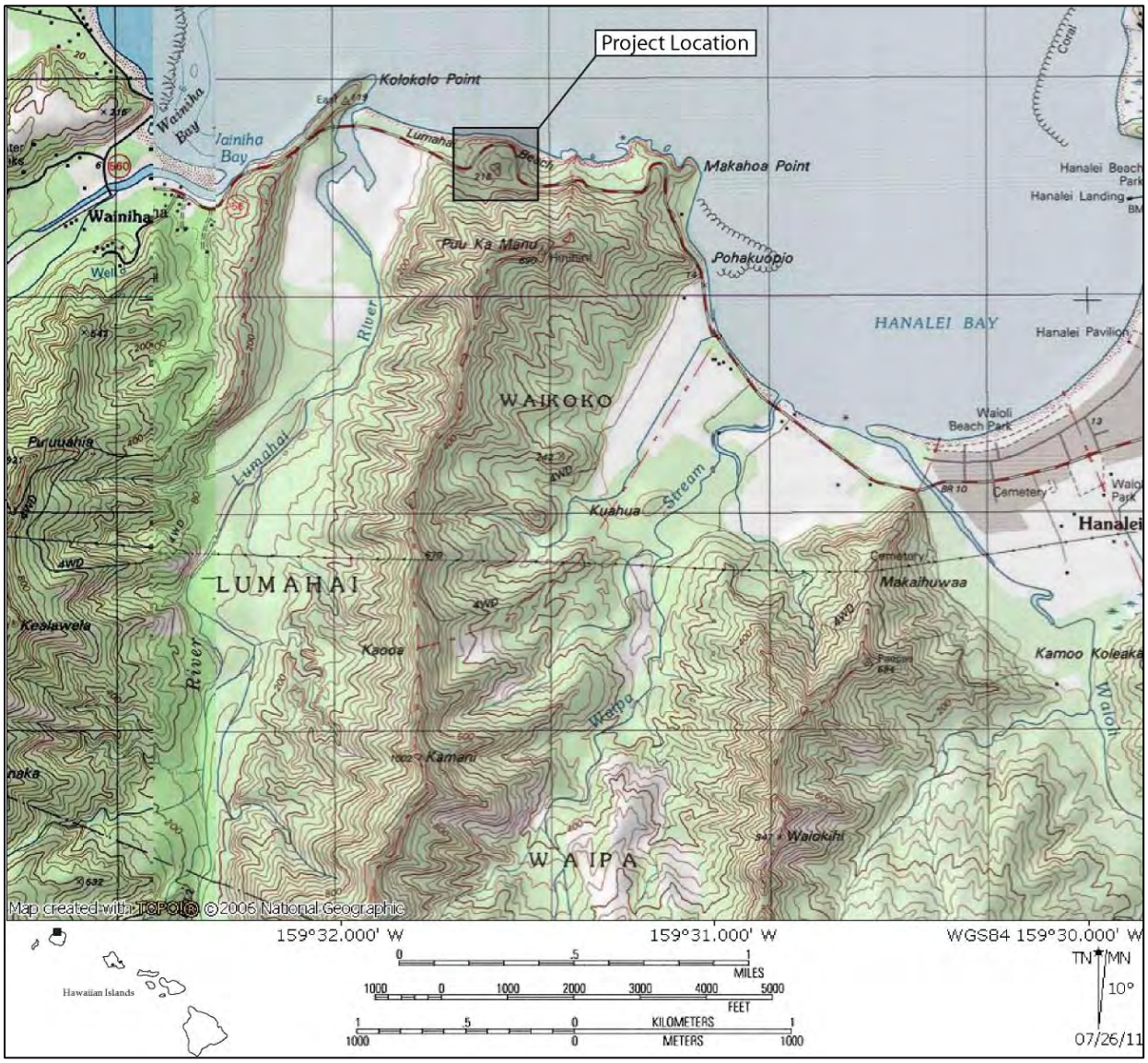

Figure 1. Location of project area.

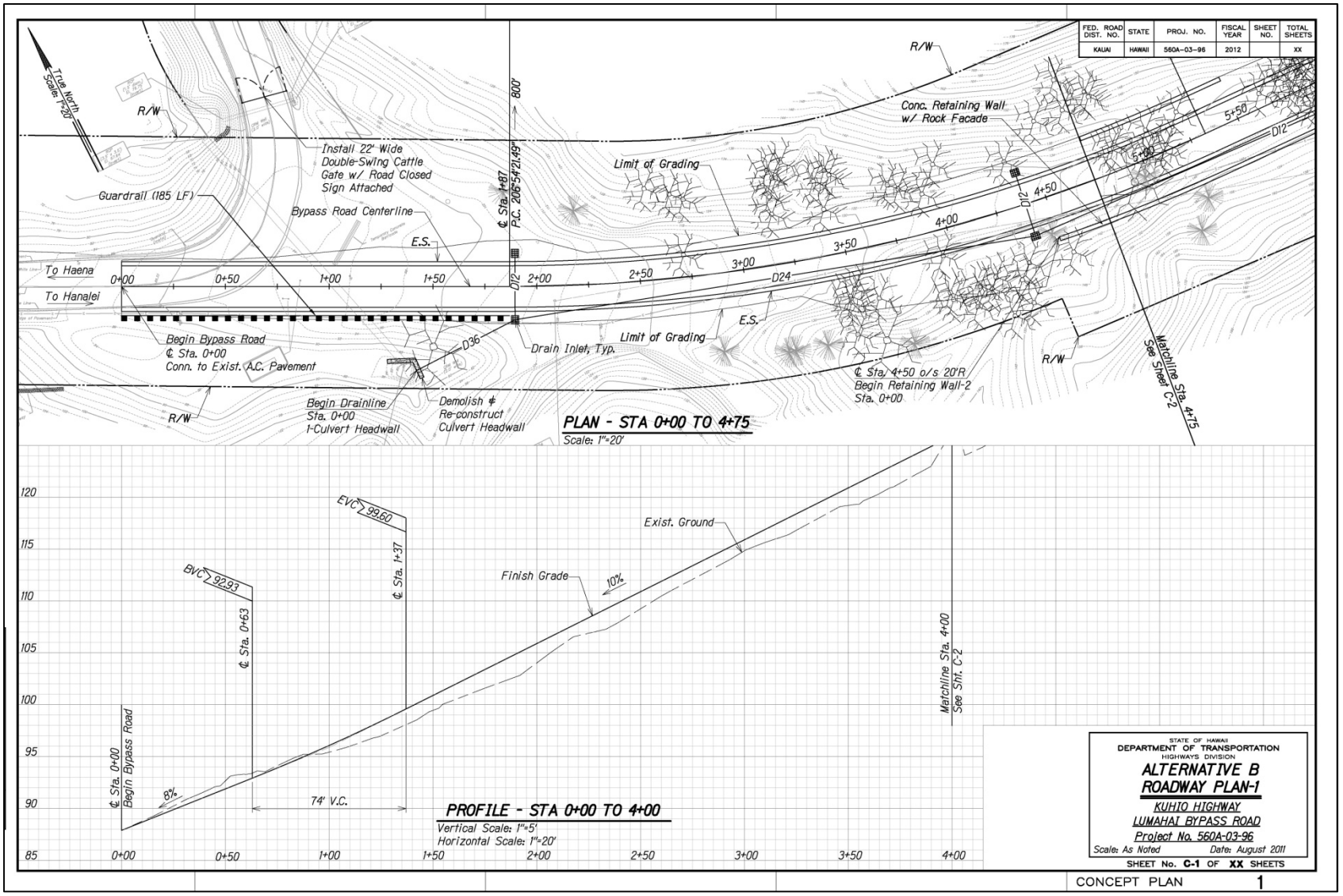

Figure 2. Plan for the proposed Bypass Road Corridor (Plan 1).

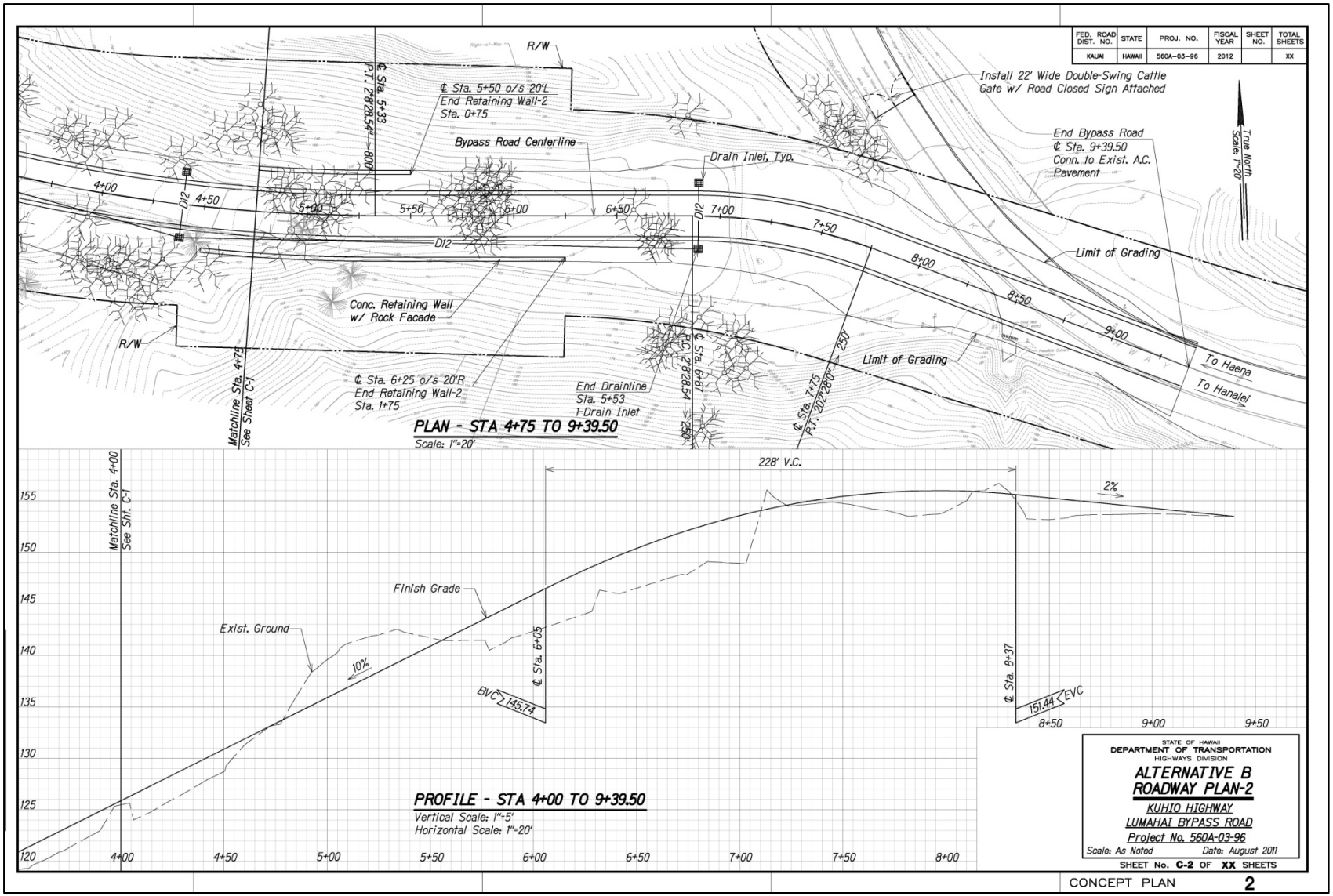

Figure 3. Plan for the proposed Bypass Road Corridor (Plan 2).

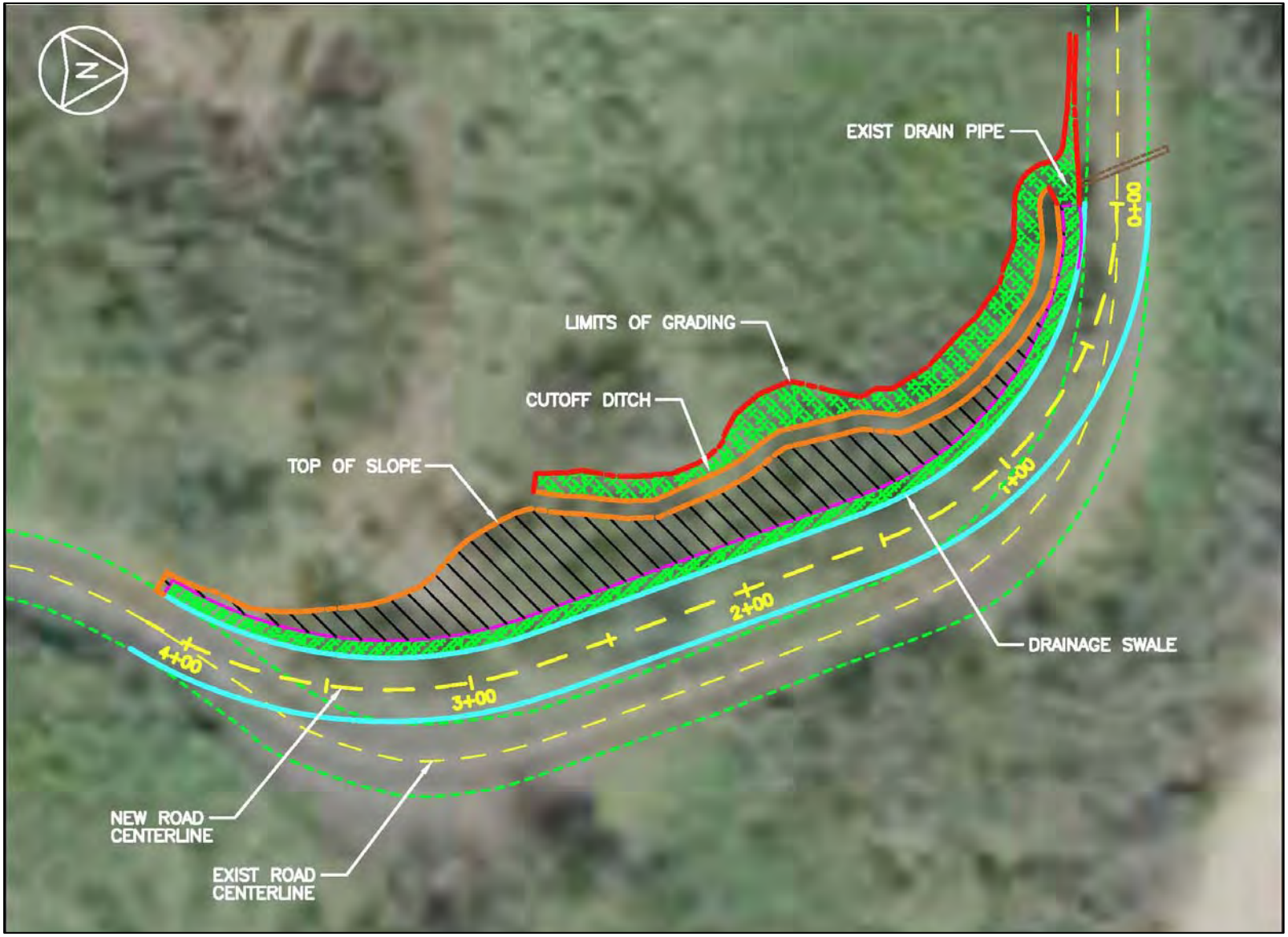

Figure 4. Proposed changes to the "Old Loop Road" section on the Hanalei side of the *puʻu*.

2.0 METHODOLOGY

Two separate field surveys were conducted (9 June and 4 August 2011) by Pacific Legacy archaeologists James McIntosh, B.A. and Kimberly Mooney, B.A. with Paul L. Cleghorn serving as Principal Investigator. On June 9th, the survey crew was met on site by Mr. Fred Reyes (DOT Highways), Mr. Jeff Chandler, Paʻula Chandler, and several community members. After a brief gathering, Mr. Reyes and the community members departed the site and the survey of the area *mauka* of the unnamed *puʻu* was conducted. The survey sweeps were conducted in an east/west direction with 10 to 15 meters spacing between archaeologists. Maps of the proposed roadway supplied to Pacific Legacy were used by the archaeologists to aid in orientation during the survey.

The 9 June survey examined a very narrow project corridor extending behind an unnamed *puʻu*. The area presently contains ironwood trees, grass and other vegetation. The slopes on both the *mauka* and *makai* sides are very steep (40-60° slopes) and eroding clay soils which have formed large talus-like slopes at their bases. Where accessible, the survey crew scaled the slopes, attempting to identify cultural resources above the project corridor.

On the second survey (4 August), the same archaeologists were met and escorted on site by Mr. Jeff Chandler. This survey focused on the existing right-of-way on both sides of the highway along the "Old Loop" road section. During this survey, the team proceeded to the top of the *puʻu* to determine if any archaeological sites or features were present, the survey then proceeded in a northerly direction on the west end of the road then turned in a southerly direction along the east side of the road.

A Trimble GeoXH was carried by the field crew to aid in orientation and site recording. However, due to the density of vegetation and the topography, the Trimble was unable to acquire enough satellites to record sites and update the on-ground position. As a result, the Trimble was ineffective for most of the survey and its use was discontinued.

When an area of interest was encountered, it was assigned a number (i.e., T-001) and it was flagged with pink flagging. Basic measurements (length/width/height) were recorded for each feature along with construction methods and materials. The locations of features were plotted on the project maps carried by the archaeologists. Photographs were taken with a digital camera documenting construction techniques and site condition.

3.0 HISTORIC BACKGROUND

Information regarding the *ahupua‘a* of Lumaha‘i is scarce. “Little is known of the traditional history of Lumaha‘i“ (Hoffman 1980: 3). Several factors point to this lack of information: a small population and control of the area by a strong *ali‘i*.

Earle writes,

> Around the turn of this century [20th], there were extensive rice plantations in the alluvial area near the sea. For the earlier historic period (1850), only limited information is available because no land awards were granted to commoners in Lumaha‘i. The reason of this absence is unclear but it was not for want of a community population. Perhaps the ahupua‘a chief and/or konohiki were instrumental in discouraging awards. Extensive bulldozing for pasturage has destroyed all archaeological evidence of pondfields in the lower section of the valley, but numerous small terrace sites are to be found in the interior. One such site was identified 2.5 km from the sea, during a rapid reconnaissance survey and others have been described by local hunters (Earle 1978, cited in Shideler et al. 2004: 61).

Given the size of the valley and the presence of the large permanent stream, there must have been a substantial population. However, the evidence cannot support this assumption,

> Lumaha‘i must have had many *lo‘i* areas in old Hawaiian days, but in 1935 most of it was used as ranch lands, which obliterates the evidences of Hawaiian farming. It could not have supported a population as large as Wainiha or Hanalei (Handy and Handy 2004: 420).

Hoffman mentions early population surveys for the valley and found that the population while not very large was still substantial for the area.

> Early missionary surveys showed a population of 119 –90 adults and 29 children—in 1935, increasing to 123 in an 1847 survey. Despite the evidence for a moderate population in the mid-19th century, no individual land grants (*kuleana* awards) were recorded for adult males in the valley at the time of the Mahele of 1848 (Hoffman 1980:3).

Two maps recovered from the State Survey Office (Metcalf [no date] and Gay [1873]) (Figures 5 and 6) show no housing or settlements with the *ahupua‘a*. Likewise, there is no documented use of the current project area or a name for the *pu‘u*.

The background research was unable to identify the name of the *pu‘u* within the project area. Likewise, community members were unsure or not wanting to divulge the name.

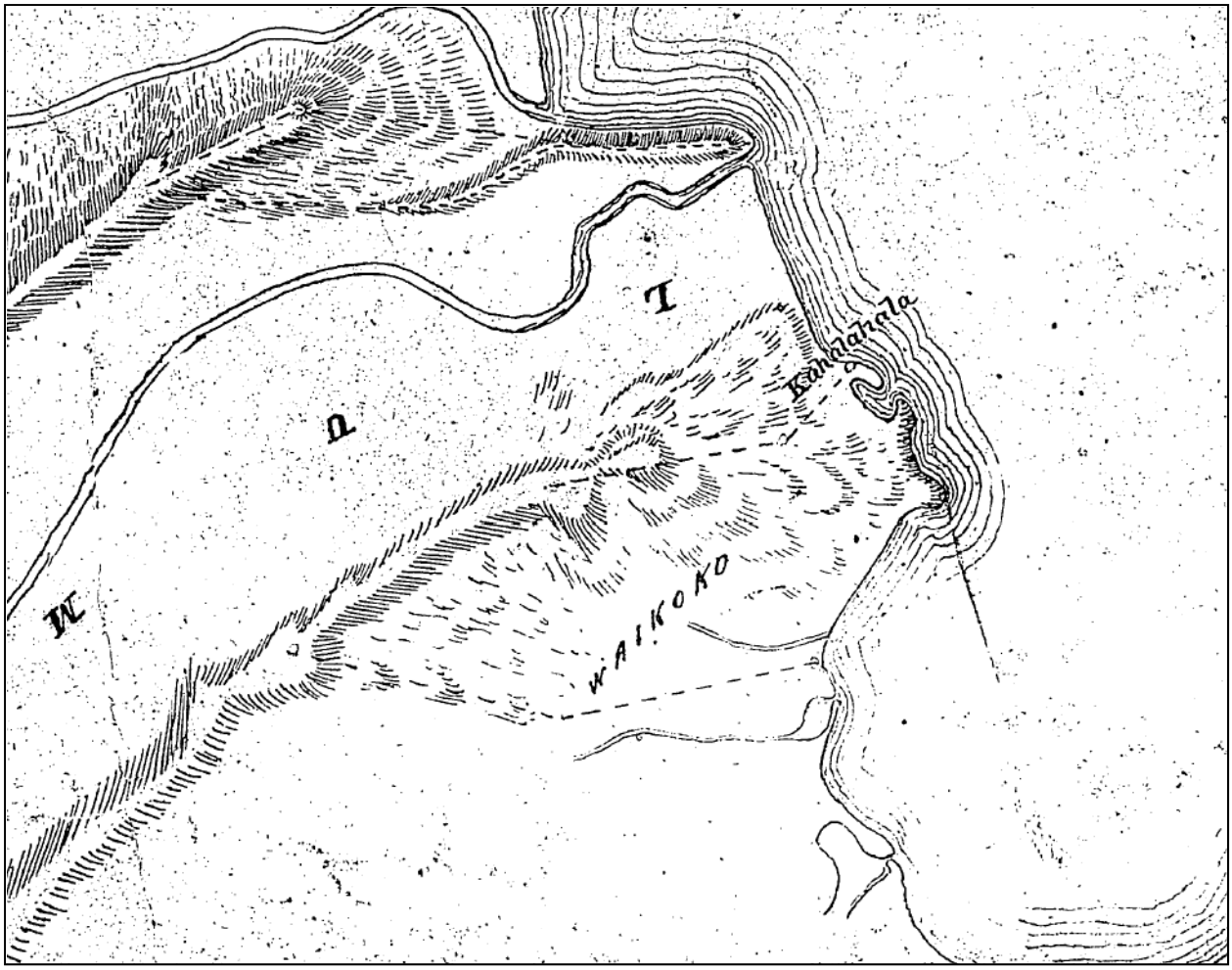

Figure 5. Metcalf Map (no date) Reg. No. 138 on file at the State Survey Office. There is no mention of a name for the *pu'u* in the current project area.

Figure 6. Gay 1873 Map (Reg. Map No. 2265) on file at the State Survey Office.

3.1 LAND COMMISSION AWARDS

Private land ownership was introduced into Hawai‘i during the Mahele ‘Āina (the division of Hawaiian lands) of 1848. Crown and *ali‘i* lands were awarded in 1848 and *kuleana* titles were awarded to the general populace in 1850 (Chinen 1958). The awarded lands are called Land Commission Awards (LCA’s). In reviewing the LCA’s we are also able to determine previous land use within and around the project area. Thus we are able to determine how Native Hawaiians lived and worked in this area of Hawai‘i and possibly indicate how the current project area was traditionally used.

A review of the LCA’s for the current project determined that a single LCA (LCA 5524) was awarded for the entire *ahupua‘a* of Lumaha‘i consisting of ca. 3,150 acres. The award went to L. Konia, the granddaughter of Kamehameha I and the wife of Paki. Together, Paki and Konia had a daughter, Bernice Pauahi, who later became Bernice Pauahi Bishop. These lands were transferred to Pauahi from Konia and became part of the legacy of today’s Kamehameha Schools, Bishop Estate. The estate currently owns the *ahupua‘a* of Lumaha‘i including the current project area.

4.0 PREVIOUS ARCHAEOLOGY

No documented archaeological investigations have taken place within the current project area. However, several studies have examined the valley of Lumahaʻi and the adjacent areas.

The earliest archaeological study in Lumahaʻi Ahupuaʻa was conducted by Thrum in 1907, where he documented three *heiau* (shrine or temple) in the region: Puʻuomama Heiau (site no. Ka-D7-1), Puʻuohewa Heiau (Site no. Ka-D7-2) located on the Lumahaʻi summit, and Kailiopaia Heiau (Site no. Ka-D8-2) located by Thrum (1907) on the *makai* side of the government road (Kūhiō Highway) and east of Lumahaʻi River on a coral point. Puʻuomama and Puʻuohewa were not relocated in subsequent surveys and retained their Bishop Museum site numbers, while Kailiopaia was relocated by Bennett (1931) and renumbered as Site 50-30-03-147 in the State Historic Preservation Department (SHPD) system.

Several years later, Emory (1928) documented several *heiau* four miles to the west of the project area at the end of the government road. Kaulaupaoa Heiau (Site 50-30-03-154) and Lohiʻau's dancing pavilion/shrine (Site 50-30-03-155) at Kēʻē, Hāʻena, were said to be related to the Pele and Lohiʻau legend also known as the Hiʻiaka myth.

Between 1928 and 1929, Bennett (1931) carried out a detailed study of archaeological sites on Kauaʻi, three of which were found less than a mile from the project area (Sites 50-30-03-147 to 149) and two within two and a half miles to the west (Sites 50-30-03-150 and 151). Kailiopaia Heiau (no. 147), located near Makahoa Point just over a half mile east of the project area, was originally found and described by Thrum (1907). Site 148 is what remained of a *heiau* located just *makai* of Site 149 on Pōpōkī knoll near Wainiha River in the *ahupuaʻa* of Wainiha less than two miles west of the project area. Kaunupepeiao Heiau (site 149), was described by Bennett (1931) as being "back of the first house on the first pali east of the mouth of the Wainiha river. A flat place about 30 feet wide and 20 feet deep with stones along the front edge meet the description given by Thrum: 'A 12-foot open-paved heiau of husbandry class; probably simply a place of offering' " (Bennett 1931:135). According to Bennett (1931), the 20 by 10 foot, ocean-facing, and river stone paved *heiau* named, Laumakai, (Site 150) is located "on a knoll west of the "Power House" road, about one mile from the government road, in Wainiha valley…" (Bennett 1931: 135).

Bennett also describes Apaukalea Heiau (Site 151), which lies just *mauka* of Laumakai Heiau, as: "the remains of recent occupation together with modern stone platforms, walks, graves with tombstones, and other such work...The heiau consists of a small, square, paved area about 35 feet on a side... To the west of this enclosure is a flat space with 2 lines of stone traversing it, while on the east are 2 paved house sites about 10 feet square." A little over a mile to the east near Waipā Stream, Bennett (1931) documented the scant remains of Halaloa Heiau (Site 146), which was noted by Thrum earlier as a "square heiau of about 80 feet in size with low walls. Kāne its deity. Destroyed years ago for mill site." (Thrum as cited by Bennett 1931: 133-4).

In a landmark study, Earle (1978) investigated the dynamics of agriculture and irrigation in Hanalei/Halelеʻa District by studying the archaeological, historical, ethnographical, and

modern record to test theories on the evolution of economic and social organizations within a chiefdom complex. While Earle (1978) pays great attention to Wainiha and Waipā Valleys, he mentions little about Lumahaʻi Valley, offering that bulldozing and cattle grazing likely erased all evidence of traditional agriculture in the lower portion of Lumahaʻi Valley. However, Earle (1978), stated that the *mauka* portion of Lumahaʻi Valley (2.5 km from sea) contained several agricultural terrace complexes. Earle's 1978 study, documented extensive traditional wetland agricultural systems in coastal Wainiha. In Waipā Ahupuaʻa, Earle (1978) documented four irrigated agricultural complexes along the coast with one complex continuing into Waikoko Ahupuaʻa, which neighbors Lumahaʻi to the east.

Cordy (1978) conducted a survey of Lumahaʻi Valley floor, finding two dryland agricultural complexes (Site 50-30-03-447 and 449), which were comprised of terrace lines (Site 447) and enclosures with one wall (Site 449). These pre-Contact or late historic sites were located less than a mile and a half southwest of the project area.

Kelly et al. (1978) as part of the same investigations as Cordy (1978) found two historic dams and a tunnel, said to be associated with rice fields owned by Japanese farmers in the 1920s. Kelly et al. (1978) state that the lower portion of Lumahaʻi Valley has been "dragged" and altered for use as rice fields and later for use as cow pasture rather than sugar or pineapple cultivation. According to Kelly et al. (1978), few sites would be expected in the lowlands.

On approximately 300 acres of land along the Lumahaʻi River and the alluvial plains of Waipā, Hoffman (1980) performed a survey and some test excavation. Hoffman (1980) recorded three undocumented sites: two walls thought to be part of one agricultural complex (Sites 50-30-03-440 and 441) and alignments of large boulders that outline enclosures (Site 444) on the east side of Lumahaʻi River. On the west side of the river, Hoffman (1980) found two additional sites: a platform with possible wall segments nearby (Site 442) and irrigation ditch (Site 443). In Waipā Valley, Hoffman was unable to locate any additional sites.

A very thorough archaeological monitoring plan was completed for the improvement of Kūhiō Highway's shoulder (Shideler et al. 2004), which compiled traditional, legendary, and historic accounts as well as archaeological backgrounds for six *ahupuaʻa* on Kauaʻi's North Shore, including Lumahaʻi, Wainiha, Waikoko, and Waipā *ahupuaʻa*. Shideler et al. (2004) suggest on-call and on-site monitoring for numerous areas along the Kūhiō Highway corridor, however, the proposed bypass corridor was not among the areas of concern.

4.1 SITE PREDICTABILITY

Based upon a review of the previous archaeological investigations and Land Commission Awards, we can predict what types of sites may be identified with the project area. There is a very low likelihood of encountering any cultural remains within the bypass corridor or the existing Kūhiō Highway corridor. The bypass corridor is both narrow and steep and unlikely to contain and archaeological resources. Likewise for the loop road section which is steep both above and below the highway. However, significant cultural resources may be located on or near the top of the *puʻu*. *Ahu* (cairns) may mark the locations of trails while platforms containing human remains could be located a top the *puʻu* as well.

5.0 FIELD INVESTIGATIONS

The field surveys identified several features associated with the existing Kūhiō Highway (Figure 7). These features were recorded but were not assigned permanent site numbers from the State historic Preservation Division. No traditional archaeological sites or features were located during the survey. No evidence of *iwi kūpuna* was observed.

The field survey conducted on the *mauka* portion of the *pu'u* did not identify any archaeological sites or features. This backside of the *pu'u* is very steep and is unlikely that anything was ever located there. The top of the *pu'u* is covered with ironwood trees and contains several areas which are quite flat. No traditional archaeological sites were identified on or around the *pu'u*.

5.1 DRAINAGE CULVERTS

Drainage Culvert 1 (Figure 8) is associated with the Kūhiō Highway. Located on the *mauka* side of Kuhio Highway and the east end of the proposed bypass, its consist of a small drain with dry-stacked and faced basalt cobble wall measuring 2.5 meters long and 0.85 meters high. The drainage pipe is filled in with soil making it difficult to determine the type of pipe used in construction. This site was likely constructed during the highway's construction to collect water and funnel it under the highway. This site is in poor condition.

Drainage Culvert 2 (Figure 9) is located near the west end of the proposed bypass on the *mauka* side of the corridor. An "L" shaped culvert, it measures 2.6 meters long and 2.55 meters high on the east side and 3 meters long and 3 meters high on the north end. The culvert is constructed of stacked basalt boulders and cobbles. There is a large concrete box drain under the stacked rock wall that extends north at ca 345°. The entrance to the culvert is blocked by soil and debris; however, a strong breeze was felt coming out of the culvert indicating that it was open on the opposite end.

Drainage Culvert 3 (Figure 10) is located on the north side of the *pu'u* and south of Kūhiō Highway. The drainage culvert contains a 24" concrete pipe with dry-stacked basalt stone on either side of the pipe. The pipe extends beneath the highway for ca 8 meters beginning on the *mauka* side of the highway and draining out on the *makai* side. Both ends of the drainage pipe are located immediately off the edge of Kūhiō Highway.

Figure 7. Locations of features recorded during the surveys. Aerial image from Google Earth.

Figure 8. Drainage Culvert 1.

Figure 9.Drainage Culvert 2 with large concrete box drain (lower left of photo).

Figure 10. Drainage Culvert 3 with drain pipe.

5.2 BOULDER BLOCKADE

A boulder blockade consisting of a series of staggered basalt boulders was located along the *makai* side of Kūhiō Highway (Figure 11). The boulders are 1.0 x 1.0 x 0.5 meters in size. According to Mr. Chandler, these rocks served a guardrail or curbing to prevent vehicles from driving over the cliff. They formerly were located along the edge of highway but over time a number have fallen over the cliff. Four boulders are still visible in bushes along the north edge of the highway. This type of road blockade is still in use and visible along section of Kūhiō Highway.

Figure 11. Boulder blockade *makai* of Kūhiō Highway.

5.3 CONCRETE POSTS

A series of concrete posts (n=11) (Figure 12) are located on the outside of the first pullover on the Hanalei side of the *pu'u*. The posts measure 0.75 x 0.20 x 0.20 and contain interior rebar. Several of the posts are eroding and exposing the rebar (Figure 13). Each post contains either two or four holes where a wood or metal beam would have been secured to it to prevent cars from passing the point. No beams are attached to these posts and a newer guardrail is present on the inside of the posts – replacing the older concrete posts. Many of the concrete posts are in very poor condition which was the likely cause of their abandonment.

Figure 12. Older concrete posts located behind the newer guardrails.

Figure 13. Concrete post showing exposed rebar. Note: the holes on the right of post were used to secure a guardrail now missing.

6.0 SIGNIFICANCE

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

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

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

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

Based upon the above stated criteria, the features identified during the current investigations do not meet any of the criteria and are assessed as not significant.

7.0 CONCLUSION AND RECOMMENDATIONS

Pacific Legacy, Inc., at the request of EKNA Services, Inc. conducted an archaeological inventory survey in the vicinity of Lumahaʻi along Kūhiō Highway for the proposed Lumahaʻi Bypass road and emergency repair work, Lumahaʻi *ahupuaʻa.* In conjunction with the by-pass, Pacific Legacy also examined an area along the existing "Old Loop Road." The proposed Lumahaʻi Bypass roadway is ca. 20 feet wide (6.1 meters), ca. 800 feet long (243 meters) extends from Kūhiō Highway behind an unnamed *puʻu* and reconnects back to Kūhiō Highway. The intent is to divert this portion of Kūhiō Highway from the *makai* side of the *puʻu* to the *mauka* side behind it. The Old Loop Road section extends from the Hanalei side of the *puʻu* for ca 700 feet and ends on the *makai* side of the *puʻu*.

The archaeological surveys did not identify any traditional archaeological sites or resources within the project area. The archaeological survey conducted around the *puʻu* did not identify any traditional cultural resources within the area. In fact, it seems unlikely that any resources ever existed *mauka* of the *puʻu* given the steep slopes and slumping soil from Kauaʻi's rainy weather, the area is not idea for any type of use. Consequently, the constant slumping of soil in this area would have made it difficult for to maintain any traditional structures or features had any have been located.

The elements recorded during the survey are all associated with the current alignment of Kūhiō Highway. Drainage Culverts 1 and 2 maybe impacted by the construction of the proposed by-pass construction. Likewise, Drainage Culvert 3, the boulder blockade and the concrete posts maybe impacted by the emergency repairs to the Old Loop Road. However, these features are not assessed as significant and have been sufficiently recorded during the current investigations. As a result, no further work is recommended on any of these features.

The proposed upgrades and construction for Kūhiō Highway will not have any effect on an any significant cultural resources within the vicinity of the unnamed *puʻu* at Lumahaʻi.

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APPENDIX E

Cultural Impact Assessment

Pacific Legacy

Incorporated

CULTURAL RESOURCES CONSULTANTS

CULTURAL IMPACT ASSESSMENT FOR THE KUHIO HIGHWAY IMPROVEMENTS, BETWEEN LUMAHAI AND WAINIHA, ISLAND OF KAUAI, HAWAII

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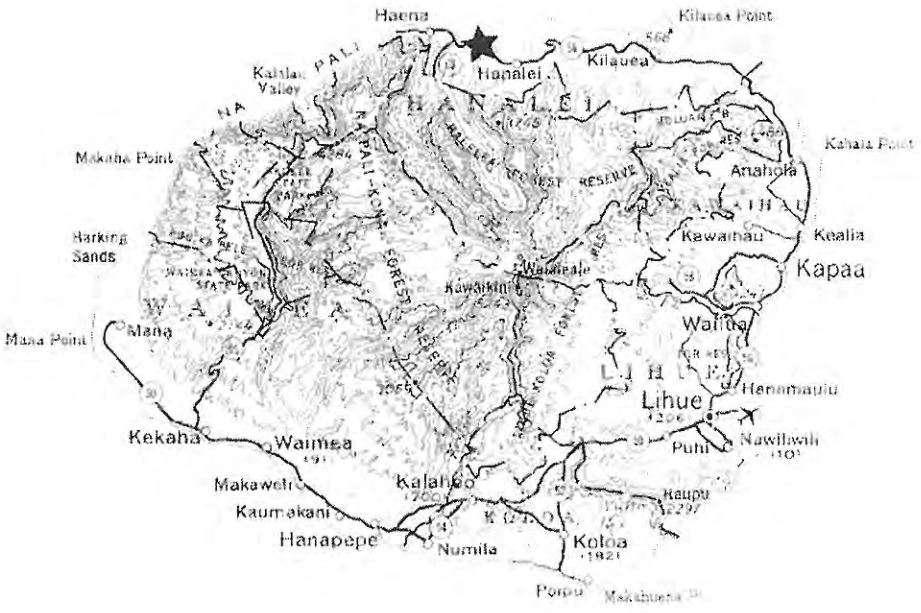

CULTURAL IMPACT ASSESSMENT FOR THE KUHIO HIGHWAY IMPROVEMENTS, BETWEEN LUMAHAI AND WAINIHA, ISLAND OF KAUAI, HAWAII

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ABSTRACT

Pacific Legacy, Inc. under contract to EKNA Services, Inc. at the request of the Kaua`i District Office Highways Division, Hawai`i Department of Transportation, completed a cultural impact assessment of the proposed project, in the vicinity of Makahoa Point to Wainiha on the Island of Kaua`i, Hawai`i. The study focused on the traditional practices that have and continue to be conducted by Native Hawaiians.

The purpose of this investigation was to investigate the Kuhio Highway project area for possible traditional practices that would be disturbed by the proposed highway improvements. Five interviews were conducted by Pacific Legacy, Inc., Jessica A. Ah Sam, B.A. in November 2004. Each interviewee signed a release form authorizing Pacific Legacy, Inc. to use the information gathered in those interviews for this report. All interviews were conducted in an informal setting and were not tape recorded.

The results of this study indicate that gathering, hunting, and fishing continue to be conducted by Native Hawaiians in the proposed project area. Plants collected on the *makai* edge of the highway may be impacted by construction activities. It is unknown at this time if these same plants are also located on the *mauka* edge of the highway. It is recommended that the *mauka* side of the highway be examined by a botanist to see if these medicinal plants are present

ACKNOWLEDGEMENTS

We would like to thank the individuals who allowed us to infringe upon their time in order to conduct this study. First, a big mahalo to the Waipā Foundation in Hanalei, especially Stacy Sproat-Beck and her parents, Uncle David and Auntie Linda Sproat. Without their support and influence the community may not have been so open to sharing their stories. We would also like to thank Jeff Chandler and his sister Lehela Chandler for pointing us in the right direction. Thank you to La France of the Office of Hawaiian Affairs for her list of contacts. Thank you to Auntie Violet Goetta and Auntie Kalahū for sharing their family history.

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*Frontis Piece: Island of Kauai with project area marked.

1.0 INTRODUCTION

Pacific Legacy, Inc. under contract to EKNA Services, Inc. at the request of the Kauai District Office of the Hawaii Department of Transportation, Highways Division, conducted a cultural impact assessment of the region from Lumahai to Wainiha, Island of Kaua`i, Hawai`i. This study focused on identifying the traditional practices that have or continue to be conducted by Native Hawaiians that could be disturbed in the proposed project (Figure 1).

To gather information on the tangible beliefs and traditions associated with the proposed project area, interviews with traditional cultural practitioners, knowledgeable in matters regarding the areas adjacent to Kuhio Highway, between Lumahai and Wainiha, were conducted.

1.1 DESCRIPTION OF THE PROJECT

The current conditions of the highway in this vicinity are a two lane highway, one lane in each direction. The width is approximately 20 feet with little or no shoulder. The highway was originally constructed by the County of Kauai by cutting into the hillside. Currently, the State is responsible for operations and maintenance as part of the State highway system (Kwock Associates, Inc., 2000). Both sides of the highway including the downhill slope are covered by light to moderate vegetation and trees. The proposed project will involve providing a new roadway surface and shoulders for the three problematic sections of the highway.

The proposed project area is located on the north coast of the island of Kauai, Hawaii. The proposed improvements to Kuhio Highway are being considered from Makahoa Point to Wainiha. Three possible sites have been identified in this area as having problems with longitudinal and fatigue cracking of the asphaltic concrete (AC) surface, depressions in the AC, and damage to cement rubble masonry wall adjacent to the roadway.

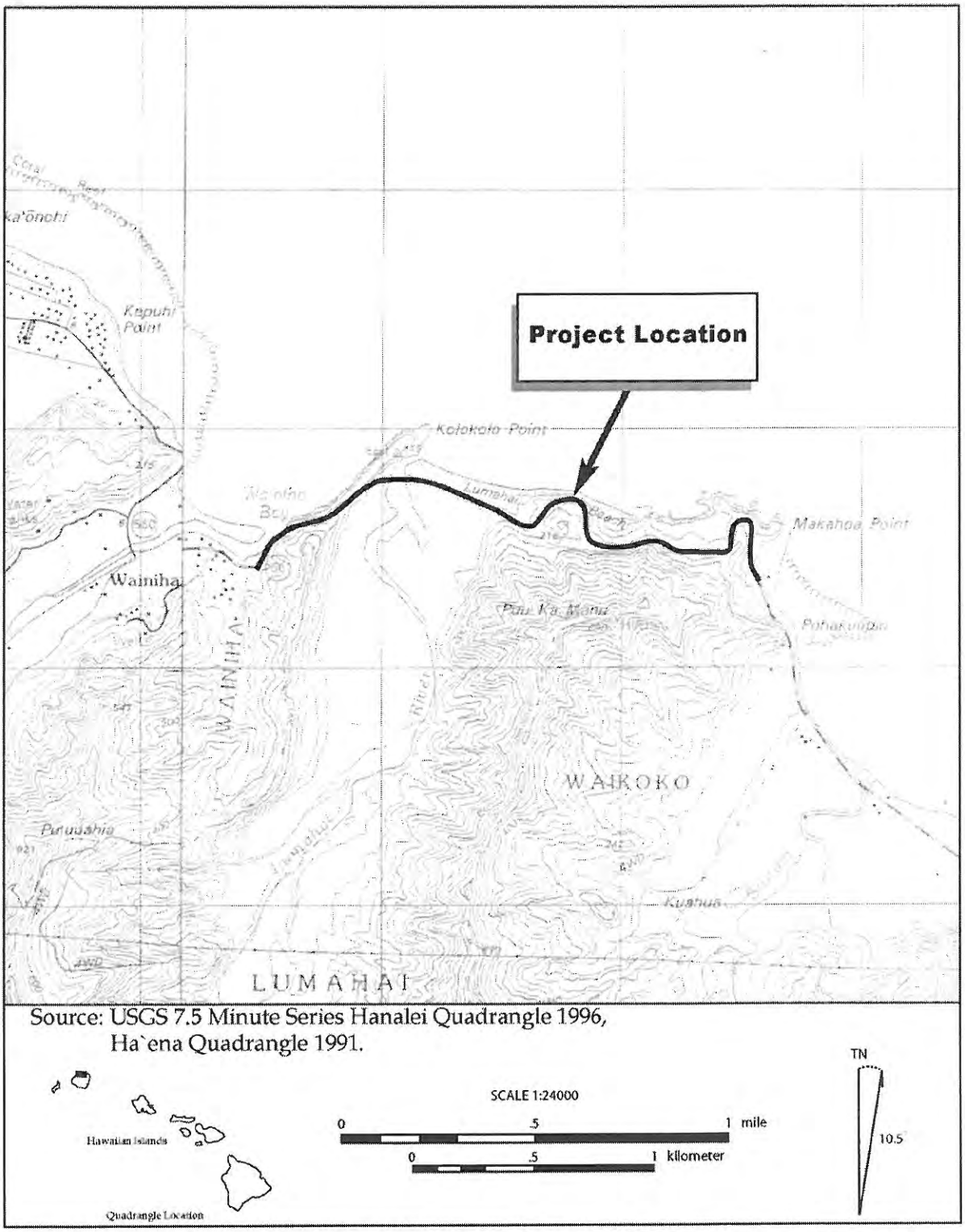

Figure 1. Project Location Map of Kuhio Highway in the vicinity from Lumahai to Wainiha.

2.0 METHODS

An attempt was made to contact various people knowledgeable about traditional cultural practices that may have been or currently conducted by Native Hawaiians in this portion of Northern Kauai and knowledgeable about the history of Kuhio Highway in the proposed project area. The people contacted are currently cultural practitioners, defined as people who conduct traditional Native Hawaiian cultural practices ranging from farming and fishing to *hula* (dance) and *la`au lapa`au* (medicine).

Informal interviews were conducted with all the practitioners. During the interviews, the interviewees were not disrupted from their busy schedules; instead they were accompanied throughout their normal daily jobs, such as, picking *ulu* (breadfruit) from the trees, pounding *poi* (taro) and mowing the lawn. Questions were prepared before each "talk-story" session, however the interviewee would commonly continue at their own pace, sharing what was most important to them.

2.1 CONTACTS

Contact information for the cultural impact assessment interviews began with an initial contact list; that expanded with recommendations from people on the original list, such as the expanded list received from OHA representative Le France Kapaka-Arboleda. Attempts were made to reach each individual listed and communication logs were kept for each individual (See Appendix A). The following people were contacted.

Lance Foster is a representative of The Office of Hawaiian Affairs, O`ahu Division. He suggested contacting the Kaua`i Office of Hawaiian Affairs, La France Kapaka-Arboleda.

La France Kapaka-Arboleda is a representative of The Office of Hawaiian Affairs, Kaua`i Division. Le France suggested contacting Auntie Violet Goetta.

Chipper Wichman is the grandson of Juliet Wichman, founder of Limahuli Gardens. Chipper managed Limahuli Gardens until recently when he took the position of Head of the National Botanical Gardens. Mr. Wichman was not familiar with traditional cultural practices in the Lumahai to Wainiha vicinity, instead he was more knowledgeable about Limahuli and Ha`ena Valley and did not feel his information was relevant.

Naomi Yokotake is a cultural practitioner in Hanalei. She was contacted via telephone but did not respond.

Rodney Haraguchi is head of the Taro Growers Association in Hanalei. A message was left with his secretary but he did not respond.

Verdelle Lum is a member and organizer for the Waioli Hui`ia Mission Church. During a visit to her church office hours she suggesting contacting the Waipā Foundation.

Representative Hermina Morita is the Kaua`i Island Representative. Representative Morita did not respond to email or phone messages.

Nancy McMahon is an archaeologist with State Historic Preservation Division on Kaua`i. She suggested contacting the Chandler Family.

Stacy Sproat-Beck is Executive Director of the Waipā Foundation in Hanalei. She contacted Jeff Chandler for me and suggested talking to her parents, David and Linda Sproat.

2.2 Knowledgeable Cultural Practitioners

After consulting with the individuals listed in Section 2.1, the following cultural practitioners were contacted:

Jeff Chandler is family member of the long-time *kama a`ina* Chandler family. His family has lived and worked in the proposed project area for "plenty generations." He is a member of the Waipā Foundation. He is a strong activist for Hawaiians in the project Hanalei area and surrounding vicinity. He is familiar with Kuhio Highway and uses many of the plants and trails that run along the highway. He did not agree to be tape-recorded however he was willing to walk the highway and locate designated trails and plants. He offered many recommendations and alternatives to the road improvements.

David Sproat is the father of the executive director of the Waipā Foundation. He lends his assistance to the foundation. He was able to give insight into his use of the land when accompanied by *kupuna* (elder) from the area but because he did not live in the Lumahai to Wainiha vicinity he explained the territorial respect for land and gathering practices. He did not agree to a tape-recorded interview. He suggested speaking to his wife, Linda Sproat.

Linda Sproat is from a lineage that begins in Kaua`i starting in 12th century. Her ancestors came from Tahiti by canoe and landed in Kalalau on the Na Pali Coast. Her family's long and continued history stretched from Kalalau - Na Pali Coast to Kalihiwai Bay. She was able to tell of her ancestor's movement eastward and family knowledge of trails and fishing spots. She also suggested speaking to a 94 year old *kupuna*, Mama Ouye. She allowed the interview to be tape-recorded; however, there were technical difficulties preventing a successful recording.

Emma "Mama" Ouye is a 94 year old *kupuna* who has lived in the Hanalei area and has a "sharp memory." Several tries were made to meet with Mama O`i through her grandson Bruce, but her schedule did not permit the time.

Violet Goetta is a member of the Waipā Foundation and is a cultural practitioner in the area. Ms. Goetta gave an informal interview while pounding *poi* at the foundation weekly poi pounding function for the community. She frequently assist in the burial council of Kaua`i in making burial decisions on the land because of her knowledge of history of property ownership. Ms. Goetta and her children use the medicinal plants off of Kuhio Highway to treat their illnesses.

Auntie Kalahū is a member of the Waipā Foundation, cultural practitioner, and local taro farmer. She is an avid hiker and has used many of the trails off of Kuhio Highway for gathering rocks for *poi* pounders. Her grandmother shared many legends to her which she shared during an informal interview while pounding *poi* at the Waipā Foundation.

A listing and dates of the interviews is provided in Appendix A, Communication Logs.

3.0 RESULTS

Information from the interviews revealed extensive native gathering usage in the proposed project area. It also shed light on the legends of ancestors that protect the area. Each of the interviews stressed the importance of having permission from *kupuna* to extract resources from the land without harm to oneself.

3.1 TERRITORIAL RESPECT

The importance of territorial space to Native Hawaiians is based on respect. Each area of land contains specific resources for a particular area. It is common courtesy to have permission to gather these resources if you are not from the area.

David Sproat was the first to approach the subject of territorial respect for the *a`ina* (land). During the interview he stressed that his experience with gathering and exploring the area were very limited. It was only when he was invited and accompanied by *kupuna* of that *a`ina* that he felt comfortable fishing, hunting pigs, and gathering medicinal plants.

Even *kupuna* such as Auntie Kalahū, told me of a lesson she learned when out gathering rocks that could be made into *poi* pounders. As a little girl, her grandmother took her on the same trail to gather. Later on, after her grandmother had passed away, she and little Rickie went to collect the rocks for pounders. She remembered the trail and scenery exactly. After making a pile of collected rocks, she and little Rickie left the pile to search for more stones. When they returned to the location where the stack of stones had been, they were gone. Auntie Kalahū knew she was not welcome in this area without her grandmother and the spirits had taken the stones back because she did not have permission to take them.

3.2 GATHERING PRACTICES

Two informants related the importance of the area for collecting plants for medicine and *hula* implements and accessories. These informants collected from the their family's land surrounding their homes.

Jeff Chandler provides medicine to his family from the Blue Porterweed (*Stachytarpheta Jamaicensis*) that lines Kuhio Highway at mile marker 5.0 (Figure 2). Mr. Chandler pointed out the reduced amount of Blue Porterweed left as a product of the highway projects in the past. This is his primary access to medicine and has been for generations of his family. Like Violet Goetta's children, the blue weed is a substitute for penicillin. The blue weed can be chewed up and made into a paste to cover cuts and heal wounds. Mr. Chandler pointed out several other plants such as the *O`lauki* (*Chamaecrista Nictitans*) (Figure 3), *honohono (Commelina diffusa)*, and tea leaves. When Linda Sproat was younger she used the Lumahai to Wainiha area for gathering for hula utensils and accessories for *hula* performances. She does not see many of these plants anymore when she visits the area, nor does she feel comfortable gathering in the Lumahai area because she now resides in Kalihiwai and it would be disrespectful to the Lumahai to Wainiha area to collect here.

Figure 2. Blue Porterweed located at mile marker 5.0.

Figure 3. *O` lauki* located at mile marker 5.0.

3.3 HUNTING AND FISHING

Hunting and fishing is a primary means of food for local families, such as the Chandlers. The Chandler family hunts pigs and fishes off Kuhio Highway in the Lumahai and Wainiha vicinity. Along with the *poi* they receive from the Wāipa Foundation each Thursday, the meals at home are complimented with the hunted pig, and fish caught off the shore line below Kuhio Highway.

The "old road" now serves as the entrance to various pig hunting trails on the *mauka* side Kuhio Highway, approximately mile marker 6.2 (Figure 4). Jeff Chandler pointed this entrance out, which was open and visible far back. Upon driving the Kuhio Highway three days later, debris had been dumped in front of the entrance. Jeff mentioned the locals concerns, over tourists venturing off Kuhio Highway on to the trails because the access was very visible and worn-in.

Mr. Chandler is knowledgeable on the hunting and fishing trails because he and his extended family still used them. All the fishing trails began at the edge of Kuhio Highway and steeply lead down to the ocean (Figure 5). Jeff had just been down picking *Opihi* a few days before. He uses visual references points such as breaks in the cement masonry wall to locate the trails.

Figure 4. Entrance of the "old road".

Figure 5. Beginning of a fishing trail at mile marker 5.4.

4.0 SUMMARY AND DISCUSSION

The purpose of this cultural impact assessment was to determine what traditional practices have, or continue to have, taken place in the vicinity of Makahoa Point to Wainiha. Five interviews were conducted with cultural practitioners of the area and they agreed to allow the information compiled during the interviews for the purpose of this project.

The results of this study show that gathering, hunting, and fishing continue to be conducted by Native Hawaiians in the proposed project area, specifically off the *mauka* (mountain) and *makai* (ocean) sides of the highway. The cultural impact assessment conducted by Pacific Legacy determined that the trails and gathered plants will be impacted, if the proposed project requires the plants to be removed from the *makai* edge of the highway. However, the *mauka* side of Kuhio Highway has not been assessed to determine if the same medicinal plants gathered from the *makai* side are present on the opposite site. It is recommended that a botanist examine the *mauka* boundary of Kuhio Highway for the presence of these gathered plants. Since no construction work will take place on the *mauka* side of the highway, if the medicinal plants are present there, then this resource would still be available to Native practitioners.

No previous archaeological investigations have been recorded on the hunting and fishing trails mentioned. These trails will not be impacted and will remain accessible with the proposed project construction.

5.0 REFERENCES

Kwock Associates, Inc.
2000 Engineering Report for Kuhio Highway, Vicinity of Wainiha and Lumahai. Prepared for Kauai District Office, Highways Division, Department of Transportation, State of Hawaii.

APPENDIX A

PACIFIC LEGACY, INC.
Communication Logs

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Jeff Chandler **Contact's Phone Number and email:** 826-6295

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/08/2004	2:02pm		Left a message requesting to speak to Jeff regarding traditional native Hawaiian practices.
11/15/2004	7:00pm	Spoke to Linda Chandler. She said Jeff would like to talk and she took my number.	
11/16/2004	11:30am	Jeff and I sat down and went over the maps and project plans. He did not want to be taped recorded. We went on a drive down Kuhio Hwy. and stopped at the gathering places and trail entrances.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Lance Foster, OHA **Contact's Phone Number and email:** 594-1904

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
10/11/2004	1:20pm	After requesting contacts for the project interviews, Lance referred me to La France (808) 241-3390 for more contacts.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Violet Goetta **Contact's Phone Number and email:**

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/18/2004	9:00am	I met Auntie Vi at the Waipā Foundation Poi pounding. Her family has lived in the area for many generations and her children use the area.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: **Kuhio Hwy 1204.01**

Contact: Rodney Haruguchi **Contact's Phone Number and email:** H323-3565 W826-6202

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/08/2004	8:35am		Left a message w/ secretary.

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: **Kuhio Hwy 1204.01**

Contact: Ulu Hashimoto **Contact's Phone Number and email:** 808-826-0330

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/08/2004	2:12pm		Left a message asking for info on traditional Hawaiian cultural practices.

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Auntie Kalahu **Contact's Phone Number and email:**

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/18/2004	11:00am	Auntie Kalahu was introduced to me at poi pounding by Stacey Sproat. She is a 74 yr old *kupuna* and taro farmer.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: La France Kapaka-Arboleda, OHA **Contact's Phone Number and email:**241-3390

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
10/12/2004	10:00am	Requested a list of contacts for the CIA. La France took my email and phone number and said she would send them to me.	
11/10/2004	9:15am	I still have not gotten a response from La France.	
11/17/2004	9:30am	I went to the OHA office in Lihue but the office was closed.	Left a message for La France letting her know I came by and to return my call.
11/17/2004	2:00pm	La France returned my call. She suggested I talk to Auntie Violet Goetta.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Verdelle Lum **Contact's Phone Number and email:** W826-6253

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/08/2004	8:40am		Left a message w/ machine.
11/16/2004	10:00am	I wet to the Waioli Church and Verdelle directed me to Waipa Foundation.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Nancy McMahon **Contact's Phone Number and email:** 808-652-1510

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
10/13/2004	12:53		Left a message explaining the purpose of my call and asked her for contacts. Left office number to be contacted.
10/13/2004	2:07		Nancy returned my message and left the names of several contacts for the area.

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Rep. Hermina Morita **Contact's Phone Number and email:** W586-8435 repmorita@Capitol.hawaii.gov

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/03/2004	10:35am		Emailed Rep. Morita asking for information on Kuhio Hwy for the CIA.
11/08/2004	8:30am		Left a message on the machine.

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Emma Ouye **Contact's Phone Number and email:** 639-4589

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/16/2004	3:00pm		Left a message with Bruce, her grandson requesting to meet with her.
11/17/2004	9:00am		Tried to reach Bruce again. Left message.
11/17/2004	12:30pm	Bruce said he would try to set up a time to meet with her.	
11/18/2004	9:00am	She would not be available because she was going to day care.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: David Sproat **Contact's Phone Number and email:** 828-1424 Cell 651-1364

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/08/2004	8:45am	Spoke to a family member who directed me their daughter (Stacy) and gave me David's cell number.	
11/16/2004	1:00pm	David gave me a brief history of his wife's family and told me he does not use the project area because it is not in his *aina*, but he goes with other kapuna from the area, when invited.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Linda Sproat **Contact's Phone Number and email:** 828-1424

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/16/2004	1:45pm	I went to Linda's home for an interview about her family's history and knowledge of the project area.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Stacy Sproat **Contact's Phone Number and email:** stacy_sproat @hotmail.com
Cell 639-1815 Work 826-9969

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/03/2004	10:30am		Emailed Stacy asking for information regarding Kuhio Hwy CIA. Email failed to go through to address.
11/08/2004	2:00pm	Stacy was able to give me a brief summary of the native gathering activities, fishing trails, and access to rivers in the Lumahai area but she referred me to Jeff Chandler.	
11/16/2004	11:30am	I met Stacy at Waipa and she introduced me to Jeff Chandler and her father David Sproat.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Chipper Wichman **Contact's Phone Number and email:** H-826-9147 W 332-7324 ext. 240

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/08/2004	8:30am		Was unable to leave a message.
11/10/2004	8:40am		Left a message on his work answering machine.
11/10/2004	8:41am		Left a message on his home phone.
11/16/2004	10:30am	Spoke to his wife Hauoli. She took my number and was going to try and schedule an appointment with him this week.	
11/18/2004	12:00pm	Chipper did not have information regarding the project area. He was more familiar with the adjacent valleys.	

PACIFIC LEGACY
COMMUNICATION LOG

Project Name and Number: Kuhio Hwy 1204.01

Contact: Naomi Yokotake **Contact's Phone Number and email:** 826-6991

Recorder: Jessica Ah Sam

DATE	TIME	DISCUSSION	MESSAGES
11/08/2004	8:30am		Left a message on home machine.

APPENDIX F

Coordination, Comment and Response Letters

(Reserved for Final EA)